Open Source Used In Managed Services Accelerator Platform Services 3.6

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1.4 animal-sniffer-annotations 1.14

1.5 antisamy 1.5.3
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1.6 antisamy 1.5.7

1.7 apache-el 8.5.35.1
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1.8 archaius-core 0.7.6

1.9 asm 5.1

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1.10 asm 7.0
1.11 asm-analysis 7.0

1.12 asm-commons 7.0

1.13 asm-tree 7.0

1.14 asm-util 5.0.3

1.15 aspectj 1.9.2
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1.20 bcpkix-jdk15on 1.60

1.21 Beanshell 2.0b6

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People
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Markus Niedermann &lt;markus.niedermann@softwired-inc.com&gt; - porting information and restrictions when using the lightweight library with the MIDP environment.

Mike Benham &lt;moxie@thoughtcrime.org&gt; - detection and fixing of an incorrect weak key in the DES key generation support classes. Suggestions for simplifying DESedeParameter objects. Optimisations for the Blowfish engine and BufferedBlockCipher class.

Soren Hilmer &lt;hilmer@mail.tele.dk&gt; - initial implementation of netscape certificate request classes.

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<li>Bryan Lovquist <bkl@#064:cpms.com.au> - Other provider compatibility fixes for CMS signing.</li>
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<li>Chris Long &lt;aclong@#064:cecm.cm.edu&gt; - adding public key decoding to PEMReader.</li>
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<li>Jiri Urbanec &lt;jiri.urbanec@#064:logicacmg.com&gt; - patch to fix defect in DERSBMPString.equals().</li>
<li>Justin Kolb &lt;jkolb@#064:pristx.com&gt; - patch to DSA signature generation in OpenPGP. Fix for the unexpected "Unexpected end of ZLIB input stream" exception.</li>
<li>Ralf Hauser &lt;ralhauser@#064:gmx.ch&gt; - patch to exception handling in PublicKeyRing. PEMReader, 1.4 build script, X509 Certificate Factory, CertPathValidatorUtilities, fromAddress null check in SignedMailValidator.</li>
<li>Michal Dvorak &lt;M_Dvorak@#064:kbc.cz&gt; - getNextUpdate patch for OCSP SingleResp.</li>
<li>Olivier Refalo &lt;Olivier_Refalo@#064:forisp.com&gt; - array fix in PGP PublicKeyEncSessionPacket.</li>
<li>Mariusz Bandola &lt;mariusz.bandola@#064:cryptotech.com.pl&gt; - patch to DERGeneralizedTime. Compliance patch for OCSP TBSRequest class. Patch to X509Name for delaing with general objects in sequences.</li>
<li>Brien Oberstein &lt;brien.oberstein@#064:transacttools.net&gt; - patch to S2K algorithm in OpenPGP, initial PGP version 3 secret key support, initial PGP version 3 signature generation, RIPEMD160 addition to PGPUtl.</li>
<li>Jan Haywood &lt;iian@#064:haywood.bpa.nu&gt; - addition of getSignatureType to PGPSignature.</li>
<li>Jonathan Edwards &lt;j34gull@#064:mac.com&gt; - initial support for reading multiple rings from a PGP key file.
Andrew Thornton <andrew@#064caret.cam.ac.uk> - patch for RSA PUBLIC KEY in PEMReader.

Gregor Leander <g@#064bos-bremen.de> - initial parsing of multiple sequence entries in an X.500 Name.

Antoon Bosselaers <Antoon.Bosselaers@#064sat.kuleuven.ac.be> - help with RipeMD320 implementation.

Peter Sylvester <Peter.Sylvester@#064edelweb.fr> - improvements to the ASN.1 BasicConstraints object.

Doug <unnmmmm@#064myrealex.com> - addition of isEncryptionKey method to OpenPGP public keys.

Francois Staes <fstaes@#064netconsult.be> - improvements to DEBitString, DERGeneralizedTime and initial implementation of DERGeneralString, addition of settable signed content info to CMSSignedDataGenerator, patch to DH key agreement.

W.R. Dittmer <wdittmer@#064cs.vu.nl> - patch to decoding of SignatureCreationTime in BCPG. Patch to PGPKeyPair to fix nullpointer exception.

Perez Paz Luis Alberto <laperdez@#064banxico.org.mx> - patch to use of BitString in X.500 name.

James Wright <James_Wright@#064harte-hanks.com> - patches for dealing with "odd" ArmoredInputStreams.

Jim Ford <jim@#064murford.com> - patch to PGPSecretKey to avoid null pointer exception on encoding secret keys, comments on KeyExpirationTime, getBitStrength for ElGamal keys. Signature creation time patch for newly created v4 signatures.

Michael Hausler <haeusler@#064ponton-consulting.de> - extra aliases for provider.

Sai Pullabhotla <psai@#064linoma.com> - fix to PGP compressed data generator to improve compression levels. Performance improvements for KeyBasedLargeFileProcessor.

Joseph Miller <joseph@#064digiweb.net.nz> - addition of ZeroBytePadding.

Lars <xzy@#064sugemdenmark.dk> - patch to explicit padded mode for CBC block cipher MAC.

Jeroen van Vianen <jeroen@#064vanvianen.nl> - the Signed and Encrypted mail example.

Jun Sun <JSun@#064diversinet.com> - patch to SecureRandom to work around problem in wtk 1.0.4 and wtk 2.1.

Petrayukem <sp dukem@#064email.cz> - patch to CMSSignedDataGenerator to allow it to work with PKCS11 providers.

Filipe Silva <filipe.silva@#064wedoconsulting.com> - patch to fix overead issue in BCPGInputSteam.

Alpesh Parmar <alps@#064linuxmail.org> - patch for class cast problem in PGPPublicKey.getSignatures().

Jay Gengelbach <jengelbach@#064webmethods.com> - patch to fix isSigningKey in PGPSecretKey class, patch to hashedPackets in PGP signatureGenerator, initial cut for indefinite length output.

Doug <doug@#064tigerprivacy.com> - public key ring patches for ElGamal Signatures, problem key ring data.

Matthew Mundy <mmundy1@#064umbc.edu> - infinite loop prevention patch to PKCSSS2ParametersGenerator.

Tom Cargill <cargill@#064profcon.com> - spelling patch in provider.

Breitenstrom Christian <C.Breitenstrom@#064t-systems.com> - compatibility patch to SignaturePacket, DetachedSignatureProcessor.

Zanotti Mirko <zanotti@#064cad.it> - patch to ordered equality test for X509Name.

Nicola Scendoni <ncsendoni@#064babels.it> - patch to add sorting to CertPath validation.


Bruce Gordon <bruce.gordon@#064savvis.net> - patch to secret key creation encoding NullPointerException in OpenPGP, speed up for BCPGInputSteam.

Miles Whiteley <Miles.Whiteley@#064savvis.net> - "223" fix for BCPGInputSteam new packets.

Albert Moliner <amoliner@#064evintia.com> - initial TSP implementation.

Carlos Lozano <carlos@#064evintia.com> - initial TSP implementation, patch to SignerInformation for
supporting repeated signers, initial updates for supporting repeated attributes in CMS.</li>
<li>Javier Delgadillo <javi@064javi.codewarp.org> - initial Mozilla PublicKeyAndChallenge classes.</li>
<li>Joni Hahkala <joni.hahkala@064cern.ch> - initial implementations of VOMS Attribute Certificate Validation, IetfAttrSyntax, and ObjectDigestInfo. We also wish to thank the a href="http://www.eu-egee.org" EGEE project</a> for making the work available.</li>
<li>Roleg Schillinger <rolf@064sir-wum.de> - initial implementation of Attribute Certificate generation.</li>
<li>Sergey Bathin <Sergey_Batin@064yahoo.com> - fix for recovering certificate aliases in BKS and UBER key stores. Initial implementations of GOST-28147, GOST-3410, EC GOST-3410, GOST OFB mode (GOFB) and GOST-3411.</li>
<li>Frant Leory <Frant.Leroy@064keynectis.com> - ANS.1 set sorting. Contributions to TSP implementation. Test vectors for Bleichenbacher's forgery attack.</li>
<li>Atsuhiyo Yamanaka <ymnk@064jcraft.com> - patch for improving use of Montgomery numbers in BigInteger library. Patch to use size of private exponent in DH parameters.</li>
<li>Nickolay Bolshakov <tyrex@reksoft.ru> - patch for class cast exception in AuthorityInformationAccess class.</li>
<li>Soren Hilmer <soren.hilmer@064tietoenantor.com> - patches for CertID with issuerSerial set in TSP implementation, additional compliance testing.</li>
<li>Steve Mitchell <mitchell@064intertrust.com> - patch for stateful path validator fix. Patch to allow BigInteger class to create negative numbers from byte arrays. Additions to allow different providers to be used for asymmetric/symmetric encryption in OpenPGP.</li>
<li>Optimisation to avoid redundant verification in path validator. Suggestion to use PKIXParameters.getSigProvider() correctly.</li>
<li>Dirk Eisner <D.Eisner@064seeburger.de> - initial implementation of ISO 78164-4 padding.</li>
<li>Julien Pasquier <julienpasquier@064free.fr> - initial implementation of attribute classes from RFC 3126. Fix to KEKIdentifier, OtherKeyAttribute parsing. Initial ContentHints class.</li>
<li>Matteo <matartuso@064libero.it> - sequence patch to ASN1Dump.</li>
<li>Andrew Paterson <andrew.paterson@064burnsec.com> - patches to PGP tools, isRevoked method on PGPPublicKey.</li>
<li>Vladimir Molotkov <vladimir.n.molotkov@064intel.com> - extensive provider exception handling compliance testing.</li>
<li>Florin Kollan <adlocflo@064web.de> - fix to ElGamalKeyParameters equality testing.</li>
<li>Pavel Vassiliev <paulvas@064gmail.com> - Initial GOST28147Mac implementation.</li>
<li>Tom Pesman <tom@064tnux.net> - addition of DES-ED5 encryption for RSAPrivate keys to PEMWriter.</li>
<li>Lukasz Kowalczyk <lukasz.b.kowalczyk@064gmail.com> - patch to fix parsing issue with OpenSSL PEM based certificate requests.</li>
<li>Arndt Hasch <Arndt.Hasch@maxence.de> - additional fix for partial reading with new style PGP packets.</li>
<li>Fx Bernd (KCDP 11) <berndfix@064credit-suisse.com> - fix for 31 byte issue and exception throwing by Whirlpool.</li>
<li>David M. Lee <dmlee@064crossroads.com> - code for add and remove secret key in the PGPSecretKeyRing class. Additions to S/MIME and CMS unit tests.</li>
<li>Mike Dillon <md5@064embody.org> - additional checks for PGP secret and public key construction, patches to copyWithNewPassword.</li>
<li>tu-vi cung <t2cung@064hotmail.com> - patch for out of bounds problem in getDecoderStream method.</li>
<li>Chris Schultz <eschultz@064gmail.com> - fix for InputStream constructor for X509V2AttributeCertificate.</li>
<li>David M. Lee <dmlee@064crossroads.com> - implementation assistance with streaming CMS classes.</li>
<li>Joel Rees <rees@064ddcom.co.jp> - fix to correct getOID methods from returning same set on X.509 attribute
certificates.

- Francesco Sau <francesc.sau@#064partners.netfocus.es> - micro fix for tsp Accuracy class.
- Larry Bugbee <larry.bugbee@#064mac.com> - initial ECNR implementation.
- Remi Blancher <remi.blancher@#064keynectis.com> - Contributions to TSP implementation. Initial implementation of RFC 3739 and ICAO ASN.1 classes.
- Brian O'Rourke <brianorumke@#064gmail.com> - patch for signature creation time override in OpenPGP.
- Andreas Schwier <andreas.schwier@#064cardcontact.de> - initial implementation of ISO9797 MAC Algorithm 3, addition of DES-EDC 64 MAC to the provider, fix to EC point encoding, addition of EC and RSA-PSS OIDs to CMS, addition of AES-CMAC and DESede-CMAC to JCE provider.
- David Josse <david.josse@#064transacttools.net> - Patch for trailer function in version 2 signature packets.
- Kishimoto Kazuhiko <kazu-k@#064hi-ho.ne.jp> - RFC 3280 updates to policy processing in the CertPath validator. Additional test data not covered by NIST.
- Lawrence Tan <lwrnctan@#064gmail.com> - Large field OID sample test data. Missing key types in JDKKeyFactory.
- Carlos Valiente <superdupont@#064gmail.com> - Addition of CRL writing to the PEMWriter class.
- Olaf Keller, <olaf.keller.bc@#064bluewin.ch> - initial implementation of the elliptic curves over binary fields F2m. Additional tests and modifications to elliptic curve support for both F2m and Fp. Performance improvements to F2m multiplication. Initial implementation of WNAF/WTNAF point multiplication. Improvement to k value generation in ECDSA.
- J&ouml;r&ouml;g Eichhorn <eichhorn@#064ponton-consulting.de> - patch to fix EOF read on SharedFileInputStream, support for F2m compression.
- Karsten Ohme <widerestand@#064t-online.de> - initial check against for out of range data on non byte aligned RSA keys. Addition of equals/hashCode on ECCurve.Fp. Additional curve type support for Fp, contributions to F2m compression. F2m decoding for ECPointUtil. Infinity fix and prime192v2 fix for Fp. Extra validation for RSA key creation. Fix to name typos for some OpenSSL key generators. RFC-1779 table, improved RFC 2253 compliance for X509Name. Additional constructor validation for X.509/ESS ASN.1 classes. Validation for Printable, IA5, and Numeric Strings. Support for surrogate pairs in DERUTF8String, DER UTF8 test. Additional X.509 name attributes for ISIS-MTT, RFC 3039, addition of indirect CRL support, initial X509 LDAP CertStore implementation, CertificatePair class, and X509CertificatePair class. Contributions to X509Store/Parser infrastructure and design. CertPath support for implicit DSA parameters and a range of NameConstraints. Addition of support for V1 attribute certificates and attribute certificate path validation. Initial classes for ASN.1 ISIS-MTT support. Enhancements for improving compliance with the NIST CertPath tests.
- Carlos Lozano Ruiz <carlos@#064tradise.com> - patch for <ctrl><m> only handling in CRLFOutputStream.
- John Alfred Prufrock <j.a.prufrock@#064gmail.com> - mods to GOST-3411 and MD2 to support ExtendedDigest.
- Stefan Neusatz Guilhen <sneusatzat#064gmail.com> - initial version of RoleSyntax, improvements to AttributeCertificateHolder and AttributeCertificateIssuer.
- Marzio Lo Giudice <marzio.logiudice@#064gmail.com> - fix to endianess in KDF2BytesGenerator, additional KDF2 tests.
- Georg Lippold <georg.lippold@#064gmx.de> - initial implementation of NaccacheStern cipher.
- Chris Viles <chris_viles@#064yahoo.com> - fix to SignatureSubpacket critical bit setting.
- Pasi Eronen <Pasi.Eronen@#064nokia.com> - extra toString() support for ASN.1 library. Initial patch for large OID components.
- Lijun Liao <lijun.liao@#064rub.de> - performance enhancements for SHA family of digests. Bug report and
patch for blank line handling in ArmoredInputStream.

- Maria Ivanova <maria.ivanova#064gmail.com> - support for tags > 30 in ASN.1 parsing.
- Armin Hämmerling <armin.haemail#064student.ethz.ch> - first cut of internationalisation, initial PKIX validation classes.
- Marius Schilder <mgschilder#064google.com> - main set of test vectors for Bleichenbacher's forgery attack.
- Xavier Le Vourch <xavier#064brittanysoftware.com> - general code clean ups.
- Erik Tews <e_tews#064cdc.informatik.tu-darmstadt.de> - initial threaded random seed generator, constant-time PKCS#1.5 decodings.
- Thomas Dixon <reikomusha#064gmail.com> - initial implementations of TEA/XTEA, Salsa20, ISAAC, and Noekeon. XTEA enhancements.
- Frank Cornelis <info#064frankcornelis.be> - addition of crlAccessMethod in X509ObjectIdentifiers.
- Rui Joaquim <rjoaquim#064cc.isel.ipl.pt> - initial implementation of RSA blinding for signatures.
- David Stacey <d_stacey#064allantgroup.com> - addition of trust packet checking on revocation signatures in PGPSecretKeyRing.
- Martijn Brinkers <list#064mitm.nl> - better exception handling in CMS enveloping, "just in time" modifications for CRL and Sequence evaluation.
- Julius Davies <juliusdavies#064gmail.com> - additional modes and algorithm support in PEMReader.
- Matthias <g#064rtner.de> - GnuPG compatibility changes for PBFileProcessor.
- Olga Kaudt <olga.kaethler#064jaekhlp-consulting.com> - initial implementation of TeleTrusT EC curves, additional ISO 9797 MACs, contributions to EAC OIDs, addition of EAC algorithms to CMS Signing.
- Germano Rizzo <germanorizzo#064gmail.com> - initial implementation of CMac, EAX, HC-128, and HC-256, optimisations for Salsa20.
- Janis Schuller <js#064tzi.de> - addition of NotationData packets for OpenPGP.
- Michael Samblanet <mike#064samblanet.com> - patches towards improved Sun/default provider support in CMS.
- Mike StJohns <mstjohns#064 Comcast.net> - patches for supporting empty subject in X.509 certificate generation, noneWithECDSA.
- Ramon Keller <ramon.keller#064gmz.ch> - patch to deal with null revocations return from other CRL in X509V2CRLGenerator.
- Mark Nelson <mark#064nhr.com> - correction to excluded DN in name constraints processing for PKIX processing.
- Eugene Golushkov <eugene_gff#064ukr.net> - mask fix to single byte read in TlsInputStream.
- Julien Pasquier <julienpasquier#064free.fr> - additional classes for supporting signature policy and signer certificates in the ASN.1 esf and ess libraries.
- Peter Knopp <pknopp#064mtg.de> - fix for named curve recognition in ECGOST key generation.
- Jakub Gwozdziuk <gwozdziu#064pg.pl> - addition of getTsa() to TimeStampTokenInfo.
- Bartosz Malkowski <bmalkow#064tigase.org> - initial implementation of VMPC cipher, VMPCRandomGenerator, VMPCMac.
- Tal Yacobi <tal.yacobi#064octavian-tech.com> - fix for issue in OpenPGP examples [#BJA-55].
- Massimiliano Ziccardi <massimiliano.ziccardi#064gmail.com> - support for counter signature reading in CMS API, update for multiple counter signature attributes.
- Andrey Pavlenko <andrey.a.pavlenko#064gmail.com> - security manager patch for PKCS1 Encoding property check.
- Mike StJohns <mstjohns#064 Comcast.net> - updates to KeyPurposeId.
- J Ross Nicoll <jrn#064jrn.me.uk> - improved exception handling for getInstance() in ASN.1 library.
Matthew Stevenson <mavricknz@064yahoo.com> - patch to constructor for CRMF CertSequence.

Gabriele Contini <gcontini@064hotpop.com> - identified a bug in ASN.1 library with handling of unterminated NDEF's.

Roelof Naude <roelof.naude@064epiuse.com> - patch for TLS client to send empty client certs in response to HP_CERTIFICATE_REQUEST.

Patrick Peck <peck@064signaturen.at> - identified problem with DERApplicationSpecific and high tag numbers in ASN.1 library.

Michael LeMay <lemaymd@064lemaymd.com> - identified problem with EAX [#BJA-93].

Alex Dupre <ale@064FreeBSD.org> - fix to use of Signature rather than SignatureSpi in provider [#BJA-90].

Addition of null provider use to SignedPublicKeyAndChallenge and PKCS10CertificationRequest [#BJA-102]

Michael Schoene <michael@064sigrid-und-michael.de> - fix of improper handling of null in ExtendedPKIXParameters.setTrustedACIssuers(), check for V2 signingCertificate attribute in TimeStampResponse.validate().

Ion Larrañaga <ilarra@064s21sec.com> fix to default partial packet generation in BCPGOutputStream.

Bob Kerns <bob.kerns@064positscience.com> fix to hashCode for X509CertificateObject.

Stefan Meyer <stefan.meyer@064ewe.de> backport for PKIXCertPathValidotor and SMIMESignedMailReviewer.

Robert J. Moore <Robert.J.Moore@064allanbank.com> speedups for OpenPGPCFB mode, clean room JCE patches.

Rui Hodai <rui@064po.ntts.co.jp> speed ups for Camellia implementation, CamelliaLightEngine.

Emir Bucalovic <emir.bucalovic@064mail.com> initial implementation of Grain-v1 and Grain-128.

Torbjorn Svensson <tobbe79@064gmail.com> initial implementation of Grain-v1 and Grain-128.

Paul FitzPatrick <bouncycastle_pfitz@064fitzpatrick.cc> error message fix to X509LDAPCertStoreSpi, comparison fix to BCStrictStyle.

Henrik Andersson <h.enrik.andersson@064gmail.com> addition of UniqeIssuerID to certificate generation.

Cagdas Cirit <cagdascirit@064gmail.com> subjectAlternativeName fix for x509CertStoreSelector.

Harakiri <harakiri_23@064yahoo.com> datahandler patch for attached parts in SMIME signatures.

Pedro Henriques <p.mahenriques@064gmail.com> explicit bounds checking for DESKeyGenerator, code simplification for OAEPEncoding.

Lothar Kimmeringer <job@064kimmeringer.de> verbose mode for ASN1Dump, support for DERExternal.

Richard Farr <rfarr.se@064gmail.com> initial SRP-6a implementation.

Thomas Castiglione <castiglione@064au.ibm.com> patch to encoding for CRMF OptionalValidity.

Elisabetta Romani <eromani@064sogei.it> patch for recognising multiple counter signatures.

Robin Lundgren <r737lundgren@064gmail.com> CMPCertificate constructor from X509CertificateStructure fix.

Petr Kadleč <smormegil@064centrum.cz> fix to sign extension key and IV problem in HC-128, HC-256.

Andreas Antener <antener.a@064gmx.ch> fix to buffer reset in AsymmetricBufferedBlockCipher.

Harendra Rawat <hsrawat@064yahoo.com> fix for BERConstructedOctetString.

Rolf Lindemann <lindemann@064trustcenter.de> patch for PKCS12 key store to support more flexible attribute specifications [#BMA-42].

Alex Artamonov <alexart.home@064gmail.com> name look up patch for GOST-2001 parameters.

Mike Lyons <mlyons@064layer7tech.com> work arounds for EC JDK bug 6738532 and JSSE EC naming conventions.

Chris Cole <chris_h_cole@064yahoo.com> identified a problem handling null passwords when loading a BKS keystore.
Tomas Krivanek <tom@064attack.cz> added checking of Sender header to SignedMailValidator.

Michael <emfa@064t-online.de> correction of field error in getResponse method in CertRepMessage.

Trevor Perrin <trevor@064cryptography.com> addition of constant time equals to avoid possible timing attacks.

Markus Kil<arings@markus@064primekey.se> several enhancements to TimeStampResponseGenerator.

Dario Novakovic <darionis@064yahoo.com> fix for NPE when checking revocation reason on CRL without extensions.

Michael Smith <msmith@064cbnco.com> bug fixes and enhancements to the CMP and CRMF classes, initial Master List classes.

Andrea Zilio <andrea.zilio@064gmail.com> fix for PEM password encryption of private keys.

Alex Birkett <alex@064birkett.co.uk> added support for EC cipher suites in TLS client (RFC 4492) [#BJA-291].

Wayne Grant <waynedgrant@064gmail.com> additional OIDs for PCKS10 and certificate generation support.

Frank Cornelis <info@064frankcornelis.be> additional support classes for CAdES, enhancements to OCSP classes.

Jan Dittberner <jan@064dittberner.info> addHeader patch for SMIME generator.

Bob McGowan <boab.mcgoo@064tiinternet.com> patch to support different content and mgf digests in PSS signing.

Ivo Matheis <i.matheis@064seeburger.de> fix to padding verification in ISO-9796-1.

Marco Sandrini <nessche@064gmail.com> patch to add IV to ISO9797AlgMac.

Alf Malf <alfmalf@064hotmail.com> removal of unnecessary limit in CMSContentInfoParser.

Alfonso Massa <alfonso.massa@064insiel.it> contributions to CMS time stamp classes.

Giacoamo Boccardo <gboccardo@064unimaticaspa.it> initial work on CMSTimeStampedDataParser.

Arnis Tartu <arnis@064ut.ee> patches for dealing with OIDs with specific key sizes associated in CMS.

Janusz Sikociiski <j.sikociiski@064gdzie.pl> addition of Features subpacket support to OpenPGP API.

Juri Hudolejev <jhudolejev@064gmail.com> JavaDoc fix to CMSSignedDataParser.

Liane Velten <liane.velten@064hjp-consulting.com> fine tuning of code for DHParameters validation.

Shawn Willden <swilden@064google.com> additional functionality to PGPKeyRing.

Atanas Krachev <akrachev@064gmail.com> added support for revocation signatures in OpenPGP.

Mickael Laiking <mickael.laiking@064keynectis.com> initial cut of EAC classes.

Tim Buktu <tbuktu@064hotmail.com> Initial implementation of NTRU signing and encryption.

Bernd <bernd@064gmail.com> Fix for open of PGP literal data stream with UTF-8 naming.

Steing Inge Morisbak <stein.inge.morisbak@064BEKK.no> Test code for lower case Hex data in PEM headers.

Andreas Schmid <andreas.schmid@064tngtech.com> Additional expiry time check in PGPPublicKeys.

Phil Steitz <phil.steitz@064gmail.com> Final patch eliminating JCE dependencies in the OpenPGP BC classes.

Ignat Korchagin <ignat.korchagin@064gmail.com> Initial implementation of DSTU-4145-2002, long hash fix for DSTU-4145-2002.

Petar Petrov <p.petrov@064bers-soft.com> Testing and debugging of UTF-8 OpenPGP passwords.

Daniel Fitzpatrick <daniel.f.nwr@064gmail.com> Initial implementation of ephemeral key support for IES, initial implementations of RSA-KEM and ECIES-KEM, initial implementation of homogeneous projective coordinates for EC.

Andy Neilson <Andy.Neilson@064quest.com>a further patches to deal with multiple providers and PEMReader.

Ted Shaw <xiao.xj@064gmail.com> patch to MiscPEMGenerator for handling new PKCS10CertificationRequests.
Eleriseth - speed up for SIC/CTR mode. Provider compatibility generalisations for EC operations.

Kenny Root - patch for issuerAltName, subjectAltName support in X509CertificateObject, BaseBlockCipher.getIV() patch for AEAD.

Maarten Bodewes - initial implementation of HKDF and NIST SP 800-108 MAC based KDF functions.

Philip Clay - Initial implementation of J-PAKE.

Brian Carlstrom - compliance patches for some JCA/JCE keystore and cipher classes, miscellaneous code quality improvements, initial provider PBKDF2WithHmacSHA1 SecretKeyFactory.

Samuel Lidéacte - patch to add DSTU-4145 to DefaultSignatureAlgorithmFinder.

Sergio Demian Lerner - pointing out isInfinity issue in ECDSASigner signature verification.

Tim Whittington - patch to remove extra init call in CMac, additional of Memable interface for Digest classes, initial implementation of GMAC, further correctness tests for IV and reset processing in OCB, CCM, and block cipher reset. Initial implementation of Skein, XSalsa20, ChaCha, reduced round Salsa20, Threefish, and the Poly1305 MAC. Documentation updates. Added OCB support to Noekeon and CAST6 in the provider, exception testing for CTS, optimisations for CCM, provider support for AAD cipher methods, safe CipherInput/OutputStream implementations for use with AAD and subsequent bug fixes, cleanup after IDEA patent expiry, work on JCE SipHash support, optimisations for AESFastEngine, further work on EncodableDigest for SHA-2 digests, contributions to BCrypt/OpenBSDBCrypt, PGP API documentation and code quality work.

Marcus Lundblad - patch for working around JDK jarsigner TSP bug, optional setting of IssuerSerial in TimeStampTokenGenerator, additional extensions enhancement for time stamp token generation.

Andrey Zhozhin - patch for override of TSP SignerInfo attributes.

Sergey Tiunov - initial cut of DVCS classes.

Daniele Ricco - initial implementation of EC keys for OpenPGP and RFC6637 support.

Matti Aarnio - tweaks to any build to remove dependence on shell scripts. Initial SM3 digest implementation, some EC related code cleanups, JavaDoc improvements for ASN.1 classes.

Babak Najafi - fixes to OpenPGP NotationData to prevent truncation problems.

Eric Müller - additional standard algorithm name lookups in JcaPEMKeyConverter.

Mathias Herberts - fix to inOff usage in RFC3394WrapEngine.

Daniil Ivanov - addition of provider support for GOST HMAC SecretKeyFactory.

Daniele Grasso - contributions to final Key calculation code for SRP6.

Andrey Utkin - patch to reconstruction of ECGOST keys from PrivateKeyInfo objects in provider classes.

Arnis Tartu - checker for generated key vs OID in JceCMSContentEncryptorBuilder.

AxelVDB - initial implementation of Shacal2.
<li>Roberto Tyley <> further work on completing gradle build.</li>
<li>Waldemar Dick <wdick@064devmue.de> code improvement in x500 ASN.1 package.</li>
<li>Sid Steward <sid.steward@064pdfblabs.com> code improvements to ASN1Boolean.</li>
<li>Alex Klyubin <klyubin@064goolge.com> AlgorithmParameters check for EC key agreement.</li>
<li>Jonathan Gillett <gsoc.student@064gmail.com> Initial support for block cipher IVs in ISESEngine, IES MAC length check bug fix.</li>
<li>Andreas Reiter <andreas.reiter@064iaik.tugraz.at> Reported incomplete status of CertificateVerify processing in (D)TLS server, and provided fix.</li>
<li>Kieran Miller <kieran.miller@064gmail.com> initial implementation for RFC 5649 key wrap with padding.</li>
<li>Oliver Ehli <ehli@064arago.de> Additional support for BSI plain ECDSA in the provider.</li>
<li>Daniel Heldt <Daniel.Heldt@064cryptovision.com> Initial support for encodable state message digests.</li>
<li>Robert Bushman <bouncycastle@064traxel.com> Clean up of DirectKeySignature example.</li>
<li>Maurice Aarts <maars@064risecure.com> updated to KDF generator to follow NIST SP 800-108.</li>
<li>Fransziskus Kiefer <https://github.com/franziskuskiefer> initial implementation of Cramer-Shoup.</li>
<li>KB Sriram <mail_kb@064yahoo.com> testing for odd encodings for PGP User Attribute Subpackets.</li>
<li>Marco Schulze <marco@064nightlabs.de> Reported verification bug in GenericSigner.</li>
<li>Andreas Reiter <andreas.reiter@iaik.tugraz.at> Reported incomplete status of CertificateVerify processing in (D)TLS server, and provided fix.</li>
<li>Kieran Miller <kieran.miller@064gmail.com> initial implementation for RFC 5649 key wrap with padding.</li>
<li>Oliver Ehli <ehli@064arago.de> Additional support for BSI plain ECDSA in the provider.</li>
<li>Daniel Heldt <Daniel.Heldt@064cryptovision.com> Initial support for encodable state message digests.</li>
<li>Robert Bushman <bouncycastle@064traxel.com> Clean up of DirectKeySignature example.</li>
<li>Maurice Aarts <maars@064risecure.com> updated to KDF generator to follow NIST SP 800-108.</li>
<li>Fransziskus Kiefer <https://github.com/franziskuskiefer> initial implementation of Cramer-Shoup.</li>
<li>KB Sriram <mail_kb@064yahoo.com> testing for odd encodings for PGP User Attribute Subpackets.</li>
<li>Marco Schulze <marco@064nightlabs.de> Reported verification bug in GenericSigner.</li>
<li>Andreas Reiter <andreas.reiter@iaik.tugraz.at> Reported incomplete status of CertificateVerify processing in (D)TLS server, and provided fix.</li>
<li>Kieran Miller <kieran.miller@064gmail.com> initial implementation for RFC 5649 key wrap with padding.</li>
Sergio Giro <sgiro@064google.com> Fixed adding of additional stores from CRL distribution point [#BJA-537]. Fixed missing null check for CRL certificate issuer [#BJA-538], removal of risky zeroisation code in PBE.java, check for salt in PBKEss that require it.

bschuette=https://github.com/bschuette> Fixed typo in DefaultSignatureAlgorithmIdentifierFinder, additional methods on CMSSignedDataParser.

Leonard Dallot=https://github.com/dallotTazTag> Fix to S2K usage of none on changing passwords on keys without passwords originally.

Jan Willem Janssen <j.w.janssen+bouncycastle@064xtreme.nl> Support for DSAParameters in lightweight SubjectPublicKeyInfoFactory, initial content signer verifier for BC lightweight EC.

Sebastian Oerding <sebastian.oerding@robotron.de> Fixes to toString() in x509.CertificatePolicies.

Kai Kramer <kai.kramer@064gmail.com> Code to deal with orphaned chain certificates in the PKCS#12 KeyStore.

Benoit Charles <benoit.charles@064opentrust.com> Fix for IES data length check on decryption.

Niko <nfink95@064gmail.com> fix to cast issue in getOutputSize() for ECIES.


Matthias Edelhoff <Matthias.Edelhoff@064cryptovision.com> BasicConstraintsValidation pathlen fix in PKIX certpath classes.

Lukasz Deputat <lukasz.deputat@064gmail.com> Fixed bugs in TlsUtils read methods [#BJA-592].

Justin Ludwing <https://github.com/justinludwig> Iterator fix for PGPObjFactory to handle stream packets at start of iterated data.

Andréacutenguel <https://github.com/aberenguel> Fix to include ECNamedCurveSpec in EC AlgorithmParameterSpi.

Slawomir Jaranowski=https://github.com/slawekjaranowski> Patch to make cipher/hash/signature name methods in PGP internal API public.

Andrey Vasilyev=https://github.com/andrey-vasilyev> Initial implementation of GOST R 34.11-2012.

William Glanton <wglanton77@064gmail.com> Fixed bug in Poly1305 [#BJA-620].

jdvorak001=https://github.com/jdvorak001> Speed improvements for ASN.1 ObjectIdentifier cache.

Joseph Naegle <jnaegle@grierforensics.com> Patch for handling multiple certificates in a DANE SMIMEA entry.


The Google Security Team (Project Wycheproof) <https://github.com/google/wycheproof> defect analysis and additional test cases for the provider.

The Intel Security Team <> analysis detecting the issue with AESFastEngine (CVE-2016-1000339), additional suggestions for improvement to hardening of AESEngine.

## 1.24 bouncycastle 1.60

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1.25 byte-buddy 1.9.7

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```java
import net.bytebuddy.asm.Advice;
import net.bytebuddy.build.HashCodeAndEqualsPlugin;
import net.bytebuddy.build.InstrumentationPlugin;
import net.bytebuddy.description.type.TypeDescription;
import net.bytebuddy.implementation.bytecode.StackSize;
import net.bytebuddy.implementation.loops.CFof;
import net.bytebuddy.matcher.NameMatching;
```

```java
1.25 byte-buddy 1.9.7
1.25.1 Available under license:

```
getParameters2()Lnet/bytebuddy/description/method/ParameterList;UV/W.net/bytebuddy/description/method/ParameterListYsize[1Zjava/lang/Void^TYPELjava/lang/Class;`a_b
represents(Ljava/lang/reflect/Type;)Zde7f
C\indexisCopyingArgumentsprepare((Lnet/bytebuddy/jar/asm/MethodVisitor;)I#net/bytebuddy/jar/asm/MethodVisitor
visitVarInsnInsn(II)Vop
qSINGLE1Lnet/bytebuddy/implementation/bytecode/StackSize;st<uZEROwt
<xiterator()Ljava/util/Iterator;z[Ljava/lang/Object;5net/bytebuddy/description/method/ParameterDescriptionertype()Lnet/bytebuddy/description/type/TypeDescriptionSGeneric;
asErasure2()Lnet/bytebuddy/description/type/TypeDescription;
getDescriptor()Ljava/lang/String;net/bytebuddy/jar/asm/Type0(Ljava/lang/String;)Lnet/bytebuddy/jar/asm/Type;
getOpcode+
getOffset19maximumd(Lnet/bytebuddy/implementation/bytecode/StackSize;)Lnet/bytebuddy/implementation/bytecode/StackSize;
<
stackSizeLnet/bytebuddy/jar/asm/Type;parameterDescription7Lnet/bytebuddy/description/method/ParameterDescription;
methodVisitor%Lnet/bytebuddy/jar/asm/MethodVisitor;equals(Ljava/lang/Object;)Zjava/lang/Object getClass()Ljava/lang/Class;
hashCodeCodeLineNumberTableLocalVariableTableLocalVariableTypeTable	SignatureInnerClasses SourceFileRuntimeVisibleAnnotations!
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%01 !NOP+U*-T*-X]`*5cg`*Ah`*Mcg`%&"9(D)T%U !UiOjR.l !kl*-TE+r+:*-3*5:?*AGK`M:?`rvMyM*-X]N--+:r+6*-3*5:?*AGK`M:_?`r,Mr.?V9:;#<0=;;D;G?NARCuDEFGHIJFKLM>Ktduz !Rt(*++*+12

1.26 byte-buddy-dep 1.9.7

1.27 byte-buddy-dep 1.8.22

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2
"X!YZ![!]^`_!abc
_d!eZ!Zghijk!lbim
no_p_qhrstuvwxyz{
1.28 cassandra-driver-core 3.6.0

1.29 cassandra-lucene-index-builder 3.10.0

:3.10.0

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1.30 cassandra-migration-tool 3.1.0.0

1.31 cglib 3.2.10
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*/
package org.checkerframework.stubparser;

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Java ClassMate library was originally written by Tatu Saloranta (tatu.saloranta@iki.fi)

Other developers who have contributed code are:

* Brian Langel

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1.58 commons-vfs 2.1

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1.59 compiler 0.9.3

1.60 compress 1.18

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1.61 consul-api 1.4.1

1.62 cryptacular 1.2.0

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### The art of simplicity is a puzzle of complexity.###

## Overview ##

[YAML](http://yaml.org) is a data serialization format designed for human readability and interaction with scripting languages.

SnakeYAML is a YAML processor for the Java Virtual Machine.

## SnakeYAML features ##

- a **complete** [YAML 1.1 processor](http://yaml.org/spec/1.1/current.html). In particular, SnakeYAML can parse all examples from the specification.
- Unicode support including UTF-8/UTF-16 input/output.
- high-level API for serializing and deserializing native Java objects.
- support for all types from the [YAML types repository](http://yaml.org/type/index.html).
- relatively sensible error messages.

## Info ##

- [Changes](https://bitbucket.org/asomov/snakeyaml/wiki/Changes)
- [Documentation](https://bitbucket.org/asomov/snakeyaml/wiki/Documentation)

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`xpack.license.self_generated.type`::
Set to `basic` (default) to enable basic {xpack} features. +
+--
  If set to `trial`, the self-generated license gives access only to all the features of a x-pack for 30 days. You can later downgrade the cluster to a basic license if needed.
+--

This API enables you to delete licensing information.

DELETE `_xpack/license`

When your license expires, {xpack} operates in a degraded mode. For more information, see `{xpack-ref}/license-expiration.html`.
[float]
==== Authorization

You must have `manage` cluster privileges to use this API. For more information, see {xpack-ref}/security-privileges.html[Security Privileges].

[float]
==== Examples

The following example queries the info API:

[source,js]
---
DELETE _xpack/license
---
// CONSOLE
// TEST[skip:license testing issues]

When the license is successfully deleted, the API returns the following response:

[source,js]
---
{
  "acknowledged": true
}
---

// NOTCONSOLE
[role="xpack"]
[testenv="basic"]
[[get-license]]

=== Get License API

This API enables you to retrieve licensing information.

[float]
==== Request

`GET /_xpack/license`

[float]
==== Description

This API returns information about the type of license, when it was issued, and when it expires, for example.

For more information about the different types of licenses, see https://www.elastic.co/subscriptions.
Query Parameters

`local`::
(boolean) Specifies whether to retrieve local information. The default value is `false`, which means the information is retrieved from the master node.

Authorization

You must have `monitor` cluster privileges to use this API.
For more information, see [Security Privileges](xpack-ref/security-privileges.html).

Examples

The following example provides information about a basic license:

```javascript
const license = {
  status: "active",
  uid: "cbff45e7-c553-41f7-ae4f-9205eabd80xx",
  type: "basic",
  issue_date: "2018-02-22T23:12:05.550Z",
  issue_date_in_millis: 1519341125550,
  max_nodes: 1000,
  issued_to: "test",
  issuer: "elasticsearch",
  start_date_in_millis: -1
}
```

Responses

```
// TESTRESPONSE["cbff45e7-c553-41f7-ae4f-9205eabd80xx"
// TESTRESPONSE["basic"
// TESTRESPONSE["2018-02-22T23:12:05.550Z"
// TESTRESPONSE[1519341125550]
```
This API enables you to update your license.

```
PUT _xpack/license
```

==== Description

You can update your license at runtime without shutting down your nodes. License updates take effect immediately. If the license you are installing does not support all of the features that were available with your previous license, however, you are notified in the response. You must then re-submit the API request with the `acknowledge` parameter set to `true`.

For more information about the different types of licenses, see https://www.elastic.co/subscriptions.

==== Query Parameters

`acknowledge`::

(booleand) Specifies whether you acknowledge the license changes. The default value is `false`.

==== Request Body

`licenses`::

(array) A sequence of one or more JSON documents containing the license information.

==== Authorization

If `{security}` is enabled, you need `manage` cluster privileges to install the license.
If `{security}` is enabled and you are installing a gold or platinum license, you must enable TLS on the transport networking layer before you install the license. See `<configuring-tls>`.

[Float]

### Examples

The following example updates to a basic license:

[source,js]

```json
POST _xpack/license
{
  "licenses": [
    {
      "uid": "893361dc-9749-4997-93cb-802e3d7fa4xx",
      "type": "basic",
      "issue_date_in_millis": 1411948800000,
      "expiry_date_in_millis": 1914278399999,
      "max_nodes": 1,
      "issued_to": "issuedTo",
      "issuer": "issuer",
      "signature": "xx"
    }
  ]
}
```

// CONSOLE

// TEST[skip: license testing issues]

NOTE: These values are invalid; you must substitute the appropriate content from your license file.

You can alternatively use a `curl` command, for example:

[source,js]

```json
[source,shell]

```

```
curl -XPUT -u <user> 'http://<host>:<port>/_xpack/license' -H "Content-Type: application/json" -d @license.json
```

// NOTCONSOLE

On Windows machine, use the following command:

[source,shell]

```json
ge \license.json | Invoke-WebRequest -uri http://<host>:<port>/_xpack/license -Credential elastic -Method Put -Content-Type "application/json"
```
In these examples,

* `<user>` is a user ID with the appropriate authority.
* `<host>` is the hostname of the `{es}` node (`localhost` if executing locally)
* `<port>` is the http port (defaults to `9200`)
* `license.json` is the license JSON file

NOTE: If your `{es}` node has SSL enabled on the HTTP interface, you must start your URL with `https://`

If you previously had a license with more features than the basic license, you receive the following response:

```javascript
{  
  "acknowledged": false,  
  "license_status": "valid",  
  "acknowledge": {  
    "message": "This license update requires acknowledgement. To acknowledge the license, please read the following messages and update the license again, this time with the "acknowledge=true" parameter."",  
    "watcher": [  
      "Watcher will be disabled"  
    ],  
    "logstash": [  
      "Logstash will no longer poll for centrally-managed pipelines"  
    ],  
    "security": [  
      "The following X-Pack security functionality will be disabled: ... " ]  
  }  
}
```

// NOTCONSOLE

To complete the update, you must re-submit the API request and set the `acknowledge` parameter to `true`. For example:

