



Service Description:
Network Optimization Service

This document describes the Network Optimization Service.

Related Documents: This document should be read in conjunction with the following documents also posted at www.cisco.com/go/servicesdescriptions/: (1) Glossary of Terms; (2) List of Services Not Covered; and (3) Severity and Escalation Guidelines. All capitalized terms in this description have the meaning ascribed to them in the Glossary of Terms.

Direct Sale from Cisco. If you have purchased these Services directly from Cisco, this document is incorporated into your Master Services Agreement (MSA), Advanced Services Agreement (ASA), or equivalent services agreement executed between you and Cisco. If not already covered in your MSA or equivalent services agreement, this document should be read in conjunction with the Related Documents identified above. In the event of a conflict between this Service Description and your MSA or equivalent services agreement, this Service Description shall govern.

Sale via Cisco Authorized Reseller. If you have purchased these Services through a Cisco Authorized Reseller, this document is for description purposes only; is not a contract between you and Cisco. The contract, if any, governing the provision of this Service will be the one between you and your Cisco Authorized Reseller. Your Cisco Authorized Reseller should provide this document to you, or you can obtain a copy of this and other Cisco service descriptions at www.cisco.com/go/servicesdescriptions/.

This Network Optimization Service is intended to supplement a current support agreement for Cisco products and is only available where all Product(s) in Customer's Network is supported through a minimum of core services such as Cisco's SMARTnet, Limited Lifetime Warranty, Software Application Services, or the Partner Support Service offering from within the Cisco Services Partner Program. Where available, Cisco shall provide the Network Optimization Service described below as selected and detailed on the Purchase Order for which Cisco has been paid the appropriate fee. Cisco shall provide a Quote for Services ("Quote") setting out the extent of the Services and duration that Cisco shall provide such Services. Cisco shall receive a Purchase Order that references the Quote agreed between the parties and that, additionally, acknowledges and agrees to the terms contained therein.

Network Optimization Service

Services Summary

Network Optimization Service includes service areas of Route/Switch, Architecture, Security, and Wireless. Network Optimization Services provide annual, ongoing support for Customer, addressing the following:

- Route/switch – any Cisco Products and technologies which forward and/or process routed IP and switched Ethernet traffic.
- Security - all Cisco Security products including firewall, intrusion prevention, VPN, content security, identity and security management.
- Wireless - all Cisco Wireless products including wireless LAN access point, wireless controllers and wireless network management.
- Supported Products exclude any Products declared to be "End of Support"

Network Optimization – Route/Switch Design

Strategy:

Design Review
 Network Topology Modeling Analysis
 Test Cycle and Review
 Testing and Lab Strategy Review
 Ongoing Design Support
 Topology Diagram Report

Software Strategy:

Software Management Strategy Review
 Ongoing Software Support
 Configuration Best Practices Report
 Custom Configuration Report
 Software Deployment Analytics
 Software Feature Deployment Analytics
 Software Infrastructure Analysis Report
 Software Recommendation Report
 Software Security Alert
 Software Lifecycle Management Dashboard
 Automated Risk Assessment and Recommendation Report
 Critical Bug Notification Software Maintenance Update Notification

Hardware Strategy:

Network Resiliency Assessment
 Ongoing Hardware Support
 Engineering Recommendation Report
 Hardware Deployment Analytics
 Hardware End of X (milestones) Report
 Hardware Field Notice Report
 Technology or Protocol Audit
 Unidentified Inventory Report

Change Management Strategy:

Media Network Readiness Assessment
 Operations Risk Management Assessment
 Unified Communications Operations Support Planning Workshop
 Ongoing Flexible Support
 Availability and Operations Gap Resolution Support.
 Ongoing Escalation Engineering Support
 Onsite Network Consulting Support
 Onsite Network Optimization Support
 Scheduled Change Support
 Network Performance Analytics
 Network Improvement Plan
 Network Infrastructure Modular Knowledge Service
 Remote Knowledge Transfer Session(s)
 Technical Knowledge Library
 Topology Diagram Report
 Virtual Training Sessions

Analytics:

Foundational Analytics
 OnPrem Analytics
 Automated Fault Detection and Service Request Notification

Architecture Specialization:

Network Architecture Development - Consult
 Network Architecture Development - Assist
 Network Architecture Development - Drive
 Availability Impact Analysis
 Converged Architecture Strategy Assessment
 Design Availability Assessment
 IPv6 Architecture Strategy Assessment
 Migration Planning and Implementation Support
 Multicast Design Development Support
 Network Architecture Design Review
 Persistent Testing Validation
 QoS Design Development Support

Remediation Service**Operations Support Systems Specialization****Security Specialization****Wireless Specialization****EnergyWise Specialization****Cisco Network Operations Automation Services****Workshop:**

Upgrade Assessment and Support
 Site and Systems Administration Support

Ongoing Support
 Custom Design Day 2 Reactive Support
 Prepare & Present QBR
 Ongoing Service and Project Management Support
 Remote Knowledge Transfer Sessions

Cisco Responsibilities

Cisco's Network Optimization Service consists of the provision of Services described below, where available which Cisco shall provide for the Customer's Network during Normal Business Hours (unless stated otherwise). Services provided by Cisco are remotely delivered unless otherwise noted. Cisco shall provide the following General Support provisions for all Services selected by Customer:

General Support

- Designate an engineer ("Advanced Services Engineer") to act as the primary interface with Customer for its Network.
- Schedule with Customer up to four (4) quarterly visits per yearly subscription period, (not to exceed eight (8) days in aggregate) to Customer's site to review Deliverables and Activities and plan for the next quarter. Additional visits will be mutually agreed upon at Cisco's then-current travel and labor rates.
- Schedule periodic (typically weekly) conference calls to review Customer's Network status, planning, and the Services being provided.
- Make collaboration tools available for hosting meetings, managing documentation, instant messaging, desktop sharing, and collaborative spaces.
- Establish a Customer-specific Cisco email alias to facilitate communication with Advanced Services Engineer.
- Provide certain Data Collection Tools Cisco identifies as appropriate for Network data collection during the Term of the Services, provided that all fees due and owing to Cisco under this Service Description have been paid. Data Collection Tools may or may not include hardware or software. Customer acknowledges and agrees Cisco shall retain full right, title, and interest to the Data Collection Tools. In addition to Cisco provided tools, the Advanced Services Engineer may utilize Customer provided data, scripts, or internal tools to assist in collecting data from the Customer Network.

Customer Termination

The Customer must return any associated Cisco materials (hardware, software and documentation) provided as part of the Service to Cisco immediately upon expiration or termination of the Service contract.

The quantity of any reporting and efforts for ongoing activities described herein will vary depending on Customer requirements and what Customer and Cisco mutually agree

upon when Services are purchased as identified in the Quote provided by Cisco.

Cisco shall provide services during Standard Business Hours (unless stated otherwise). Cisco shall provide the following General Support provisions for all Services selected by Customer:

Routing & Switching

Design Strategy

Design Review. Cisco will consult with Customer via a series of meetings to develop a thorough understanding of Customer Network design requirements, typically focusing on technical and business requirements for incremental growth such as adding or migrating new features, Hardware, topologies, or solutions to the existing architecture or design. A Design Review may include, among other information, the following:

- Review of Customer's design requirements, priorities, and goals
- Analysis of impact of new requirements on the existing Network
- Review of Network architecture and topology
- Review of protocol selection and configuration
- Review of feature selection and configuration
- Review of device security considerations (i.e. authentication, VLANs, subnet isolations, etc.)
- Report describing the new or current design with recommendations

Network Topology Modeling Analysis. Cisco will consult with Customer via a series of meetings to improve end to end network availability and resiliency by analyzing the core routing and switching components that support mission critical applications and services. The service models current operational state and provides actionable recommendations. A Network Topology Modeling Analysis service may include, among other information, the following:

- Network Topology Representation

- Network Resiliency Analysis
- Network Availability Analysis

Test Cycle and Review. Cisco will consult with Customer via a series of meetings to develop a thorough understanding of Customer's solution-oriented testing goals and requirements. Cisco will execute networking tests to prove or disprove theories and report findings to Customer. A Test Cycle and Review may include, among other information, the following:

- Review of Customer's testing goals and business objectives
- Collaborate on a Test Plan
- Analysis of requirements such as platforms, topology, protocols, and configurations
- Report describing test findings and recommendations

Testing and Lab Strategy Review. Cisco will consult with Customer via a series of meetings to develop a thorough understanding of Customer's networking device testing capabilities, lab strategy, practices, and business goals. A Testing and Lab Strategy Review will contain overall strategy recommendations and may include, among other information, the following:

- Review of Customer's test environment, resources, concerns, and challenges
- Analysis of Customer's current testing practices and lab strategy
- Report describing the analysis comparing Customer's current practices to Cisco's recommended best practices and Cisco's recommendations

Ongoing Design Support. Provide informal, support for incremental changes to the Network or architecture

Topology Diagram Report. These reports typically analyze Customer's production configurations (per device) to graphically depict connectivity and spatial relationships.

