



## Obtaining and Installing Licenses

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Licenses are available in all switches in the Cisco MDS 9000 Family. Licensing allows you to access specified premium features on the switch after you install the appropriate license for that feature.

This chapter contains information related to licensing types, options, procedures, installation, and management for the Cisco MDS SAN-OS software.

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## Licensing Terminology

The following terms are used in this chapter:

- Licensed feature—Permission to use a particular feature through a license file, a hardware object, or a legal contract. This permission is limited to the number of users, number of instances, time span, and the implemented switch.
- License expiry—The time span during which a licensed feature is valid. The software tracks all licenses and sends periodic alerts before shutting down the licensed feature.
- Counted license—The number of usage instances for a licensed feature.
- Licensed application—A software feature that requires a license to be used.
- License enforcement—A mechanism that prevents a feature from being used without first obtaining a license.
- Node-locked license—A license that can only be used on a particular switch using the switch's unique host ID.
- Host IDs—A unique chassis serial number that is specific to each Cisco MDS switch.
- Proof of purchase—A document entitling its rightful owner to use licensed feature(s) on one Cisco MDS switch as described in that document. Also known as the claim certificate.
- Product Authorization Key (PAK)—The PAK allows you to obtain a license key from one of the sites listed in the proof of purchase document. After registering at the specified website, you will receive your license key file and installation instructions through e-mail.
- License key file—A switch-specific unique file that specifies the licensed features. Each file contains digital signatures to prevent tampering and modification. License keys are required to use a licensed feature. License keys are enforced within a specified time span.
- Counted license—The number of licenses issued for a single feature (for example, FCIP). You can increase counted licenses (incremental licenses) should a need arise in the future.
- Incremental license—An additional licensed feature that was not in the initial license file. License keys are incremental—if you purchase some features now and others later, the license file and the software detect the sum of all features for the specified switch.
- Evaluation license—A temporary license. Evaluation licenses are time bound (valid for a specified number of days) and are not tied to a host ID (switch serial number).
- Grace period—The amount of time the features in a license package can continue functioning without a license.
- Support—If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco Systems, contact Cisco Technical Support at this URL: <http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

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## Licensing Model

The licensing model defined for the Cisco MDS product line has two options:

- Feature-based licensing—features that are applicable to the entire switch. The cost varies based on a per-switch usage. [Table 3-1](#) lists the feature-based license packages.
- Module-based licensing— features that require additional hardware modules. The cost varies based on a per-module usage. An example is the IPS-8 or IPS-4 module using the FCIP feature.



**Note**

Each module requires its own separate license. If you replace a module that requires a license with a module of the same type (such as replacing a Storage Services Module (SSM) with another SSM), the existing license will support the new module.



**Note**

Any feature not included in a license package is bundled with the Cisco MDS 9000 Family switches and is provided at no charge to the user.

**Table 3-1 Feature-Based Licenses**

Feature License	Features
Enterprise package (ENTERPRISE_PKG)	<ul style="list-style-type: none"> <li>• Enhanced security features:               <ul style="list-style-type: none"> <li>– LUN zoning</li> <li>– Read-only zones</li> </ul> </li> <li>• Port security</li> <li>• VSAN-based access control</li> <li>• Fibre Channel Security Protocol (FC-SP) authentication</li> <li>• IP Security Protocol (IPsec) for iSCSI and FCIP using the MPS-14/2 module or Cisco MDS 9216i switch</li> <li>• Advanced traffic engineering—Quality of Service (QoS)</li> <li>• Enhanced VSAN routing—inter-VSAN routing (IVR) over FC</li> <li>• IVR Network Address Translation (NAT) over FC</li> <li>• Zone-based traffic prioritizing</li> <li>• Extended credits using the MPS-14/2 module or the Cisco MDS 9216i Switch</li> <li>• Zone-based QoS</li> <li>• Extended Credits</li> <li>• Fibre Channel write acceleration</li> <li>• SCSI flow statistics</li> <li>• FCIP encryption</li> </ul>