```javascript
POST _xpack/license?acknowledge=true  
{  
  "licenses": [  
    {  
      "uid": "893361dc-9749-4997-93cb-802e3d7fa4xx",  
      "type": "basic"  
    }  
  ]  
}
```
"issue_date_in_millis":1411948800000,
"expiry_date_in_millis":1914278399999,
"max_nodes":1,
"issued_to":"issuedTo",
"issuer":"issuer",
"signature":"xx"
}
]

// CONSOLE
// TEST[skip:license testing issues]

Alternatively:

[source,sh]

curl -XPUT -u elastic 'http://<host>:<port>/_xpack/license?acknowledge=true' -H "Content-Type: application/json"
-d @license.json

// NOTCONSOLE

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From: 'an unknown organization'
- geronimo-jms_1.1_spec org.apache.geronimospecs:geronimo-jms_1.1_spec:jar:1.0

From: 'Apache Software Foundation' (http://www.apache.org)
- Apache Log4j (http://logging.apache.org/log4j/1.2/) log4j/log4j:bundle:1.2.17
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package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.action.admin.cluster.health.ClusterHealthResponse;
import org.elasticsearch.action.admin.cluster.node.info.NodeInfo;
import org.elasticsearch.action.admin.cluster.node.info.NodesInfoResponse;
import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.client.Client;
import org.elasticsearch.client.Requests;
import org.elasticsearch.cluster.health.ClusterHealthStatus;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.Priority;
import org.elasticsearch.common.UUIDs;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.discovery.zen.SettingsBasedHostsProvider;
import org.elasticsearch.env.Environment;
import org.elasticsearch.node.MockNode;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.test.ESIntegTestCase.ClusterScope;
import org.elasticsearch.test.ESIntegTestCase.Scope;
import org.elasticsearch.test.InternalTestCluster;
import org.elasticsearch.test.NodeConfigurationSource;
import org.elasticsearch.test.TestCluster;
import org.elasticsearch.test.discovery.TestZenDiscovery;
import org.elasticsearch.tribe.TribePlugin;
import org.elasticsearch.xpack.CompositeTestingXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.deprecation.Deprecation;
import org.elasticsearch.xpack.graph.Graph;
import org.elasticsearch.xpack.logstash.Logstash;
import org.elasticsearch.xpack.ml.MachineLearning;
import org.elasticsearch.xpack.core.ml.MachineLearningField;
import org.elasticsearch.xpack.monitoring.Monitoring;
import org.elasticsearch.xpack.security.Security;
import org.elasticsearch.xpack.upgrade.Upgrade;
import org.elasticsearch.xpack.watcher.Watcher;
import java.nio.file.Path;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collection;
import java.util.Collections;
import java.util.List;
import java.util.function.Function;
import static org.elasticsearch.test.hamcrest.ElasticsearchAssertions.assertAcked;
import static org.hamcrest.Matchers.anyOf;
import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.equalTo;

@ClusterScope(scope = Scope.TEST, transportClientRatio = 0, numClientNodes = 1, numDataNodes = 2)
public abstract class TribeTransportTestCase extends ESIntegTestCase {

    // Code implementation goes here...
}
protected List<String> enabledFeatures() {
    return Collections.emptyList();
}

@Override
protected final Settings nodeSettings(int nodeOrdinal) {
    final Settings.Builder builder = Settings.builder()
        .put(NetworkModule.HTTP_ENABLED.getKey(), false)
        .put("transport.type", getTestTransportType());
    List<String> enabledFeatures = enabledFeatures();
    builder.put(XPackSettings.SECURITY_ENABLED.getKey(), enabledFeatures.contains(XPackField.SECURITY));
    builder.put(XPackSettings.MONITORING_ENABLED.getKey(), enabledFeatures.contains(XPackField.MONITORING));
    builder.put(XPackSettings.WATCHER_ENABLED.getKey(), enabledFeatures.contains(XPackField.WATCHER));
    builder.put(XPackSettings.GRAPH_ENABLED.getKey(), enabledFeatures.contains(XPackField.GRAPH));
    builder.put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), enabledFeatures.contains(XPackField.MACHINE_LEARNING));
    builder.put(MachineLearningField.AUTODETECT_PROCESS.getKey(), false);
    return builder.build();
}

@Override
protected boolean ignoreExternalCluster() {
    return true;
}

@Override
protected boolean addTestZenDiscovery() {
    return false;
}

public static class TribeAwareTestZenDiscoveryPlugin extends TestZenDiscovery.TestPlugin {
    public TribeAwareTestZenDiscoveryPlugin(Settings settings) {
        super(settings);
    }

    @Override
    public Settings additionalSettings() {
        if (settings.getGroups("tribe", true).isEmpty()) {
            return super.additionalSettings();
        } else {
            return Settings.EMPTY;
        }
    }
}
public static class MockTribePlugin extends TribePlugin {

    public MockTribePlugin(Settings settings) {
        super(settings);
    }

    protected Function<Settings, Node> nodeBuilder(Path configPath) {
        return settings -> new MockNode(new Environment(settings, configPath), internalCluster().getPlugins());
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>();
        plugins.add(MockTribePlugin.class);
        plugins.add(TribeAwareTestZenDiscoveryPlugin.class);
        plugins.add(CompositeTestingXPackPlugin.class);
        plugins.add(CommonAnalysisPlugin.class);
        return plugins;
    }

    @Override
    protected final Collection<Class<? extends Plugin>> transportClientPlugins() {
        ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>();
        plugins.add(MockTribePlugin.class);
        plugins.add(TribeAwareTestZenDiscoveryPlugin.class);
        plugins.add(XPackClientPlugin.class);
        plugins.add(CommonAnalysisPlugin.class);
        return plugins;
    }

    public void testTribeSetup() throws Exception {
        NodeConfigurationSource nodeConfigurationSource = new NodeConfigurationSource() {
            @Override
            public Settings nodeSettings(int nodeOrdinal) {
                return TribeTransportTestCase.this.nodeSettings(nodeOrdinal);
            }

            @Override
            public Path nodeConfigPath(int nodeOrdinal) {
                return null;
            }

            @Override
            public Collection<Class<? extends Plugin>> nodePlugins() {
                return TribeTransportTestCase.this.nodePlugins();
            }
        }
    }
@Override
public Settings transportClientSettings() {
    return TribeTransportTestCase.this.transportClientSettings();
}

@Override
public Collection<Class<? extends Plugin>> transportClientPlugins() {
    return TribeTransportTestCase.this.transportClientPlugins();
}
);
final InternalTestCluster cluster2 = new InternalTestCluster(
    randomLong(), createTempDir(), true, true, 2, 2,
    UUIDs.randomBase64UUID(random()), nodeConfigurationSource, 1, false, "tribe_node2",
    getMockPlugins(), getClientWrapper());
cluster2.beforeTest(random(), 0.0);

logger.info("create 2 indices, test1 on t1, and test2 on t2");
assertAcked(internalCluster().client().admin().indices().prepareCreate("test1").get());
assertAcked(cluster2.client().admin().indices().prepareCreate("test2").get());
ensureYellow(internalCluster());
ensureYellow(cluster2);
//        Map<String,String> asMap = internalCluster().getDefaultSettings().getAsMap();
Settings.Builder tribe1Defaults = Settings.builder();
Settings.Builder tribe2Defaults = Settings.builder();
internalCluster().getDefaultSettings().keySet().forEach(k -> {
    if (k.startsWith("path.") == false) {
        tribe1Defaults.copy(k, internalCluster().getDefaultSettings());
        tribe2Defaults.copy(k, internalCluster().getDefaultSettings());
    }
});
tribe1Defaults.normalizePrefix("tribe.t1.");
tribe2Defaults.normalizePrefix("tribe.t2.");
// give each tribe it's unicast hosts to connect to
tribe1Defaults.putList("tribe.t1." +
    SettingsBasedHostsProvider.DISCOVERY_ZEN_PING_UNICAST_HOSTS_SETTING.getKey(),
    getUnicastHosts(internalCluster().client()));
tribe1Defaults.putList("tribe.t2." +
    SettingsBasedHostsProvider.DISCOVERY_ZEN_PING_UNICAST_HOSTS_SETTING.getKey(),
    getUnicastHosts(cluster2.client()));

Settings merged = Settings.builder()
    .put("tribe.t1.cluster.name", internalCluster().getClusterName())
    .put("tribe.t2.cluster.name", cluster2.getClusterName())
    .put("tribe.t1.transport.tcp.port", 0)
    .put("tribe.t2.transport.tcp.port", 0)
    .put("tribe.t1.transport.type", getTestTransportType())
.put("tribe.t2.transport.type", getTestTransportType())
    .put("tribe.blocks.write", false)
    .put(tribe1Defaults.build())
    .put(tribe2Defaults.build())
    .put(NetworkModule.HTTP_ENABLED.getKey(), false)
    .put(internalCluster().getDefaultSettings())
    .put(XPackSettings.SECURITY_ENABLED.getKey(), false) // otherwise it conflicts with mock transport
    .put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
    .put(MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
    .put("tribe.t1." + XPackSettings.SECURITY_ENABLED.getKey(), false)
    .put("tribe.t2." + XPackSettings.SECURITY_ENABLED.getKey(), false)
    .put("tribe.t1." + XPackSettings.WATCHER_ENABLED.getKey(), false)
    .put("tribe.t2." + XPackSettings.WATCHER_ENABLED.getKey(), false)
    .put("tribe.t1." + XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
    .put("tribe.t2." + MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
    .put("tribe.t1." + MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
    .put("tribe.t2." + MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
    .put("node.name", "tribe_node") // make sure we can identify threads from this node
    .put("transport.type", getTestTransportType())
    .build();

    final List<Class<? extends Plugin>> mockPlugins = Arrays.asList(MockTribePlugin.class,
                    TribeAwareTestZenDiscoveryPlugin.class,
                    getTestTransportPlugin(), Deprecation.class, Graph.class, Logstash.class, MachineLearning.class,
                    Monitoring.class,
                    Security.class, Upgrade.class, Watcher.class, XPackPlugin.class);
    final Node tribeNode = new MockNode(merged, mockPlugins).start();
    Client tribeClient = tribeNode.client();

    logger.info("wait till tribe has the same nodes as the 2 clusters");
    assertBusy(() -> {
        DiscoveryNodes tribeNodes = tribeNode.client().admin().cluster().prepareState().get().getNodes();
        assertThat(countDataNodesForTribe("t1", tribeNodes),
                        equalTo(internalCluster().client().admin().cluster().prepareState().get().getNodes().getDataNodes().size()));
        assertThat(countDataNodesForTribe("t2", tribeNodes),
                        equalTo(cluster2.client().admin().cluster().prepareState().get().getNodes().getDataNodes().size()));
    });

    logger.info(" --> verify transport actions for tribe node");
    verifyActionOnTribeNode(tribeClient);
    logger.info(" --> verify transport actions for data node");
    verifyActionOnDataNode(randomBoolean() ? internalCluster() : cluster2).dataNodeClient());
    logger.info(" --> verify transport actions for master node");
    verifyActionOnMasterNode(randomBoolean() ? internalCluster() : cluster2).masterClient());
    logger.info(" --> verify transport actions for client node");
    verifyActionOnClientNode((randomBoolean() ? internalCluster() : cluster2).coordOnlyNodeClient());

    try {
cluster2.wipe(Collections.<String>emptySet());
} finally {
    cluster2.afterTest();
}
tribeNode.close();
cluster2.close();

/**
 * Verify transport action behaviour on client node
 */
protected abstract void verifyActionOnClientNode(Client client) throws Exception;

/**
 * Verify transport action behaviour on master node
 */
protected abstract void verifyActionOnMasterNode(Client masterClient) throws Exception;

/**
 * Verify transport action behaviour on data node
 */
protected abstract void verifyActionOnDataNode(Client dataNodeClient) throws Exception;

/**
 * Verify transport action behaviour on tribe node
 */
protected abstract void verifyActionOnTribeNode(Client tribeClient) throws Exception;

protected void failAction(Client client, Action action) {
    try {
        client.execute(action, action.newRequestBuilder(client).request());
        fail("expected [" + action.name() + "] to fail");
    } catch (IllegalStateException e) {
        assertThat(e.getMessage(), containsString("failed to find action"));
    }
}

private void ensureYellow(TestCluster testCluster) {
    ClusterHealthResponse actionGet = testCluster.client().admin().cluster()
        .health(Requests.clusterHealthRequest().waitForYellowStatus()
        .waitForEvents(Priority.LANGUID).waitForNoRelocatingShards(true)).actionGet();
    if (actionGet.isTimedOut()) {
        logger.info("ensureGreen timed out, cluster state:\n{}\n", testCluster.client().admin().cluster()
            .prepareState().get().getState(),
        testCluster.client().admin().cluster().preparePendingClusterTasks().get());
        assertThat("timed out waiting for yellow state", actionGet.isTimedOut(), equalTo(false));
    }
    assertThat(actionGet.getStatus(), anyOf(equalTo(ClusterHealthStatus.YELLOW),
        containsString("failed to find action")));  
}
private int countDataNodesForTribe(String tribeName, DiscoveryNodes nodes) {
    int count = 0;
    for (DiscoveryNode node : nodes) {
        if (!node.isDataNode()) {
            continue;
        }
        if (tribeName.equals(node.getAttributes().get("tribe.name"))) {
            count++;
        }
    }
    return count;
}

private static String[] getUnicastHosts(Client client) {
    ArrayList<String> unicastHosts = new ArrayList<>();
    NodesInfoResponse nodeInfos = client.admin().cluster().prepareNodesInfo().clear().setTransport(true).get();
    for (NodeInfo info : nodeInfos.getNodes()) {
        TransportAddress address = info.getTransport().getAddress().publishAddress();
        unicastHosts.add(address.getAddress() + ":" + address.getPort());
    }
    return unicastHosts.toArray(new String[unicastHosts.size()]);
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.client.Client;
import org.elasticsearch.common.unit.TimeValue;
import static org.elasticsearch.license.TestUtils.generateSignedLicense;

public class LicenseTribeTests extends TribeTransportTestCase {

    @Override
    protected void verifyActionOnClientNode(Client client) throws Exception {
        assertLicenseTransportActionsWorks(client);
    }

    @Override
    protected void verifyActionOnMasterNode(Client masterClient) throws Exception {
        assertLicenseTransportActionsWorks(masterClient);
    }
}
assertLicenseTransportActionsWorks(masterClient);
}

@Override
protected void verifyActionOnDataNode(Client dataNodeClient) throws Exception {
    assertLicenseTransportActionsWorks(dataNodeClient);
}

private static void assertLicenseTransportActionsWorks(Client client) throws Exception {
    client.execute(GetLicenseAction.INSTANCE, new GetLicenseRequest()).get();
    client.execute(PutLicenseAction.INSTANCE, new PutLicenseRequest()
        .license(generateSignedLicense(TimeValue.timeValueHours(1))));
    client.execute(DeleteLicenseAction.INSTANCE, new DeleteLicenseRequest());
}

@Override
protected void verifyActionOnTribeNode(Client tribeClient) throws Exception {
    // The get licence action should work, but everything else should fail
    tribeClient.execute(GetLicenseAction.INSTANCE, new GetLicenseRequest()).get();
    failAction(tribeClient, PutLicenseAction.INSTANCE);
    failAction(tribeClient, DeleteLicenseAction.INSTANCE);
}


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 */

package org.elasticsearch.xpack.monitoring;

import org.elasticsearch.action.admin.cluster.node.info.NodeInfo;
import org.elasticsearch.action.admin.cluster.node.info.NodesInfoResponse;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.env.Environment;
import org.elasticsearch.node.MockNode;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.plugins.PluginInfo;
import org.elasticsearch.test.ESIntegTestCase.ClusterScope;
import org.elasticsearch.test.discovery.TestZenDiscovery;
import org.elasticsearch.tribe.TribePlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.monitoring.test.MonitoringIntegTestCase;
import java.nio.file.Path;
import java.util.ArrayList;
import java.util.Collection;
import java.util.function.Function;
import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;
import static org.hamcrest.Matchers.equalTo;

@ClusterScope(scope = TEST, transportClientRatio = 0, numClientNodes = 0, numDataNodes = 0)
public class MonitoringPluginTests extends MonitoringIntegTestCase {

    public MonitoringPluginTests() throws Exception {
        super();
    }

    @Override
    protected void startMonitoringService() {
        // do nothing as monitoring is sometime unbound
    }

    @Override
    protected void stopMonitoringService() {
        // do nothing as monitoring is sometime unbound
    }

    @Override
    protected boolean addTestZenDiscovery() {
        return false;
    }

    public static class TribeAwareTestZenDiscoveryPlugin extends TestZenDiscovery.TestPlugin {

        public TribeAwareTestZenDiscoveryPlugin(Settings settings) {
            super(settings);
        }

        @Override
        public Settings additionalSettings() {
            if (settings.getGroups("tribe", true).isEmpty()) {
                return super.additionalSettings();
            } else {
                return Settings.EMPTY;
            }
        }
    }

    public static class MockTribePlugin extends TribePlugin {

        public MockTribePlugin(Settings settings) {
            super(settings);
        }
    }
}
protected Function<Settings, Node> nodeBuilder(Path configPath) {
    return settings -> new MockNode(new Environment(settings, configPath), internalCluster().getPlugins());
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>(super.nodePlugins());
    plugins.add(MockTribePlugin.class);
    plugins.add(TribeAwareTestZenDiscoveryPlugin.class);
    return plugins;
}

@Override
protected Settings nodeSettings(int nodeOrdinal) {
    return Settings.builder()
        .put(super.nodeSettings(nodeOrdinal))
        .put(MonitoringService.INTERVAL.getKey(), "-1")
        .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
        .put(XPackSettings.WATCHER_ENABLED.getKey(), false)
        .build();
}

@Override
protected Settings transportClientSettings() {
    return Settings.builder()
        .put(super.transportClientSettings())
        .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
        .build();
}

public void testMonitoringEnabled() {
    internalCluster().startNode(Settings.builder()
        .put(XPackSettings.MONITORING_ENABLED.getKey(), true)
        .build());
    assertPluginIsLoaded();
    assertServiceIsBound(MonitoringService.class);
}

public void testMonitoringDisabled() {
    internalCluster().startNode(Settings.builder()
        .put(XPackSettings.MONITORING_ENABLED.getKey(), false)
        .build());
    assertPluginIsLoaded();
    assertServiceIsNotBound(MonitoringService.class);
}
public void testMonitoringEnabledOnTribeNode() {
    internalCluster().startNode(Settings.builder()
        .put(XPackSettings.MONITORING_ENABLED.getKey(), true)
        .put("tribe.name", "t1")
        .build());
    assertPluginIsLoaded();
    assertServiceIsBound(MonitoringService.class);
}

public void testMonitoringDisabledOnTribeNode() {
    internalCluster().startNode(Settings.builder().put("tribe.name", "t1").build());
    assertPluginIsLoaded();
    assertServiceIsNotBound(MonitoringService.class);
}

private void assertPluginIsLoaded() {
    NodesInfoResponse response = client().admin().cluster().prepareNodesInfo().setPlugins(true).get();
    for (NodeInfo nodeInfo : response.getNodes()) {
        assertNotNull(nodeInfo.getPlugins());
        boolean found = false;
        for (PluginInfo plugin : nodeInfo.getPlugins().getPluginInfos()) {
            assertNotNull(plugin);
            if (LocalStateMonitoring.class.getName().equals(plugin.getName())) {
                found = true;
                break;
            }
        }
        assertThat("xpack plugin not found", found, equalTo(true));
    }
}

private void assertServiceIsBound(Class<?> klass) {
    try {
        Object binding = internalCluster().getDataNodeInstance(klass);
        assertNotNull(binding);
        assertTrue(klass.isInstance(binding));
    } catch (Exception e) {
        fail("no service bound for class " + klass.getSimpleName());
    }
}

private void assertServiceIsNotBound(Class<?> klass) {
    try {
        // it should be bound, but directly as null
        assertNull(internalCluster().getDataNodeInstance(klass));
    } catch (Exception ce) {
    }
}
assertThat("message contains error about missing implementation: " + ce.getMessage(),
   ce.getMessage().contains("Could not find a suitable constructor"), equalTo(true));
}
}
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 */
package org.elasticsearch.xpack.monitoring;

import org.elasticsearch.client.Client;
import org.elasticsearch.license.TribeTransportTestCase;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.monitoring.action.MonitoringBulkAction;
import org.elasticsearch.xpack.core.monitoring.action.MonitoringBulkRequest;
import java.util.Collections;
import java.util.List;

public class MonitoringTribeTests extends TribeTransportTestCase {

   @Override
   protected List<String> enabledFeatures() {
      return Collections.singletonList(XPackField.MONITORING);
   }

   @Override
   protected void verifyActionOnClientNode(Client client) throws Exception {
      assertMonitoringTransportActionsWorks(client);
   }

   @Override
   protected void verifyActionOnMasterNode(Client masterClient) throws Exception {
      assertMonitoringTransportActionsWorks(masterClient);
   }

   @Override
   protected void verifyActionOnDataNode(Client dataNodeClient) throws Exception {
      assertMonitoringTransportActionsWorks(dataNodeClient);
   }

   private static void assertMonitoringTransportActionsWorks(Client client) throws Exception {
      client.execute(MonitoringBulkAction.INSTANCE, new MonitoringBulkRequest());
   }

   @Override
protected void verifyActionOnTribeNode(Client tribeClient) {
    failAction(tribeClient, MonitoringBulkAction.INSTANCE);
}
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 */
package org.elasticsearch.xpack;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.LicenseService;
import org.elasticsearch.license.XPackLicenseState;
import org.elasticsearch.license.XPackLicenseState;
import org.elasticsearch.license.XPackLicenseState;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.ssl.SSLService;
import org.elasticsearch.xpack.deprecation.Deprecation;
import org.elasticsearch.xpack.graph.Graph;
import org.elasticsearch.xpack.logstash.Logstash;
import org.elasticsearch.xpack.ml.MachineLearning;
import org.elasticsearch.xpack.monitoring.Monitoring;
import org.elasticsearch.xpack.security.Security;
import org.elasticsearch.xpack.xpack.security.Security;
import org.elasticsearch.xpack.xpack.security.security.Security;
import java.nio.file.Path;

public class CompositeTestingXPackPlugin extends LocalStateCompositeXPackPlugin {
    public CompositeTestingXPackPlugin(final Settings settings, final Path configPath) throws Exception {
        super(settings, configPath);
        CompositeTestingXPackPlugin thisVar = this;
        plugins.add(new Deprecation());
        plugins.add(new Graph(settings));
        plugins.add(new Logstash(settings));
        plugins.add(new MachineLearning(settings, configPath) {
            @Override
            protected XPackLicenseState getLicenseState() {
                return super.getLicenseState();
            }
        });
        plugins.add(new Monitoring(settings)) {
            @Override
            protected SSLService getSslService() {
                return thisVar.getSslService();
            }
        });
        @Override
        protected LicenseService getLicenseService() {

    }
return thisVar.getLicenseService();
}

@Override
protected XPackLicenseState getLicenseState() {
    return thisVar.getLicenseState();
}

});
plugins.add(new Watcher(settings) {
    @Override
    protected SSLService getSslService() {
        return thisVar.getSslService();
    }

    @Override
    protected XPackLicenseState getLicenseState() {
        return thisVar.getLicenseState();
    }
});
plugins.add(new Security(settings, configPath) {
    @Override
    protected SSLService getSslService() { return thisVar.getSsslService(); }
    @Override
    protected XPackLicenseState getLicenseState() { return thisVar.getLicenseState(); }
});

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*/
package org.elasticsearch.test;

import org.elasticsearch.Build;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.GetLicenseResponse;
import org.elasticsearch.license.License;
import org.elasticsearch.license.LicensesStatus;
import org.elasticsearch.license.LicensingClient;
import org.elasticsearch.license.PutLicenseResponse;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.junit.AfterClass;
import java.io.IOException;
import java.net.InetAddress;
import java.net.InetSocketAddress;
import java.net.URL;
import java.nio.charset.StandardCharsets;
import java.util.Collection;
import java.util.Collections;
import static org.hamcrest.CoreMatchers.equalTo;

public class LicensingTribeIT extends ESIntegTestCase {
    private static TestCluster cluster2;
    private static TestCluster tribeNode;

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Collections.singletonList(XPackPlugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
    }

    @Override
    public void setUp() throws Exception {
        super.setUp();
        if (cluster2 == null) {
            cluster2 = buildExternalCluster(System.getProperty("tests.cluster2"));
        }
        if (tribeNode == null) {
            tribeNode = buildExternalCluster(System.getProperty("tests.tribe"));
        }
    }

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        Settings.Builder builder = Settings.builder();
        builder.put(super.nodeSettings(nodeOrdinal));
        return builder.build();
    }

    @AfterClass
    public static void tearDownExternalClusters() throws IOException {
        if (cluster2 != null) {

            if (tribeNode != null) {
                tribeNode = buildExternalCluster(System.getProperty("tests.tribe"));
            }
        }
    }

    protected Settings nodeSettings(int nodeOrdinal) {
        Settings.Builder builder = Settings.builder();
        builder.put(super.nodeSettings(nodeOrdinal));
        return builder.build();
    }

    @AfterClass
    public static void tearDownExternalClusters() throws IOException {
        if (cluster2 != null) {

            if (tribeNode != null) {
                tribeNode = buildExternalCluster(System.getProperty("tests.tribe"));
            }
        }
    }
}
try {
    cluster2.close();
} finally {
    cluster2 = null;
}

if (tribeNode != null) {
    try {
        tribeNode.close();
    } finally {
        tribeNode = null;
    }
}

@Override
protected Settings externalClusterClientSettings() {
    Settings.Builder builder = Settings.builder();
    builder.put(XPackSettings.SECURITY_ENABLED.getKey(), false);
    builder.put(XPackSettings.MONITORING_ENABLED.getKey(), false);
    builder.put(XPackSettings.WATCHER_ENABLED.getKey(), false);
    builder.put(XPackSettings.GRAPH_ENABLED.getKey(), false);
    builder.put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false);
    return builder.build();
}

private ExternalTestCluster buildExternalCluster(String clusterAddresses) throws IOException {
    String[] stringAddresses = clusterAddresses.split(",");
    TransportAddress[] transportAddresses = new TransportAddress[stringAddresses.length];
    int i = 0;
    for (String stringAddress : stringAddresses) {
        URL url = new URL("http://" + stringAddress);
        InetAddress inetAddress = InetAddress.getByName(url.getHost());
        transportAddresses[i++] = new TransportAddress(new InetSocketAddress(inetAddress, url.getPort()));
    }
    return new ExternalTestCluster(createTempDir(), externalClusterClientSettings(), transportClientPlugins(),
        transportAddresses);
}

public void testLicensePropagateToTribeNode() throws Exception {
    assumeTrue("License is only valid when tested against snapshot/test keys", Build.CURRENT.isSnapshot());
    // test that auto-generated basic license propagates to tribe
    assertBusy(() -> {
        GetLicenseResponse getLicenseResponse = new LicensingClient(tribeNode.client()).prepareGetLicense().get();
        assertNotNull(getLicenseResponse.license());
        assumeThat(getLicenseResponse.license().operationMode(), equalTo(License.OperationMode.BASIC));
    });
// test that signed license with higher operation mode takes precedence
LicensingClient cluster2Client = new LicensingClient(cluster2.client());
PutLicenseResponse licenseResponse = cluster2Client
  .preparePutLicense(License.fromSource(new
BytesArray(PLATINUM_LICENSE.getBytes(StandardCharsets.UTF_8)), XContentType.JSON))
  .setAcknowledge(true).get();
assertThat(licenseResponse.isAcknowledged(), equalTo(true));
assertThat(licenseResponse.status(), equalTo(LicensesStatus.VALID));
assertBusy(() -> {
  GetLicenseResponse getLicenseResponse = new
LicensingClient(tribeNode.client()).prepareGetLicense().get();
  assertNotNull(getLicenseResponse.license());
  assertThat(getLicenseResponse.license().operationMode(), equalTo(License.OperationMode.PLATINUM));
});

// test removing signed license falls back works
assertTrue(cluster2Client.prepareDeleteLicense().get().isAcknowledged());
assertBusy(() -> {
  GetLicenseResponse getLicenseResponse = new
LicensingClient(tribeNode.client()).prepareGetLicense().get();
  assertNotNull(getLicenseResponse.license());
  assertThat(getLicenseResponse.license().operationMode(), equalTo(License.OperationMode.BASIC));
});

public void testDummy() throws Exception {
  // this test is here so that testLicensePropagateToTribeNode's assumption
  // doesn't result in this test suite to have no tests run and trigger a build failure
}

private static final String PLATINUM_LICENSE = "{"license":{"uid":"1","type":"platinum","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1914278399999,"max_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"AAAAAwAAAA2hWlkvKcxQIpdVWdCtAAABmC9ZNOhjZDBGYnVyxRxpCOW5Bb3FjZDAxOWpSTVoMVZwUrzRxVkI" + ""P5mXZkaxzDw5IMhjTHN0nN1X2MxMrRFk4d3JTZeX3R3RZ0pzU3lobWJKZnQvSEFvao0ppTHBkWkpRZWZSqi9iNRMnkw1SlplN0I" + ""DalzC5095XMRGNI11ZlpYcVVTNnFrcTE2dzhJZmZrDFQRn3JQeGwwbU0MXZ0dlJHSEKITZTVLOHnsSDByWnpzoEphZHBEZjUrTVB" + ""xREnNSXnsWJwZlIaODdZVmEzUJniWkteNWGM5TUhvQV2plaU04Q1JOUm4MXNUL0pSehQaVB2azhmUK9QVzhFETfoMIQ0rnXrSG5" + ""3MWk2K055c28z5mRnVnFrIH2JSQkFLV2VXUmVHNDZ2R3o2VE1qbnVNS2ixOHN5bUerZINIWkZSVmZIWEtaSU9wTtjEndVvT1NCykd" + ""cUyYKZFrwRwxa06dlIDMbMzSGTQc3FWOTgzi3ZUCxXMvQkt2RUZwMFJnZzlVl2d2bDRWUzh6UG5pdENGWFhrExNKNe9PQAAQBWg" + ""u3yZpKOBG//92X4Ymawu3P5asvx0FAPDXZ2z734Tap/nc30X6t4yEEm+6bCQr/ibBOqWboJKRbbTZLBQfYFmL1ZqvyA3bJ1/Xs" + "}"};
"8NyDfxKGztUv/IIOzHPzxs0f8Bv4OJeK48vjoyWaDce1Vmo4n1SGyyl0JcEbOWC6A3U3mBSW7wLUe+hW9+akUYO0STcm60ub7k" +
"H/LIZNOhvGg1SVDbh3p8EBkNMY0CV7urQ0wdG1nLCnrfB8BiT151C5nLrM9Dt5w3pzciPlASzw4iksW/CzvYy5tjOoWKEnxi2EZOB" +
"9dKyT4mTdvyBOtrThLdgr4lmHd3qYAEgTCaQV",\"start_date_in_millis\":-1}};}
}
import org.elasticsearch.gradle.test.ClusterConfiguration
import org.elasticsearch.gradle.test.ClusterFormationTasks
import org.elasticsearch.gradle.test.NodeInfo

apply plugin: 'elasticsearch.standalone-test'
apply plugin: 'elasticsearch.standalone-rest-test'
apply plugin: 'elasticsearch.rest-test'

dependencies {
testCompile project(path: ':modules:tribe', configuration: 'runtime')
testCompile project(path: xpackProject('plugin').path, configuration: 'testArtifacts')

// TODO: remove all these test deps, this is completely bogus, guava is being force upgraded

// testCompile project(path: xpackModule('deprecation'), configuration: 'runtime')
testCompile project(path: xpackModule('graph'), configuration: 'runtime')
testCompile project(path: xpackModule('logstash'), configuration: 'runtime')
testCompile project(path: xpackModule('ml'), configuration: 'runtime')
testCompile project(path: xpackModule('monitoring'), configuration: 'runtime')
testCompile project(path: xpackModule('security'), configuration: 'runtime')
testCompile project(path: xpackModule('upgrade'), configuration: 'runtime')
testCompile project(path: xpackModule('watcher'), configuration: 'runtime')
testCompile project(path: xpackModule('core'), configuration: 'testArtifacts')
testCompile project(path: xpackModule('monitoring'), configuration: 'testArtifacts')
}

compileTestJava.options.compilerArgs << "-Xlint:-rawtypes,-unchecked"
namingConventions.skipIntegTestInDisguise = true

test {
/*
 * We have to disable setting the number of available processors as tests in the same JVM randomize processors and
will step on each
 * other if we allow them to set the number of available processors as it's set-once in Netty.
 */

systemProperty 'es.set.netty.runtime.available.processors', 'false'
include '***/Tests.class'
}

String licensePath = xpackProject('license-tools').projectDir.toPath().resolve('src/test/resources').toString()
sourceSets {
test {
resources {

}}
srcDirs += [licensePath]

}

}

project.forbiddenPatterns {
    exclude '**/*.key'
}

task setupClusterOne {
    ClusterConfiguration cluster1Config = new ClusterConfiguration(project)
    cluster1Config.clusterName = 'cluster1'
    cluster1Config.setting('node.name', 'cluster1-node1')

    // x-pack
    cluster1Config.setting('xpack.monitoring.enabled', false)
    cluster1Config.setting('xpack.security.enabled', false)
    cluster1Config.setting('xpack.watcher.enabled', false)
    cluster1Config.setting('xpack.graph.enabled', false)
    cluster1Config.setting('xpack.ml.enabled', false)

    List<NodeInfo> cluster1Nodes = ClusterFormationTasks.setup(project, 'clusterOne', setupClusterOne, cluster1Config)

}

task setupClusterTwo {
    ClusterConfiguration cluster2Config = new ClusterConfiguration(project)
    cluster2Config.clusterName = 'cluster2'
    cluster2Config.setting('node.name', 'cluster2-node1')

    // x-pack
    cluster2Config.setting('xpack.monitoring.enabled', false)
    cluster2Config.setting('xpack.security.enabled', false)
    cluster2Config.setting('xpack.watcher.enabled', false)
    cluster2Config.setting('xpack.graph.enabled', false)
    cluster2Config.setting('xpack.ml.enabled', false)

    List<NodeInfo> cluster2Nodes = ClusterFormationTasks.setup(project, 'clusterTwo', setupClusterTwo, cluster2Config)

}

integTestCluster {
    dependsOn setupClusterOne, setupClusterTwo
    setting 'node.name', 'tribe-node'
    setting 'tribe.on_conflict', 'prefer_cluster1'
    setting 'tribe.cluster1.cluster.name', 'cluster1'
    setting 'tribe.cluster1.discovery.zen.ping.unicast.hosts', "${- cluster1Nodes.get(0).transportUri()}
    setting 'tribe.cluster1.http.enabled', 'true'
    setting 'tribe.cluster1.http.port', '0'
    setting 'tribe.cluster1.transport.tcp.port', '0'
    setting 'tribe.cluster1.xpack.monitoring.enabled', false
setting 'tribe.cluster1.xpack.monitoring.enabled', false
setting 'tribe.cluster1.xpack.security.enabled', false
setting 'tribe.cluster1.xpack.watcher.enabled', false
setting 'tribe.cluster1.xpack.graph.enabled', false
setting 'tribe.cluster1.xpack.ml.enabled', false
setting 'tribe.cluster1.xpack.license.self_generated.type', 'trial'
setting 'tribe.cluster2.cluster.name', 'cluster2'
setting 'tribe.cluster2.discovery.zen.ping.unicast.hosts', "'${-> cluster2Nodes.get(0).transportUri()}'")
setting 'tribe.cluster2.http.enabled', 'true'
setting 'tribe.cluster1.http.port', '0'
setting 'tribe.cluster1.transport.tcp.port', '0'
setting 'tribe.cluster2.xpack.monitoring.enabled', false
setting 'tribe.cluster2.xpack.security.enabled', false
setting 'tribe.cluster2.xpack.watcher.enabled', false
setting 'tribe.cluster2.xpack.graph.enabled', false
setting 'tribe.cluster2.xpack.ml.enabled', false
setting 'tribe.cluster2.xpack.license.self_generated.type', 'trial'

// x-pack
setting 'xpack.monitoring.enabled', false
setting 'xpack.security.enabled', false
setting 'xpack.watcher.enabled', false
setting 'xpack.graph.enabled', false
setting 'xpack.ml.enabled', false
setting 'xpack.license.self_generated.type', 'trial'

waitCondition = { node, ant ->
    File tmpFile = new File(node.cwd, 'wait.success')
    // 5 nodes: tribe + clusterOne (1 node + tribe internal node) + clusterTwo (1 node + tribe internal node)
             dest: tmpFile.toString(),
             ignoreerrors: true,
             retries: 10)
    return tmpFile.exists()
}
}

integTestRunner {
    /*
     * We have to disable setting the number of available processors as tests in the same JVM randomize processors and
     * will step on each
     * other if we allow them to set the number of available processors as it's set-once in Netty.
     */
    systemProperty 'es.set.netty.runtime.available.processors', 'false'
    systemProperty 'tests.cluster1', "${-> cluster1Nodes.get(0).transportUri()}"
    systemProperty 'tests.cluster2', "${-> cluster2Nodes.get(0).transportUri()}"
    systemProperty 'tests.tribe', "${-> integTest.nodes.get(0).transportUri()}"
    finalizedBy 'clusterOne#stop'
 finalizedBy 'clusterTwo#stop'
}
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 */

/**
 * Licensing for xpack.
 *
 * A [ @link org.elasticsearch.license.License] is a signed set of json properties that determine what features
 * are available in a running cluster. Licenses are registered through a
 * [ @link org.elasticsearch.license.PutLicenseRequest]. This action is handled by the master node, which places
 * the signed license into the cluster state. Each node listens for cluster state updates via the
 * [ @link org.elasticsearch.license.LicenseService], and updates its local copy of the license when it detects
 * changes in the cluster state.
 *
 * The logic for which features are available given the current license is handled by
 * [ @link org.elasticsearch.license.XPackLicenseState], which is updated by the
 * [ @link org.elasticsearch.license.LicenseService] when the license changes.
 */
package org.elasticsearch.license;

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.MasterNodeReadOperationRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

public class GetLicenseRequestBuilder extends MasterNodeReadOperationRequestBuilder<GetLicenseRequest,
GetLicenseResponse,
GetLicenseRequestBuilder> {

public GetLicenseRequestBuilder(ElasticsearchClient client) {
 this(client, GetLicenseAction.INSTANCE);
}

/**
 * Creates new get licenses request builder
 *
 * @param client elasticsearch client
 *
 */
public GetLicenseRequestBuilder(ElasticsearchClient client, GetLicenseAction action) {
 super(client, action, new GetLicenseRequest());

package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import java.io.IOException;

public class DeleteLicenseRequest extends AcknowledgedRequest<DeleteLicenseRequest> {

    public DeleteLicenseRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        super.readFrom(in);
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        super.writeTo(out);
    }
}

package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetBasicStatusAction extends Action<GetBasicStatusRequest, GetBasicStatusResponse,

    }
public static final GetBasicStatusAction INSTANCE = new GetBasicStatusAction();
public static final String NAME = "cluster:admin/xpack/license/basic_status";

private GetBasicStatusAction() {
    super(NAME);
}

@Override
public GetBasicStatusRequestBuilder newRequestBuilder(ElasticsearchClient client) {
    return new GetBasicStatusRequestBuilder(client, this);
}

@Override
public GetBasicStatusResponse newResponse() {
    return new GetBasicStatusResponse();
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;
import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

public class PutLicenseResponse extends AcknowledgedResponse {
    private LicensesStatus status;
    private Map<String, String[]> acknowledgeMessages;
    private String acknowledgeHeader;

    PutLicenseResponse() {
    }

    public PutLicenseResponse(boolean acknowledged, LicensesStatus status) {
        this(acknowledged, status, null, Collections.<String, String[]>emptyMap());
    }

    public PutLicenseResponse(}
public PutLicenseResponse(boolean acknowledged, LicensesStatus status, String acknowledgeHeader, Map<String, String[]> acknowledgeMessages) {
    super(acknowledged);
    this.status = status;
    this.acknowledgeHeader = acknowledgeHeader;
    this.acknowledgeMessages = acknowledgeMessages;
}

public LicensesStatus status() {
    return status;
}

public Map<String, String[]> acknowledgeMessages() {
    return acknowledgeMessages;
}

public String acknowledgeHeader() {
    return acknowledgeHeader;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    status = LicensesStatus.fromId(in.readVInt());
    acknowledgeHeader = in.readOptionalString();
    int size = in.readVInt();
    Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
    for (int i = 0; i < size; i++) {
        String feature = in.readString();
        int nMessages = in.readVInt();
        String[] messages = new String[nMessages];
        for (int j = 0; j < nMessages; j++) {
            messages[j] = in.readString();
        }
        acknowledgeMessages.put(feature, messages);
    }
    this.acknowledgeMessages = acknowledgeMessages;
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    out.writeVInt(status.id());
    out.writeOptionalString(acknowledgeHeader);
    out.writeVInt(acknowledgeMessages.size());
    for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
        out.writeString(entry.getKey());
        out.writeVInt(entry.getValue().length);
        for (String message : entry.getValue()) {
            out.writeString(message);
        }
    }
}
out.writeString(entry.getKey());
out.writeVInt(entry.getValue().length);
for (String message : entry.getValue()) {
    out.writeString(message);
}

@Override
protected void addCustomFields(XContentBuilder builder, Params params) throws IOException {
    switch (status) {
    case VALID:
        builder.field("license_status", "valid");
        break;
    case INVALID:
        builder.field("license_status", "invalid");
        break;
    case EXPIRED:
        builder.field("license_status", "expired");
        break;
    default:
        throw new IllegalArgumentException("unknown status \[" + status + "] found");
    }
    if (!acknowledgeMessages.isEmpty()) {
        builder.startObject("acknowledge");
        builder.field("message", acknowledgeHeader);
        for (Map.Entry<String, String> entry : acknowledgeMessages.entrySet()) {
            builder.startArray(entry.getKey());
            for (String message : entry.getValue()) {
                builder.value(message);
            }
            builder.endArray();
        }
        builder.endObject();
    }
}

@Override
public String toString() {
    return Strings.toString(this, true, true);
}

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 */
package org.elasticsearch.license;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.action.RestToXContentListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;
import java.io.IOException;
import static org.elasticsearch.rest.RestRequest.Method.POST;
import static org.elasticsearch.rest.RestRequest.Method.PUT;

public class RestPutLicenseAction extends XPackRestHandler {
    public RestPutLicenseAction(Settings settings, RestController controller) {
        super(settings);
        // @deprecated Remove deprecations in 6.0
        controller.registerWithDeprecatedHandler(POST, URI_BASE + "/license", this,
            POST, "/license", deprecationLogger);
        controller.registerWithDeprecatedHandler(PUT, URI_BASE + "/license", this,
            PUT, "/license", deprecationLogger);

        // Remove _licenses support entirely in 6.0
        controller.registerAsDeprecatedHandler(POST, "/licenses", this,
            "[POST /licenses] is deprecated! Use " +
            "[POST /xpack/license] instead.",
            deprecationLogger);
        controller.registerAsDeprecatedHandler(PUT, "/licenses", this,
            "[PUT /licenses] is deprecated! Use " +
            "[PUT /xpack/license] instead.",
            deprecationLogger);
    }

    @Override
    public String getName() {
        return "xpack_put_license_action";
    }

    @Override
    public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws IOException {
        if (request.hasContent() == false) {
            throw new IllegalArgumentException("The license must be provided in the request body");
        }
        PutLicenseRequest putLicenseRequest = new PutLicenseRequest();
        putLicenseRequest.license(request.content(), request.getXContentType());
        putLicenseRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
        putLicenseRequest.timeout(request.paramAsTime("timeout", putLicenseRequest.timeout()));
    }
}
putLicenseRequest.masterNodeTimeout(request.paramAsTime("master_timeout", putLicenseRequest.masterNodeTimeout()));

if ("basic".equals(putLicenseRequest.license().type())) {
    throw new IllegalArgumentException("Installing basic licenses is no longer allowed. Use the POST " + "/_xpack/license/start_basic API to install a basic license that does not expire.");
}

return channel -> client.es().admin().cluster().execute(PutLicenseAction.INSTANCE, putLicenseRequest, 
    new RestToXContentListener<>(channel));
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;
import java.io.IOException;
import java.util.Map;
import static org.elasticsearch.rest.RestRequest.Method.POST;

public class RestPostStartTrialLicense extends XPackRestHandler {

RestPostStartTrialLicense(Settings settings, RestController controller) {
    super(settings);
    controller.registerHandler(POST, URI_BASE + "/license/start_trial", this);
}

@Override
protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
{
    PostStartTrialRequest startTrialRequest = new PostStartTrialRequest();
    startTrialRequest.setType(request.param("type", "trial"));
    startTrialRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
    return channel -> client.licensing().postStartTrial(startTrialRequest,
    new RestToXContentListener<>(channel));
}
new RestBuilderListener<PostStartTrialResponse>(channel) {
    @Override
    public RestResponse buildResponse(PostStartTrialResponse response, XContentBuilder builder) throws Exception {
        PostStartTrialResponse.Status status = response.getStatus();
        builder.startObject();
        builder.field("acknowledged", startTrialRequest.isAcknowledged());
        if (status.isTrialStarted()) {
            builder.field("trial_was_started", true);
            builder.field("type", startTrialRequest.getType());
        } else {
            builder.field("trial_was_started", false);
            builder.field("error_message", status.getErrorMessage());
        }

        Map<String, String[]> acknowledgementMessages = response.getAcknowledgementMessages();
        if (acknowledgementMessages.isEmpty() == false) {
            builder.startObject("acknowledge");
            builder.field("message", response.getAcknowledgementMessage());
            for (Map.Entry<String, String[]> entry : acknowledgementMessages.entrySet()) {
                builder.startArray(entry.getKey());
                for (String message : entry.getValue()) {
                    builder.value(message);
                }
                builder.endArray();
            }
            builder.endObject();
        }
        builder.endObject();
        return new BytesRestResponse(status.getRestStatus(), builder);
    }
}

@Override
public String getName() {
    return "xpack_upgrade_to_trial_action";
}

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 */
package org.elasticsearch.license;
import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;
class PostStartBasicRequestBuilder extends ActionRequestBuilder<PostStartBasicRequest, PostStartBasicResponse, PostStartBasicRequestBuilder> {
    PostStartBasicRequestBuilder(ElasticsearchClient client, PostStartBasicAction action) {
        super(client, action, new PostStartBasicRequest());
    }

    public PostStartBasicRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;

public class DeleteLicenseResponse extends AcknowledgedResponse {
    DeleteLicenseResponse() {
    }

    DeleteLicenseResponse(boolean acknowledged) {
        super(acknowledged);
    }
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.RestStatus;
import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;
import static org.elasticsearch.license.PostStartBasicResponse.Status.NEED_ACKNOWLEDGEMENT;

class PostStartBasicResponse extends AcknowledgedResponse {

    private Map<String, String[]> acknowledgeMessages;
    private String acknowledgeMessage;

    enum Status {
        GENERATED_BASIC(true, null, RestStatus.OK),
        ALREADY_USING_BASIC(false, "Operation failed: Current license is basic.", RestStatus.FORBIDDEN),
        NEED_ACKNOWLEDGEMENT(false, "Operation failed: Needs acknowledgement.", RestStatus.OK);

        private final boolean isBasicStarted;
        private final String errorMessage;
        private final RestStatus restStatus;

        Status(boolean isBasicStarted, String errorMessage, RestStatus restStatus) {
            this.isBasicStarted = isBasicStarted;
            this.errorMessage = errorMessage;
            this.restStatus = restStatus;
        }

        boolean isBasicStarted() {
            return isBasicStarted;
        }

        String getErrorMessage() {
            return errorMessage;
        }

        RestStatus getRestStatus() {
            return restStatus;
        }
    }

    private final boolean isBasicStarted;
    private final String errorMessage;
    private final RestStatus restStatus;

    Status(boolean isBasicStarted, String errorMessage, RestStatus restStatus) {
        this.isBasicStarted = isBasicStarted;
        this.errorMessage = errorMessage;
        this.restStatus = restStatus;
    }

    boolean isBasicStarted() {
        return isBasicStarted;
    }

    String getErrorMessage() {
        return errorMessage;
    }

    RestStatus getRestStatus() {
        return restStatus;
    }
}

private Status status;

PostStartBasicResponse() {
}

PostStartBasicResponse(Status status) {
    this(status, Collections.emptyMap(), null);
}

PostStartBasicResponse(Status status, Map<String, String[]> acknowledgeMessages, String acknowledgeMessage) {
    super(status != NEED_ACKNOWLEDGEMENT);
public Status getStatus() {
    return status;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    status = in.readEnum(Status.class);
    acknowledgeMessage = in.readOptionalString();
    int size = in.readVInt();
    Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
    for (int i = 0; i < size; i++) {
        String feature = in.readString();
        int nMessages = in.readVInt();
        String[] messages = new String[nMessages];
        for (int j = 0; j < nMessages; j++) {
            messages[j] = in.readString();
        }
        acknowledgeMessages.put(feature, messages);
    }
    this.acknowledgeMessages = acknowledgeMessages;
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    out.writeEnum(status);
    out.writeOptionalString(acknowledgeMessage);
    out.writeVInt(acknowledgeMessages.size());
    for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
        out.writeString(entry.getKey());
        out.writeVInt(entry.getValue().length);
        for (String message : entry.getValue()) {
            out.writeString(message);
        }
    }
}

@Override
protected void addCustomFields(XContentBuilder builder, Params params) throws IOException {
    if (status.isBasicStarted()) {
        builder.field("basic_was_started", true);
    } else {

builder.field("basic_was_started", false);
builder.field("error_message", status.getErrorMessage());
}
if (acknowledgeMessages.isEmpty() == false) {
builder.startObject("acknowledge");
builder.field("message", acknowledgeMessage);
for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
builder.startArray(entry.getKey());
for (String message : entry.getValue()) {
builder.value(message);
}
builder.endArray();
}
builder.endObject();
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportDeleteLicenseAction extends TransportMasterNodeAction<DeleteLicenseRequest,
DeleteLicenseResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportDeleteLicenseAction(Settings settings, TransportService transportService, ClusterService
    clusterService,
            LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
IndexNameExpressionResolver indexNameExpressionResolver) {
    super(settings, DeleteLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
           indexNameExpressionResolver, DeleteLicenseRequest::new);
    this.licenseService = licenseService;
}

@Override
protected String executor() {
    return ThreadPool.Names.MANAGEMENT;
}

@Override
protected DeleteLicenseResponse newResponse() {
    return new DeleteLicenseResponse();
}

@Override
protected ClusterBlockException checkBlock(DeleteLicenseRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
}

@Override
protected void masterOperation(final DeleteLicenseRequest request, ClusterState state, final
ActionListener<DeleteLicenseResponse>
    listener) throws ElasticsearchException {
    licenseService.removeLicense(request, new ActionListener<ClusterStateUpdateResponse>() {
        @Override
        public void onResponse(ClusterStateUpdateResponse clusterStateUpdateResponse) {
            listener.onResponse(new DeleteLicenseResponse(clusterStateUpdateResponse.isAcknowledged()));
        }
        @Override
        public void onFailure(Exception e) {
            listener.onFailure(e);
        }
    });
}

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 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.apache.logging.log4j.util.Supplier;
import org.apache.lucene.util.BytesRef;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.watcher.FileChangesListener;
import org.elasticsearch.watcher.FileWatcher;
import org.elasticsearch.watcher.ResourceWatcherService;

import java.io.IOException;
import java.nio.file.Files;
import java.nio.file.Path;
import java.util.concurrent.atomic.AtomicBoolean;

/**
 * File based watcher for license {@link OperationMode}
 * Watches for changes in <code>licenseModePath</code>, use
 * {@link #getCurrentOperationMode()} to access the latest mode
 * *
 * In case of failure to read a valid operation mode from <code>licenseModePath</code>,
 * the operation mode will default to PLATINUM
 * */
public final class OperationModeFileWatcher implements FileChangesListener {
    private final ResourceWatcherService resourceWatcherService;
    private final Path licenseModePath;
    private final AtomicBoolean initialized = new AtomicBoolean();
    private final OperationMode defaultOperationMode = OperationMode.PLATINUM;
    private volatile OperationMode currentOperationMode = defaultOperationMode;
    private final Logger logger;
    private final Runnable onChange;
    public OperationModeFileWatcher(ResourceWatcherService resourceWatcherService, Path licenseModePath,
          Logger logger, Runnable onChange) {
        this.resourceWatcherService = resourceWatcherService;
        this.licenseModePath = licenseModePath;
        this.logger = logger;
        this.onChange = onChange;
    }

    public void init() {
        if (initialized.compareAndSet(false, true)) {
            final FileWatcher watcher = new FileWatcher(licenseModePath);
            watcher.addListener(this);
            try {
                resourceWatcherService.add(watcher, ResourceWatcherService.Frequency.HIGH);
                if (Files.exists(licenseModePath)) {
                    onChange(licenseModePath);
                }
            } catch (IOException e) {
                logger.error("couldn't initialize watching license mode file", e);
            }
        }
    }
}
/**
 * Returns the current operation mode based on license mode file.
 * Defaults to {@link OperationMode#PLATINUM}
 */
public OperationMode getCurrentOperationMode() {
    return currentOperationMode;
}

@Override
public void onFileInit(Path file) {
    onChange(file);
}

@Override
public void onFileCreated(Path file) {
    onChange(file);
}

@Override
public void onFileDeleted(Path file) {
    onChange(file);
}

@Override
public void onFileChanged(Path file) {
    onChange(file);
}

private synchronized void onChange(Path file) {
    if (file.equals(licenseModePath)) {
        OperationMode newOperationMode = defaultOperationMode;
        try {
            if (Files.exists(licenseModePath)
                && Files.isReadable(licenseModePath)) {
                final byte[] content;
                try {
                    content = Files.readAllBytes(licenseModePath);
                } catch (IOException e) {
                    logger.error(
                            (Supplier<?>) () -> new ParameterizedMessage(
                                "couldn't read operation mode from [{ }]", licenseModePath.toAbsolutePath()), e);
                    return;
                }
            // this UTF-8 conversion is much pickier than java String
            } catch (IOException e) {
                logger.error(
                        (Supplier<?>) () -> new ParameterizedMessage(
                            "couldn't read operation mode from [{ }]", licenseModePath.toAbsolutePath()), e);
                return;
            }
        } catch (IOException e) {
            logger.error(
                    (Supplier<?>) () -> new ParameterizedMessage(
                        "couldn't read operation mode from [{ }]", licenseModePath.toAbsolutePath()), e);
            return;
        }
    }
}
final String operationMode = new BytesRef(content).utf8ToString();
try {
    newOperationMode = OperationMode.resolve(operationMode);
} catch (IllegalArgumentException e) {
    logger.error((Supplier<?>) () -> new ParameterizedMessage("invalid operation mode in [{ }]", licenseModePath.toAbsolutePath()), e);
    return;
}

finally {
    // set this after the fact to prevent that we are jumping back and forth first setting to defautl and then
    // actual op mode resetting it.
    this.currentOperationMode = newOperationMode;
    onChange.run();
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import java.io.IOException;

class GetTrialStatusResponse extends ActionResponse {

    private boolean eligibleToStartTrial;

    GetTrialStatusResponse() {
    }

    GetTrialStatusResponse(boolean eligibleToStartTrial) {
        this.eligibleToStartTrial = eligibleToStartTrial;
    }

    boolean isEligibleToStartTrial() {
        return eligibleToStartTrial;
    }
@Override
public void readFrom(StreamInput in) throws IOException {
    eligibleToStartTrial = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    out.writeBoolean(eligibleToStartTrial);
}

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*/
package org.elasticsearch.license;

import javax.crypto.BadPaddingException;
import javax.crypto.Cipher;
import javax.crypto.IllegalBlockSizeException;
import javax.crypto.NoSuchPaddingException;
import javax.crypto.SecretKey;
import javax.crypto.SecretKeyFactory;
import javax.crypto.spec.PBEKeySpec;
import javax.crypto.spec.SecretKeySpec;
import java.nio.charset.StandardCharsets;
import java.security.GeneralSecurityException;
import java.security.KeyFactory;
import java.security.MessageDigest;
import java.security.PrivateKey;
import java.security.PublicKey;
import java.security.SecureRandom;
import java.security.NoSuchAlgorithmException;
import java.security.InvalidKeyException;
import java.security.spec.InvalidKeySpecException;
import java.security.spec.PKCS8EncodedKeySpec;
import java.security.spec.X509EncodedKeySpec;
import java.util.Base64;

public class CryptUtils {
    // SALT must be at least 128bits for FIPS 140-2 compliance
    private static final byte[] SALT = {
        (byte) 0x74, (byte) 0x68, (byte) 0x69, (byte) 0x73,
        (byte) 0x69, (byte) 0x73, (byte) 0x74, (byte) 0x68,
        (byte) 0x65, (byte) 0x73, (byte) 0x61, (byte) 0x6C,
        (byte) 0x74, (byte) 0x77, (byte) 0x65, (byte) 0x75
    };
private static final String KEY_ALGORITHM = "RSA";
private static final char[] DEFAULT_PASS_PHRASE = "elasticsearch-license".toCharArray();
private static final String KDF_ALGORITHM = "PBKDF2WithHmacSHA512";
private static final int KDF_ITERATION_COUNT = 10000;
private static final String CIPHER_ALGORITHM = "AES";
// This can be changed to 256 once Java 9 is the minimum version
// http://www.oracle.com/technetwork/java/javase/terms/readme/jdk9-readme-3852447.html#jce
private static final int ENCRYPTION_KEY_LENGTH = 128;
private static final SecureRandom RANDOM = new SecureRandom();

/**
 * Read encrypted private key file content with default pass phrase
 */
public static PrivateKey readEncryptedPrivateKey(byte[] fileContents) {
  return readEncryptedPrivateKey(fileContents, DEFAULT_PASS_PHRASE, false);
}

/**
 * Returns encrypted private key file content with default pass phrase
 */
public static byte[] writeEncryptedPrivateKey(PrivateKey privateKey) {
  return writeEncryptedPrivateKey(privateKey, DEFAULT_PASS_PHRASE);
}

/**
 * Read encrypted private key file content with provided <code>passPhrase</code>
 */
public static PrivateKey readEncryptedPrivateKey(byte[] fileContents, char[] passPhrase, boolean preV4) {
  byte[] keyBytes = preV4 ? decryptV3Format(fileContents) : decrypt(fileContents, passPhrase);
  PKCS8EncodedKeySpec privateKeySpec = new PKCS8EncodedKeySpec(keyBytes);
  try {
    return KeyFactory.getInstance(KEY_ALGORITHM).generatePrivate(privateKeySpec);
  } catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
    throw new IllegalStateException(e);
  }
}

/**
 * Read public key file content
 */
public static PublicKey readPublicKey(byte[] fileContents) {
  X509EncodedKeySpec publicKeySpec = new X509EncodedKeySpec(fileContents);
  try {
    return KeyFactory.getInstance(CryptUtils.KEY_ALGORITHM).generatePublic(publicKeySpec);
  } catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
    throw new IllegalStateException(e);
  }
}
public static byte[] writeEncryptedPublicKey(PublicKey publicKey) {
    X509EncodedKeySpec encodedKeySpec = new X509EncodedKeySpec(publicKey.getEncoded());
    return encrypt(encodedKeySpec.getEncoded(), DEFAULT_PASS_PHRASE);
}

public static byte[] writeEncryptedPrivateKey(PrivateKey privateKey, char[] passPhrase) {
    PKCS8EncodedKeySpec encodedKeySpec = new PKCS8EncodedKeySpec(privateKey.getEncoded());
    return encrypt(encodedKeySpec.getEncoded(), passPhrase);
}

static byte[] encrypt(byte[] data) {
    return encrypt(data, DEFAULT_PASS_PHRASE);
}

static byte[] decrypt(byte[] encryptedData) {
    return decrypt(encryptedData, DEFAULT_PASS_PHRASE);
}

private static byte[] encrypt(byte[] data, char[] passPhrase) {
    try {
        final Cipher encryptionCipher = getEncryptionCipher(deriveSecretKey(passPhrase));
        return encryptionCipher.doFinal(data);
    } catch (IllegalBlockSizeException | BadPaddingException e) {
        throw new IllegalStateException(e);
    }
}

private static byte[] decrypt(byte[] encryptedData, char[] passPhrase) {
    try {
        return decrypt(encryptedData, passPhrase);
    } catch (IllegalBlockSizeException | BadPaddingException e) {
        throw new IllegalStateException(e);
    }
}
final Cipher cipher = getDecryptionCipher(deriveSecretKey(passPhrase));
return cipher.doFinal(encryptedData);
} catch (IllegalBlockSizeException | BadPaddingException e) {
    throw new IllegalStateException(e);
}

}

static byte[] encryptV3Format(byte[] data) {
    try {
        SecretKey encryptionKey = getV3Key();
        final Cipher encryptionCipher = getEncryptionCipher(encryptionKey);
        return encryptionCipher.doFinal(pad(data, 20));
    } catch (GeneralSecurityException e) {
        throw new IllegalStateException(e);
    }
}

static byte[] decryptV3Format(byte[] data) {
    try {
        SecretKey decryptionKey = getV3Key();
        final Cipher decryptionCipher = getDecryptionCipher(decryptionKey);
        return unPad(decryptionCipher.doFinal(data));
    } catch (GeneralSecurityException e) {
        throw new IllegalStateException(e);
    }
}

private static SecretKey getV3Key() throws NoSuchAlgorithmException, InvalidKeySpecException {
    final byte[] salt = {
        (byte) 0xA9, (byte) 0xA2, (byte) 0xB5, (byte) 0xDE,
        (byte) 0x2A, (byte) 0x8A, (byte) 0x9A, (byte) 0xE6
    };
    final byte[] passBytes = "elasticsearch-license".getBytes(StandardCharsets.UTF_8);
    final byte[] digest = MessageDigest.getInstance("SHA-512").digest(passBytes);
    final char[] hashedPassphrase = Base64.getEncoder().encodeToString(digest).toCharArray();
    PBEKeySpec keySpec = new PBEKeySpec(hashedPassphrase, salt, 1024, 128);
    byte[] shortKey = SecretKeyFactory.getInstance("PBEWithSHA1AndDESede").
generateSecret(keySpec).getEncoded();
    byte[] intermediaryKey = new byte[16];
    for (int i = 0, j = 0; i < 16; i++) {
        intermediaryKey[i] = shortKey[j];
        if (++j == shortKey.length)
            j = 0;
    }
    return new SecretKeySpec(intermediaryKey, "AES");
}

private static SecretKey deriveSecretKey(char[] passPhrase) {
try {
    PBEKeySpec keySpec = new PBEKeySpec(passPhrase, SALT, KDF_ITERATION_COUNT,
            ENCRYPTION_KEY_LENGTH);

    SecretKey secretKey = SecretKeyFactory.getInstance(KDF_ALGORITHM).
            generateSecret(keySpec);
    return new SecretKeySpec(secretKey.getEncoded(), CIPHER_ALGORITHM);
} catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
    throw new IllegalStateException(e);
}

private static Cipher getEncryptionCipher(SecretKey secretKey) {
    return getCipher(Cipher.ENCRYPT_MODE, secretKey);
}

private static Cipher getDecryptionCipher(SecretKey secretKey) {
    return getCipher(Cipher.DECRYPT_MODE, secretKey);
}

private static Cipher getCipher(int mode, SecretKey secretKey) {
    try {
        Cipher cipher = Cipher.getInstance(CIPHER_ALGORITHM);
        cipher.init(mode, secretKey, RANDOM);
        return cipher;
    } catch (NoSuchAlgorithmException | InvalidKeyException | NoSuchPaddingException e) {
        throw new IllegalStateException(e);
    }
}

private static byte[] pad(byte[] bytes, int length) {
    if (bytes.length >= length) {
        byte[] out = new byte[bytes.length + 1];
        System.arraycopy(bytes, 0, out, 0, bytes.length);
        out[bytes.length] = (byte) 1;
        return out;
    }

    byte[] out = new byte[length + 1];
    int i = 0;
    for (; i < bytes.length; i++)
        out[i] = bytes[i];

    int padded = length - i;

    // fill the rest with random bytes
    byte[] fill = new byte[padded - 1];
```java
import java.io.IOException;
import static org.elasticsearch.rest.RestRequest.Method.GET;