Software Strategy

Software Management Strategy Review. Cisco will consult with Customer via a series of meetings to develop a thorough understanding of Customer's Software management requirements and practices such as standards, migration triggers, and implementation methodologies. A Software Management Strategy Review will contain overall strategy recommendations and may include, among other information:

- Review of Customer's Software management concerns and challenges
- Analysis of Customer's current practices related to establishing and managing Software release standards and Software migration triggers
- Analysis of Customer's current practices related Software selection, testing, staging, deployment, and troubleshooting
- Report describing the analysis comparing Customer's current practices to Cisco's recommended best practices and Cisco's recommendations
- Assistance establishing Software Track methodologies
- Assistance defining Customer-specific Software migration triggers
- Assistance in defining feature requirements and performance/availability objectives as relates to Software strategy

Ongoing Software Support. Provide informal, ongoing Software Support for incremental changes to the Network or architecture.

Configuration Best Practices Report. These reports typically examine Customer's production configurations (per device) and compare them to Cisco's best practice recommendations. The

focus of the best practices is typically within the following areas:

- Technology and Software features
- Routing or routed protocols
- Device security management
- Device network management

Custom Configuration Report. These reports typically analyze Customer's production configurations (per device) to compare them to Customer's configuration standards templates or Cisco's recommended configuration templates.

Software Lifecycle Management Dashboard. Provide customer access to online dashboard providing details on critical bugs affecting OS/Platform/Release. Customer needs to subscribe for a specific OS/Platform/Release of choice to view the critical bugs. The dash board will include the following

- **Software Adoption Trends and Benchmarking.** Analysis of software release upgrade trends observed in install base. Software usage benchmarks across platforms and best practices
- **Software Release Bug Tracking. Periodic insights and tracking of critical bugs for specified** software release standards. Customer's access to Dashboard will be valid until the duration of the engagement. Cisco Platforms and associated OS types delivered through the dashboard are as follows.

| | |
|----------------------------|--------------|
| ASR9K, CRS, NCS 6K | Cisco IOS-XR |
| Nexus 3K, 5K, 7K, 9K | NX-OS |
| 7600, 6500, Cat 2k, 3k, 4k | IOS |
| ASR1K | IOS-XE |

Automated Software Risk Assessment and Recommendation Report

This report contains information on Cisco's software recommendation based on a customer's request of a feature/release belonging to Cisco platform and will be delivered to the customer through the Software Lifecycle Management Dashboard. The report includes the following:

- Analysis of findings of Customer-specific tracks and release standards which may include the following
- Overall Software recommendation. Customer should test and consider.
- Descriptions of new Software features
- Unresolved Software bugs to which Customer may be exposed and if possible, appropriate workaround.
- Software feature upgrade analysis of identified software versions relative to the Customer's current and future software feature requirements

Critical Bug Notification. These alert subscriptions inform the Customer about occurrence, status change or resolution of Critical issues on Cisco's platforms based on Customer's platform of interest. The alerts include the following:

- Provide periodic notifications alerting the Customer of discovery, status change or resolution of critical bugs in the Software release tracks preferred by the Customer

Software Maintenance Update Notification. These alert subscriptions inform the Customer about availability or modifications to the Software Maintenance Updates on Cisco's platforms based on Customer's platform and release of interest. The alerts include the following:

- Provide periodic notifications alerting the Customer of the availability of patch or software maintenance update containing fix for a specific bug/feature/software release of interest

Software Deployment Analytics

- Interactive report provided will include analysis of Customer-specific information related to the consistency and complexity of Software release deployment. This analysis can also feature performance and deployment data including comparisons of the functional roles of devices in Network, exceptions to established policies and configurations, factors affecting Network performance, effects of changes in Network, and benchmarking
- Interactive report provided to Customer based upon Customer infrastructure equipment data uploaded to the Cisco back-end system
- Report format will be delivered at Cisco discretion via either Adobe Air standalone application delivered on encrypted CD/DVD or via Customer access to private Customer-specific portal interface on which the interactive report resides.
- Cisco will contact Customer to review provided content via remote collaboration session.

Software Feature Deployment Analytics. Interactive report provided will include analysis of Customer-specific information related to the consistency and complexity of Software features deployed. This analysis can also feature performance and deployment data including comparisons of the functional roles of devices in Network, exceptions to established policies and configurations, factors affecting Network performance, effects of changes in Network, and benchmarking

- Interactive report provided to Customer based upon Customer infrastructure equipment data uploaded to the Cisco back-end system
- Report format will be delivered at Cisco discretion via either Adobe Air standalone application delivered on encrypted CD/DVD or via Customer access to private Customer-specific portal interface on which the interactive report resides.
- Cisco will contact Customer to review provided content via remote collaboration session.

Software Infrastructure Analysis Report. Information in these reports typically include:

- Customer standards and conformance to Software release recommendations
- Software release diversity
- Software Track related high-level analysis of Software Advisories, Software Deferrals, and Software release

milestones such as End of Sale, End of Engineering, and End of Life status

Software Recommendation Report. Each report covers a single Software Track and may include, among other information, the following:

- Overall Software recommendation Customer should test and consider
- Descriptions of new Software features
- Unresolved Software bugs to which Customer may be exposed and if possible, appropriate workarounds
- Periodically updated follow-up reports, at a rate of no more than once per month, for up to 120 days from the original Software recommendation date

Software Security Alert. These reports provide information about Cisco's Software Advisories and typically include:

- Analysis of how a Cisco Security Advisory may or may not affect Customer's Network
- Recommendations to mitigate risk
- List of affected or potentially affected Networking devices

Hardware Strategy

Network Resiliency Assessment. Cisco will consult with Customer via a series of meetings to understand Customer's Network architecture or design, primarily focusing on resiliency and availability. A Network Resiliency Assessment will contain recommendations to improve resiliency and availability and may include, among other information:

- Review Customer's Network architecture and design specific to resiliency requirements
- Analysis of strategic locations within the IP infrastructure examining topology, protocols, configurations, Network services, power, and environment
- Report describing the analysis comparing Customer's current practices to Cisco's recommended best practices and recommendations to improve Network resiliency

Ongoing Hardware Support. Provide informal, Ongoing Hardware Support for incremental changes to the Network or architecture.

Engineering Recommendation Report. These reports typically provide recommendations or best practices about a subset of networking devices. These reports typically include information regarding:

- Stability, performance, or tuning recommendations
- Engineering recommendations for platforms, topology, protocols, configurations, Network services, power, or environment

Hardware Deployment Analytics. Interactive report provided will include analysis of Customer-specific information related to the consistency and complexity of deployed hardware platforms. This analysis also can feature performance and deployment data including comparisons of the functional roles of devices in Network, exceptions to established policies and

configurations, factors affecting network performance, effects of changes in Network, and benchmarking,

- Interactive report provided to Customer based upon Customer infrastructure equipment data uploaded to the Cisco back-end system
- Report format will be delivered at Cisco discretion via either Adobe Air standalone application delivered on encrypted CD/DVD or via Customer access to private Customer-specific portal interface on which the interactive report resides.
- Cisco will contact Customer to review provided content via remote collaboration session.

Hardware End of X (milestones) Report. These reports typically provide information about Cisco's product family milestones such as:

- End of Sale (the product is no longer sold by Cisco)
- End of Engineering (the product is no longer receiving engineering maintenance)
- End of Life (the product is no longer supported by Cisco)

Hardware Field Notice Report. These reports provide information about Cisco's Field Notices and typically include:

- Analysis of how a Cisco Field Notice may or may not affect Customer's Network
- Recommendations to mitigate risk
- List of affected or potentially affected Networking devices

Technology or Protocol Audit. Audits are usually limited to no more than 500 devices polled from a single network collector. Audits typically include information and analysis such as the following:

- Analysis of performance, fault, or capacity information
- Hardware inventory information
- Exception based reporting
- Device, feature, or protocol recommendations

Unidentified Inventory Report. These reports typically include:

- List of networking devices believed to be attached to Customer's network, but missing from managed inventory
- Information about the devices such as recent status, reporting source, and trends

Change Management Strategy

Media Network Readiness Assessment. Cisco will consult with Customer via a series of meetings to understand and assess Customer's Unified Media Network readiness. A Media Network Readiness Assessment is comprised of the following:

- Review of Customer's Network design and services
- Review of Customer's Network documentation
- Analysis of information collected examining Network topology, protocols, configurations, and environment
- Report describing the analysis comparing Customer's current practices to Cisco's recommended best practices and recommendations to prepare for Unified Media Network readiness.

Operations Risk Management Assessment. Cisco will consult with Customer via a series of meetings to understand Customer's operational practices. An Operations Risk Management Assessment may include, among other information, the following:

- Review Customer's operational processes regarding incident management, problem management, configuration management, change management, release management, Network performance and capacity management, availability management, service level management, Network resiliency, security management, IT service continuity management, and staffing
- Review Customer's operational processes of Network management systems tools and instrumentation
- Report describing specific operations optimization recommendations based on industry leading practices

Unified Communications Operations Support Planning Workshop. Cisco will consult with Customer via a series of meetings to understand Customer's Unified Communications Network readiness. A Unified Communications Operations Support Planning Workshop may include, among other information, the following:

- Review Customer's proposed Unified Communications high-level design and solution requirements
- Review Customer's Network documentation
- Analysis of current Network infrastructure and the Network's readiness to support the proposed Unified Communication design
- Analysis of current voice infrastructure and configurations to support proposed Unified Communications design
- Report describing the analysis comparing Customer's current practices and capabilities to Cisco's recommended best practices, and Cisco's recommendations to meet Customer's Network management business requirements

Ongoing Flexible Support. Provide informal, Ongoing Flexible Support for incremental changes to the Network or architecture.