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**Table 3-1 Feature-Based Licenses (continued)**

Feature License	Features
SAN extension over IP package for IPS-8 modules (SAN_EXTN_OVER_IP)  SAN extension over IP package for IPS-4 modules (SAN_EXTN_OVER_IP_IPS4)	The following features apply to IPS-8 and IPS-4 modules: <ul style="list-style-type: none"> <li>• FCIP</li> <li>• FCIP compression</li> <li>• FCIP write acceleration</li> <li>• FCIP tape acceleration</li> <li>• SAN extension tuner features</li> <li>• IVR over FCIP</li> <li>• IVR NAT over FCIP</li> </ul>
SAN extension over IP package for MPS-14/2 modules (SAN_EXTN_OVER_IPS2)  <b>Note</b> The FCIP, IVR, and SAN extension tuner features are bundled with the Cisco MDS 9216i switch and do not require the SAN extension over IP package to be installed for the fixed IP ports on the integrated supervisor module. You must install a SAN extension over IP package if you install an MPS-14/2, IPS-8, or IPS-4 module in the Cisco MDS9216i switch.	The following features apply to the MPS-14/2 module and the fixed Cisco MDS 9216i IP ports: <ul style="list-style-type: none"> <li>• FCIP</li> <li>• Hardware-based FCIP compression</li> <li>• FCIP write acceleration</li> <li>• FCIP tape acceleration</li> <li>• SAN extension tuner features</li> <li>• IVR over FCIP</li> <li>• IVR NAT over FCIP</li> </ul>
Mainframe package (MAINFRAME_PKG)	<ul style="list-style-type: none"> <li>• FICON protocol and CUP management</li> <li>• FICON VSAN and intermixing</li> <li>• Switch cascading</li> <li>• Fabric binding</li> <li>• IBM TotalStorage Virtual Tape Server (VTS)</li> <li>• IBM TotalStorage XRC application</li> </ul>

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**Table 3-1 Feature-Based Licenses (continued)**

Feature License	Features
Fabric Manager Server package (FM_SERVER_PKG)	<ul style="list-style-type: none"> <li>• Multiple physical fabric management</li> <li>• Centralized fabric discovery services</li> <li>• Continuous MDS health and event monitoring</li> <li>• Long term historical Fibre Channel performance monitoring</li> <li>• Performance reports and charting for hotspot analysis</li> <li>• Web-based operational view</li> <li>• Threshold monitoring</li> <li>• Fabric Manager Web Client for operational view</li> <li>• Performance thresholds</li> </ul>
Storage Services Enabler package (STORAGE_SERVICES_ENABLER_PKG)	<ul style="list-style-type: none"> <li>• Provides the underlying infrastructure and programmatic interface to enable network-based storage applications when used with the Advanced Services Modules (ASMs) and Storage Services Modules (SSMs).</li> <li>• The network-based storage applications running on the ASM and SSM that require the SSE license are as follows:               <ul style="list-style-type: none"> <li>– VERITAS Storage Foundation for Networks</li> </ul> </li> <li>• The intelligent fabric applications running on the SSM that require the SSE license are as follows:               <ul style="list-style-type: none"> <li>– SANTap</li> <li>– Network-Accelerated Serverless Backup (NASB)</li> <li>– Third-party partner applications</li> </ul> </li> </ul>

## Licensing High Availability

As with other Cisco MDS SAN-OS features, the licensing feature also maintains the following high availability standards for all switches in the Cisco MDS 9000 Family:

- Installing any license in any switch is a nondisruptive process.
- Installing a license automatically saves a copy of permanent licenses to the chassis in all switches.
- Enabling a license feature without a license key starts a counter on the grace period. You then have 60 days (for earlier versions of SAN-OS 1.3(3c) or earlier) or 120 days (for SAN-OS 1.3(4) or later) to install the appropriate license keys or disable the use of that feature. If at the end of the 60 day or 120 day grace period the switch does not have a valid license key for the feature, the feature is automatically disabled by the switch.

