Cisco Identity Services Engine (ISE)v3.1

Common Criteria Operational User Guidance
And Preparative Procedures

Version 0.5

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List of Acronyms

The following acronyms and abbreviations are used in this document:

Table 1: Acronyms

Acronyms / Abbreviations	Definition
AES	Advanced Encryption Standard
FIPS	Federal Information Processing Standards
HTTPS	Hyper-Text Transport Protocol Secure
IP	Internet Protocol
SSHv2	Secure Shell (version 2)
TCP	Transport Control Protocol
TOE	Target of Evaluation

DOCUMENT INTRODUCTION

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DOCUMENT INTRODUCTION

This document provides supporting evidence for an evaluation of a specific Target of Evaluation (TOE), the Identity Services Engine (ISE) (also referred to as ISE 3.1 in this document). This Operational User Guidance with Preparative Procedures addresses the administration of the TOE software and hardware and describes how to install, configure, and maintain the TOE in the Common Criteria evaluated configuration. Administrators of the TOE will be referred to as administrators, Security administrators, TOE administrators, semi-privileged administrators, and privileged administrators in this document.

1. Introduction

This Operational User Guidance with Preparative Procedures documents the administration of the Identity Services Engine (ISE), the TOE, as it is being certified under Common Criteria. The Identity Services Engine (ISE) may be referenced below as ISE 3.1, TOE, or simply ISE.

1.1 Audience

This document is written for administrators configuring the TOE. This document assumes that you are familiar with the basic concepts and terminologies used in internetworking and understand your network topology and the protocols that the devices in your network can use, that you are a trusted individual, and that you are trained to use the operating systems on which you are running your network.

1.2 Purpose

This document is the Operational User Guidance with Preparative Procedures for the Common Criteria evaluation. It was written to highlight the specific TOE configuration and administrator functions and interfaces that are necessary to configure and maintain the TOE in the evaluated configuration. This document is not meant to detail specific actions performed by the administrator but rather is a road map for identifying the appropriate locations within Cisco documentation to get the specific details for configuring and maintaining ISE 3.1 operations.

1.3 Document References

This document makes reference to several Cisco Systems documents. The documents used are shown below in Table 2. Throughout this document, the guides will be referred to by the "#", such as [1].

Table 2: Cisco Documentation

#	Title	Link
[1]	Cisco Identity Services Engine CLI Reference Guide, Release 3.1	https://www.cisco.com/c/en/us/td/docs/security/ise/3-0/cli_guide/b_ise_cli_reference_guide_30.html

#	Title	Link
[2]	Cisco Identity Services Engine Administrator Guide, Release 3.1	https://www.cisco.com/c/en/us/td/docs/security/ise/3-0/admin_guide/b_ISE_admin_3_0/b_ISE_admin_30_overview.html
[3]	Cisco Identity Services Engine Installation Guide, Release 3.1	https://www.cisco.com/c/en/us/support/security/identity-services-engine/products-installation-guides-list.html
[4]	Cisco SNS 3500 Series Appliance Hardware Installation Guide	https://www.cisco.com/c/en/us/td/docs/security/ise/sns3500hig/b_ise_SNS3500HIG/b_ise_SNS3500HardwareInstallationGuide22_chapter_010.html
[5]	Cisco SNS 3600 Series Appliance Hardware Installation Guide	https://www.cisco.com/c/en/us/td/docs/security/ise/sns3600hig/b_sns_3600_install/b_sns_3600_install_chapter_00.html
[6]	Documentation for the Cisco 5900 Embedded Services Routers	https://www.cisco.com/c/en/us/support/routers/5921-embedded-services-router/model.html
[7]	Cisco Identity Services Engine (ISE) Security Target	Enclosed
[8]	Public Key Infrastructure Configuration Guide, Cisco IOS Release 15MT	https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/sec_conn_pki/configuration/15-mt/sec-pki-15-mt-book/sec-sis-with-ca.html

#	Title	Link
[9]	ISE Configuration for EAP-TLS Server (Supplement to the Common Criteria Operational User Guidance And Preparative Procedures for ISEv3.1) v0.1	Enclosed

1.4 Supported Hardware and Software

Only the hardware and software listed in section 1.7 of the Security Target (ST) is compliant with the Common Criteria evaluation. Using hardware not specified in the ST invalidates the secure configuration. Likewise, using any software version other than the evaluated software listed in the ST will invalidate the secure configuration. The TOE includes five hardware options - Cisco Identity Services Engine Appliance 3595 Cisco Identity Services Engine Appliance 3615 Cisco Identity Services Engine Appliance 3655 and Cisco Identity Services Engine Appliance 3695. It also includes ISE-VM on ESXi 6.7/7.0 running on Cisco UCS C220-M5SX (UCSC-C220-M5SX). The network, on which they reside, is considered part of the environment. The software comes pre-installed and is comprised of the ISE v3.1 Patch 5, running on Cisco Application Deployment Engine (ADE) Release 3.1 operating system (ADE-OS).

1.5 Operational Environment

1.5.1 Supported non-TOE Hardware/ Software/ Firmware

The TOE supports (in some cases optionally) the following hardware, software, and firmware in its environment:

Table 3: Operational Environment Components

Component	Required	Usage/Purpose Description for TOE performance
Administrative Console	Yes	This console provides the connection to the ISE appliance for administration and management. The console can connect directly to ISE or over the network via a browser or SSHv2 connection. The TOE supports the following browsers: • Mozilla Firefox version 70 and later • Google Chrome version 78 and later • Microsoft Edge
Remote Authentication Store	No	The TOE supports local authentication or authentication via a remote authentication store, including LDAP and Active Directory.
Syslog Target	Yes	The TOE must offload syslog to an external entity, which can be another iteration of ISE or a syslog server that supports TLS-protected transfer.
RADIUS Authenticator	Yes	Used during the 802.1X authentication exchange to relay the supplicant authentication to the Authentication Server. The 802.1X frames carry EAP authentication packets which are passed through to the RADIUS Authentication Server.