Availability and Operations Gap Resolution Support. Cisco will help remediate operational problems discovered via a series of meetings with Customer. Availability and Operations Gap Resolution Support may include, among other information, the following:

- Review a gap resolution plan to address operational gaps
- Assist with gap remediation

Ongoing Escalation Engineering Support. Provide an Ongoing Escalation Engineering Support remote resource to join Cisco's Technical Assistance Center's (TAC) restoration of service activities for unplanned or unscheduled device or Network failures. Customer must open a Service Request the Cisco TAC prior to contacting the Advanced Services Engineer. Ongoing Escalation Engineering Support is only available to certain geographic locations and will be specified in the Quote

if provided. Where available, Ongoing Escalation Engineering Support typically includes:

- Technical evaluation of initial TAC problem diagnosis based on knowledge of Customer's Network
- Help the Cisco TAC restore service

Onsite Network Consulting Support. In addition to conditions defined in the "General Support" section, designate an engineer ("Advanced Services Engineer") onsite at Customer's designated location to act as the primary interface with Customer, providing general advice and guidance related to Customer's Network. Customer directed tasks to be performed by Advanced Services Engineer are subject to Cisco approval, which shall not be unreasonably withheld. An Onsite Network Consulting Support is only available to certain geographic locations and will be specified in the Quote if provided. Where available, the following may include:

- Ongoing, onsite support and technical leadership from a local Cisco Advanced Services Engineer available up for to five days per week (pending local work restrictions) during Normal Business Hours excluding Cisco holidays, locally recognized country holidays, vacation, and training days.

Onsite Network Optimization Support. In addition to conditions defined in the "General Support" section, designate an engineer ("Advanced Services Engineer") onsite at Customer's designated location to act as the primary interface with Customer for its Network, providing general advice and guidance to lead the delivery of the Network Optimization Service ordered by Customer. Customer directed tasks to be performed by Advanced Services Engineer are subject to Cisco approval, which shall not be unreasonably withheld. Onsite Network Optimization Support is only available to certain geographic locations and will be specified in the Quote if provided. Where available, the following may include:

- Ongoing, onsite support and technical leadership from a local Cisco Advanced Services Engineer available up for to five days per week (pending local work restrictions) during Normal Business Hours excluding Cisco holidays, locally recognized country holidays, vacation, and training days.

Scheduled Change Support. Provide a Scheduled Change Support remote resource for critical scheduled changes. Cisco will make available, upon receipt of not less than twenty-one (21) days prior written request by Customer to Cisco, a designated support contact person who will be available to consult with Customer in major Network service changes (i.e. major Hardware upgrade(s), major site installation(s) or major configuration changes). Customer agrees to submit a detailed request and schedule to Cisco prior to any such activity, which may include:

- Collaboration with Customer to evaluate the potential impact of the proposed changes
- Review the implementation procedures
- Remote assistance for Customer to resolve problems with Network changes during a major activity to the production Network

Network Performance Analytics

- Automated network improvement plan – provides consolidated reporting and automated analysis and trending of correlated exceptions within the following areas:
 - Configuration Best Practices
 - Custom Configuration
 - Engineering Recommendation
 - Software Infrastructure Analysis
 - Software Security
 - Syslog Analysis
 - Technology or Protocol
 - Topology Diagram
- Online access to Network Performance Analytics Portal -- Provide customer access to online portal supporting unified delivery of the following high-level features
- Metrics that leverage the correlated exceptions mentioned above:
 - Overall Customer network health index and index trending
 - Risk/compliance/problem management metrics
 - Index showing progress against established Customer-specific improvement initiatives
- On-line access to automated network Improvement plan details

Network Improvement Plan (Only relevant for standalone when Network Performance Analytics not purchased). These plans integrate recommendations from Network Optimization Service Deliverables and Activities into a single living document. The Network Improvement Plan represents the Customer-approved and agreed-upon Cisco recommendations as prioritized by a joint steering committee comprised of Cisco and Customer, and may be used by Customer to track future projects.

Network Infrastructure Modular Knowledge Service. The Network Infrastructure Modular Knowledge Service is made available through a secure web-based portal (“Portal”). The Network Infrastructure Modular Service is only available to certain geographic locations and will be specified in the Quote if provided. Where available, the following is provided:

- Assistance with user account creation to access the Portal
- Initial assistance in getting the Portal operational with appropriate authentication and authorizations for user community
- Content available to the specified number of authorized viewers
- Multimedia clips in the form of video on demand or audio on demand content
- Customer-specific deliverables archive when delivered as part of an Advanced Services subscription engagement
- Sidebar content such as white papers, case studies, design guides, configuration guides, troubleshooting guides, training documents, deployment guides, online textbooks and/or manuals, or bumper clips

- Listed web based trainings provided via Portal to authorized viewers
- Preventative maintenance in accordance with Cisco's normal maintenance schedules and procedures
- Troubleshooting assistance for issues submitted to Cisco
- Updated content as Cisco may revise, update, and/or remove previously-released multimedia clips and/or sidebar content (“updated content”) and whereby Customer should discontinue any use of superseded content

Remote Knowledge Transfer Session(s). Cisco will consult with Customer to identify requirements and topics for informal training sessions. Remote Knowledge Transfer Sessions are:

- Delivered in English, with other languages subject to availability
- Delivered remotely up to four (4) hours in length, with no labs and no printed course materials
- Relevant to the Cisco products and technologies deployed in Customer's production Network

Technical Knowledge Library. The Technical Knowledge Library is made available through a secure web-based portal (“Portal”). The Technical Knowledge Library is only available to certain geographic locations and will be specified in the Quote if provided. Where available, the following is provided:

- Assistance with user account creation to access the Portal
- Initial assistance in getting the Portal operational with appropriate authentication and authorizations for user community
- Content available to the specified number of authorized viewers
- Multimedia clips in the form of video on demand or audio on demand content
- Customer-specific deliverables archive when delivered as part of an Advanced Services subscription engagement
- Sidebar content such as white papers, case studies, design guides, configuration guides, troubleshooting guides, training documents, deployment guides, online textbooks and/or manuals, or bumper clips
- Listed web based trainings provided via Portal to authorized viewers
- Preventative maintenance in accordance with Cisco's normal maintenance schedules and procedures
- Troubleshooting assistance for issues submitted to Cisco
- Updated content as Cisco may revise, update, and/or remove previously-released multimedia clips and/or sidebar content (“updated content”) and whereby Customer should discontinue any use of superseded content.

Topology Diagram Report. These reports typically analyze Customer's production configurations (per device) to graphically depict connectivity and spatial relationships.

Virtual Training Sessions. Cisco will consult with Customer to identify requirements and topics on Advanced Technologies for virtual training sessions. Virtual Training Sessions are:

- Delivered in English, with other languages subject to availability
- Delivered to up to 12 students in each session.
- Delivered remotely and up to twelve (12) hours in length (covered in two contiguous, 6 hour day maximum). Can include lab access, lab exercises, session materials.
- Relevant to the Cisco products and technologies as agreed to between Customer and Cisco.
- For a list of current supported topics go to www.cisco.com/go/ase and select 'Virtual Training Services.

Analytics

Foundational Analytics Foundational Analytics identifies deficiencies and potential risks which should be resolved to optimize availability and performance of the Cisco infrastructure and application environment. Foundational Analytics also helps assess the effectiveness of the Cisco environment for purposes of planning current and future changes based on evolving business imperatives and requirements.

Foundational Analytics involves collection and analysis of data as part of a periodic examination of post deployment, or audited environments, that require additional examination guided by Customer needs and concerns.