Directors in the Cisco MDS 9500 Series have the following additional high availability features:

- The license software runs on both supervisor modules and provides failover protection.

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- The license key file is mirrored on both supervisor modules. Even if both supervisor modules fail, the license file continues to function from the version that is available on the chassis.

## Options to Install a License

If you have purchased a new switch through either your reseller or through Cisco Systems, you can:

- Obtain a factory-installed license (only applies to new switch orders).
- Perform a manual license installation (applies to existing switches).

## Obtaining a Factory-Installed License

You can obtain factory-installed licenses for a new switch.

To obtain a factory-installed license for a new Cisco MDS switch, follow these steps.

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**Step 1** Contact your reseller or Cisco representative and request this service.



**Note** If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco Systems, contact Cisco Technical Support at this URL: <http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

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Your switch is shipped with the required licenses installed in the system. The proof of purchase document is sent along with the switch.

**Step 2** Obtain the host ID from the proof of purchase for future use.

**Step 3** Start to use the switch and the licensed features.

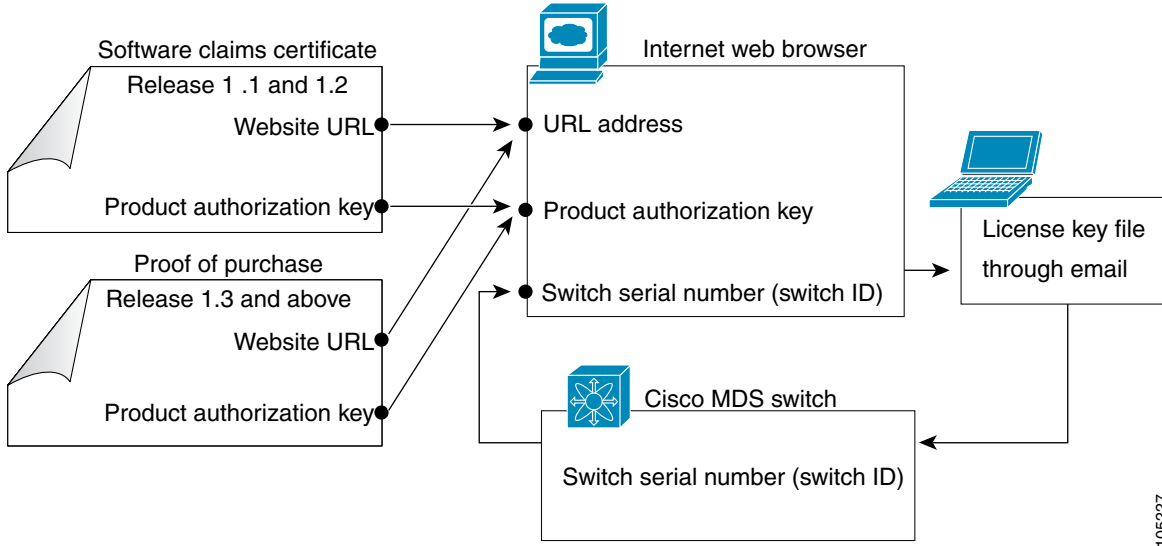
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## Performing a Manual Installation

If you have existing switches or if you wish to install the licenses on your own, you must first obtain the license key file and then install that file in the switch (see [Figure 3-1](#)).

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**Figure 3-1** Obtaining a License Key File



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## Obtaining the License Key File



### Note

Refer to the *Cisco MDS 9000 Family Fabric Manager Configuration Guide* for details on installing automated licenses using the Fabric Manager GUI.

To obtain new or updated license key files using the CLI, follow these steps.