1.6 Excluded Functionality

The following functionality is excluded from the evaluation.

Table 4: Excluded Functionality

Excluded Functionality	Exclusion Rationale
Non-FIPS mode of operation	This mode of operation includes non-FIPS allowed operations.
Guest Management	Not within the scope of the evaluation
The device profiler feed service	Not within the scope of the evaluation
NTP	This version of TOE cannot provide secure NTP channel.
Virtual environment Microsoft Hyper-V on Microsoft Windows Server 2012 R2 for ISE-VM	Only ESXi 6.7 and 7.0 virtual environment will be tested
Virtual environment KVM on RHEL 7.3 for ISE-VM	Only ESXi 6.7 and 7.0 virtual environment will be tested

These services will be disabled by configuration. The exclusion of this functionality does not affect compliance to the collaborative Protection Profile for Network Devices Version 2.2e.

2. Secure Acceptance of the TOE

In order to ensure the correct TOE is received, the TOE should be examined to ensure that that is has not been tampered with during delivery. Verify that the TOE software and hardware were not tampered with during delivery by performing the following actions:

Step 1 Before unpacking the TOE, inspect the physical packaging the equipment was delivered in. Verify that the external cardboard packing is printed with the Cisco Systems logo and motifs. If it is not, contact the supplier of the equipment (Cisco Systems or an authorized Cisco distributor/partner).

Step 2 Verify that the packaging has not obviously been opened and resealed by examining the tape that seals the package. If the package appears to have been resealed, contact the supplier of the equipment (Cisco Systems or an authorized Cisco distributor/partner).

Step 3 Verify that the box has a white tamper-resistant, tamper-evident Cisco Systems bar coded label applied to the external cardboard box. If it does not, contact the supplier of the equipment (Cisco Systems or an authorized Cisco distributor/partner). This label will include the Cisco product number, serial number, and other information regarding the contents of the box.

Step 4 Note the serial number of the TOE on the shipping documentation. The serial number displayed on the white label affixed to the outer box will be that of the device. Verify the serial number on the shipping documentation matches the serial number on the separately mailed invoice for the equipment. If it does not, contact the supplier of the equipment (Cisco Systems or an authorized Cisco distributor/partner).

Step 5 Verify that the box was indeed shipped from the expected supplier of the equipment (Cisco Systems or an authorized Cisco distributor/partner). This can be

done by verifying with the supplier that they shipped the box with the courier company that delivered the box and that the consignment note number for the shipment matches that used on the delivery. Also verify that the serial numbers of the items shipped match the serial numbers of the items delivered. This verification should be performed by some mechanism that was not involved in the actual equipment delivery, for example, phone/FAX or other online tracking service.

Step 6 Once the TOE is unpacked, inspect the unit. Verify that the serial number displayed on the unit itself matches the serial number on the shipping documentation and the invoice. If it does not, contact the supplier of the equipment (Cisco Systems or an authorized Cisco distributor/partner). Also verify that the unit has the following external identification as described in Table 5 below.

Table 5: TOE External Identification

Product Name	Model Number	External Identification
ISE 3.1 - 3500 Series	3595	SNS-3595
ISE 3.1 – 3600 Series	3615	SNS-3615
	3655	SNS-3655
	3695	SNS-3695
ISE 3.1 – ISE-VM	ISE Virtual	Cisco UCS C220-M5SX

Step 7 Approved methods for obtaining a Common Criteria evaluated software images:

- Download the Common Criteria evaluated software image file from Cisco.com onto a trusted computer system. Software images are available from Cisco.com at the following:

https://software.cisco.com/download/redirect?config=a27582451f7dffb1baf7857a5c89f0e7

- The TOE ships with the correct software images installed.

Step 8 Digital Signature mechanism is used to verify software/firmware update files (to ensure they have not been modified from the originals distributed by Cisco) before they are used to actually update the applicable TOE components. The updates can be downloaded from the software.Cisco.com. The TOE image files are digitally signed so their integrity can be verified during the boot process, and an image that fails an integrity check will not be loaded. The digital certificates used by the update verification mechanism are contained on the TOE. If the digital signature fails, contact Cisco Technical Assistance Center (TAC) https://tools.cisco.com/ServiceRequestTool/create/launch.do.

Step 9 Install the downloaded and verified software image onto your ISE 3.1 as described in [**1**] under **patch install** or in [2] under Install a Software Patch and the following sections.
Start your ISE 3.1 as described in [**3**] – Chapter 7. Confirm that your ISE 3.1 loads the image correctly, completes internal self-checks and displays the cryptographic export warning on the console.

Step 10 The end-user must confirm once the TOE has booted that they are indeed running the evaluated version. Use the “show application version ise” command to display the currently running software release version.

Table 6: Evaluated Software Images

Software Version	Image Name	Hash
ISEv3.1	ise-3.1.0.518.SPA.x86_64.iso	92b747fbb7392f29fe8d4ed523ec7d40688d6e4841ff33ab52ac764d90300f31488906d88f3e465c522f0ccff4553ccfb74b939aa0d5ac4b4586d39a4f878423
	ise-apply-CSCwe28719_3.1.0.518_patch5-SPA.tar.gz	**6**202bfff12715d3d1a8b2cee08f077fba38af2db4e5e0bbbbbac2fb6fb6c24c36ebe1ddd04878de40edd7414f85cd19ef2cd16fd28ad68be3e42f930da2c6f67

3. Secure Installation and Configuration

3.1 Physical Installation

For the appliance form-factor, follow the Cisco Identity Services Engine Hardware Installation Guide, Release 3.1 [**3**] for hardware installation instructions.