public class RestGetTrialStatus extends XPackRestHandler {

    RestGetTrialStatus(Settingsoptions, RestController controller) {
        super(options);
        controller.registerHandler(GET, URI_BASE + "/license/trial_status", this);
    }
```
@Override
protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException {
    return channel -> client.licensing().prepareGetStartTrial().execute(
        new RestBuilderListener<GetTrialStatusResponse>(channel) {
            @Override
            public RestResponse buildResponse(GetTrialStatusResponse response, XContentBuilder builder) throws Exception {
                builder.startObject();
                builder.field("eligible_to_start_trial", response.isEligibleToStartTrial());
                builder.endObject();
                return new BytesRestResponse(RestStatus.OK, builder);
            }
        });
    }
}

@Override
public String getName() {
    return "xpack_trial_status_action";
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PostStartTrialAction extends Action<PostStartTrialRequest, PostStartTrialResponse, PostStartTrialRequestBuilder> {

    public static final PostStartTrialAction INSTANCE = new PostStartTrialAction();
    public static final String NAME = "cluster:admin/xpack/license/start_trial";

    private PostStartTrialAction() {
        super(NAME);
    }

    @Override
    public PostStartTrialRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new PostStartTrialRequestBuilder(client, this);
    }

    @Override
    public PostStartTrialResponse newResponse() {
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.Version;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.rest.RestStatus;
import java.util.stream.StreamSupport;

public class LicenseUtils {

    public static final String EXPIRED_FEATURE_METADATA = "es.license.expired.feature";

    /**
     * Exception to be thrown when a feature action requires a valid license, but license
     * has expired
     *
     * <code>feature</code> accessible through {@link #EXPIRED_FEATURE_METADATA} in the
     * exception's rest header
     */
    public static ElasticsearchSecurityException newComplianceException(String feature) {
        ElasticsearchSecurityException e = new ElasticsearchSecurityException("current license is non-compliant for
            [{}],
            RestStatus.FORBIDDEN, feature);
        e.addMetadata(EXPIRED_FEATURE_METADATA, feature);
        return e;
    }

    /**
     * Checks if a given {@link ElasticsearchSecurityException} refers to a feature that
     * requires a valid license, but the license has expired.
     */
    public static boolean isLicenseExpiredException(ElasticsearchSecurityException exception) {
        return (exception != null) && (exception.getMetadata(EXPIRED_FEATURE_METADATA) != null);
    }

    public static boolean licenseNeedsExtended(License license) {
        return "basic".equals(license.type()) && license.expiryDate() !=
            LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    }
}
/**
 * Checks if the signature of a self generated license with older version needs to be
 * recreated with the new key
 */

public static boolean signatureNeedsUpdate(License license, DiscoveryNodes currentNodes) {
    assert License.VERSION_CRYPTO_ALGORITHMS == License.VERSION_CURRENT : "update this method when adding a new version";
    return ("basic".equals(license.type()) || "trial".equals(license.type())) &&
           // only upgrade signature when all nodes are ready to deserialize the new signature
           (license.version() < License.VERSION_CRYPTO_ALGORITHMS &&
            compatibleLicenseVersion(currentNodes) == License.VERSION_CRYPTO_ALGORITHMS);
}

public static int compatibleLicenseVersion(DiscoveryNodes currentNodes) {
    assert License.VERSION_CRYPTO_ALGORITHMS == License.VERSION_CURRENT : "update this method when adding a new version";
    if (StreamSupport.stream(currentNodes.spliterator(), false)
        .allMatch(node -> node.getVersion().onOrAfter(Version.V_6_4_0))){
        // License.VERSION_CRYPTO_ALGORITHMS was introduced in 6.4.0
        return License.VERSION_CRYPTO_ALGORITHMS;
    } else {
        return License.VERSION_START_DATE;
    }
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;

public class GetTrialStatusRequest extends MasterNodeReadRequest<GetTrialStatusRequest> {
    public GetTrialStatusRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class DeleteLicenseAction extends Action<DeleteLicenseRequest, DeleteLicenseResponse, DeleteLicenseRequestBuilder> {

    public static final DeleteLicenseAction INSTANCE = new DeleteLicenseAction();
    public static final String NAME = "cluster:admin/xpack/license/delete";

    private DeleteLicenseAction() {
        super(NAME);
    }

    @Override
    public DeleteLicenseResponse newResponse() {
        return new DeleteLicenseResponse();
    }

    @Override
    public DeleteLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new DeleteLicenseRequestBuilder(client, this);
    }

    /*
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     * or more contributor license agreements. Licensed under the Elastic License;
     * you may not use this file except in compliance with the Elastic License.
     */
    package org.elasticsearch.license;

    import org.elasticsearch.ElasticsearchException;
    import org.elasticsearch.action.ActionListener;
    import org.elasticsearch.action.support.ActionFilters;
    import org.elasticsearch.action.support.master.TransportMasterNodeAction;
    import org.elasticsearch.cluster.service.ClusterService;
    import org.elasticsearch.cluster.block.ClusterBlockException;
    import org.elasticsearch.cluster.block.ClusterBlockLevel;
    import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
    import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPutLicenseAction extends TransportMasterNodeAction<PutLicenseRequest,
PutLicenseResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportPutLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
            LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
            IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, PutLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
        indexNameExpressionResolver,
            PutLicenseRequest::new);
        this.licenseService = licenseService;
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.MANAGEMENT;
    }

    @Override
    protected PutLicenseResponse newResponse() {
        return new PutLicenseResponse();
    }

    @Override
    protected ClusterBlockException checkBlock(PutLicenseRequest request, ClusterState state) {
        return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
    }

    @Override
    protected void masterOperation(final PutLicenseRequest request, ClusterState state, final
ActionListener<PutLicenseResponse>
            listener) throws ElasticsearchException {
        licenseService.registerLicense(request, listener);
    }

    }

    /*
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     * or more contributor license agreements. Licensed under the Elastic License;
     * you may not use this file except in compliance with the Elastic License.
     */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class GetTrialStatusRequestBuilder extends ActionRequestBuilder<GetTrialStatusRequest, GetTrialStatusResponse, GetTrialStatusRequestBuilder> {

    GetTrialStatusRequestBuilder(ElasticsearchClient client, GetTrialStatusAction action) {
        super(client, action, new GetTrialStatusRequest());
    }
}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */

package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.monitoring.MonitoringField;

import java.util.Collections;
import java.util.LinkedHashMap;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.concurrent.CopyOnWriteArrayList;
import java.util.function.BiFunction;

/**
 * A holder for the current state of the license for all xpack features.
 */
public class XPackLicenseState {

    /** Messages for each feature which are printed when the license expires. */
    static final Map<String, String[]> EXPIRATION_MESSAGES;
    static {
        Map<String, String[]> messages = new LinkedHashMap<>();
        messages.put(XPackField.SECURITY, new String[] {

    }
"Cluster health, cluster stats and indices stats operations are blocked",
"All data operations (read and write) continue to work"
});
messages.put(XPackField.WATCHER, new String[] {
"PUT / GET watch APIs are disabled, DELETE watch API continues to work",
"Watches execute and write to the history",
"The actions of the watches don't execute"
});
messages.put(XPackField.MONITORING, new String[] {
"The agent will stop collecting cluster and indices metrics",
"The agent will stop automatically cleaning indices older than [xpack.monitoring.history.duration]"
});
messages.put(XPackField.GRAPH, new String[] {
"Graph explore APIs are disabled"
});
messages.put(XPackField.MACHINE_LEARNING, new String[] {
"Machine learning APIs are disabled"
});
messages.put(XPackField.LOGSTASH, new String[] {
"Logstash will continue to poll centrally-managed pipelines"
});
messages.put(XPackField.DEPRECATION, new String[] {
"Deprecation APIs are disabled"
});
messages.put(XPackField.UPGRADE, new String[] {
"Upgrade API is disabled"
});
messages.put(XPackField.SQL, new String[] {
"SQL support is disabled"
});
messages.put(XPackField.ROLLUP, new String[] {
"Creating and Starting rollup jobs will no longer be allowed.",
"Stopping/Deleting existing jobs, RollupCaps API and RollupSearch continue to function."
});
EXPIRATION_MESSAGES = Collections.unmodifiableMap(messages);
}

/**
 * Messages for each feature which are printed when the license type changes.
 * The value is a function taking the old and new license type, and returns the messages for that feature.
 */
static final Map<String, BiFunction<OperationMode, OperationMode, String[]>> ACKNOWLEDGMENT_MESSAGES;
static {
Map<String, BiFunction<OperationMode, OperationMode, String[]>> messages = new LinkedHashMap<>();
messages.put(XPackField.SECURITY, XPackLicenseState::securityAcknowledgementMessages);
messages.put(XPackField.WATCHER, XPackLicenseState::watcherAcknowledgementMessages);
messages.put(XPackField.MONITORING, XPackLicenseState::monitoringAcknowledgementMessages);
messages.put(XPackField.GRAPH, XPackLicenseState::graphAcknowledgementMessages);
messages.put(XPackField.MACHINE_LEARNING, XPackLicenseState::machineLearningAcknowledgementMessages);
messages.put(XPackField.LOGSTASH, XPackLicenseState::logstashAcknowledgement Messages);
messages.put(XPackField.DEPRECATION, XPackLicenseState::deprecationAcknowledgementMessages);
messages.put(XPackField.UPGRADE, XPackLicenseState::upgradeAcknowledgementMessages);
messages.put(XPackField.SQL, XPackLicenseState::sqlAcknowledgementMessages);
messages.put(XPackField.ROLLUP, XPackLicenseState::rollupAcknowledgementMessages);
ACKNOWLEDGMENT_MESSAGES = Collections.unmodifiableMap(messages);
}
messages.put(XPackField.GRAPH, XPackLicenseState::graphAcknowledgementMessages);
messages.put(XPackField.MACHINE_LEARNING, XPackLicenseState::machineLearningAcknowledgementMessages);
messages.put(XPackField.LOGSTASH, XPackLicenseState::logstashAcknowledgementMessages);
messages.put(XPackField.SQL, XPackLicenseState::sqlAcknowledgementMessages);
ACKNOWLEDGMENT_MESSAGES = Collections.unmodifiableMap(messages);
}

private static String[] securityAcknowledgementMessages(OperationMode currentMode, OperationMode newMode) {
    switch (newMode) {
        case BASIC:
            switch (currentMode) {
                case TRIAL:
                case STANDARD:
                case GOLD:
                case PLATINUM:
                    return new String[] {
                        "The following X-Pack security functionality will be disabled: authentication, authorization," +
                        "ip filtering, and auditing. Please restart your node after applying the license.",
                        "Field and document level access control will be disabled.",
                        "Custom realms will be ignored."
                    };
            }
            break;
        case GOLD:
            switch (currentMode) {
                case BASIC:
                case STANDARD:
                    // ^^ though technically it was already disabled, it's not bad to remind them
                case TRIAL:
                case PLATINUM:
                    return new String[] {
                        "Field and document level access control will be disabled.",
                        "Custom realms will be ignored."
                    };
            }
            break;
        case STANDARD:
            switch (currentMode) {
                case BASIC:
                    // ^^ though technically it was already disabled, it's not bad to remind them
                case GOLD:
                case PLATINUM:
                case TRIAL:
                    return new String[] {
                        "Authentication will be limited to the native realms.",
                        "IP filtering and auditing will be disabled."
                    };
            }
            break;
    }
    return new String[] {
        "Field and document level access control will be disabled.",
        "Custom realms will be ignored."
    };
}
"Field and document level access control will be disabled."
"Custom realms will be ignored."
};
}
}
return Strings.EMPTY_ARRAY;

private static String[] watcherAcknowledgementMessages(OperationMode currentMode, OperationMode newMode) {
  switch (newMode) {
    case BASIC:
      switch (currentMode) {
        case TRIAL:
        case STANDARD:
        case GOLD:
        case PLATINUM:
          return new String[] { "Watcher will be disabled" };
        }
      break;
    }
    return Strings.EMPTY_ARRAY;
  }

private static String[] monitoringAcknowledgementMessages(OperationMode currentMode, OperationMode newMode) {
  switch (newMode) {
    case BASIC:
      switch (currentMode) {
        case TRIAL:
        case STANDARD:
        case GOLD:
        case PLATINUM:
          return new String[] {
            LoggerMessageFormat.format(
              "Multi-cluster support is disabled for clusters with \{\} license. If you are\n" +
              "running multiple clusters, users won't be able to access the clusters with\n" +
              "\{\} licenses from within a single X-Pack Kibana instance. You will have to deploy a\n" +
              "separate and dedicated X-pack Kibana instance for each \{\} cluster you wish to monitor.\",
            newMode, newMode, newMode),
            LoggerMessageFormat.format(
              "Automatic index cleanup is locked to \{\} days for clusters with \{\} license.\",
              MonitoringField.HISTORY_DURATION.getDefault(Settings.EMPTY).days(), newMode)
          };
        }
      break;
    }
    return Strings.EMPTY_ARRAY;
  }
private static String[] graphAcknowledgementMessages(OperationMode currentMode, OperationMode newMode) {
    switch (newMode) {
    case BASIC:
        case STANDARD:
        case GOLD:
            switch (currentMode) {
                case TRIAL:
                case PLATINUM:
                    return new String[] { "Graph will be disabled" }; // return the message
                }
            break;
    }
    return Strings.EMPTY_ARRAY;
}

private static String[] machineLearningAcknowledgementMessages(OperationMode currentMode, OperationMode newMode) {
    switch (newMode) {
    case BASIC:
        case STANDARD:
        case GOLD:
            switch (currentMode) {
                case TRIAL:
                case PLATINUM:
                    return new String[] { "Machine learning will be disabled" }; // return the message
                }
            break;
    }
    return Strings.EMPTY_ARRAY;
}

private static String[] logstashAcknowledgementMessages(OperationMode currentMode, OperationMode newMode) {
    switch (newMode) {
    case BASIC:
        switch (currentMode) {
            case TRIAL:
            case STANDARD:
            case GOLD:
            case PLATINUM:
                return new String[] { "Logstash will no longer poll for centrally-managed pipelines" }; // return the message
            }
        break;
    }
    return Strings.EMPTY_ARRAY;
private static String[] sqlAcknowledgementMessages(OperationMode currentMode, OperationMode newMode) {
    switch (newMode) {
        case BASIC:
            case STANDARD:
            case GOLD:
                switch (currentMode) {
                    case TRIAL:
                    case PLATINUM:
                        return new String[] { "JDBC support will be disabled, but you can continue to use SQL CLI and
                        REST endpoint" };
                    
                    break;
                }
    }
    return Strings.EMPTY_ARRAY;
}

/** A wrapper for the license mode and state, to allow atomically swapping. */
private static class Status {

    /** The current "mode" of the license (ie license type). */
    final OperationMode mode;

    /** True if the license is active, or false if it is expired. */
    final boolean active;

    Status(OperationMode mode, boolean active) {
        this.mode = mode;
        this.active = active;
    }
}

private final List<Runnable> listeners;
private final boolean isSecurityEnabled;
private final boolean isSecurityExplicitlyEnabled;

private Status status = new Status(OperationMode.TRIAL, true);
private boolean isSecurityEnabledByTrialVersion;

public XPackLicenseState(Settings settings) {
    this.listeners = new CopyOnWriteArrayList<>();
    this.isSecurityEnabled = XPackSettings.SECURITY_ENABLED.get(settings);
    // 6.0+ requires TLS for production licenses, so if TLS is enabled and security is enabled
    // we can interpret this as an explicit enabling of security if the security enabled
    // setting is not explicitly set
    this.isSecurityExplicitlyEnabled = isSecurityEnabled &&
        (settings.hasValue(XPackSettings.SECURITY_ENABLED.getKey()) ||

    private final List<Runnable> listeners;
    private final boolean isSecurityEnabled;
    private final boolean isSecurityExplicitlyEnabled;
    private Status status = new Status(OperationMode.TRIAL, true);
    private boolean isSecurityEnabledByTrialVersion;

    public XPackLicenseState(Settings settings) {
        this.listeners = new CopyOnWriteArrayList<>();
        this.isSecurityEnabled = XPackSettings.SECURITY_ENABLED.get(settings);
        // 6.0+ requires TLS for production licenses, so if TLS is enabled and security is enabled
        // we can interpret this as an explicit enabling of security if the security enabled
        // setting is not explicitly set
        this.isSecurityExplicitlyEnabled = isSecurityEnabled &&
            (settings.hasValue(XPackSettings.SECURITY_ENABLED.getKey()) ||
XPackSettings.TRANSPORT_SSL_ENABLED.get(settings));
this.isSecurityEnabledByTrialVersion = false;
}

private XPackLicenseState(XPackLicenseState xPackLicenseState) {
    this.listeners = xPackLicenseState.listeners;
    this.isSecurityEnabled = xPackLicenseState.isSecurityEnabled;
    this.isSecurityExplicitlyEnabled = xPackLicenseState.isSecurityExplicitlyEnabled;
    this.status = xPackLicenseState.status;
    this.isSecurityEnabledByTrialVersion = xPackLicenseState.isSecurityEnabledByTrialVersion;
}

/**
 * Updates the current state of the license, which will change what features are available.
 *
 * @param mode   The mode (type) of the current license.
 * @param active True if the current license exists and is within its allowed usage period; false if it is expired or
 * missing.
 * @param mostRecentTrialVersion If this cluster has, at some point commenced a trial, the most recent version
 * on which they did that.
 * May be [@code null] if they have never generated a trial license on this cluster, or the most
 * recent
 * trial was prior to this metadata being tracked (6.1)
 */
void update(OperationMode mode, boolean active, @Nullable Version mostRecentTrialVersion) {
    synchronized (this) {
        status = new Status(mode, active);
        if (isSecurityEnabled == true && isSecurityExplicitlyEnabled == false && mode == OperationMode.TRIAL
            && isSecurityEnabledByTrialVersion == false) {
            // Before 6.3, Trial licenses would default having security enabled.
            // If this license was generated before that version, then treat it as if security is explicitly enabled
            if (mostRecentTrialVersion == null || mostRecentTrialVersion.before(Version.V_6_3_0)) {
                Loggers.getLogger(getClass()).info("Automatically enabling security for older trial license ({}),
mostRecentTrialVersion == null ? "$[pre 6.1.0]" : mostRecentTrialVersion.toString());
                isSecurityEnabledByTrialVersion = true;
            }
        }
    }
    listeners.forEach(Runnable::run);
}

/** Add a listener to be notified on license change */
public void addListener(Runnable runnable) {
    listeners.add(Objects.requireNonNull(runnable));
}

/** Remove a listener */
public void removeListener(Runnable runnable) {
}
 /**
 * @return true if authentication and authorization should be enabled. this does not indicate what realms are
 * available
 * @see #allowedRealmType() for the enabled realms
 */
 public synchronized boolean isAuthAllowed() {
     OperationMode mode = status.mode;
     final boolean isSecurityCurrentlyEnabled =
         isSecurityEnabled(mode, isSecurityExplicitlyEnabled, isSecurityEnabledByTrialVersion, isSecurityEnabled);
     return isSecurityCurrentlyEnabled && (mode == OperationMode.STANDARD || mode == OperationMode.GOLD
         || mode == OperationMode.PLATINUM || mode == OperationMode.TRIAL);
 }

 /**
 * @return true if IP filtering should be enabled
 */
 public synchronized boolean isIpFilteringAllowed() {
     OperationMode mode = status.mode;
     final boolean isSecurityCurrentlyEnabled =
         isSecurityEnabled(mode, isSecurityExplicitlyEnabled, isSecurityEnabledByTrialVersion, isSecurityEnabled);
     return isSecurityCurrentlyEnabled && (mode == OperationMode.GOLD || mode == OperationMode.PLATINUM
         || mode == OperationMode.TRIAL);
 }

 /**
 * @return true if auditing should be enabled
 */
 public synchronized boolean isAuditingAllowed() {
     OperationMode mode = status.mode;
     final boolean isSecurityCurrentlyEnabled =
         isSecurityEnabled(mode, isSecurityExplicitlyEnabled, isSecurityEnabledByTrialVersion, isSecurityEnabled);
     return isSecurityCurrentlyEnabled && (mode == OperationMode.GOLD || mode == OperationMode.PLATINUM
         || mode == OperationMode.TRIAL);
/**
 * Indicates whether the stats and health API calls should be allowed. If a license is expired and past the grace
 * period then we deny these calls.
 *
 * @return true if the license allows for the stats and health APIs to be used.
 */
public synchronized boolean isStatsAndHealthAllowed() {
    return status.active;
}

/**
 * Determine if Document Level Security (DLS) and Field Level Security (FLS) should be enabled.
 * <p>
 * DLS and FLS are only disabled when the mode is not:
 * <ul>
 * <li>{@link OperationMode#PLATINUM}</li>
 * <li>{@link OperationMode#TRIAL}</li>
 * </ul>
 * Note: This does not consider the <em>state</em> of the license so that Security does not suddenly leak
 * information!
 * 
 * @return {@code true} to enable DLS and FLS. Otherwise {@code false}.
 */
public synchronized boolean isDocumentAndFieldLevelSecurityAllowed() {
    OperationMode mode = status.mode;
    final boolean isSecurityCurrentlyEnabled =
        isSecurityEnabled(mode, isSecurityExplicitlyEnabled, isSecurityEnabledByTrialVersion, isSecurityEnabled);
    return isSecurityCurrentlyEnabled && (mode == OperationMode.TRIAL || mode ==
    OperationMode.PLATINUM);
}

/** Classes of realms that may be available based on the license type. */
public enum AllowedRealmType {
    NONE, 
    NATIVE, 
    DEFAULT, 
    ALL 
}

/**
 * @return the type of realms that are enabled based on the license [{@link OperationMode}]
 */
public synchronized AllowedRealmType allowedRealmType() {
    final boolean isSecurityCurrentlyEnabled =
        isSecurityEnabled(status.mode, isSecurityExplicitlyEnabled, isSecurityEnabledByTrialVersion, isSecurityEnabled,
        isSecurityEnabled);
    if (isSecurityCurrentlyEnabled) {
        return
    }
switch (status.mode) {
    case PLATINUM:
    case TRIAL:
        return AllowedRealmType.ALL;
    case GOLD:
        return AllowedRealmType.DEFAULT;
    case STANDARD:
        return AllowedRealmType.NATIVE;
    default:
        return AllowedRealmType.NONE;
}
} else {
    return AllowedRealmType.NONE;
}

/**
 * @return whether custom role providers are allowed based on the license {@link OperationMode}
 */
public synchronized boolean isCustomRoleProvidersAllowed() {
    final boolean isSecurityCurrentlyEnabled =
        isSecurityEnabled(status.mode, isSecurityExplicitlyEnabled, isSecurityEnabledByTrialVersion,
        isSecurityEnabled);
    return isSecurityCurrentlyEnabled && (status.mode == OperationMode.PLATINUM || status.mode ==
        OperationMode.TRIAL)
        && status.active;
}

/**
 * Determine if Watcher is available based on the current license.
 * <p>
 * Watcher is available if the license is active (hasn’t expired) and of one of the following types:
 * <ul>
 *     <li>{@link OperationMode#STANDARD}</li>
 *     <li>{@link OperationMode#PLATINUM}</li>
 *     <li>{@link OperationMode#GOLD}</li>
 *     <li>{@link OperationMode#TRIAL}</li>
 * </ul>
 * @return {@code true} as long as the license is valid. Otherwise {@code false}.
 */
public synchronized boolean isWatcherAllowed() {
    Status localStatus = status;
    if (localStatus.active == false) {
        return false;
    }
}
switch (localStatus.mode) {
    case TRIAL:
    case GOLD:
    case PLATINUM:
    case STANDARD:
        return true;
    default:
        return false;
}

/**
 * Monitoring is always available as long as there is a valid license
 * @return true if the license is active
 */
public synchronized boolean isMonitoringAllowed() {
    return status.active;
}

/**
 * Monitoring Cluster Alerts requires the equivalent license to use Watcher.
 * @return [@link #isWatcherAllowed()]
 * @see #isWatcherAllowed()
 */
public synchronized boolean isMonitoringClusterAlertsAllowed() {
    return isWatcherAllowed();
}

/**
 * Determine if the current license allows the retention of indices to be modified.
 * Only users with a non-[@link OperationMode#BASIC] license can update the retention period.
 * Note: This does not consider the <em>state</em> of the license so that any change is remembered for when they fix their license.
 * @return [@code true] if the user is allowed to modify the retention. Otherwise [@code false].
 */
public synchronized boolean isUpdateRetentionAllowed() {
    final OperationMode mode = status.mode;
    return mode != OperationMode.BASIC && mode != OperationMode.MISSING;
}

/**
 * Determine if Graph Exploration should be enabled.
 *
* Exploration is only disabled when the license has expired or if the mode is not:
* <ul>
* <li>{@link OperationMode#PLATINUM}</li>
* <li>{@link OperationMode#TRIAL}</li>
* </ul>

* @return [@code true] as long as the license is valid. Otherwise [@code false].
*/

public synchronized boolean isGraphAllowed() {
    Status localStatus = status;
    OperationMode operationMode = localStatus.mode;

    boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
    OperationMode.PLATINUM;

    return licensed && localStatus.active;
}

/**
 * Determine if Machine Learning should be enabled.
 * <p>
 * Machine Learning is only disabled when the license has expired or if the
 * mode is not:
 * <ul>
 * <li>{@link OperationMode#PLATINUM}</li>
 * <li>{@link OperationMode#TRIAL}</li>
 * </ul>
 *
 * @return [@code true] as long as the license is valid. Otherwise
 *         [@code false].
 * */

public synchronized boolean isMachineLearningAllowed() {
    final Status currentStatus = status;
    final OperationMode operationMode = currentStatus.mode;
    final boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
    OperationMode.PLATINUM;

    return currentStatus.active && licensed;
}

 /**<
 * Rollup is always available as long as there is a valid license
 * *
 * @return true if the license is active
 * */

public synchronized boolean isRollupAllowed() {
    return status.active;
}
public synchronized boolean isLogstashAllowed() {
    Status localStatus = status;

    if (localStatus.active == false) {
        return false;
    }

    switch (localStatus.mode) {
        case TRIAL:
        case GOLD:
        case PLATINUM:
        case STANDARD:
            return true;
        default:
            return false;
    }
}

public synchronized boolean isDeprecationAllowed() {
    return status.active;
}

public synchronized boolean isUpgradeAllowed() {
    // Should work on all active licenses
    return status.active;
}

public synchronized boolean isSQLAllowed() {
    // SQL is available for all license types except "MISSING"
    return status.active;
}
public synchronized boolean isSqlAllowed() {
    return status.active;
}

/**
 * Determine if JDBC support should be enabled.
 * <p>
 * JDBC is available only in for {@link OperationMode#PLATINUM} and {@link OperationMode#TRIAL} licences
 */
public synchronized boolean isJdbcAllowed() {
    Status localStatus = status;
    OperationMode operationMode = localStatus.mode;

    boolean licensed = operationMode == OperationMode.TRIAL || operationMode == OperationMode.PLATINUM;

    return licensed && localStatus.active;
}

public synchronized boolean isTrialLicense() {
    return status.mode == OperationMode.TRIAL;
}

/**
 * @return true if security is available to be used with the current license type
 */
public synchronized boolean isSecurityAvailable() {
    OperationMode mode = status.mode;
    return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM || mode == OperationMode.STANDARD ||
    mode == OperationMode.TRIAL;
}

/**
 * @return true if security has been disabled by a trial license which is the case of the default distribution post 6.3.0. The conditions necessary for this are:
 * <ul>
 *     <li>A trial license generated in 6.3.0+</li>
 *     <li>xpack.security.enabled not specified as a setting</li>
 * </ul>
 */
public synchronized boolean isSecurityDisabledByTrialLicense() {
    return status.mode == OperationMode.TRIAL && isSecurityEnabled
    && isSecurityExplicitlyEnabled == false
    && isSecurityEnabledByTrialVersion == false;
}
private static boolean isSecurityEnabled(final OperationMode mode, final boolean isSecurityExplicitlyEnabled,
   final boolean isSecurityEnabledByTrialVersion, final boolean isSecurityEnabled) {
   return mode == OperationMode.TRIAL ? (isSecurityExplicitlyEnabled || isSecurityEnabledByTrialVersion) :
   isSecurityEnabled;
}

/**
 * Creates a copy of this object based on the state at the time the method was called. The
 * returned object will not be modified by a license update/expiration so it can be used to
 * make multiple method calls on the license state safely. This object should not be long
 * lived but instead used within a method when a consistent view of the license state
 * is needed for multiple interactions with the license state.
 * /
   public synchronized XPackLicenseState copyCurrentLicenseState() {
      return new XPackLicenseState(this);
   }

package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.xpack.core.XPackPlugin;
import java.time.Clock;
import java.util.Collections;
import java.util.Map;
import java.util.UUID;

public class StartTrialClusterTask extends ClusterStateUpdateTask {

   private static final String ACKNOWLEDGEMENT_HEADER = "This API initiates a free 30-day trial for all
   platinum features. " +
   "By starting this trial, you agree that it is subject to the terms and conditions at" +
   " https://www.elastic.co/legal/trial_license/. To begin your free trial, call /start_trial again and specify " +
   "the \'\'acknowledge=true\'\' parameter.";

   private static final Map<String, String[]> ACK_MESSAGES = Collections.singletonMap("security",

new String[] {"With a trial license, X-Pack security features are available, but are not enabled by default."};

private final Logger logger;
private final String clusterName;
private final PostStartTrialRequest request;
private final ActionListener<PostStartTrialResponse> listener;
private final Clock clock;

StartTrialClusterTask(Logger logger, String clusterName, Clock clock, PostStartTrialRequest request,
ActionListener<PostStartTrialResponse> listener) {
this.logger = logger;
this.clusterName = clusterName;
this.request = request;
this.listener = listener;
this.clock = clock;
}

@Override
public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
LicensesMetaData oldLicensesMetaData = oldState.metaData().custom(LicensesMetaData.TYPE);
logger.debug("started self generated trial license: {}", oldLicensesMetaData);

if (request.isAcknowledged() == false) {
    listener.onResponse(new PostStartTrialResponse(PostStartTrialResponse.Status.NEED_AACKNOWLEDGEMENT,
        ACK_MESSAGES, ACKNOWLEDGEMENT_HEADER));
} else if (oldLicensesMetaData == null || oldLicensesMetaData.isEligibleForTrial()) {
    listener.onResponse(new PostStartTrialResponse(PostStartTrialResponse.Status.UPGRADED_TO_TRIAL));
} else {
    listener.onResponse(new PostStartTrialResponse(PostStartTrialResponse.Status.TRIAL_ALREADY_ACTIVATED));
}
}

@Override
public ClusterState execute(ClusterState currentState) throws Exception {
XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
LicensesMetaData currentLicensesMetaData = currentState.metaData().custom(LicensesMetaData.TYPE);

if (request.isAcknowledged() == false) {
    return currentState;
} else if (currentLicensesMetaData == null || currentLicensesMetaData.isEligibleForTrial()) {
    long issueDate = clock.millis();
    MetaData.Builder mdBuilder = MetaData.builder(currentState.metaData());
    long expiryDate = issueDate + LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.getMillis();

    License.Builder specBuilder = License.builder()
License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder, currentState.nodes());
LicensesMetaData newLicensesMetaData = new LicensesMetaData(selfGeneratedLicense,
Version.CURRENT);
mdBuilder.putCustom(LicensesMetaData.TYPE, newLicensesMetaData);
return ClusterState.builder(currentState).metaData(mdBuilder).build();
} else {
    return currentState;
}

@Override
public void onFailure(String source, @Nullable Exception e) {
    logger.error(new ParameterizedMessage("unexpected failure during 
["]", source), e);
    listener.onFailure(e);
}

package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PutLicenseAction extends Action<PutLicenseRequest, PutLicenseResponse,
    PutLicenseRequestBuilder> {

    public static final PutLicenseAction INSTANCE = new PutLicenseAction();
    public static final String NAME = "cluster:admin/xpack/license/put";

    private PutLicenseAction() {
        super(NAME);
    }

    @Override
    public PutLicenseResponse newResponse() {
        return new PutLicenseResponse();
    }

    @Override
    public PutLicenseResponse newResponse() {
        return new PutLicenseResponse();
    }

    @Override
    public void onFailure(String source, @Nullable Exception e) {
        logger.error(new ParameterizedMessage("unexpected failure during 
["]", source), e);
        listener.onFailure(e);
    }

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    */

    import org.elasticsearch.action.Action;
    import org.elasticsearch.client.ElasticsearchClient;

    public class PutLicenseAction extends Action<PutLicenseRequest, PutLicenseResponse,
        PutLicenseRequestBuilder> {

        public static final PutLicenseAction INSTANCE = new PutLicenseAction();
        public static final String NAME = "cluster:admin/xpack/license/put";

        private PutLicenseAction() {
            super(NAME);
        }

        @Override
        public PutLicenseResponse newResponse() {
            return new PutLicenseResponse();
        }

        @Override
        public void onFailure(String source, @Nullable Exception e) {
            logger.error(new ParameterizedMessage("unexpected failure during 
["]", source), e);
            listener.onFailure(e);
        }
public PutLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
    return new PutLicenseRequestBuilder(client, this);
}
*/

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;
public class GetLicenseAction extends Action<GetLicenseRequest, GetLicenseResponse,
GetLicenseRequestBuilder> {

    public static final GetLicenseAction INSTANCE = new GetLicenseAction();
    public static final String NAME = "cluster:monitor/xpack/license/get";

    private GetLicenseAction() {
        super(NAME);
    }

    @Override
    public GetLicenseResponse newResponse() {
        return new GetLicenseResponse();
    }

    @Override
    public GetLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new GetLicenseRequestBuilder(client, this);
    }
    */

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 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.xpack.core.XPackPlugin;
import java.time.Clock;
import java.util.Collections;
import java.util.Map;
import java.util.UUID;
import java.util.concurrent.atomic.AtomicReference;

public class StartBasicClusterTask extends ClusterStateUpdateTask {

    private static final String ACKNOWLEDGEMENT_HEADER = "This license update requires acknowledgement. To acknowledge the license, " +
    "please read the following messages and call /start_basic again, this time with the \"acknowledge=true\" parameter."

    private final Logger logger;
    private final String clusterName;
    private final PostStartBasicRequest request;
    private final ActionListener<PostStartBasicResponse> listener;
    private final Clock clock;
    private AtomicReference<Map<String, String[]>> ackMessages = new
    AtomicReference<>(Collections.emptyMap());

    StartBasicClusterTask(Logger logger, String clusterName, Clock clock, PostStartBasicRequest request,
                           ActionListener<PostStartBasicResponse> listener) {
        this.logger = logger;
        this.clusterName = clusterName;
        this.request = request;
        this.listener = listener;
        this.clock = clock;
    }

    @Override
    public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
        LicensesMetaData oldLicensesMetaData = oldState.metaData().custom(LicensesMetaData.TYPE);
        logger.debug("license prior to starting basic license: {}", oldLicensesMetaData);
        License oldLicense = LicensesMetaData.extractLicense(oldLicensesMetaData);
        Map<String, String[]> acknowledgeMessages = ackMessages.get();
        if (acknowledgeMessages.isEmpty() == false) {
            listener.onResponse(new PostStartBasicResponse(PostStartBasicResponse.Status.NEED_ACKNOWLEDGEMENT, acknowledgeMessages,
                                                             ACKNOWLEDGEMENT_HEADER));
        } else if (oldLicense != null && oldLicense.type().equals("basic")) {
            listener.onResponse(new PostStartBasicResponse(PostStartBasicResponse.Status.ALREADY_USING_BASIC));
        } else {
            listener.onResponse(new PostStartBasicResponse(PostStartBasicResponse.Status.GENERATED_BASIC));
        }
    }
}
@Override
public ClusterState execute(ClusterState currentState) throws Exception {
    XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
    LicensesMetaData licensesMetaData = currentState.metaData().custom(LicensesMetaData.TYPE);
    License currentLicense = LicensesMetaData.extractLicense(licensesMetaData);
    if (currentLicense == null || currentLicense.type().equals("basic") == false) {
        long issueDate = clock.millis();
        MetaData.Builder mdBuilder = MetaData.builder(currentState.metaData());
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo(clusterName)
            .maxNodes(LicenseService.SELF_GENERATED_LICENSE_MAX_NODES)
            .issueDate(issueDate)
            .type("basic")
            .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
        License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder, currentState.nodes());
        if (request.isAcknowledged() == false && currentLicense != null) {
            Map<String, String[]> ackMessages = LicenseService.getAckMessages(selfGeneratedLicense,
                currentLicense);
            if (ackMessages.isEmpty() == false) {
                this.ackMessages.set(ackMessages);
                return currentState;
            }
        }
        Version trialVersion = null;
        if (licensesMetaData != null) {
            trialVersion = licensesMetaData.getMostRecentTrialVersion();
        }
        LicensesMetaData newLicensesMetaData = new LicensesMetaData(selfGeneratedLicense, trialVersion);
        mdBuilder.putCustom(LicensesMetaData.TYPE, newLicensesMetaData);
        return ClusterState.builder(currentState).metaData(mdBuilder).build();
    } else {
        return currentState;
    }
}

@Override
public void onFailure(String source, @Nullable Exception e) {
    logger.error(new ParameterizedMessage("unexpected failure during [{}]", source), e);
    listener.onFailure(e);
}

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package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPostStartBasicAction extends TransportMasterNodeAction<PostStartBasicRequest,
PostStartBasicResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportPostStartBasicAction(Settings settings, TransportService transportService, ClusterService
clusterService,
            LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, PostStartBasicAction.NAME, transportService, clusterService, threadPool, actionFilters,
indexNameExpressionResolver, PostStartBasicRequest::new);
        this.licenseService = licenseService;
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.SAME;
    }

    @Override
    protected PostStartBasicResponse newResponse() {
        return new PostStartBasicResponse();
    }

    @Override
    protected void masterOperation(PostStartBasicRequest request, ClusterState state,
ActionListener<PostStartBasicResponse> listener) throws Exception {
        licenseService.startBasicLicense(request, listener);
    }
}
@Override
protected ClusterBlockException checkBlock(PostStartBasicRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class PostStartTrialRequestBuilder extends ActionRequestBuilder<PostStartTrialRequest,
PostStartTrialResponse, PostStartTrialRequestBuilder> {
    PostStartTrialRequestBuilder(ElasticsearchClient client, PostStartTrialAction action) {
        super(client, action, new PostStartTrialRequest());
    }

    public PostStartTrialRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.action.RestToXContentListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;
import java.io.IOException;
import static org.elasticsearch.rest.RestRequest.Method.DELETE;

public class RestDeleteLicenseAction extends XPackRestHandler {
    public RestDeleteLicenseAction(Settings settings, RestController controller) {
        super(settings);
    }

    public static class RestDeleteLicenseRequest {
        public RestDeleteLicenseRequest() {
            super(settings);
        }
    }

    @Override
    public void handleRequest(RestRequest request, ResponseHandler<RestDeleteLicenseResponse> handler) {
        RestDeleteLicenseRequest requestObj = (RestDeleteLicenseRequest) request;
        handler.copyRequest(requestObj, new RestToXContentListener<>(handler));
    }
}

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class PostStartTrialRequestBuilder extends ActionRequestBuilder<PostStartTrialRequest,
PostStartTrialResponse, PostStartTrialRequestBuilder> {
    PostStartTrialRequestBuilder(ElasticsearchClient client, PostStartTrialAction action) {
        super(client, action, new PostStartTrialRequest());
    }

    public PostStartTrialRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.action.RestToXContentListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;
import java.io.IOException;
import static org.elasticsearch.rest.RestRequest.Method.DELETE;

public class RestDeleteLicenseAction extends XPackRestHandler {
    public RestDeleteLicenseAction(Settings settings, RestController controller) {
        super(settings);
    }

    public static class RestDeleteLicenseRequest {
        public RestDeleteLicenseRequest() {
            super(settings);
        }

        @Override
        public void handleRequest(RestRequest request, ResponseHandler<RestDeleteLicenseResponse> handler) {
            RestDeleteLicenseRequest requestObj = (RestDeleteLicenseRequest) request;
            handler.copyRequest(requestObj, new RestToXContentListener<>(handler));
        }
    }
}

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class PostStartTrialRequestBuilder extends ActionRequestBuilder<PostStartTrialRequest,
PostStartTrialResponse, PostStartTrialRequestBuilder> {
    PostStartTrialRequestBuilder(ElasticsearchClient client, PostStartTrialAction action) {
        super(client, action, new PostStartTrialRequest());
    }

    public PostStartTrialRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.action.RestToXContentListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;
import java.io.IOException;
import static org.elasticsearch.rest.RestRequest.Method.DELETE;

public class RestDeleteLicenseAction extends XPackRestHandler {
    public RestDeleteLicenseAction(Settings settings, RestController controller) {
        super(settings);
    }

    public static class RestDeleteLicenseRequest {
        public RestDeleteLicenseRequest() {
            super(settings);
        }

        @Override
        public void handleRequest(RestRequest request, ResponseHandler<RestDeleteLicenseResponse> handler) {
            RestDeleteLicenseRequest requestObj = (RestDeleteLicenseRequest) request;
            handler.copyRequest(requestObj, new RestToXContentListener<>(handler));
        }
    }
}

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class PostStartTrialRequestBuilder extends ActionRequestBuilder<PostStartTrialRequest,
PostStartTrialResponse, PostStartTrialRequestBuilder> {
    PostStartTrialRequestBuilder(ElasticsearchClient client, PostStartTrialAction action) {
        super(client, action, new PostStartTrialRequest());
    }

    public PostStartTrialRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }
}
@Override
public String getName() {
    return "xpack_delete_license_action";
}

@Override
public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws IOException {
    DeleteLicenseRequest deleteLicenseRequest = new DeleteLicenseRequest();
    deleteLicenseRequest.timeout(request.paramAsTime("timeout", deleteLicenseRequest.timeout()));
    deleteLicenseRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
        deleteLicenseRequest.masterNodeTimeout()));

    return channel ->
        client.es().admin().cluster().execute(DeleteLicenseAction.INSTANCE, deleteLicenseRequest,
        new RestToXContentListener<>(channel));
}

package org.elasticsearch.license;

import org.apache.lucene.util.BytesRef;
import org.apache.lucene.util.BytesRefIterator;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.core.internal.io.Streams;
import java.io.ByteArrayOutputStream;
import java.io.IOException;
import java.io.InputStream;
import java.nio.ByteBuffer;

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*/
import java.security.InvalidKeyException;
import java.security.NoSuchAlgorithmException;
import java.security.Signature;
import java.security.SignatureException;
import java.util.Arrays;
import java.util.Base64;
import java.util.Collections;

/**
 * Responsible for verifying signed licenses
 */
public class LicenseVerifier {

    /**
     * verifies the license content with the signature using the packaged
     * public key
     * @param license to verify
     * @return true if valid, false otherwise
     */
    public static boolean verifyLicense(final License license, byte[] publicKeyData) {
        byte[] signedContent = null;
        byte[] publicKeyFingerprint = null;
        try {
            byte[] signatureBytes = Base64.getDecoder().decode(license.signature());
            ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
            int version = byteBuffer.getInt();
            int magicLen = byteBuffer.getInt();
            byte[] magic = new byte[magicLen];
            byteBuffer.get(magic);
            int hashLen = byteBuffer.getInt();
            publicKeyFingerprint = new byte[hashLen];
            byteBuffer.get(publicKeyFingerprint);
            int signedContentLen = byteBuffer.getInt();
            signedContent = new byte[signedContentLen];
            byteBuffer.get(signedContent);
            XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
            license.toXContent(contentBuilder, new
                    ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
            Signature rsa = Signature.getInstance("SHA512withRSA");
            rsa.initVerify(CryptUtils.readPublicKey(publicKeyData));
            BytesRefIterator iterator = BytesReference.bytes(contentBuilder).iterator();
            BytesRef ref;
            while((ref = iterator.next()) != null) {
                rsa.update(ref.bytes, ref.offset, ref.length);
            }
            return rsa.verify(signedContent);
        } catch (IOException | NoSuchAlgorithmException | SignatureException | InvalidKeyException e) {
            throw new IllegalStateException(e);
        }
    }
}
public static boolean verifyLicense(final License license) {
    final byte[] publicKeyBytes;
    try (InputStream is = LicenseVerifier.class.getResourceAsStream("/public.key")) {
        ByteArrayOutputStream out = new ByteArrayOutputStream();
        Streams.copy(is, out);
        publicKeyBytes = out.toByteArray();
    } catch (IOException ex) {
        throw new IllegalStateException(ex);
    }
    return verifyLicense(license, publicKeyBytes);
}

package org.elasticsearch.license;

import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.LoggingDeprecationHandler;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.common.xcontent.XContentType;
import java.io.IOException;
import java.nio.ByteBuffer;
import java.util.Base64;
import java.util.Collections;
import static org.elasticsearch.license.CryptUtils.encryptV3Format;
import static org.elasticsearch.license.CryptUtils.encrypt;
import static org.elasticsearch.license.CryptUtils.decryptV3Format;
import static org.elasticsearch.license.CryptUtils.decrypt;

class SelfGeneratedLicense {

public static License create(License.Builder specBuilder, DiscoveryNodes currentNodes) {
    return create(specBuilder, LicenseUtils.compatibleLicenseVersion(currentNodes));
}

public static License create(License.Builder specBuilder, int version) {
    License spec = specBuilder
    .issuer("elasticsearch")
    .version(version)
    .build();
    final String signature;
    try {
        XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
        spec.toXContent(contentBuilder, new
        ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
        byte[] encrypt;
        if (version < License.VERSION_CRYPTO_ALGORITHMS) {
            encrypt = encryptV3Format(BytesReference.toBytes(BytesReference.bytes(contentBuilder)));
        } else {
            encrypt = encrypt(BytesReference.toBytes(BytesReference.bytes(contentBuilder)));
        }
        byte[] bytes = new byte[4 + 4 + encrypt.length];
        ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
        // Set -version in signature
        byteBuffer.putInt(-version)
        .putInt(encrypt.length)
        .put(encrypt);
        signature = Base64.getEncoder().encodeToString(bytes);
    } catch (IOException e) {
        throw new IllegalStateException(e);
    }
    return License.builder().fromLicenseSpec(spec, signature).build();
}

public static boolean verify(final License license) {
    try {
        byte[] signatureBytes = Base64.getDecoder().decode(license.signature());
        ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
        int version = byteBuffer.getInt();
        int contentLen = byteBuffer.getInt();
        byte[] content = new byte[contentLen];
        byteBuffer.get(content);
        final License expectedLicense;
        // Version in signature is -version, so check for -(-version) < 4
        byte[] decryptedContent = (-version < License.VERSION_CRYPTO_ALGORITHMS) ?
        decryptV3Format(content) : decrypt(content);
        // EMPTY is safe here because we don't call namedObject
        try (XContentParser parser = XContentFactory.xContent(XContentType.JSON)
            .createParser(NamedXContentRegistry.EMPTY, LoggingDeprecationHandler.INSTANCE,
            parser)) { return true; }
    } catch (IOException e) {
        throw new IllegalStateException(e);
    }
    return false;
}

public static License.Builder builder() {
    return License.builder();
}

public static License fromLicenseSpec(LicenseSpec spec, String signature) {
    return License.builder().fromLicenseSpec(spec, signature).build();
}

public static License fromLicenseSpec(LicenseSpec spec, String signature, String version) {
    return License.builder().fromLicenseSpec(spec, signature, version).build();
}
decryptedContent)) {
    parser.nextToken();
    expectedLicense = License.builder().fromLicenseSpec(License.fromXContent(parser),
        license.signature()).version(-version).build();
}
return license.equals(expectedLicense);
} catch (IOException e) {
    throw new IllegalStateException(e);
}
}

public static boolean validSelfGeneratedType(String type) {
    return "basic".equals(type) || "trial".equals(type);
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetTrialStatusAction extends TransportMasterNodeReadAction<GetTrialStatusRequest,
    GetTrialStatusResponse> {

    @Inject
    public TransportGetTrialStatusAction(Settings settings, TransportService transportService, ClusterService
        clusterService,
        ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, GetTrialStatusAction.NAME, transportService, clusterService, threadPool, actionFilters,
            indexNameExpressionResolver, GetTrialStatusRequest::new);
    }

    @Override
protected String executor() {
    return ThreadPool.Names.SAME;
}

@Override
protected GetTrialStatusResponse newResponse() {
    return new GetTrialStatusResponse();
}

@Override
protected void masterOperation(GetTrialStatusRequest request, ClusterState state, ActionListener<GetTrialStatusResponse> listener) throws Exception {
    LicensesMetaData licensesMetaData = state.metaData().custom(LicensesMetaData.TYPE);
    listener.onResponse(new GetTrialStatusResponse(licensesMetaData == null || licensesMetaData.isEligibleForTrial()));
}

@Override
protected ClusterBlockException checkBlock(GetTrialStatusRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.unit.TimeValue;
import java.util.UUID;

abstract class ExpirationCallback {

    static final String EXPIRATION_JOB_PREFIX = ".license_expiration_job_";

    public enum Orientation {PRE, POST}

    /**
     * Callback that is triggered every <code>frequency</code> when
     * current time is between <code>max</code> and <code>min</code>
     * before license expiry.
     */
    public abstract static class Pre extends ExpirationCallback {
/**
 * Callback schedule prior to license expiry
 *
 * @param min       latest relative time to execute before license expiry
 * @param max       earliest relative time to execute before license expiry
 * @param frequency interval between execution
 */
Pre(TimeValue min, TimeValue max, TimeValue frequency) {
    super(Orientation.PRE, min, max, frequency);
}

/**
 * Callback that is triggered every <code>frequency</code> when
 * current time is between <code>min</code> and <code>max</code>
 * after license expiry.
 */
public abstract static class Post extends ExpirationCallback {

    /**
     * Callback schedule after license expiry
     *
     * @param min       earliest relative time to execute after license expiry
     * @param max       latest relative time to execute after license expiry
     * @param frequency interval between execution
     */
    Post(TimeValue min, TimeValue max, TimeValue frequency) {
        super(Orientation.POST, min, max, frequency);
    }
}

private final String id;
private final Orientation orientation;
private final long min;
private final long max;
private final long frequency;

private ExpirationCallback(Orientation orientation, TimeValue min, TimeValue max, TimeValue frequency) {
    this.orientation = orientation;
    this.min = (min == null) ? 0 : min.getMillis();
    this.max = (max == null) ? Long.MAX_VALUE : max.getMillis();
    this.frequency = frequency.getMillis();
    this.id = String.join("", EXPIRATION_JOB_PREFIX, UUID.randomUUID().toString());
}

public final String getId() {
    return id;
}
public final long getFrequency() {
    return frequency;
}

/**
 * Calculates the delay for the next trigger time. When <code>now</code> is in a
 * valid time bracket with respect to <code>expirationDate</code>, the delay is 0.
 * When <code>now</code> is before the time bracket, than delay to the start of the
 * time bracket and when <code>now</code> is passed the valid time bracket, the delay
 * is <code>null</code>
 * @param expirationDate license expiry date in milliseconds
 * @param now current time in milliseconds
 * @return time delay
 */
final TimeValue delay(long expirationDate, long now) {
    final TimeValue delay;
    switch (orientation) {
        case PRE:
            if (expirationDate >= now) {
                // license not yet expired
                long preExpiryDuration = expirationDate - now;
                if (preExpiryDuration > max) {
                    // license duration is longer than maximum duration, delay it to the first match time
                    delay = TimeValue.timeValueMillis(preExpiryDuration - max);
                } else if (preExpiryDuration <= max && preExpiryDuration >= min) {
                    // no delay in valid time bracket
                    delay = TimeValue.timeValueMillis(0);
                } else {
                    // passed last match time
                    delay = null;
                }
            } else {
                // invalid after license expiry
                delay = null;
            }
            break;
        case POST:
            if (expirationDate >= now) {
                // license not yet expired, delay it to the first match time
                delay = TimeValue.timeValueMillis(expirationDate - now + min);
            } else {
                // license has expired
                long expiredDuration = now - expirationDate;
                if (expiredDuration < min) {
                    // license expiry duration is shorter than minimum duration, delay it to the first match time
                    delay = TimeValue.timeValueMillis(min - expiredDuration);
                } else if (expiredDuration >= min && expiredDuration <= max) {
                    // no delay in valid time bracket
                    delay = TimeValue.timeValueMillis(0);
                } else {
                    // passed last match time
                    delay = null;
                }
            }
            break;
    }
    return delay;
}
// no delay in valid time bracket
delay = TimeValue.timeValueMillis(0);
} else {
    // passed last match time
    delay = null;
}
}
break;
default:
    throw new IllegalStateException("orientation [" + orientation + "] unknown");
}
return delay;

/**
 * { @link org.elasticsearch.xpack.core.scheduler.SchedulerEngine.Schedule#nextScheduledTimeAfter(long, long)}
 * with respect to license expiry date
 */
public final long nextScheduledTimeForExpiry(long expiryDate, long startTime, long time) {
    TimeValue delay = delay(expiryDate, time);
    if (delay != null) {
        long delayInMillis = delay.getMillis();
        if (delayInMillis == 0L) {
            if (startTime == time) {
                // initial trigger and in time bracket, schedule immediately
                return time;
            } else {
                // in time bracket, add frequency
                return time + frequency;
            }
        } else {
            // not in time bracket
            return time + delayInMillis;
        }
    }
    return -1;
}

/**
 * Code to execute when the expiry callback is triggered in a valid
 * time bracket
 * @param license license to operate on
 */
public abstract void on(License license);

public final String toString() {
    return LoggerMessageFormat.format(null, "ExpirationCallback:(orientation [{}, min [{}, max [{}, freq
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.AckedClusterStateUpdateTask;
import org.elasticsearch.cluster.ClusterChangedEvent;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateListener;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.component.AbstractLifecycleComponent;
import org.elasticsearch.common.component.Lifecycle;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.discovery.DiscoveryModule;
import org.elasticsearch.env.Environment;
import org.elasticsearch.gateway.GatewayService;
import org.elasticsearch.protocol.xpack.XPackInfoResponse;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;
import java.time.Clock;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.HashMap;
import java.util.HashSet;
import java.util.List;
import java.util.Locale;
import java.util.Map;
import java.util.Set;
import java.util.concurrent.atomic.AtomicReference;

/**
 * Service responsible for managing { LicensesMetaData }.
 * <p>
 * On the master node, the service handles updating the cluster state when a new license is registered.
 * It also listens on all nodes for cluster state updates, and updates { XPackLicenseState } when
 * the license changes are detected in the cluster state.
 * */
public class LicenseService extends AbstractLifecycleComponent implements ClusterStateListener,
SchedulerEngine.Listener {

    public static final Setting<String> SELF_GENERATED_LICENSE_TYPE = new
Setting<>("xpack.license.self_generated.type",
        (s) -> "basic", (s) -> {
            if (SelfGeneratedLicense.validSelfGeneratedType(s)) {
                return s;
            } else {
                throw new IllegalArgumentException("Illegal self generated license type [" + s + "]. Must be trial or basic.");
            }
        }), Setting.Property.NodeScope);

    // pkg private for tests
    static final TimeValue NON_BASIC_SELF_GENERATED_LICENSE_DURATION =
TimeValue.timeValueHours(30 * 24);

    static final Set<String> VALID_TRIAL_TYPES = new HashSet<>(Arrays.asList("trial", "platinum", "gold");

    /**
     * Duration of grace period after a license has expired
     */
    static final TimeValue GRACE_PERIOD_DURATION = days(7);

    public static final long BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS =
XPackInfoResponse.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;

    private final ClusterService clusterService;

    /**
     * The xpack feature state to update when license changes are made.
     */
    private final XPackLicenseState licenseState;

    /**
     * Currently active license
     */
private final AtomicReference<License> currentLicense = new AtomicReference<>();
private SchedulerEngine scheduler;
private final Clock clock;

/**
 * File watcher for operation mode changes
 */
private final OperationModeFileWatcher operationModeFileWatcher;

/**
 * Callbacks to notify relative to license expiry
 */
private List<ExpirationCallback> expirationCallbacks = new ArrayList<>();

/**
 * Max number of nodes licensed by generated trial license
 */
static final int SELF_GENERATED_LICENSE_MAX_NODES = 1000;

public static final String LICENSE_JOB = "licenseJob";

private static final FormatDateTimeFormatter DATE_FORMATTER = Joda.forPattern("EEEE, MMMMM dd, yyyy", Locale.ROOT);

private static final String ACKNOWLEDGEMENT_HEADER = "This license update requires acknowledgement. To acknowledge the license, " +
    "please read the following messages and update the license again, this time with the "acknowledge=true" parameter:";

public LicenseService(Settings settings, ClusterService clusterService, Clock clock, Environment env,
                        ResourceWatcherService resourceWatcherService, XPackLicenseState licenseState) {
    super(settings);
    this.clusterService = clusterService;
    this.clock = clock;
    this.scheduler = new SchedulerEngine(settings, clock);
    this.licenseState = licenseState;
    this.operationModeFileWatcher = new OperationModeFileWatcher(resourceWatcherService,
        XPackPlugin.resolveConfigFile(env, "license_mode"), logger,
        () -> updateLicenseState(getLicensesMetaData()));
    this.scheduler.register(this);
    populateExpirationCallbacks();
}

private void logExpirationWarning(long expirationMillis, boolean expired) {
    String expiredMsg = expired ? "expired" : "will expire";
    String general = LoggerMessageFormat.format(null, "License [{}] on [{}].
" +# If you have a new license, please update it. Otherwise, please reach out to
# your support contact.
");
"# ", expiredMsg, DATE_FORMATTER.printer().print(expirationMillis));
if (expired) {
    general = general.toUpperCase(Locale.ROOT);
}
StringBuilder builder = new StringBuilder(general);
builder.append(System.lineSeparator());
if (expired) {
    builder.append("# COMMERCIAL PLUGINS OPERATING WITH REDUCED FUNCTIONALITY");
} else {
    builder.append("# Commercial plugins operate with reduced functionality on license expiration:");
}
XPackLicenseState.EXPIRATION_MESSAGES.forEach((feature, messages) -> {
    if (messages.length > 0) {
        builder.append(System.lineSeparator());
        builder.append("# - ");
        builder.append(feature);
        for (String message : messages) {
            builder.append(System.lineSeparator());
            builder.append("#  - ");
            builder.append(message);
        }
    }
});
logger.warn("{}", builder);

private void populateExpirationCallbacks() {
    expirationCallbacks.add(new ExpirationCallback.Pre(days(7), days(25), days(1)) {
        @Override
        public void on(License license) {
            logExpirationWarning(license.expiryDate(), false);
        }
    });
    expirationCallbacks.add(new ExpirationCallback.Pre(days(0), days(7), TimeValue.timeValueMinutes(10)) {
        @Override
        public void on(License license) {
            logExpirationWarning(license.expiryDate(), false);
        }
    });
    expirationCallbacks.add(new ExpirationCallback.Post(days(0), null, TimeValue.timeValueMinutes(10)) {
        @Override
        public void on(License license) {
            // logged when grace period begins
            logExpirationWarning(license.expiryDate(), true);
        }
    });
}
/**
 * Registers new license in the cluster
 * Master only operation. Installs a new license on the master provided it is VALID
 */

public void registerLicense(final PutLicenseRequest request, final ActionListener<PutLicenseResponse> listener) {
    final License newLicense = request.license();
    final long now = clock.millis();
    if (!LicenseVerifier.verifyLicense(newLicense) ||
        newLicense.issueDate() > now ||
        newLicense.startDate() > now) {
        listener.onResponse(new PutLicenseResponse(true, LicensesStatus.INVALID));
    } else if (newLicense.type().equals("basic")) {
        listener.onFailure(new IllegalArgumentException("Registering basic licenses is not allowed."));
    } else if (newLicense.expiryDate() < now) {
        listener.onResponse(new PutLicenseResponse(true, LicensesStatus.EXPIRED));
    } else {
        if (!request.acknowledged()) {
            // TODO: ack messages should be generated on the master, since another node's cluster state may be
            // behind...
            final License currentLicense = getLicense();
            if (currentLicense != null) {
                Map<String, String[]> acknowledgeMessages = getAckMessages(newLicense, currentLicense);
                if (acknowledgeMessages.isEmpty() == false) {
                    // needs acknowledgement
                    listener.onResponse(new PutLicenseResponse(false, LicensesStatus.VALID,
                        ACKNOWLEDGEMENT_HEADER,
                        acknowledgeMessages));
                    return;
                }
            }
        }
    }

    if (XPackSettings.SECURITY_ENABLED.get(settings)) {
        // TODO we should really validate that all nodes have xpack installed and are consistently configured but
        // this
        // should happen on a different level and not in this code
        if (newLicense.isProductionLicense() &&
            XPackSettings.TRANSPORT_SSL_ENABLED.get(settings) == false &&
            isProductionMode(settings, clusterService.localNode())) {
            // security is on but TLS is not configured we gonna fail the entire request and throw an exception
            throw new IllegalStateException("Cannot install a [" + newLicense.operationMode() +
                "] license unless TLS is configured or security is disabled");
        } else if (XPackSettings.FIPS_MODE_ENABLED.get(settings) &&
            newLicense.operationMode() != License.OperationMode.PLATINUM &&
            newLicense.operationMode() != License.OperationMode.TRIAL) {
            throw new IllegalStateException("Cannot install a [" + newLicense.operationMode() +
                "] license unless FIPS mode is disabled");
        }
    }
}
clusterService.submitStateUpdateTask("register license [" + newLicense.uid() + "]", new
AckedClusterStateUpdateTask<PutLicenseResponse>(request, listener) {
    @Override
    protected PutLicenseResponse newResponse(boolean acknowledged) {
        return new PutLicenseResponse(acknowledged, LicensesStatus.VALID);
    }

    @Override
    public ClusterState execute(ClusterState currentState) throws Exception {
        XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
        MetaData currentMetadata = currentState.metaData();
        LicensesMetaData licensesMetaData = currentMetadata.custom(LicensesMetaData.TYPE);
        Version trialVersion = null;
        if (licensesMetaData != null) {
            trialVersion = licensesMetaData.getMostRecentTrialVersion();
        }
        MetaData.Builder mdBuilder = MetaData.builder(currentMetadata);
        mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(newLicense,
                trialVersion));
        return ClusterState.builder(currentState).metaData(mdBuilder).build();
    }
});

public static Map<String, String[]> getAckMessages(License newLicense, License currentLicense) {
    Map<String, String[]> acknowledgeMessages = new HashMap<>();
    if (!License.isAutoGeneratedLicense(currentLicense.signature()) // current license is not auto-generated
            && currentLicense.issueDate() > newLicense.issueDate()) // and has a later issue date
        acknowledgeMessages.put("license", new String[]{
            "The new license is older than the currently installed license. " +
            "Are you sure you want to override the current license?"});
    XPackLicenseState.ACKNOWLEDGMENT_MESSAGES.forEach((feature, ackMessages) -> {
        String[] messages = ackMessages.apply(currentLicense.operationMode(), newLicense.operationMode());
        if (messages.length > 0) {
            acknowledgeMessages.put(feature, messages);
        }
    });
    return acknowledgeMessages;
}

private static TimeValue days(int days) {
    return TimeValue.timeValueHours(days * 24);
}
public void triggered(SchedulerEngine.Event event) {
    final LicensesMetaData licensesMetaData = getLicensesMetaData();
    if (licensesMetaData != null) {
        final License license = licensesMetaData.getLicense();
        if (event.getJobName().equals(LICENSE_JOB)) {
            updateLicenseState(license, licensesMetaData.getMostRecentTrialVersion());
        } else if (event.getJobName().startsWith(ExpirationCallback.EXPIRATION_JOB_PREFIX)) {
            expirationCallbacks.stream()
                .filter(expirationCallback -> expirationCallback.getId().equals(event.getJobName()))
                .forEach(expirationCallback -> expirationCallback.on(license));
        }
    }
}

/**
 * Remove license from the cluster state metadata
 */
public void removeLicense(final DeleteLicenseRequest request, final ActionListener<ClusterStateUpdateResponse> listener) {
    clusterService.submitStateUpdateTask("delete license",
        new AckedClusterStateUpdateTask<ClusterStateUpdateResponse>(request, listener) {
            @Override
            protected ClusterStateUpdateResponse newResponse(boolean acknowledged) {
                return new ClusterStateUpdateResponse(acknowledged);
            }

            @Override
            public ClusterState execute(ClusterState currentState) throws Exception {
                MetaData metaData = currentState.metaData();
                final LicensesMetaData currentLicenses = metaData.custom(LicensesMetaData.TYPE);
                if (currentLicenses.getLicense() != LicensesMetaData.LICENSE_TOMBSTONE) {
                    MetaData.Builder mdBuilder = MetaData.builder(currentState.metaData());
                    LicensesMetaData newMetadata = new LicensesMetaData(LicensesMetaData.LICENSE_TOMBSTONE,
                        currentLicenses.getMostRecentTrialVersion());
                    mdBuilder.putCustom(LicensesMetaData.TYPE, newMetadata);
                    return ClusterState.builder(currentState).metaData(mdBuilder).build();
                } else {
                    return currentState;
                }
        });
}

public License getLicense() {
    final License license = getLicense(clusterService.state().metaData());
}
void startTrialLicense(PostStartTrialRequest request, final ActionListener<PostStartTrialResponse> listener) {
    if (VALID_TRIAL_TYPES.contains(request.getType()) == false) {
        throw new IllegalArgumentException("Cannot start trial of type "[" + request.getType() + "]]. Valid trial types are "
        + VALID_TRIAL_TYPES + ");
    }
    StartTrialClusterTask task = new StartTrialClusterTask(logger, clusterService.getClusterName().value(), clock,
            request, listener);
    clusterService.submitStateUpdateTask("started trial license", task);
}

void startBasicLicense(PostStartBasicRequest request, final ActionListener<PostStartBasicResponse> listener) {
    StartBasicClusterTask task = new StartBasicClusterTask(logger, clusterService.getClusterName().value(),
            clock, request, listener);
    clusterService.submitStateUpdateTask("start basic license", task);
}

/**
 * Master-only operation to generate a one-time global self generated license.
 * The self generated license is only generated and stored if the current cluster state metadata
 * has no existing license. If the cluster currently has a basic license that has an expiration date,
 * a new basic license with no expiration date is generated.
 */
private void registerOrUpdateSelfGeneratedLicense() {
    clusterService.submitStateUpdateTask("maybe generate license for cluster",
            new StartupSelfGeneratedLicenseTask(settings, clock, clusterService));
}

@Override
protected void doStart() throws ElasticsearchException {
    clusterService.addListener(this);
    scheduler.start(Collections.emptyList());
    logger.debug("initializing license state");
    if (clusterService.lifecycleState() == Lifecycle.State.STARTED) {
        final ClusterState clusterState = clusterService.state();
        if (clusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK) == false
                &&
                clusterState.nodes().getMasterNode() != null &&
                XPackPlugin.isReadyForXPackCustomMetadata(clusterState)) {
            final LicensesMetaData currentMetaData = clusterState.metaData().custom(LicensesMetaData.TYPE);
            boolean noLicense = currentMetaData == null || currentMetaData.getLicense() == null;
        }
if (clusterState.getNodes().isLocalNodeElectedMaster() &&
    (noLicense || LicenseUtils.licenseNeedsExtended(currentMetaData.getLicense()))) {

    // triggers a cluster changed event eventually notifying the current licensee
    registerOrUpdateSelfGeneratedLicense();
}
}
}

@Override
protected void doStop() throws ElasticsearchException {

    clusterService.removeListener(this);
    scheduler.stop();
    // clear current license
    currentLicense.set(null);
}

@Override
protected void doClose() throws ElasticsearchException {
}

/**
 * When there is no global block on { @link org.elasticsearch.gateway.GatewayService#STATE_NOT_RECOVERED_BLOCK}
 * notify licensees and issue auto-generated license if no license has been installed/issued yet.
 */

@Override
public void clusterChanged(ClusterChangedEvent event) {

    final ClusterState previousClusterState = event.previousState();
    final ClusterState currentClusterState = event.state();

    if (!currentClusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK)) {
        if (XPackPlugin.isReadyForXPackCustomMetadata(currentClusterState) == false) {
            logger.debug("cannot add license to cluster as the following nodes might not understand the license metadata: {}", () -> XPackPlugin.nodesNotReadyForXPackCustomMetadata(currentClusterState));
            return;
        }

        final LicensesMetaData prevLicensesMetaData = previousClusterState.getMetaData().custom(LicensesMetaData.TYPE);
        final LicensesMetaData currentLicensesMetaData = currentClusterState.getMetaData().custom(LicensesMetaData.TYPE);

        if (logger.isDebugEnabled()) {
            logger.debug("previous 
[{}]", prevLicensesMetaData);
            logger.debug("current 
[{}]", currentLicensesMetaData);
        }

        // notify all interested plugins
        if (previousClusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK)
License currentLicense = null;
boolean noLicenseInPrevMetadata = prevLicensesMetaData == null || prevLicensesMetaData.getLicense() == null;
if (noLicenseInPrevMetadata == false) {
    currentLicense = prevLicensesMetaData.getLicense();
}

boolean noLicenseInCurrentMetadata = (currentLicensesMetaData == null || currentLicensesMetaData.getLicense() == null);
if (noLicenseInCurrentMetadata == false) {
    currentLicense = currentLicensesMetaData.getLicense();
}

boolean noLicense = noLicenseInPrevMetadata && noLicenseInCurrentMetadata;
// auto-generate license if no licenses ever existed or if the current license is basic and
// needs extended or if the license signature needs to be updated. this will trigger a subsequent cluster changed
event
if (currentClusterState.getNodes().isLocalNodeElectedMaster() &&
    (noLicense || LicenseUtils.licenseNeedsExtended(currentLicense) ||
    LicenseUtils.signatureNeedsUpdate(currentLicense, currentClusterState.nodes()))) {
    registerOrUpdateSelfGeneratedLicense();
}
} else if (logger.isDebugEnabled()) {
    logger.debug("skipped license notifications reason: [{ }],
GatewayService.STATE_NOT_RECOVERED_BLOCK);
}
}

private void updateLicenseState(LicensesMetaData licensesMetaData) {
    if (licensesMetaData != null) {
        updateLicenseState(getLicense(licensesMetaData), licensesMetaData.getMostRecentTrialVersion());
    }
}

protected void updateLicenseState(final License license, Version mostRecentTrialVersion) {
    if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
        // implies license has been explicitly deleted
        licenseState.update(License.OperationMode.MISSING, false, mostRecentTrialVersion);
        return;
    }
    if (license != null) {
long time = clock.millis();
boolean active;
if (license.expiryDate() == BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
    active = true;
} else {
    // We subtract the grace period from the current time to avoid overflowing on an expiration
    // date that is near Long.MAX_VALUE
    active = time >= license.issueDate() && time - GRACE_PERIOD_DURATION.getMillis() < license.expiryDate();
}
licenseState.update(license.operationMode(), active, mostRecentTrialVersion);

if (active) {
    if (time < license.expiryDate()) {
        logger.debug("license [{}] - valid", license.uid());
    } else {
        logger.warn("license [{}] - grace", license.uid());
    }
} else {
    logger.warn("license [{}] - expired", license.uid());
}

/**
 * Notifies registered licensees of license state change and/or new active license
 * based on the license in <code>currentLicensesMetaData</code>.
 * Additionally schedules license expiry notifications and event callbacks
 * relative to the current license's expiry
 */
private void onUpdate(final LicensesMetaData currentLicensesMetaData) {
    final License license = getLicense(currentLicensesMetaData);
    // license can be null if the trial license is yet to be auto-generated
    // in this case, it is a no-op
    if (license != null) {
        final License previousLicense = currentLicense.get();
        if (license.equals(previousLicense) == false) {
            currentLicense.set(license);
            license.setOperationModeFileWatcher(operationModeFileWatcher);
            scheduler.add(new SchedulerEngine.Job(LICENSE_JOB, nextLicenseCheck(license)));
            for (ExpirationCallback expirationCallback : expirationCallbacks) {
                scheduler.add(new SchedulerEngine.Job(expirationCallback.getId(),
                    (startTime, now) ->
                        expirationCallback.nextScheduledTimeForExpiry(license.expiryDate(), startTime, now)));
            }
        } else {
            // remove operationModeFileWatcher to gc the old license object
            previousLicense.removeOperationModeFileWatcher();
        }
    }
}
logger.info("license [{ }] mode [{ }] - valid", license.uid(),
    license.operationMode().name().toLowerCase(Locale.ROOT));
}
updateLicenseState(license, currentLicensesMetaData.getMostRecentTrialVersion());
}

// pkg private for tests
static SchedulerEngine.Schedule nextLicenseCheck(License license) {
    return (startTime, time) -> {
        if (time < license.issueDate()) {
            // when we encounter a license with a future issue date
            // which can happen with autogenerated license,
            // we want to schedule a notification on the license issue date
            // so the license is notificed once it is valid
            // see https://github.com/elastic/x-plugins/issues/983
            return license.issueDate();
        } else if (time < license.expiryDate()) {
            return license.expiryDate();
        } else if (time < license.expiryDate() + GRACE_PERIOD_DURATION.getMillis()) {
            return license.expiryDate() + GRACE_PERIOD_DURATION.getMillis();
        }
        return -1; // license is expired, no need to check again
    };
}

public static License getLicense(final MetaData metaData) {
    final LicensesMetaData licensesMetaData = metaData.custom(LicensesMetaData.TYPE);
    return getLicense(licensesMetaData);
}

static License getLicense(final LicensesMetaData metaData) {
    if (metaData != null) {
        License license = metaData.getLicense();
        if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
            return license;
        } else if (license != null) {
            boolean autoGeneratedLicense = License.isAutoGeneratedLicense(license.signature());
            if ((autoGeneratedLicense && SelfGeneratedLicense.verify(license))
                || (autoGeneratedLicense && LicenseVerifier.verifyLicense(license))) {
                return license;
            }
        }
    }
    return null;
}
private static boolean isProductionMode(Settings settings, DiscoveryNode localNode) {
    final boolean singleNodeDisco = "single-node".equals(DiscoveryModule.DISCOVERY_TYPE_SETTING.get(settings));
    return singleNodeDisco == false && isBoundToLoopback(localNode) == false;
}

private static boolean isBoundToLoopback(DiscoveryNode localNode) {
    return localNode.getAddress().address().getAddress().isLoopbackAddress();
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

public class DeleteLicenseRequestBuilder extends AcknowledgedRequestBuilder<DeleteLicenseRequest,
    DeleteLicenseResponse,
    DeleteLicenseRequestBuilder> {

    public DeleteLicenseRequestBuilder(ElasticsearchClient client) {
        this(client, DeleteLicenseAction.INSTANCE);
    }

    public DeleteLicenseRequestBuilder(ElasticsearchClient client, DeleteLicenseAction action) {
        super(client, action, new DeleteLicenseRequest());
    }

    /**<
     * Creates new get licenses request builder
     * @param client elasticsearch client
     */
    public DeleteLicenseRequestBuilder(ElasticsearchClient client, DeleteLicenseAction action) {
        super(client, action, new DeleteLicenseRequest());
    }

}
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;
import static org.elasticsearch.rest.RestRequest.Method.POST;

public class RestPostStartBasicLicense extends XPackRestHandler {

    RestPostStartBasicLicense(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(POST, URI_BASE + "/license/start_basic", this);
    }

    @Override
    protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException {
        PostStartBasicRequest startBasicRequest = new PostStartBasicRequest();
        startBasicRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
        startBasicRequest.timeout(request.paramAsTime("timeout", startBasicRequest.timeout()));
        startBasicRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
                                                                  startBasicRequest.masterNodeTimeout()));
        return channel -> client.licensing().postStartBasic(startBasicRequest, new
                                        RestBuilderListener<PostStartBasicResponse>(channel) {
                                            @Override
                                            public RestResponse buildResponse(PostStartBasicResponse response,
                                                                            XContentBuilder builder) throws
                                                                           Exception {
                                                                PostStartBasicResponse.Status status = response.getStatus();
                                                                response.toXContent(builder, ToXContent.EMPTY_PARAMS);
                                                                return new BytesRestResponse(status.getRestStatus(), builder);
                                            }
                                        });
    }

    @Override
    public String getName() {
        return "xpack_start_basic_action";
    }

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     */
package org.elasticsearch.license;
import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;
class GetBasicStatusRequestBuilder extends ActionRequestBuilder<GetBasicStatusRequest,
GetBasicStatusResponse,
GetBasicStatusRequestBuilder> {
GetBasicStatusRequestBuilder(ElasticsearchClient client, GetBasicStatusAction action) {
super(client, action, new GetBasicStatusRequest());
}
}
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*/
package org.elasticsearch.license;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;
import java.io.IOException;
import static org.elasticsearch.rest.RestRequest.Method.GET;
public class RestGetBasicStatus extends XPackRestHandler {
RestGetBasicStatus(Settings settings, RestController controller) {
super(settings);
controller.registerHandler(GET, URI_BASE + "/license/basic_status", this);
}
@Override
protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
{
return channel -> client.licensing().prepareGetStartBasic().execute(
new RestBuilderListener<GetBasicStatusResponse>(channel) {
@Override

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public RestResponse buildResponse(GetBasicStatusResponse response, XContentBuilder builder) throws Exception {
    builder.startObject();
    builder.field("eligible_to_start_basic", response.isEligibleToStartBasic());
    builder.endObject();
    return new BytesRestResponse(RestStatus.OK, builder);
}

@Override
public String getName() {
    return "xpack_basic_status_action";
}
*/

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.ValidateActions;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentType;
import java.io.IOException;

public class PutLicenseRequest extends AcknowledgedRequest<PutLicenseRequest> {

    private License license;
    private boolean acknowledge = false;

    public PutLicenseRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return (license == null) ? ValidateActions.addValidationError("license is missing", null) : null;
    }

    /**
     * Parses license from json format to an instance of [License]
     */
public PutLicenseRequest license(BytesReference licenseDefinition, XContentType xContentType) {
    try {
        return license(License.fromSource(licenseDefinition, xContentType));
    } catch (IOException e) {
        throw new IllegalArgumentException("failed to parse license source", e);
    }
}

public PutLicenseRequest license(License license) {
    this.license = license;
    return this;
}

public License license() {
    return license;
}

public PutLicenseRequest acknowledge(boolean acknowledge) {
    this.acknowledge = acknowledge;
    return this;
}

public boolean acknowledged() {
    return acknowledge;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    license = License.readLicense(in);
    acknowledge = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    license.writeTo(out);
    out.writeBoolean(acknowledge);
}

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package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PostStartBasicAction extends Action<PostStartBasicRequest, PostStartBasicResponse,
PostStartBasicRequestBuilder> {

    public static final PostStartBasicAction INSTANCE = new PostStartBasicAction();
    public static final String NAME = "cluster:admin/xpack/license/start_basic";

    private PostStartBasicAction() {
        super(NAME);
    }

    @Override
    public PostStartBasicRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new PostStartBasicRequestBuilder(client, this);
    }

    @Override
    public PostStartBasicResponse newResponse() {
        return new PostStartBasicResponse();
    }
}

package org.elasticsearch.license;
import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import java.io.IOException;

public class PostStartBasicRequest extends AcknowledgedRequest<PostStartBasicRequest> {

    private boolean acknowledge = false;

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}

package org.elasticsearch.license;
import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import java.io.IOException;

public class PostStartBasicRequest extends AcknowledgedRequest<PostStartBasicRequest> {

    private boolean acknowledge = false;

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}
public PostStartBasicRequest acknowledge(boolean acknowledge) {
    this.acknowledge = acknowledge;
    return this;
}

public boolean isAcknowledged() {
    return acknowledge;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    acknowledge = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    out.writeBoolean(acknowledge);
}

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/****************************************************************************************************
*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import java.io.IOException;

class GetBasicStatusResponse extends ActionResponse {

    private boolean eligibleToStartBasic;

    GetBasicStatusResponse() {
    }

    GetBasicStatusResponse(boolean eligibleToStartBasic) {
        this.eligibleToStartBasic = eligibleToStartBasic;
    }

    boolean isEligibleToStartBasic() {
        return eligibleToStartBasic;
    }
package org.elasticsearch.license;

import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.joda.time.MutableDateTime;
import org.joda.time.format.DateTimeFormatter;
import org.joda.time.format.ISODateTimeFormat;

public class DateUtils {

    private static final FormatDateTimeFormatter formatDateOnlyFormatter = Joda.forPattern("yyyy-MM-dd");
    private static final DateTimeFormatter dateOnlyFormatter = formatDateOnlyFormatter.parser().withZoneUTC();
    private static final DateTimeFormatter dateTimeFormatter = ISODateTimeFormat.dateTime().withZoneUTC();

    public static long endOfTheDay(String date) {
        try {
            // Try parsing using complete date/time format
            return dateTimeFormatter.parseDateTime(date).getMillis();
        } catch (IllegalArgumentException ex) {
            // Fall back to the date only format
            MutableDateTime dateTime = dateOnlyFormatter.parseMutableDateTime(date);
            dateTime.millisOfDay().set(dateTime.millisOfDay().getMaximumValue());
            return dateTime.getMillis();
        }
    }

    public static long beginningOfTheDay(String date) {
        try {
            // Try parsing using complete date/time format
            return dateTimeFormatter.parseDateTime(date).getMillis();
        } catch (IllegalArgumentException ex) {
            // Fall back to the date only format
            MutableDateTime dateTime = dateOnlyFormatter.parseMutableDateTime(date);
            dateTime.millisOfDay().set(dateTime.millisOfDay().getMaximumValue());
            return dateTime.getMillis();
        }
    }
}
return dateTimeFormatter.parseDateTime(date).getMillis();
} catch (IllegalArgumentException ex) {
    // Fall back to the date only format
    return dateOnlyFormatter.parseDateTime(date).getMillis();
}

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*/
package org.elasticsearch.license;

public enum LicensesStatus {
    VALID((byte) 0),
    INVALID((byte) 1),
    EXPIRED((byte) 2);

    private final byte id;

    LicensesStatus(byte id) {
        this.id = id;
    }

    public int id() {
        return id;
    }

    public static LicensesStatus fromId(int id) {
        if (id == 0) {
            return VALID;
        } else if (id == 1) {
            return INVALID;
        } else if (id == 2) {
            return EXPIRED;
        } else {
            throw new IllegalStateException("no valid LicensesStatus for id="+ id);
        }
    }

    }

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*/
package org.elasticsearch.license;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;
import java.util.HashMap;
import java.util.Map;
import static org.elasticsearch.rest.RestRequest.Method.GET;
import static org.elasticsearch.rest.RestStatus.NOT_FOUND;
import static org.elasticsearch.rest.RestStatus.OK;

public class RestGetLicenseAction extends XPackRestHandler {

    @Inject
    public RestGetLicenseAction(Settings settings, RestController controller) {
        super(settings);
        // @deprecated Remove deprecations in 6.0
        controller.registerWithDeprecatedHandler(GET, URI_BASE + "/license", this,
                                                GET, "/_license", deprecationLogger);

        // Remove _licenses support entirely in 6.0
        controller.registerAsDeprecatedHandler(GET, "/_licenses", this,
                                                "[GET "/_licenses"] is deprecated! Use "+
                                                "[GET "/_xpack/license"] instead.",
                                                deprecationLogger);
    }

    @Override
    public String getName() {
        return "xpack_get_license_action";
    }

    /**
     * There will be only one license displayed per feature, the selected license will have the latest expiry_date
     * out of all other licenses for the feature.
     * <p>
     * The licenses are sorted by latest issue_date
     */
public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws IOException {
    final Map<String, String> overrideParams = new HashMap<>(2);
    overrideParams.put(License.REST_VIEW_MODE, "true");
    overrideParams.put(License.LICENSE_VERSION_MODE, String.valueOf(License.VERSION_CURRENT));
    final ToXContent.Params params = new ToXContent.DelegatingMapParams(overrideParams, request);
    GetLicenseRequest getLicenseRequest = new GetLicenseRequest();
    getLicenseRequest.local(request.paramAsBoolean("local", getLicenseRequest.local()));
    return channel -> client.es().admin().cluster().execute(GetLicenseAction.INSTANCE, getLicenseRequest,
        new RestBuilderListener<GetLicenseResponse>(channel) {
            @Override
            public RestResponse buildResponse(GetLicenseResponse response, XContentBuilder builder) throws Exception {
                // Default to pretty printing, but allow ?pretty=false to disable
                if (!request.hasParam("pretty")) {
                    builder.prettyPrint().ifAtEnd();
                }
                boolean hasLicense = response.license() != null;
                builder.startObject();
                if (hasLicense) {
                    builder.startObject("license");
                    response.license().toInnerXContent(builder, params);
                    builder.endObject();
                }
                builder.endObject();
                return new BytesRestResponse(hasLicense ? OK : NOT_FOUND, builder);
            }
        });
    }
}

package org.elasticsearch.license;

import java.io.IOException;
import java.io.InputStream;
import java.nio.ByteBuffer;
import java.util.ArrayList;
import java.util.Base64;
import java.util.Comparator;
import java.util.List;
import java.util.Locale;
import org.apache.lucene.util.CollectionUtil;
import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.ElasticsearchParseException;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.LoggingDeprecationHandler;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.ToXContentObject;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.protocol.xpack.license.LicenseStatus;

/**
 * Data structure for license. Use {@link Builder} to build a license.
 * Provides serialization/deserialization & validation methods for license object
 */
public class License implements ToXContentObject {
    public static final int VERSION_START = 1;
    public static final int VERSION_NO_FEATURE_TYPE = 2;
    public static final int VERSION_START_DATE = 3;
    public static final int VERSION_CRYPTO_ALGORITHMS = 4;
    public static final int VERSION_CURRENT = VERSION_CRYPTO_ALGORITHMS;

    /**
     * XContent param name to deserialize license(s) with
     * an additional <code>status</code> field, indicating whether a
     * particular license is 'active' or 'expired' and no signature
     * and in a human readable format
     */
    public static final String REST_VIEW_MODE = "rest_view";

    /**
     * XContent param name to deserialize license(s) with
     * no signature
     */
    public static final String LICENSE_SPEC_VIEW_MODE = "license_spec_view";

    /**
     * XContent param name to deserialize licenses according
     * to a specific license version
     */
    public static final String LICENSE_VERSION_MODE = "license_version";

    public static final Comparator<License> LATEST_ISSUE_DATE_FIRST = Comparator.comparing(License::issueDate).reversed();
private final int version;
private final String uid;
private final String issuer;
private final String issuedTo;
private final long issueDate;
private final String type;
private final String subscriptionType;
private final String feature;
private final String signature;
private final long expiryDate;
private final long startDate;
private final int maxNodes;
private final OperationMode operationMode;

/**
 * Decouples operation mode of a license from the license type value.
 * <p>
 * Note: The mode indicates features that should be made available, but it does not indicate whether the license is active!
 * <p>
 * The id byte is used for ordering operation modes (used for merging license md in tribe node)
 */
public enum OperationMode {
    MISSING((byte) 0),
    TRIAL((byte) 1),
    BASIC((byte) 2),
    STANDARD((byte) 3),
    GOLD((byte) 4),
    PLATINUM((byte) 5);

    private final byte id;
    OperationMode(byte id) {
        this.id = id;
    }

    /** Returns non-zero positive number when \texttt{opMode1} is greater than \texttt{opMode2} */
    public static int compare(OperationMode opMode1, OperationMode opMode2) {
        return Integer.compare(opMode1.id, opMode2.id);
    }

    public static OperationMode resolve(String type) {
        switch (type.toLowerCase(Locale.ROOT)) {
            case "missing":
                return MISSING;
            case "trial":
...
private License(int version, String uid, String issuer, String issuedTo, long issueDate, String type,
String subscriptionType, String feature, String signature, long expiryDate, int maxNodes, long startDate) {
    this.version = version;
    this.uid = uid;
    this.issuer = issuer;
    this.issuedTo = issuedTo;
    this.issueDate = issueDate;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.feature = feature;
    this.signature = signature;
    // We will validate that only a basic license can have the
    BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS
    // in the validate() method.
    if (expiryDate == -1) {
        this.expiryDate = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    } else {
        this.expiryDate = expiryDate;
    }
    this.maxNodes = maxNodes;
    this.startDate = startDate;
    if (version == VERSION_START) {
        // in 1.x: the acceptable values for 'subscription_type': none | dev | silver | gold | platinum
        this.operationMode = OperationMode.resolve(subscriptionType);
    } else {
        // in 2.x: the acceptable values for 'type': trial | basic | silver | dev | gold | platinum
        throw new IllegalArgumentException("unknown type [" + type + "]");
    }
}
    this.operationMode = OperationMode.resolve(type);
    }
    validate();
    }

/**
 * @return version of the license
 */
    public int version() {
        return version;
    }

/**
 * @return a unique identifier for a license
 */
    public String uid() {
        return uid;
    }

/**
 * @return type of the license [trial, subscription, internal]
 */
    public String type() {
        return type;
    }

/**
 * @return the issueDate in milliseconds
 */
    public long issueDate() {
        return issueDate;
    }

/**
 * @return the startDate in milliseconds
 */
    public long startDate() {
        return startDate;
    }

/**
 * @return the expiry date in milliseconds
 */
    public long expiryDate() {
        return expiryDate;
    }

/**
* @return the maximum number of nodes this license has been issued for
*/
public int maxNodes() {
    return maxNodes;
}

/**
* @return a string representing the entity this license has been issued to
*/
public String issuedTo() {
    return issuedTo;
}

/**
* @return a string representing the entity responsible for issuing this license (internal)
*/
public String issuer() {
    return issuer;
}

/**
* @return a string representing the signature of the license used for license verification
*/
public String signature() {
    return signature;
}

/**
* @return the operation mode of the license as computed from the license type or from
* the license mode file
*/
public OperationMode operationMode() {
    synchronized (this) {
        if (canReadOperationModeFromFile() && operationModeFileWatcher != null) {
            return operationModeFileWatcher.getCurrentOperationMode();
        }
    }
    return operationMode;
}

private boolean canReadOperationModeFromFile() {
    return type.equals("cloud_internal");
}

private volatile OperationModeFileWatcher operationModeFileWatcher;

/**
* Sets the operation mode file watcher for the license and initializes the
public synchronized void setOperationModeFileWatcher(final OperationModeFileWatcher operationModeFileWatcher) {
    this.operationModeFileWatcher = operationModeFileWatcher;
    if (canReadOperationModeFromFile()) {
        this.operationModeFileWatcher.init();
    }
}

/**
 * Removes operation mode file watcher, so unused license objects can be gc'ed
 */
public synchronized void removeOperationModeFileWatcher() {
    this.operationModeFileWatcher = null;
}

/**
 * @return the current license's status
 */
public LicenseStatus status() {
    long now = System.currentTimeMillis();
    if (issueDate > now) {
        return LicenseStatus.INVALID;
    } else if (expiryDate < now) {
        return LicenseStatus.EXPIRED;
    }
    return LicenseStatus.ACTIVE;
}

private void validate() {
    if (issuer == null) {
        throw new IllegalStateException("issuer can not be null");
    } else if (issuedTo == null) {
        throw new IllegalStateException("issuedTo can not be null");
    } else if (issueDate == -1) {
        throw new IllegalStateException("issueDate has to be set");
    } else if (type == null) {
        throw new IllegalStateException("type can not be null");
    } else if (subscriptionType == null && version == VERSION_START) {
        throw new IllegalStateException("subscriptionType can not be null");
    } else if (uid == null) {
        throw new IllegalStateException("uid can not be null");
    } else if (feature == null && version == VERSION_START) {
        throw new IllegalStateException("feature can not be null");
    } else if (maxNodes == -1) {
        throw new IllegalStateException("maxNodes has to be set");
    } else if (expiryDate == -1) {

throw new IllegalStateException("expiryDate has to be set");
} else if (expiryDate == LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS
&& "basic".equals(type) == false) {
    throw new IllegalStateException("only basic licenses are allowed to have no expiration");
}

public static License readLicense(StreamInput in) throws IOException {
    int version = in.readVInt(); // Version for future extensibility
    if (version > VERSION_CURRENT) {
        throw new ElasticsearchException("Unknown license version found, please upgrade all nodes to the latest
elasticsearch-license" +
            " plugin");
    }
    Builder builder = builder();
    builder.version(version);
    builder.uid(in.readString());
    builder.type(in.readString());
    if (version == VERSION_START) {
        builder.subscriptionType(in.readString());
    }
    builder.issueDate(in.readLong());
    if (version == VERSION_START) {
        builder.feature(in.readString());
    }
    builder.expiryDate(in.readLong());
    builder.maxNodes(in.readInt());
    builder.issuedTo(in.readString());
    builder.issuer(in.readString());
    builder.signature(in.readOptionalString());
    if (version >= VERSION_START_DATE) {
        builder.startDate(in.readLong());
    }
    return builder.build();
}

public void writeTo(StreamOutput out) throws IOException {
    out.writeVInt(version);
    out.writeString(uid);
    out.writeString(type);
    if (version == VERSION_START) {
        out.writeString(subscriptionType);
    }
    out.writeLong(issueDate);
    if (version == VERSION_START) {
        out.writeString(feature);
    }
    out.writeLong(expiryDate);
out.writeInt(maxNodes);
out.writeString(issuedTo);
out.writeString(issuer);
out.writeOptionalString(signature);
if (version >= VERSION_START_DATE) {
    out.writeLong(startDate);
}

@Override
public String toString() {
    try {
        final XContentBuilder builder = XContentFactory.jsonBuilder();
        toXContent(builder, ToXContent.EMPTY_PARAMS);
        return Strings.toString(builder);
    } catch (IOException e) {
        return "";
    }
}

@Override
public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    builder.startObject();
    toInnerXContent(builder, params);
    builder.endObject();
    return builder;
}

public XContentBuilder toInnerXContent(XContentBuilder builder, Params params) throws IOException {
    boolean licenseSpecMode = params.paramAsBoolean(LICENSE_SPEC_VIEW_MODE, false);
    boolean restViewMode = params.paramAsBoolean(REST_VIEW_MODE, false);
    boolean previouslyHumanReadable = builder.humanReadable();
    if (licenseSpecMode && restViewMode) {
        throw new IllegalArgumentException("can have either " + REST_VIEW_MODE + " or " + LICENSE_SPEC_VIEW_MODE);
    } else if (restViewMode) {
        if (!previouslyHumanReadable) {
            builder.humanReadable(true);
        }
    }
    final int version;
    if (params.param(LICENSE_VERSION_MODE) != null && restViewMode) {
        version = Integer.parseInt(params.param(LICENSE_VERSION_MODE));
    } else if (restViewMode) {
        version = this.version;
    } else {
        version = Integer.parseInt(params.param(LICENSE_VERSION_MODE));
    }
    builder.field(Fields.STATUS, status().label());
private class Builder {
    field(Fields.UID, uid);
    field(Fields.TYPE, type);
    if (version == VERSION_START) {
        field(Fields.SUBSCRIPTION_TYPE, subscriptionType);
    }
    timeField(Fields.ISSUE_DATE_IN_MILLIS, Fields.ISSUE_DATE, issueDate);
    if (version == VERSION_START) {
        field(Fields.FEATURE, feature);
    }
    if (expiryDate != LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
        timeField(Fields.EXPIRY_DATE_IN_MILLIS, Fields.EXPIRY_DATE, expiryDate);
    }
    field(Fields.MAX_NODES, maxNodes);
    field(Fields.ISSUED_TO, issuedTo);
    field(Fields.ISSUER, issuer);
    if (!licenseSpecMode && !restViewMode && signature != null) {
        field(Fields.SIGNATURE, signature);
    }
    if (restViewMode) {
        humanReadable(previouslyHumanReadable);
    }
    if (version >= VERSION_START_DATE) {
        timeField(Fields.START_DATE_IN_MILLIS, Fields.START_DATE, startDate);
    }
    return builder;
}

public static License fromXContent(XContentParser parser) throws IOException {
    Builder builder = new Builder();
    XContentParser.Token token;
    while ((token = parser.nextToken()) != XContentParser.Token.END_OBJECT) {
        if (token == XContentParser.Token.FIELD_NAME) {
            String currentFieldName = parser.currentName();
            token = parser.nextToken();
            if (token.isValue()) {
                if (Fields.UID.equals(currentFieldName)) {
                    builder.uid(parser.text());
                } else if (Fields.TYPE.equals(currentFieldName)) {
                    builder.type(parser.text());
                } else if (Fields.SUBSCRIPTION_TYPE.equals(currentFieldName)) {
                    builder.subscriptionType(parser.text());
                } else if (Fields.ISSUE_DATE.equals(currentFieldName)) {
                    builder.issueDate(parseDate(parser, "issue", false));
                } else if (Fields.ISSUE_DATE_IN_MILLIS.equals(currentFieldName)) {
                    builder.issueDate(parser.longValue());
                } else if (Fields.FEATURE.equals(currentFieldName)) {
                    builder.feature(parser.text());
                } else if (Fields.EXPIRY_DATE.equals(currentFieldName)) {
                    builder.expiryDate(parseDate(parser, "expiry", false));
                } else if (Fields.EXPIRY_DATE_IN_MILLIS.equals(currentFieldName)) {
                    builder.expiryDate(parser.longValue());
                } else if (Fields.MAX_NODES.equals(currentFieldName)) {
                    builder.maxNodes(parser.longValue());
                } else if (Fields.ISSUED_TO.equals(currentFieldName)) {
                    builder.issuedTo(parser.text());
                } else if (Fields.ISSUER.equals(currentFieldName)) {
                    builder.issuer(parser.text());
                } else if (Fields.SIGNATURE.equals(currentFieldName)) {
                    builder.signature(parser.text());
                } else if (Fields.TIMESTAMP.equals(currentFieldName)) {
                    builder.timestamp(parser.longValue());
                } else if (Fields.START_DATE.equals(currentFieldName)) {
                    builder.startDate(parseDate(parser, "start", false));
                } else if (Fields.START_DATE_IN_MILLIS.equals(currentFieldName)) {
                    builder.startDate(parser.longValue());
                } else if (Fields.SIGNATURE.equals(currentFieldName)) {
                    builder.signatures().add(parser.text());
                }
            }
        }
    }
    return builder;
}
builder.feature(parser.text());

} else if (Fields.EXPIRY_DATE.equals(currentFieldName)) {
    builder.expiryDate(parseDate(parser, "expiration", true));
}

} else if (Fields.EXPIRY_DATE_IN_MILLIS.equals(currentFieldName)) {
    builder.expiryDate(parser.longValue());
}

} else if (Fields.START_DATE.equals(currentFieldName)) {
    builder.startDate(parseDate(parser, "start", false));
}

} else if (Fields.START_DATE_IN_MILLIS.equals(currentFieldName)) {
    builder.startDate(parser.longValue());
}

} else if (Fields.MAX_NODES.equals(currentFieldName)) {
    builder.maxNodes(parser.intValue());
}

} else if (Fields.ISSUED_TO.equals(currentFieldName)) {
    builder.issuedTo(parser.text());
}

} else if (Fields.ISSUER.equals(currentFieldName)) {
    builder.issuer(parser.text());
}

} else if (Fields.SIGNATURE.equals(currentFieldName)) {
    builder.signature(parser.text());
}

} else if (Fields.VERSION.equals(currentFieldName)) {
    builder.version(parser.intValue());
}

// Ignore unknown elements - might be new version of license
}

} else if (token == XContentParser.Token.START_ARRAY) {
    // It was probably created by newer version - ignoring
    parser.skipChildren();
}

} else if (token == XContentParser.Token.START_OBJECT) {
    // It was probably created by newer version - ignoring
    parser.skipChildren();
}

}

// not a license spec
if (builder.signature != null) {
    byte[] signatureBytes = Base64.getDecoder().decode(builder.signature);
    ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
    int version = byteBuffer.getInt();
    // we take the absolute version, because negative versions
    // mean that the license was generated by the cluster (see TrialLicense)
    // and positive version means that the license was signed
    if (version < 0) {
        version *= -1;
    }

    if (version == 0) {
        throw new ElasticsearchException("malformed signature for license [" + builder.uid + "]");
    } else if (version > VERSION_CURRENT) {
        throw new ElasticsearchException("Unknown license version found, please upgrade all nodes to the latest
" +
          "elasticsearch-license plugin");
    }
}
// signature version is the source of truth
builder.version(version);
}
return builder.build();
}

/**
 * Returns true if the license was auto-generated (by license plugin),
 * false otherwise
 */
public static boolean isAutoGeneratedLicense(String signature) {
    try {
        byte[] signatureBytes = Base64.getDecoder().decode(signature);
        ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
        return byteBuffer.getInt() < 0;
    } catch (IllegalArgumentException e) {
        throw new IllegalStateException(e);
    }
}

public static License fromSource(BytesReference bytes, XContentType xContentType) throws IOException {
    if (bytes == null || bytes.length() == 0) {
        throw new ElasticsearchParseException("failed to parse license - no content provided");
    }
    if (xContentType == null) {
        throw new ElasticsearchParseException("failed to parse license - no content-type provided");
    }
    // EMPTY is safe here because we don't call namedObject
    try (InputStream byteStream = bytes.streamInput();
         XContentParser parser = xContentType.xContent().
             createParser(NamedXContentRegistry.EMPTY, LoggingDeprecationHandler.INSTANCE, byteStream)) {
        License license = null;
        if (parser.nextToken() == XContentParser.Token.START_OBJECT) {
            if (parser.nextToken() == XContentParser.Token.FIELD_NAME) {
                String currentFieldName = parser.currentName();
                if (Fields.LICENSES.equals(currentFieldName)) {
                    final List<License> pre20Licenses = new ArrayList<>();
                    if (parser.nextToken() == XContentParser.Token.START_ARRAY) {
                        while (parser.nextToken() != XContentParser.Token.END_ARRAY) {
                            pre20Licenses.add(License.fromXContent(parser));
                        }
                        // take the latest issued unexpired license
                        CollectionUtil.timSort(pre20Licenses, LATEST_ISSUE_DATE_FIRST);
                        long now = System.currentTimeMillis();
                        for (License oldLicense : pre20Licenses) {
                            if (oldLicense.expiryDate() > now) {
                                license = oldLicense;
                                break;
                            }
                        }
                    }
                }
            }
        }
    }
}
break;
}
}
if (license == null && !pre20Licenses.isEmpty()) {
    license = pre20Licenses.get(0);
}
} else {
    throw new ElasticsearchParseException("failed to parse licenses expected an array of licenses");
}
} else if (Fields.LICENSE.equals(currentFieldName)) {
    license = License.fromXContent(parser);
}
// Ignore all other fields - might be created with new version
} else {
    throw new ElasticsearchParseException("failed to parse licenses expected field");
}
} else {
    throw new ElasticsearchParseException("failed to parse licenses expected start object");

return license;
}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;
    License license = (License) o;
    if (issueDate != license.issueDate) return false;
    if (expiryDate != license.expiryDate) return false;
    if (startDate!= license.startDate) return false;
    if (maxNodes != license.maxNodes) return false;
    if (version != license.version) return false;
    if (uid != null ? !uid.equals(license.uid) : license.uid != null) return false;
    if (issuer != null ? !issuer.equals(license.issuer) : license.issuer != null) return false;
    if (issuedTo != null ? !issuedTo.equals(license.issuedTo) : license.issuedTo != null) return false;
    if (type != null ? !type.equals(license.type) : license.type != null) return false;
    if (subscriptionType != null ? !subscriptionType.equals(license.subscriptionType) : license.subscriptionType !=
null)
        return false;
    if (feature != null ? !feature.equals(license.feature) : license.feature != null) return false;
    return !(signature != null ? !signature.equals(license.signature) : license.signature != null);

}

@Override
public int hashCode() {
    int result = uid != null ? uid.hashCode() : 0;
    result = 31 * result + (issuer != null ? issuer.hashCode() : 0);
    result = 31 * result + (issuedTo != null ? issuedTo.hashCode() : 0);
    result = 31 * result + (issueDate ^ (issueDate >>> 32));
    result = 31 * result + (type != null ? type.hashCode() : 0);
    result = 31 * result + (subscriptionType != null ? subscriptionType.hashCode() : 0);
    result = 31 * result + (feature != null ? feature.hashCode() : 0);
    result = 31 * result + (signature != null ? signature.hashCode() : 0);
    result = 31 * result + (expiryDate ^ (expiryDate >>> 32));
    result = 31 * result + (startDate ^ (startDate >>> 32));
    result = 31 * result + maxNodes;
    result = 31 * result + version;
    return result;
}

public static final class Fields {
    public static final String STATUS = "status";
    public static final String UID = "uid";
    public static final String TYPE = "type";
    public static final String SUBSCRIPTION_TYPE = "subscription_type";
    public static final String ISSUE_DATE_IN_MILLIS = "issue_date_in_millis";
    public static final String ISSUE_DATE = "issue_date";
    public static final String FEATURE = "feature";
    public static final String EXPIRY_DATE_IN_MILLIS = "expiry_date_in_millis";
    public static final String EXPIRY_DATE = "expiry_date";
    public static final String START_DATE_IN_MILLIS = "start_date_in_millis";
    public static final String START_DATE = "start_date";
    public static final String MAX_NODES = "max_nodes";
    public static final String ISSUED_TO = "issued_to";
    public static final String ISSUER = "issuer";
    public static final String VERSION = "version";
    public static final String SIGNATURE = "signature";
}

private static long parseDate(XContentParser parser, String description, boolean endOfTheDay) throws IOException {
    if (parser.currentToken() == XContentParser.Token.VALUE_NUMBER) {
        return parser.longValue();
    } else {
        try {
            if (endOfTheDay) {
                return DateUtils.endOfTheDay(parser.text());
            } else {