Cisco responsibilities

- Conduct interviews with administrative and operational personnel for information gathering and analysis
- Establish Foundational Analytics requirements and strategies
- Cisco will consult with Customer via a series of meetings to develop a thorough understanding of Customer's Software release and conformance objectives such as but not limited to:
 - Customer's current practices for establishing and managing software release standards and conformance
 - Software selection process and software migration triggers
- Cisco data collection is required and provided by Cisco to gather the following information:
 - Design and configuration data
 - Hardware and software levels
 - Diagnostic information
 - Baseline of Customer's standards and conformance of deployed software release standards & objectives, requirements and strategies
 - Criteria for grouping of software releases into Customer-specific tracks and release standards
- Analyze information from data collected and identify deficiencies and potential risks based on Cisco leading practices
- Provide a Cisco Cloud Hosted Analytics & Insights Portal for delivering Foundational Analytics and recommendations which includes the following:
 - Assist Customer in account creation for the

Portal

- Make content available for up to five Customer personnel as Portal administrators.
- Provide preventative maintenance in accordance with Cisco's normal maintenance schedules and procedures.
- Provide technical assistance to the Customer as Cisco may deem necessary to properly provide the Portal
- Cisco Cloud Hosted Analytics & Insights based on information gathered, analysis of findings and ongoing actionable insights and recommendations for the following standard features:
 - Configuration Best Practices
 - Policy Configuration Conformance
 - Hardware Lifecycle Milestones
 - Diagnostic Analysis & Recommendations
 - Field Notices where applicable
 - Software Track Conformance
 - PSIRTs Analysis where applicable
- Conduct up to two hourly remote collaborative sessions per month with the key personnel to review key actionable insights from the Cisco Analytics & Insights Portal and determine next steps

Deliverables:

- Cisco Cloud Hosted Analytics & Insights Portal

Customer responsibilities:

In addition to the Customer General Responsibilities, the following Cisco Cloud Hosted Analytics & Insights Portal specific responsibilities apply:

- Customer's use of the Cisco Cloud Hosted Analytics and Insights Portal is subject to the Universal Cloud Terms located at <http://www.cisco.com/c/en/us/products/universal-cloud-agreement.html>, which is incorporated herein by reference.
- Customer is responsible for testing of the Portal interface
- Customer is responsible for security, network connection, IP address assignment and any required firewall or Access Control List changes required on Customer's network in order for the end-users to access the "Portal".
- Designate & provide list of up to five persons, as Portal Administrators, to be responsible for management of portal accounts.
- For the Customer Portal Administrators, provide on-boarding information as follows: contact name, title, Email-IDs, address, telephone number, e-mail address of primary and secondary team lead or manager
- Participate in collaborative sessions with Cisco to discuss Cisco recommendations.
- Notify Cisco of any technical support requests or troubleshooting issues related to the Portal

OnPrem Analytics

OnPrem Analytics identifies deficiencies and potential risks which should be resolved to optimize availability and performance of the Cisco infrastructure and application environment. OnPrem Analytics also helps assess the effectiveness of the Cisco environment for purposes of planning current and future changes based on evolving business imperatives and requirements.

OnPrem Analytics involves collection and analysis of data as part of a periodic examination of post deployment, or audited environments, that require additional examination guided by Customer needs and concerns. OnPrem Analytics Tool is designed to collect and analyze customer data on-premise, the data never leaves the customer site.

Cisco responsibilities

- Conduct interviews with administrative and operational personnel for information gathering and analysis
- Establish OnPrem Analytics requirements and strategies
- Cisco will consult with Customer via a series of meetings to develop a thorough understanding of Customer's Software release and conformance objectives such as but not limited to:
 - Customer's current practices for establishing and managing software release standards and conformance
 - Software selection process and software migration triggers
- Provide a Cisco OnPrem Analytics Tool (software only) for gathering the following:
 - Design and configuration data
 - Hardware and software levels
 - Baseline of Customer's standards and conformance of deployed software release standards & objectives, requirements and strategies
 - Criteria for grouping of software releases into Customer-specific tracks and release standards
- Provide Cisco OnPrem Analytics Tools (Software Only) Cisco identifies as appropriate for Network data collection and analysis during the Term of the Services.
- Cisco will require access to Cisco approved Customer-provided hardware to Install, update and maintain the Cisco OnPrem Analytics Software.
- Analyze information from data collected and identify deficiencies and potential risks based on Cisco leading practices
- Provide Following Reports based on information gathered, analysis of findings and recommendations which include the following:
 - Configuration Best Practices
 - Hardware Lifecycle Milestones
 - Field Notices where applicable
 - Software Track Conformance Report
 - PSIRTs where applicable

Deliverables:

- Configuration Best Practices Report
- Hardware Lifecycle Milestones Report
- Field Notices where applicable Report
- Software Track Conformance Report
- PSIRTs where applicable Report

Customer Responsibilities:

- Customer agrees and acknowledges to purchase, install and make available Cisco supported Hardware for Cisco OnPrem Analytics Tool (Software only provided by Cisco) within 30 days of commencement of the Service.
- Customer agrees and acknowledges to maintain Cisco approved Hardware and Hardware support and maintenance contract separate from Services purchased under this Service Description.
- Customer acknowledges and agrees Cisco shall retain full right, title, and interest to the Cisco OnPrem Analytics Software.
- Customer must provide, install, maintain and grant Cisco remote and physical access to Cisco-approved Unified Communication Server (UCS) Hardware that will be used by Cisco to operate the Cisco OnPrem Analytics Tool. Only Cisco personnel will have access to the Cisco OnPrem Analytics Tool software.
- Customer shall remain responsible for any damage to or loss or theft of the Cisco OnPrem Analytics Tool while in Customer's custody.
- Customer shall ensure that such Cisco OnPrem Analytics Tool is under lock and key and with access restricted to those Customer employee(s) or contractor(s) who have a need to access the Cisco OnPrem Analytics Tool and/or a need to know the contents of the output of Cisco OnPrem Analytics Tool.
- Initial Set-up (One Time) Cisco OnPrem Analytics Tool located at Customer's site, an initial set-up is required and the following must be performed:
 - Complete the Cisco OnPrem Analytics Tool installation and system configuration questionnaire(s) (i.e. IP address, netmask, hostname, etc.) and return to the Advanced Services Engineer.
 - Install the Cisco OnPrem Analytics Tool hardware in a secure area with controlled physical access.
 - Connect the Cisco OnPrem Analytics Tool hardware to the Network.
 - Secure the Cisco OnPrem Analytics Tool behind Customer's corporate firewall.
 - Provide access to Cisco OnPrem Analytics Tool for use by Cisco to install, troubleshoot, maintain and produce deliverables described

within the Services description; for remote access, SSH, Telnet, and/or dial are options, but virtual private network (VPN) access to the Cisco OnPrem Analytics Tool is preferred and recommended.

- When applicable, provide Cisco OnPrem Analytics Tool access to support the transfer of Cisco OnPrem Analytics software patches, security patches, and Rules Based Markup Language (RBML) update packages.
- Provide Cisco OnPrem Analytics Tool with SNMP and Command Line Interface (CLI) access to all Product(s) in the Network (necessary to facilitate collection and analysis of inventory, software and configuration information).

Automated Fault Detection and Service Request Notification

Automated Fault Detection and Service Request Notification analyzes device syslog messages using Cisco's proprietary intellectual capital rules and algorithms to detect software, hardware and configuration faults in the network and deliver remediation automatically to the customer. Syslogs are monitored in near real-time to detect sequences indicating a fault has happened or is eminent. When detection occurs, the system collects device data that is required for problem resolution and uses it to open a case with Cisco support. This speeds resolution and help customer focus on what's critical.

Deliverable

Quarterly Fault Detection and Service Request Report listing the number and type of faults detected, support cases opened and support case status.

Cisco Responsibilities

- Cisco shall explain system deployment and operational requirements to the customer in a meeting with customer-designated personnel.
- Cisco shall configure and deploy Automated Fault Detection and Service Request Notification Virtual Machine in customer's network to process syslog messages and open support cases.
- Cisco shall inform customer of faults found and support cases opened using automated email sent to customer designated address (es).
- Cisco shall update managed device information on the Automated Fault Detection and Service Request Notification server, based on customer supplied information as often as once per week.
- Cisco shall deliver a Fault Detection and Service Request Report quarterly, listing the number and type of faults detected; support cases opened and support case status. The report will be delivered electronically and may include up one hour of remote consultation with a Cisco network engineer.

Customer Responsibilities

- Customer will provide Cisco with device list and access credentials for all network devices under service. Customer will update said list promptly when network changes occur. This may be done via API to Cisco Network Collections device, if present, or by formatted electronic record provided to Cisco personnel.
- Customer shall allow collection of device serial numbers and product IDs by Cisco Network Collections device.
- Customer shall allow the use of aforementioned data to configure the Automated Fault Detection and Service Request Notification server.
- Customer will provide specified deployment and runtime environment for Cisco Automated Fault Detection and Service Request Notification Server virtual machine.
- Customer shall provide Cisco Automated Fault Detection and Service Request Notification Server with communications access to devices under service for collection of configuration and status data.
- Customer will provide Cisco Automated Fault Detection and Service Request Notification Server with encrypted communications access to Cisco hosted servers for the purpose of support case management and software updates to Automated Fault Detection and Service Request Notification software.
- Customer shall configure devices under service to send syslog messages to a syslog server and configure syslog server to forward the syslog events to Automated Fault Detection and Service Request Notification virtual machine.
- Provide access to email server for Automated Fault Detection and Service Request Notification Server and email addresses to send notification mails to.
- Customer may integrate Alarm management system with Cisco Automated Fault Detection and Service Request Notification using Rest API, if desired. Cisco will not perform this work
Customer shall provide access to Cisco Network Collector APIs, if deployed

Architecture Specialization

Network Architecture Development - Consult. Cisco will provide leadership through the process of developing architecture frameworks for the foundational network infrastructure. Cisco will guide the Customer through the network architecture lifecycle process and associated architecture development methodology. Cisco shall provide the Service selected by Customer during Standard Business Hours, unless stated otherwise.