3.2 Initial Setup

Basic configuration of the TOE via console connection needs to be completed prior to being connected to any network.

3.2.1 Options to be chosen during the initial setup of the ISE 3.1

When you start to configure ISE via the CLI, a number of parameters must be configured. See [**3**] under Installing and Configuring a Cisco SNS-3500/3600 Series Appliance -> Cisco ISE Setup Program Parameters.
The exception to the information given in this section is that the password must meet the requirements in the ST:

1. Passwords shall be able to be composed of any combination of upper and lower case letters, numbers, and the following special characters: [“!”, “@”, “#”, “$”, “%”, “^”, “&”, “*”, “(“, “)”];
2. Minimum password length shall be settable by the Security Administrator, and support passwords of 15 characters or greater.

Additional setup via the HTTPS Graphical User Interface (GUI) is needed:

Administrator Password Policy: the policy may be set to enforce a minimum password length of 15 characters:

a. Choose Administration > System > Admin Access > Authentication
b. Click the Password Policy tab.
c. On the Password Policy tab, change the Minimum Length field to 15.
d. Additional restrictions can be set per local company policy.

3.2.2 Saving Configuration

ISE uses both a running configuration and a starting configuration when working with the CLI. Configuration changes affect the running configuration, in order to save that configuration the running configuration (held in memory) must be copied to the startup configuration. This may be achieved by either using the write memory command or the copy running-config startup-config command. These commands should be used frequently when making changes to the configuration of the TOE. If the TOE reboots and resumes operation when uncommitted changes have been made, these changes will be lost and the TOE will revert to the last configuration saved.

When working with the GUI, the configuration is automatically saved every time values are entered and the "Save" button is used on each screen.

3.2.3 Enabling FIPS Mode

For the TOE to be in the Common Criteria evaluated configuration, the TOE must be run in the FIPS mode of operation. The instructions to enable FIPS are under the section – "**Configure FIPS Mode on ISE"** in the document - http://www.cisco.com/c/en/us/support/docs/security/identity-services-engine/200535-FIPS-Mode-on-ISE.html. No other mode of operation was tested and this limits Cisco ISE to only the cryptographic operations claimed by the Common Criteria evaluation.

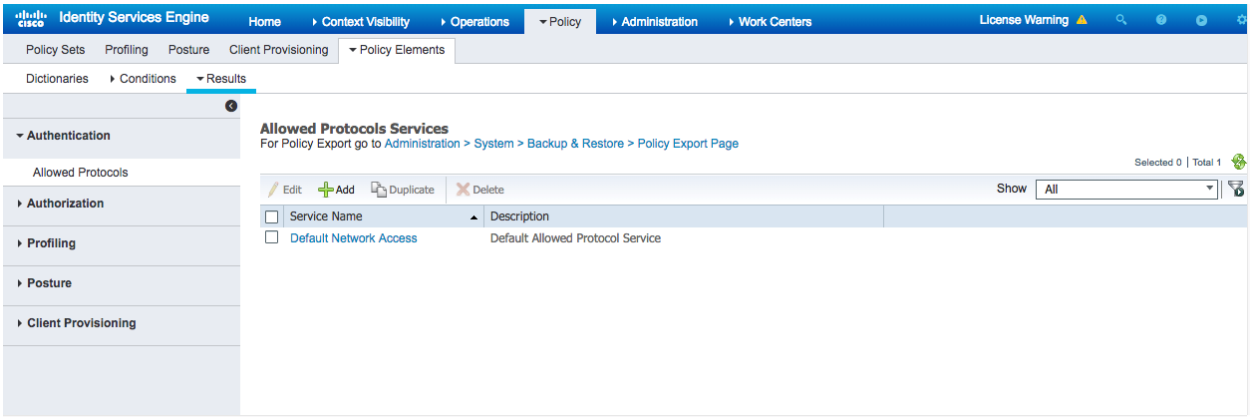
The TOE administrator must verify that a FIPS mode icon is displayed to the left of the node name in the upper-right corner of the GUI screen. This indicates that the TOE is in FIPS mode.

In addition to enabling FIPS mode, the Security Administrator should uncheck the following settings under Administration > Protocols > Security Settings:

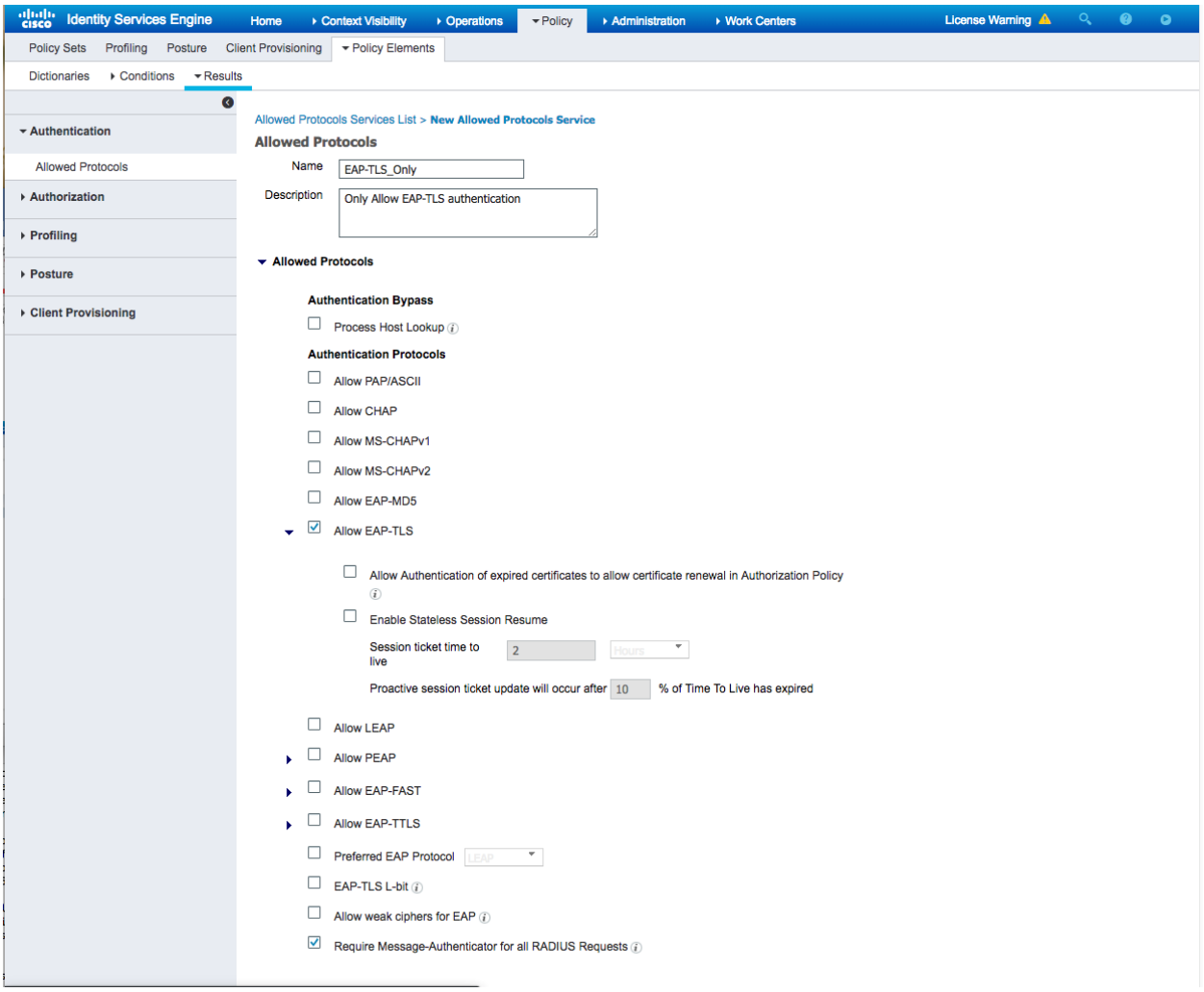
- Allow TLS 1.0
- Allow TLS 1.1
- Allow unsafe legacy TLS renegotiation for ISE as a client and accept certificates without validation
- Allow 3DES, DSS ciphers

Please find the detailed steps to configure the FIPS mode of operation in ISEv3.1 below -

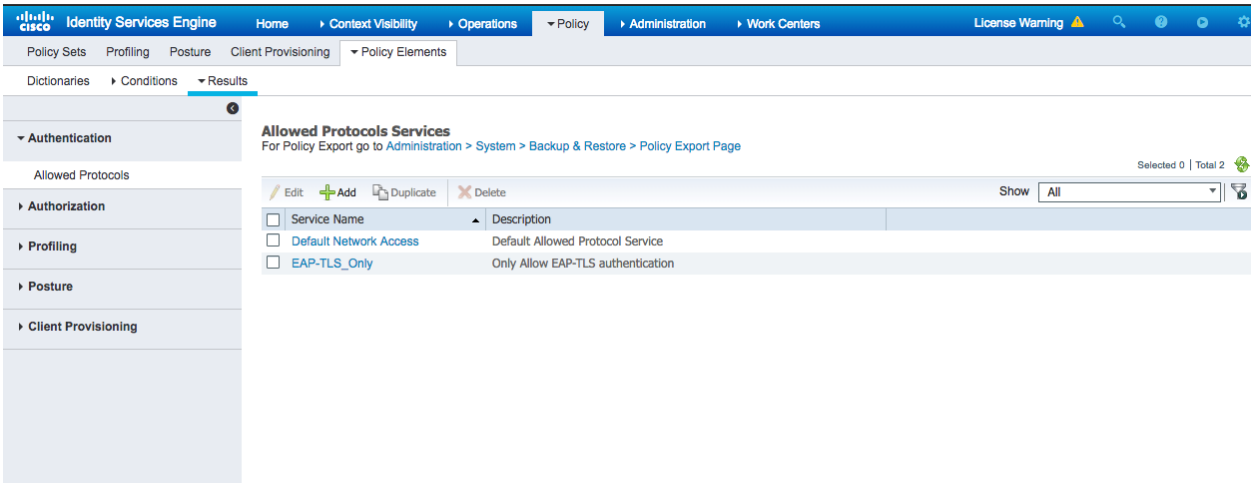
1. Add Allowed Protocols - Click on Add button



2. Add Name, Description
   a) Check the checkbox for **Allow EAP-TLS**
   b) Check the checkbox for **Require Message-Authenticator for all RADIUS Requests** and uncheck all other checkboxes