```
return DateUtils.beginningOfDay(parser.text());
}
} catch (IllegalArgumentException ex) {
    throw new ElasticsearchParseException("invalid " + description + " date format " + parser.text());
}
}
}

public static Builder builder() {
    return new Builder();
}

public static class Builder {
    private int version = License.VERSION_CURRENT;
    private String uid;
    private String issuer;
    private String issuedTo;
    private long issueDate = -1;
    private String type;
    private String subscriptionType;
    private String feature;
    private String signature;
    private long expiryDate = -1;
    private long startDate = -1;
    private int maxNodes = -1;

    public Builder uid(String uid) {
        this.uid = uid;
        return this;
    }

    public Builder version(int version) {
        this.version = version;
        return this;
    }

    public Builder issuer(String issuer) {
        this.issuer = issuer;
        return this;
    }

    public Builder issuedTo(String issuedTo) {
        this.issuedTo = issuedTo;
        return this;
    }

    public Builder issueDate(long issueDate) {
        this.issueDate = issueDate;
        return this;
    }

    public Builder expiryDate(long expiryDate) {
        this.expiryDate = expiryDate;
        return this;
    }

    public Builder startDate(long startDate) {
        this.startDate = startDate;
        return this;
    }

    public Builder maxNodes(int maxNodes) {
        this.maxNodes = maxNodes;
        return this;
    }
}

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public Builder type(String type) {
    this.type = type;
    return this;
}

public Builder subscriptionType(String subscriptionType) {
    this.subscriptionType = subscriptionType;
    return this;
}

public Builder feature(String feature) {
    this.feature = feature;
    return this;
}

public Builder expiryDate(long expiryDate) {
    this.expiryDate = expiryDate;
    return this;
}

public Builder maxNodes(int maxNodes) {
    this.maxNodes = maxNodes;
    return this;
}

public Builder signature(String signature) {
    if (signature != null) {
        this.signature = signature;
    }
    return this;
}

public Builder startDate(long startDate) {
    this.startDate = startDate;
    return this;
}

public Builder fromLicenseSpec(License license, String signature) {
    return uid(license.uid())
        .version(license.version())
        .issuedTo(license.issuedTo())
        .issueDate(license.issueDate())
        .startDate(license.startDate())
        .type(license.type())
        .subscriptionType(license.subscriptionType)
        .signature(signature);
}
public Builder fromPre20LicenseSpec(License pre20License) {
    return uid(pre20License.uid())
        .issuedTo(pre20License.issuedTo())
        .issueDate(pre20License.issueDate())
        .maxNodes(pre20License.maxNodes())
        .expiryDate(pre20License.expiryDate());
}

public License build() {
    return new License(version, uid, issuer, issuedTo, issueDate, type,
        subscriptionType, feature, signature, expiryDate, maxNodes, startDate);
}

public Builder validate() {
    if (issuer == null) {
        throw new IllegalStateException("issuer can not be null");
    } else if (issuedTo == null) {
        throw new IllegalStateException("issuedTo can not be null");
    } else if (issueDate == -1) {
        throw new IllegalStateException("issueDate has to be set");
    } else if (type == null) {
        throw new IllegalStateException("type can not be null");
    } else if (uid == null) {
        throw new IllegalStateException("uid can not be null");
    } else if (signature == null) {
        throw new IllegalStateException("signature can not be null");
    } else if (maxNodes == -1) {
        throw new IllegalStateException("maxNodes has to be set");
    } else if (expiryDate == -1) {
        throw new IllegalStateException("expiryDate has to be set");
    }
    return this;
}

/**
 * Returns <code>true</code> iff the license is a production license
public boolean isProductionLicense() {
    switch (operationMode()) {
        case MISSING:
        case TRIAL:
        case BASIC:
            return false;
        case STANDARD:
        case GOLD:
        case PLATINUM:
            return true;
        default:
            throw new AssertionError("unknown operation mode: " + operationMode());
    }
}
*/

package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetLicenseAction extends TransportMasterNodeReadAction<GetLicenseRequest, GetLicenseResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportGetLicenseAction(Settings settings, TransportService transportService, ClusterService clusterService,
        LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
super(settings, GetLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters, indexNameExpressionResolver,
    GetLicenseRequest::new);
this.licenseService = licenseService;
}

@override
protected String executor() {
    return ThreadPool.Names.MANAGEMENT;
}

@override
protected GetLicenseResponse newResponse() {
    return new GetLicenseResponse();
}

@override
protected ClusterBlockException checkBlock(GetLicenseRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
}

@override
protected void masterOperation(final GetLicenseRequest request, ClusterState state, final ActionListener<GetLicenseResponse> listener) throws ElasticsearchException {
    listener.onResponse(new GetLicenseResponse(licenseService.getLicense()));
}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.apache.logging.log4j.util.Supplier;
import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.xpack.core.XPackPlugin;
import java.time.Clock;

import java.time.Clock;
import java.util.UUID;

public class StartupSelfGeneratedLicenseTask extends ClusterStateUpdateTask {

    /**
     * Max number of nodes licensed by generated trial license
     */
    private int selfGeneratedLicenseMaxNodes = 1000;

    private final Settings settings;
    private final Clock clock;
    private final ClusterService clusterService;
    private final Logger logger;

    public StartupSelfGeneratedLicenseTask(Settings settings, Clock clock, ClusterService clusterService) {
        this.settings = settings;
        this.clock = clock;
        this.clusterService = clusterService;
        this.logger = Loggers.getLogger(getClass(), settings);
    }

    @Override
    public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
        LicensesMetaData licensesMetaData = newState.metaData().custom(LicensesMetaData.TYPE);
        if (logger.isDebugEnabled()) {
            logger.debug("registered self generated license: {}", licensesMetaData);
        }
    }

    @Override
    public ClusterState execute(ClusterState currentState) throws Exception {
        XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
        final MetaData metaData = currentState.metaData();
        final LicensesMetaData currentLicensesMetaData = metaData.custom(LicensesMetaData.TYPE);

        if (currentLicensesMetaData == null) {
            String type = LicenseService.SELF_GENERATED_LICENSE_TYPE.get(settings);
            if (SelfGeneratedLicense.validSelfGeneratedType(type) == false) {
                throw new IllegalArgumentException("Illegal self generated license type [" + type + "].
                                                Must be trial or basic.");
            }
            return updateWithLicense(currentState, type);
        } else if (LicenseUtils.signatureNeedsUpdate(currentLicensesMetaData.getLicense(), currentState.nodes())) {
            return updateLicenseSignature(currentState, currentLicensesMetaData);
        } else if (LicenseUtils.licenseNeedsExtended(currentLicensesMetaData.getLicense())) {
            return extendBasic(currentState, currentLicensesMetaData);
        } else {
            return currentState;
        }
    }
}

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private LicensesMetaData createBasicLicenseFromExistingLicense(LicensesMetaData currentLicenseMetadata) {

    License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder, currentState.nodes());
    Version trialVersion = currentLicenseMetaData.getMostRecentTrialVersion();
    LicensesMetaData newLicenseMetadata = new LicensesMetaData(selfGeneratedLicense, trialVersion);
    mdBuilder.putCustom(LicensesMetaData.TYPE, newLicenseMetadata);
    logger.info("Existing basic license has an expiration. Basic licenses no longer expire.

    Old license:
    {}

    New license:
    {}", license, newLicenseMetadata.getLicense());
    return ClusterState.builder(currentState).metaData(mdBuilder).build();
}

@Override
public void onFailure(String source, @Nullable Exception e) {
    logger.error((Supplier<?>) () -> new ParameterizedMessage("unexpected failure during 
[{}]", source), e);
}

private ClusterState extendBasic(ClusterState currentState, LicensesMetaData currentLicenseMetadata) {

    License license = currentLicenseMetaData.getLicense();
    MetaData.Builder mdBuilder = MetaData.builder(currentState.metaData());
    String type = license.type();
    long issueDate = license.issueDate();
    long expiryDate = license.expiryDate();
    // extend the basic license expiration date if needed since extendBasic will not be called now
    if ("basic".equals(type) && expiryDate != LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
        expiryDate = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    }
    License.Builder specBuilder = License.builder()
        .uid(license.uid())
        .issuedTo(license.issuedTo())
        .maxNodes(selfGeneratedLicenseMaxNodes)
        .issueDate(issueDate)
        .type(type)
        .expiryDate(expiryDate);
    License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder, currentState.nodes());
    Version trialVersion = currentLicenseMetaData.getMostRecentTrialVersion();
    LicensesMetaData newLicenseMetadata = new LicensesMetaData(selfGeneratedLicense, trialVersion);
    mdBuilder.putCustom(LicensesMetaData.TYPE, newLicenseMetadata);
    logger.info("Updating existing license to the new version.

    Old license:
    {}

    New license:
    {}", license, newLicenseMetadata.getLicense());
    return ClusterState.builder(currentState).metaData(mdBuilder).build();
}
License currentLicense = currentLicenseMetadata.getLicense();
License.Builder specBuilder = License.builder()
 .uid(currentLicense.uid())
 .issuedTo(currentLicense.issuedTo())
 .maxNodes(selfGeneratedLicenseMaxNodes)
 .issueDate(currentLicense.issueDate())
 .type("basic")
 .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder, currentLicense.version());
Version trialVersion = currentLicenseMetadata.getMostRecentTrialVersion();
return new LicensesMetaData(selfGeneratedLicense, trialVersion);
}

private ClusterState updateWithLicense(ClusterState currentState, String type) {
    long issueDate = clock.millis();
    MetaData.Builder mdBuilder = MetaData.builder(currentState.metaData());
    long expiryDate;
    if ("basic".equals(type)) {
        expiryDate = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    } else {
        expiryDate = issueDate +
        LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.getMillis();
    }
    License.Builder specBuilder = License.builder()
 .uid(UUID.randomUUID().toString())
 .issuedTo(clusterService.getClusterName().value())
 .maxNodes(selfGeneratedLicenseMaxNodes)
 .issueDate(issueDate)
 .type(type)
 .expiryDate(expiryDate);
License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder, currentState.nodes());
LicensesMetaData licensesMetaData;
if ("trial".equals(type)) {
    licensesMetaData = new LicensesMetaData(selfGeneratedLicense, Version.CURRENT);
} else {
    licensesMetaData = new LicensesMetaData(selfGeneratedLicense, null);
}
mdBuilder.putCustom(LicensesMetaData.TYPE, licensesMetaData);
return ClusterState.builder(currentState).metaData(mdBuilder).build();
}

package org.elasticsearch.license;

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 */
import org.elasticsearch.Version;
import org.elasticsearch.cluster.AbstractNamedDiffable;
import org.elasticsearch.cluster.MergableCustomMetaData;
import org.elasticsearch.cluster.NamedDiff;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.xpack.core.XPackPlugin;
import java.io.IOException;
import java.util.EnumSet;

/**
 * Contains metadata about registered licenses
 */
public class LicensesMetaData extends AbstractNamedDiffable<MetaData.Custom> implements 
XPackPlugin.XPackMetaDataCustom,
MergableCustomMetaData<LicensesMetaData> {

public static final String TYPE = "licenses";

/**
 * When license is explicitly removed by a user, LICENSE_TOMBSTONE
 * is used as a placeholder in the license metadata. This enables
 * us to distinguish between the scenario when a cluster never
 * had a license (null) and when a license was removed explicitly
 * (LICENSE_TOMBSTONE).
 * We rely on this to decide whether to generate a unsigned trial
 * license or not. we should only generate a license if no license
 * ever existed in the cluster state
 */
public static final License LICENSE_TOMBSTONE = License.builder()
.type("trial")
.issuer("elasticsearch")
.uid("TOMBSTONE")
.issuedTo(""")
.maxNodes(0)
.issueDate(0)
.expiryDate(0)
.build();

private License license;

// This field describes the version of x-pack for which this cluster has exercised a trial. If the field
// is null, then no trial has been exercised. We keep the version to leave open the possibility that we
// may eventually allow a cluster to exercise a trial every time they upgrade to a new major version.

@Nullable
private Version trialVersion;

LicensesMetaData(License license, Version trialVersion) {
    this.license = license;
    this.trialVersion = trialVersion;
}

public License getLicense() {
    return license;
}

boolean isEligibleForTrial() {
    if (trialVersion == null) {
        return true;
    }
    return Version.CURRENT.major > trialVersion.major;
}

Version getMostRecentTrialVersion() {
    return trialVersion;
}

@Override
public String toString() {
    return "LicensesMetaData{" +
    "license=" + license +
    ", trialVersion=" + trialVersion +
    "}';
}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;
    LicensesMetaData that = (LicensesMetaData) o;
    if (license != null ? !license.equals(that.license) : that.license != null) return false;
    return trialVersion != null ? trialVersion.equals(that.trialVersion) : that.trialVersion == null;
}

@Override
public int hashCode() {
    int result = license != null ? license.hashCode() : 0;
    result = 31 * result + (trialVersion != null ? trialVersion.hashCode() : 0);
}
return result;
}

@Override
public String getWriteableName() {
    return TYPE;
}

@Override
public Version getMinimalSupportedVersion() {
    return Version.CURRENT.minimumCompatibilityVersion();
}

@Override
public EnumSet<MetaData.XContentContext> context() {
    return EnumSet.of(MetaData.XContentContext.GATEWAY);
}

public static LicensesMetaData fromXContent(XContentParser parser) throws IOException {
    License license = LICENSE_TOMBSTONE;
    Version trialLicense = null;

    XContentParser.Token token;
    while ((token = parser.nextToken()) != XContentParser.Token.END_OBJECT) {
        if (token == XContentParser.Token.FIELD_NAME) {
            String fieldName = parser.currentName();
            if (fieldName != null) {
                if (fieldName.equals(Fields.LICENSE)) {
                    token = parser.nextToken();
                    if (token == XContentParser.Token.START_OBJECT) {
                        license = License.fromXContent(parser);
                    } else if (token == XContentParser.Token.VALUE_NULL) {
                        license = LICENSE_TOMBSTONE;
                    }
                } else if (fieldName.equals(Fields.TRIAL_LICENSE)) {
                    parser.nextToken();
                    trialLicense = Version.fromString(parser.text());
                }
            }
        }
    }

    return new LicensesMetaData(license, trialLicense);
}

@Override
public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    if (license == LICENSE_TOMBSTONE) {
        builder.nullField(Fields.LICENSE);
    } else {
        return result;
    }
}

public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    if (license == LICENSE_TOMBSTONE) {
        builder.nullField(Fields.LICENSE);
    } else {
        return result;
    }
}
builder.startObject(Fields.LICENSE);
    license.toInnerXContent(builder, params);
    builder.endObject();

    } if (trialVersion != null) {
        builder.field(Fields.TRIAL_LICENSE, trialVersion.toString());
    } return builder;
}

@Override
public void writeTo(StreamOutput streamOutput) throws IOException {
    if (license == LICENSE_TOMBSTONE) {
        streamOutput.writeBoolean(false); // no license
    } else {
        streamOutput.writeBoolean(true); // has a license
        license.writeTo(streamOutput);
    }

    if (streamOutput.getVersion().onOrAfter(Version.V_6_1_0)) {
        if (trialVersion == null) {
            streamOutput.writeBoolean(false);
        } else {
            streamOutput.writeBoolean(true);
            Version.writeVersion(trialVersion, streamOutput);
        }
    }
}

public LicensesMetaData(StreamInput streamInput) throws IOException {
    if (streamInput.readBoolean()) {
        license = License.readLicense(streamInput);
    } else {
        license = LICENSE_TOMBSTONE;
    }

    if (streamInput.getVersion().onOrAfter(Version.V_6_1_0)) {
        boolean hasExercisedTrial = streamInput.readBoolean();
        if (hasExercisedTrial) {
            this.trialVersion = Version.readVersion(streamInput);
        }
    }
}

public static NamedDiff<MetaData.Custom> readDiffFrom(StreamInput streamInput) throws IOException {
    return readDiffFrom(MetaData.Custom.class, TYPE, streamInput);
}

public static License extractLicense(LicensesMetaData licensesMetaData) {
    if (licensesMetaData != null) {
License license = licensesMetaData.getLicense();
if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
    return null;
} else {
    return license;
}
return null;
}

@Override
public LicensesMetaData merge(LicensesMetaData other) {
    if (other.license == null) {
        return this;
    } else if (license == null
        || OperationMode.compare(other.license.operationMode(), license.operationMode()) > 0) {
        return other;
    }
    return this;
}

private static final class Fields {
    private static final String LICENSE = "license";
    private static final String TRIAL_LICENSE = "trial_license";
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import java.io.IOException;

import java.io.IOException;

public class GetLicenseResponse extends ActionResponse {

    private License license;

    GetLicenseResponse() {
    }

    GetLicenseResponse(License license) {
        this.license = license;
    }
public License license() {
    return license;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    if (in.readBoolean()) {
        license = License.readLicense(in);
    }
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    if (license == null) {
        out.writeBoolean(false);
    } else {
        out.writeBoolean(true);
        license.writeTo(out);
    }
}

package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPostStartTrialAction extends TransportMasterNodeAction<PostStartTrialRequest, PostStartTrialResponse> {
private final LicenseService licenseService;

@Inject
public TransportPostStartTrialAction(Settings settings, TransportService transportService, ClusterService clusterService,
                                          LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
                                          IndexNameExpressionResolver indexNameExpressionResolver) {
    super(settings, PostStartTrialAction.NAME, transportService, clusterService, threadPool, actionFilters,
          indexNameExpressionResolver, PostStartTrialRequest::new);
    this.licenseService = licenseService;
}

@Override
protected String executor() {
    return ThreadPool.Names.SAME;
}

@Override
protected PostStartTrialResponse newResponse() {
    return new PostStartTrialResponse();
}

@Override
protected void masterOperation(PostStartTrialRequest request, ClusterState state,
                                 ActionListener<PostStartTrialResponse> listener) throws Exception {
    licenseService.startTrialLicense(request, listener);
}

@Override
protected ClusterBlockException checkBlock(PostStartTrialRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import java.io.IOException;
public class PostStartTrialRequest extends MasterNodeRequest<PostStartTrialRequest> {

    private boolean acknowledge = false;
    private String type;

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }

    public PostStartTrialRequest setType(String type) {
        this.type = type;
        return this;
    }

    public String getType() {
        return type;
    }

    public PostStartTrialRequest acknowledge(boolean acknowledge) {
        this.acknowledge = acknowledge;
        return this;
    }

    public boolean isAcknowledged() {
        return acknowledge;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        super.readFrom(in);
        if (in.getVersion().onOrAfter(Version.V_6_3_0)) {
            type = in.readString();
            acknowledge = in.readBoolean();
        } else {
            type = "trial";
            acknowledge = true;
        }
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        Version version = Version.V_6_3_0;
        if (out.getVersion().onOrAfter(version)) {
            super.writeTo(out);
            out.writeString(type);
            out.writeBoolean(acknowledge);
        }
    }
}
} else {
    if ("trial".equals(type) == false) {
        throw new IllegalArgumentException("All nodes in cluster must be version "+ version + "] or newer to start trial with a different type than 'trial'. Attempting to write to "+ 
        "a node with version "+ out.getVersion() + "] with trial type "+ type + "]."");
    } else if (acknowledge == false) {
        throw new IllegalArgumentException("Request must be acknowledged to send to a node with a version "+ 
        "prior to "+ version + "]]. Attempting to send request to node with version [" + out.getVersion() + "] " 
        + 
        "without acknowledgement.");
    } else {
        super.writeTo(out);
    }
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.XContentType;

/**
 * Register license request builder
 */
public class PutLicenseRequestBuilder extends AcknowledgedRequestBuilder<PutLicenseRequest,
PutLicenseResponse, PutLicenseRequestBuilder> {

    public PutLicenseRequestBuilder(ElasticsearchClient client) {
        this(client, PutLicenseAction.INSTANCE);
    }

    /**
     * Constructs register license request
     *
     * @param client elasticsearch client
     */
    public PutLicenseRequestBuilder(ElasticsearchClient client, PutLicenseAction action) {
        super(client, action, new PutLicenseRequest());
    }

    /**
* Sets the license
* @param license license
* @return this builder
*/
public PutLicenseRequestBuilder setLicense(License license) {
    request.license(license);
    return this;
}

public PutLicenseRequestBuilder setLicense(BytesReference licenseSource, XContentType xContentType) {
    request.license(licenseSource, xContentType);
    return this;
}

public PutLicenseRequestBuilder setAcknowledge(boolean acknowledge) {
    request.acknowledge(acknowledge);
    return this;
}
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* /
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;

public class GetBasicStatusRequest extends MasterNodeReadRequest<GetBasicStatusRequest> {

    public GetBasicStatusRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}
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* /
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetBasicStatusAction extends TransportMasterNodeReadAction<GetBasicStatusRequest,
GetBasicStatusResponse> {

@Inject
public TransportGetBasicStatusAction(Settings settings, TransportService transportService, ClusterService
clusterService,
        ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
    super(settings, GetBasicStatusAction.NAME, transportService, clusterService, threadPool, actionFilters,
        indexNameExpressionResolver, GetBasicStatusRequest::new);
}

@Override
protected String executor() {
    return ThreadPool.Names.SAME;
}

@Override
protected GetBasicStatusResponse newResponse() {
    return new GetBasicStatusResponse();
}

@Override
protected void masterOperation(GetBasicStatusRequest request, ClusterState state,
        ActionListener<GetBasicStatusResponse> listener) throws Exception {
    LicensesMetaData licensesMetaData = state.metaData().custom(LicensesMetaData.TYPE);
    if (licensesMetaData == null) {
        listener.onResponse(new GetBasicStatusResponse(true));
    } else {
        License license = licensesMetaData.getLicense();
        listener.onResponse(new GetBasicStatusResponse(license == null || license.type().equals("basic") == false));
    }
}

@Override
protected ClusterBlockException checkBlock(GetBasicStatusRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetTrialStatusAction extends Action<GetTrialStatusRequest, GetTrialStatusResponse, GetTrialStatusRequestBuilder> {

    public static final GetTrialStatusAction INSTANCE = new GetTrialStatusAction();
    public static final String NAME = "cluster:admin/xpack/license/trial_status";

    private GetTrialStatusAction() {
        super(NAME);
    }

    @Override
    public GetTrialStatusRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new GetTrialStatusRequestBuilder(client, this);
    }

    @Override
    public GetTrialStatusResponse newResponse() {
        return new GetTrialStatusResponse();
    }

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    */
    package org.elasticsearch.license;

    import org.elasticsearch.action.ActionListener;
    import org.elasticsearch.client.ElasticsearchClient;

    public class LicensingClient {

        private final ElasticsearchClient client;

        public LicensingClient(ElasticsearchClient client) {
            this.client = client;
        }
    }
public LicensingClient(ElasticsearchClient client) {
    this.client = client;
}

public PutLicenseRequestBuilder preparePutLicense(License license) {
    return new PutLicenseRequestBuilder(client).setLicense(license);
}

public void putLicense(PutLicenseRequest request, ActionListener<PutLicenseResponse> listener) {
    client.execute(PutLicenseAction.INSTANCE, request, listener);
}

public GetLicenseRequestBuilder prepareGetLicense() {
    return new GetLicenseRequestBuilder(client);
}

public void getLicense(GetLicenseRequest request, ActionListener<GetLicenseResponse> listener) {
    client.execute(GetLicenseAction.INSTANCE, request, listener);
}

public DeleteLicenseRequestBuilder prepareDeleteLicense() {
    return new DeleteLicenseRequestBuilder(client);
}

public void deleteLicense(DeleteLicenseRequest request, ActionListener<DeleteLicenseResponse> listener) {
    client.execute(DeleteLicenseAction.INSTANCE, request, listener);
}

public PostStartTrialRequestBuilder preparePostStartTrial() {
    return new PostStartTrialRequestBuilder(client, PostStartTrialAction.INSTANCE);
}

public GetTrialStatusRequestBuilder prepareGetStartTrial() {
    return new GetTrialStatusRequestBuilder(client, GetTrialStatusAction.INSTANCE);
}

public void postStartTrial(PostStartTrialRequest request, ActionListener<PostStartTrialResponse> listener) {
    client.execute(PostStartTrialAction.INSTANCE, request, listener);
}

public void postStartBasic(PostStartBasicRequest request, ActionListener<PostStartBasicResponse> listener) {
    client.execute(PostStartBasicAction.INSTANCE, request, listener);
}

public PostStartBasicRequestBuilder preparePostStartBasic() {
    return new PostStartBasicRequestBuilder(client, PostStartBasicAction.INSTANCE);
}
public GetBasicStatusRequestBuilder prepareGetStartBasic() {
    return new GetBasicStatusRequestBuilder(client, GetBasicStatusAction.INSTANCE);
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.rest.RestStatus;
import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

class PostStartTrialResponse extends ActionResponse {

    // Nodes Prior to 6.3 did not have NEED_ACKNOWLEDGEMENT as part of status
    enum Pre63Status {
        UPGRADED_TO_TRIAL,
        TRIAL_ALREADY_ACTIVATED;
    }
    enum Status {
        UPGRADED_TO_TRIAL(true, null, RestStatus.OK),
        TRIAL_ALREADY_ACTIVATED(false, "Operation failed: Trial was already activated.",
        RestStatus.FORBIDDEN),
        NEED_ACKNOWLEDGEMENT(false, "Operation failed: Needs acknowledgement.", RestStatus.OK);
    }
    private final boolean isTrialStarted;
    private final String errorMessage;
    private final RestStatus restStatus;
    Status(boolean isTrialStarted, String errorMessage, RestStatus restStatus) {
        this.isTrialStarted = isTrialStarted;
        this.errorMessage = errorMessage;
        this.restStatus = restStatus;
    }

    boolean isTrialStarted() {
        return isTrialStarted;
    }
}
String getErrorMessage() {
    return errorMessage;
}

RestStatus getRestStatus() {
    return restStatus;
}

private Status status;
private Map<String, String[]> acknowledgeMessages;
private String acknowledgeMessage;

PostStartTrialResponse() {
}

PostStartTrialResponse(Status status) {
    this(status, Collections.emptyMap(), null);
}

PostStartTrialResponse(Status status, Map<String, String[]> acknowledgeMessages, String acknowledgeMessage)
{
    this.status = status;
    this.acknowledgeMessages = acknowledgeMessages;
    this.acknowledgeMessage = acknowledgeMessage;
}

public Status getStatus() {
    return status;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    status = in.readEnum(Status.class);
    if (in.getVersion().onOrAfter(Version.V_6_3_0)) {
        acknowledgeMessage = in.readOptionalString();
        int size = in.readVInt();
        Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
        for (int i = 0; i < size; i++) {
            String feature = in.readString();
            int nMessages = in.readVInt();
            String[] messages = new String[nMessages];
            for (int j = 0; j < nMessages; j++) {
                messages[j] = in.readString();
            }
            acknowledgeMessages.put(feature, messages);
        }
    }
    acknowledgeMessages = in.readMap seriess from Optional;
this.acknowledgeMessages = acknowledgeMessages;
} else {
    this.acknowledgeMessages = Collections.emptyMap();
}
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    Version version = Version.V_6_3_0;
    if (out.getVersion().onOrAfter(version)) {
        out.writeEnum(status);
        out.writeOptionalString(acknowledgeMessage);
        out.writeVInt(acknowledgeMessages.size());
        for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
            out.writeString(entry.getKey());
            out.writeVInt(entry.getValue().length);
            for (String message : entry.getValue()) {
                out.writeString(message);
            }
        }
    } else {
        if (status == Status.UPGRADED_TO_TRIAL) {
            out.writeEnum(Pre63Status.UPGRADED_TO_TRIAL);
        } else if (status == Status.TRIAL_ALREADY_ACTIVATED) {
            out.writeEnum(Pre63Status.TRIAL_ALREADY_ACTIVATED);
        } else {
            throw new IllegalArgumentException("Starting trial on node with version "] + Version.CURRENT + "]
                requires "+
                "acknowledgement parameter.");
        }
    }
}

Map<String, String[]> getAcknowledgementMessages() {
    return acknowledgeMessages;
}

String getAcknowledgementMessage() {
    return acknowledgeMessage;
}

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 */
package org.elasticsearch.license;
import org.elasticsearch.action.ActionRequest;
import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.cluster.NamedDiff;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.ParseField;
import org.elasticsearch.common.io.stream.NamedWriteableRegistry;
import org.elasticsearch.common.settings.ClusterSettings;
import org.elasticsearch.common.settings.IndexScopedSettings;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.settings.SettingsFilter;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.plugins.ActionPlugin;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestHandler;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
import java.util.function.Supplier;
import static org.elasticsearch.xpack.core.XPackClientActionPlugin.isTribeNode;
import static org.elasticsearch.xpack.core.XPackPlugin.transportClientMode;

public class Licensing implements ActionPlugin {

    public static final String NAME = "license";
    protected final Settings settings;
    private final boolean isTransportClient;
    private final boolean isTribeNode;

    // Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits
to this file
    // are also carried out in XPackClientPlugin.java
    public List<NamedWriteableRegistry.Entry> getNamedWriteables() {
        List<NamedWriteableRegistry.Entry> entries = new ArrayList<>();
        entries.add(new NamedWriteableRegistry.Entry(MetaData.Custom.class, LicensesMetaData.TYPE,
            LicensesMetaData::new));
        entries.add(new NamedWriteableRegistry.Entry(NamedDiff.class, LicensesMetaData.TYPE,
            LicensesMetaData::readDiffFrom));
        return entries;
    }

    // Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits
public List<NamedXContentRegistry.Entry> getNamedXContent() {
    List<NamedXContentRegistry.Entry> entries = new ArrayList<>();
    // Metadata
    entries.add(new NamedXContentRegistry.Entry(MetaData.Custom.class, new ParseField(LicensesMetaData.TYPE),
        LicensesMetaData::fromXContent));
    return entries;
}

public Licensing(Settings settings) {
    this.settings = settings;
    isTransportClient = transportClientMode(settings);
    isTribeNode = isTribeNode(settings);
}

@Override
public List<ActionHandler<? extends ActionRequest, ? extends ActionResponse>> getActions() {
    if (isTribeNode) {
        return Collections.singletonList(new ActionHandler<>(GetLicenseAction.INSTANCE, TransportGetLicenseAction.class));
    }
    return Arrays.asList(new ActionHandler<>(PutLicenseAction.INSTANCE, TransportPutLicenseAction.class),
        new ActionHandler<>(GetLicenseAction.INSTANCE, TransportGetLicenseAction.class),
        new ActionHandler<>(DeleteLicenseAction.INSTANCE, TransportDeleteLicenseAction.class),
        new ActionHandler<>(PostStartTrialAction.INSTANCE, TransportPostStartTrialAction.class),
        new ActionHandler<>(GetTrialStatusAction.INSTANCE, TransportGetTrialStatusAction.class),
        new ActionHandler<>(PostStartBasicAction.INSTANCE, TransportPostStartBasicAction.class),
        new ActionHandler<>(GetBasicStatusAction.INSTANCE, TransportGetBasicStatusAction.class));
}

@Override
public List<RestHandler> getRestHandlers(Settings settings, RestController restController, ClusterSettings clusterSettings,
    IndexScopedSettings indexScopedSettings, SettingsFilter settingsFilter, IndexNameExpressionResolver indexNameExpressionResolver,
    Supplier<DiscoveryNodes> nodesInCluster) {
    List<RestHandler> handlers = new ArrayList<>();
    handlers.add(new RestGetLicenseAction(settings, restController));
    if (false == isTribeNode) {
        handlers.add(new RestPutLicenseAction(settings, restController));
        handlers.add(new RestDeleteLicenseAction(settings, restController));
        handlers.add(new RestGetTrialStatus(settings, restController));
        handlers.add(new RestGetBasicStatus(settings, restController));
        handlers.add(new RestPostStartTrialLicense(settings, restController));
        handlers.add(new RestPostStartBasicLicense(settings, restController));
    }
}
return handlers;
}

// Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits to this file
// are also carried out in XPackClientPlugin.java
public List<Setting<?>> getSettings() {
    // TODO convert this wildcard to a real setting
    return Collections.singletonList(Setting.groupSetting("license.", Setting.Property.NodeScope));
}

}/*
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* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;

public class GetLicenseRequest extends MasterNodeReadRequest<GetLicenseRequest> {

    public GetLicenseRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}

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*/
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.logging.log4j.Logger;
import org.apache.lucene.util.automaton.Automaton;
import org.apache.lucene.util.automaton.Operations;
import org.elasticsearch.common.collect.Tuple;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.xpack.core.security.authz.privilege.ApplicationPrivilege;
import org.elasticsearch.xpack.core.security.support.Automatons;

import org.apache.logging.log4j.LogManager;
import org.apache.logging.log4j.Logger;
import org.apache.lucene.util.automaton.Automaton;
import org.apache.lucene.util.automaton.Operations;
import org.elasticsearch.common.collect.Tuple;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.xpack.core.security.authz.privilege.ApplicationPrivilege;
import org.elasticsearch.xpack.core.security.support.Automatons;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.HashMap;
import java.util.List;
import java.util.Map;
import java.util.Set;
import java.util.function.Predicate;

/**
 * A permission that is based on privileges for application (non elasticsearch) capabilities
 */
public final class ApplicationPermission {

    public static final ApplicationPermission NONE = new ApplicationPermission(Collections.emptyList());

    private final Logger logger;
    private final List<PermissionEntry> permissions;

    /**
     * @param privilegesAndResources A list of (privilege, resources). Each element in the @link List is a @link Tuple containing
     * a single @link ApplicationPrivilege and the @link Set of resources to which that privilege is
     * applied. The resources are treated as a wildcard @link Automatons#pattern.
     */
    ApplicationPermission(List<Tuple<ApplicationPrivilege, Set<String>>> privilegesAndResources) {
        this.logger = Loggers.getLogger(getClass());
        Map<ApplicationPrivilege, PermissionEntry> permissionsByPrivilege = new HashMap<>();
        privilegesAndResources.forEach(tup -> permissionsByPrivilege.compute(tup.v1(), (k, existing) -> {
            final Automaton patterns = Automatons.patterns(tup.v2());
            if (existing == null) {
                return new PermissionEntry(k, patterns);
            } else {
                return new PermissionEntry(k, Automatons.unionAndMinimize(Arrays.asList(existing.resources,
                    patterns)));
            }
        }));
        this.permissions = Collections.unmodifiableList(new ArrayList<>(permissionsByPrivilege.values()));
    }

    /**
     * Determines whether this permission grants the specified privilege on the given resource.
     */
    * <p>
    * An @link ApplicationPermission consists of a sequence of permission entries, where each entry contains a single
    * @link ApplicationPrivilege and one or more resource patterns.
    * </p>
* <p>
* This method returns {code true} if, one or more of those entries meet the following criteria
* </p>
* <ul>
* <li>The entry's application, when interpreted as an {link Automaton} {link Automatons#pattern(String) pattern} matches the
* application given in the argument (interpreted as a raw string)
* </li>
* <li>The {link ApplicationPrivilege#getAutomaton automaton that defines the entry's actions} entirely covers the
* automaton given in the argument (that is, the argument is a subset of the entry's automaton)
* </li>
* <li>The entry's resources, when interpreted as an {link Automaton} {link Automatons#patterns(String...) set of patterns} entirely
* covers the resource given in the argument (also interpreted as an {link Automaton} {link Automatons#pattern(String) pattern}.
* </li>
* </ul>
*/

```
public boolean grants(ApplicationPrivilege other, String resource) {
    Automaton resourceAutomaton = Automatons.patterns(resource);
    final boolean matched = permissions.stream().anyMatch(e -> e.grants(other, resourceAutomaton));
    logger.trace("Permission \[{}\] {} grant \[{} , {}\]", this, matched ? "does" : "does not", other, resource);
    return matched;
}
```

```
@Override
public String toString() {
    return getClass().getSimpleName() + "{privileges=" + permissions + "}";
}
```

```
private static class PermissionEntry {
    private final ApplicationPrivilege privilege;
    private final Predicate<String> application;
    private final Automaton resources;
    private PermissionEntry(ApplicationPrivilege privilege, Automaton resources) {
        this.privilege = privilege;
        this.application = Automatons.predicate(privilege.getApplication());
        this.resources = resources;
    }

    private boolean grants(ApplicationPrivilege other, Automaton resource) {
        return this.application.test(other.getApplication())
            && Operations.isEmpty(privilege.getAutomaton()) == false
            && Operations.subsetOf(other.getAutomaton(), privilege.getAutomaton())
            && Operations.subsetOf(resource, this.resources);
    }
```


@Override
public String toString() {
    return privilege.toString();
}
}
*/

package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.index.DirectoryReader;
import org.apache.lucene.util.Accountable;
import org.apache.lucene.util.RamUsageEstimator;
import org.apache.lucene.util.automaton.Automaton;
import org.apache.lucene.util.automaton.CharacterRunAutomaton;
import org.apache.lucene.util.automaton.MinimizationOperations;
import org.apache.lucene.util.automaton.Operations;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.regex.Regex;
import org.elasticsearch.index.mapper.AllFieldMapper;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.FieldSubsetReader;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition.FieldGrantExcludeGroup;
import org.elasticsearch.xpack.core.security.support.Automatons;
import java.io.IOException;
import java.util.Arrays;
import java.util.HashMap;
import java.util.HashSet;
import java.util.List;
import java.util.Set;
import java.util.stream.Collectors;
import static org.apache.lucene.util.automaton.Operations.subsetOf;

/**
 * Stores patterns to fields which access is granted or denied to and maintains an automaton that can be used to check
 * if permission is
 * allowed for a specific field.
 * Field permissions are configured via a list of strings that are patterns a field has to match. Two lists determine
 * whether or
 * not a field is granted access to:
 * 1. It has to match the patterns in grantedFieldsArray
 */

import java.io.IOException;
import java.util.Arrays;
import java.util.HashMap;
import java.util.HashSet;
import java.util.List;
import java.util.Set;
import java.util.stream.Collectors;
import static org.apache.lucene.util.automaton.Operations.subsetOf;

/**
 * Stores patterns to fields which access is granted or denied to and maintains an automaton that can be used to check
 * if permission is
 * allowed for a specific field.
 * Field permissions are configured via a list of strings that are patterns a field has to match. Two lists determine
 * whether or
 * not a field is granted access to:
 * 1. It has to match the patterns in grantedFieldsArray
 */

import java.io.IOException;
import java.util.Arrays;
import java.util.HashMap;
import java.util.HashSet;
import java.util.List;
import java.util.Set;
import java.util.stream.Collectors;
import static org.apache.lucene.util.automaton.Operations.subsetOf;

/**
 * Stores patterns to fields which access is granted or denied to and maintains an automaton that can be used to check
 * if permission is
 * allowed for a specific field.
 * Field permissions are configured via a list of strings that are patterns a field has to match. Two lists determine
 * whether or
 * not a field is granted access to:
 * 1. It has to match the patterns in grantedFieldsArray
 */
* 2. it must not match the patterns in deniedFieldsArray
* /

class FieldPermissions implements Accountable {

    public static final FieldPermissions DEFAULT = new FieldPermissions();

    private static final long BASE_FIELD_PERM_DEF_BYTES = RamUsageEstimator.shallowSizeOf(new FieldPermissionsDefinition(null, null));
    private static final long BASE_FIELD_GROUP_BYTES = RamUsageEstimator.shallowSizeOf(new FieldGrantExcludeGroup(null, null));
    private static final long BASE_HASHSET_SIZE = RamUsageEstimator.shallowSizeOfInstance(HashSet.class);
    private static final long BASE_HASHSET_ENTRY_SIZE;
    static {
        HashMap<String, Object> map = new HashMap<>();
        map.put(FieldPermissions.class.getName(), new Object());
        long mapEntryShallowSize = RamUsageEstimator.shallowSizeOf(map.entrySet().iterator().next());
        // assume a load factor of 50%
        // for each entry, we need two object refs, one for the entry itself
        // and one for the free space that is due to the fact hash tables can
        // not be fully loaded
        BASE_HASHSET_ENTRY_SIZE = mapEntryShallowSize + 2 * RamUsageEstimator.NUM_BYTES_OBJECT_REF;
    }

    private final FieldPermissionsDefinition fieldPermissionsDefinition;
    // an automaton that represents a union of one more sets of permitted and denied fields
    private final CharacterRunAutomaton permittedFieldsAutomaton;
    private final boolean permittedFieldsAutomatonIsTotal;
    private final Automaton originalAutomaton;

    private final long ramBytesUsed;

    /** Constructor that does not enable field-level security: all fields are accepted. */
    public FieldPermissions() {
        this(new FieldPermissionsDefinition(null, null), Automatons.MATCH_ALL);
    }

    /** Constructor that enables field-level security based on include/exclude rules. Exclude rules
     * have precedence over include rules. */
    public FieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition) {
        this(fieldPermissionsDefinition, initializePermittedFieldsAutomaton(fieldPermissionsDefinition));
    }

    /** Constructor that enables field-level security based on include/exclude rules. Exclude rules
     * have precedence over include rules. */
    FieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition, Automaton permittedFieldsAutomaton) {
        if (permittedFieldsAutomaton.isDeterministic() == false && permittedFieldsAutomaton.getNumStates() > 1) {
we only accept deterministic automata so that the CharacterRunAutomaton constructor
// directly wraps the provided automaton
throw new IllegalArgumentException("Only accepts deterministic automata");
}
this.fieldPermissionsDefinition = fieldPermissionsDefinition;
this.originalAutomaton = permittedFieldsAutomaton;
this.permittedFieldsAutomaton = new CharacterRunAutomaton(permittedFieldsAutomaton);
// we cache the result of isTotal since this might be a costly operation
this.permittedFieldsAutomatonIsTotal = Operations.isTotal(permittedFieldsAutomaton);

long ramBytesUsed = BASE_FIELD_PERM_DEF_BYTES;

for (FieldGrantExcludeGroup group : fieldPermissionsDefinition.getFieldGrantExcludeGroups()) {
    ramBytesUsed += BASE_FIELD_GROUP_BYTES + BASE_HASHSET_ENTRY_SIZE;
    if (group.getGrantedFields() != null) {
        ramBytesUsed += RamUsageEstimator.shallowSizeOf(group.getGrantedFields());
    }
    if (group.getExcludedFields() != null) {
        ramBytesUsed += RamUsageEstimator.shallowSizeOf(group.getExcludedFields());
    }
    ramBytesUsed += permittedFieldsAutomaton.ramBytesUsed();
    ramBytesUsed += runAutomatonRamBytesUsed(permittedFieldsAutomaton);
    this.ramBytesUsed = ramBytesUsed;
}

/**
 * Return an estimation of the ram bytes used by a {@link CharacterRunAutomaton}
 * that wraps the given automaton.
 */
private static long runAutomatonRamBytesUsed(Automaton a) {
    return a.getNumStates() * 5; // wild guess, better than 0
}

public static Automaton initializePermittedFieldsAutomaton(FieldPermissionsDefinition fieldPermissionsDefinition) {
    Set<FieldGrantExcludeGroup> groups = fieldPermissionsDefinition.getFieldGrantExcludeGroups();
    assert groups.size() > 0 : "there must always be a single group for field inclusion/exclusion";
    List<Automaton> automatonList =
        groups.stream()
            .map(g -> FieldPermissions.initializePermittedFieldsAutomaton(g.getGrantedFields(),
                g.getExcludedFields()))
            .collect(Collectors.toList());
    return Automatons.unionAndMinimize(automatonList);
}

private static Automaton initializePermittedFieldsAutomaton(final String[] grantedFields, final String[]
    deniedFields) {
Automaton grantedFieldsAutomaton;
if (grantedFields == null || Arrays.stream(grantedFields).anyMatch(Regex::isMatchAllPattern)) {
    grantedFieldsAutomaton = Automatons.MATCH_ALL;
} else {
    // an automaton that includes metadata fields, including join fields created by the _parent field such
    // as _parent#type
    Automaton metaFieldsAutomaton = Operations.concatenate(Automata.makeChar('_'),
        Automata.makeAnyString());
    grantedFieldsAutomaton = Operations.union(Automatons.patterns(grantedFields), metaFieldsAutomaton);
}