- Provide architecture leadership to guide the Customer through architecture development phases based on Cisco architecture methodology, which may include the following:

- Requirements analysis
- Architecture Strategy and Initiative Roadmap
- Architecture Assessment
- Designate an architect to act as the technical lead to the Customer for overall guidance in network architecture process development and management activities, which may include the following:
 - Objective setting
 - Interviews with Customer to establish performance metrics
 - Architecture project set up, management and oversight
 - Regular communications and reporting
 - Creation of central repository for all materials
 - Final reporting and transition plan at end of the Service
- Designate a Cisco contact to act as the primary interface to the Customer.
 - Participate in regular visits to meet with the Customer in-person as required to review project status.
 - Participate in periodic conference calls with Customer representatives and Cisco personnel.
 - Create and monitor a Customer-specific Cisco email alias, to facilitate communication with all Customer designated contacts under the Service

Network Architecture Development - Assist. Cisco will provide leadership through the process of developing architecture frameworks for the foundational network infrastructure. Cisco will guide the Customer through the network architecture lifecycle process and associated architecture development methodology. Cisco shall provide the Service selected by Customer during Standard Business Hours, unless stated otherwise.

- Provide architecture leadership to guide the Customer through architecture development phases based on Cisco architecture methodology, which may include the following:
 - Requirements analysis
 - Architecture Strategy and Initiative Roadmap
 - Architecture Assessment
 - Design Guidance
- Designate an architect to act as the technical lead to the Customer for overall guidance in network architecture process development and management activities, which may include the following:
 - objective setting
 - interviews with Customer to establish performance metrics
 - Architecture project set up, management and oversight
 - Regular communications and reporting ○ Creation of central repository for all materials ○ Final reporting and transition plan at end of the Service

- Designate a Cisco contact to act as the primary interface to the Customer.
 - Participate in regular visits to meet with the Customer in-person as required to review project status.
 - Participate in periodic conference calls with Customer representatives and Cisco personnel.
 - Create and monitor a Customer-specific Cisco email alias, to facilitate communication with all Customer designated contacts under the Service

Network Architecture Development - Drive. Cisco will provide leadership through the process of developing architecture frameworks for the foundational network infrastructure. Cisco will guide the Customer through the network architecture lifecycle process and associated architecture development methodology. Cisco shall provide the Service selected by Customer during Standard Business Hours, unless stated otherwise.

- Provide architecture leadership to guide the Customer through architecture development phases based on Cisco architecture methodology, which may include the following:
 - Requirements analysis
 - Architecture Strategy and Initiative Roadmap
 - Architecture Assessment
 - Design Development
 - Validating Testing
 - Implementation Planning
- Designate an architect to act as the technical lead to the Customer for overall guidance in network architecture process development and management activities, which may include the following:
 - Objective setting
 - Interviews with Customer to establish performance metrics
 - Architecture project set up, management and oversight
 - Regular communications and reporting ○ Creation of central repository for all materials ○ Final reporting and transition plan at end of the Service
- Designate a Cisco contact to act as the primary interface to the Customer.
 - Participate in regular visits to meet with the Customer in-person as required to review project status.
 - Participate in periodic conference calls with Customer representatives and Cisco personnel.
 - Create and monitor a Customer-specific Cisco email alias, to facilitate communication with all Customer designated contacts under the Service

Availability Impact Analysis. Availability Impact Analysis (AIA) establishes the difference between the projected availability of current and proposed routing and switching network environments; based upon network hardware

elements, topological arrangements, and method of connectivity. An AIA may include, among other information, the following:

- collecting current and proposed routing and switching design information
- analyzing data in order to project availability of each design scenario
- providing report based on analysis findings

Converged Architecture Strategy Assessment. Converged Architecture Strategy Assessment (CASA) evaluates the Customer's network infrastructure and its ability to support collaborative applications. This service helps to determine the network's readiness to deploy a converged architecture that enables end-to-end network services. The Converged Architecture Strategy Assessment work item will assess no more than thirty-five (35) network devices total. For full service CASA, refer to Network Architecture Development deliverable. A CASA may include, among other information, the following:

- Identify gaps using representative configurations from in-scope network areas, using Cisco reference architectures, best practices, and key performance indicators (KPIs) which may indicate the network is not ready to support Customer requirements and goals for the applications and services the Customer is planning to adopt.
- Provide recommendations to address identified gaps that would prepare the network for application and service readiness.
- Provide high level directional strategy that describes how the assessed network areas should evolve given the future service requirements.
- The Converged Architecture and Strategy Assessment (CASA) will provide:
 - Objective network benchmark analysis against converged architecture principles
 - Short/medium/long term remediation recommendations
 - Architecture Strategy Roadmap based on industry trends

Design Availability Assessment. Design Availability Assessment procedure (DAAP) projects end-to-end availability of a network infrastructure topology, based upon network hardware elements, topological arrangements, and method of connectivity; and provides future solutions and alternatives based on analysis findings. A Design Availability Assessment may consider, among other information, the following:

- Network infrastructure platform availability
- current availability and project end-end availability across multiple nodes.
- ROI availability projections that compare differing network infrastructure topologies' projected availability vs. costs providing downtime avoidance cost/benefit analysis.

IPv6 Architecture Strategy Assessment. IPv6 Architecture Strategy Assessment evaluates the Customer's network infrastructure and its ability to support IPv6. This service helps to determine the network's readiness to deploy IPv6 and provides an architecture strategy and recommendations and may include amongst other information, the following:

- Consult with Customer via a series of meetings to understand Customer's business and technical requirements and goals for IPv6.
- Perform an IPv6 architecture assessment on Customer's current network infrastructure.
- Provide an IPv6 Architecture Strategy report is comprised of the following:
 - Customer IPv6 requirements and goals
 - Analysis of findings
 - IPv6 architecture strategy proposal with recommendations

Migration Planning and Implementation Support.

Provide migration-consulting services that support network refresh and product migration activities and may include, among other information, the following:

- Develop a requisite list of high level events, phased changes and activities in order to introduce new hardware and protocols into the network
- Identify network dependencies and impact and provide risk mitigation steps for the migration.
- Align plan to organizational implementation policies and change management goals
- Gather information from Customer for organizational change management processes and recurring time periods that prohibit implementation activities
- Create Method Of Procedure documentation for pre and post cut-over connectivity and testing
- Create Master configuration templates for representative device or site types
- Provide reusable templates and standardized methods of procedures for up to 5 representative sites
- Site Specific Configurations based on Master Template for up to 5 hardware platform types and no more than 5 devices per site
- Create Site specific test procedures for the network-ready-for-use (NRFU)
- Provide migration cut-over support for up to 2 sites and additional remote issue resolution

Multicast Design Development Support. Cisco will perform a multicast comparative gap analysis between current and desired design benchmarked against identified Customer requirements as well as Cisco and industry leading practices. A Multicast Design Review may include, among other information, the following:

- Review business, technical and operational multicast requirements
- Review of multicast application requirements
- Review PIM (protocol independent multicast)-mode, RP (rendezvous placement) placement, IGMP (independent group multicast protocol) design
- Review WAN mVPN, mldp (multicast label distribution protocol), msdp (multicast source discovery protocol) design
- Multicast Report describing summary of strengths and weaknesses of Customer's multicast design; description of specific gaps in multicast design; recommendations to remediate multicast design gaps

Network Architecture Design Review. Design Review provides network design expertise to the Customer to review the Customer's design and make recommendations and may include, among other information, the following:

- Consult with Customer to develop a thorough understanding of Customer's network design requirements
- Review of Customer's design requirements, priorities, and goals
- Analysis of impact of new requirements on existing network
- Review of network architecture and topology
- Address design related questions
- Review protocol and feature design, selection and configuration
- Informal recommendations or advice about a network design

Persistent Testing Validation. Provide Lab consulting services in Cisco lab that support and align with Customer's technology roadmaps and may include, among other information, the following:

- Develop test plan strategy to align with technology roadmap
- Execute Test cycles which may include:
 - Review Customer network design, if applicable;
 - Review Customer test plans, if applicable;
 - Update Customer test plans, as applicable;
 - Set up lab and test tools;
 - Execute Customer test plans
 - Recommend modifications to the Customer design during test execution, if applicable
 - Document and review test results from Test Plan execution with Customer

QoS Design Development Support. Cisco will perform a Quality of Service (QoS) comparative gap analysis between current and desired design benchmarked against identified Customer requirements as well as Cisco and industry leading practices. A QoS Design Review may include, among other information, the following:

- Review business, technical and operational QoS requirements
- Review of applications requiring specific QoS treatment and corresponding network performance requirements for non-Cisco applications
- Review QoS class structure; network traffic identification and trust boundaries scheme; network traffic marking rules; and network traffic queuing strategy.
- QoS Report describing summary of strengths and weaknesses of Customer's QoS design; description of specific gaps in QoS design; recommendations to remediate QoS design gaps

Remediation Support

This section describes the Remediation Service work items available in the Cisco Network Optimization Service. Cisco provides Remediation Service as an additional component of the NOS portfolio.

Remediation Service Summary

The Remediation Service Component is an optional component of the Network Optimization Service (as are the other service components found in this document).