- Step 1** Use the **show license host-id** command to obtain the serial number for your switch. The host ID is also referred to as the switch serial number.

```
switch# show license host-id
License hostid: VDH=FOX064317SQ
```



### Tip

Use the entire ID that appears after the colon (:) sign. In this example, the host ID is VDH=FOX064317SQ.

- Step 2** Obtain either your claim certificate or your proof of purchase document. This document accompanies every Cisco MDS switch.
- Step 3** Get the product authorization key (PAK) from either the claim certificate or the proof of purchase document.
- Step 4** Locate the website URL from either the claim certificate or the proof of purchase document.
- Step 5** Access the specified URL that applies to your switch and enter the switch serial number and the PAK. The license key file is sent to you by e-mail. The license key file is digitally signed to only authorize use on the requested switch. The requested features are also enabled once the Cisco SAN-OS software on the specified switch accesses the license key file.

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**Caution** Install the license key file in the specified MDS switch without making any modifications.

A license is either permanent or it expires on a fixed date. If you do not have a license, the grace period for using that feature starts from the first time you start using a feature offered by that license (see the “Grace Period Alerts” section on page 3-11).

- Step 6** Use the **copy licenses** command in EXEC mode to save your license file to one of two locations—bootflash: or slot0: (see the “Backing Up License Files” section on page 3-9).

## Installing the License Key File



**Tip** If you need to install multiple licenses in any switch in the Cisco MDS 9000 Family, be sure to provide unique file names for each license key file.

To install a license key file in any switch, follow these steps:

- Step 1** Log into the switch through the console port of the active supervisor.
- Step 2** Perform the installation by issuing the **install license** command on the active supervisor module from the switch console.

```
switch# install license bootflash:license_file.lic
Installing license ..done
```



**Note** If you provide a target name for the license key file, the file is installed with the specified name. Otherwise, the file name specified in the license key file is used to install the license.

- Step 3** Exit the switch console and open a new terminal session to view all license files installed on the switch using the **show license** command.

```
switch# show license
Permanent.lic:
SERVER this_host ANY
VENDOR cisco
INCREMENT MAINFRAME_PKG cisco 1.0 permanent uncounted \
  HOSTID=VDH=FOX0646S017 \
  NOTICE="<LicFileID></LicFileID><LicLineID>0</LicLineID> \
  <PAK>dummyPak</PAK>" SIGN=EE9F91EA4B64
```



**Note** If the license meets all guidelines when the **install license** command is issued, all features and modules continue functioning as configured. This is true for any switch in the Cisco MDS 9000 Family.



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## Backing Up License Files

All installed license files can be backed up as a .tar file in the user specified location. Use the **copy licenses** command in EXEC mode to save your license file to one of two locations—bootflash: or slot0:. The following example saves all licenses to a file named Enterprise.tar.

```
switch# copy licenses bootflash:/Enterprise.tar
Backing up license done
```



**Tip**

We recommend backing up your license files immediately after installing them and just before issuing a **write erase** command.



**Caution**

If you erase any existing licenses, you can only install them using the **install license** command.

## Identifying License Features in Use

When a feature is enabled, it can activate a license grace period. To identify the features active for a specific license using the **show license usage** *license-name* command.

```
switch# show license usage ENTERPRISE_PKG
Application
-----
ivr
qos_manager
-----
```

## Uninstalling Licenses

You can only uninstall a permanent license that is not in use. If you try to delete a permanent license that is currently being used, the software rejects the request and issues an error message. Uninstalling an unused license causes the grace period to come into effect. The grace period is counted from the first use of the feature without a license and is reset when a valid license file is installed.



**Note**

Permanent licenses cannot be uninstalled if they are currently being used. Features turned on by permanent licenses must first be disabled, before that license is uninstalled.



**Tip**

If you are using an evaluation license and would like to install a new permanent license, you can do so without service disruption and before the evaluation license expires. Removing an evaluation license immediately triggers a grace period without service disruption.



**Caution**

Uninstalling a license requires the related features to first be disabled.