Automaton deniedFieldsAutomaton;
if (deniedFields == null || deniedFields.length == 0) {
    deniedFieldsAutomaton = Automatons.EMPTY;
} else {
    deniedFieldsAutomaton = Automatons.patterns(deniedFields);
}

grantedFieldsAutomaton = MinimizationOperations.minimize(grantedFieldsAutomaton,
    Operations.DEFAULT_MAX_DETERMINIZED_STATES);
    deniedFieldsAutomaton = MinimizationOperations.minimize(deniedFieldsAutomaton,
    Operations.DEFAULT_MAX_DETERMINIZED_STATES);

if (subsetOf(deniedFieldsAutomaton, grantedFieldsAutomaton) == false) {
    throw new ElasticsearchSecurityException("Exceptions for field permissions must be a subset of the " +
        "granted fields but " + Strings.arrayToCommaDelimitedString(deniedFields) + " is not a subset of " +
        Strings.arrayToCommaDelimitedString(grantedFields));
}

if (!containsAllField(grantedFields) && !containsAllField(deniedFields)) {
    // It is not explicitly stated whether _all should be allowed/denied
    // In that case we automatically disable _all, unless all fields would match
    if (Operations.isTotal(grantedFieldsAutomaton) && & Operations.isEmpty(deniedFieldsAutomaton)) {
        // all fields are accepted, so using _all is fine
    } else {
        deniedFieldsAutomaton = Operations.union(deniedFieldsAutomaton,
            Automata.makeString(AllFieldMapper.NAME));
    }
}

grantedFieldsAutomaton = Automatons.minusAndMinimize(grantedFieldsAutomaton,
    deniedFieldsAutomaton);
    return grantedFieldsAutomaton;
}

private static boolean containsAllField(String[] fields) {
    return fields != null && Arrays.stream(fields).anyMatch(AllFieldMapper.NAME::equals);
}
/**
 * Returns true if this field permission policy allows access to the field and false if not.
 * fieldName can be a wildcard.
 */

public boolean grantsAccessTo(String fieldName) {
    return permittedFieldsAutomatonIsTotal || permittedFieldsAutomaton.run(fieldName);
}

FieldPermissionsDefinition getFieldPermissionsDefinition() {
    return fieldPermissionsDefinition;
}

/** Return whether field-level security is enabled, ie. whether any field might be filtered out. */
public boolean hasFieldLevelSecurity() {
    return permittedFieldsAutomatonIsTotal == false;
}

/** Return a wrapped reader that only exposes allowed fields. */
public DirectoryReader filter(DirectoryReader reader) throws IOException {
    if (hasFieldLevelSecurity() == false) {
        return reader;
    }
    return FieldSubsetReader.wrap(reader, permittedFieldsAutomaton);
}

// for testing only
Automaton getIncludeAutomaton() {
    return originalAutomaton;
}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;
    FieldPermissions that = (FieldPermissions) o;
    if (permittedFieldsAutomatonIsTotal != that.permittedFieldsAutomatonIsTotal) return false;
    return fieldPermissionsDefinition != null ?
            fieldPermissionsDefinition.equals(that.fieldPermissionsDefinition) : that.fieldPermissionsDefinition ==
            null;
}

@Override
public int hashCode() {
    int result = fieldPermissionsDefinition != null ?
            fieldPermissionsDefinition.hashCode() : 0;
    result = 31 * result + (permittedFieldsAutomatonIsTotal ? 1 : 0);
}

public boolean equals(Object o) { /* Method implementation */
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;
    FieldPermissions that = (FieldPermissions) o;
    if (permittedFieldsAutomatonIsTotal != that.permittedFieldsAutomatonIsTotal) return false;
    return fieldPermissionsDefinition != null ?
            fieldPermissionsDefinition.equals(that.fieldPermissionsDefinition) : that.fieldPermissionsDefinition ==
            null;
}

@Override
public int hashCode() {
    int result = fieldPermissionsDefinition != null ?
            fieldPermissionsDefinition.hashCode() : 0;
    result = 31 * result + (permittedFieldsAutomatonIsTotal ? 1 : 0);
}
return result;
}

@override
public long ramBytesUsed() {
    return ramBytesUsed;
}
}

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*/

package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.transport.TransportRequest;
import org.elasticsearch.xpack.core.security.authz.privilege.ClusterPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.ConditionalClusterPrivilege;
import java.util.Collection;
import java.util.Set;
import java.util.function.Predicate;
import java.util.stream.Collectors;

/**
* A permission that is based on privileges for cluster wide actions, with the optional ability to inspect the request
* object
*/
public abstract class ClusterPermission {
    private final ClusterPrivilege privilege;

    ClusterPermission(ClusterPrivilege privilege) {
        this.privilege = privilege;
    }

    public ClusterPrivilege privilege() {
        return privilege;
    }

    public abstract boolean check(String action, TransportRequest request);

    /**
    * A permission that is based solely on cluster privileges and does not consider request state
    */
    public static class SimpleClusterPermission extends ClusterPermission {
        public static final SimpleClusterPermission NONE = new SimpleClusterPermission(ClusterPrivilege.NONE);
private final Predicate<String> predicate;

SimpleClusterPermission(ClusterPrivilege privilege) {
    super(privilege);
    this.predicate = privilege.predicate();
}

@Override
public boolean check(String action, TransportRequest request) {
    return predicate.test(action);
}

/**
 * A permission that makes use of both cluster privileges and request inspection
 */
public static class ConditionalClusterPermission extends ClusterPermission {
    private final Predicate<String> actionPredicate;
    private final Predicate<TransportRequest> requestPredicate;

    public ConditionalClusterPermission(ConditionalClusterPrivilege conditionalPrivilege) {
        this(conditionalPrivilege.getPrivilege(), conditionalPrivilege.getRequestPredicate());
    }

    public ConditionalClusterPermission(ClusterPrivilege privilege, Predicate<TransportRequest> requestPredicate) {
        super(privilege);
        this.actionPredicate = privilege.predicate();
        this.requestPredicate = requestPredicate;
    }

    @Override
    public boolean check(String action, TransportRequest request) {
        return actionPredicate.test(action) && requestPredicate.test(request);
    }
}

/**
 * A permission that composes a number of other cluster permissions
 */
public static class CompositeClusterPermission extends ClusterPermission {
    private final Collection<ClusterPermission> children;

    public CompositeClusterPermission(Collection<ClusterPermission> children) {
        super(buildPrivilege(children));
        this.children = children;
    }

    @Override
    public boolean check(String action, TransportRequest request) {
        return children.stream().allMatch(permission -> permission.check(action, request));
    }
}
private static ClusterPrivilege buildPrivilege(Collection<ClusterPermission> children) {
    final Set<String> names = children.stream()
        .map(ClusterPermission::privilege)
        .map(ClusterPrivilege::name)
        .flatMap(Set::stream)
        .collect(Collectors.toSet());
    return ClusterPrivilege.get(names);
}

@Override
public boolean check(String action, TransportRequest request) {
    return children.stream().anyMatch(p -> p.check(action, request));
}
}

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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.collect.Tuple;
import org.elasticsearch.common.util.set.Sets;
import org.elasticsearch.xpack.core.security.authz.RoleDescriptor;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.IndicesAccessControl;
import org.elasticsearch.xpack.core.security.authz.privilege.ApplicationPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.ClusterPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.ConditionalClusterPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.Set;

public final class Role {
    public static final Role EMPTY = Role.builder("__empty").build();

    private final String[] names;
private final ClusterPermission cluster;
private final IndicesPermission indices;
private final ApplicationPermission application;
private final RunAsPermission runAs;

Role(String[] names, ClusterPermission cluster, IndicesPermission indices, ApplicationPermission application,
RunAsPermission runAs) {
    this.names = names;
    this.cluster = Objects.requireNonNull(cluster);
    this.indices = Objects.requireNonNull(indices);
    this.application = Objects.requireNonNull(application);
    this.runAs = Objects.requireNonNull(runAs);
}

public String[] names() {
    return names;
}

public ClusterPermission cluster() {
    return cluster;
}

public IndicesPermission indices() {
    return indices;
}

public ApplicationPermission application() {
    return application;
}

public RunAsPermission runAs() {
    return runAs;
}

public static Builder builder(String... names) {
    return new Builder(names, null);
}

public static Builder builder(String[] names, FieldPermissionsCache fieldPermissionsCache) {
    return new Builder(names, fieldPermissionsCache);
}

public static Builder builder(RoleDescriptor rd, FieldPermissionsCache fieldPermissionsCache) {
    return new Builder(rd, fieldPermissionsCache);
}

/**
 * Returns whether at least one group encapsulated by this indices permissions is authorized to execute the
* specified action with the requested indices/aliases. At the same time if field and/or document level security
* is configured for any group also the allowed fields and role queries are resolved.
 */

public IndicesAccessControl authorize(String action, Set<String> requestedIndicesOrAliases, MetaData
metaData,

    FieldPermissionsCache fieldPermissionsCache) {
    Map<String, IndicesAccessControl.IndexAccessControl> indexPermissions = indices.authorize(
        action, requestedIndicesOrAliases, metaData, fieldPermissionsCache
    );

    // At least one role / indices permission set need to match with all the requested indices/aliases:
    boolean granted = true;
    for (Map.Entry<String, IndicesAccessControl.IndexAccessControl> entry : indexPermissions.entrySet()) {
        if (!entry.getValue().isGranted()) {
            granted = false;
            break;
        }
    }
    return new IndicesAccessControl(granted, indexPermissions);
}

public static class Builder {

    private final String[] names;
    private ClusterPermission cluster = ClusterPermission.SimpleClusterPermission.NONE;
    private RunAsPermission runAs = RunAsPermission.NONE;
    private List<IndicesPermission.Group> groups = new ArrayList<>();
    private FieldPermissionsCache fieldPermissionsCache = null;
    private List<Tuple<ApplicationPrivilege, Set<String>>> applicationPrivs = new ArrayList<>();

    private Builder(String[] names, FieldPermissionsCache fieldPermissionsCache) {
        this.names = names;
        this.fieldPermissionsCache = fieldPermissionsCache;
    }

    private Builder(RoleDescriptor rd, @Nullable FieldPermissionsCache fieldPermissionsCache) {
        this.names = new String[] { rd.getName() };
        this.fieldPermissionsCache = fieldPermissionsCache;
        cluster(Sets.newHashSet(rd.getClusterPrivileges()), Arrays.asList(rd.getConditionalClusterPrivileges()));
        groups.addAll(convertFromIndicesPrivileges(rd.getIndicesPrivileges(), fieldPermissionsCache));

        final RoleDescriptor.ApplicationResourcePrivileges[] applicationPrivileges = rd.getApplicationPrivileges();
        for (int i = 0; i < applicationPrivileges.length; i++) {
            applicationPrivs.add(convertApplicationPrivilege(rd.getName(), i, applicationPrivileges[i]));
        }

        String[] rdRunAs = rd.getRunAs();
        if (rdRunAs != null && rdRunAs.length > 0) {

this.runAs(new Privilege(Sets.newHashSet(rdRunAs), rdRunAs));
}
}

public Builder cluster(Set<String> privilegeNames, Iterable<ConditionalClusterPrivilege> conditionalClusterPrivileges) {
    List<ClusterPermission> clusterPermissions = new ArrayList<>();
    if (privilegeNames.isEmpty() == false) {
        clusterPermissions.add(new ClusterPermission.SimpleClusterPermission(ClusterPrivilege.get(privilegeNames)));
    }
    for (ConditionalClusterPrivilege ccp : conditionalClusterPrivileges) {
        clusterPermissions.add(new ClusterPermission.ConditionalClusterPermission(ccp));
    }
    if (clusterPermissions.isEmpty()) {
        this.cluster = ClusterPermission.SimpleClusterPermission.NONE;
    } else if (clusterPermissions.size() == 1) {
        this.cluster = clusterPermissions.get(0);
    } else {
        this.cluster = new ClusterPermission.CompositeClusterPermission(clusterPermissions);
    }
    return this;
}

/**
 * @deprecated Use @link #cluster(Set, Iterable)
 */
@Deprecated
public Builder cluster(ClusterPrivilege privilege) {
    cluster = new ClusterPermission.SimpleClusterPermission(privilege);
    return this;
}

public Builder runAs(Privilege privilege) {
    runAs = new RunAsPermission(privilege);
    return this;
}

public Builder add(IndexPrivilege privilege, String... indices) {
    groups.add(new IndicesPermission.Group(privilege, FieldPermissions.DEFAULT, null, indices));
    return this;
}

public Builder add(FieldPermissions fieldPermissions, Set<BytesReference> query, IndexPrivilege privilege, String... indices) {
    groups.add(new IndicesPermission.Group(privilege, fieldPermissions, query, indices));
    return this;
}
public Builder addApplicationPrivilege(ApplicationPrivilege privilege, Set<String> resources) {
    applicationPrivs.add(new Tuple<>(privilege, resources));
    return this;
}

public Role build() {
    IndicesPermission indices = groups.isEmpty() ? IndicesPermission.NONE :
        new IndicesPermission(groups.toArray(new IndicesPermission.Group[groups.size()]));
    final ApplicationPermission applicationPermission
        = applicationPrivs.isEmpty() ? ApplicationPermission.NONE : new
        ApplicationPermission(applicationPrivs);
    return new Role(names, cluster, indices, applicationPermission, runAs);
}

static List<IndicesPermission.Group> convertFromIndicesPrivileges(RoleDescriptor.IndicesPrivileges[]
    indicesPrivileges,
    @Nullable FieldPermissionsCache fieldPermissionsCache) {
    List<IndicesPermission.Group> list = new ArrayList<>(indicesPrivileges.length);
    for (RoleDescriptor.IndicesPrivileges privilege : indicesPrivileges) {
        final FieldPermissions fieldPermissions;
        if (fieldPermissionsCache != null) {
            fieldPermissions = fieldPermissionsCache.getFieldPermissions(privilege.getGrantedFields(),
                privilege.getDeniedFields());
        } else {
            fieldPermissions = new FieldPermissions(
                new FieldPermissionsDefinition(privilege.getGrantedFields(), privilege.getDeniedFields()));
        }
        final Set<BytesReference> query = privilege.getQuery() == null ? null :
            Collections.singleton(privilege.getQuery());
        list.add(new IndicesPermission.Group(IndexPrivilege.get(Sets.newHashSet(privilege.getPrivileges())),
            fieldPermissions, query, privilege.getIndices()));
    }
    return list;
}

static Tuple<ApplicationPrivilege, Set<String>> convertApplicationPrivilege(String role, int index,
    RoleDescriptor.ApplicationResourcePrivileges arp) {
    return new Tuple<>(new ApplicationPrivilege(arp.getApplication(),
        "role." + role.replaceAll(\[^a-zA-Z0-9\], "." + index,
        arp.getPrivileges()), Sets.newHashSet(arp.getResources()));
}
}
import org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.util.automaton.Automaton;
import org.apache.lucene.util.automaton.TooComplexToDeterminizeException;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.cluster.metadata.AliasOrIndex;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.IndicesAccessControl;
import org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege;
import org.elasticsearch.xpack.core.security.support.Automatons;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.HashMap;
import java.util.HashSet;
import java.util.Iterator;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.Set;
import java.util.SortedMap;
import java.util.concurrent.ConcurrentHashMap;
import java.util.function.Function;
import java.util.function.Predicate;
import static java.util.Collections.unmodifiableMap;
import static java.util.Collections.unmodifiableSet;

/**
 * A permission that is based on privileges for index related actions executed
 * on specific indices
 */
public final class IndicesPermission implements Iterable<IndicesPermission.Group> {

    public static final IndicesPermission NONE = new IndicesPermission();

    private final Function<String, Predicate<String>> loadingFunction;

    // Constructor and other methods
}
private final ConcurrentHashMap<String, Predicate<String>> allowedIndicesMatchersForAction = new ConcurrentHashMap<>();

private final Group[] groups;

group IndicesPermission(Permission/groups) {
    this.groups = groups;
    loadingFunction = (action) -> {
        List<String> indices = new ArrayList<>();
        for (Group group : groups) {
            if (group.actionMatcher.test(action)) {
                indices.addAll(Arrays.asList(group.indices));
            }
        }
        return indexMatcher(indices);
    }
}

static Predicate<String> indexMatcher(List<String> indices) {
    try {
        return Automatons.predicate(indices);
    } catch (TooComplexToDeterminateException e) {
        Loggers.getLogger(IndicesPermission.class).debug("Index pattern automaton [{}] is too complex", indices);
        String description = Strings.collectionToCommaDelimitedString(indices);
        if (description.length() > 80) {
            description = Strings.cleanTruncate(description, 80) + "...";
        }
        throw new ElasticsearchSecurityException("The set of permitted index patterns [{}] is too complex to evaluate", e, description);
    }
}

@Override
public Iterator<Group> iterator() {
    return Arrays.asList(groups).iterator();
}

public Group[] groups() {
    return groups;
}

/**
 * @return A predicate that will match all the indices that this permission
 * has the privilege for executing the given action on.
 */
public Predicate<String> allowedIndicesMatcher(String action) {
    return allowedIndicesMatchersForAction.computeIfAbsent(action, loadingFunction);
}
/**
 * Checks if the permission matches the provided action, without looking at indices.
 * To be used in very specific cases where indices actions need to be authorized regardless of their indices.
 * The use case for this is composite actions that are initially only authorized based on the action name (indices are not
 * checked on the coordinating node), and properly authorized later at the shard level checking their indices as well.
 *
 * public boolean check(String action) {
 *     for (Group group : groups) {
 *         if (group.check(action)) {
 *             return true;
 *         }
 *     }
 *     return false;
 * }
 *
 * public Automaton allowedActionsMatcher(String index) {
 *     List<Automaton> automatonList = new ArrayList<>();
 *     for (Group group : groups) {
 *         if (group.indexNameMatcher.test(index)) {
 *             automatonList.add(group.privilege.getAutomaton());
 *         }
 *     }
 *     return automatonList.isEmpty() ? Automatons.EMPTY : Automatons.unionAndMinimize(automatonList);
 * }
 *
 * public Map<String, IndicesAccessControl.IndexAccessControl> authorize(String action, Set<String> requestedIndicesOrAliases, Metadata metaData, FieldPermissionsCache fieldPermissionsCache) {
 *     SortedMap<String, AliasOrIndex> allAliasesAndIndices = metaData.getAliasAndIndexLookup();
 *     Map<String, Set<FieldPermissions>> fieldPermissionsByIndex = new HashMap<>();
 *     Map<String, DocumentLevelPermissions> roleQueriesByIndex = new HashMap<>();
 *     Map<String, Boolean> grantedBuilder = new HashMap<>();
 * 
 *     for (String indexOrAlias : requestedIndicesOrAliases) {
 *         boolean granted = false;
 *         Set<String> concreteIndices = new HashSet<>();
 *         AliasOrIndex aliasOrIndex = allAliasesAndIndices.get(indexOrAlias);
 *         if (aliasOrIndex != null) {
 *             for (IndexMetaData indexMetaData : aliasOrIndex.getIndices()) {
 *                 if (indexMetaData != null) {
 *                     concreteIndices.add(indexMetaData.getName());
 *                 }
 *             }
 *             fieldPermissionsByIndex.put(indexOrAlias, new HashSet<>());
 *             roleQueriesByIndex.put(indexOrAlias, new DocumentLevelPermissions());
 *             grantedBuilder.put(indexOrAlias, false);
 *         }
 *         
 *         for (String index : concreteIndices) {
 *             for (Group group : groups) {
 *                 if (group.check(index)) {
 *                     grantedBuilder.put(indexOrAlias, true);
 *                     fieldPermissionsByIndex.get(indexOrAlias).add(group.fieldPermissions);
concreteIndices.add(indexMetaData.getIndex().getName());
}
}

for (Group group : groups) {
    if (group.check(action, indexOrAlias)) {
        granted = true;
        for (String index : concreteIndices) {
            Set<FieldPermissions> fieldPermissions = fieldPermissionsByIndex.computeIfAbsent(index, (k) ->
new HashSet<>());
            fieldPermissionsByIndex.put(indexOrAlias, fieldPermissions);
            fieldPermissions.add(group.getFieldPermissions());
            DocumentLevelPermissions permissions =
roleQueriesByIndex.computeIfAbsent(index, (k) -> new DocumentLevelPermissions());
            roleQueriesByIndex.putIfAbsent(indexOrAlias, permissions);
            if (group.hasQuery()) {
                permissions.addAll(group.getQuery());
            } else {
                // if more than one permission matches for a concrete index here and if
                // a single permission doesn't have a role query then DLS will not be
                // applied even when other permissions do have a role query
                permissions.setAllowAll(true);
            }
        }
    }
}

if (concreteIndices.isEmpty()) {
    grantedBuilder.put(indexOrAlias, granted);
} else {
    grantedBuilder.put(indexOrAlias, granted);
    for (String concreteIndex : concreteIndices) {
        grantedBuilder.put(concreteIndex, granted);
    }
}

Map<String, IndicesAccessControl.IndexAccessControl> indexPermissions = new HashMap<>();
for (Map.Entry<String, Boolean> entry : grantedBuilder.entrySet()) {
    String index = entry.getKey();
    DocumentLevelPermissions permissions = roleQueriesByIndex.get(index);
    final Set<BytesReference> roleQueries;
    if (permissions != null && permissions.isAllowAll() == false) {
        roleQueries = unmodifiableSet(permissions.queries);
    } else {
        roleQueries = null;
    }
final FieldPermissions fieldPermissions;
final Set<FieldPermissions> indexFieldPermissions = fieldPermissionsByIndex.get(index);
if (indexFieldPermissions != null && indexFieldPermissions.isEmpty() == false) {
    fieldPermissions = indexFieldPermissions.size() == 1 ? indexFieldPermissions.iterator().next() :
    fieldPermissionsCache.getFieldPermissions(indexFieldPermissions);
} else {
    fieldPermissions = FieldPermissions.DEFAULT;
}
indexPermissions.put(index, new IndicesAccessControl.IndexAccessControl(entry.getValue(),
    fieldPermissions, roleQueries));
return unmodifiableMap(indexPermissions);
}

public static class Group {
    private final IndexPrivilege privilege;
    private final Predicate<String> actionMatcher;
    private final String[] indices;
    private final Predicate<String> indexNameMatcher;

    public FieldPermissions getFieldPermissions() {
        return fieldPermissions;
    }

    private final FieldPermissions fieldPermissions;
    private final Set<BytesReference> query;

    public Group(IndexPrivilege privilege, FieldPermissions fieldPermissions, @Nullable Set<BytesReference> query, String... indices) {
        assert indices.length != 0;
        this.privilege = privilege;
        this.actionMatcher = privilege.predicate();
        this.indices = indices;
        this.indexNameMatcher = indexMatcher(Arrays.asList(indices));
        this.fieldPermissions = Objects.requireNonNull(fieldPermissions);
        this.query = query;
    }

    public IndexPrivilege privilege() {
        return privilege;
    }

    public String[] indices() {
        return indices;
    }

    @Nullable
    public Set<BytesReference> getQuery() {

return query;
}

private boolean check(String action) {
    return actionMatcher.test(action);
}

private boolean check(String action, String index) {
    assert index != null;
    return check(action) && indexNameMatcher.test(index);
}

boolean hasQuery() {
    return query != null;
}
}

private static class DocumentLevelPermissions {
    private Set<BytesReference> queries = null;
    private boolean allowAll = false;

    private void addAll(Set<BytesReference> query) {
        if (allowAll == false) {
            if (queries == null) {
                queries = new HashSet<>();
            }
            queries.addAll(query);
        }
    }

    private boolean isAllowAll() {
        return allowAll;
    }

    private void setAllowAll(boolean allowAll) {
        this.allowAll = allowAll;
    }
}

package org.elasticsearch.xpack.core.security.authz.permission;
import java.util.Arrays;
import java.util.Collections;
import java.util.Set;

/**
 * Represents the definition of a [@link FieldPermissions]. Field permissions are defined as a
 * collections of grant and exclude definitions where the exclude definition must be a subset of
 * the grant definition.
 */
public final class FieldPermissionsDefinition {

    private final Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups;

    public FieldPermissionsDefinition(String[] grant, String[] exclude) {
        this(Collections.singleton(new FieldGrantExcludeGroup(grant, exclude)));
    }

    public FieldPermissionsDefinition(Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups) {
        this.fieldGrantExcludeGroups = Collections.unmodifiableSet(fieldGrantExcludeGroups);
    }

    public Set<FieldGrantExcludeGroup> getFieldGrantExcludeGroups() {
        return fieldGrantExcludeGroups;
    }

    @Override
    public boolean equals(Object o) {
        if (this == o) return true;
        if (o == null || getClass() != o.getClass()) return false;
        FieldPermissionsDefinition that = (FieldPermissionsDefinition) o;
        return fieldGrantExcludeGroups != null ?
            fieldGrantExcludeGroups.equals(that.fieldGrantExcludeGroups) :
            that.fieldGrantExcludeGroups == null;
    }

    @Override
    public int hashCode() {
        return fieldGrantExcludeGroups != null ? fieldGrantExcludeGroups.hashCode() : 0;
    }

    public static final class FieldGrantExcludeGroup {
        private final String[] grantedFields;
        private final String[] excludedFields;

        public FieldGrantExcludeGroup(String[] grantedFields, String[] excludedFields) {
            this.grantedFields = grantedFields;
            this.excludedFields = excludedFields;
        }
    }
}
public String[] getGrantedFields() {
    return grantedFields;
}

public String[] getExcludedFields() {
    return excludedFields;
}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;
    FieldGrantExcludeGroup that = (FieldGrantExcludeGroup) o;

    if (!Arrays.equals(grantedFields, that.grantedFields)) return false;
    return Arrays.equals(excludedFields, that.excludedFields);
}

@Override
public int hashCode() {
    int result = Arrays.hashCode(grantedFields);
    result = 31 * result + Arrays.hashCode(excludedFields);
    return result;
}
*/

package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;
import java.util.function.Predicate;

/**
 * A permissions that is based on a general privilege that contains patterns of users that this
 * user can execute a request as
 */
public final class RunAsPermission {

    public static final RunAsPermission NONE = new RunAsPermission(Privilege.NONE);

    public static final RunAsPermission NONE = new RunAsPermission(Privilege.NONE);

    import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;

    import java.util.function.Predicate;

    /**<
     * A permissions that is based on a general privilege that contains patterns of users that this
     * user can execute a request as
     */
    public final class RunAsPermission {

        public static final RunAsPermission NONE = new RunAsPermission(Privilege.NONE);
private final Predicate<String> predicate;

RunAsPermission(Privilege privilege) {
    this.predicate = privilege.predicate();
}

/**
 * Checks if this permission grants run as to the specified user
 */
public boolean check(String username) {
    return predicate.test(username);
}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.util.automaton.Automaton;
import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.common.cache.Cache;
import org.elasticsearch.common.cache.CacheBuilder;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Setting.Property;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition.FieldGrantExcludeGroup;
import org.elasticsearch.xpack.core.security.support.Automatons;
import java.util.Collection;
import java.util.List;
import java.util.Optional;
import java.util.Set;
import java.util.concurrent.ExecutionException;
import java.util.function.Predicate;
import java.util.stream.Collectors;
import static org.elasticsearch.xpack.core.security.SecurityField.setting;

/**
 * A service for managing the caching of [@link FieldPermissions] as these may often need to be combined or
 * created and internally they
 * use an [@link org.apache.lucene.util.automaton.Automaton], which can be costly to create once you account for
 * minimization
 */
public final class FieldPermissionsCache {
public static final Setting<Long> CACHE_SIZE_SETTING = Setting.longSetting(
    setting("authz.store.roles.field_permissions.cache.max_size_in_bytes"), 100 * 1024 * 1024, -1L,
    Property.NodeScope);
private final Cache<FieldPermissionsDefinition, FieldPermissions> cache;

public FieldPermissionsCache(Settings settings) {
    this.cache = CacheBuilder.<FieldPermissionsDefinition, FieldPermissions>builder()
        .setMaximumWeight(CACHE_SIZE_SETTING.get(settings))
        .weigher((key, fieldPermissions) -> fieldPermissions.ramBytesUsed())
        .build();
}

/**
 * Gets a { @link FieldPermissions} instance that corresponds to the granted and denied parameters. The instance
 * may come from the cache
 * or if it gets created, the instance will be cached
 */
FieldPermissions getFieldPermissions(String[] granted, String[] denied) {
    return getFieldPermissions(new FieldPermissionsDefinition(granted, denied));
}

/**
 * Gets a { @link FieldPermissions} instance that corresponds to the granted and denied parameters. The instance
 * may come from the cache
 * or if it gets created, the instance will be cached
 */
public FieldPermissions getFieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition) {
    try {
        return cache.computeIfAbsent(fieldPermissionsDefinition,
            (key) -> new FieldPermissions(key, FieldPermissions.initializePermittedFieldsAutomaton(key)));
    } catch (ExecutionException e) {
        throw new ElasticsearchException("unable to compute field permissions", e);
    }
}

/**
 * Returns a field permissions object that corresponds to the merging of the given field permissions and caches the
 * instance if one was
 * not found in the cache.
 */
FieldPermissions getFieldPermissions(Collection<FieldPermissions> fieldPermissionsCollection) {
    Optional<FieldPermissions> allowAllFieldPermissions = fieldPermissionsCollection.stream()
        .filter(((Predicate<FieldPermissions>) (FieldPermissions::hasFieldLevelSecurity)).negate())
        .findFirst();
    return allowAllFieldPermissions.orElseGet(() -> {
        final Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups = fieldPermissionsCollection.stream()
            .flatMap(fieldPermission -> fieldPermission.getFieldPermissionsDefinition().getFieldGrantExcludeGroups().stream())
            .collect(Collectors.toSet());
        return FieldPermissions.getFieldPermissionsDefinition().getFieldGrantExcludeGroups().stream()
            .flatMap(fieldGrantExcludeGroup -> fieldGrantExcludeGroup.getFields().stream());
    });
}
import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.env.Environment;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase.ClusterScope;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.util.Arrays;
import java.util.Collection;
import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;
import static org.hamcrest.CoreMatchers.equalTo;
import static org.hamcrest.CoreMatchers.nullValue;

@ClusterScope(scope = TEST, numDataNodes = 0, numClientNodes = 0, maxNumDataNodes = 0,
transportClientRatio = 0)
public class LicenseServiceClusterTests extends AbstractLicensesIntegrationTestCase {

    @Override

    } catch (ExecutionException e) {
        throw new ElasticsearchException("unable to compute field permissions", e);
    }
}

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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;
protected Settings nodeSettings(int nodeOrdinal) {
    return nodeSettingsBuilder(nodeOrdinal).build();
}

private Settings.Builder nodeSettingsBuilder(int nodeOrdinal) {
    return Settings.builder()
        .put(super.nodeSettings(nodeOrdinal))
        .put("node.data", true)
        .put("resource.reload.interval.high", "500ms") // for license mode file watcher
        .put(NetworkModule.HTTP_ENABLED.getKey(), true);
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class,
                         Netty4Plugin.class);
}

@Override
protected Collection<Class<? extends Plugin>> transportClientPlugins() {
    return nodePlugins();
}

public void testClusterRestartWithLicense() throws Exception {
    wipeAllLicenses();

    int numNodes = randomIntBetween(1, 5);
    logger.info("---> starting {} node(s)", numNodes);
    internalCluster().startNodes(numNodes);
    ensureGreen();

    logger.info("---> put signed license");
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense(TimeValue.timeValueMinutes(1));
    putLicense(license);
    assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
    assertOperationMode(license.operationMode());

    logger.info("---> restart all nodes");
    internalCluster().fullRestart();
    ensureYellow();
    licensingClient = new LicensingClient(client());
    logger.info("---> get and check signed license");
    assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
    logger.info("---> remove licenses");
    licensingClient.prepareDeleteLicense().get();
    assertOperationMode(License.OperationMode.MISSING);
}
logger.info("--> restart all nodes");
internalCluster().fullRestart();
licensingClient = new LicensingClient(client());
ensureYellow();
assertThat(licensingClient.prepareGetLicense().get().license(), nullValue());
assertOperationMode(License.OperationMode.MISSING);

wipeAllLicenses();
}

public void testCloudInternalLicense() throws Exception {
    wipeAllLicenses();

    int numNodes = randomIntBetween(1, 5);
    logger.info("--> starting {} node(s)", numNodes);
    internalCluster().startNodes(numNodes);
    ensureGreen();

    logger.info("--> put signed license");
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense("cloud_internal", License.VERSION_CURRENT, System.currentTimeMillis(), TimeValue.timeValueMinutes(1));
    putLicense(license);
    assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
    assertOperationMode(License.OperationMode.PLATINUM);
    writeCloudInternalMode("gold");
    assertOperationMode(License.OperationMode.GOLD);
    writeCloudInternalMode("basic");
    assertOperationMode(License.OperationMode.BASIC);
}

public void testClusterRestartWhileEnabled() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();
    ensureGreen();
    assertLicenseActive(true);
    logger.info("--> restart node");
    internalCluster().fullRestart();
    ensureYellow();
    logger.info("--> await node for enabled");
    assertLicenseActive(true);
}

public void testClusterRestartWhileGrace() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();
assertLicenseActive(true);
putLicense(TestUtils.generateSignedLicense(TimeValue.timeValueMillis(0)));
ensureGreen();
assertLicenseActive(true);
logger.info("--> restart node");
internalCluster().fullRestart();
ensureYellow();
logger.info("--> await node for grace_period");
assertLicenseActive(true);
}

public void testClusterRestartWhileExpired() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();
    ensureGreen();
    assertLicenseActive(true);
    putLicense(TestUtils.generateExpiredNonBasicLicense(System.currentTimeMillis() -
        LicenseService.GRACE_PERIOD_DURATION.getMillis()));
    assertLicenseActive(false);
    logger.info("--> restart node");
    internalCluster().fullRestart();
    ensureYellow();
    logger.info("--> await node for disabled");
    assertLicenseActive(false);
}

public void testClusterRestartWithOldSignature() throws Exception {
    assumeFalse("Can't run in a FIPS JVM. We can't generate old licenses since PBEWithSHA1AndDESede is not
        available", inFipsJvm());
    wipeAllLicenses();
    internalCluster().startNode();
    ensureGreen();
    assertLicenseActive(true);
    putLicense(TestUtils.generateSignedLicenseOldSignature());
    LicensingClient licensingClient = new LicensingClient(client());
    assertThat(licensingClient.prepareGetLicense().get().license().version(),
        equalTo(License.VERSION_START_DATE));
    logger.info("--> restart node");
    internalCluster().fullRestart(); // restart so that license is updated
    ensureYellow();
    logger.info("--> await node for enabled");
    assertLicenseActive(true);
    licensingClient = new LicensingClient(client());
    assertThat(licensingClient.prepareGetLicense().get().license().version(),
        equalToTo(License.VERSION_CURRENT)); // license updated
    internalCluster().fullRestart(); // restart once more and verify updated license is active
    ensureYellow();
    logger.info("--> await node for enabled");
assertLicenseActive(true);
}

private void assertOperationMode(License.OperationMode operationMode) throws InterruptedException {
    boolean success = awaitBusy(() -> {
        for (XPackLicenseState licenseState : internalCluster().getDataNodeInstances(XPackLicenseState.class)) {
            if (licenseState.getOperationMode() == operationMode) {
                return true;
            }
        }
        return false;
    });
    assertTrue(success);
}

private void writeCloudInternalMode(String mode) throws Exception {
    for (Environment environment : internalCluster().getDataOrMasterNodeInstances(Environment.class)) {
        Path licenseModePath = XPackPlugin.resolveConfigFile(environment, "license_mode");
        Files.createDirectories(licenseModePath.getParent());
        Files.write(licenseModePath, mode.getBytes(StandardCharsets.UTF_8));
    }
}

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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.threadpool.TestThreadPool;
import org.elasticsearch.watcher.ResourceWatcherService;
import java.io.IOException;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.StandardOpenOption;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.TimeUnit;
import java.util.concurrent.atomic.AtomicReference;
import static org.hamcrest.Matchers.equalTo;

import java.io.IOException;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.StandardOpenOption;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.TimeUnit;
import java.util.concurrent.atomic.AtomicReference;
import static org.hamcrest.Matchers.equalTo;

import static org.hamcrest.Matchers.equalTo;

public class OperationModeFileWatcherTests extends ESTestCase {
    private ResourceWatcherService watcherService;
    private TestThreadPool threadPool;
    private Path licenseModePath;
    private OperationModeFileWatcher operationModeFileWatcher;
    private AtomicReference<CountDownLatch> onChangeCounter;

    @Before
    public void setup() throws Exception {
        threadPool = new TestThreadPool("license mode file watcher tests");
        Settings settings = Settings.builder()
                .put("resource.reload.interval.high", "10ms")
                .build();
        watcherService = new ResourceWatcherService(settings, threadPool);
        watcherService.start();
        licenseModePath = createTempFile();
        onChangeCounter = new AtomicReference<>(new CountDownLatch(1));
        operationModeFileWatcher = new OperationModeFileWatcher(watcherService, licenseModePath, logger,
                () -> onChangeCounter.get().countDown());
    }

    @After
    public void shutdown() throws InterruptedException {
        terminate(threadPool);
        watcherService.stop();
    }

    public void testInit() throws Exception {
        onChangeCounter.set(new CountDownLatch(2));
        writeMode("gold");
        assertThat(operationModeFileWatcher.getCurrentOperationMode(),
                equalTo(License.OperationMode.PLATINUM));
        operationModeFileWatcher.init();
        assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
        assertThat(operationModeFileWatcher.getCurrentOperationMode(),
                equalTo(License.OperationMode.GOLD));
    }

    public void testUpdateModeFromFile() throws Exception {
        Files.delete(licenseModePath);
        operationModeFileWatcher.init();
        assertThat(operationModeFileWatcher.getCurrentOperationMode(),
                equalTo(License.OperationMode.PLATINUM));
        writeMode("gold");
        assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
        assertThat(operationModeFileWatcher.getCurrentOperationMode(),
                equalTo(License.OperationMode.GOLD));
        onChangeCounter.set(new CountDownLatch(1));
    }
}
public void testDeleteModeFromFile() throws Exception {
    Files.delete(licenseModePath);
    operationModeFileWatcher.init();
    writeMode("gold");
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
    onChangeCounter.set(new CountDownLatch(1));
    Files.delete(licenseModePath);
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.PLATINUM));
}

public void testInvalidModeFromFile() throws Exception {
    writeMode("invalid");
    operationModeFileWatcher.init();
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
                equalTo(License.OperationMode.PLATINUM));
    operationModeFileWatcher.onFileChanged(licenseModePath);
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
                equalTo(License.OperationMode.PLATINUM));
}

public void testLicenseModeFileIsDirectory() throws Exception {
    licenseModePath = createTempDir();
    operationModeFileWatcher.init();
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
                equalTo(License.OperationMode.PLATINUM));
    operationModeFileWatcher.onFileChanged(licenseModePath);
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
                equalTo(License.OperationMode.PLATINUM));
}

public void testLicenseModeFileCreatedAfterInit() throws Exception {
    Files.delete(licenseModePath);
    operationModeFileWatcher.init();
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
                equalTo(License.OperationMode.PLATINUM));
    onChangeCounter.set(new CountDownLatch(1));
    Path tempFile = createTempFile();
    writeMode("gold", tempFile);
    licenseModePath = tempFile;
assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
}

private void writeMode(String mode) throws IOException {
    writeMode(mode, licenseModePath);
}

static void writeMode(String mode, Path file) throws IOException {
    Files.write(file, mode.getBytes(StandardCharsets.UTF_8), StandardOpenOption.CREATE);
}

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*/

package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.BytesStreamOutput;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentHelper;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;
import java.io.IOException;
import java.util.HashMap;
import java.util.List;
import java.util.Locale;
import java.util.Map;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;
import static org.hamcrest.Matchers.sameInstance;

public class PutLicenseResponseTests extends ESTestCase {
    @SuppressWarnings("unchecked")
    public void testSerialization() throws Exception {
        boolean acknowledged = randomBoolean();
        LicensesStatus status = randomFrom(LicensesStatus.VALID, LicensesStatus.INVALID,
                LicensesStatus.EXPIRED);
        Map<String, String[]> ackMessages = randomAckMessages();

        PutLicenseResponse response = new PutLicenseResponse(acknowledged, status, "", ackMessages);

        PutLicenseResponse result = new PutLicenseResponse(acknowledged, status, "", ackMessages);

        assertEquals(response, result);
    }

    import java.io.IOException;
    import java.util.HashMap;
    import java.util.List;
    import java.util.Locale;
    import java.util.Map;
    import static org.hamcrest.Matchers.equalTo;
    import static org.hamcrest.Matchers.not;
    import static org.hamcrest.Matchers.sameInstance;

    public class PutLicenseResponse {
        private final boolean acknowledged;
        private final LicensesStatus status;
        private final String error;
        private final Map<String, String[]> ackMessages;

        public PutLicenseResponse(boolean acknowledged, LicensesStatus status, String error, Map<String, String[]> ackMessages) {
            this.acknowledged = acknowledged;
            this.status = status;
            this.error = error;
            this.ackMessages = ackMessages;
        }

        @Override
        public boolean equals(Object object) {
            if (this == object) {
                return true;
            }
            if (object == null || getClass() != object.getClass()) {
                return false;
            }
            PutLicenseResponse that = (PutLicenseResponse) object;
            if (acknowledged != that.acknowledged) {
                return false;
            }
            if (status != that.status) {
                return false;
            }
            if (error != null ? !error.equals(that.error) : that.error != null) {
                return false;
            }
            return ackMessages != null ? !ackMessages.equals(that.ackMessages) : that.ackMessages != null;
        }

        @Override
        public int hashCode() {
            int result = acknowledged ? 1 : 0;
            result = 31 * result + (status != null ? status.hashCode() : 0);
            result = 31 * result + (error != null ? error.hashCode() : 0);
            result = 31 * result + (ackMessages != null ? ackMessages.hashCode() : 0);
            return result;
        }
    }
}
XContentBuilder contentBuilder = XContentFactory.jsonBuilder();
response.toXContent(contentBuilder, ToXContent.EMPTY_PARAMS);

Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(contentBuilder), false,
contentBuilder.contentType()).v2();
assertThat(map.containsKey("acknowledged"), equalTo(true));
boolean actualAcknowledged = (boolean) map.get("acknowledged");
assertThat(actualAcknowledged, equalTo(acknowledged));

assertThat(map.containsKey("license_status"), equalTo(true));
String actualStatus = (String) map.get("license_status");
assertThat(actualStatus, equalTo(status.name().toLowerCase(Locale.ROOT)));

assertThat(map.containsKey("acknowledge"), equalTo(true));
Map<String, List<String>> actualAckMessages = (Map<String, List<String>>) map.get("acknowledge");
assertTrue(actualAckMessages.containsKey("message"));
actualAckMessages.remove("message");
assertThat(actualAckMessages.keySet(), equalTo(ackMessages.keySet()));
for (Map.Entry<String, List<String>> entry : actualAckMessages.entrySet()) {
    assertArrayEquals(entry.getValue().toArray(), ackMessages.get(entry.getKey()));
}
}

public void testStreamSerialization() throws IOException {
    boolean acknowledged = randomBoolean();
    LicensesStatus status = randomFrom(LicensesStatus.VALID, LicensesStatus.INVALID,
LicensesStatus.EXPIRED);
    Map<String, String[]> ackMessages = randomAckMessages();

    // write the stream so that we can attempt to read it back
    BytesStreamOutput output = new BytesStreamOutput();
    PutLicenseResponse response = new PutLicenseResponse(acknowledged, status, 
",", ackMessages);
    // write it out
    response.writeTo(output);

    StreamInput input = output.bytes().streamInput();

    // read it back in
    response.readFrom(input);

    assertThat(response.isAcknowledged(), equalTo(acknowledged));
    assertThat(response.status(), equalTo(status));
    assertThat(response.acknowledgeMessages(), not(sameInstance(ackMessages)));
    assertThat(response.acknowledgeMessages().size(), equalTo(ackMessages.size()));

    for (String key : ackMessages.keySet()) {
        assertArrayEquals(ackMessages.get(key), response.acknowledgeMessages().get(key));
    }
}
private static Map<String, String[]> randomAckMessages() {
    int nFeatures = randomIntBetween(1, 5);

    Map<String, String[]> ackMessages = new HashMap<>();

    for (int i = 0; i < nFeatures; i++) {
        String feature = randomAlphaOfLengthBetween(9, 15);
        int nMessages = randomIntBetween(1, 5);
        String[] messages = new String[nMessages];
        for (int j = 0; j < nMessages; j++) {
            messages[j] = randomAlphaOfLengthBetween(10, 30);
        }
        ackMessages.put(feature, messages);
    }

    return ackMessages;
}

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 */

package org.elasticsearch.license;

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import java.util.Arrays;
import java.util.Collection;
import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;

@ESIntegTestCase.ClusterScope(scope = TEST, numDataNodes = 0, numClientNodes = 0, maxNumDataNodes = 0,
        transportClientRatio = 0,
        autoMinMasterNodes = false)
public class LicenseServiceClusterNotRecoveredTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {

        import org.elasticsearch.license.
import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import java.util.Arrays;
import java.util.Collection;
import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;

@ESIntegTestCase.ClusterScope(scope = TEST, numDataNodes = 0, numClientNodes = 0, maxNumDataNodes = 0,
        transportClientRatio = 0,
        autoMinMasterNodes = false)
public class LicenseServiceClusterNotRecoveredTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {

        import org.elasticsearch.license.
return nodeSettingsBuilder(nodeOrdinal).build();
}

private Settings.Builder nodeSettingsBuilder(int nodeOrdinal) {
    return Settings.builder()
        .put(super.nodeSettings(nodeOrdinal))
        .put("node.data", true)
        .put("resource.reload.interval.high", "500ms") // for license mode file watcher
        .put(NetworkModule.HTTP_ENABLED.getKey(), true);
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class, Netty4Plugin.class);
}

@Override
protected Collection<Class<? extends Plugin>> transportClientPlugins() {
    return nodePlugins();
}

public void testClusterNotRecovered() throws Exception {
    logger.info("--> start one master out of two [recovery state]");
    internalCluster().startNode(nodeSettingsBuilder(0).put("discovery.zen.minimum_master_nodes", 2).put("node.master", true));
    logger.info("--> start second master out of two [recovered state]");
    internalCluster().startNode(nodeSettingsBuilder(1).put("discovery.zen.minimum_master_nodes", 2).put("node.master", true));
    assertLicenseActive(true);
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESSingleNodeTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.junit.Before;
import java.util.Collection;
import java.util.Collections;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicBoolean;

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;

public class LicensesManagerServiceTests extends ESSingleNodeTestCase {

    @Override
    protected Collection<Class<? extends Plugin>> getPlugins() {
        return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
    }

    @Override
    protected Settings nodeSettings() {
        return Settings.builder()
                .put(super.nodeSettings())
                .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
                .put(XPackSettings.MONITORING_ENABLED.getKey(), false)
                .put(XPackSettings.WATCHER_ENABLED.getKey(), false)
                .put(XPackSettings.GRAPH_ENABLED.getKey(), false)
                .put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
                .build();
    }

    @Override
    protected boolean resetNodeAfterTest() {
        return true;
    }

    @Before
    public void waitForTrialLicenseToBeGenerated() throws Exception {
        assertBusy(() ->
                assertNotNull(getInstanceFromNode(ClusterService.class).state().metaData().custom(LicensesMetaData.TYPE)));
    }

    public void testStoreAndGetLicenses() throws Exception {
        LicenseService licenseService = getInstanceFromNode(LicenseService.class);
        ClusterService clusterService = getInstanceFromNode(ClusterService.class);
        License goldLicense = TestUtils.generateSignedLicense("gold", TimeValue.timeValueHours(1));
        TestUtils.registerAndAckSignedLicenses(licenseService, goldLicense, LicensesStatus.VALID);
        License silverLicense = TestUtils.generateSignedLicense("silver", TimeValue.timeValueHours(2));
        TestUtils.registerAndAckSignedLicenses(licenseService, silverLicense, LicensesStatus.VALID);
        License platinumLicense = TestUtils.generateSignedLicense("platinum", TimeValue.timeValueHours(1));
    }
}
public void testEffectiveLicenses() throws Exception {
    final LicenseService licenseService = getInstanceFromNode(LicenseService.class);
    final ClusterService clusterService = getInstanceFromNode(ClusterService.class);
    License goldLicense = TestUtils.generateSignedLicense("gold", TimeValue.timeValueSeconds(5));
    // put gold license
    TestUtils.registerAndAckSignedLicenses(licenseService, goldLicense, LicensesStatus.VALID);
    LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(LicenseService.getLicense(licensesMetaData), equalTo(goldLicense));

    License platinumLicense = TestUtils.generateSignedLicense("platinum", TimeValue.timeValueSeconds(3));
    // put platinum license
    TestUtils.registerAndAckSignedLicenses(licenseService, platinumLicense, LicensesStatus.VALID);
    licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(LicenseService.getLicense(licensesMetaData), equalTo(platinumLicense));
}

public void testRemoveLicenses() throws Exception {
    LicenseService licenseService = getInstanceFromNode(LicenseService.class);
    ClusterService clusterService = getInstanceFromNode(ClusterService.class);

    // modify content of signed license
    License tamperedLicense = License.builder()
        .fromLicenseSpec(signedLicense, signedLicense.signature())
        .expiryDate(signedLicense.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
        .validate()
        .build();

    TestUtils.registerAndAckSignedLicenses(licenseService, tamperedLicense, LicensesStatus.INVALID);

    // ensure that the invalid license never made it to cluster state
    LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(licensesMetaData.getLicense(), not(equalTo(tamperedLicense)));
}
// generate signed licenses
License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(1));
TestUtils.registerAndAckSignedLicenses(licenseService, license, LicensesStatus.VALID);
LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
assertThat(licensesMetaData.getLicense(), not(LicensesMetaData.LICENSE_TOMBSTONE));

// remove signed licenses
removeAndAckSignedLicenses(licenseService);
licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
assertThat(licensesMetaData.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
}

private void removeAndAckSignedLicenses(final LicenseService licenseService) {
    final CountDownLatch latch = new CountDownLatch(1);
    final AtomicBoolean success = new AtomicBoolean(false);
    licenseService.removeLicense(new DeleteLicenseRequest(), new
    ActionListener<ClusterStateUpdateResponse>() {
        @Override
        public void onResponse(ClusterStateUpdateResponse clusterStateUpdateResponse) {
            if (clusterStateUpdateResponse.isAcknowledged()) {
                success.set(true);
            }
            latch.countDown();
        }

        @Override
        public void onFailure(Exception throwable) {
            latch.countDown();
        }
    });
    try {
        latch.await();
    } catch (InterruptedException e) {
        fail(e.getMessage());
    }
    assertThat("remove license(s) failed", success.get(), equalTo(true));
}

package org.elasticsearch.license;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;

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 */
import org.elasticsearch.common.common.bytes.BytesArray;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentHelper;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;
import java.nio.charset.StandardCharsets;
import java.util.Collections;
import java.util.Map;
import java.util.UUID;
import static org.hamcrest.core.IsEqual.equalTo;
import static org.hamcrest.core.IsNull.notNullValue;
import static org.hamcrest.core.IsNull.nullValue;

public class LicenseSerializationTests extends ESTestCase {
    public void testSimpleIssueExpiryDate() throws Exception {
        long now = System.currentTimeMillis();
        String issueDate = TestUtils.dateMathString("now", now);
        String expiryDate = TestUtils.dateMathString("now+10d/d", now);
        String licenseSpecs = TestUtils.generateLicenseSpecString(new TestUtils.LicenseSpec(issueDate, expiryDate));
        License generatedLicense = License.fromSource(new
            BytesArray(licenseSpecs.getBytes(StandardCharsets.UTF_8)), XContentType.JSON);
        assertThat(generatedLicense.issueDate(), equalTo(DateUtils.beginningOfTheDay(issueDate)));
        assertThat(generatedLicense.expiryDate(), equalTo(DateUtils.endOfTheDay(expiryDate)));
    }
    public void testLicensesFields() throws Exception {
        TestUtils.LicenseSpec randomLicenseSpec =
            TestUtils.generateRandomLicenseSpec(License.VERSION_START);
        String licenseSpecsSource = TestUtils.generateLicenseSpecString(randomLicenseSpec);
        final License fromSource =
            License.fromSource(new
                BytesArray(licenseSpecsSource.getBytes(StandardCharsets.UTF_8)), XContentType.JSON);
        TestUtils.assertLicenseSpec(randomLicenseSpec, fromSource);
    }
    public void testLicenseRestView() throws Exception {
        long now = System.currentTimeMillis();
        String expiredLicenseExpiryDate = TestUtils.dateMathString("now-1d/d", now);
        String validLicenseIssueDate = TestUtils.dateMathString("now-10d/d", now);
        String invalidLicenseIssueDate = TestUtils.dateMathString("now+1d/d", now);
        String validLicenseExpiryDate = TestUtils.dateMathString("now+2d/d", now);
        License license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(validLicenseIssueDate,
            expiredLicenseExpiryDate));
        XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
        license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true"));
builder.flush();

Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();

// should have an extra status field, human readable issue_date and expiry_date
assertThat(map.get("status"), notNullValue());
assertThat(map.get("issue_date"), notNullValue());
assertThat(map.get("expiry_date"), notNullValue());
assertThat(map.get("status"), equalTo("expired"));
builder = XContentFactory.contentTypeBuilder(XContentType.JSON);
license.toXContent(builder, ToXContent.EMPTY_PARAMS);
builder.flush();
map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
assertThat(map.get("status"), nullValue());

license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(validLicenseIssueDate, validLicenseExpiryDate));
builder = XContentFactory.contentTypeBuilder(XContentType.JSON);
license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
builder.flush();
map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();

// should have an extra status field, human readable issue_date and expiry_date
assertThat(map.get("status"), notNullValue());
assertThat(map.get("issue_date"), notNullValue());
assertThat(map.get("expiry_date"), notNullValue());
assertThat(map.get("status"), equalTo("active"));
builder = XContentFactory.contentTypeBuilder(XContentType.JSON);
license.toXContent(builder, ToXContent.EMPTY_PARAMS);
builder.flush();
map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
assertThat(map.get("status"), nullValue());

license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(invalidLicenseIssueDate, validLicenseExpiryDate));
builder = XContentFactory.contentTypeBuilder(XContentType.JSON);
license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
builder.flush();
map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();

// should have an extra status field, human readable issue_data and expiry_date
assertThat(map.get("status"), notNullValue());
assertThat(map.get("issue_date"), notNullValue());
assertThat(map.get("expiry_date"), notNullValue());
assertThat(map.get("status"), equalTo("invalid"));
builder = XContentFactory.contentBuilder(XContentType.JSON);
license.toXContent(builder, ToXContent.EMPTY_PARAMS);
builder.flush();
map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
assertThat(map.get("status"), nullValue());
}
public void testLicenseRestViewNonExpiringBasic() throws Exception {
    long now = System.currentTimeMillis();

    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .issuedTo("test")
        .maxNodes(1000)
        .issueDate(now)
        .type("basic")
        .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
    License license = SelfGeneratedLicense.create(specBuilder, License.VERSION_CURRENT);
    XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, new
        ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
    builder.flush();
    Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();

    // should have an extra status field, human readable issue_data and no expiry_date
    assertThat(map.get("status"), notNullValue());
    assertThat(map.get("type"), equalTo("basic"));
    assertThat(map.get("issue_date"), notNullValue());
    assertThat(map.get("expiry_date"), nullValue());
    assertThat(map.get("expiry_date_in_millis"), nullValue());
    assertThat(map.get("status"), equalTo("active"));
    builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.flush();
    map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
    assertThat(map.get("status"), nullValue());
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.gateway.FileWatcher;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.junit.Before;

import java.nio.file.Path;

import static org.hamcrest.Matchers.equalTo;
import static org.mockito.Matchers.any;
import static org.mockito.Matchers.eq;
import static org.mockito.Mockito.mock;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.verifyZeroInteractions;

public class LicenseOperationModeUpdateTests extends ESTestCase {
    private OperationModeFileWatcher operationModeFileWatcher;
    private Path licenseModeFile;
    private ResourceWatcherService resourceWatcherService;

    @Before
    public void init() throws Exception {
        licenseModeFile = createTempFile();
        resourceWatcherService = mock(ResourceWatcherService.class);
        operationModeFileWatcher = new OperationModeFileWatcher(resourceWatcherService, licenseModeFile, logger, () -> { });
    }

    public void testLicenseOperationModeUpdate() throws Exception {
        String type = randomFrom("trial", "basic", "standard", "gold", "platinum");
        License license = License.builder()
            .uid("id")
            .expiryDate(0)
            .issueDate(0)
            .issuedTo("elasticsearch")
            .issuer("issuer")
            .type(type)
            .maxNodes(1)
            .build();

        assertThat(license.operationMode(), equalTo(License.OperationMode.resolve(type)));
        OperationModeFileWatcherTests.writeMode("gold", licenseModeFile);
        license.setOperationModeFileWatcher(operationModeFileWatcher);
        verifyZeroInteractions(resourceWatcherService);
        assertThat(license.operationMode(), equalTo(License.OperationMode.resolve(type)));
    }

    public void testCloudInternalLicenseOperationModeUpdate() throws Exception {
        String type = randomFrom("trial", "basic", "standard", "gold", "platinum");
        License license = License.builder()
            .uid("id")
            .expiryDate(0)
            .issueDate(0)
            .issuedTo("elasticsearch")
            .issuer("issuer")
            .type(type)
            .maxNodes(1)
            .build();

        assertThat(license.operationMode(), equalTo(License.OperationMode.resolve(type)));
        OperationModeFileWatcherTests.writeMode("gold", licenseModeFile);
        license.setOperationModeFileWatcher(operationModeFileWatcher);
        verifyZeroInteractions(resourceWatcherService);
        assertThat(license.operationMode(), equalTo(License.OperationMode.resolve(type)));
    }
}

assertThat(license.operationMode(), equalTo(License.OperationMode.PLATINUM));
OperationModeFileWatcherTests.writeMode("gold", licenseModeFile);
license.setOperationModeFileWatcher(operationModeFileWatcher);
verify(resourceWatcherService, times(1)).add(any(FileWatcher.class),
eq(ResourceWatcherService.Frequency.HIGH));
assertThat(license.operationMode(), equalTo(License.OperationMode.GOLD));
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.license.
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import java.util.Arrays;
import java.util.Collection;
import java.util.concurrent.CountDownLatch;

public abstract class AbstractLicensesIntegrationTestCase extends ESIntegTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), false).build();
    }
}
@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class);
}

@Override
protected Collection<Class<? extends Plugin>> transportClientPlugins() {
    return Arrays.asList(XPackClientPlugin.class, CommonAnalysisPlugin.class);
}

@Override
protected Settings transportClientSettings() {
    // Plugin should be loaded on the transport client as well
    return nodeSettings(0);
}

protected void putLicense(final License license) throws InterruptedException {
    final CountDownLatch latch = new CountDownLatch(1);
    ClusterService clusterService = internalCluster().getInstance(ClusterService.class,
    internalCluster().getMasterName());
    clusterService.submitStateUpdateTask("putting license", new ClusterStateUpdateTask() {
        @Override
        public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
            latch.countDown();
        }
    });
    latch.await();
}

protected void putLicenseTombstone() throws InterruptedException {
    putLicense(LicensesMetaData.LICENSE_TOMBSTONE);
}

protected void wipeAllLicenses() throws InterruptedException {
    final CountDownLatch latch = new CountDownLatch(1);
    ClusterService clusterService = internalCluster().getInstance(ClusterService.class,
internalCluster().getMasterName();

clusterService.submitStateUpdateTask("delete licensing metadata", new ClusterStateUpdateTask() {
    @Override
    public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
        latch.countDown();
    }

    @Override
    public ClusterState execute(ClusterState currentState) throws Exception {
        MetaData.Builder mdBuilder = MetaData.builder(currentState.metaData());
        mdBuilder.removeCustom(LicensesMetaData.TYPE);
        return ClusterState.builder(currentState).metaData(mdBuilder).build();
    }

    @Override
    public void onFailure(String source, @Nullable Exception e) {
        logger.error("error on metaData cleanup after test", e);
    }
});
latch.await();

protected void assertLicenseActive(boolean active) throws InterruptedException {
    boolean success = awaitBusy(() -> {
        for (XPackLicenseState licenseState : internalCluster().getDataNodeInstances(XPackLicenseState.class)) {
            if (licenseState.isActive() == active) {
                return true;
            }
        }
        return false;
    });
    assertTrue(success);
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.XPackSettings;

import java.util.Arrays;
import java.util.function.Predicate;
import java.util.stream.Collectors;

import static org.elasticsearch.license.License.OperationMode.BASIC;
import static org.elasticsearch.license.License.OperationMode.GOLD;
import static org.elasticsearch.license.License.OperationMode.MISSING;
import static org.elasticsearch.license.License.OperationMode.PLATINUM;
import static org.elasticsearch.license.License.OperationMode.STANDARD;
import static org.elasticsearch.license.License.OperationMode.TRIAL;
import static org.hamcrest.Matchers.is;

/**
 * Unit tests for the {link XPackLicenseState}
 */
public class XPackLicenseStateTests extends ESTestCase {

/** Creates a license state with the given license type and active state, and checks the given method returns
 expected. */
 void assertAllowed(OperationMode mode, boolean active, Predicate<XPackLicenseState> predicate, boolean
 expected) {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 licenseState.update(mode, active, null);
 assertEquals(expected, predicate.test(licenseState));
 }