The Remediation Service Component includes a choice or combination of (a) Software Compliance and Remediation, and (b) Configuration Compliance & Remediation work-items as follows:

- a) Software Compliance & Remediation updates the version of the resident operating system for covered network devices based on Software Recommendation Reports, Bug scrubs, etc.
- b) Configuration Compliance & Remediation refers to the codification of Compliance audit and remediation scripts and configuration templates for the managed devices. The actions are based on Configuration Best Practices, Custom Best Practices and / or Platform/Audit/Solution Audit Reports according to NOS Engineer and Customer SME priority.

The scope of the Remediation Service includes Cisco products under IOS, IOS-XE, IOS-XR and Nexus-OS and ASA products (excluding UCS, Collaboration products and non-ASA Security products). Certain 3rd Party (non-Cisco) devices are also supported.

The service is typically delivered via a Customer-premise-

based Cisco-owned platform with the existing NOS Customer-based CSPC(s) (common collector) in conjunction with additional Software that will push images and/or configuration changes to the managed devices.

Cisco Remediation Service, based on prioritized actions, may audit Cisco Best Practice, Custom Best Practice or Software Version policies on the managed devices. Prioritization of remediation will be set by the Customer SME and Cisco NOS Engineer agreement.

Cisco Responsibilities

Cisco shall provide the following General Support for all Services selected by the Customer under the Remediation Service portfolio:

General Support

- Designate engineering resources as purchased ("Remediation Service Network Engineer") to act as the primary interface with the Cisco project manager and the NOS Engineers appointed for the Customer.
- The Remediation Service Software performs the scheduling and execution of configuration changes, image management, auditing and related activities.

Cisco Engineers will utilize the Software to:

- Run reports, view configurations and perform audits based on NOS best practices and other standards as specified by the NOS Engineer.
- Leverage the workflow management functionality for Change Management reviews and approvals prior to execution of network change requests.
- Dictate the exact configuration changes to be made.
- Schedule the specific time(s) to execute changes on targeted Network Elements.
- Perform configuration rollbacks (in concert with CSPC functionality)
- Remediate non-compliant configurations to relevant network policies and best practices based on customer agreement and priority.
- Archive Network Element configurations.
- Participate remotely in meetings with the Customer as required by the Cisco project manager to review deliverables, activities and to plan for service window execution.

- Cisco Engineer may utilize Customer provided data, scripts or internal tools to assist in collecting data from the Customer operations environment.

Software Compliance and Remediation

- Cisco provides Software upgrade scripts for each device type selection based on device complexity and operating system.
- The NOS Engineer will identify the quantity of covered devices (limited to the purchased quantity) and determine the complexity-assignment based on device type for Groups 1 (least complex) through 5 (most complex).
- The software image for each managed device will be upgraded by Cisco engineers during the service hour windows included in the contract. The service windows are typically defined by 4-hour blocks. By request, the service window schedule may be adjusted; the scheduled completion date may vary based on the service window schedule selected.

Configuration Compliance & Remediation

- Cisco provides configuration, compliance and remediation scripts as appropriate for each device configuration. These deliverables will be used to remediate network device configurations provided during the service hour windows included in the contract.
- The service windows are typically defined by 4-hour blocks. By request, the service window schedule may be adjusted; the scheduled completion date may vary based on the service window schedule selected.
- Cisco will perform the requested changes and perform basic validation that the configuration was applied as intended. The customer assumes final responsibility to verify the end-to-end desired functionality of change within scope of the network goals.
- By special arrangement Cisco may perform the final validation covered under separate agreement.

Program Management

Account Kickoff

- Work with Customer to deploy necessary hardware, software, and personnel.

- o Conduct a kickoff Workshop to identify key stakeholders, review and agree on service scope and activities and discuss governance & communication process.

Customer Responsibilities

General Responsibilities

- o Designate at least two (2) but not more than six (6) technical representatives in each area covered under Remediation Service, who must be Customer's employees in a centralized operations support center (Customer's technical assistance center), to act as the primary technical interface to the Remediation Service and NOS Network Consulting Engineer(s). Customer will designate as contacts senior engineers with the authority to make any necessary changes to the network configuration. One individual, who is a senior member of management or technical staff, will be designated as Customer's primary point of contact to manage the implementation of services selected under this Service Description (e.g., chair the weekly conference calls, assist with prioritization of projects and activities).
- o Timely execution of the customer-network-provisioning necessary to provide access to the Remediation Service Software as well as communication between the resident CSPC collectors and the Remediation Service Software.
- o Provide reasonable electronic access to Customer's network to allow the Cisco Network Consulting Engineer to provide support.
- o In the event the numbers of managed devices within scope are altered after the Services selected under this Service Description have become effective, Customer is responsible to notify Cisco in writing within ten days (10) of the change. Cisco may require modifications to the fee if the network composition has increased beyond the original pricing quote for Services.
- o Create and manage an internal email alias for communication with the Cisco Network Consulting Engineer(s). If agreed upon, an existing email alias may be used.
- o Retain overall responsibility for any business process impact and any process change implementations.

Operations Systems Support (OSS)/Network Management Systems (NMS) Specialization

- The OSS/NMS Specialization for NOS is comprised of the service elements described in the OSS Optimization Service shown at http://www.cisco.com/c/dam/en_us/about/doing_business/legal/service_descriptions/docs/OSS_Optimization_Support.pdf, incorporated herein by reference.

Security Specialization

- The Security Specialization for NOS is comprised of the service elements described in the Cisco Security Optimization Service shown at http://www.cisco.com/c/dam/en_us/about/doing_business/legal/service_descriptions/docs/Cisco_Security_Optimization_Service.pdf, incorporated herein by reference.

Wireless Specialization

- The Wireless Specialization for NOS is comprised of the service elements described in the Wireless LAN Optimization Service shown at http://www.cisco.com/c/dam/en_us/about/doing_business/legal/service_descriptions/docs/Wireless_LAN_Optimization_Service.pdf, incorporated herein by reference.

EnergyWise Specialization

- The EnergyWise Specialization for NOS is comprised of the service elements described in the Cisco EnergyWise Optimization Service shown at http://www.cisco.com/c/dam/en_us/about/doing_business/legal/service_descriptions/docs/Cisco_EnergyWise_Optimization_Service.pdf, incorporated herein by reference.

Cisco Network Operations Automation Services (CNOAS)

The Cisco Network Operations Automation Service is intended to automate proactive and reactive network operations tasks, integrating Cisco best practices with the Customer's operational process and tool environment. This service is intended to supplement a current maintenance agreement for Cisco products and is only available where all Product(s) in Customer's Network is supported with a minimum of core services (such as SMARTnet and/or Software Application Services) as applicable.

Upgrade Assessment/Support

The Cisco Network Operation Automation Service (CNOAS) will provide assessment and support services to determine the impact and effort associated with upgrading Customer's existing CNOAS solution to appropriate new version. Cisco will consult with Customer via a series of meetings to understand and analyze aspects of Customer's current CNOAS Environment. Cisco will provide assessment services to:

- Review Customer's existing production functionalities, including standard product configurations, integrations and customizations to determine the actions needed to maintain the existing functionality.
- Review current platform and hardware components to understand any sizing and product compatibility issues with third party applications
- Review new product features, product changes, benefits with Customer describing differences between existing and new application software versions and assess impact on existing configurations including potential fitness for use with Customer's existing implementation
- Review customizations, integrations and assess needed changes to ensure continued performance.
- Determine the feasibility, effort and risk associated with utilizing new features and functions that are part of the upgraded CNOAS software.
- Complete review sessions with Customer's project team on their steps taken to date and current status, resulting in an assessment of recommended next steps and upgrade plans
- Devise a plan documenting findings and recommendation that include:
 - Detailed impact, recommended strategy and estimate the level of effort required to complete the upgrade.
 - Review of Customer's project staffing capabilities and available resources/skill sets.
 - Plan and effort to remedy any issues uncovered during review process.
 - Contingency and rollback plans to restore the software to its original version
 - Plan and effort to utilize new desired product features.
 - Interactive presentation of findings, analysis, and recommendations.
 - Recommend a plan and effort to remedy any issues uncovered during review process.
- Once per yearly subscription period, Cisco may provide Customer with following upgrade service(s) on site for up to a maximum of five (5) business days to upgrade non-production CNOAS environment(s):
 - Provide one (1) upgrade for each non-production CNOAS element(s)
 - Provide testing of upgraded environment by executing one (1) of each software element and one (1) of each agent/adaptor to be used in the CNOAS solution. Support Customer during the test execution
 - Provide fix of any corruptions found during the validation
 - Provide one (1) knowledge transfer session for up to a maximum of twelve (12) Customer participants at Customer facility for up to one(1) day
 - Test upgrade and the differences between the prior CNOAS version and the upgraded CNOAS version
 - Reach agreement on the actual location and the commencement date for the knowledge transfer session within five (5) business days prior to the start of the upgrade engagement
- Once per yearly subscription period, Cisco may provide Customer with an provide the following upgrade service(s) on site for up to a maximum of five (5) business days to upgrade production CNOAS environment(s):
 - Provide one (1) upgrade for each production CNOAS element(s)
 - Provide testing of all Production CNOAS Fault tolerant environment elements (Primary Master, Backup Master and Fault Monitor)
 - Provide fix of any corruptions found during the validation
 - Provide upgrade of up to five (5) desktop client(s) in production environment
 - Provide cut over support for each upgraded production environment(s)
 - Provide post go live support for up to 10 business days and assist in resolving any upgrade related issues during go live.
- Once per yearly subscription period, Cisco may provide workflow customization for mutually agreeable Customer pain points identified for up to 5 workflows within up to a maximum of five (5) business days per workflow
- Once per yearly subscription period, Cisco may provide the following upgrade service(s) on site for both production and non-production CNOAS environment(s) mentioned above for up to a maximum of five (5) business days:
 - For each environment that is candidate for upgrade, provide health and risk assessment of Customer environment for the current CNOAS configuration, architecture, operating system (OS), database (DB), and workflows in CPO
 - Review and provide recommendation on Customer developed contingency plan
 - Provide fix of any corruptions found during the validation
 - Provide testing of upgraded component connectivity (CPO, database, adaptors, targets)

The quantity of any reporting and efforts for upgrade and assessment activities described herein will vary depending on

Customer requirements and what Customer and Cisco mutually agree upon when Services are purchased as identified in the Quote provided by Cisco.