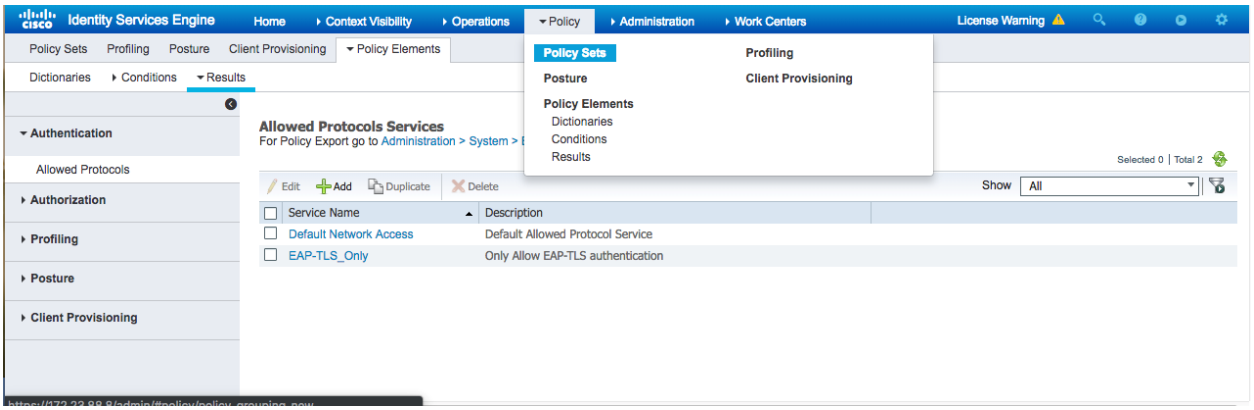


c) Click the Submit button to persist the changes. The saved Allowed Protocol Service is shown in the table as shown below:

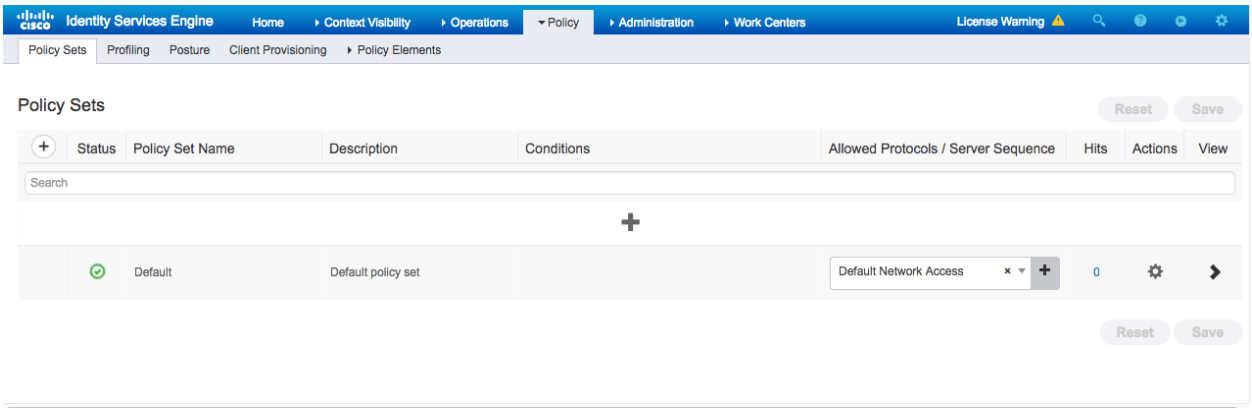


3. Modify the Authentication Policy to use the newly created **EAP-TLS Only** settings instead of the **Default Network Access** setting.

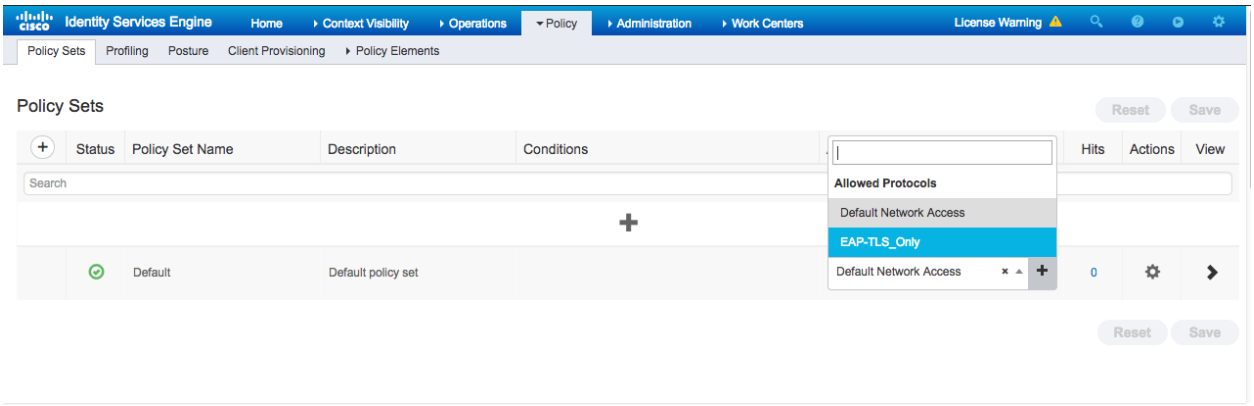
   a) Select the Menu: Policy > Policy Sets



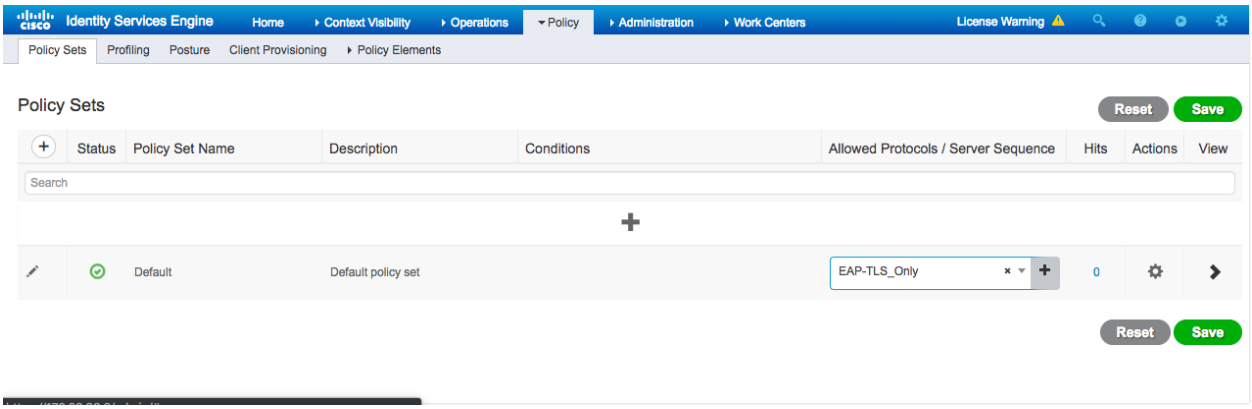
   b) The default Policy Set configuration appears:



c) Mouse click on the Default Network Access Pulldown selection, then select **EAP-TLS_Only**