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To uninstall a license, follow these steps:

- 
- Step 1** Save your running configuration to a remote server using the **copy** command (see the “Initial Configuration” section on page 4-1).
- Step 2** Issue the **show license brief** command in EXEC mode to view a list of all installed license key files and identify the file to be uninstalled. In this example, the file to be uninstalled is the Ficon.lic file.
- ```
switch# show license brief
Enterprise.lic
Ficon.lic
```
- Step 3** Disable the features provided by the license to be uninstalled. Issue the **show license usage package\_name** command to view the enabled features for a specified package.
- ```
switch# show license usage ENTERPRISE_PKG
Application
-----
ivr
qos_manager
-----
```
- Step 4** Uninstall the Ficon.lic file using the **clear license filename** command, where *filename* is the name of the installed license key file.
- ```
switch# clear license Enterprise.lic
Clearing license Enterprise.lic:
SERVER this_host ANY
VENDOR cisco
```
- Step 5** Enter **yes** (yes is the default) to continue with the license update.
- ```
Do you want to continue? (y/n) y
Clearing license ..done
```
- The Ficon.lic license key file is now uninstalled.
- 

## Updating Licenses

If your license is time bound, you must obtain and install an updated license. Contact technical support to request an updated license.



### Note

If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco Systems, contact Cisco Technical Support at this URL: <http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

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To update a license, follow these steps:

- 
- Step 1** Obtain the updated license file using the procedure described in the “Obtaining the License Key File” section on page 3-7.
- Step 2** Save your running configuration to a remote server using the **copy** command (see the “Copying Files” section on page 7-6).
- Step 3** Issue the **show license brief** command to verify the name of the file to be updated.

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```
switch# show license brief
sanextn1.lic:
```

- Step 4** Update the license file using the **update license** *url* command, where *url* specifies the bootflash:, slot0:, or volatile: location of the updated license file.

```
switch# update license bootflash:sanextn2.lic sanextn1.lic
Updating sanextn1.lic:
SERVER this_host ANY
VENDOR cisco
# An example fcports license
INCREMENT SAN_EXTN_OVER_IP cisco 1.000 permanent 1 HOSTID=VDH=ABCD \
    NOTICE=<LicFileID>san_extn1.lic</LicFileID><LicLineID>0</LicLineID> \
    SIGN=33088E76F668
```

```
with bootflash:/sanextn2.lic:
SERVER this_host ANY
VENDOR cisco
# An example fcports license
INCREMENT SAN_EXTN_OVER_IP cisco 1.000 permanent 1 HOSTID=VDH=ABCD \
    NOTICE=<LicFileID>san_extn2.lic</LicFileID><LicLineID>1</LicLineID> \
    SIGN=67CB2A8CCAC2
```

- Step 5** Enter **yes** (yes is the default), to continue with the license update.

```
Do you want to continue? (y/n) y
Updating license ..done
switch#
The sanextn1.lic license key file is now updated.
```

## Grace Period Alerts

Cisco SAN-OS gives you a 120 day grace period. This grace period starts or continues when you are evaluating a feature for which you have not installed a license.

The grace period stops if you disable a feature you are evaluating, but if you enable that feature again without a valid license, the grace period countdown continues where it left off.

The grace period operates across all features in a license package. License packages can contain several features. If you disable a feature during the grace period and there are other features in that license package that are still enabled, the countdown does not stop for that license package. To suspend the grace period countdown for a license package, you must disable every feature in that license package. Use the **show license usage** *license-name* command to determine which applications to disable.