Site and Systems Administration Support

- Cisco will consult with Customer to support Site and System administration that is process of maintaining and operating computer systems and networks as part of CNOAS solution (CPO, database, adapters, targets). Cisco will provide support for the following responsibilities that are generally performed:
- Perform routine audits of CNOAS solution
- Perform backups of CNOAS solution
- User management and user security administration such as add, remove, or update user account information, reset passwords, etc.
- Tune system performance
- Routine tasks to operate the CNOAS solution
- Provide architecture blueprint for CNOAS solution
- Participate in system build and document the configuration of the system
- Implementation of approved operating system updates, patches, and configuration changes
- Provide knowledge transfer of CNOAS Best Practices
- Provide periodic status report to management on tasks delivered and recommendations

The quantity of any reporting and efforts for site and system administration activities described herein will vary depending on Customer requirements and what Customer and Cisco mutually agree upon when Services are purchased as identified in the Quote provided by Cisco.

Ongoing Support

This service will provide support to assist Customer with general advice and guidance on Cisco recommendations around CNOAS solution. A maximum of twenty (20) custom workflows support will be provided.

- Designate an engineer (“Advanced Services Engineer”) to act as the primary interface with Customer for its CNOAS solution. This engineer would be available for five (5) days per week (pending local work restrictions) during Normal Business Hours excluding Cisco holidays, locally recognized country holidays, vacation, and training days.
- Participate in regular visits to the Customer either via phone, email or in-person to review proactive deliverables and activities and to plan for next quarter. In-person visits not to exceed five (5) days in aggregate. Additional visits will be mutually agreed at Cisco’s then-current travel and labor rates.
- Ongoing support service’s scope focuses on content and Cisco recommendations around CNOAS solution

- Participate in periodic conference calls (usually Bi-weekly or Monthly) at mutually agreeable time for an hour to review Customer’s CNOAS solution status, address questions, planning and the services being provided.
- Monitor a Customer-specific Cisco email alias to facilitate communication with primary Advanced Services Engineer as well as the engineers on the Cisco’s CNOAS team. Respond to Customer emails within 24-48 hours with acknowledgement and start working with Customer on the plan to address the topic of the email.
- Advanced Services Engineer will provide general advice and guidance to lead the delivery of the CNOAS solution ordered by Customer.
- Make collaboration tools available for the purposes of (including but not limited to): hosting meetings, managing documentation, instant messaging, desktop sharing, and collaborative spaces.

The quantity of any reporting and efforts for ongoing activities described herein will vary depending on Customer requirements and what Customer and Cisco mutually agree upon when Services are purchased as identified in the Quote provided by Cisco.

Custom Solution Support - Day 2 Reactive

Upon identification of a problem related to Customer solution and receipt of an error report from Customer containing a detailed description of the nature of the defect or error in the solution, the conditions under which it occurs and other relevant information sufficient to enable Cisco to reproduce the error in order to verify its existence and diagnose its cause, Cisco will use reasonable commercial efforts to furnish Customer an avoidance procedure, bypass, work-around or patch to correct or alleviate the condition reported

Prepare & Present QBR

- Schedule with Customer up to four (4) quarterly visits per yearly subscription period, (not to exceed eight (8) days in aggregate) to Customer’s site to review Deliverables and activities and plan for the next quarter. Additional visits will be mutually agreed upon at Cisco’s then-current travel and labor rates.

Workshop

- Conduct a workshop for up to two (2) working days with business and IT stakeholders to identify pain points in Customer’s network environment.
- Review with Customer their network’s current capabilities and discuss possible capabilities with help of CNOAS solution that allows the team to identify the desired automation goals and objectives. The workshop plays a vital tool for generating recommendations that optimize the

value gained from the automation process and provides a technical blueprint.

- Document findings including any gaps and recommended actions for the CNOAS solution workflow development for automation process.

Ongoing Service and Project Management Support

Provide ongoing support and project management to assist with the overall delivery of the Data Center Optimization Service for incremental changes to the CNOAS environment.

Remote Knowledge Transfer Sessions

Cisco will consult with Customer to identify requirements and topics for informal training sessions related to CNOAS solution.

Remote Knowledge Transfer Sessions are:

- Delivered in English (other languages subject to availability)
- Informal technical updates such as a “chalk talk” on a topic that is mutually agreed upon and relevant to the technologies in the data center.
- Service to be provided by an Advanced Services Engineer or another senior Cisco engineer.
- Delivered remotely for up to four (4) hours in length, with no labs and no printed course materials
- Relevant to the CNOAS solution - products and technologies deployed in Customer’s production Network

Customer Responsibilities

General Responsibilities

- Designate at least two (2) but not more than six (6) technical representatives to act as the primary technical interface to the Advanced Services Engineer. Representatives must be Customer’s employees in a centralized location. Customer will designate as contacts senior engineers, stakeholders, and decision-makers to participate with the authority to make any necessary changes to the Network configuration. One individual, who is a senior member of management or technical staff, will be designated as Customer’s primary point of contact to manage the implementation of services under this Service Description (e.g., chair the weekly conference calls, assist with prioritization of projects and activities). Provide its designated person(s) with instructions on process and procedure to engage the Advanced Services Engineer.
- In the event the Network composition is altered, after the selected Services in this Service Description are in effect, Customer is responsible to notify Cisco in writing within ten days (10) of the change. Cisco may require modifications to the fee if the Network composition has increased beyond the original pricing quote for Services.

- Within one (1) year from the commencement of the Services in this Service Description, Customer will have at least one (1) Cisco Certified Internetworking Expert (“CCIE”) trained employee or one (1) employee that has achieved, in Cisco’s sole determination, an equal standard through training and experience as designated contacts.
- Provide reasonable electronic access to Customer’s Network to allow the Advanced Services Engineer to provide support.
- Provide periodic information about changes planned for the Network regarding new technology, applications, or major design changes (short term and long term).
- Provide Customer internal incident escalation process and contact information.
- Provide information about Customer device and Network lab testing and certification process(es).
- Provide Network topology map(s).
- Provide information about any service level agreements or Network performance requirements.
- Provide information about critical applications supported by the Network.
- Provide information about expected Network growth and application mix changes.
- Notify Advanced Services Engineer of any major Network changes (e.g., topology, configuration, new Software releases).
- Create and manage an internal email alias for communication with Advances Services Engineer & delivery team.
- Utilize communication and collaboration tool(s) provided by Cisco. If Customer uses non-Cisco provided collaboration tools for hosting meetings, managing documentation, instant messaging, desktop sharing, and collaborative spaces, provide Cisco with access.
 - Customer will provide names of users who will have authorization to access these tools.
 - Customer will support the implementation of software required to use tools in their environment.
- Retain overall responsibility for any business process impact and any process change implementations.
- Provide list of Cisco.com Customer user-ids to be entitled as required to enable access by Customer to any Customer-accessible portal or online component throughout service contract duration.
- Data Collection Tools. Customer shall ensure that such Data Collection Tools or scripts are under lock and key and with access restricted to those Customer employee(s) or contractor(s) who have a need to access the Data Collection Tools and/or a need to know the contents of the output of Data Collection Tools. In the event Data Collection Tool provided by Cisco is Software, Customer agrees to make appropriate computers available and download Software as needed. Customer shall remain responsible for any damage to or loss or theft of the Data Collection Tools while in Customer’s custody.