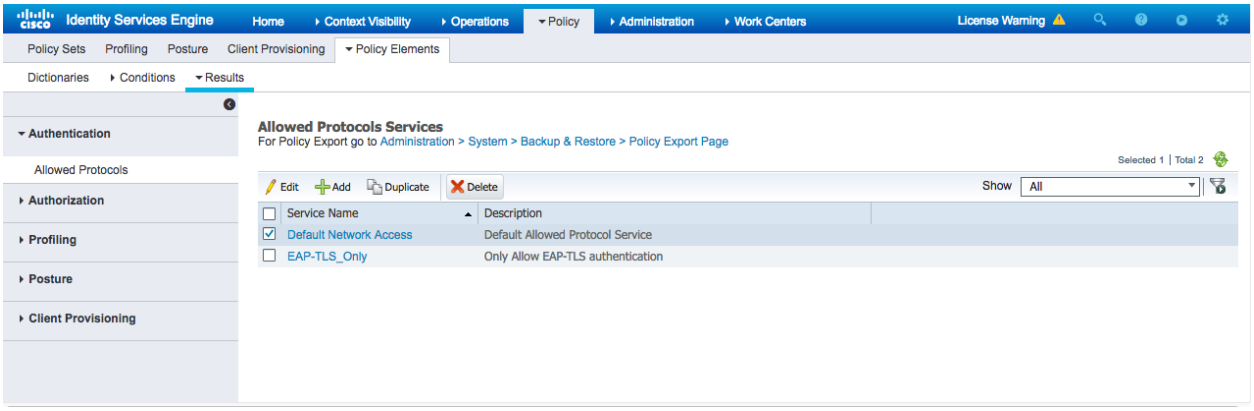
d) Click on the Save button to persist the changes.



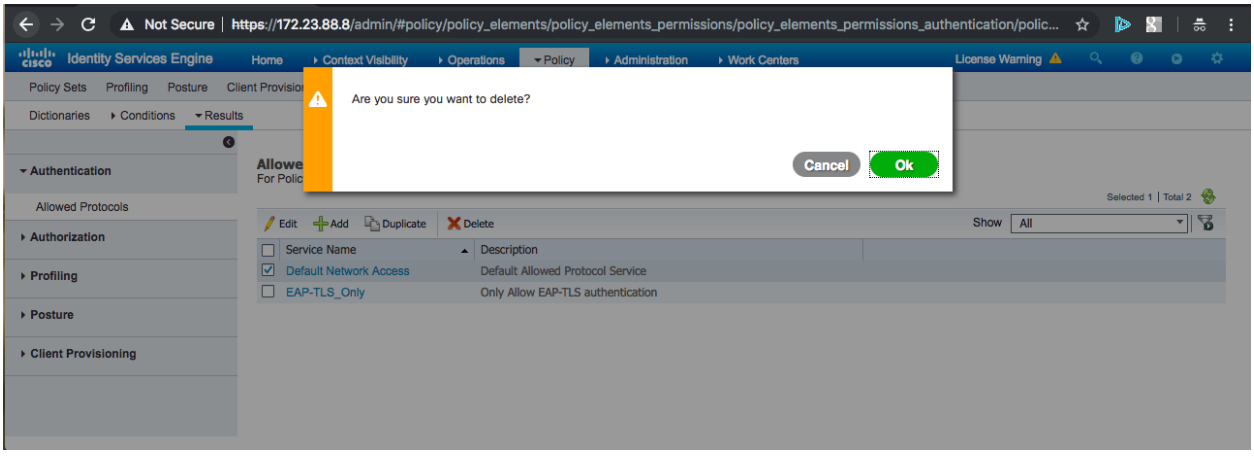
4. Delete the Default Network Access settings because it uses insecure algorithms that will prevent ISE from enabling FIPS 140 mode.

   a) Select Menu: Policy > Policy Elements > Results

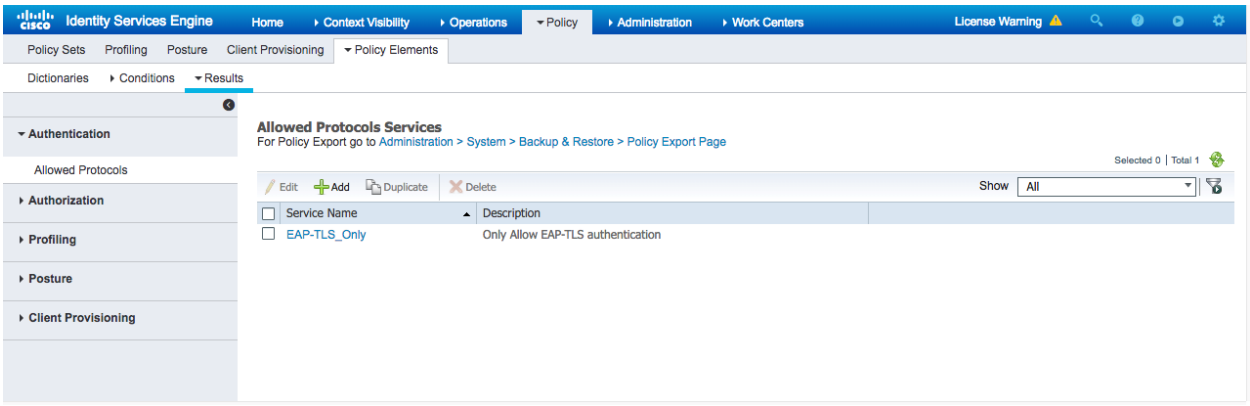
   b) Check the checkbox **Default Network Access** then click the **Delete** button.



   c) Click on the **Ok** button to confirm that deletion is desired.