/** Checks the ack message going from the {code from} license type to {code to} license type.
 * TODO: check the actual messages, not just the number of them! This was copied from previous license tests...
 */
 void assertAckMesssages(String feature, OperationMode from, OperationMode to, int expectedMessages) {
 String[] gotMessages = XPackLicenseState.ACKNOWLEDGMENT_MESSAGES.get(feature).apply(from, to);
 assertEquals(expectedMessages, gotMessages.length);
 }

static <T> T randomFrom(T[] values, Predicate<T> filter) {
 return randomFrom(Arrays.stream(values).filter(filter).collect(Collectors.toList()));
 }

static OperationMode randomMode() {
 return randomFrom(OperationMode.values());
 }

public static OperationMode randomTrialStandardGoldOrPlatinumMode() {
 return randomFrom(TRIAL, STANDARD, GOLD, PLATINUM);
 }
}
public static OperationMode randomTrialOrPlatinumMode() {
    return randomFrom(TRIAL, PLATINUM);
}

public static OperationMode randomTrialBasicStandardGoldOrPlatinumMode() {
    return randomFrom(TRIAL, BASIC, STANDARD, GOLD, PLATINUM);
}

public static OperationMode randomBasicStandardOrGold() {
    return randomFrom(BASIC, STANDARD, GOLD);
}

public void testSecurityDefaults() {
    XPackLicenseState licenseState =
        new XPackLicenseState(Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(),
            true).build());
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));

    licenseState =
        new XPackLicenseState(Settings.builder().put(XPackSettings.TRANSPORT_SSL_ENABLED.getKey(),
            true).build());
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));

    licenseState = new XPackLicenseState(Settings.EMPTY);
    assertThat(licenseState.isAuthAllowed(), is(false));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NONE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityBasic() {
    XPackLicenseState licenseState =
Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
licenseState.update(BASIC, true, null);

assertThat(licenseState.isAuthAllowed(), is(false));
assertThat(licenseState.isIpFilteringAllowed(), is(false));
assertThat(licenseState.isAuditingAllowed(), is(false));
assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NONE));
assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityBasicExpired() {
XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
   Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
licenseState.update(BASIC, false, null);

assertThat(licenseState.isAuthAllowed(), is(false));
assertThat(licenseState.isIpFilteringAllowed(), is(false));
assertThat(licenseState.isAuditingAllowed(), is(false));
assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NONE));
assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityStandard() {
XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
   Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
licenseState.update(STANDARD, true, null);

assertThat(licenseState.isAuthAllowed(), is(true));
assertThat(licenseState.isIpFilteringAllowed(), is(false));
assertThat(licenseState.isAuditingAllowed(), is(false));
assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NATIVE));
assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityStandardExpired() {
XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
   Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
licenseState.update(STANDARD, false, null);

assertThat(licenseState.isAuthAllowed(), is(true));
assertThat(licenseState.isIpFilteringAllowed(), is(false));
assertThat(licenseState.isAuditingAllowed(), is(false));
assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NATIVE));
assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityGold() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
            Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(GOLD, true, null);
    licenseState.update(GOLD, true, null);
    licenseState.update(GOLD, true, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.DEFAULT));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityGoldExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
            Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(GOLD, false, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.DEFAULT));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityPlatinum() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
            Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(PLATINUM, true, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

public void testSecurityPlatinumExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(PLATINUM, false, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testNewTrialDefaultsSecurityOff() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(TRIAL, true, VersionUtils.randomVersionBetween(random(), Version.V_6_3_0,
        Version.CURRENT));

    assertThat(licenseState.isSecurityDisabledByTrialLicense(), is(true));
    assertThat(licenseState.isAuthAllowed(), is(false));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NONE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testOldTrialDefaultsSecurityOn() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(TRIAL, true, rarely() ? null : VersionUtils.randomVersionBetween(random(),
        Version.V_5_6_0, Version.V_6_2_4));

    assertThat(licenseState.isSecurityDisabledByTrialLicense(), is(false));
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

public void testSecurityAckBasicToNotGoldOrStandard() {
    OperationMode toMode = randomFrom(OperationMode.values(), mode -> mode != GOLD && mode !=
        STANDARD);
    assertAckMesssages(XPackField.SECURITY, BASIC, toMode, 0);
public void testSecurityAckAnyToTrialOrPlatinum() {
    assertAckMessages(XPackField.SECURITY, randomMode(), randomTrialOrPlatinumMode(), 0);
}

public void testSecurityAckTrialStandardGoldOrPlatinumToBasic() {
    assertAckMessages(XPackField.SECURITY, randomMode(), randomTrialStandardGoldOrPlatinumMode(), BASIC, 3);
}

public void testSecurityAckAnyToStandard() {
    OperationMode from = randomFrom(BASIC, GOLD, PLATINUM, TRIAL);
    assertAckMessages(XPackField.SECURITY, from, STANDARD, 4);
}

public void testSecurityAckBasicStandardTrialOrPlatinumToGold() {
    OperationMode from = randomFrom(BASIC, PLATINUM, TRIAL, STANDARD);
    assertAckMessages(XPackField.SECURITY, from, GOLD, 2);
}

public void testMonitoringAckBasicToAny() {
    assertAckMessages(XPackField.MONITORING, BASIC, randomMode(), 0);
}

public void testMonitoringAckAnyToTrialGoldOrPlatinum() {
    assertAckMessages(XPackField.MONITORING, randomMode(), randomTrialStandardGoldOrPlatinumMode(), 0);
}

public void testMonitoringAckNotBasicToBasic() {
    OperationMode from = randomFrom(STANDARD, GOLD, PLATINUM, TRIAL);
    assertAckMessages(XPackField.MONITORING, from, BASIC, 2);
}

public void testMonitoringAllowed() {
    assertAllowed(randomMode(), true, XPackLicenseState::isMonitoringAllowed, true);
    assertAllowed(randomMode(), false, XPackLicenseState::isMonitoringAllowed, false);
}

public void testMonitoringUpdateRetention() {
    assertAllowed(STANDARD, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(GOLD, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(TRIAL, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(BASIC, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(MISSING, false, XPackLicenseState::isUpdateRetentionAllowed, false);
}
public void testWatcherPlatinumGoldTrialStandard() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isWatcherAllowed, true);
    assertAllowed(GOLD, true, XPackLicenseState::isWatcherAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isWatcherAllowed, true);
    assertAllowed(STANDARD, true, XPackLicenseState::isWatcherAllowed, true);
}

public void testWatcherBasicLicense() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isWatcherAllowed, false);
}

public void testWatcherInactive() {
    assertAllowed(BASIC, false, XPackLicenseState::isWatcherAllowed, false);
}

public void testWatcherInactivePlatinumGoldTrial() throws Exception {
    assertAllowed(TRIAL, false, XPackLicenseState::isWatcherAllowed, false);
    assertAllowed(GOLD, false, XPackLicenseState::isWatcherAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isWatcherAllowed, false);
    assertAllowed(STANDARD, false, XPackLicenseState::isWatcherAllowed, false);
}

public void testGraphPlatinumTrial() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isGraphAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isGraphAllowed, true);
}

public void testGraphBasic() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphStandard() throws Exception {
    assertAllowed(STANDARD, true, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphInactiveBasic() {
    assertAllowed(BASIC, false, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphInactivePlatinumTrial() throws Exception {
    assertAllowed(TRIAL, false, XPackLicenseState::isMachineLearningAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningPlatinumTrial() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isMachineLearningAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isMachineLearningAllowed, true);
}
public void testMachineLearningBasic() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningStandard() throws Exception {
    assertAllowed(STANDARD, true, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningInactiveBasic() {
    assertAllowed(BASIC, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningInactivePlatinumTrial() throws Exception {
    assertAllowed(TRIAL, false, XPackLicenseState::isMachineLearningAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testLogstashPlatinumGoldTrialStandard() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isLogstashAllowed, true);
    assertAllowed(GOLD, true, XPackLicenseState::isLogstashAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isLogstashAllowed, true);
    assertAllowed(STANDARD, true, XPackLicenseState::isLogstashAllowed, true);
}

public void testLogstashBasicLicense() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isLogstashAllowed, false);
}

public void testLogstashInactive() {
    assertAllowed(BASIC, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(TRIAL, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(GOLD, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(STANDARD, false, XPackLicenseState::isLogstashAllowed, false);
}

public void testSqlDefaults() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(true));
}

public void testSqlBasic() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(BASIC, true, null);

    assertThat(licenseState.isSqlAllowed(), is(true));
```java
assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlBasicExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(BASIC, false, null);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlGold() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(GOLD, true, null);

    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlGoldExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(GOLD, false, null);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}
```

assertThat(licenseState.isJdbcAllowed(), is(true));
}

public void testSqlPlatinumExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(PLATINUM, false, null);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlAckAnyToTrialOrPlatinum() {
    assertAckMesssages(XPackField.SQL, randomMode(), randomTrialOrPlatinumMode(), 0);
}

public void testSqlAckTrialOrPlatinumToNotTrialOrPlatinum() {
    assertAckMesssages(XPackField.SQL, randomTrialOrPlatinumMode(), randomBasicStandardOrGold(), 1);
}

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* or more contributor license agreements. Licensed under the Elastic License;
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*/
package org.elasticsearch.license;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;
import static org.hamcrest.Matchers.equalTo;

public class LicenseScheduleTests extends ESTestCase {

    private License license;
    private SchedulerEngine.Schedule schedule;

    @Before
    public void setuo() throws Exception {
        license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(12));
        schedule = LicenseService.nextLicenseCheck(license);
    }

    public void testEnabledLicenseSchedule() throws Exception {
        int expiryDuration = (int) (license.expiryDate() - license.issueDate());
        long triggeredTime = license.issueDate() + between(0, expiryDuration);
    }

    public void testSqlPlatinumExpired() {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        licenseState.update(PLATINUM, false, null);

        assertThat(licenseState.isSqlAllowed(), is(false));
        assertThat(licenseState.isJdbcAllowed(), is(false));
    }

    public void testSqlAckAnyToTrialOrPlatinum() {
        assertAckMesssages(XPackField.SQL, randomMode(), randomTrialOrPlatinumMode(), 0);
    }

    public void testSqlAckTrialOrPlatinumToNotTrialOrPlatinum() {
        assertAckMesssages(XPackField.SQL, randomTrialOrPlatinumMode(), randomBasicStandardOrGold(), 1);
    }

    import static org.hamcrest.Matchers.equalTo;

    import org.elasticsearch.license;
    import org.elasticsearch.common.unit.TimeValue;
    import org.elasticsearch.test.ESTestCase;
    import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;
    import org.junit.Before;
    import static org.hamcrest.Matchers.equalTo;

    import static org.hamcrest.Matchers.equalTo;
    import org.elasticsearch.license;
    import org.elasticsearch.common.unit.TimeValue;
    import org.elasticsearch.test.ESTestCase;
    import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;
    import org.junit.Before;
    import static org.hamcrest.Matchers.equalTo;

    public class LicenseScheduleTests extends ESTestCase {

        private License license;
        private SchedulerEngine.Schedule schedule;

        @Before
        public void setuo() throws Exception {
            license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(12));
            schedule = LicenseService.nextLicenseCheck(license);
        }

        public void testEnabledLicenseSchedule() throws Exception {
            int expiryDuration = (int) (license.expiryDate() - license.issueDate());
            long triggeredTime = license.issueDate() + between(0, expiryDuration);
        }

    }
assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
equalTo(license.expiryDate()));
}

public void testGraceLicenseSchedule() throws Exception {
    long triggeredTime = license.expiryDate() + between(1,
        (int) LicenseService.GRACE_PERIOD_DURATION.getMillis());
    assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
        equalTo(license.expiryDate() + LicenseService.GRACE_PERIOD_DURATION.getMillis()));
}

public void testExpiredLicenseSchedule() throws Exception {
    long triggeredTime = license.expiryDate() + LicenseService.GRACE_PERIOD_DURATION.getMillis() +
        randomIntBetween(1, 1000);
    assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
        equalTo(-1L));
}

public void testInvalidLicenseSchedule() throws Exception {
    long triggeredTime = license.issueDate() - randomIntBetween(1, 1000);
    assertThat(schedule.nextScheduledTimeAfter(triggeredTime, triggeredTime),
        equalTo(license.issueDate()));
}

import org.elasticsearch.client.Request;
import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.RestClient;
import org.elasticsearch.common.io.Streams;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;
import java.io.InputStreamReader;
import java.nio.charset.StandardCharsets;
import java.util.Arrays;

import java.io.InputStreamReader;
import java.nio.charset.StandardCharsets;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.SUITE;

@ESIntegTestCase.ClusterScope(scope = SUITE)
public class StartBasicLicenseTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return Settings.builder()
                .put(super.nodeSettings(nodeOrdinal))
                .put("node.data", true)
                .put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(), "basic")
                .put(NetworkModule.HTTP_ENABLED.getKey(), true).build();
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Arrays.asList(LocalStateCompositeXPackPlugin.class, Netty4Plugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return Arrays.asList(XPackClientPlugin.class, Netty4Plugin.class);
    }

    public void testStartBasicLicense() throws Exception {
        LicensingClient licensingClient = new LicensingClient(client());
        License license = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, -1,
                TimeValue.timeValueHours(24));
        licensingClient.preparePutLicense(license).get();

        assertBusy(() -> {
            GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
            assertEquals("trial", getLicenseResponse.license().type());
        });

        // Testing that you can start a basic license when you have no license
        if (randomBoolean()) {
            licensingClient.prepareDeleteLicense().get();
            assertNull(licensingClient.prepareGetLicense().get().license());
        }
    }

    RestClient restClient = getRestClient();
    Response response = restClient.performRequest(new Request("GET", "/_xpack/license/basic_status"));
    String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
            StandardCharsets.UTF_8));
    assertEquals(200, response.getStatusLine().getStatusCode());
assertEquals("{"eligible_to_start_basic":true}", body);

Request ackRequest = new Request("POST", "/_xpack/license/start_basic");
ackRequest.setParameter("acknowledge", "true");
Response response2 = restClient.performRequest(ackRequest);
String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(), StandardCharsets.UTF_8));
assertEquals(200, response2.getStatusLine().getStatusCode());
assertTrue(body2.contains("\"acknowledged\":true"));
assertTrue(body2.contains("\"basic_was_started\":true"));

assertBusy(() -> {
    GetLicenseResponse currentLicense = licensingClient.prepareGetLicense().get();
    assertEquals("basic", currentLicense.license().type());
});

long expirationMillis = licensingClient.prepareGetLicense().get().license().expiryDate();
assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS, expirationMillis);

Response response3 = restClient.performRequest(new Request("GET", "/_xpack/license"));
String body3 = Streams.copyToString(new InputStreamReader(response3.getEntity().getContent(), StandardCharsets.UTF_8));
assertTrue(body3.contains("\"type\": \"basic\"");
assertFalse(body3.contains("expiry_date"));
assertFalse(body3.contains("expiry_date_in_millis"));

Response response4 = restClient.performRequest(new Request("GET", "/_xpack/license/basic_status"));
String body4 = Streams.copyToString(new InputStreamReader(response4.getEntity().getContent(), StandardCharsets.UTF_8));
assertEquals(200, response3.getStatusLine().getStatusCode());
assertEquals("{"eligible_to_start_basic":false}", body4);

ResponseException ex = expectThrows(ResponseException.class, () -> restClient.performRequest(new Request("POST", "/_xpack/license/start_basic")));
Response response5 = ex.getResponse();
String body5 = Streams.copyToString(new InputStreamReader(response5.getEntity().getContent(), StandardCharsets.UTF_8));
assertEquals(403, response5.getStatusLine().getStatusCode());
assertTrue(body5.contains("\"basic_was_started\":false"));
assertTrue(body5.contains("\"acknowledged\":true"));
assertTrue(body5.contains("\"error_message\":\"Operation failed: Current license is basic.\""));

public void testUnacknowledgedStartBasicLicense() throws Exception {
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, -1,
        TimeValue.timeValueHours(24));
}
licensingClient.preparePutLicense(license).get();

assertBusy(() -> {
    GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
    assertEquals("trial", getLicenseResponse.license().type());
});

Response response2 = getRestClient().performRequest(new Request("POST", "/_xpack/license/start_basic"));
String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response2.getStatusLine().getStatusCode());
assertTrue(body2.contains("\"acknowledged\":false\""));
assertTrue(body2.contains("\"basic_was_started\":false\""));
assertTrue(body2.contains("\"error_message\":\"Operation failed: Needs acknowledgement.\"\"));
assertTrue(body2.contains("\"message\":\"This license update requires acknowledgement. To acknowledge the license, " +
    "please read the following messages and call /start_basic again, this time with the\n    \"acknowledge=true\"\"");
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import com.carrotsearch.randomizedtesting.RandomizedTest;
import org.elasticsearch.Version;
import org.elasticsearch.action ActionListener;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.joda.DateMathParser;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.licensor.LicenseSigner;
import org.hamcrest.MatcherAssert;
import org.joda.time.format.DateTimeFormatter;
import org.junit.Assert;
import java.io.IOException;
import java.io.InputStream;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.StandardCopyOption;
import java.util.ArrayList;
import java.util.List;
import java.util.UUID;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicReference;

import static com.carrotsearch.randomizedtesting.RandomizedTest.randomBoolean;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomInt;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomFrom;
import static org.apache.lucene.util.LuceneTestCase.createTempFile;
import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.ESTestCase.randomAlphaOfLength;
import static org.elasticsearch.test.ESTestCase.randomIntBetween;
import static org.hamcrest.core.IsEqual.equalTo;
import static org.junit.Assert.assertThat;

public class TestUtils {

    private static final FormatDateTimeFormatter formatDateTimeFormatter = Joda.forPattern("yyyy-MM-dd");
    private static final DateMathParser dateMathParser = new DateMathParser(formatDateTimeFormatter);
    private static final DateTimeFormatter dateTimeFormatter = formatDateTimeFormatter.printer();

    public static String dateMathString(String time, final long now) {
        return dateTimeFormatter.print(dateMathParser.parse(time, () -> now));
    }

    public static long dateMath(String time, final long now) {
        return dateMathParser.parse(time, () -> now);
    }

    public static LicenseSpec generateRandomLicenseSpec(int version) {
        boolean datesInMillis = randomBoolean();
        long now = System.currentTimeMillis();
        String uid = UUID.randomUUID().toString();
        String feature = "feature__" + randomInt();
        String issuer = "issuer__" + randomInt();
        String issuedTo = "issuedTo__" + randomInt();
        final String type;
        final String subscriptionType;
        if (version < License.VERSION_NO_FEATURE_TYPE) {
            subscriptionType = randomFrom("gold", "silver", "platinum");
            type = "subscription";
        } else {
            subscriptionType = null;
            type = randomFrom("basic", "dev", "gold", "silver", "platinum");
        }
int maxNodes = RandomizedTest.randomIntBetween(5, 100);
if (datesInMillis) {
    long issueDateInMillis = dateMath("now", now);
    long expiryDateInMillis = dateMath("now+10d/d", now);
    return new LicenseSpec(version, uid, feature, issueDateInMillis, expiryDateInMillis, type, subscriptionType,
            issuedTo, issuer,
            maxNodes);
} else {
    String issueDate = dateMathString("now", now);
    String expiryDate = dateMathString("now+10d/d", now);
    return new LicenseSpec(version, uid, feature, issueDate, expiryDate, type, subscriptionType, issuedTo,
            issuer, maxNodes);
}

public static String generateLicenseSpecString(LicenseSpec licenseSpec) throws IOException {
    XContentBuilder licenses = jsonBuilder();
    licenses.startObject();
    licenses.startArray("licenses");
    licenses.startObject()
        .field("uid", licenseSpec.uid)
        .field("type", licenseSpec.type)
        .field("subscription_type", licenseSpec.subscriptionType)
        .field("issued_to", licenseSpec.issuedTo)
        .field("issuer", licenseSpec.issuer)
        .field("feature", licenseSpec.feature)
        .field("max_nodes", licenseSpec.maxNodes);
    if (licenseSpec.issueDate != null) {
        licenses.field("issue_date", licenseSpec.issueDate);
    } else {
        licenses.field("issue_date_in_millis", licenseSpec.issueDateInMillis);
    }
    if (licenseSpec.expiryDate != null) {
        licenses.field("expiry_date", licenseSpec.expiryDate);
    } else {
        licenses.field("expiry_date_in_millis", licenseSpec.expiryDateInMillis);
    }
    licenses.endObject();
    licenses.endArray();
    licenses.endObject();
    return Strings.toString(licenses);
}

public static License generateLicenses(LicenseSpec spec) {
    License.Builder builder = License.builder()
```java
public static LicenseSpec assertLicenseSpec(LicenseSpec spec, License license) {
    MatcherAssert.assertThat(license.uid(), equalTo(spec.uid));
    MatcherAssert.assertThat(license.issuedTo(), equalTo(spec.issuedTo));
    MatcherAssert.assertThat(license.issuer(), equalTo(spec.issuer));
    MatcherAssert.assertThat(license.type(), equalTo(spec.type));
    MatcherAssert.assertThat(license.maxNodes(), equalTo(spec.maxNodes));
    if (spec.issueDate != null) {
        MatcherAssert.assertThat(license.issueDate(), equalTo(DateUtils.beginningOfTheDay(spec.issueDate)));
    } else {
        MatcherAssert.assertThat(license.issueDate(), equalTo(spec.issueDateInMillis));
    }
    if (spec.expiryDate != null) {
        MatcherAssert.assertThat(license.expiryDate(), equalTo(DateUtils.endOfTheDay(spec.expiryDate)));
    } else {
        MatcherAssert.assertThat(license.expiryDate(), equalTo(spec.expiryDateInMillis));
    }
    return license;
}
```

```java
public static class LicenseSpec {
    public final int version;
    public final String feature;
    public final String issueDate;
    public final long issueDateInMillis;
    public final String expiryDate;
    public final long expiryDateInMillis;
    public final String uid;
    public final String type;
```
public final String subscriptionType;
public final String issuedTo;
public final String issuer;
public final int maxNodes;

public LicenseSpec(String issueDate, String expiryDate) {
    this(License.VERSION_CURRENT, UUID.randomUUID().toString(), "feature", issueDate, expiryDate, "trial", "none", "customer", "elasticsearch", 5);
}

public LicenseSpec(int version, String uid, String feature, long issueDateInMillis, long expiryDateInMillis, String type, String subscriptionType, String issuedTo, String issuer, int maxNodes) {
    this.version = version;
    this.feature = feature;
    this.issueDateInMillis = issueDateInMillis;
    this.issueDate = null;
    this.expiryDateInMillis = expiryDateInMillis;
    this.expiryDate = null;
    this.uid = uid;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.issuedTo = issuedTo;
    this.issuer = issuer;
    this.maxNodes = maxNodes;
}

private static Path getTestPriKeyPath() throws Exception {
    return getResourcePath("/private.key");
}
private static Path getTestPubKeyPath() throws Exception {
    return getResourcePath("/public.key");
}

public static String dumpLicense(License license) throws Exception {
    XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
    builder.startObject();
    builder.startObject("license");
    license.toInnerXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.endObject();
    builder.endObject();
    return Strings.toString(builder);
}

public static License generateSignedLicense(TimeValue expiryDuration) throws Exception {
    return generateSignedLicense(null, -1, expiryDuration);
}

public static License generateSignedLicense(String type, TimeValue expiryDuration) throws Exception {
    return generateSignedLicense(type, -1, expiryDuration);
}

public static License generateSignedLicense(long issueDate, TimeValue expiryDuration) throws Exception {
    return generateSignedLicense(null, issueDate, expiryDuration);
}

public static License generateSignedLicense(String type, long issueDate, TimeValue expiryDuration) throws Exception {
    return generateSignedLicense(type, randomIntBetween(License.VERSION_START, License.VERSION_CURRENT), issueDate, expiryDuration);
}

public static License generateSignedLicenseOldSignature() {
    long issueDate = System.currentTimeMillis();
    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(License.VERSION_START_DATE)
        .issuedTo("customer")
        .maxNodes(5)
        .type("trial")
        .issueDate(issueDate)
        .expiryDate(issueDate + TimeValue.timeValueHours(24).getMillis());
    return SelfGeneratedLicense.create(specBuilder, License.VERSION_START_DATE);
}

/**
 * This method which chooses the license type randomly if the type is null. However, it will not randomly
 * choose trial or basic types as those types can only be self-generated.
public static License generateLicense(String type, int version, long issueDate, TimeValue expiryDuration) throws Exception {
    long issue = (issueDate != -1L) ? issueDate : System.currentTimeMillis() - TimeValue.timeValueHours(2).getMillis();
    final String licenseType;
    if (version < License.VERSION_NO_FEATURE_TYPE) {
        licenseType = randomFrom("subscription", "internal", "development");
    } else {
        licenseType = (type != null) ? type : randomFrom("silver", "dev", "gold", "platinum");
    }
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(version)
        .expiryDate(System.currentTimeMillis() + expiryDuration.getMillis())
        .issueDate(issue)
        .type(licenseType)
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    if (version == License.VERSION_START) {
        builder.subscriptionType((type != null) ? type : randomFrom("dev", "gold", "platinum", "silver");
        builder.feature(randomAlphaOfLength(10));
    }
    final LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
    return signer.sign(builder.build());
}

public static License generateLicense(License.Builder builder) throws Exception {
    LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
    return signer.sign(builder.build());
}

public static License generateExpiredNonBasicLicense(long expiryDate) throws Exception {
    return generateExpiredNonBasicLicense(randomFrom("silver", "dev", "gold", "platinum"), expiryDate);
}

public static License generateExpiredNonBasicLicense() throws Exception {
    return generateExpiredNonBasicLicense(randomFrom("silver", "dev", "gold", "platinum"));
}

public static License generateExpiredNonBasicLicense(String type) throws Exception {
    return generateExpiredNonBasicLicense(randomFrom("silver", "dev", "gold", "platinum"));
}

public static License generateExpiredNonBasicLicense(String type, int version, long issueDate, TimeValue expiryDuration) throws Exception {
    long issue = (issueDate != -1L) ? issueDate : System.currentTimeMillis() - TimeValue.timeValueHours(2).getMillis();
    final String licenseType;
    if (version < License.VERSION_NO_FEATURE_TYPE) {
        licenseType = randomFrom("subscription", "internal", "development");
    } else {
        licenseType = (type != null) ? type : randomFrom("silver", "dev", "gold", "platinum");
    }
    final License.Builder builder = License.builder()
LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
return signer.sign(builder.build());
}

private static Path getResourcePath(String resource) throws Exception {
    Path resourceFile = createTempFile();
    try (InputStream resourceInput = TestUtils.class.getResourceAsStream(resource)) {
        Files.copy(resourceInput, resourceFile, StandardCopyOption.REPLACE_EXISTING);
    }
    return resourceFile;
}

public static void registerAndAckSignedLicenses(final LicenseService licenseService, License license,
    final LicensesStatus expectedStatus) {
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(license).acknowledge(true);
    final CountDownLatch latch = new CountDownLatch(1);
    final AtomicReference<LicensesStatus> status = new AtomicReference<>();
    licenseService.registerLicense(putLicenseRequest, new ActionListener<PutLicenseResponse>() {
        @Override
        public void onResponse(PutLicenseResponse licensesUpdateResponse) {
            status.set(licensesUpdateResponse.status());
            latch.countDown();
        }

        @Override
        public void onFailure(Exception e) {
            latch.countDown();
        }
    });
    try {
        latch.await();
    } catch (InterruptedException e) {
        Assert.fail(e.getMessage());
    }
    assertThat(status.get(), equalTo(expectedStatus));
}

public static class AssertingLicenseState extends XPackLicenseState {
    public final List<License.OperationMode> modeUpdates = new ArrayList<>();
    public final List<Boolean> activeUpdates = new ArrayList<>();
}

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public final List<Version> trialVersionUpdates = new ArrayList<>();

public AssertingLicenseState() {
    super(Settings.EMPTY);
}

@Override
void update(License.OperationMode mode, boolean active, Version mostRecentTrialVersion) {
    modeUpdates.add(mode);
    activeUpdates.add(active);
    trialVersionUpdates.add(mostRecentTrialVersion);
}
}

/**
* A license state that makes the {@link #update(License.OperationMode, boolean, Version)}
* method public for use in tests.
*/
public static class UpdatableLicenseState extends XPackLicenseState {
    public UpdatableLicenseState() {
        this(Settings.EMPTY);
    }

    public UpdatableLicenseState(Settings settings) {
        super(settings);
    }

    @Override
    public void update(License.OperationMode mode, boolean active, Version mostRecentTrialVersion) {
        super.update(mode, active, mostRecentTrialVersion);
    }
}

public static void putLicense(MetaData.Builder builder, License license) {
    builder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
}

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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;

import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.settings.Settings;
import org.mockito.ArgumentCaptor;
import org.mockito.Mockito;
import java.util.UUID;
import static org.elasticsearch.license.TestUtils.dateMath;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.when;

public class LicenseRegistrationTests extends AbstractLicenseServiceTestCase {

public void testSelfGeneratedTrialLicense() throws Exception {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(null, licenseState, Settings.EMPTY, "trial");
    when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
    licenseService.start();
    ClusterState state = ClusterState.builder(new ClusterName("")
            .build();
    ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
            ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
    verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
    ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
    LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
    assertNotNull(licenseMetaData);
    assertNotNull(licenseMetaData.getLicense());
    assertFalse(licenseMetaData.isEligibleForTrial());
    assertEquals("trial", licenseMetaData.getLicense().type());
    assertEquals(clock.millis() + LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.millis(), licenseMetaData.getLicense().expiryDate());
}

public void testSelfGeneratedBasicLicense() throws Exception {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(null, licenseState, Settings.EMPTY, "basic");
    when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
    licenseService.start();
    ClusterState state = ClusterState.builder(new ClusterName("a")
            .build();
    ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
            ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
    verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
    ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
    LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
    assertNotNull(licenseMetaData);
    assertNotNull(licenseMetaData.getLicense());
    assertEquals("trial", licenseMetaData.getLicense().expiryDate());
    ensureThat(licenseMetaData.getLicense().type());

```
assertTrue(licenseMetaData.isEligibleForTrial());
assertEquals("basic", licenseMetaData.getLicense().type());
assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
}

public void testNonSelfGeneratedBasicLicenseIsReplaced() throws Exception {
    long now = System.currentTimeMillis();
    String uid = UUID.randomUUID().toString();
    final License.Builder builder = License.builder()
        .uid(uid)
        .version(License.VERSION_CURRENT)
        .expiryDate(dateMath("now+2h", now))
        .startDate(now)
        .issueDate(now)
        .type("basic")
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    License license = TestUtils.generateSignedLicense(builder);
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(license, licenseState, Settings.EMPTY);
    when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
    licenseService.start();
    MetaData.Builder mdBuilder = MetaData.builder();
    mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
    ClusterState state = ClusterState.builder(new ClusterName("a")).metaData(mdBuilder.build()).build();
    ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
    ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
    verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
    ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
    LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
    assertNotNull(licenseMetaData);
    assertNotNull(licenseMetaData.getLicense());
    assertTrue(licenseMetaData.isEligibleForTrial());
    assertEquals("basic", licenseMetaData.getLicense().type());
    assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
    assertEquals(uid, licenseMetaData.getLicense().uid());
}

public void testExpiredSelfGeneratedBasicLicenseIsExtended() throws Exception {
    long now = System.currentTimeMillis();
    String uid = UUID.randomUUID().toString();
    License.Builder builder = License.builder()
        .uid(uid)
License license = SelfGeneratedLicense.create(builder, License.VERSION_CURRENT);

XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
setInitialState(license, licenseState, Settings.EMPTY);
when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
licenseService.start();

MetaData.Builder mdBuilder = MetaData.builder();
mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
ClusterState state = ClusterState.builder(new ClusterName("a")).metaData(mdBuilder.build()).build();
ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
assertNotNull(licenseMetaData);
assertNotNull(licenseMetaData.getLicense());
assertTrue(licenseMetaData.isEligibleForTrial());
assertEquals("basic", licenseMetaData.getLicense().type());
assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
assertEquals(uid, licenseMetaData.getLicense().uid());
*/

package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterModule;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.metadata.RepositoriesMetaData;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.ToXContent.Params;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.test.ESTestCase;

import java.util.Collections;
import java.util.UUID;
import java.util.stream.Collectors;
import java.util.stream.Stream;

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.notNullValue;
import static org.hamcrest.Matchers.nullValue;

public class LicensesMetaDataSerializationTests extends ESTestCase {

public void testXContentSerializationOneSignedLicense() throws Exception {
    License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
    LicensesMetaData licensesMetaData = new LicensesMetaData(license, null);
    XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.endObject();
    builder.endObject();
    LicensesMetaData licensesMetaDataFromXContent =
    getLicensesMetaDataFromXContent(createParser(builder));
    assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(license));
    assertNull(licensesMetaDataFromXContent.getMostRecentTrialVersion());
}

public void testXContentSerializationOneSignedLicenseWithUsedTrial() throws Exception {
    License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
    LicensesMetaData licensesMetaData = new LicensesMetaData(license, Version.CURRENT);
    XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.endObject();
    builder.endObject();
    LicensesMetaData licensesMetaDataFromXContent =
    getLicensesMetaDataFromXContent(createParser(builder));
    assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(license));
    assertEquals(licensesMetaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
}

public void testLicenseMetadataParsingDoesNotSwallowOtherMetaData() throws Exception {
    new Licensing(Settings.EMPTY); // makes sure LicensePlugin is registered in Custom MetaData
    License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
    LicensesMetaData licensesMetaData = new LicensesMetaData(license, Version.CURRENT);
    }
RepositoryMetaData repositoryMetaData = new RepositoryMetaData("repo", "fs", Settings.EMPTY);
RepositoriesMetaData repositoriesMetaData = new
RepositoryMetaData(Collections.singletonList(repositoryMetaData));
final MetaData.Builder metaDataBuilder = MetaData.builder();
if (randomBoolean()) { // random order of insertion
    metaDataBuilder.putCustom(licensesMetaData.getWriteableName(), licensesMetaData);
    metaDataBuilder.putCustom(repositoriesMetaData.getWriteableName(), repositoriesMetaData);
} else {
    metaDataBuilder.putCustom(repositoriesMetaData.getWriteableName(), repositoriesMetaData);
    metaDataBuilder.putCustom(licensesMetaData.getWriteableName(), licensesMetaData);
}
// serialize metadata
XContentBuilder builder = XContentFactory.jsonBuilder();
Params params = new
ToXContent.MapParams(Collections.singletonMap(MetaData.CONTEXT_MODE_PARAM,
MetaData.CONTEXT_MODE_GATEWAY));
builder.startObject();
builder = metaDataBuilder.build().toXContent(builder, params);
builder.endObject();
// deserialize metadata again
MetaData metaData = MetaData.Builder.fromXContent(createParser(builder));
// check that custom metadata still present
assertThat(metaData.custom(licensesMetaData.getWriteableName()), notNullValue());
assertThat(metaData.custom(repositoriesMetaData.getWriteableName()), notNullValue());
}

public void testXContentSerializationOneTrial() throws Exception {
    long issueDate = System.currentTimeMillis();
    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .issuedTo("customer")
        .maxNodes(5)
        .issueDate(issueDate)
        .type(randomBoolean() ? "trial" : "basic")
        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
    final License trialLicense = SelfGeneratedLicense.create(specBuilder, License.VERSION_CURRENT);
    LicensesMetaData licensesMetaData = new LicensesMetaData(trialLicense, Version.CURRENT);
    XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder = licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.endObject();
    LicensesMetaData licensesMetaDataFromXContent =
        getLicensesMetaDataFromXContent(createParser(builder));
    assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(trialLicense));
    assertEquals(licensesMetaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
}
public void testLicenseTombstoneFromXContext() throws Exception {
    final XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    builder.nullField("license");
    builder.endObject();
    builder.endObject();
    LicensesMetaData metaDataFromXContent = getLicensesMetaDataFromXContent(createParser(builder));
    assertThat(metaDataFromXContent.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
}

public void testLicenseTombstoneWithUsedTrialFromXContext() throws Exception {
    final XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    builder.nullField("license");
    builder.field("trial_license", Version.CURRENT.toString());
    builder.endObject();
    builder.endObject();
    LicensesMetaData metaDataFromXContent = getLicensesMetaDataFromXContent(createParser(builder));
    assertThat(metaDataFromXContent.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
    assertEquals(metaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
}

private static LicensesMetaData getLicensesMetaDataFromXContent(XContentParser parser) throws Exception {
    parser.nextToken(); // consume null
    parser.nextToken(); // consume "licenses"
    LicensesMetaData licensesMetaDataFromXContent = LicensesMetaData.fromXContent(parser);
    parser.nextToken(); // consume endObject
    assertThat(parser.nextToken(), nullValue());
    return licensesMetaDataFromXContent;
}

@Override
protected NamedXContentRegistry xContentRegistry() {
    return new NamedXContentRegistry(Stream.concat(
            new Licensing(Settings.EMPTY).getNamedXContent().stream(),
            ClusterModule.getNamedXWriteables().stream()  
        ).collect(Collectors.toList()));
}

@override
protected NamedXContentRegistry xContentRegistry() {
    return new NamedXContentRegistry(Stream.concat(
            new Licensing(Settings.EMPTY).getNamedXContent().stream(),
            ClusterModule.getNamedXWriteables().stream()  
        ).collect(Collectors.toList()));
}

package org.elasticsearch.license;

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 */
import org.elasticsearch.client.Request;
import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.RestClient;
import org.elasticsearch.common.io.Streams;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;
import java.io.InputStreamReader;
import java.nio.charset.StandardCharsets;
import java.util.Arrays;
import java.util.Collection;
import static org.elasticsearch.test.ESIntegTestCase.Scope.SUITE;

@ESIntegTestCase.ClusterScope(scope = SUITE)
public class StartTrialLicenseTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return Settings.builder()
                .put(super.nodeSettings(nodeOrdinal))
                .put("node.data", true)
                .put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(), "basic")
                .put(NetworkModule.HTTP_ENABLED.getKey(), true).build();
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Arrays.asList(LocalStateCompositeXPackPlugin.class, Netty4Plugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return Arrays.asList(XPackClientPlugin.class, Netty4Plugin.class);
    }

    public void testStartTrial() throws Exception {
        LicensingClient licensingClient = new LicensingClient(client());
        ensureStartingWithBasic();
        RestClient restClient = getRestClient();
    }
}
Response response = restClient.performRequest(new Request("GET", "/_xpack/license/trial_status"));
String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(), StandardCharsets.UTF_8));
assertEquals(200, response.getStatusLine().getStatusCode());
assertEquals("{"eligible_to_start_trial":true}", body);

// Test that starting will fail without acknowledgement
Response response2 = restClient.performRequest(new Request("POST", "/_xpack/license/start_trial"));
String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(), StandardCharsets.UTF_8));
assertEquals(200, response2.getStatusLine().getStatusCode());
assertTrue(body2.contains("""trial_was_started":false"");
assertTrue(body2.contains("""error_message":"Operation failed: Needs acknowledgement."""));
assertTrue(body2.contains("""acknowledged":false"");

assertBusy(() -> {
    GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
    assertEquals("basic", getLicenseResponse.license().type());
});

String type = randomFrom(LicenseService.VALID_TRIAL_TYPES);

Request ackRequest = new Request("POST", "/_xpack/license/start_trial");
ackRequest.setParameter("acknowledge", "true");
Response response3 = restClient.performRequest(ackRequest);
String body3 = Streams.copyToString(new InputStreamReader(response3.getEntity().getContent(), StandardCharsets.UTF_8));
assertEquals(200, response3.getStatusLine().getStatusCode());
assertTrue(body3.contains("""trial_was_started":true"");
assertTrue(body3.contains("""type":""" + type + """"));
assertTrue(body3.contains("""acknowledged":true"");

assertBusy(() -> {
    GetLicenseResponse postTrialLicenseResponse = licensingClient.prepareGetLicense().get();
    assertEquals(type, postTrialLicenseResponse.license().type());
});

Response response4 = restClient.performRequest(new Request("GET", "/_xpack/license/trial_status"));
String body4 = Streams.copyToString(new InputStreamReader(response4.getEntity().getContent(), StandardCharsets.UTF_8));
assertEquals(200, response4.getStatusLine().getStatusCode());
assertEquals("{"eligible_to_start_trial":false}", body4);

String secondAttemptType = randomFrom(LicenseService.VALID_TRIAL_TYPES);

Request startTrialWhenStartedRequest = new Request("POST", "/_xpack/license/start_trial");
startTrialWhenStartedRequest.setParameter("acknowledge", "true");
startTrialWhenStartedRequest.addParameter("type", secondAttemptType);
ResponseException ex = expectThrows(ResponseException.class, () ->
restClient.performRequest(startTrialWhenStartedRequest));
Response response5 = ex.getResponse();
String body5 = Streams.copyToString(new InputStreamReader(response5.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(403, response5.getStatusLine().getStatusCode());
assertTrue(body5.contains("\"trial_was_started\":false");
assertTrue(body5.contains("\"error_message\":\"Operation failed: Trial was already activated.\"");
}

public void testInvalidType() throws Exception {
    ensureStartingWithBasic();

    Request request = new Request("POST", "/_xpack/license/start_trial");
    request.addParameter("type", "basic");
    ResponseException ex = expectThrows(ResponseException.class, () ->
getRestClient().performRequest(request));
    Response response = ex.getResponse();
    String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertEquals(400, response.getStatusLine().getStatusCode());
    assertTrue(body.contains("\"type\":\"illegal_argument_exception\""));
    assertTrue(body.contains("\"reason\":\"Cannot start trial of type [basic]. Valid trial types are [\"");
}

private void ensureStartingWithBasic() throws Exception {
    LicensingClient licensingClient = new LicensingClient(client());
    GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
    if ("basic".equals(getLicenseResponse.license().type()) == false) {
        licensingClient.preparePostStartBasic().setAcknowledge(true).get();
    }

    assertBusy(() -> {
        GetLicenseResponse postTrialLicenseResponse = licensingClient.prepareGetLicense().get();
        assertEquals("basic", postTrialLicenseResponse.license().type());
    });
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.test.ESTestCase;

import java.util.Arrays;

import static org.elasticsearch_MATCHERS.contains;
import static org.elasticsearch_MATCHERS.equalTo;
import static org.elasticsearch_MATCHERS.hasSize;

public class LicenseUtilsTests extends ESTestCase {

public void testNewExpirationException() {
    for (String feature : Arrays.asList("feature", randomAlphaOfLength(5), null, ")") {
        ElasticsearchSecurityException exception = LicenseUtils.newComplianceException(feature);
        assertNotNull(exception);
        assertThat(exception.getMetadataKeys(), contains(LicenseUtils.EXPIRED_FEATURE_METADATA));
        assertThat(exception.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA), hasSize(1));
        assertThat(exception.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA).iterator().next(),
        equalTo(feature));
    }
}

public void testIsLicenseExpiredException() {
    ElasticsearchSecurityException exception = LicenseUtils.newComplianceException("feature");
    assertTrue(LicenseUtils.isLicenseExpiredException(exception));

    exception = new ElasticsearchSecurityException("msg");
    assertFalse(LicenseUtils.isLicenseExpiredException(exception));
}

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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;
import java.io.IOException;
import java.nio.ByteBuffer;
import java.util.Base64;
import java.util.Collections;
import java.util.UUID;

import static org.elasticsearch.license.CryptUtils.encryptV3Format;
import static org.hamcrest.Matchers.equalTo;

public class SelfGeneratedLicenseTests extends ESTestCase {

    public void testBasic() throws Exception {
        long issueDate = System.currentTimeMillis();
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo("customer")
            .maxNodes(5)
            .type(randomBoolean() ? "trial" : "basic")
            .issueDate(issueDate)
            .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
        License trialLicense = SelfGeneratedLicense.create(specBuilder, License.VERSION_CURRENT);
        assertThat(SelfGeneratedLicense.verify(trialLicense), equalTo(true));
    }

    public void testTampered() throws Exception {
        long issueDate = System.currentTimeMillis();
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo("customer")
            .type(randomBoolean() ? "trial" : "basic")
            .maxNodes(5)
            .issueDate(issueDate)
            .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
        License trialLicense = SelfGeneratedLicense.create(specBuilder, License.VERSION_CURRENT);
        final String originalSignature = trialLicense.signature();
        License tamperedLicense = License.builder().fromLicenseSpec(trialLicense, originalSignature)
            .expiryDate(System.currentTimeMillis() + TimeValue.timeValueHours(5).getMillis())
            .build();
        assertThat(SelfGeneratedLicense.verify(trialLicense), equalTo(true));
        assertThat(SelfGeneratedLicense.verify(tamperedLicense), equalTo(false));
    }

    public void testFrom1x() throws Exception {
        long issueDate = System.currentTimeMillis();
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo("customer")
            .type("subscription")
            .subscriptionType("trial")
            .issuer("elasticsearch")
            .feature(""");
    }
}
License pre20TrialLicense = specBuilder.build();
License license = SelfGeneratedLicense.create(License.builder().fromPre20LicenseSpec(pre20TrialLicense).type("trial"),
License.VERSION_CURRENT);
assertThat(SelfGeneratedLicense.verify(license), equalTo(true));
}

public void testTrialLicenseVerifyWithOlderVersion() throws Exception {
    assumeFalse("Can't run in a FIPS JVM. We can't generate old licenses since PBEWithSHA1AndDESEde is not available", inFipsJvm());
    long issueDate = System.currentTimeMillis();
    License.Builder specBuilder = License.builder()
        .issuedTo("customer")
        .maxNodes(5)
        .issueDate(issueDate)
        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis())
        .feature(""")
        .subscriptionType("trial")
        .version(1);
    License trialLicenseV1 = createTrialLicense(specBuilder);
    assertThat(SelfGeneratedLicense.verify(trialLicenseV1), equalTo(true));
}

private static License createTrialLicense(License.Builder specBuilder) {
    License spec = specBuilder
        .type(randomBoolean() ? "trial" : "basic")
        .issuer("elasticsearch")
        .uid(UUID.randomUUID().toString())
        .build();
    final String signature;
    try {
        XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
        spec.toXContent(contentBuilder, new ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
        byte[] encrypt = encryptV3Format(BytesReference.toBytes(BytesReference.bytes(contentBuilder)));
        byte[] bytes = new byte[4 + 4 + encrypt.length];
        ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
        byteBuffer.putInt(-spec.version())
            .putInt(encrypt.length)
            .put(encrypt);
        signature = Base64.getEncoder().encodeToString(bytes);
    } catch (IOException e) { throw new IllegalStateException(e); }
}
return License.builder().fromLicenseSpec(spec, signature).build();
}
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.test.ESTestCase;
import java.util.Locale;
import static org.elasticsearch.license.License.OperationMode;
import static org.hamcrest.Matchers.equalTo;

/**
 * Tests {@link License.OperationMode} for correctness.
 * <p>
 * If you change the behavior of these tests, then it means that licensing changes across the products!
 */
public class LicenseOperationModeTests extends ESTestCase {
    public void testResolveTrial() {
        // assert 1.x BWC
        assertResolve(OperationMode.TRIAL, "nONE", "DEv", "deveLopment");
        // assert expected (2.x+) variant
        assertResolve(OperationMode.TRIAL, "tRiAl", "trial");
    }

    public void testResolveBasic() {
        // assert expected (2.x+) variant (note: no 1.x variant of BASIC)
        assertResolve(OperationMode.BASIC, "bAsIc", "basic");
    }

    public void testResolveStandard() {
        // assert expected (2.x+) variant (note: no 1.x variant of STANDARD)
        assertResolve(OperationMode.STANDARD, "StAnDARd", "standard");
    }

    public void testResolveGold() {
        // assert expected (2.x+) variant (note: no different 1.x variant of GOLD)
        assertResolve(OperationMode.GOLD, "SiLvEr", "gOlD", "silver", "gold");
    }

    public void testResolvePlatinum() {
        // assert 1.x BWC
        assertResolve(OperationMode.PLATINUM, "iNtErNaL");
    }
}
// assert expected (2.x+) variant
assertResolve(OperationMode.PLATINUM, "PlAtINum", "platinum");
}

public void testResolveUnknown() {
    // 'enterprise' is a type that exists in cloud but should be rejected under normal operation
    // See https://github.com/elastic/x-plugins/issues/3371
    String[] types = { "unknown", "fake", "enterprise" };

    for (String type : types) {
        try {
            OperationMode.resolve(type);
            fail(String.format(Locale.ROOT, "[%s] should not be recognized as an operation mode", type));
        } catch (IllegalArgumentException e) {
            assertThat(e.getMessage(), equalTo("unknown type [" + type + "]"));
        }
    }
}

private static void assertResolve(OperationMode expected, String... types) {
    for (String type : types) {
        assertThat(OperationMode.resolve(type), equalTo(expected));
    }
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.test.ESTestCase;
import static org.elasticsearch.common.unit.TimeValue.timeValueMillis;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.nullValue;

public class ExpirationCallbackTests extends ESTestCase {

    public void testPostExpirationDelay() throws Exception {
        TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
        TimeValue min = TimeValue.timeValueSeconds(1);
        TimeValue max = TimeValue.timeValueSeconds(4);
        TimeValue frequency = TimeValue.timeValueSeconds(1);
NoopPostExpirationCallback post = new NoopPostExpirationCallback(min, max, frequency);
long now = System.currentTimeMillis();
long expiryDate = now + expiryDuration.getMillis();
assertThat(post.delay(expiryDate, now),
        equalTo(TimeValue.timeValueMillis(expiryDuration.getMillis() + min.getMillis()))); // before license expiry
assertThat(post.delay(expiryDate, expiryDate), equalTo(min)); // on license expiry
int latestValidTriggerDelay = (int) (expiryDuration.getMillis() + max.getMillis());
int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() + min.getMillis());
assertExpirationCallbackDelay(post, expiryDuration.millis(), latestValidTriggerDelay,
                             earliestValidTriggerDelay);
}

public void testPreExpirationDelay() throws Exception {
    TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
    TimeValue min = TimeValue.timeValueSeconds(1);
    TimeValue max = TimeValue.timeValueSeconds(4);
    TimeValue frequency = TimeValue.timeValueSeconds(1);
    NoopPreExpirationCallback pre = new NoopPreExpirationCallback(min, max, frequency);
    long now = System.currentTimeMillis();
    long expiryDate = now + expiryDuration.getMillis();
    assertThat(pre.delay(expiryDate, expiryDate), nullValue()); // on license expiry
    int latestValidTriggerDelay = (int) (expiryDuration.getMillis() - min.getMillis());
    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() - max.getMillis());
    assertExpirationCallbackDelay(pre, expiryDuration.millis(), latestValidTriggerDelay,
                                   earliestValidTriggerDelay);
}

public void testPostExpirationWithNullMax() throws Exception {
    int postExpirySeconds = randomIntBetween(5, 10);
    TimeValue postExpiryDuration = TimeValue.timeValueSeconds(postExpirySeconds);
    TimeValue min = TimeValue.timeValueSeconds(postExpirySeconds - randomIntBetween(1, 3));
    final ExpirationCallback.Post post = new NoopPostExpirationCallback(min, null, timeValueMillis(10));
    long now = System.currentTimeMillis();
    assertThat(post.delay(now - postExpiryDuration.millis(), now), equalTo(TimeValue.timeValueMillis(0)));
}

public void testPreExpirationWithNullMin() throws Exception {
    int expirySeconds = randomIntBetween(5, 10);
    TimeValue expiryDuration = TimeValue.timeValueSeconds(expirySeconds);
    TimeValue max = TimeValue.timeValueSeconds(expirySeconds + randomIntBetween(1, 10));
    final ExpirationCallback.Pre pre = new NoopPreExpirationCallback(null, max, timeValueMillis(10));
    long now = System.currentTimeMillis();
    assertThat(pre.delay(expiryDuration.millis() + now, now), equalToOrWithin(TimeValue.timeValueMillis(0)));
}
public void testPreExpirationScheduleTime() throws Exception {
    TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
    TimeValue min = TimeValue.timeValueSeconds(1);
    TimeValue max = TimeValue.timeValueSeconds(4);
    TimeValue frequency = TimeValue.timeValueSeconds(1);
    NoopPreExpirationCallback pre = new NoopPreExpirationCallback(min, max, frequency);
    int latestValidTriggerDelay = (int) (expiryDuration.getMillis() - min.getMillis());
    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() - max.getMillis());
    assertExpirationCallbackScheduleTime(pre, expiryDuration.millis(), latestValidTriggerDelay,
                                         earliestValidTriggerDelay);
}

public void testPostExpirationScheduleTime() throws Exception {
    TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
    TimeValue min = TimeValue.timeValueSeconds(1);
    TimeValue max = TimeValue.timeValueSeconds(4);
    TimeValue frequency = TimeValue.timeValueSeconds(1);
    NoopPostExpirationCallback pre = new NoopPostExpirationCallback(min, max, frequency);
    int latestValidTriggerDelay = (int) (expiryDuration.getMillis() + max.getMillis());
    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() + min.getMillis());
    assertExpirationCallbackScheduleTime(pre, expiryDuration.millis(), latestValidTriggerDelay,
                                         earliestValidTriggerDelay);
}

private void assertExpirationCallbackDelay(ExpirationCallback expirationCallback, long expiryDuration,
                                           int latestValidTriggerDelay, int earliestValidTriggerDelay) {
    long now = System.currentTimeMillis();
    long expiryDate = now + expiryDuration;
    // bounds
    assertThat(expirationCallback.delay(expiryDate, now + earliestValidTriggerDelay),
                equalTo(TimeValue.timeValueMillis(0)));
    assertThat(expirationCallback.delay(expiryDate, now + latestValidTriggerDelay),
                equalTo(TimeValue.timeValueMillis(0)));
    // in match
    assertThat(expirationCallback.delay(expiryDate,
                                         now + randomIntBetween(earliestValidTriggerDelay, latestValidTriggerDelay)),
                equalTo(TimeValue.timeValueMillis(0)));
    // out of bounds
    int deltaBeforeEarliestMatch = between(1, earliestValidTriggerDelay);
    assertThat(expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch),
                equalTo(TimeValue.timeValueMillis(earliestValidTriggerDelay - deltaBeforeEarliestMatch)));
    int deltaAfterLatestMatch = between(latestValidTriggerDelay + 1, Integer.MAX_VALUE); // after expiry and after max
    assertThat(expirationCallback.delay(expiryDate, expiryDate + deltaAfterLatestMatch), nullValue());
}

public void assertExpirationCallbackScheduleTime(ExpirationCallback expirationCallback, long expiryDuration,
                                                   int latestValidTriggerDelay, int earliestValidTriggerDelay) {
long now = System.currentTimeMillis();
long expiryDate = now + expiryDuration;
int validTriggerInterval = between(earliestValidTriggerDelay, latestValidTriggerDelay);
assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
    now + validTriggerInterval, now + validTriggerInterval),
    equalTo(now + validTriggerInterval));
assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now + validTriggerInterval),
    equalTo(now + validTriggerInterval + expirationCallback.getFrequency()));

int deltaBeforeEarliestMatch = between(1, earliestValidTriggerDelay - 1);
assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now +
    deltaBeforeEarliestMatch),
    equalTo(now + deltaBeforeEarliestMatch +
        expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch).getMillis()));
assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now + deltaBeforeEarliestMatch +
    expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch).getMillis()));

int deltaAfterLatestMatch = between(latestValidTriggerDelay + 1, Integer.MAX_VALUE); // after expiry and after max
assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now + deltaAfterLatestMatch),
    equalTo(-1L));
assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now + deltaAfterLatestMatch, now + deltaAfterLatestMatch),
    equalTo(-1L));

private static class NoopPostExpirationCallback extends ExpirationCallback.Post {

    NoopPostExpirationCallback(TimeValue min, TimeValue max, TimeValue frequency) {
        super(min, max, frequency);
    }

    @Override
    public void on(License license) {}  
}

private static class NoopPreExpirationCallback extends ExpirationCallback.Pre {

    NoopPreExpirationCallback(TimeValue min, TimeValue max, TimeValue frequency) {
        super(min, max, frequency);
    }

    @Override
    public void on(License license) {}  
}
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.support.PlainActionFuture;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.common.unit.TimeValue;
import java.net.InetAddress;
import static java.util.Collections.emptyMap;
import static java.util.Collections.emptySet;
import static org.hamcrest.Matchers.containsString;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;

public class LicenseTLSTests extends AbstractLicenseServiceTestCase {

    private InetAddress inetAddress;

    public void testApplyLicenseInDevMode() throws Exception {
        License newLicense = TestUtils.generateSignedLicense(randomFrom("gold", "platinum"),
        TimeValue.timeValueHours(24L));
        PutLicenseRequest request = new PutLicenseRequest();
        request.acknowledge(true);
        request.license(newLicense);
        Settings settings = Settings.builder().put("xpack.security.enabled", true).build();
        XPackLicenseState licenseState = new XPackLicenseState(settings);
        inetAddress = InetAddress.getLoopbackAddress();
        setInitialState(null, licenseState, settings);
        licenseService.start();
        PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
        licenseService.registerLicense(request, responseFuture);
        verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
        inetAddress = TransportAddress.META_ADDRESS;
        settings = Settings.builder().put("xpack.security.enabled", true)
        .put("discovery.type", "single-node")
.build();
licenseService.stop();
licenseState = new XPackLicenseState(settings);
setInitialState(null, licenseState, settings);
licenseService.start();
licenseService.registerLicense(request, responseFuture);
verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

public void testApplyLicenseInProdMode() throws Exception {
    final String licenseType = randomFrom("GOLD", "PLATINUM");
    License newLicense = TestUtils.generateSignedLicense(licenseType, TimeValue.timeValueHours(24L));
    PutLicenseRequest request = new PutLicenseRequest();
    request.acknowledge(true);
    request.license(newLicense);
    Settings settings = Settings.builder().put("xpack.security.enabled", true).build();
    XPackLicenseState licenseState = new XPackLicenseState(settings);
    inetAddress = TransportAddress.META_ADDRESS;
    setInitialState(null, licenseState, settings);
    licenseService.start();
    PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
    IllegalStateException e = expectThrows(IllegalStateException.class, () ->
        licenseService.registerLicense(request, responseFuture));
    assertThat(e.getMessage(),
        containsString("Cannot install a \" + licenseType + \" license unless TLS is configured or security is disabled\")));

    settings = Settings.builder().put("xpack.security.enabled", false).build();
    licenseService.stop();
    licenseState = new XPackLicenseState(settings);
    setInitialState(null, licenseState, settings);
    licenseService.start();
    licenseService.registerLicense(request, responseFuture);
    verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

    settings = Settings.builder()
        .put("xpack.security.enabled", true)
        .put("xpack.security.transport.ssl.enabled", true)
        .build();
    licenseService.stop();
    licenseState = new XPackLicenseState(settings);
    setInitialState(null, licenseState, settings);
    licenseService.start();
    licenseService.registerLicense(request, responseFuture);
    verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}
```java
@Override
protected DiscoveryNode getLocalNode()
{
    return new DiscoveryNode("localnode", new TransportAddress(inetAddress, randomIntBetween(9300, 9399)),
                           emptyMap(), emptySet(), Version.CURRENT);
}

/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionFuture;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESSingleNodeTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import java.nio.charset.StandardCharsets;
import java.util.Collection;
import java.util.Collections;
import java.util.UUID;
import static org.elasticsearch.license.TestUtils.dateMath;
import static org.elasticsearch.license.TestUtils.generateExpiredNonBasicLicense;
import static org.elasticsearch.license.TestUtils.generateSignedLicense;
import static org.hamcrest.CoreMatchers.equalTo;
import static org.hamcrest.CoreMatchers.not;

public class LicensesTransportTests extends ESSingleNodeTestCase {

    @Override
    protected boolean resetNodeAfterTest() {
        return true;
    }

    @Override
    protected Collection<Class<? extends Plugin>> getPlugins() {
        return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
    }

    @Override
    public void testGetLicenses() {
        // Test code...
    }

    @Override
    public void testGetExpiredLicenses() {
        // Test code...
    }

    @Override
    public void testGetSignedLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicExpiredLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicSignedLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicExpiredNonBasicLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicSignedNonBasicLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicExpiredNonBasicSignedLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicSignedExpiredNonBasicLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicExpiredNonBasicSignedExpiredNonBasicLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicSignedExpiredNonBasicSignedNonBasicLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicExpiredNonBasicSignedExpiredNonBasicSignedNonBasicLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicSignedExpiredNonBasicSignedExpiredNonBasicSignedNonBasicLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicExpiredNonBasicSignedExpiredNonBasicSignedExpiredNonBasicSignedNonBasicLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicSignedExpiredNonBasicSignedExpiredNonBasicSignedExpiredNonBasicSignedNonBasicLicenses() {
        // Test code...
    }