```
switch# show license usage MAINFRAME_PKG
Application
-----
Ficon
-----
```

The Cisco SAN-OS license counter keeps track of all licenses on a switch. If you are evaluating a feature and the grace period has started, you will receive console messages, SNMP traps, system messages, and Call Home messages on a daily basis.

Beyond that, the frequency of these messages become hourly during the last seven days of the grace period. The following example uses the FICON feature. On January 30th, you enabled the FICON feature, using the 120 day grace period. You will receive grace period ending messages as:

- Daily alerts from January 30th to May 21st.

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- Hourly alerts from May 22nd to May 30th.

On May 31st, the grace period ends, and the FICON feature is automatically disabled. You will not be allowed to use FICON until you purchase a valid license.



**Note**

You cannot modify the frequency of the grace period messages.



**Caution**

After the final seven days of the grace period, the feature is turned off and your network traffic may be disrupted. Any future upgrade will enforce license requirements and the 120-day grace period.

Use the **show license usage** command to display grace period information for a switch.

```
switch# show license usage
Feature                Installed  License Status  ExpiryDate  Comments
                        Count
-----
FM_SERVER_PKG          Yes       -               Unused      never       license missing
MAINFRAME_PKG          No        -               Unused      never       Grace Period 57days15hrs
ENTERPRISE_PKG        Yes       -               InUse       never       -
SAN_EXTN_OVER_IP      No        0               Unused      never       -
SAN_EXTN_OVER_IP_IPS4 No        0               Unused      never       -
-----
```

## License Transfers Between Switches

A license is specific to the switch for which it is issued and is not valid on any other switch. If you need to transfer a license from one switch to another, contact your customer service representative.



**Note**

If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco Systems, contact Cisco Technical Support at this URL:  
<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

## Displaying License Information

Use the **show license** commands to display all license information configured on this switch (see Examples 3-1 to 3-6).

**Example 3-1 Displays Information About Current License Usage**

```
switch# show license usage
Feature                Installed  License Status  ExpiryDate  Comments
                        Count
-----
FM_SERVER_PKG          Yes       -               Unused      never       license missing
MAINFRAME_PKG          No        -               Unused      never       Grace Period 57days15hrs
ENTERPRISE_PKG        Yes       -               InUse       never       -
SAN_EXTN_OVER_IP      No        0               Unused      never       -
SAN_EXTN_OVER_IP_IPS4 No        0               Unused      never       -
-----
```

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**Example 3-2 Displays the List of Features in a Specified Package**

```
switch# show license usage ENTERPRISE_PKG
Application
-----
ivr
qos_manager
-----
```

**Example 3-3 Displays the Host ID for the License**

```
switch# show license host-id
License hostid: VDH=FOX0646S017
```



**Note**

Use the entire ID that appears after the colon (:). The VHD is the Vendor Host ID.

**Example 3-4 Displays All Installed License Key Files and their Contents**

```
switch# show license
Permanent.lic:
SERVER this_host ANY
VENDOR cisco
INCREMENT MAINFRAME_PKG cisco 1.0 permanent uncounted \
  HOSTID=VDH=FOX0646S017 \
  NOTICE="<LicFileID></LicFileID><LicLineID>0</LicLineID> \
  <PAK>dummyPak</PAK>" SIGN=EE9F91EA4B64
Evaluation.lic:
SERVER this_host ANY
VENDOR cisco
INCREMENT MAINFRAME_PKG cisco 1.0 30-Dec-2003 uncounted \
  HOSTID=VDH=FOX0646S017 \
  NOTICE="<LicFileID></LicFileID><LicLineID>0</LicLineID> \
  <PAK>dummyPak</PAK>" SIGN=EE9F91EA4B64
```

**Example 3-5 Displays a List of Installed License Key Files**

```
switch# show license brief
Enterprise.lic
Ficon.lic
FCIP.lic
```

**Example 3-6 Displays the Contents of a Specified License Key File**

```
switch# show license file Permanent.lic
Permanent.lic:
SERVER this_host ANY
VENDOR cisco
INCREMENT MAINFRAME_PKG cisco 1.0 permanent uncounted \
  HOSTID=VDH=FOX0646S017 \
  NOTICE="<LicFileID></LicFileID><LicLineID>0</LicLineID> \
  <PAK>dummyPak</PAK>" SIGN=EE9F91EA4B64
```

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