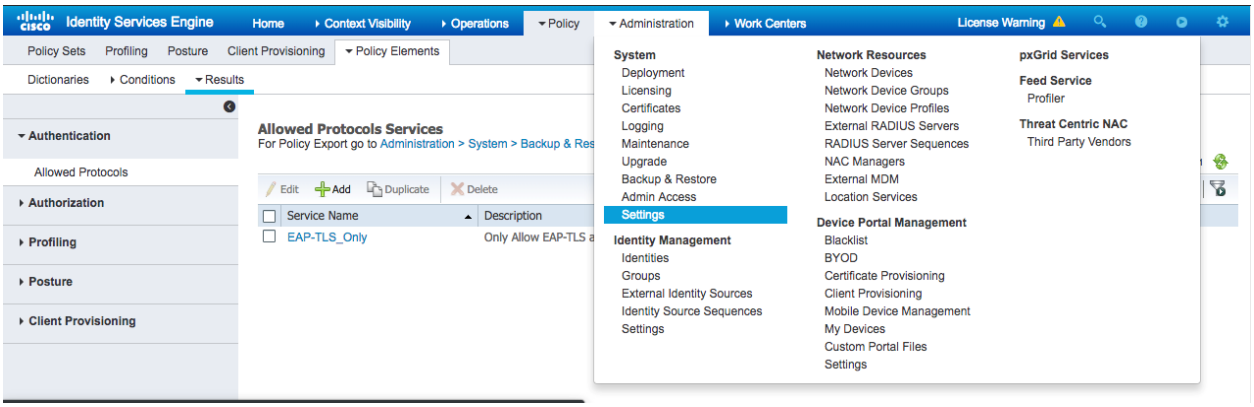


   d) The Allowed Protocols Services table will no longer show the Default Network Access setting which was deleted.

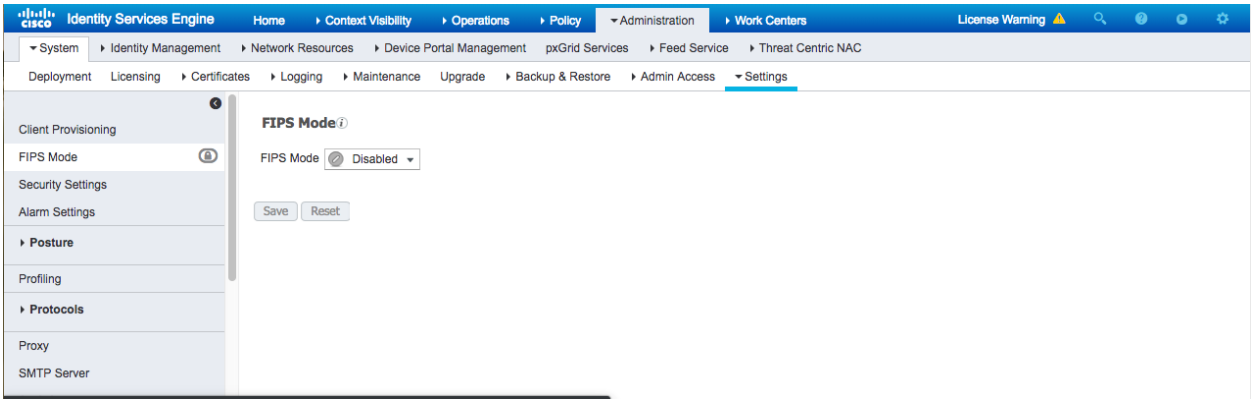


5. Set ISE in FIPS 140 mode

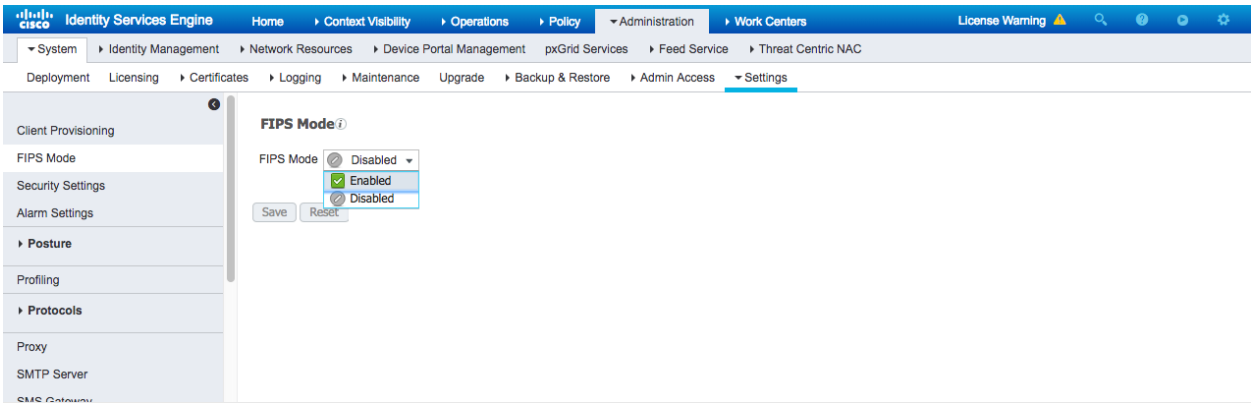
a) Navigate to Menu: Administration > System > Settings