    @Override
    public void testGetNonBasicExpiredNonBasicSignedExpiredNonBasicSignedExpiredNonBasicSignedExpiredNonBasicSignedNonBasicLicenses() {
        // Test code...
    }
```

protected Settings nodeSettings() {
    Settings.Builder newSettings = Settings.builder();
    newSettings.put(super.nodeSettings());
    newSettings.put(XPackSettings.SECURITY_ENABLED.getKey(), false);
    // newSettings.put(XPackSettings.MONITORING_ENABLED.getKey(), false);
    // newSettings.put(XPackSettings.WATCHER_ENABLED.getKey(), false);
    newSettings.put(Node.NODE_DATA_SETTING.getKey(), true);
    return newSettings.build();
}

public void testEmptyGetLicense() throws Exception {
    // basic license is added async, we should wait for it
    assertBusy(() -> {
        try {
            final ActionFuture<GetLicenseResponse> getLicenseFuture =
                    new GetLicenseRequestBuilder(client().admin().cluster(), GetLicenseAction.INSTANCE).execute();
            final GetLicenseResponse getLicenseResponse;
            getLicenseResponse = getLicenseFuture.get();
            assertNotNull(getLicenseResponse.license());
            assertThat(getLicenseResponse.license().operationMode(), equalTo(License.OperationMode.BASIC));
        } catch (Exception e) {
            throw new RuntimeException("unexpected exception", e);
        }
    });
}

public void testPutLicense() throws Exception {
    License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));
    // put license
    PutLicenseRequestBuilder putLicenseRequestBuilder =
            new PutLicenseRequestBuilder(client().admin().cluster(), PutLicenseAction.INSTANCE).setLicense(signedLicense)
                    .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
    // get and check license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
            GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(signedLicense));
}

public void testPutLicenseFromString() throws Exception {
    License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));
    String licenseString = TestUtils.dumpLicense(signedLicense);
// put license source
PutLicenseRequestBuilder putLicenseRequestBuilder =
    new PutLicenseRequestBuilder(client().admin().cluster(), PutLicenseAction.INSTANCE)
    .setLicense(new BytesArray(licenseString.getBytes(StandardCharsets.UTF_8)),
        XContentType.JSON)
    .setAcknowledge(true);
PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));

// get and check license
GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
    GetLicenseAction.INSTANCE).get();
assertThat(getLicenseResponse.license(), equalTo(signedLicense));
}

public void testPutInvalidLicense() throws Exception {
    License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));

    // modify content of signed license
    License tamperedLicense = License.builder()
        .fromLicenseSpec(signedLicense, signedLicense.signature())
        .expiryDate(signedLicense.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
        .validate()
        .build();

    PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
        PutLicenseAction.INSTANCE);
    builder.setLicense(tamperedLicense);
    // try to put license (should be invalid)
    final PutLicenseResponse putLicenseResponse = builder.get();
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.INVALID));

    // try to get invalid license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
        GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), not(tamperedLicense));
}

public void testPutBasicLicenseIsInvalid() throws Exception {
    License signedLicense = generateSignedLicense("basic", License.VERSION_CURRENT, -1,
        TimeValue.timeValueMinutes(2));

    PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
        PutLicenseAction.INSTANCE);
    builder.setLicense(signedLicense);

    // try to put license (should be invalid)
    final PutLicenseResponse putLicenseResponse = builder.get();
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.INVALID));

    // try to get invalid license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
        GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), not(signedLicense));
}
try to put license (should be invalid)
IllegalArgumentException iae = expectThrows(IllegalArgumentException.class, builder::get);
assertEquals(iae.getMessage(), "Registering basic licenses is not allowed.");

try to get invalid license
GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
assertThat(getLicenseResponse.license(), not(signedLicense));
}

public void testPutExpiredLicense() throws Exception {
License expiredLicense = generateExpiredNonBasicLicense();
PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
builder.setLicense(expiredLicense);
PutLicenseResponse putLicenseResponse = builder.get();
assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.EXPIRED));
// get license should not return the expired license
GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
assertThat(getLicenseResponse.license(), not(expiredLicense));
}

public void testPutLicensesSimple() throws Exception {
License goldSignedLicense = generateSignedLicense("gold", TimeValue.timeValueMinutes(5));
PutLicenseRequestBuilder putLicenseRequestBuilder =
new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(goldSignedLicense)
.setAcknowledge(true);
PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
assertThat(getLicenseResponse.license(), equalTo(goldSignedLicense));
License platinumSignedLicense = generateSignedLicense("platinum", TimeValue.timeValueMinutes(2));
putLicenseRequestBuilder.setLicense(platinumSignedLicense);
putLicenseResponse = putLicenseRequestBuilder.get();
assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
assertThat(getLicenseResponse.license(), equalTo(platinumSignedLicense));
}

public void testRemoveLicensesSimple() throws Exception {
License goldLicense = generateSignedLicense("platinum", TimeValue.timeValueMinutes(5));
PutLicenseRequestBuilder putLicenseRequestBuilder =

new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(goldLicense)
.setAcknowledge(true);
PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
assertThat(getLicenseResponse.license(), equalTo(goldLicense));
// delete all licenses
DeleteLicenseRequestBuilder deleteLicenseRequestBuilder =
new DeleteLicenseRequestBuilder(client().admin().cluster(), DeleteLicenseAction.INSTANCE);
DeleteLicenseResponse deleteLicenseResponse = deleteLicenseRequestBuilder.get();
assertThat(deleteLicenseResponse.isAcknowledged(), equalTo(true));
// get licenses (expected no licenses)
getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
assertNull(getLicenseResponse.license());
}

public void testLicenseIsRejectWhenStartDateLaterThanNow() throws Exception {
    long now = System.currentTimeMillis();
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(License.VERSION_CURRENT)
        .expiryDate(dateMath("now+2h", now))
        .startDate(dateMath("now+1h", now))
        .issueDate(now)
        .type(License.OperationMode.TRIAL.toString())
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    License license = TestUtils.generateSignedLicense(builder);
    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(license)
            .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.INVALID));
}

public void testLicenseIsAcceptedWhenStartDateBeforeThanNow() throws Exception {
    long now = System.currentTimeMillis();
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(License.VERSION_CURRENT)
License license = TestUtils.generateSignedLicense(builder);

PutLicenseRequestBuilder putLicenseRequestBuilder =
    new PutLicenseRequestBuilder(client().admin().cluster(),
    PutLicenseAction.INSTANCE).setLicense(license)
    .setAcknowledge(true);
PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
}
*/
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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.common.settings.Settings;
import static org.elasticsearch.common.unit.TimeValue.timeValueHours;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;
public class LicensesAcknowledgementTests extends AbstractLicenseServiceTestCase {

    public void testAcknowledgment() throws Exception {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        setInitialState(TestUtils.generateSignedLicense("gold", timeValueHours(2)), licenseState, Settings.EMPTY);
        licenseService.start();
        // try installing a signed license
        long issueDate = System.currentTimeMillis() - TimeValue.timeValueHours(24 * 2).getMillis();
        License signedLicense = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, issueDate,
            timeValueHours(10));
        PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
// ensure acknowledgement message was part of the response
licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true));
assertThat(licenseService.getLicense(), not(signedLicense));
verify(clusterService, times(0)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

// try installing a signed license with acknowledgement
putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
// ensure license was installed and no acknowledgement message was returned
licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

public void testRejectUpgradeToProductionWithoutTLS() throws Exception {
XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.EMPTY);
licenseService.start();
// try installing a signed license
License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
// ensure acknowledgement message was part of the response
IllegalStateException ise = expectThrows(IllegalStateException.class, () ->
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true)));
assertEquals("Cannot install a [PLATINUM] license unless TLS is configured or security is disabled",
ise.getMessage());
}

public void testUpgradeToProductionWithoutTLSAndSecurityDisabled() throws Exception {
XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.builder()
    .put("xpack.security.enabled", false).build());
licenseService.start();
// try installing a signed license
License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true));
assertThat(licenseService.getLicense(), not(signedLicense));
verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
// try installing a signed license with acknowledgement
putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
// ensure license was installed and no acknowledgment message was returned
licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
public void testUpgradeToProductionWithTLSAndSecurity() throws Exception {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.builder()
            .put("xpack.security.enabled", true)
            .put("xpack.security.transport.ssl.enabled", true).build());
    licenseService.start();
    // try installing a signed license
    License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
    LicensesStatus.VALID, true));
    assertThat(licenseService.getLicense(), not(signedLicense));
    verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

    // try installing a signed license with acknowledgement
    putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
    // ensure license was installed and no acknowledgment message was returned
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
    LicensesStatus.VALID, false));
    verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

private static class AssertingLicensesUpdateResponse implements ActionListener<PutLicenseResponse> {
    private final boolean expectedAcknowledgement;
    private final LicensesStatus expectedStatus;
    private final boolean expectAckMessages;

    AssertingLicensesUpdateResponse(boolean expectedAcknowledgement, LicensesStatus expectedStatus,
    boolean expectAckMessages) {
        this.expectedAcknowledgement = expectedAcknowledgement;
        this.expectedStatus = expectedStatus;
        this.expectAckMessages = expectAckMessages;
    }

    @Override
    public void onResponse(PutLicenseResponse licensesUpdateResponse) {
        assertThat(licensesUpdateResponse.isAcknowledged(), equalTo(expectedAcknowledgement));
        assertThat(licensesUpdateResponse.status(), equalTo(expectedStatus));
        assertEquals(licensesUpdateResponse.acknowledgeMessages().isEmpty(), expectAckMessages == false);
    }

    @Override
    public void onFailure(Exception throwable) {
        throw new RuntimeException(throwable);
    }
}

private static class AssertingLicensesUpdateResponse implements ActionListener<PutLicenseResponse> {
    private final boolean expectedAcknowledgement;
    private final LicensesStatus expectedStatus;
    private final boolean expectAckMessages;

    AssertingLicensesUpdateResponse(boolean expectedAcknowledgement, LicensesStatus expectedStatus,
    boolean expectAckMessages) {
        this.expectedAcknowledgement = expectedAcknowledgement;
        this.expectedStatus = expectedStatus;
        this.expectAckMessages = expectAckMessages;
    }

    @Override
    public void onResponse(PutLicenseResponse licensesUpdateResponse) {
        assertThat(licensesUpdateResponse.isAcknowledged(), equalTo(expectedAcknowledgement));
        assertThat(licensesUpdateResponse.status(), equalTo(expectedStatus));
        assertEquals(licensesUpdateResponse.acknowledgeMessages().isEmpty(), expectAckMessages == false);
    }

    @Override
    public void onFailure(Exception throwable) {
        throw new RuntimeException(throwable);
    }
}
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灸/
灸package org.elasticsearch.license;

灸import org.elasticsearch.Version;
灸import org.elasticsearch.cluster.ClusterName;
灸import org.elasticsearch.cluster.ClusterState;
灸import org.elasticsearch.cluster.block.ClusterBlocks;
灸import org.elasticsearch.cluster.metadata.MetaData;
灸import org.elasticsearch.cluster.node.DiscoveryNode;
灸import org.elasticsearch.cluster.node.DiscoveryNodes;
灸import org.elasticsearch.cluster.service.ClusterService;
灸import org.elasticsearch.common.component.Lifecycle;
灸import org.elasticsearch.common.settings.Settings;
灸import org.elasticsearch.env.Environment;
灸import org.elasticsearch.test.ESTestCase;
灸import org.elasticsearch.watcher.ResourceWatcherService;
灸import org.elasticsearch.xpack.core.XPackPlugin;
灸import org.elasticsearch.xpack.core.watcher.watch.ClockMock;
灸import org.junit.After;
灸import org.junit.Before;
灸import java.nio.file.Path;
灸import java.util.Arrays;

灸import static java.util.Collections.emptySet;
灸import static java.util.Collections.singletonMap;
灸import static org.mockito.Mockito.mock;
灸import static org.mockito.Mockito.when;

灸public abstract class AbstractLicenseServiceTestCase extends ESTestCase {

灸 protected LicenseService licenseService;
灸 protected ClusterService clusterService;
灸 protected ResourceWatcherService resourceWatcherService;
灸 protected ClockMock clock;
灸 protected DiscoveryNodes discoveryNodes;
灸 protected Environment environment;
灸 protected String licenseType;

灸@Before
灸public void init() throws Exception {
灸
clock = ClockMock.frozen();

灸}
discoveryNodes = mock(DiscoveryNodes.class);
resourceWatcherService = mock(ResourceWatcherService.class);
environment = mock(Environment.class);
}

protected void setInitialState(License license, XPackLicenseState licenseState, Settings settings) {
    setInitialState(license, licenseState, settings, randomBoolean() ? "trial" : "basic");
}

protected void setInitialState(License license, XPackLicenseState licenseState, Settings settings, String selfGeneratedType) {
    Path tempDir = createTempDir();
    when(environment.configFile()).thenReturn(tempDir);
    licenseType = selfGeneratedType;
    settings = Settings.builder().put(settings).put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(), licenseType).build();
    licenseService = new LicenseService(settings, clusterService, clock, environment, resourceWatcherService, licenseState);
    ClusterState state = mock(ClusterState.class);
    final ClusterBlocks noBlock = ClusterBlocks.builder().build();
    when(state.blocks()).thenReturn(noBlock);
    MetaData metaData = mock(MetaData.class);
    when(metaData.custom(LicensesMetaData.TYPE)).thenReturn(new LicensesMetaData(license, null));
    when(state.metaData()).thenReturn(metaData);
    final DiscoveryNode mockNode = getLocalNode();
    when(discoveryNodes.getMasterNode()).thenReturn(mockNode);
    when(discoveryNodes.spliterator()).thenReturn(Arrays.asList(mockNode).spliterator());
    when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(false);
    when(state.nodes()).thenReturn(discoveryNodes); // it is really ridiculous we have nodes() and getNodes()...
    when(clusterService.state()).thenReturn(state);
    when(clusterService.lifecycleState()).thenReturn(Lifecycle.State.STARTED);
    when(clusterService.getClusterName()).thenReturn(new ClusterName("a"));
    when(clusterService.localNode()).thenReturn(mockNode);
}

protected DiscoveryNode getLocalNode() {
    return new DiscoveryNode("b", buildNewFakeTransportAddress(),
                        singletonMap(XPackPlugin.XPACK_INSTALLED_NODE_ATTR, "true"),
                        emptySet(), Version.CURRENT);
}

@After
public void tearDown() throws Exception {
    super.tearDown();
    licenseService.stop();
}
package org.elasticsearch.license;

import org.elasticsearch.action.support.PlainActionFuture;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import static org.hamcrest.Matchers.containsString;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.verify;

public class LicenseFIPSTests extends AbstractLicenseServiceTestCase {
    
    public void testFIPSCheckWithAllowedLicense() throws Exception {
        License newLicense = TestUtils.generateSignedLicense(randomFrom("trial", "platinum"),
                TimeValue.timeValueHours(24L));
        PutLicenseRequest request = new PutLicenseRequest();
        request.acknowledge(true);
        request.license(newLicense);
        Settings settings = Settings.builder()
                .put("xpack.security.enabled", true)
                .put("xpack.security.transport.ssl.enabled", true)
                .put("xpack.security.fips_mode.enabled", randomBoolean())
                .build();
        XPackLicenseState licenseState = new XPackLicenseState(settings);
        setInitialState(null, licenseState, settings);
        licenseService.start();
        PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
        licenseService.registerLicense(request, responseFuture);
        verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
    }

    public void testFIPSCheckWithoutAllowedLicense() throws Exception {
        License newLicense = TestUtils.generateSignedLicense(randomFrom("gold", "standard"),
                TimeValue.timeValueHours(24L));
        PutLicenseRequest request = new PutLicenseRequest();
        request.acknowledge(true);
        request.license(newLicense);
        Settings settings = Settings.builder()
                .put("xpack.security.enabled", true)
                .build();
        XPackLicenseState licenseState = new XPackLicenseState(settings);

        setInitialState(null, licenseState, settings);
        licenseService.start();
        PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
        licenseService.registerLicense(request, responseFuture);
        verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
    }
}
.put("xpack.security.transport.ssl.enabled", true)
.put("xpack.security.fips_mode.enabled", true)
.build();
XPackLicenseState licenseState = new XPackLicenseState(settings);

setInitialState(null, licenseState, settings);
licenseService.start();
PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
IllegalStateException e = expectThrows(IllegalStateException.class, () ->
licenseService.registerLicense(request, responseFuture));
assertThat(e.getMessage(),
  containsString("Cannot install a \[" + newLicense.operationMode() + "] license unless FIPS mode is
disabled");)
licenseService.stop();

settings = Settings.builder()
  .put("xpack.security.enabled", true)
  .put("xpack.security.transport.ssl.enabled", true)
  .put("xpack.security.fips_mode.enabled", false)
  .build();
licenseState = new XPackLicenseState(settings);

setInitialState(null, licenseState, settings);
licenseService.start();
licenseService.registerLicense(request, responseFuture);
verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}
}

package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterChangedEvent;
import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.cluster.UpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.junit.After;
import org.junit.Before;
import org.mockito.ArgumentCaptor;
import static java.util.Collections.emptyList;
import static java.util.Collections.emptySet;
import static org.hamcrest.Matchers.equalTo;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.when;

public class LicenseClusterChangeTests extends AbstractLicenseServiceTestCase {

    private TestUtils.AssertingLicenseState licenseState;

    @Before
    public void setup() {
        licenseState = new TestUtils.AssertingLicenseState();
        setInitialState(null, licenseState, Settings.EMPTY);
        licenseService.start();
    }

    @After
    public void teardown() {
        licenseService.stop();
    }

    public void testNotificationOnNewLicense() throws Exception {
        ClusterState oldState = ClusterState.builder(new ClusterName("a")).build();
        final License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(24));
        MetaData metaData = MetaData.builder().putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null)).build();
        ClusterState newState = ClusterState.builder(new ClusterName("a")).metaData(metaData).build();
        licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
        assertThat(licenseState.activeUpdates.size(), equalTo(1));
        assertTrue(licenseState.activeUpdates.get(0));
    }

    public void testNoNotificationOnExistingLicense() throws Exception {
        final License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(24));
        MetaData metaData = MetaData.builder().putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null)).build();
        ClusterState newState = ClusterState.builder(new ClusterName("a")).metaData(metaData).build();
        ClusterState oldState = ClusterState.builder(newState).build();
        licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
        assertThat(licenseState.activeUpdates.size(), equalTo(0));
        assertTrue(licenseState.activeUpdates.get(0));
    }

    public void testSelfGeneratedLicenseGeneration() throws Exception {
DiscoveryNode master = new DiscoveryNode("b", buildNewFakeTransportAddress(), emptyMap(), emptySet(), Version.CURRENT);
ClusterState oldState = ClusterState.builder(new ClusterName("a"))
 .nodes(DiscoveryNodes.builder().masterNodeId(master.getId()).add(master)).build();
when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
ClusterState newState = ClusterState.builder(oldState).nodes(discoveryNodes).build();
licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
verify(clusterService, times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
ClusterState stateWithLicense = stateUpdater.getValue().execute(newState);
LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
assertNotNull(licenseMetaData);
assertNotNull(licenseMetaData.getLicense());
assertEquals(licenseType, licenseMetaData.getLicense().type());
long expiration;
if (licenseType.equals("basic")) {
    expiration = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
} else {
    expiration = LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.millis() +
    clock.millis();
}
assertEquals(expiration, licenseMetaData.getLicense().expiryDate());
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*/
package org.elasticsearch.xpack.core.security.authz.permission;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.test.ESTestCase;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
public class FieldPermissionsCacheTests extends ESTestCase {

    public void testFieldPermissionsCaching() {
        FieldPermissionsCache fieldPermissionsCache = new FieldPermissionsCache(Settings.EMPTY);
        String[] allowed = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*",
            randomAlphaOfLength(5) + "*"};
        String[] denied = new String[]{allowed[0] + randomAlphaOfLength(5), allowed[1] +
            randomAlphaOfLength(5) + "*"};

        fieldPermissionsCache.addAll(allowed);
        fieldPermissionsCache.addAll(denied);
        fieldPermissionsCache.addAll(allowed);
        fieldPermissionsCache.addAll(denied);
        fieldPermissionsCache.addAll(allowed);
        fieldPermissionsCache.addAll(denied);
        fieldPermissionsCache.addAll(allowed);
        fieldPermissionsCache.addAll(denied);

        List<String> permissions = fieldPermissionsCache.getPermissions();
        List<String> deniedPermissions = fieldPermissionsCache.getDeniedPermissions();

        assertEquals(allowed, permissions);
        assertEquals(denied, deniedPermissions);
    }
}
randomAlphaOfLength(5),
allowed[2] + randomAlphaOfLength(5)};
FieldPermissions fieldPermissions = fieldPermissionsCache.getFieldPermissions(allowed, denied);
assertNotNull(fieldPermissions);
final String[] allowed2 = randomBoolean() ? allowed : Arrays.copyOf(allowed, allowed.length);
final String[] denied2 = randomBoolean() ? denied : Arrays.copyOf(denied, denied.length);
assertSame(fieldPermissions, fieldPermissionsCache.getFieldPermissions(allowed2, denied2));
}
public void testMergeFieldPermissions() {
FieldPermissionsCache fieldPermissionsCache = new FieldPermissionsCache(Settings.EMPTY);
String allowedPrefix1 = randomAlphaOfLength(5);
String allowedPrefix2 = randomAlphaOfLength(5);
String[] allowed1 = new String[]{allowedPrefix1 + "*"};
String[] allowed2 = new String[]{allowedPrefix2 + "*"};
String[] denied1 = new String[]{allowedPrefix1 + "a"};
String[] denied2 = new String[]{allowedPrefix2 + "a"};
FieldPermissions fieldPermissions1 = randomBoolean() ?
fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
new FieldPermissions(fieldPermissionDef(allowed1, denied1));
FieldPermissions fieldPermissions2 = randomBoolean() ?
fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
new FieldPermissions(fieldPermissionDef(allowed2, denied2));
FieldPermissions mergedFieldPermissions =
fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(mergedFieldPermissions.grantsAccessTo(allowedPrefix1 + "b"));
assertTrue(mergedFieldPermissions.grantsAccessTo(allowedPrefix2 + "b"));
assertFalse(mergedFieldPermissions.grantsAccessTo(denied1[0]));
assertFalse(mergedFieldPermissions.grantsAccessTo(denied2[0]));
allowed1 = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*"};
allowed2 = null;
denied1 = new String[]{allowed1[0] + "a", allowed1[1] + "a"};
denied2 = null;
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertFalse(mergedFieldPermissions.hasFieldLevelSecurity());
allowed1 = new String[]{};
allowed2 = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*"};
denied1 = new String[]{};
denied2 = new String[]{allowed2[0] + "a", allowed2[1] + "a"};
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
new FieldPermissions(fieldPermissionDef(allowed1, denied1));

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fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) : 
new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
for (String field : allowed2) {
    assertTrue(mergedFieldPermissions.grantsAccessTo(field));
}
for (String field : denied2) {
    assertFalse(mergedFieldPermissions.grantsAccessTo(field));
}
allowed1 = randomBoolean() ? null : new String["*"];
allowed2 = randomBoolean() ? null : new String["*"];
denied1 = new String["a"];
denied2 = new String["b"];
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) : 
new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) : 
new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(mergedFieldPermissions.grantsAccessTo("a"));
assertTrue(mergedFieldPermissions.grantsAccessTo("b"));

// test merge does not remove _all
allowed1 = new String["_*_"];
allowed2 = new String[{}];
denied1 = null;
denied2 = null;
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) : 
new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) : 
new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(fieldPermissions1.grantsAccessTo("_*_"));
assertFalse(fieldPermissions2.grantsAccessTo("_*_"));
assertTrue(mergedFieldPermissions.grantsAccessTo("_*_"));

allowed1 = new String[ { "a*" } ];
allowed2 = new String[ { "b*" } ];
denied1 = new String[ { "aa*" } ];
denied2 = null;
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) : 
new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) : 
new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(mergedFieldPermissions.grantsAccessTo("a"));
assertTrue(mergedFieldPermissions.grantsAccessTo("b"));
assertFalse(mergedFieldPermissions.grantsAccessTo("aa"));
assertFalse(mergedFieldPermissions.grantsAccessTo("aa1"));
assertTrue(mergedFieldPermissions.grantsAccessTo("a1"));
}

public void testNonFlsAndFlsMerging() {
    List<FieldPermissions> permissionsList = new ArrayList<>();
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] {"field1"}, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] {"field2", "query*"}, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] {"field1", "field2"}, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] {}, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(null, null)));

    FieldPermissionsCache cache = new FieldPermissionsCache(Settings.EMPTY);
    for (int i = 0; i < scaledRandomIntBetween(1, 12); i++) {
        Collections.shuffle(permissionsList, random());
        FieldPermissions result = cache.getFieldPermissions(permissionsList);
        assertFalse(result.hasFieldLevelSecurity());
    }
}

private static FieldPermissionsDefinition fieldPermissionDef(String[] granted, String[] denied) {
    return new FieldPermissionsDefinition(granted, denied);
}

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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.common.collect.Tuple;
import org.elasticsearch.common.util.set.Sets;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.security.authz.privilege.ApplicationPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.ApplicationPrivilegeDescriptor;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
import static java.util.Collections.singletonList;
import static org.hamcrest.Matchers.equalTo;

import java.util.List;
import java.util.Arrays;
public class ApplicationPermissionTests extends ESTestCase {

    private List<ApplicationPrivilegeDescriptor> store = new ArrayList<>();

    private ApplicationPrivilege app1All = storePrivilege("app1", "all", "*");
    private ApplicationPrivilege app1Empty = storePrivilege("app1", "empty");
    private ApplicationPrivilege app1Read = storePrivilege("app1", "read", "read/*");
    private ApplicationPrivilege app1Write = storePrivilege("app1", "write", "write/*");
    private ApplicationPrivilege app1Delete = storePrivilege("app1", "delete", "write/delete");
    private ApplicationPrivilege app1Create = storePrivilege("app1", "create", "write/create");
    private ApplicationPrivilege app2Read = storePrivilege("app2", "read", "read/*");

    private ApplicationPrivilege storePrivilege(String app, String name, String... patterns) {
        store.add(new ApplicationPrivilegeDescriptor(app, name, Sets.newHashSet(patterns), Collections.emptyMap()));
        return new ApplicationPrivilege(app, name, patterns);
    }

    public void testCheckSimplePermission() {
        final ApplicationPermission hasPermission = buildPermission(app1Write, "*");
        assertThat(hasPermission.grants(app1Write, "*"), equalTo(true));
        assertThat(hasPermission.grants(app1Write, "foo"), equalTo(true));
        assertThat(hasPermission.grants(app1Delete, "*"), equalTo(true));
        assertThat(hasPermission.grants(app1Create, "foo"), equalTo(true));
        assertThat(hasPermission.grants(app1Read, "*"), equalTo(false));
        assertThat(hasPermission.grants(app1Read, "foo"), equalTo(false));
        assertThat(hasPermission.grants(app1All, "*"), equalTo(false));
        assertThat(hasPermission.grants(app1All, "foo"), equalTo(false));
    }

    public void testNonePermission() {
        final ApplicationPermission hasPermission = buildPermission(ApplicationPrivilege.NONE.apply("app1"), "*");
        for (ApplicationPrivilege privilege : Arrays.asList(app1All, app1Empty, app1Create, app1Delete, app1Read, app1Write, app2Read)) {
            assertThat("Privilege " + privilege + " on ", hasPermission.grants(privilege, "*"), equalToF(true));
            final String resource = randomAlphaOfLengthBetween(1, 6);
            assertThat("Privilege " + privilege + ", resource, hasPermission.grants(privilege, resource), equalToF(false));
        }
    }

    public void testResourceMatching() {
        final ApplicationPermission hasPermission = buildPermission(app1All, "dashboard/*", "audit/*", "user/12345");

        assertThat(hasPermission.grants(app1Write, "*"), equalToF(false));
    }
}
assertThat(hasPermission.grants(app1Write, "dashboard"), equalTo(false));
assertThat(hasPermission.grants(app1Write, "dashboard/999"), equalTo(true));

assertThat(hasPermission.grants(app1Create, "audit/2018-02-21"), equalTo(true));
assertThat(hasPermission.grants(app1Create, "report/2018-02-21"), equalTo(false));

assertThat(hasPermission.grants(app1Read, "user/12345"), equalTo(true));
assertThat(hasPermission.grants(app1Read, "user/67890"), equalTo(false));

assertThat(hasPermission.grants(app1All, "dashboard/999"), equalTo(true));
assertThat(hasPermission.grants(app1All, "audit/2018-02-21"), equalTo(true));
assertThat(hasPermission.grants(app1All, "user/12345"), equalTo(true));
}

class TestActionMatching {
    public void testActionMatching() {
        final ApplicationPermission hasPermission = buildPermission(app1Write, "allow/*");

        final ApplicationPrivilege update = actionPrivilege("app1", "write/update");
        assertThat(hasPermission.grants(update, "allow/1"), equalTo(true));
        assertThat(hasPermission.grants(update, "deny/1"), equalTo(false));

        final ApplicationPrivilege updateCreate = actionPrivilege("app1", "write/update", "write/create");
        assertThat(hasPermission.grants(updateCreate, "allow/1"), equalTo(true));
        assertThat(hasPermission.grants(updateCreate, "deny/1"), equalTo(false));

        final ApplicationPrivilege manage = actionPrivilege("app1", "admin/manage");
        assertThat(hasPermission.grants(manage, "allow/1"), equalTo(false));
        assertThat(hasPermission.grants(manage, "deny/1"), equalTo(false));
    }

    public void testDoesNotMatchAcrossApplications() {
        assertThat(buildPermission(app1Read, "+").grants(app1Read, "123"), equalTo(true));
        assertThat(buildPermission(app1All, "+").grants(app1Read, "123"), equalTo(true));

        assertThat(buildPermission(app1Read, "+").grants(app2Read, "123"), equalTo(false));
        assertThat(buildPermission(app1All, "+").grants(app2Read, "123"), equalTo(false));
    }

    public void testMergedPermissionChecking() {
        final ApplicationPrivilege app1ReadWrite = ApplicationPrivilege.get("app1", Sets.union(app1Read.name(), app1Write.name()), store);
        final ApplicationPermission hasPermission = buildPermission(app1ReadWrite, "allow/*");

        assertThat(hasPermission.grants(app1Read, "allow/1"), equalTo(true));
        assertThat(hasPermission.grants(app1Write, "allow/1"), equalTo(true));
        assertThat(hasPermission.grants(app1Read, "deny/1"), equalTo(false));
        assertThat(hasPermission.grants(app1Write, "deny/1"), equalTo(false));
    }
}
assertThat(hasPermission.grants(app1All, "allow/1"), equalTo(false));
assertThat(hasPermission.grants(app2Read, "allow/1"), equalTo(false));
}

private ApplicationPrivilege actionPrivilege(String appName, String... actions) {
    return ApplicationPrivilege.get(appName, Sets.newHashSet(actions), Collections.emptyList());
}

private ApplicationPermission buildPermission(ApplicationPrivilege privilege, String... resources) {
    return new ApplicationPermission(singletonList(new Tuple<>(privilege, Sets.newHashSet(resources))));
}

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}

"xpack.license.delete": {
"methods": ["DELETE"],
"url": {
"path": "/_xpack/license",
"paths": ["/_xpack/license"],
"parts": {}
},
"body": null
}

"xpack.license.post_start_trial": {
"methods": ["POST"],
"url": {
"path": "/_xpack/license/start_trial",
"paths": ["/_xpack/license/start_trial"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of trial license to generate (default: "trial")"
},
"acknowledge": {
"type": "boolean",
"description": "whether the user has acknowledged acknowledge messages (default: false)"
}
},
"body": null
}

"xpack.license.post_start_basic": {
"methods": ["POST"],
"url": {
"path": "/_xpack/license/start_basic",
"paths": ["/_xpack/license/start_basic"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of basic license to generate (default: "basic")"
},
"acknowledge": {
"type": "boolean",
"description": "whether the user has acknowledged acknowledge messages (default: false)"
}
},
"body": null
}

"xpack.license.get": {
"methods": ["GET"],
"url": {
"path": "/_xpack/license",
"paths": ["/_xpack/license"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of license to get (default: "current")"
},
"acknowledge": {
"type": "boolean",
"description": "whether the user has acknowledged acknowledge messages (default: false)"
}
},
"body": null
}

"xpack.license.update": {
"methods": ["PUT"],
"url": {
"path": "/_xpack/license",
"paths": ["/_xpack/license"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of license to update (default: "current")"
},
"acknowledge": {
"type": "boolean",
"description": "whether the user has acknowledged acknowledge messages (default: false)"
}
},
"body": null
}

"xpack.license.delete": {
"methods": ["DELETE"],
"url": {
"path": "/_xpack/license",
"paths": ["/_xpack/license"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of license to delete (default: "current")"
},
"acknowledge": {
"type": "boolean",
"description": "whether the user has acknowledged acknowledge messages (default: false)"
}
},
"body": null
}

"xpack.license.post_start_trial": {
"methods": ["POST"],
"url": {
"path": "/_xpack/license/start_trial",
"paths": ["/_xpack/license/start_trial"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of trial license to generate (default: "trial")"
}
},
"body": null
}

"xpack.license.post_start_basic": {
"methods": ["POST"],
"url": {
"path": "/_xpack/license/start_basic",
"paths": ["/_xpack/license/start_basic"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of basic license to generate (default: "basic")"
}
},
"body": null
}

"xpack.license.get": {
"methods": ["GET"],
"url": {
"path": "/_xpack/license",
"paths": ["/_xpack/license"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of license to get (default: "current")"
},
"acknowledge": {
"type": "boolean",
"description": "whether the user has acknowledged acknowledge messages (default: false)"
}
},
"body": null
}

"xpack.license.update": {
"methods": ["PUT"],
"url": {
"path": "/_xpack/license",
"paths": ["/_xpack/license"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of license to update (default: "current")"
},
"acknowledge": {
"type": "boolean",
"description": "whether the user has acknowledged acknowledge messages (default: false)"
}
},
"body": null
}

"xpack.license.delete": {
"methods": ["DELETE"],
"url": {
"path": "/_xpack/license",
"paths": ["/_xpack/license"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of license to delete (default: "current")"
},
"acknowledge": {
"type": "boolean",
"description": "whether the user has acknowledged acknowledge messages (default: false)"
}
},
"body": null
}

"xpack.license.post_start_trial": {
"methods": ["POST"],
"url": {
"path": "/_xpack/license/start_trial",
"paths": ["/_xpack/license/start_trial"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of trial license to generate (default: "trial")"
}
},
"body": null
}

"xpack.license.post_start_basic": {
"methods": ["POST"],
"url": {
"path": "/_xpack/license/start_basic",
"paths": ["/_xpack/license/start_basic"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of basic license to generate (default: "basic")"
}
},
"body": null
}

"xpack.license.get": {
"methods": ["GET"],
"url": {
"path": "/_xpack/license",
"paths": ["/_xpack/license"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of license to get (default: "current")"
},
"acknowledge": {
"type": "boolean",
"description": "whether the user has acknowledged acknowledge messages (default: false)"
}
},
"body": null
}

"xpack.license.update": {
"methods": ["PUT"],
"url": {
"path": "/_xpack/license",
"paths": ["/_xpack/license"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of license to update (default: "current")"
},
"acknowledge": {
"type": "boolean",
"description": "whether the user has acknowledged acknowledge messages (default: false)"
}
},
"body": null
}

"xpack.license.delete": {
"methods": ["DELETE"],
"url": {
"path": "/_xpack/license",
"paths": ["/_xpack/license"],
"parts": {
},
"params": {
"type": {
"type": "string",
"description": "The type of license to delete (default: "current")"
},
"acknowledge": {
"type": "boolean",
"description": "whether the user has acknowledged acknowledge messages (default: false)"
}
},
"body": null
}
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teardown:

- do:
  xpack.license.post:
    acknowledge: true
    body: |
      "licenses": [{"uid":"3aa62ffe-36e1-4fad-bfcd-9df8301eb222","type":"trial","issue_date_in_millis":1523456691721,"max_nodes":5,"issued_to":"customer","issuer":"elasticsearch","signature":"AAAAABAAAAA2kWNcuc+DT0rlmYZKAAAAIAo5x6hrsGh1QqqJmy4qgmcEC7gK0U4zQ6q5ZEMhm4jAAABEn6fG9y2VxKBU2T3D5hfh56kzQODCODhr0y2d17ZSIJMRqQ7OywPCWNS1aR33GhbIHKTER0ysML0xMH/gXavhyRvMBndJ0UBKzwqTawSlnxYtcpN8mSBtJ7Ki+uJ1SpAILC2ZP9fnkRLqwxQfITrfrYn7znZgu9DKrOWruiPTObo7jceP8vTK6nWFen7/hCFDQJUFZ0JQvd+ncq7A1PAcGHGnsGfbdMVmAXCQxGWRFrt3cln9/vado+isNhlsPq9mN7gwsvBAKta1FrpH2EXYYfbOspBvUmhgYMgErLgI1k3/CbS0pCWLKOaX1xTMayosdZOjagU3auZXY=","start_date_in_millis":-1}]

---

"Installing and getting license works":

## current license version

- do:
  xpack.license.post:
    acknowledge: true
    body: |
      "licenses": [{"uid":"894371dc-9t49-4997-93cb-80e23776a889","type":"trial","issue_date_in_millis":1411948800000,"max_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"AAAAAgAAAA0FWh0T9njItjQ2qamnAAAABmC9ZN0hjZDBGYnVRxPCOWS5Bh3fjZDAxOWpsbTvoMVZvUzRxIkPsmkaxXZdW51MhlTHnoN1N2XMvRfn4r3JTZEex3R3RRZ0pzU3lobWJKZnQvSEfta0ppTHBkWkpzWZS9Qi9NRMQkvlSRpL0dALaZCS095MXRGN1IlZpYcVVTkPrcFeT2dzhlZmZrdFQrN3JQeGwxbo0UMXz0dDJSERERZTvLOHnoZSBsBwpnZpEphZHBEZhUrTVBxRENNSXnSWWJzZeDdxVnEuzuniWktNWMG5MUTuhQ2plaUoQ1JOUm4MXNu0lSOEhQaVB2azhnuK9QVzhFETOMiJQ0RnXSG53MWk2K055c28zSmRNvKfb2JSQkFLV2VXYmVHNDZ3R0sO2VE1q
bBQYQ5liOHNS5bUeZINWKZSVmZlWEttaSU9wTTJENDVvT1NCYklacUYyK2FrwRW9xa06dldMmmMz5GQ1c3FWOTg2ZUZUCxMq2UZwisXMPJzZlVlZ2d2bDRwUzh6U5pEdENGWFRrXNKNkE9PQAXAAAQBZhvQaVA0trrXgUZLIQhTaTsKTha9C5KVQ6p8ygg1pnsBpZXC18kIXroF0n1bXq611Jwfw5qmmYNiH3hRto9EyaCBAkLk8NXQZ6frkQSpEenBmAYUKZeXXsuBoOkB4amzwC8taAMakzrTeEBtbBog+57cSaU9y37Gkdd+1jXCQrXp+jOEUI7gnXWZvE6oeroLcLct1fYn09kOFC8kKtrbP7SjC6igZIlVHyee74XQ9PRowVaHax737T4U0EdQZX/PlibS/QlWkbBRD5YQ1POYVjTayoltTnWLMxfEccAkATJZLHpbEHST7kZWjrTS6J1dCReJe7a8Vsj/78HXvOly"
}

- match: { license_status: "valid" }

- do:
a license object has 11 attributes
- length: { license: 11 }

# bwc for licenses format
- do:
xpack.license.post:
  acknowledge: true
  body: |
  ["licenses":{"uid":"893361dc-9749-4997-93cb-802e3d7fa4a8","type":"gold","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1914278399999,"max_nodes":1,"issued_to","issued_to","issuer","signature":AAAAAawAAA2T3vqdB8etKQaMgnwAABmcC9Z0hjZDBGYnVyRxPcOW5Bb3fjZDAxOWpSbTvOmvZwUrzVkJ1PSmxakZdW51MhIlTHNoN1N2MXMvRkF4d3JTZex3R3RRZ0pzU3lobWJKZnQvSEFvaoppTHBkWkpzWZSQ9iNmRQNkw1SlpNL0IDLaZC0S095MXRGN11lZrpYcVVTNnFrcTE2dzhJZmZrdFQrN3JqceGwxb0U0MXZ0dDJHSErIZTVLOHNzSDByWnpoZEphZHBHEZJUrTVbXRENNSXNSWjJzZlaOoDzVmEzUJnWktNWGM5tUqH2v2laU04QlJOUl4MXNuL0jSOehQaVB2ahmUk9QVzFhTeFM1qM0RnXG5SMWk2K055c28sSmRnVkJ1b2JSQKFLV2VUXeVHNDZ2R3o2Ve1qBvNQ52lxOHN5bUeZ1NlWkZSVmZIWEtaSU9wTJTjNDv5t1NCYklacUYYK2FwRW9xa0t6dMBmMzS
GtQc3FwOTgZ3ZUCmXyQuk2RUzwMfJnZzLvbL2d2DruWUzh6Ug5pdENGWFReXNNKNe9PQAAABP7GFGYgawfLm9zzT80LvcLHjy1t/v2uSzCQWKdXXhrwSywWj4FrH2uKf+Pei7aEwP5erLy5kLA6OEZJAdPT+mjOPuLt0t+i1j4DmN7ybmOPXWXBc6LETE3+p0GZPyOmwsZKzURegTc0r2R6zmdnGrhOY80y08KvwwhdU/DHw41MK7ePo6tq73Nze9y9d9g9xf0u44gEBPbnnTDBDBVQ2SjAauy8s0Mse9rDDRayw1kAmYWraraaPIGX+2YjhtUeQhmlCplx9wECJ7/knPss5b13ozQ93fxXjcdXNnHElsblqLrMCal3plx7lII+KPYMa2ZYL/am4P")]
- match: { license_status: "valid" }
- do:
xpack.license.get: {}
- length: { license: 11 }

# license version: 1.x
- do:
xpack.license.post:
  acknowledge: true
  body: |
  ["licenses":{"uid":"893361dc-9749-4997-93cb-802e3d7fa4a8","type":"subscription","subscription_type":"gold","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1914278399999,"max_nodes":1,"issued_to","issued_to","issuer","signature":AAAAAawAAA2T3vqdB8etKQaMgnwAABmcC9Z0hjZDBGYnVyRxPcOW5Bb3fjZDAxOWpSbTvOmvZwUrzVkJ1PSmxakZdW51MhIlTHNoN1N2MXMvRkF4d3JTZex3R3RRZ0pzU3lobWJKZnQvSEFvaoppTHBkWkpzWZSQ9iNmRQNkw1SlpNL0IDLaZC0S095MXRGN11lZrpYcVVTNnFrcTE2dzhJZmZrdFQrN3JqceGwxb0U0MXZ0dDJHSErIZTVLOHNzSDByWnpoZEphZHBHEZJUrTVbXRENNSXNSWjJzZlaOoDzVmEzUJnWktNWGM5tUqH2v2laU04QlJOUl4MXNuL0jSOehQaVB2ahmUk9QVzFhTeFM1qM0RnXG5SMWk2K055c28sSmRnVkJ1b2JSQKFLV2VUXeVHNDZ2R3o2Ve1qBvNQ52lxOHN5bUeZ1NlWkZSVmZIWEtaSU9wTJTjNDv5t1NCYklacUYYK2FwRW9xa0t6dMBmMzS
GtQc3FwOTgZ3ZUCmXyQuk2RUzwMfJnZzLvbL2d2
- match: { license_status:  "valid" }
  - do:
    xpack.license.get: {}
- length: { license: 11 }

# multiple licenses version: 1.x
- do:
  xpack.license.post:
    acknowledge: true
    body: |
      {"licenses": [{"uid":"893361dc-9749-4997-93cb-802ed37f4aae","type":"internal","subscription_type":null,"issue_date_in_millis":1411948800000,"feature":"shield","expiry_date_in_millis":1440827999999,"max_nodes":1,"is_valid":true,"is_renewed":false,"is_armed":false,"is_inactive":false,"is_test":false,"is_in_production":true,"is_transferable":true,"is_transfered":false,"signature":null},
       {"uid":"893361dc-9749-4997-93cb-802ed37f4aae","type":"internal","subscription_type":null,"issue_date_in_millis":1443484800000,"feature":"watcher","expiry_date_in_millis":1914278399999,"max_nodes":1,"is_valid":true,"is_renewed":false,"is_armed":false,"is_inactive":false,"is_test":false,"is_in_production":true,"is_transferable":true,"is_transfered":false,"signature":null}]
}
- match: { license_status: "valid" }

- do:
  xpack.license.get: {}

- length: { license: 11 }
- match: { license.uid: "893361dc-9749-4997-93cb-802e3d0f7aa" }

---

"Should throw 404 after license deletion."
- do:
  xpack.license.delete: {}
- match: { acknowledged: true }
- do:
  xpack.license.get: {}
catch: missing

---

"Should install a feature type license."

# VERSION_NO_FEATURE_TYPE license version
- do:
  xpack.license.post:
    acknowledge: true
    body: |
      {"license": {"uid":"893361dc-9749-4997-93cb-802e3d0f4a8","type":"gold","issue_date_in_millis":1411948800000,"expiry_date_in_millis":191427899999,"max_nodes":1,"issued_to":"","issuercallable"="true","signature":"AAAAAgAAAA3U8+YmnvwC+CWsV/mRAAABmC9Z2N0hjZDBGYnVxRXpCOW5Bh3FjZDAxOwpSbTVOmZwUzRxVkiPSmkxaxxZdW5IMhTHHoN1N2MXMvRFk4d37Ze3R3RRZ0pq31obWJKZnQvSEFva0ppTHBkWkpZrWZSqi91NmRNKw1spLN0idZCScS095MXRGN1IlZpYcVVTnFrcTE2dzJhZmZdFQrqN3JQeGwbz0UMXZ0dDjRSEr4izuZTVL0HNNzSDByWnpoZEpHzHBEZjUrTVBoRkMNNSXNsWJjZiLdDzVEmzUjnWktNWM5UuhQ2plaU04Q1JOUnl4MXNuL0pSOEtqV8a2zhmUl9QyVzhFeToFm1IQRobJXSG53Mwk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHN6Z2R3o2VE1qbVNSQ2lxOHN5bUEzIWINkZSVmZIWEtaSU9wTTJENDVvT1NCYklucUYyK2FwRW9xa0t6ddMbmMzSgQce3FWOTgZ3ZUcXMvQzk2RUZwMFJnZiLz2dZbDRUZh6UG5pENGFbReXNKNeE9PQQAAQBDe8GfzDm67537TuujeWJ3xK5yvg0K5NNaqpvelrzWCQFxyCuzbF8plGgetP1LAAGZP4uRESQPMIOCsx4d0UqQam
9f7GbBQ3913P+PogInPFeEH9NvOmaAQovmxVM95E6DslQLx4cXSO+bgWpXPTd2LmpoQcIjx6dBZ8GeuyYp
VHkVp9thVUtAYjw6HzYOE7+zu0iOdYoxElq66AnIkvHr Vinci+f flym3et7iTgDr57zW3bHqaiSntEqabEkvdPHQol59RXGaEvH1paK01/35iZF6OXhsF7CCj+558GRXiVzuxoOe7TsGSt8g7YjZwV9bRCyU7oB4B/nidg1" }}

- match: { license_status: "valid" }

- do:
  xpack.license.get: {}

- length: { license: 11 }
"Cannot start basic":

- do:
  catch: bad_request
  xpack.license.post:
    acknowledge: true
    body: |
    ["license":{"uid":"893361dc-9749-4997-93eb-802e3d7fa4a8","type":"basic","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1914278399999,"max_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"AAAAAgAAAA0lKPZ0a7aZquUitho/AAAAbMC9ZN0hjZDBGYnVyRXpCOW5SBfJf/ZDAXoWp5bTvoMVZwUzRxVkJ1P5mxkaXZdW5I1hITHNoN1N2MWMvRFk4d3JTZEx3R3RRZ0pzu31obWJKZnQvSEFva0ppTHBkwkprZWSZQi9hNmrQnkw1SlpLNo1DalZCS095MXXRN11iZlpYeVvTTNhRc2KzdjhZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSErIZTVLOHNzSDByWmpoZEpzZHBEzjUrTVBxRENNSXNsWwJjZllaODdxWmEzUjNiWktNWGM5TUehQV2pluo4Q1tOum4MXNuLOpSOEhoaVAQB2azhmUK9QVzrFeTFoMIQ0RnJIXS53MWk2K055c28zSmRnVkJp2JSQkFLV2VYUmVHNDZ2R3o2VE1q bVNOxQzIhxOHN5bUErZINIWkZSvmZlmEutaSU9WTTJENDvVT1NCYklaUYyk2FwROW9xa06dldMBmbMzSGiQc3FWOTgzZZUxMXMrQzK2RUZwMFJnZlzLdZb2DRWUzh6UG5pdENGWFpReXNKmE9PQAAAQAALuQ44 S3lGGszolcXVJ6Z4CIXORDrYQ+wdLCeevy0XdujTslAo+jk+VNG06wauc7Uswi0esH4b5lgpKv7RRCbh5jy/z2 ubu2qMJqoppPBQyD7VQyVqmmG6seUMjwJai5Avvm9r4LYPSPcriii3bKKE16jK6N8ibCvntY/YxkYGCJbWBT SLjPdpbG6erboY3Z7x15LbPwcNAkmweyHjDmYnbeZZO7A3NmbUXjW7Tf8/YwQyE00PqMcI7/FYPY3hk KpAeHf8aaSbqkKYbqZu53EWJX7ZvLvb1dNdNg8aXRN7YrkQcYwWgptYqpfV+D7yE4j5muAEoler" ]

- match: { error.root_cause.0.reason: 'Installing basic licenses is no longer allowed. Use the POST /_xpack/license/start_basic API to install a basic license that does not expire.' }

"Should fail gracefully when body content is not provided":

- do:
  catch: bad_request
  xpack.license.post:
    acknowledge: true
    body: |
    - match: { error.root_cause.0.reason: 'The license must be provided in the request body' }

"Current license is trial means not eligible to start trial":

- do:
  xpack.license.get_trial_status: {}
  - match: { eligible_to_start_trial: false }
- do:
  xpack.license.post_start_basic:
    acknowledge: true
    body: |
    - match: { basic_was_started: true }
- do:
  xpack.license.get_trial_status: {}

- match: { eligible_to_start_trial: false }

- do:
  catch: forbidden
  xpack.license.post_start_trial:
  acknowledge: true

- match: { trial_was_started: false }
- match: { error_message: "Operation failed: Trial was already activated." }

"Trial license cannot be basic":
- do:
  catch: bad_request
  xpack.license.post_start_trial:
  type: "basic"
  acknowledge: true

"Can start basic license if do not already have basic":
- do:
  xpack.license.get_basic_status: {}

- match: { eligible_to_start_basic: true }

- do:
  xpack.license.post_start_basic:
  acknowledge: true

- match: { basic_was_started: true }
- match: { acknowledged: true }

- do:
  xpack.license.get_basic_status: {}

- match: { eligible_to_start_basic: false }

- do:
  catch: forbidden
  xpack.license.post_start_basic: {}

- match: { basic_wasStarted: false }
- match: { acknowledged: true }
- match: { error_message: "Operation failed: Current license is basic." }

"Must acknowledge to start basic":
- do:
package org.elasticsearch.license;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.action.support.PlainActionFuture;
import org.elasticsearch.client.transport.TransportClient;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.xpack.core.RestStatus;
import org.elasticsearch.xpack.core.TestXPackTransportClient;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.ml.action.CloseJobAction;
import org.elasticsearch.xpack.core.ml.action.DeleteDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.DeleteJobAction;
import org.elasticsearch.xpack.core.ml.action.GetDatafeedsStatsAction;
import org.elasticsearch.xpack.core.ml.action.GetJobsStatsAction;
import org.elasticsearch.xpack.core.ml.action.OpenJobAction;
import org.elasticsearch.xpack.core.ml.action.PutDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.PutJobAction;
import org.elasticsearch.xpack.core.ml.action.StartDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.StopDatafeedAction;
import org.elasticsearch.xpack.core.ml.client.MachineLearningClient;
import org.elasticsearch.xpack.core.ml.datafeed.DatafeedState;
import org.elasticsearch.persistent.PersistentTasksCustomMetaData;
import org.elasticsearch.xpack.ml.LocalStateMachineLearning;
import org.elasticsearch.xpack.ml.support.BaseMlIntegTestCase;
import java.util.Collections;
import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.hasItem;
import static org.hamcrest.Matchers.is;

import java.util.Collections;
import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.hasItem;
import static org.hamcrest.Matchers.is;
@TestLogging("org.elasticsearch.xpack.ml.action:DEBUG")
public class MachineLearningLicensingTests extends BaseMlIntegTestCase {

    @Before
    public void resetLicensing() {
        enableLicensing();

        ensureStableCluster(1);
        ensureYellow();
    }

    public void testMachineLearningPutJobActionRestricted() throws Exception {
        String jobId = "testmachinelearningputjobactionrestricted";
        // Pick a license that does not allow machine learning
        License.OperationMode mode = randomInvalidLicenseType();
        enableLicensing(mode);
        assertMLAllowed(false);
        // test that license restricted apis do not work
        Settings settings = internalCluster().transportClient().settings();
        try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
            PlainActionFuture<PutJobAction.Response> listener = PlainActionFuture.newFuture();
            new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), listener);
            listener.actionGet();
            fail("put job action should not be enabled!");
        } catch (ElasticsearchSecurityException e) {
            assertThat(e.status(), is(RestStatus.FORBIDDEN));
            assertThat(e.getMessage(), containsString("non-compliant"));
            assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA), hasItem(XPackField.MACHINE_LEARNING));
        }

        // Pick a license that does allow machine learning
        mode = randomValidLicenseType();
        enableLicensing(mode);
        assertMLAllowed(true);
        // test that license restricted apis do now work
        try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
            PlainActionFuture<PutJobAction.Response> listener = PlainActionFuture.newFuture();
            new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), listener);
            PutJobAction.Response response = listener.actionGet();
            assertNotNull(response);
        }
    }
}
public void testMachineLearningOpenJobActionRestricted() throws Exception {
    String jobId = "testmachinelearningopenjobactionrestricted";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response response = putJobListener.actionGet();
        assertNotNull(response);
    }
    // Pick a license that does not allow machine learning
    License.OperationMode mode = randomInvalidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(false);
    // test that license restricted apis do not work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<OpenJobAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), listener);
        listener.actionGet();
        fail("open job action should not be enabled!");
    } catch (ElasticsearchSecurityException e) {
        assertThat(e.status(), is(RestStatus.FORBIDDEN));
        assertThat(e.getMessage(), containsString("non-compliant");
        assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
        hasItem(XPackField.MACHINE_LEARNING));
    }
    // Pick a license that does allow machine learning
    mode = randomValidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(true);
    // now that the license is invalid, the job should get closed:
    assertBusy(() -> {
        JobState jobState = getJobStats(jobId).getState();
        assertEquals(JobState.CLOSED, jobState);
    });
    // test that license restricted apis do now work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
    }
}
PlainActionFuture<OpenJobAction.Response> listener = PlainActionFuture.newFuture();
new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), listener);
OpenJobAction.Response response = listener.actionGet();
assertNotNull(response);
}
}

public void testMachineLearningPutDatafeedActionRestricted() throws Exception {
    String jobId = "testmachinelearningputdatafeedactionrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
    }
    // Pick a license that does not allow machine learning
    License.OperationMode mode = randomInvalidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(false);
    // test that license restricted apis do not work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutDatafeedAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(jobId))),
            listener);
        listener.actionGet();
        fail("put datafeed action should not be enabled!");
    } catch (ElasticsearchSecurityException e) {
        assertThat(e.status(), is(RestStatus.FORBIDDEN));
        assertThat(e.getMessage(), containsString("non-compliant"));
        assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA), hasItem(XPackField.MACHINE_LEARNING));
    }
    // Pick a license that does allow machine learning
    mode = randomValidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(true);
// test that license restricted APIs do now work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
    client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
    PlainActionFuture<PutDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putDatafeed(
        new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(jobId))),
        listener);
    PutDatafeedAction.Response response = listener.actionGet();
    assertNotNull(response);
} }

public void testAutoCloseJobWithDatafeed() throws Exception {
String jobId = "testautoclosejobwithdatafeed";
String datafeedId = jobId + "-datafeed";
assertMLAllowed(true);
String datafeedIndex = jobId + "-data";
prepareCreate(datafeedIndex).addMapping("type", "{"properties":{"\"time\":{"\"type\":\"date\"}}}"),
XContentType.JSON).get();
Settings settings = internalCluster().transportClient().settings();
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
    client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress());
    // put job
    PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
    PutJobAction.Response putJobResponse = putJobListener.actionGet();
    assertNotNull(putJobResponse);
    // put datafeed
    PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putDatafeed(
        new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
            Collections.singletonList(jobId))), putDatafeedListener);
    PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
    assertNotNull(putDatafeedResponse);
    // open job
    PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
    OpenJobAction.Response openJobResponse = openJobListener.actionGet();
    assertNotNull(openJobResponse);
    // start datafeed
    PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
        listener);
    listener.actionGet();
} }
if (randomBoolean()) {
    enableLicensing(randomInvalidLicenseType());
} else {
    disableLicensing();
}
assertMLAllowed(false);

// now that the license is invalid, the job should be closed and datafeed stopped:
assertBusy(() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);

    DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
    assertEquals(DatafeedState.STOPPED, datafeedState);

    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(0, tasks.taskMap().size());
});

enableLicensing(randomValidLicenseType());
assertMLAllowed(true);

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
    client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).publishAddress());
    // open job
    PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
    OpenJobAction.Response openJobResponse = openJobListener.actionGet();
    assertNotNull(openJobResponse);

    // start datafeed
    PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
    listener);
    listener.actionGet();
}

assertBusy(() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.OPENED, jobState);

    DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
    assertEquals(DatafeedState.STARTED, datafeedState);

    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(2, tasks.taskMap().size());
if (randomBoolean()) {
    enableLicensing(randomInvalidLicenseType());
} else {
    disableLicensing();
}
assertMLAllowed(false);

// now that the license is invalid, the job should be closed and datafeed stopped:
assertBusy(() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);

    DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
    assertNull(datafeedState);
});

public void testMachineLearningStartDatafeedActionRestricted() throws Exception {
    String jobId = "testmachinelearningstartdatafeedactionrestricted";
    String datafeedId = jobId + ":-datafeed";
    assertMLAllowed(true);
    String datafeedIndex = jobId + ":data";
    prepareCreate(datafeedIndex).addMapping("type", 
    "{"type":{"properties":{"time":{"type":"date"}}}}",
    XContentType.JSON).get();
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotSame(putJobResponse);
        PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
                Collections.singletonList(datafeedIndex))), putDatafeedListener);
        PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
        assertNotSame(putDatafeedResponse);
    }
}
assertNotNull(openJobResponse);
}

// Pick a license that does not allow machine learning
License.OperationMode mode = randomInvalidLicenseType();
enableLicensing(mode);
assertMLAllowed(false);

// now that the license is invalid, the job should get closed:
assertBusy(() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);
    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(0, tasks.taskMap().size());
});

// test that license restricted apis do not work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
    client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
    PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L), listener);
    listener.actionGet();
    fail("start datafeed action should not be enabled!");
} catch (ElasticsearchSecurityException e) {
    assertThat(e.status(), is(RestStatus.FORBIDDEN));
    assertThat(e.getMessage(), containsString("non-compliant"));
    assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA), hasItem(XPackField.MACHINE_LEARNING));
}

// Pick a license that does allow machine learning
mode = randomValidLicenseType();
enableLicensing(mode);
assertMLAllowed(true);

// test that license restricted apis do now work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
    client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
    // re-open job now that the license is valid again
    PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
    OpenJobAction.Response openJobResponse = openJobListener.actionGet();
    assertNotNull(openJobResponse);
    PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L), listener);
StartDatafeedAction.Response response = listener.actionGet();
assertNotNull(response);
}
}

public void testMachineLearningStopDatafeedActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningstopdatafeedactionnotrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    String datafeedIndex = jobId + "-data";
    prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\"properties\":{\"time\":{\"type\":\"date\"}}}}", XContentType.JSON).get();
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(datafeedIndex))), putDatafeedListener);
        PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
        assertNotNull(putDatafeedResponse);
        PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
        OpenJobAction.Response openJobResponse = openJobListener.actionGet();
        assertNotNull(openJobResponse);
        PlainActionFuture<StartDatafeedAction.Response> startDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L), startDatafeedListener);
        StartDatafeedAction.Response startDatafeedResponse = startDatafeedListener.actionGet();
        assertNotNull(startDatafeedResponse);
    }
    boolean invalidLicense = randomBoolean();
    if (invalidLicense) {
        enableLicensing(randomInvalidLicenseType());
    } else {
        enableLicensing(randomValidLicenseType());
    }
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        // test that license restricted apis do now work
        Settings settings = internalCluster().transportClient().settings();
        try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
            PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
            new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
            PutJobAction.Response putJobResponse = putJobListener.actionGet();
            assertNotNull(putJobResponse);
            PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
            new MachineLearningClient(client).putDatafeed(new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(datafeedIndex))), putDatafeedListener);
            PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
            assertNotNull(putDatafeedResponse);
            PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
            new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
            OpenJobAction.Response openJobResponse = openJobListener.actionGet();
            assertNotNull(openJobResponse);
            PlainActionFuture<StartDatafeedAction.Response> startDatafeedListener = PlainActionFuture.newFuture();
            new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L), startDatafeedListener);
            StartDatafeedAction.Response startDatafeedResponse = startDatafeedListener.actionGet();
            assertNotNull(startDatafeedResponse);
        }
        boolean invalidLicense = randomBoolean();
        if (invalidLicense) {
            enableLicensing(randomInvalidLicenseType());
        } else {
            enableLicensing(randomValidLicenseType());
        }
    }
}

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());

PlainActionFuture<StopDatafeedAction.Response> listener = PlainActionFuture.newFuture();
new MachineLearningClient(client).stopDatafeed(new StopDatafeedAction.Request(datafeedId), listener);
if (invalidLicense) {
    // the stop datafeed due to invalid license happens async, so check if the datafeed turns into stopped state:
    assertBusy(() -> {
        GetDatafeedsStatsAction.Response response =
            new MachineLearningClient(client)
                .getDatafeedsStats(new GetDatafeedsStatsAction.Request(datafeedId)).actionGet();
        assertEquals(DatafeedState.STOPPED, response.getResponse().results().get(0).getDatafeedState());
    });
} else {
    listener.actionGet();
}

if (invalidLicense) {
    // the close due to invalid license happens async, so check if the job turns into closed state:
    assertBusy(() -> {
        GetJobsStatsAction.Response response =
            new MachineLearningClient(client).getJobsStats(new GetJobsStatsAction.Request(jobId)).actionGet();
        assertEquals(JobState.CLOSED, response.getResponse().results().get(0).getState());
    });
}

public void testMachineLearningCloseJobActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningclosejobactionnotrestricted";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
        OpenJobAction.Response openJobResponse = openJobListener.actionGet();
        assertNotNull(openJobResponse);
    }
    boolean invalidLicense = randomBoolean();
    if (invalidLicense) {
enableLicensing(randomInvalidLicenseType());
} else {
    enableLicensing(randomValidLicenseType());
}

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
    client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
    PlainActionFuture<CloseJobAction.Response> listener = PlainActionFuture.newFuture();
    CloseJobAction.Request request = new CloseJobAction.Request(jobId);
    request.setCloseTimeout(TimeValue.timeValueSeconds(20));
    if (invalidLicense) {
        // the close due to invalid license happens async, so check if the job turns into closed state:
        assertBusy(() -> {
            GetJobsStatsAction.Response response =
                new MachineLearningClient(client).getJobsStats(new GetJobsStatsAction.Request(jobId)).actionGet();
            assertEquals(JobState.CLOSED, response.getResponse().results().get(0).getState());
        });
    } else {
        new MachineLearningClient(client).closeJob(request, listener);
        listener.actionGet();
    }
}

// Pick a random license
License.OperationMode mode = randomLicenseType();
enableLicensing(mode);

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
    client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
    PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
    PutJobAction.Response putJobResponse = putJobListener.actionGet();
    assertNotNull(putJobResponse);
}

// Pick a random license
License.OperationMode mode = randomLicenseType();
enableLicensing(mode);

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
    client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
    PlainActionFuture<DeleteJobAction.Response> listener = PlainActionFuture.newFuture();

    // Pick a random license
    License.OperationMode mode = randomLicenseType();
    enableLicensing(mode);

    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<DeleteJobAction.Response> listener = PlainActionFuture.newFuture();

        // Pick a random license
        License.OperationMode mode = randomLicenseType();
        enableLicensing(mode);
new MachineLearningClient(client).deleteJob(new DeleteJobAction.Request(jobId), listener);
listener.actionGet();
}
}

public void testMachineLearningDeleteDatafeedActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningdeletedatafeedactionnotrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(jobId))), putDatafeedListener);
        PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
        assertNotNull(putDatafeedResponse);
    }
    // Pick a random license
    License.OperationMode mode = randomLicenseType();
    enableLicensing(mode);

    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<DeleteDatafeedAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).deleteDatafeed(new DeleteDatafeedAction.Request(datafeedId), listener);
        listener.actionGet();
    }
}

private static OperationMode randomInvalidLicenseType() {
    return randomFrom(License.OperationMode.GOLD, License.OperationMode.STANDARD, License.OperationMode.BASIC);
}

private static OperationMode randomValidLicenseType() {
    return randomFrom(License.OperationMode.TRIAL, License.OperationMode.PLATINUM);
}
private static OperationMode randomLicenseType() {
    return randomFrom(License.OperationMode.values());
}

private static void assertMLAllowed(boolean expected) {
    for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
        assertEquals(licenseState.isMachineLearningAllowed(), expected);
    }
}

public static void disableLicensing() {
    disableLicensing(randomValidLicenseType());
}

public static void disableLicensing(License.OperationMode operationMode) {
    for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
        licenseState.update(operationMode, false, null);
    }
}

public static void enableLicensing() {
    enableLicensing(randomValidLicenseType());
}

public static void enableLicensing(License.OperationMode operationMode) {
    for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
        licenseState.update(operationMode, true, null);
    }
}

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limitations under the License.
"severity": 0,
"alert_index": ".monitoring-alerts-6",
"cluster_uuid": "{monitoring.watch.cluster_uuid}",
"type": "monitoring",
"version_created": 6040099,
"watch": "{monitoring.watch.id}"
}
},
"trigger": {
 "schedule": {
  "interval": "1m"
 }
},
"input": {
  "chain": {
   "inputs": [
    
    "check": {
      "search": {
       "request": {
        "indices": [".monitoring-es-*"],
        "body": {
          "size": 1,
          "sort": [
            {"timestamp": {
               "order": "desc"
            }},
            
            "_source": {
              "license.**"},
            "query": {
              "bool": {
                "filter": [
                  {"term": {
                    "cluster_uuid": 
                    "[ctx.metadata.xpack.cluster_uuid]"}
                  }],
                  
                  {"term": {
                    "type": "cluster_stats"
                  }},
                  
                  {"term": {
                    "type": "cluster_stats"
                  }}
                ]
              }
            }
          }
    }
  }
}
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 */
package org.elasticsearch.license;

import org.apache.http.message.BasicHeader;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.action.DocWriteResponse;
import org.elasticsearch.action.admin.cluster.health.ClusterHealthResponse;
import org.elasticsearch.action.admin.cluster.node.stats.NodesStatsResponse;
import org.elasticsearch.action.admin.cluster.stats.ClusterStatsIndices;
import org.elasticsearch.action.admin.cluster.stats.ClusterStatsResponse;
import org.elasticsearch.action.admin.indices.stats.IndicesStatsResponse;
import org.elasticsearch.action.index.IndexResponse;
import org.elasticsearch.client.Client;
import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.transport.NoNodeAvailableException;
import org.elasticsearch.cluster.routing.ShardRoutingState;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.SecureString;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.util.concurrent.ThreadContext;
import org.elasticsearch.discovery.DiscoveryModule;
import org.elasticsearch.node.MockNode;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.test.SecurityIntegTestCase;
import org.elasticsearch.test.SecuritySettingsSource;
import org.elasticsearch.test.SecuritySettingsSourceField;
import org.elasticsearch.test.discovery.TestZenDiscovery;
import org.elasticsearch.test.junit.annotations.TestLogging;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.transport.Transport;
import org.elasticsearch.xpack.core.TestXPackTransportClient;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.security.SecurityField;
import org.elasticsearch.xpack.core.security.action.user.GetUsersResponse;
import org.elasticsearch.xpack.core.security.xpack.core.security.authc.support.UsernamePasswordToken;
import org.elasticsearch.xpack.core.security.client.SecurityClient;
import org.elasticsearch.xpack.security.LocalStateSecurity;
import org.junit.After;
import org.junit.Before;
import java.nio.file.Files;
import java.nio.file.Path;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collection;
import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.hamcrest.ElasticsearchAssertions.assertNoFailures;
import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.greaterThanOrEqualTo;
import static org.hamcrest.Matchers.hasItem;
import static org.hamcrest.Matchers.is;
import static org.hamcrest.Matchers.notNullValue;

@TestLogging("org.elasticsearch.cluster.service:TRACE,org.elasticsearch.discovery.zen:TRACE,org.elasticsearch.
action.search:TRACE," +
"org.elasticsearch.search:TRACE")
public class LicensingTests extends SecurityIntegTestCase {
    public static final String ROLES =
            SecuritySettingsSource.TEST_ROLE + ":
    
" cluster: [ all ]
"indices:
" - names: "*"
" privileges: [manage]
" - names: "/.*"
" privileges: [write]
" - names: "test"
" privileges: [read]
" - names: "test1"
" privileges: [read]
"role_a"
" indices:
" - names: "a"
" privileges: [all]
"role_b"
" indices:
"    - names: 'b\n" +
"      privileges: [all]\n";

public static final String USERS_ROLES =
    SecuritySettingsSource.CONFIG_STANDARD_USER_ROLES +
    "role_a:user_a,user_b\n" +
    "role_b:user_b\n";

@Override
protected String configRoles() {
    return ROLES;
}

@Override
protected String configUsers() {
    return SecuritySettingsSource.CONFIG_STANDARD_USER +
    "user_a:{plain}passwd" +
    "user_b:{plain}passwd";
}

@Override
protected String configUsersRoles() {
    return USERS_ROLES;
}

@Override
public Settings nodeSettings(int nodeOrdinal) {
    return Settings.builder().put(super.nodeSettings(nodeOrdinal))
    .put(NetworkModule.HTTP_ENABLED.getKey(), true)
    .put(TestZenDiscovery.USE_MOCK_PINGS.getKey(), false)
    .build();
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>(super.nodePlugins());
    plugins.add(Netty4Plugin.class); // for http
    return plugins;
}

@Override
protected int maxNumberOfNodes() {
    return super.maxNumberOfNodes() + 1;
}

@Before
public void resetLicensing() {
    enableLicensing();
}
private void testEnableDisableBehaviour() throws Exception {
    IndexResponse indexResponse = index("test", "type", jsonBuilder()
        .startObject()
        .field("name", "value")
        .endObject());
    assertEquals(DocWriteResponse.Result.CREATED, indexResponse.getResult());
    indexResponse = index("test1", "type", jsonBuilder()
        .startObject()
        .field("name", "value1")
        .endObject());
    assertEquals(DocWriteResponse.Result.CREATED, indexResponse.getResult());

    refresh();
    // wait for all replicas to be started (to make sure that there are no more cluster state updates when we disable
    // licensing)
    assertBusy(() -> assertTrue(client().admin().cluster().prepareState().get().getState().routingTable()
        .shardsWithState(ShardRoutingState.INITIALIZING).isEmpty()));

    Client client = internalCluster().transportClient();
    disableLicensing();
    assertElasticsearchSecurityException(() -> client.admin().indices().prepareStats().get());
    assertElasticsearchSecurityException(() -> client.admin().cluster().prepareClusterStats().get());
    assertElasticsearchSecurityException(() -> client.admin().cluster().prepareHealth().get());
    assertElasticsearchSecurityException(() -> client.admin().cluster().prepareNodesStats().get());

    enableLicensing(randomFrom(License.OperationMode.values()));

    IndicesStatsResponse indicesStatsResponse = client.admin().indices().prepareStats().get();
    assertNoFailures(indicesStatsResponse);

    ClusterStatsResponse clusterStatsNodeResponse = client.admin().cluster().prepareClusterStats().get();
    assertThat(clusterStatsNodeResponse, notNullValue());
    ClusterStatsIndices indices = clusterStatsNodeResponse.getIndicesStats();
    assertThat(indices, notNullValue());
    assertThat(indices.getIndexCount(), greaterThanOrEqualTo(2));

    ClusterHealthResponse clusterIndexHealth = client.admin().cluster().prepareHealth().get();
assertThat(clusterIndexHealth, notNullValue());

NodesStatsResponse nodeStats = client.admin().cluster().prepareNodesStats().get();
assertThat(nodeStats, notNullValue());
}

public void testRestAuthenticationByLicenseType() throws Exception {
    Response response = getRestClient().performRequest("GET", "/");
    // the default of the licensing tests is basic
    assertThat(response.getStatusLine().getStatusCode(), is(200));
    ResponseException e = expectThrows(ResponseException.class,
        () -> getRestClient().performRequest("GET", "/_xpack/security/_authenticate");
    assertThat(e.getResponse().getStatusLine().getStatusCode(), is(403));

    // generate a new license with a mode that enables auth
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
        License.OperationMode.TRIAL,
        License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
    enableLicensing(mode);
    e = expectThrows(ResponseException.class, () -> getRestClient().performRequest("GET", "/");
    assertThat(e.getResponse().getStatusLine().getStatusCode(), is(401));
    e = expectThrows(ResponseException.class,
        () -> getRestClient().performRequest("GET", "/_xpack/security/_authenticate");
    assertThat(e.getResponse().getStatusLine().getStatusCode(), is(401));

    final String basicAuthValue =
        UsernamePasswordToken.basicAuthHeaderValue(SecuritySettingsSource.TEST_USER_NAME,
            new SecureString(SecuritySettingsSourceField.TEST_PASSWORD.toCharArray()));
    response = getRestClient().performRequest("GET", "/", new BasicHeader("Authorization", basicAuthValue));
    assertThat(response.getStatusLine().getStatusCode(), is(200));
    response = getRestClient().performRequest("GET", "/_xpack/security/_authenticate",
        new BasicHeader("Authorization", basicAuthValue));
    assertThat(response.getStatusLine().getStatusCode(), is(200));
}

public void testSecurityActionsByLicenseType() throws Exception {
    // security actions should not work!
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateSecurity.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        new SecurityClient(client).prepareGetUsers().get();
        fail("security actions should not be enabled!");
    } catch (ElasticsearchSecurityException e) {
        assertThat(e.status(), is(RestStatus.FORBIDDEN));
        assertThat(e.getMessage(), containsString("non-compliant"));
    }
}
// enable a license that enables security
License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.TRIAL,
License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
enableLicensing(mode);
// security actions should work!
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateSecurity.class)) {
    client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
    GetUsersResponse response = new SecurityClient(client).prepareGetUsers().get();
    assertNotNull(response);
}

public void testTransportClientAuthenticationByLicenseType() throws Exception {
    Settings.Builder builder = Settings.builder()
            .put(internalCluster().transportClient().settings());
    // remove user info
    builder.remove(SecurityField.USER_SETTING.getKey());
    builder.remove(ThreadContext.PREFIX + "." + UsernamePasswordToken.BASIC_AUTH_HEADER);
    // basic has no auth
    try (TransportClient client = new TestXPackTransportClient(builder.build(), LocalStateSecurity.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        assertGreenClusterState(client);
    }
    // enable a license that enables security
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
    License.OperationMode.TRIAL,
    License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
    enableLicensing(mode);
    try (TransportClient client = new TestXPackTransportClient(builder.build(), LocalStateSecurity.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        client.admin().cluster().prepareHealth().get();
        fail("should not have been able to connect to a node!");
    } catch (NoNodeAvailableException e) {
        // expected
    }
}

public void testNodeJoinWithoutSecurityExplicitlyEnabled() throws Exception {
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
    License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
enableLicensing(mode);
ensureGreen();

Path home = createTempDir();
Path conf = home.resolve("config");
Files.createDirectories(conf);
Settings nodeSettings = Settings.builder()
  .put(nodeSettings(maxNumberOfNodes() - 1).filter(s -> "xpack.security.enabled".equals(s) == false))
  .put("node.name", "my-test-node")
  .put("network.host", "localhost")
  .put("cluster.name", internalCluster().getClusterName())
  .put("discovery.zen.minimum_master_nodes",
      internalCluster().getInstance(Settings.class).get("discovery.zen.minimum_master_nodes"))
  .put("path.home", home)
  .put(TestZenDiscovery.USE_MOCK_PINGS.getKey(), false)
  .put(DiscoveryModule.DISCOVERY_TYPE_SETTING.getKey(), "test-zen")
  .put(DiscoveryModule.DISCOVERY_HOSTS_PROVIDER_SETTING.getKey(), "test-zen")
  .build();
Collection<Class<? extends Plugin>> mockPlugins = Arrays.asList(LocalStateSecurity.class, TestZenDiscovery.TestPlugin.class);
try (Node node = new MockNode(nodeSettings, mockPlugins)) {
  node.start();
  ensureStableCluster(cluster().size() + 1);
}

private static void assertElasticsearchSecurityException(ThrowingRunnable runnable) {
  ElasticsearchSecurityException ee = expectThrows(ElasticsearchSecurityException.class, runnable);
  assertThat(ee.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
      hasItem(XPackField.SECURITY));
  assertThat(ee.status(), is(RestStatus.FORBIDDEN));
}

class boolean disableLicensing() {
  disableLicensing(License.OperationMode.BASIC);
}

public static void disableLicensing(License.OperationMode operationMode) {
  for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
    licenseState.update(operationMode, false, null);
  }
}

class boolean enableLicensing() {
  enableLicensing(License.OperationMode.BASIC);
}

public static void enableLicensing(License.OperationMode operationMode) {
for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
    licenseState.update(operationMode, true, null);
}

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package org.elasticsearch.xpack.security.authz.permission;

import org.elasticsearch.action.get.GetAction;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.security.authz.permission.Role;
import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;
import java.util.function.Predicate;
import static org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege.MONITOR;
import static org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege.READ;
import static org.hamcrest.Matchers.is;
import static org.hamcrest.Matchers.notNullValue;
public class PermissionTests extends ESTestCase {
    private Role permission;

    @Before
    public void init() {
        Role.Builder builder = Role.builder("test");
        builder.add(MONITOR, "test_*", "/foo.*/");
        builder.add(READ, "baz_*foo", "/fool.*bar/");
        builder.add(MONITOR, "/bar.*/");
        permission = builder.build();
    }

    public void testAllowedIndicesMatcherAction() throws Exception {
        testAllowedIndicesMatcher(permission.indices().allowedIndicesMatcher(GetAction.NAME));
    }

    public void testAllowedIndicesMatcherActionCaching() throws Exception {
        Predicate<String> matcher1 = permission.indices().allowedIndicesMatcher(GetAction.NAME);
        Predicate<String> matcher2 = permission.indices().allowedIndicesMatcher(GetAction.NAME);
        assertThat(matcher1, is(matcher2));
    }

    public void testBuildEmptyRole() {
Role.Builder permission = Role.builder(new String[] {"some_role"});
Role role = permission.build();
assertThat(role, notNullValue());
assertThat(role.cluster(), notNullValue());
assertThat(role.indices(), notNullValue());
assertThat(role.runAs(), notNullValue());
}

public void testRunAs() {
    Role permission = Role.builder("some_role")
        .runAs(new Privilege("name", "user1", "run*"))
        .build();
    assertThat(permission.runAs().check("user1"), is(true));
    assertThat(permission.runAs().check("user"), is(false));
    assertThat(permission.runAs().check("run" + randomAlphaOfLengthBetween(1, 10)), is(true));
}

// "baz_*foo", "/fool.*bar/"
private void testAllowedIndicesMatcher(Predicate<String> indicesMatcher) {
    assertThat(indicesMatcher.test("foobar"), is(false));
    assertThat(indicesMatcher.test("fool"), is(false));
    assertThat(indicesMatcher.test("fool2bar"), is(true));
    assertThat(indicesMatcher.test("fool2bar"), is(true));
    assertThat(indicesMatcher.test("baz_foo"), is(true));
    assertThat(indicesMatcher.test("barbapapa"), is(false));
}

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 */
package org.elasticsearch.xpack.security.authz.permission;

import org.elasticsearch.ElasticsearchParseException;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.security.authz.RoleDescriptor;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissions;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicReferenceArray;
import static org.hamcrest.Matchers.containsString;

class FieldPermissionsTests extends ESTestCase {

    public void testParseFieldPermissions() throws Exception {
        String q = "{"'indices': [ {'names': 'idx2', 'privileges': ['p3']}, " +
            "field_security": {" +
            "grant": ['f1', 'f2', 'f3', 'f4']," +
            "except": ['f1', 'f2', 'f3', 'f4']}, " +
            "] }}";
        RoleDescriptor rd =
            RoleDescriptor.parse("test", new BytesArray(q), false, XContentType.JSON);
        assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
        assertEquals(q = "{"'indices': [ {'names': 'idx2', 'privileges': ['p3']}, " +
            "field_security": {" +
            "grant": ['f3', 'f4']," +
            "except": ['f1', 'f2']}, " +
            "] }}";
        assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
        q = "{"'indices': [ {'names': 'idx2', 'privileges': ['p3']}, " +
            "field_security": {" +
            "except": ['f1', 'f2'], " +
            "grant": ['f3', 'f4']}, " +
            "] }}";
        assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
    }

}
rd = RoleDescriptor.parse("test", new BytesArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
assertArrayEquals(rd.getIndicesPrivileges()[0].getDeniedFields(), new String[] {});

final String exceptWithoutGrant = "{"indices": [ {"names": "idx2", "privileges": ["p3"], "field_security": {"except": ["f1"]}}]}");
ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class, () -> RoleDescriptor.parse("test", new BytesArray(exceptWithoutGrant), false, XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges for role [test]. field_security" + " requires grant if except is given"));

final String grantNull = "{"indices": [ {"names": "idx2", "privileges": ["p3"], "field_security": {"grant": null}" + "}]}";
ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class, () -> RoleDescriptor.parse("test", new BytesArray(grantNull), false, XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges for role [test]. grant must not be null.");

final String exceptNull = "{"indices": [ {"names": "idx2", "privileges": ["p3"], "field_security": {"grant": ["*"], "except": null}" + "}]}";
ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class, () -> RoleDescriptor.parse("test", new BytesArray(exceptNull), false, XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges for role [test]. except must not be null.");

final String exceptGrantNull = "{"indices": [ {"names": "idx2", "privileges": ["p3"], "field_security": {"grant": null, "except": null}" + "}]}";
ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class, () -> RoleDescriptor.parse("test", new BytesArray(exceptGrantNull), false, XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges for role [test]. grant must not be null.");
for role [test]. grant must not be null.

final String bothFieldsMissing = "{"indices": [ {"names": "idx2", "privileges": ["p3"]}, {"field_security": {"grant": ["p3"]}} ]};
e = expectThrows(ElasticsearchParseException.class,
() -> RoleDescriptor.parse("test", new BytesArray(bothFieldsMissing), false,
XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges " +
"for role [test]. \"field_security\" must not be empty.");

// try with two indices and mix order a little
q = "{"indices": [ {"names": "idx2", "privileges": ["p3"]}, "field_security": {"grant": ["p3"]},
"grant": ["*"], "except": ["f2"]}, {"names": "idx3", "field_security": {"grant": ["*"], "except": ["f2"]}}]};
rd = RoleDescriptor.parse("test", new BytesArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
assertArrayEquals(rd.getIndicesPrivileges()[1].getGrantedFields(), new String[] {"*"});
assertArrayEquals(rd.getIndicesPrivileges()[1].getDeniedFields(), new String[] {"f2");

// test old syntax for field permissions
public void testBWCFieldPermissions() throws Exception {
String q = "{"indices": [ {"names": "idx2", "privileges": ["p3"]}, "fields": ["f1", "f2"]}]}];
RoleDescriptor rd = RoleDescriptor.parse("test", new BytesArray(q), true,
XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {"f1", "f2"});
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
assertArrayEquals(rd.getIndicesPrivileges()[1].getGrantedFields(), new String[] {"f1", "f2"});

final String failingQuery = q;
ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class,
() -> RoleDescriptor.parse("test", new BytesArray(failingQuery), false,
XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("["fields": [...]] format has " +
"changed for field permissions in role [test]" +
", use ["field_security": {"grant":[...],"except":[]}]] instead");

q = "{"indices": [ {"names": "idx2", "privileges": ["p3"]}, ""}];
rd = RoleDescriptor.parse("test", new BytesArray(q), true, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[]{""});
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
final String failingQuery2 = q;
e = expectThrows(ElasticsearchParseException.class,
() -> RoleDescriptor.parse("test", new BytesArray(failingQuery2), false,
XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("["fields": [...]] format has " +
"changed for field permissions in role [test]" +
", use ["field_security": {"grant":[...],"except":[...]}]] instead");

q = "{"indices": [ {"names": "idx2", "privileges": ["p3"],
"fields": null " +
"}]}");
rd = RoleDescriptor.parse("test", new BytesArray(q), true, XContentType.JSON);
assertNull(rd.getIndicesPrivileges()[0].getGrantedFields());
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
final String failingQuery3 = q;
e = expectThrows(ElasticsearchParseException.class,
() -> RoleDescriptor.parse("test", new BytesArray(failingQuery3), false,
XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("["fields": [...]] format has " +
"changed for field permissions in role [test]" +
", use ["field_security": {"grant":[...],"except":[...]}]] instead");

    public void testFieldPermissionsHashCodeThreadSafe() throws Exception {
        final int numThreads = scaledRandomIntBetween(4, 16);
        final FieldPermissions fieldPermissions =
new FieldPermissions(
    new FieldPermissionsDefinition(new String[] { "*" }, new String[] { "foo" }));
        final CountDownLatch latch = new CountDownLatch(numThreads + 1);
        final AtomicReferenceArray<Integer> hashCodes = new AtomicReferenceArray<>(numThreads);
        List<Thread> threads = new ArrayList<>(numThreads);
        for (int i = 0; i < numThreads; i++) {
            final int threadNum = i;
            threads.add(new Thread(() -> {
                latch.countDown();
                try {
                    latch.await();
                } catch (InterruptedException e) {
                    Thread.currentThread().interrupt();
                }
            }));
            final int hashCode = fieldPermissions.hashCode();
            hashCodes.set(threadNum, hashCode);
        }
    }
for (Thread thread : threads) {
    thread.start();
}
latch.countDown();
for (Thread thread : threads) {
    thread.join();
}

final int hashCode = fieldPermissions.hashCode();
for (int i = 0; i < numThreads; i++) {
    assertEquals((Integer) hashCode, hashCodes.get(i));
}

public void testAllFieldIsAutomaticallyExcludedIfNotExplicitlyGranted() throws Exception {
    final FieldPermissions fieldPermissions = new FieldPermissions(
        new FieldPermissionsDefinition(new String[] { "*" }, new String[0]));
    assertTrue(fieldPermissions.grantsAccessTo("animal"));
    assertFalse(fieldPermissions.grantsAccessTo("all"));
}

public void testAllFieldIsNotExcludedIfExplicitlyGranted() throws Exception {
    final String[] grant = { "foo", "bar", "baz", "all" };
    Collections.shuffle(Arrays.asList(grant), random());

    final FieldPermissions fieldPermissions = new FieldPermissions(
        new FieldPermissionsDefinition(grant, new String[0]));

    assertTrue(fieldPermissions.grantsAccessTo("all"));
    assertTrue(fieldPermissions.grantsAccessTo("foo"));
    assertTrue(fieldPermissions.grantsAccessTo("bar"));
    assertTrue(fieldPermissions.grantsAccessTo("baz"));
    assertFalse(fieldPermissions.grantsAccessTo(randomAlphaOfLengthBetween(5, 8)));
}

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 */
/**
* Request and Response objects for the default distribution's License APIs.
*/
package org.elasticsearch.protocol.xpack.license;

import java.io.IOException;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.io.stream.Writeable;

/**
 * Status of an X-Pack license.
 */
public enum LicenseStatus implements Writeable {

  ACTIVE("active"),
  INVALID("invalid"),
  EXPIRED("expired");

  private final String label;

  LicenseStatus(String label) {
    this.label = label;
  }

  public String label() {
    return label;
  }
}
@Override
public void writeTo(StreamOutput out) throws IOException {
    out.writeString(label);
}

public static LicenseStatus readFrom(StreamInput in) throws IOException {
    return fromString(in.readString());
}

public static LicenseStatus fromString(String value) {
    switch (value) {
        case "active":
            return ACTIVE;
        case "invalid":
            return INVALID;
        case "expired":
            return EXPIRED;
        default:
            throw new IllegalArgumentException("unknown license status [" + value + "]");
    }
}

linear"

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 * under the License.
 */

package org.elasticsearch.protocol.xpack.license;

import java.io.IOException;
import org.elasticsearch.test.ESTestCase;

public class LicenseStatusTests extends ESTestCase {

    import java.io.IOException;
    import org.elasticsearch.test.ESTestCase;

    public class LicenseStatusTests extends ESTestCase {
```java
public void testSerialization() throws IOException {
    LicenseStatus status = randomFrom(LicenseStatus.values());
    assertSame(status, copyWriteable(status, writableRegistry(), LicenseStatus::readFrom));
}
}
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*/
package org.elasticsearch.licensor;