- Initial Set-up (One Time). If Cisco provides Data Collection Tools or scripts located at Customer's site, an initial set-up is required and the following must be performed:
 - Complete the Data Collection Tools installation and system configuration questionnaire(s) (i.e. IP address, netmask, hostname, etc.) and return to the Advanced Services Engineer
 - Install the Data Collection Tools hardware in a secure area with controlled physical access
 - Connect the Data Collection Tools hardware to the Network
 - Secure the Data Collection Tools behind Customer's corporate firewall
 - Provide access to Data Collection Tools for use by Cisco to install, troubleshoot, and maintain; for remote access, SSH, Telnet, and/or dial are options, but virtual private network (VPN) access to the Graphical User Interface (GUI) is preferred and recommended
 - When applicable, provide Data Collection Tools with HTTPS (SSL) access back to Cisco CCO/CCX servers located at `nettoolsupload.cisco.com`; HTTP/FTP/PFTP may be used but Cisco strongly recommends HTTPS (SSL)
 - When applicable, provide Data Collection Tools with SSH to the `nettools-upload.cisco.com` server to support the transfer of Data Collection Tools patches, security patches, and Rules Based Markup Language (RBML) update packages; FTP may be used but Cisco strongly recommends SSH
 - Provide Data Collection Tools with SNMP and Command Line Interface (CLI) access to all Product(s) in the Network (necessary to facilitate collection of inventory and configuration information)
 - Provide Data Collection Tools with the Network Product list in seedfile format containing SNMP Read Only (RO) community string and CLI (`vtty/enable` or TACACS `user-id / password`) for access to all Product(s) in the Network (necessary to create the Data Collection Tools seedfile)
 - Provide Syslog server and upload information
- Data Collection Tools Management (Ongoing). In the event Data Collection Tools are installed on Customer's Network, the following items must be performed on a regular or as needed basis to support the operation of Data Collection Tools in the Network:
 - Notify Cisco about changes made to the Network such as Product(s) added/deleted and changes made to Product credentials
 - Fix access problems (Access Control List's, firewall, etc.) which may periodically occur between Data Collection Tools and the Product(s) in the Network
 - When applicable, fix data communication problems which prevent Data Collection Tools from uploading data to Cisco or prevent the remote maintenance of the Data Collection Tools
 - Notify the Advanced Services Engineer when changes are made to Syslog, DNS, proxy and gateway servers IP address(es)

Design Strategy

In addition to the General Responsibilities, Customer shall:

- Provide information about new requirements for the existing Network such as design requirements, priorities, and goals
- Ensure key detailed design stakeholders and decision makers are available to participate during the course of Design Reviews
- Provide information required for any design efforts (e.g., current and planned traffic characteristics)
- Provide information required for any design efforts (e.g., current and planned traffic characteristics)

Software Strategy

In addition to the General Responsibilities, Customer shall:

- Provide information about Customer business and technical requirements for new Software releases
- Review recommended Software releases with the Advanced Services Engineer
- Provide information about current Software releases operating on the Network
- Provide information about current configuration templates
- Provide information about current Software releases operating on the Network
- Provide information about current configuration templates

Hardware Strategy

In addition to the General Responsibilities, Customer shall:

- Provide information about strategic locations and details about the IP infrastructure such as topology, protocols, configurations, Network services, power, and environment
- Provide information about architecture and design resiliency requirements
- During Network audits, minimize changes made to the product(s) audited through the period of audit collection (typically a one (1) day or seven (7) day period). If feasible, no configuration changes should be made in order to avoid erroneous Network audit results.

Change Management Strategy

In addition to the General Responsibilities, Customer shall:

- Provide information about operational and change management processes
- Provide information about maintenance windows and any other constraints
- Provide information about Customer's standard operating procedures related to business practices, its internal operational nomenclature, to allow Cisco to effectively communicate and discuss changes with Customer in the context of Customer's business environment

Onsite Network Optimization Support and Onsite Network Consulting Support

- Provide Advanced Services Engineer with reasonable access to computer equipment, workstation, facilities, workspace and telephone
- Provide badge to Advanced Services Engineer to enable unescorted access into Customer buildings
- Involve Advanced Services Engineer in Network infrastructure planning and operations
- Unless otherwise agreed to by the parties, Customer shall respond within two (2) business days of Cisco's request for documentation or information needed during performance of the Service
- For the Project shall provide reasonable access to computer equipment, facilities, work-space and telephone for Onsite TAC engineer's use during the project

Virtual Training

Provide appropriate computers and other dedicated facilities as required for usage by students for instructional purposes.

- Provide remote access to instructional lab facilities as required, to enable access to the Internet, including static IP addresses when required.
- Agree to temporary use of Cisco's VPN AnyConnect client software to enable secured VPN access to lab facilities for course duration. Customer acknowledges that its personnel will be required to accept licensing terms as part of client software download and such terms can be reviewed at www.cisco.com/go/ase.
- Upon desiring to cancel a scheduled class, should do so in writing to the designated Cisco point of contact prior to 30 days from the start of scheduled session to avoid forfeiture of class delivery at Cisco discretion.
- Agree that all instructional content is the sole property of Cisco and/or Cisco subcontractors and are exclusively for the benefit of the course attendee only and for his/her internal use and shall not be reproduced in any way

Remote Knowledge Transfer Sessions

Collaborate with Cisco Advanced Services to determine appropriate and relevant topics.

- Provide a single point of contact to be used for all communication and coordination of requested sessions.
- Provide details in advance about the background and skill sets of each Remote Knowledge Transfer session audience.

Technical Knowledge Library

Customer is responsible for installation of the Content Engine or testing of the Portal interface, depending on which method for delivery is selected by Cisco. If the Content Engine delivery method is selected by Cisco, the Customer is also responsible for power and surge protection, security, Network connection, IP address assignment, and any required firewall or Access Control List changes required on Customer's Network in order for the Services to be provided by Cisco and to provide Cisco with the necessary remote access to Cisco equipment. In addition to the General Responsibilities, Customer shall:

- Provide shipment contact information such as: contact name, title, address, telephone number, e-mail address, and fax number.
- For the Content Engine delivery method, provide Cisco physical and remote access to the Content Engines(s) and all related hardware, as reasonably requested by Cisco, to provide, support, and maintain the Content Engine. The following TCP/IP ports are required for outbound remote access initiated from Content Engine on Customer premises:
 - HTTPS/SSL (TCP 443); SSH (TCP 22); HTTP (TCP 80)-possibly required; DNS (UDP 53)-possibly required
- Install and removal of the Content Engine or testing of the Portal interface, depending on which method for delivery is selected by Cisco.
- Notify Cisco of any technical support requests or troubleshooting issues related to the Services

Architecture Strategy

Network Architecture Development

- Designate a contact to act as the primary interface to Cisco.
- Participate in regular meetings with Cisco as required to review project status.
- Participate in periodic conference calls.

Availability Impact Analysis

- Provide current and proposed routing and switching design information

Converged Architecture Strategy Assessment

- Provide list of devices to be included in the assessment.
- Provide representative configurations from in-scope network areas

Design Availability Assessment

- Provide Network infrastructure platform information

IPv6 Architecture Strategy Assessment

- Consult with Cisco via a series of meetings to discuss business and technical requirements and goals for IPv6.

- Provide information on current network infrastructure which may include diagrams and topologies.

required by Cisco in support of an assessment. Review assessment report and suggestions provided by Cisco.

- Ensure key detailed design stakeholders and decision makers are available to participate during the course of the service.
- Provide reasonable electronic access (onsite and remote) to Customer's Network to allow the Advanced Services Engineer to provide support.
- Provide a Network topology map, configuration information, and information of new features being implemented as needed.
- Notify Advanced Services Engineer of any major Network changes (e.g., topology, configuration, new IOS releases.).
- Customer shall advise Cisco immediately of all adds, moves and changes of the CNOAS solution within Customer's environment.
- Provide necessary hardware, software and third party tools in the environment as specified in the CNOAS installation pre-requisite documentation.
- Provide documented information on Customer's existing CNOAS Infrastructure design including items such as: Inventory of servers, network and configuration data.
- Provide documented information on all non-Cisco applications integrated through the Automation Software Tools including interface specifications as required.

Migration Planning and Implementation Support

- Provide organizational implementation policies and change management goals
- Provide information for organizational change management processes and recurring time periods that prohibit implementation activities
- Identify representative device, platform or site types

Multicast Design Development Support

- Provide business, technical and operational multicast requirements
- Provide multicast application requirements
- Provide PIM (protocol independent multicast)-mode, RP (rendezvous placement) placement, IGMP (independent group multicast protocol) design
- Provide WAN mVPN, mldp (multicast label distribution protocol), msdp (multicast source discovery protocol) design

Network Architecture Design Review

- Provide documentation of any business requirements and technical requirements for the new design.
- Provide information on any current and planned traffic characteristics or constraints.
- Provide network architecture and topology
- Provide protocol and feature design, selection and configuration
- Ensure key detailed design stakeholders and decision makers are available to participate during the design review.

Persistent Testing Validation

- Provide technology roadmap
- Provide documentation which may include:
 - Network design, if applicable
 - Test plans, if applicable

QoS Design Development Support

- Provide business, technical and operational QoS requirements
- Provide list of applications requiring specific QoS treatment and corresponding network performance requirements for non-Cisco applications
- Provide QoS class structure; network traffic identification and trust boundaries scheme; network traffic marking rules; and network traffic queuing strategy.

Cisco Network Operations Automation Service (CNOAS)

- Ensure key engineering, networking and operational personnel are available to participate in interview sessions as