import org.apache.lucene.util.BytesRef;
import org.apache.lucene.util.BytesRefIterator;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.hash.MessageDigests;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.CryptUtils;
import org.elasticsearch.license.License;
import java.io.IOException;
import java.nio.ByteBuffer;
import java.nio.file.Files;
import java.nio.file.Path;
import java.security.InvalidKeyException;
import java.security.MessageDigest;
import java.security.NoSuchAlgorithmException;
import java.security.PrivateKey;
import java.security.PublicKey;
import java.security.SecureRandom;
import java.security.Signature;
import java.security.SignatureException;
import java.util.Base64;
import java.util.Collections;
import java.util.Map;

/**
* Responsible for generating a license signature according to the signature spec and sign it with
* the provided encrypted private key
*/
public class LicenseSigner {

    private static final int MAGIC_LENGTH = 13;
    private final Path publicKeyPath;
    private final Path privateKeyPath;
```
public LicenseSigner(final Path privateKeyPath, final Path publicKeyPath) {
    this.publicKeyPath = publicKeyPath;
    this.privateKeyPath = privateKeyPath;
}

/**
 * Generates a signature for the [code licenseSpec]. Signature structure:
 * <code>
 * | VERSION | MAGIC | PUB_KEY_DIGEST | SIGNED_LICENSE_CONTENT |
 * </code>
 *
 * @return a signed License
 */
public License sign(License licenseSpec) throws IOException {
    XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
    final Map<String, String> licenseSpecViewMode = Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true");
    licenseSpec.toXContent(contentBuilder, new ToXContent.MapParams(licenseSpecViewMode));
    final byte[] signedContent;
    final boolean preV4 = licenseSpec.version() < License.VERSION_CRYPTO_ALGORITHMS;
    try {
        final Signature rsa = Signature.getInstance("SHA512withRSA");
        PrivateKey decryptedPrivateKey = CryptUtils.readEncryptedPrivateKey(Files.readAllBytes(privateKeyPath));
        rsa.initSign(decryptedPrivateKey);
        final BytesRefIterator iterator = BytesReference.bytes(contentBuilder).iterator();
        BytesRef ref;
        while((ref = iterator.next()) != null) {
            rsa.update(ref.bytes, ref.offset, ref.length);
        }
        signedContent = rsa.sign();
    } catch (InvalidKeyException | IOException | NoSuchAlgorithmException | SignatureException e) {
        throw new IllegalStateException(e);
    }
    final byte[] magic = new byte[MAGIC_LENGTH];
    SecureRandom random = new SecureRandom();
    random.nextBytes(magic);
    final byte[] publicKeyBytes = Files.readAllBytes(publicKeyPath);
    PublicKey publicKey = CryptUtils.readPublicKey(publicKeyBytes);
    final byte[] pubKeyFingerprint = preV4 ?
            Base64.getEncoder().encode(CryptUtils.writeEncryptedPublicKey(publicKey)) :
            getPublicKeyFingerprint(publicKeyBytes);
    final byte[] bytes = new byte[4 + 4 + MAGIC_LENGTH + 4 + pubKeyFingerprint.length + 4 +
            signedContent.length];
ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
byteBuffer.putInt(licenseSpec.version())
    .putInt(magic.length)
    .put(magic)
    .putInt(pubKeyFingerprint.length)
    .put(pubKeyFingerprint)
    .putInt(signedContent.length)
    .put(signedContent);

return License.builder()
    .fromLicenseSpec(licenseSpec, Base64.getEncoder().encodeToString(bytes))
    .build();

private byte[] getPublicKeyFingerprint(byte[] keyBytes) {
    MessageDigest sha256 = MessageDigests.sha256();
    sha256.update(keyBytes);
    return sha256.digest();
}

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]W'o""rY9@9x"[hN\>a3>8ZOSdj]R4HxQU99dQ\nT\X?7?*}QMB7fhIE952^hn=-m2-pF8T_I^yT1/=dc=^Ge^^f71cb~_^][5yZI&9L$RxR8XNUC1%^R;CiVIN~O]c%\h]&UXj]_#9/^?1H@_WrSl,}v[#?;m;O'ZiB<Pu
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5)"*"DK[\%N\(Af9l)0X'M:co1uAm]jB_/f
es.logger.level=INFO
log4j.rootLogger=${es.logger.level}, out
log4j.logger.org.apache.http=INFO, out
log4j.additivity.org.apache.http=false
log4j.logger.org.elasticsearch.license=TRACE
log4j.appender.out=org.apache.log4j.ConsoleAppender
log4j.appender.out.layout=org.apache.log4j.PatternLayout
log4j.appender.out.layout.conversionPattern=[%d{ISO8601}][%-5p][%-25c] %m%n
/*
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package org.elasticsearch.license.licensor;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.license.DateUtils;
import org.elasticsearch.license.License;
import org.elasticsearch.license.LicenseVerifier;
import org.elasticsearch.test.ESTestCase;
import org.junit.After;
import org.junit.Before;
import java.nio.file.Files;
import java.nio.file.Path;

public class LicenseVerificationTests extends ESTestCase {

    protected Path pubKeyPath = null;
    protected Path priKeyPath = null;

    @Before
    public void setup() throws Exception {
        pubKeyPath = getDataPath("/public.key");
        priKeyPath = getDataPath("/private.key");
    }

    @After
    public void cleanUp() {
        pubKeyPath = null;
        priKeyPath = null;
    }

    public void testGeneratedLicenses() throws Exception {
        final TimeValue fortyEightHours = TimeValue.timeValueHours(2 * 24);
        final License license = TestUtils.generateSignedLicense(fortyEightHours, pubKeyPath, priKeyPath);
        assertTrue(LicenseVerifier.verifyLicense(license, Files.readAllBytes(pubKeyPath)));
    }

    public void testLicenseTampering() throws Exception {
        final TimeValue twoHours = TimeValue.timeValueHours(2);
        License license = TestUtils.generateSignedLicense(twoHours, pubKeyPath, priKeyPath);
        final License tamperedLicense = License.builder()
            .fromLicenseSpec(license, license.signature())
            .expiryDate(license.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
            .validate()
            .build();
    }
}
assertFalse(LicenseVerifier.verifyLicense(tamperedLicense, Files.readAllBytes(pubKeyPath)));
}

public void testRandomLicenseVerification() throws Exception {
    TestUtils.LicenseSpec licenseSpec = TestUtils.generateRandomLicenseSpec(
            randomIntBetween(License.VERSION_START, License.VERSION_CURRENT));
    License generatedLicense = generateSignedLicense(licenseSpec, pubKeyPath, priKeyPath);
    assertTrue(LicenseVerifier.verifyLicense(generatedLicense, Files.readAllBytes(pubKeyPath)));
}

private static License generateSignedLicense(
    TestUtils.LicenseSpec spec, Path pubKeyPath, Path priKeyPath) throws Exception {
    LicenseSigner signer = new LicenseSigner(priKeyPath, pubKeyPath);
    License.Builder builder = License.builder()
            .uid(spec.uid)
            .feature(spec.feature)
            .type(spec.type)
            .subscriptionType(spec.subscriptionType)
            .issuedTo(spec.issuedTo)
            .issuer(spec.issuer)
            .maxNodes(spec.maxNodes);

    if (spec.expiryDate != null) {
        builder.expiryDate(DateUtils.endOfTheDay(spec.expiryDate));
    } else {
        builder.expiryDate(spec.expiryDateInMillis);
    }

    if (spec.issueDate != null) {
        builder.issueDate(DateUtils.beginningOfTheDay(spec.issueDate));
    } else {
        builder.issueDate(spec.issueDateInMillis);
    }

    builder.version(spec.version);
    return signer.sign(builder.build());
}

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 */
package org.elasticsearch.license.licensor;

import org.elasticsearch.common.Strings;
import org.elasticsearch.common.joda.DateMathParser;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.DateUtils;
import org.elasticsearch.license.License;
import org.elasticsearch.test.ESTestCase;
import org.javacriptMatcher.Assert;
import org.joda.time.format.DateTimeFormatter;
import java.io.IOException;
import java.nio.file.Path;
import java.util.UUID;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomBoolean;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomInt;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomIntBetween;
import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.ESTestCase.randomFrom;
import static org.hamcrest.core.IsEqual.equalTo;

public class TestUtils {

    public static final String PUBLIC_KEY_RESOURCE = "public.key";
    public static final String PRIVATE_KEY_RESOURCE = "private.key";

    private static final FormatDateTimeFormatter formatDateTimeFormatter =
            Joda.forPattern("yyyy-MM-dd");
    private static final DateMathParser dateMathParser =
            new DateMathParser(formatDateTimeFormatter);
    private static final DateTimeFormatter dateTimeFormatter = formatDateTimeFormatter.printer();

    public static String dumpLicense(License license) throws Exception {
        XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
        builder.startObject();
        builder.startObject("license");
        license.toInnerXContent(builder, ToXContent.EMPTY_PARAMS);
        builder.endObject();
        builder.endObject();
        return Strings.toString(builder);
    }

    public static String dateMathString(String time, final long now) {
        return dateTimeFormatter.print(dateMathParser.parse(time, () -> now));
    }
}
public static long dateMath(String time, final long now) {
    return dateMathParser.parse(time, () -> now);
}

public static LicenseSpec generateRandomLicenseSpec(int version) {
    boolean datesInMillis = randomBoolean();
    long now = System.currentTimeMillis();
    String uid = UUID.randomUUID().toString();
    String issuer = "issuer__" + randomInt();
    String issuedTo = "issuedTo__" + randomInt();
    String type = version < License.VERSION_NO_FEATURE_TYPE ?
        randomFrom("subscription", "internal", "development") :
        randomFrom("basic", "silver", "dev", "gold", "platinum");

    final String subscriptionType;
    final String feature;
    if (version < License.VERSION_NO_FEATURE_TYPE) {
        subscriptionType = randomFrom("gold", "silver", "platinum");
        feature = "feature__" + randomInt();
    } else {
        subscriptionType = null;
        feature = null;
    }

    int maxNodes = randomIntBetween(5, 100);
    if (datesInMillis) {
        long issueDateInMillis = dateMath("now", now);
        long expiryDateInMillis = dateMath("now+10d/d", now);
        return new LicenseSpec(
            version,
            uid,
            feature,
            issueDateInMillis,
            expiryDateInMillis,
            type,
            subscriptionType,
            issuedTo,
            issuer,
            maxNodes);
    } else {
        String issueDate = dateMathString("now", now);
        String expiryDate = dateMathString("now+10d/d", now);
        return new LicenseSpec(
            version,
            uid,
            feature,
            issueDate,
            expiryDate,
            type,
            subscriptionType,
public static String generateLicenseSpecString(LicenseSpec licenseSpec) throws IOException {
    XContentBuilder licenses = jsonBuilder();
    licenses.startObject();
    licenses.startObject("license")
        .field("uid", licenseSpec.uid)
        .field("type", licenseSpec.type)
        .field("subscription_type", licenseSpec.subscriptionType)
        .field("issued_to", licenseSpec.issuedTo)
        .field("issuer", licenseSpec.issuer)
        .field("feature", licenseSpec.feature)
        .field("max_nodes", licenseSpec.maxNodes);
    if (licenseSpec.issueDate != null) {
        licenses.field("issue_date", licenseSpec.issueDate);
    } else {
        licenses.field("issue_date_in_millis", licenseSpec.issueDateInMillis);
    }
    if (licenseSpec.expiryDate != null) {
        licenses.field("expiry_date", licenseSpec.expiryDate);
    } else {
        licenses.field("expiry_date_in_millis", licenseSpec.expiryDateInMillis);
    }
    licenses.field("version", licenseSpec.version);
    licenses.endObject();
    licenses.endObject();
    return Strings.toString(licenses);
}

public static void assertLicenseSpec(LicenseSpec spec, License license) {
    MatcherAssert.assertThat(license.uid(), equalTo(spec.uid));
    MatcherAssert.assertThat(license.issuedTo(), equalTo(spec.issuedTo));
    MatcherAssert.assertThat(license.issuer(), equalTo(spec.issuer));
    MatcherAssert.assertThat(license.type(), equalTo(spec.type));
    MatcherAssert.assertThat(license.maxNodes(), equalTo(spec.maxNodes));
    if (spec.issueDate != null) {
        MatcherAssert.assertThat(
            license.issueDate(),
            equalTo(DateUtils.beginningOfTheDay(spec.issueDate)));
    } else {
        MatcherAssert.assertThat(license.issueDate(), equalTo(spec.issueDateInMillis));
    }
    if (spec.expiryDate != null) {
        MatcherAssert.assertThat(
            license.expiryDate(),
            equalTo(DateUtils.beginningOfTheDay(spec.expiryDate)));
    } else {
        MatcherAssert.assertThat(license.expiryDate(), equalTo(spec.expiryDateInMillis));
    }
}
MatcherAssert.assertThat(
    license.expiryDate(),
    equalTo(DateUtils.endOfTheDay(spec.expiryDate)));
} else {
    MatcherAssert.assertThat(license.expiryDate(), equalTo(spec.expiryDateInMillis));
}

public static License generateSignedLicense(
    TimeValue expiryDuration, Path pubKeyPath, Path priKeyPath) throws Exception {
    int version = ESTestCase.randomIntBetween(License.VERSION_START, License.VERSION_CURRENT);
    String type = version < License.VERSION_NO_FEATURE_TYPE ?
        randomFrom("subscription", "internal", "development") :
        randomFrom("trial", "basic", "silver", "dev", "gold", "platinum");
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .expiryDate(issue + expiryDuration.getMillis())
        .issueDate(issue)
        .version(version)
        .type(type)
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    if (version == License.VERSION_START) {
        builder.subscriptionType(randomFrom("dev", "gold", "platinum", "silver");
        builder.feature(ESTestCase.randomAlphaOfLength(10));
    }
    LicenseSigner signer = new LicenseSigner(priKeyPath, pubKeyPath);
    return signer.sign(builder.build());
}

public static class LicenseSpec {
    public final int version;
    public final String feature;
    public final String issueDate;
    public final long issueDateInMillis;
    public final String expiryDate;
    public final long expiryDateInMillis;
    public final String uid;
    public final String type;
    public final String subscriptionType;
    public final String issuedTo;
    public final String issuer;
    public final int maxNodes;

    public LicenseSpec(
        int version,
String uid,
String feature,
long issueDateInMillis,
long expiryDateInMillis,
String type,
String subscriptionType,
String issuedTo,
String issuer,
int maxNodes) {
    this.version = version;
    this.feature = feature;
    this.issueDateInMillis = issueDateInMillis;
    this.issueDate = null;
    this.expiryDateInMillis = expiryDateInMillis;
    this.expiryDate = null;
    this.uid = uid;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.issuedTo = issuedTo;
    this.issuer = issuer;
    this.maxNodes = maxNodes;
}

public LicenseSpec(
    int version,
    String uid,
    String feature,
    String issueDate,
    String expiryDate,
    String type,
    String subscriptionType,
    String issuedTo,
    String issuer,
    int maxNodes) {
    this.version = version;
    this.feature = feature;
    this.issueDate = issueDate;
    this.issueDateInMillis = -1;
    this.expiryDate = expiryDate;
    this.expiryDateInMillis = -1;
    this.uid = uid;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.issuedTo = issuedTo;
    this.issuer = issuer;
    this.maxNodes = maxNodes;
}
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   * or more contributor license agreements. Licensed under the Elastic License;
   * you may not use this file except in compliance with the Elastic License.
   */
package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.license.Claim;
import org.elasticsearch.license.LicenseTest;
public void testTool() throws Exception {
    Path keysDir = createTempDir();
    Path publicKeyFilePath = keysDir.resolve("public");
    Path privateKeyFilePath = keysDir.resolve("private");

    execute(
        "--publicKeyPath",
        publicKeyFilePath.toString(),
        "--privateKeyPath",
        privateKeyFilePath.toString());
    assertTrue(publicKeyFilePath.toString(), Files.exists(publicKeyFilePath));
    assertTrue(privateKeyFilePath.toString(), Files.exists(privateKeyFilePath));
}

package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.license.License;
import org.elasticsearch.license.licensor.TestUtils;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.Paths;
import java.nio.file.attribute.FileTime;
import java.nio.file.attribute.FileTime;
import java.nio.file.attribute.PosixFileLinkAttribute;
import java.nio.file.attribute.PosixFilePermissions;
import java.nio.file.attribute.PosixFileTime;
import java.nio.file.attribute.BasicFileAttributes;
import java.nio.file.attribute.BasicFileAttributes;
import java.nio.file.attribute.FileAttributes;
import java.nio.file.attribute.FileTime;
import java.nio.file.attribute.FileTime;
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import java.nio.file.attribute.FileTime;
import java.nio.file.attribute.FileTime;
import java.nio.file.attribute.FileTime;
import java.nio.file.attribute.FileTime;
import java.nio.file attribute.FileTime;
protected Command newCommand() {
    return new LicenseVerificationTool();
}

public void testMissingKeyPath() throws Exception {
    Path pub = createTempDir().resolve("pub");
    UserException e = expectThrows(
            UserException.class,
            () -> execute("--publicKeyPath", pub.toString()));
    assertTrue(e.getMessage(), e.getMessage().contains("pub does not exist"));
    assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testMissingLicenseSpec() throws Exception {
    UserException e = expectThrows(UserException.class, () -> {
        execute("--publicKeyPath", pubKeyPath.toString());
    });
    assertTrue(
            e.getMessage(),
            e.getMessage().contains("Must specify either --license or --licenseFile");
    assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testBrokenLicense() throws Exception {
    final TimeValue oneHour = TimeValue.timeValueHours(1);
    License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
    License tamperedLicense = License.builder()
            .fromLicenseSpec(signedLicense, signedLicense.signature())
            .expiryDate(signedLicense.expiryDate() + randomIntBetween(1, 1000)).build();
    UserException e = expectThrows(
            UserException.class,
            () -> execute(
                    "--publicKeyPath",
                    pubKeyPath.toString(),
                    "--license",
                    TestUtils.dumpLicense(tamperedLicense)));
    assertEquals("Invalid License!", e.getMessage());
    assertEquals(ExitCodes.DATA_ERROR, e.exitCode);
}

public void testLicenseSpecString() throws Exception {
    final TimeValue oneHour = TimeValue.timeValueHours(1);
    License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
    String output = execute(
            "--publicKeyPath",
            pubKeyPath.toString(),
            "--license",
            TestUtils.dumpLicense(signedLicense));
    }
```java
public void testLicenseSpecFile() throws Exception {
    final TimeValue oneHour = TimeValue.timeValueHours(1);
    License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
    Path licenseSpecFile = createTempFile();
    Files.write(
        licenseSpecFile,
        TestUtils.dumpLicense(signedLicense).getBytes(StandardCharsets.UTF_8));
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--licenseFile",
        licenseSpecFile.toString());
    assertFalse(output, output.isEmpty());
}
```

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 */

```
package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.license.License;
import org.elasticsearch.license.licensor.TestUtils;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;

public class LicenseGenerationToolTests extends CommandTestCase {

    protected Path pubKeyPath = null;
    protected Path priKeyPath = null;

    @Before
    public void setup() throws Exception {
        pubKeyPath = getDataPath(TestUtils.PUBLIC_KEY_RESOURCE);
    }

    protected Path pubKeyPath = null;
    protected Path priKeyPath = null;

    @Before
    public void setup() throws Exception {
        pubKeyPath = getDataPath(TestUtils.PUBLIC_KEY_RESOURCE);
```
priorKeyPath = getDataPath(TestUtils.PRIVATE_KEY_RESOURCE);
}

@Override
protected Command newCommand() {
    return new LicenseGeneratorTool();
}

public void testMissingKeyPaths() throws Exception {
    Path pub = createTempDir().resolve("pub");
    Path pri = createTempDir().resolve("pri");
    UserException e = expectThrows(
        UserException.class,
        () -> execute(
            "--publicKeyPath",
            pub.toString(),
            "--privateKeyPath",
            pri.toString()));
    assertTrue(e.getMessage(), e.getMessage().contains("pri does not exist"));
    assertEquals(ExitCodes.USAGE, e.exitCode);

    Files.createFile(pri);
    e = expectThrows(
        UserException.class,
        () -> execute(
            "--publicKeyPath",
            pub.toString(),
            "--privateKeyPath",
            pri.toString()));
    assertTrue(e.getMessage(), e.getMessage().contains("pub does not exist"));
    assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testMissingLicenseSpec() throws Exception {
    UserException e = expectThrows(
        UserException.class,
        () -> execute(
            "--publicKeyPath",
            pubKeyPath.toString(),
            "--privateKeyPath",
            priKeyPath.toString()));
    assertTrue(e.getMessage(), e.getMessage().contains("Must specify either --license or --licenseFile");
    assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testLicenseSpecString() throws Exception {
TestUtils.LicenseSpec inputLicenseSpec =
    TestUtils.generateRandomLicenseSpec(License.VERSION_CURRENT);
String licenseSpecString = TestUtils.generateLicenseSpecString(inputLicenseSpec);
String output = execute(
    "--publicKeyPath",
    pubKeyPath.toString(),
    "--privateKeyPath",
    priKeyPath.toString(),
    "--license",
    licenseSpecString);
final BytesArray bytes = new BytesArray(output.getBytes(StandardCharsets.UTF_8));
License outputLicense = License.fromSource(bytes, XContentType.JSON);
TestUtils.assertLicenseSpec(inputLicenseSpec, outputLicense);
}

public void testLicenseSpecFile() throws Exception {
    TestUtils.LicenseSpec inputLicenseSpec =
        TestUtils.generateRandomLicenseSpec(License.VERSION_CURRENT);
    String licenseSpecString = TestUtils.generateLicenseSpecString(inputLicenseSpec);
    Path licenseSpecFile = createTempFile();
    Files.write(licenseSpecFile, licenseSpecString.getBytes(StandardCharsets.UTF_8));
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--privateKeyPath",
        priKeyPath.toString(),
        "--licenseFile",
        licenseSpecFile.toString());
    final BytesArray bytes = new BytesArray(output.getBytes(StandardCharsets.UTF_8));
    License outputLicense = License.fromSource(bytes, XContentType.JSON);
    TestUtils.assertLicenseSpec(inputLicenseSpec, outputLicense);
}

apply plugin: 'elasticsearch.build'

dependencies {
    compile project(path: xpackModule('core'), configuration: 'shadow')
    compile "org.elasticsearch:elasticsearch:${version}"
    testCompile "org.elasticsearch.test:framework:${version}"
}

project.forbiddenPatterns {
    exclude '*/*.key'
}

dependencyLicenses.enabled = false
task buildZip(type: Zip, dependsOn: jar) {
    String parentDir = 'license-tools-${version}'
    into(parentDir + '/lib') {
        from jar
        from configurations.runtime
    }
    into(parentDir + '/bin') {
        from 'bin'
    }
}

assemble.dependsOn buildZip

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BSD-licensed, created by Anders Mller. See http://www.brics.dk/automaton/

The levenshtein automata tables (under core/src/java/org/apache/lucene/util/automaton) were
automatically generated with the moman/finenight FSA library, created by
Jean-Philippe Barrette-LaPierre. This library is available under an MIT license,
see http://sites.google.com/site/rrettesite/moman and
http://bitbucket.org/jpbarrette/moman/overview/

The class org.apache.lucene.util.WeakIdentityMap was derived from
the Apache CXF project and is Apache License 2.0.

The Google Code Prettify is Apache License 2.0.
See http://code.google.com/p/google-code-prettify/
JUnit (junit-4.10) is licensed under the Common Public License v. 1.0
See http://junit.sourceforge.net/cpl-v10.html

This product includes code (JaspellTernarySearchTrie) from Java Spelling Checkin
g Package (jaspell): http://jaspell.sourceforge.net/
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The snowball stemmers in
analysis/common/src/java/net/sf/snowball
were developed by Martin Porter and Richard Boulton.
The snowball stopword lists in
analysis/common/src/resources/org/apache/lucene/analysis/snowball
were developed by Martin Porter and Richard Boulton.
The full snowball package is available from
http://snowball.tartarus.org/

The KStem stemmer in
analysis/common/src/org/apache/lucene/analysis/en
was developed by Bob Krovetz and Sergio Guzman-Lara (CIIR-UMass Amherst)
under the BSD-license.

The Arabic,Persian,Romanian,Bulgarian, Hindi and Bengali analyzers (common) come with a default
stopword list that is BSD-licensed created by Jacques Savoy. These files reside in:
analysis/common/src/resources/org/apache/lucene/analysis/ar/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/fa/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/ro/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bg/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/hi/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bn/stopwords.txt

The German,Spanish,Finnish,French,Hungarian,Italian,Portuguese,Russian and Swedish light stemmers
(common) are based on BSD-licensed reference implementations created by Jacques Savoy and
Ljiljana Dolamic. These files reside in:
analysis/common/src/java/org/apache/lucene/analysis/de/GermanLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/de/GermanMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/es/SpanishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fi/FinnishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/hu/HungarianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/it/ItalianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/ru/RussianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/sv/SwedishLightStemmer.java

The Stempel analyzer (stempel) includes BSD-licensed software developed
by the Egothor project http://egothor.sf.net/, created by Leo Galambos, Martin Kvapil, and Edmond Nolan.

The Polish analyzer (stempel) comes with a default stopword list that is BSD-licensed created by the Carrot2 project. The file resides in stempel/src/resources/org/apache/lucene/analysis/pl/stopwords.txt. See http://project.carrot2.org/license.html.

The SmartChineseAnalyzer source code (smarten) was provided by Xiaoping Gao and copyright 2009 by www.imdct.net.

WordBreakTestUnicode_*.java (under modules/analysis/common/src/test/) is derived from Unicode data such as the Unicode Character Database. See http://unicode.org/copyright.html for more details.

The Morfologik analyzer (morfologik) includes BSD-licensed software developed by Dawid Weiss and Marcin Mikowski (http://morfologik.blogspot.com/).

Morfologik uses data from Polish ispell/myspell dictionary (http://www.sjp.pl/slownik/en/) licenced on the terms of (inter alia) LGPL and Creative Commons ShareAlike.

Morfologic includes data from BSD-licensed dictionary of Polish (SGJP) (http://sgjp.pl/morfeusz/)

Servlet-api.jar and javax.servlet-*.jar are under the CDDL license, the original source code for this can be found at http://www.eclipse.org/jetty/downloads.php

===========================================================================
Kuromoji Japanese Morphological Analyzer - Apache Lucene Integration
===========================================================================

This software includes a binary and/or source version of data from

mecab-ipadic-2.7.0-20070801

which can be obtained from

http://atilika.com/releases/mecab-ipadic/mecab-ipadic-2.7.0-20070801.tar.gz

or

http://jaist.dl.sourceforge.net/project/mecab/mecab-ipadic/2.7.0-20070801/mecab-ipadic-2.7.0-20070801.tar.gz

===========================================================================
mecab-ipadic-2.7.0-20070801 Notice
===========================================================================

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OSXAdapter

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JUnRAR (https://github.com/edmund-wagner/junrar/)

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Alan Beale <biljir@pobox.com> also deserves special credit as he has, in addition to providing the 12Dicts package and being a major contributor to the ENABLE word list, given me an incredible amount of feedback and created a number of special lists (those found in the Supplement) in order to help improve the overall quality of SCOWL.

The 10 level includes the 1000 most common English words (according to the Moby (TM) Words II [MWords] package), a subset of the 1000 most common words on the Internet (again, according to Moby Words II), and frequently class 16 from Brian Kelk's "UK English Wordlist with Frequency Classification".

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Date: Sat, 08 Jul 2000 20:27:21 +0100
From: Brian Kelk <Brian.Kelk@cl.cam.ac.uk>

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> Wordlist With Frequency Classification word list as it seems to
> be lacking any copyright notice.

There were many many sources in total, but any text marked
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source. An earlier version of the list resided in a filesystem called
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Date: Tue, 11 Jul 2000 19:31:34 +0100

> So are you saying your word list is also in the public domain?

That is the intention.

The 20 level includes frequency classes 7-15 from Brian's word list.

The 35 level includes frequency classes 2-6 and words appearing in at
least 11 of 12 dictionaries as indicated in the 12Dicts package. All
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The 80 level includes the ENABLE word list, all the lists in the ENABLE supplement package (except for ABLE), the "UK Advanced Cryptics Dictionary" (UKACD), the list of signature words in from YAWL package,
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1.80 google-guava 25.1.0.jre

1.81 gson 2.8.5

1.82 guava 25.1

1.83 HdrHistogram 2.1.9

1.83.1 Available under license:

<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="utf-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta name="viewport" content="width=device-width, initial-scale=1">
<meta name="description" content="Home page of The Apache Software Foundation">
<link rel="apple-touch-icon" sizes="57x57" href="/favicons/apple-touch-icon-57x57.png">
<link rel="apple-touch-icon" sizes="60x60" href="/favicons/apple-touch-icon-60x60.png">
<link rel="apple-touch-icon" sizes="72x72" href="/favicons/apple-touch-icon-72x72.png">
<link rel="apple-touch-icon" sizes="76x76" href="/favicons/apple-touch-icon-76x76.png">
<link rel="apple-touch-icon" sizes="114x114" href="/favicons/apple-touch-icon-114x114.png">
<link rel="apple-touch-icon" sizes="120x120" href="/favicons/apple-touch-icon-120x120.png">
<link rel="apple-touch-icon" sizes="144x144" href="/favicons/apple-touch-icon-144x144.png">
<link rel="apple-touch-icon" sizes="152x152" href="/favicons/apple-touch-icon-152x152.png">
<link rel="apple-touch-icon" sizes="180x180" href="/favicons/apple-touch-icon-180x180.png">
<link rel="icon" type="image/png" href="/favicons/favicon-32x32.png" sizes="32x32">
<link rel="icon" type="image/png" href="/favicons/favicon-194x194.png" sizes="194x194">
<link rel="icon" type="image/png" href="/favicons/favicon-96x96.png" sizes="96x96">
<link rel="icon" type="image/png" href="/favicons/android-chrome-192x192.png" sizes="192x192">
<link rel="manifest" href="/favicons/manifest.json">
<link rel="shortcut icon" href="/favicons/favicon.ico">
<meta name="msapplication-TileColor" content="#603cba">
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</head>

<body>

<!-- Navigation -->
<header>
<nav class="navbar navbar-default navbar-fixed-top">
<div class="container">
<div class="navbar-header">
<button class="navbar-toggle" type="button" data-toggle="collapse" data-target="#mainnav-collapse">
<span class="sr-only">Toggle navigation</span>
<span class="icon-bar"></span>
<span class="icon-bar"></span>
<span class="icon-bar"></span>
</button>
<a href="/" class="navbar-brand"><span class="glyphicon glyphicon-home"></span></a>
</div>
<div class="collapse navbar-collapse" id="mainnav-collapse">
<div style="line-height:20px; padding-top:5px; float:left"><a href="/">Home</a>&nbsp;&raquo&nbsp;<a href="/licenses/">Licenses</a></div>
<ul class="nav navbar-nav navbar-right">
<li class="dropdown">
<a href="/" class="dropdown-toggle" data-toggle="dropdown">About <span class="caret"></span></a>
<ul class="dropdown-menu" role="menu">
<li><a href="/foundation/">Overview</a></li>
<li><a href="/foundation/members.html/">Members</a></li>
<li><a href="/foundation/how-it-works.html/">Process</a></li>
<li><a href="/foundation/sponsorship.html/">Sponsorship</a></li>
<li><a href="/foundation/glossary.html/">Glossary</a></li>
</ul>
</li>
</ul>
</div>
</div>
</nav>
</header>

<footer>
</footer>

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</pre></div></div>
<div class="col-sm-2">
<h5 class="white">Innovation</h5>
<ul class="list-unstyled white" role="menu">
<li><a href="http://incubator.apache.org/">Incubator</a></li>
<li><a href="http://labs.apache.org/">Labs</a></li>
<li><a href="/licenses/">Licensing</a></li>
<li><a href="/foundation/license-faq.html">Licensing FAQ</a></li>
<li><a href="/foundation/marks/">Trademark Policy</a></li>
<li><a href="/foundation/contact.html">Contacts</a></li>
</ul>
</div>

<div class="col-sm-2">
<h5 class="white">Tech Operations</h5>
<ul class="list-unstyled white" role="menu">
<li><a href="/dev/">Developer Information</a></li>
<li><a href="/dev/infrastructure.html">Infrastructure</a></li>
<li><a href="/security/">Security</a></li>
<li><a href="http://status.apache.org">Status</a></li>
<li><a href="/foundation/contact.html">Contacts</a></li>
</ul>
</div>

<div class="col-sm-2">
<h5 class="white">Press</h5>
<ul class="list-unstyled white" role="menu">
<li><a href="/press/">Overview</a></li>
<li><a href="https://blogs.apache.org/foundation/">Announcements</a></li>
<li><a href="https://twitter.com/TheASF">Twitter Feed</a></li>
<li><a href="/press/#contact">Contacts</a></li>
</ul>
</div>

<div class="col-sm-2">
<h5 class="white">Legal</h5>
<ul class="list-unstyled white" role="menu">
<li><a href="/legal/">Legal Affairs</a></li>
<li><a href="/licenses/">Licenses</a></li>
<li><a href="/foundation/marks/">Trademark Policy</a></li>
<li><a href="/foundation/records/">Public Records</a></li>
<li><a href="/foundation/policies/privacy.html">Privacy Policy</a></li>
<li><a href="/licenses/exports/">Export Information</a></li>
<li><a href="/foundation/license-faq.html">License/Distribution FAQ</a></li>
<li><a href="/foundation/contact.html">Contacts</a></li>
</ul>
</div>
1.84 hibernate-validator 6.0.14

1.84.1 Available under license:

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<!--
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~
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--><validation-config
xmlns="http://jboss.org/xml/ns/javax/validation/configuration"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://jboss.org/xml/ns/javax/validation/configuration validation-configuration-1.1.xsd"
version="1.1">
    <property
        name="hibernate.validator.constraint_mapping_contributors">org.hibernate.validator.test.cfg.ConstraintMappingContributorConfiguredInValidationXmlTest$MyConstraintMappingContributor1,org.hibernate.validator.test.cfg.ConstraintMappingContributorConfiguredInValidationXmlTest$MyConstraintMappingContributor2</property>
</validation-config>
<?xml version="1.0" encoding="UTF-8"?>
<!--
~ Hibernate Validator, declare and validate application constraints
~
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--><validation-config
xmlns="http://jboss.org/xml/ns/javax/validation/configuration"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://jboss.org/xml/ns/javax/validation/configuration validation-configuration-1.1.xsd"
version="1.1">
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    <property
        name="hibernate.validator.constraint_mapping_contributors">org.hibernate.validator.test.cfg.ConstraintMappingContributorConfiguredInValidationXmlTest$MyConstraintMappingContributor2</property>
</validation-config>
<validation-config>
<property name="hibernate.validator.constraint_mapping_contributors">org.hibernate.validator.integration.wildfly.MyConstraintMappingContributor</property>
</validation-config>

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## 1.100 jackson-dataformat-cbor 2.9.8

## 1.101 jackson-dataformat-smile 2.9.8

## 1.102 jackson-dataformat-yaml 2.9.8
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1.112 jaxen 1.1.2

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Eclipse

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* org.eclipse.jetty.orbit:org.eclipse.jdt.core

The following artifacts are EPL and ASL2.
* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.
* org.eclipse.jetty.orbit:javax.mail.glassfish

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https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

* javax.servlet:javax.servlet-api
* javax.annotation:javax.annotation-api
* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

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Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following artifacts may be included in the distribution or downloaded when ALPN module is selected.

* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications are hosted at github and both modified and original are under GPL v2 with classpath exceptions.
http://openjdk.java.net/legal/gplv2+ce.html

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OW2

The following artifacts are licensed by the OW2 Foundation according to the terms of http://asm.ow2.org/license.html
org.ow2.asm:asm-commons
org.ow2.asm:asm

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Apache

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org.apache.taglibs:taglibs-standard-spec
org.apache.taglibs:taglibs-standard-impl

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MortBay

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org.mortbay.jasper:apache-jsp
org.apache.tomcat:tomcat-jasper
org.apache.tomcat:tomcat-juli
org.apache.tomcat:tomcat-jsp-api
org.apache.tomcat:tomcat-el-api
org.apache.tomcat:tomcat-jasper-el
org.apache.tomcat:tomcat-api
org.apache.tomcat:tomcat-util-scan
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el
org.apache.tomcat:tomcat-jasper-el
org.apache.tomcat:tomcat-el-api

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Mortbay

The following artifacts are CDDL + GPLv2 with classpath exception.

https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

org.eclipse.jetty.toolchain:jetty-schemas

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Assorted

The UnixCrypt.java code implements the one way cryptography used by Unix systems for simple password protection. Copyright 1996 Aki Yoshida,
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1.131 json-java 20140107

1.132 json-path 2.4.0

1.133 json-smart 2.3
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1.138 kryo 4.0.2

1.139 kryo-parent 4.0.2
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JUnit

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1.141 lang-mustache-client 6.4.2

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1.143 lettuce-core 5.1.3

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1.145 log4j-to-slf4j 2.11.1

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VERSION: 2.1 PoliMorf
BUILD: 2016-02-13 19:37:50+01:00
GIT: 6e63b53

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1.164 mapstruct 1.2.0

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1.165 metrics 4.0.5

1.166 micrometer-core 1.1.2

1.167 minlog 1.3.0
1.167.1 Available under license:

```xml
<!DOCTYPE html>
<html lang="en" dir="ltr">
<head profile="http://www.w3.org/1999/xhtml/vocab">
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<meta name="viewport" content="width=device-width, initial-scale=1" />
```
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    x = "<br><p>The following are other community resources that may be helpful:<br>\n<a href=https://tldrlegal.com/license/bsd-2-clause-license-%28freebsd%29 style='font-weight: bold;'>The BSD 2-Clause License on TLDRLegal</a><br><a href=http://www.gnu.org/licenses/license-list.en.html>GNU License List</a><br><a href=https://en.wikipedia.org/wiki/Comparison_of_free_and_open-source_software_licenses>Wikipedia License List</a><br><a href=http://oss-watch.ac.uk/apps/licdiff/>OSSWatch License Diff</a><br><a href=choosealicense.com>Choosealicense</a>\n";
  } else {
    x = " ";
  }
  document.getElementById("demo").innerHTML = x;
}

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1.168 modelmapper 2.3.0

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1.174 netty-buffer 4.1.31

1.175 netty-codec 4.1.31

1.176 netty-codec-http 4.1.31

1.177 netty-handler 4.1.31

1.178 netty-resolver 4.1.31

1.179 netty-transport 4.1.31
1.180 not-yet-commons-ssl 0.3.17

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1.185 opensaml-java 2.6.1

1.186 opensaml-java 2.6.6

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1.188 parent-join-client 6.4.2

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1.192 rank-eval-client 6.4.2

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1.200 ribbon-core 2.3.0

1.201 ribbon-httpclient 2.3.0

1.202 ribbon-loadbalancer 2.3.0

1.203 ribbon-transport 2.3.0

1.204 rxjava 1.3.8

1.205 rxjava-reactive-streams 1.2.1

1.206 rxnetty 0.4.9

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1.207 rxnetty-contexts 0.4.9

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1.211 slf4j 1.7.25

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1.212 snakeyaml 1.23

1.213 snappy-java 1.1.7.1

1.214 spring-aop 5.1.4
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1.220 spring-boot-configuration-processor 2.1.2

1.221 spring-boot-starter 2.1.2

1.222 spring-boot-starter-actuator 2.1.2

1.223 spring-boot-starter-aop 2.1.2

1.224 spring-boot-starter-cache 2.1.2

1.225 spring-boot-starter-data-cassandra 2.1.2
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1.234 spring-cloud-commons 2.1.0
1.235 spring-cloud-consul 2.1.0

1.236 spring-cloud-consul-config 2.1.0

1.237 spring-cloud-consul-core 2.1.0

1.238 spring-cloud-consul-discovery 2.1.0

1.239 spring-cloud-context 2.1.0

1.240 spring-cloud-function-context 2.0.0

1.241 spring-cloud-function-core 2.0.0

1.242 spring-cloud-netflix 2.1.0

1.243 spring-cloud-netflix-archaius 2.1.0

1.244 spring-cloud-netflix-core 2.1.0
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1.259 spring-cloud-stream 2.1.0

1.260 spring-cloud-stream-binder-kafka 2.1.0

1.261 spring-cloud-stream-binder-kafka-core 2.1.0
1.262 spring-cloud-vault-config 2.1.0

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1.272 spring-integration-core 5.1.2

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1.273 spring-integration-jmx 5.1.2

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1.274 spring-integration-kafka 3.1.0

1.275 spring-integration-tuple 1.0.0

1.276 spring-jcl 5.1.4

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1.292 spring-security-web 5.1.3

1.293 spring-session 2.1.3
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1.302 springfox-core 2.9.2

1.303 springfox-schema 2.9.2

1.304 springfox-spi 2.9.2

1.305 springfox-spring-web 2.9.2

1.306 springfox-swagger-common 2.9.2

1.307 springfox-swagger2 2.9.2

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2

SourceFileLicenseMapper.java
RuntimeVisibleAnnotations
L java/lang/annotation/Target;value"L java/lang/annotation/ElementType;METHOD
L java/lang/annotation/Retention;&Ljava/lang/annotation/RetentionPolicy;SOURCE
RuntimeInvisibleAnnotationsLo
go/mapstruct/Qualifier;springfox/documentation/swagger2/mappers/LicenseMapper$L
LicenseLicenseInnerClassesja
va/lang/Objectjava/lang/annotation/Annotation6springfox/documentation/swagger2/mappers/LicenseMapper&}
e

1.308 stax-ex 1.8

1.309 swagger 1.5.20
1.310 swagger 1.5.10

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```java
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import com.fasterxml.jackson.annotation.JsonAnyGetter;
import com.fasterxml.jackson.annotation.JsonAnySetter;
import java.util.HashMap;
import java.util.Map;

public class License {
    private final Map<String, Object> vendorExtensions = new HashMap<String, Object>();
    private String name;
    private String url;

    public License name(String name) {
        setName(name);
        return this;
    }

    public License url(String url) {
        setUrl(url);
        return this;
    }

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public String getUrl() {
        return url;
    }

    public void setUrl(String url) {
        this.url = url;
    }

    @JsonAnyGetter
    public Map<String, Object> getVendorExtensions() {
        return vendorExtensions;
    }
```
return vendorExtensions;
}

@JsonAnySetter
public void setVendorExtension(String name, Object value) {
    if (name.startsWith("x-")) {
        vendorExtensions.put(name, value);
    }
}

@Override
public int hashCode() {
    final int prime = 31;
    int result = 1;
    result = prime * result + ((name == null) ? 0 : name.hashCode());
    result = prime * result + ((url == null) ? 0 : url.hashCode());
    return result;
}

@Override
public boolean equals(Object obj) {
    if (this == obj) {
        return true;
    }
    if (obj == null) {
        return false;
    }
    if (getClass() != obj.getClass()) {
        return false;
    }
    License other = (License) obj;
    if (name == null) {
        if (other.name != null) {
            return false;
        }
    } else if (!name.equals(other.name)) {
        return false;
    }
    if (url == null) {
        if (other.url != null) {
            return false;
        }
    } else if (!url.equals(other.url)) {
        return false;
    }
    return true;
}
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 */

package io.swagger.annotations;

import java.lang.annotation.ElementType;
import java.lang.annotation.Retention;
import java.lang.annotation.RetentionPolicy;
import java.lang.annotation.Target;

/**
 * License metadata available within the info section of a Swagger definition, see
 * https://github.com/OAI/OpenAPI-Specification/blob/master/versions/2.0.md#licenseObject
 * @since 1.5.0
 */

@Target(ElementType.ANNOTATION_TYPE)
@Retention(RetentionPolicy.RUNTIME)
public @interface License {

/**
 * The name of the license.
 * @return the name of the license
 */
String name();

/**
 * An optional URL for the license.
 * @return an optional URL for the license.
 */
String url() default "";
}
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1.311 swagger-annotations 1.5.20

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package io.swagger.annotations;

import java.lang.annotation.ElementType;
import java.lang.annotation.Retention;
import java.lang.annotation.RetentionPolicy;
import java.lang.annotation.Target;

/**
 * License metadata available within the info section of a Swagger definition, see
 * https://github.com/OAI/OpenAPI-Specification/blob/master versions/2.0.md#licenseObject
 * @since 1.5.0
 */

@Target(ElementType.ANNOTATION_TYPE)
```
@Retention(RetentionPolicy.RUNTIME)
public @interface License {

    /**
     * The name of the license.
     */
    String name();

    /**
     * An optional URL for the license.
     */
    String url() default "";
}

1.312 swagger-ui 2.2.10-1

1.313 t-digest 3.2

1.314 tomcat-embed-el 9.0.14

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David Megginson, david@megginson.com
2000-05-05

1.326 xml-apis-ext 1.3.04

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2000-05-05

1.327 xmltooling 1.4.6

1.328 xom 1.2.5

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