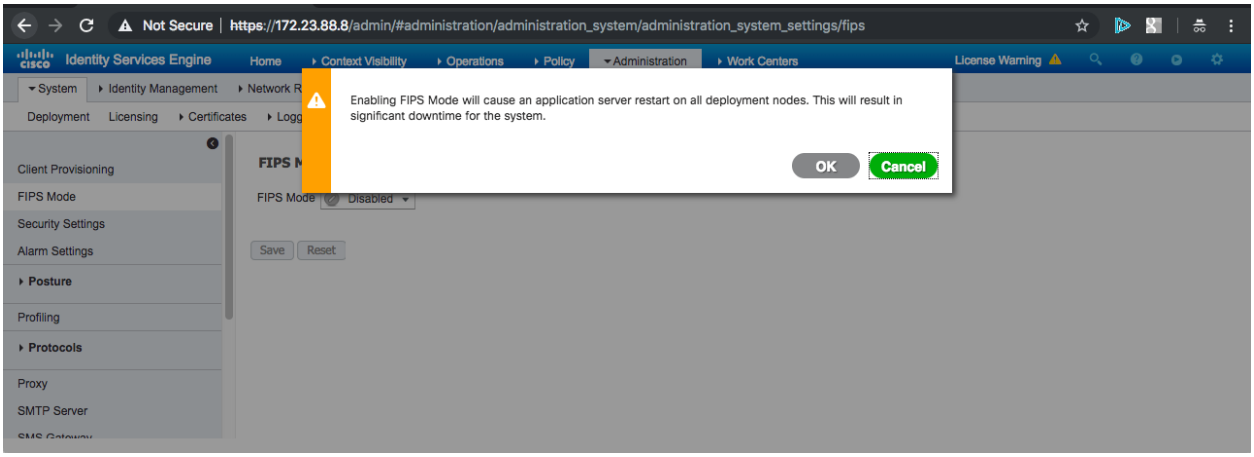
b) On the Left-Side, click **FIPS Mode**



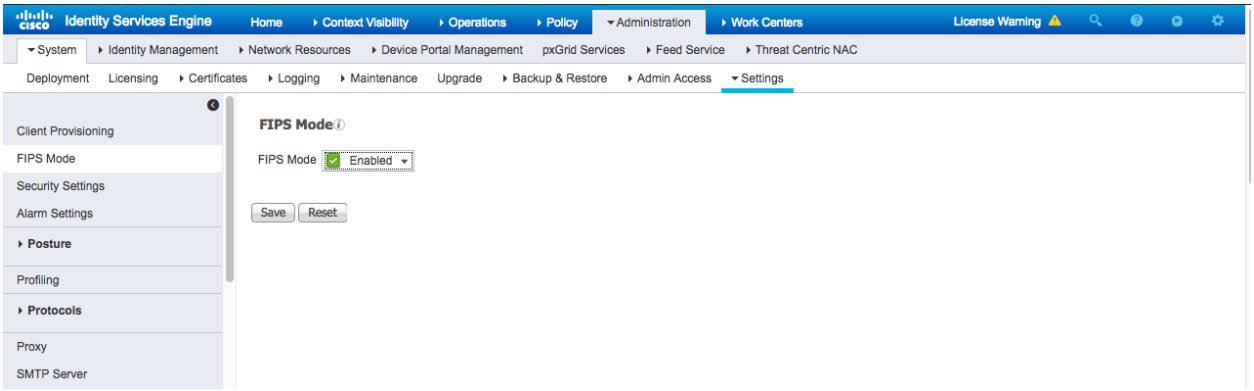
c) Click on the FIPS Mode value of Disabled and Select **Enabled**



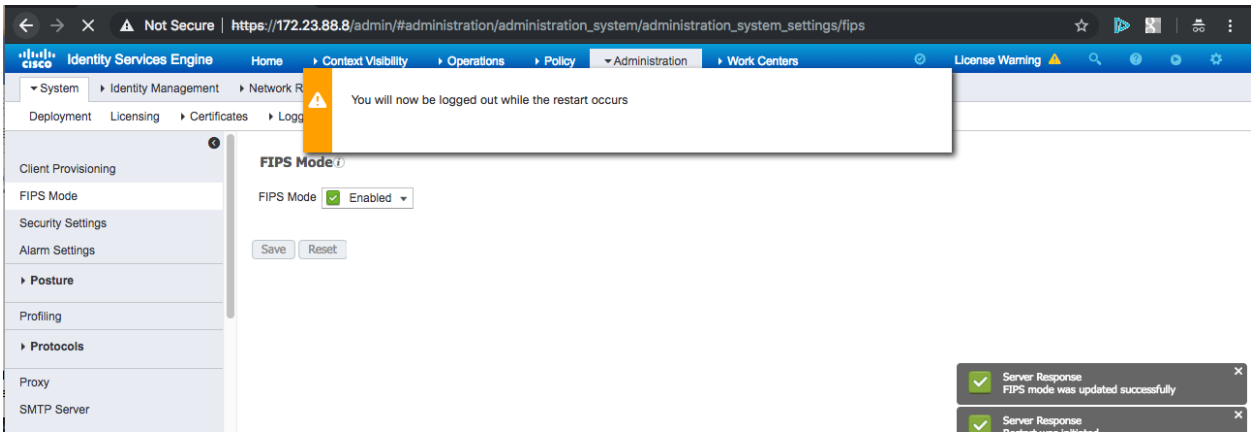
d) Confirm that an automatic restart of all ISE services will take place as ISE initializes the cryptographic library into FIPS 140 mode, by clicking on the **OK** button.



e) Click the “Save” button to start the transition to FIPS 140 mode.



f) The user interface informs the administrator that a logout will occur.



g) The Login page appears but login will not be allowed until the web application and all services are restarted with the cryptographic library initialized into FIPS 140 mode.

3.2.4 Authentication Stores

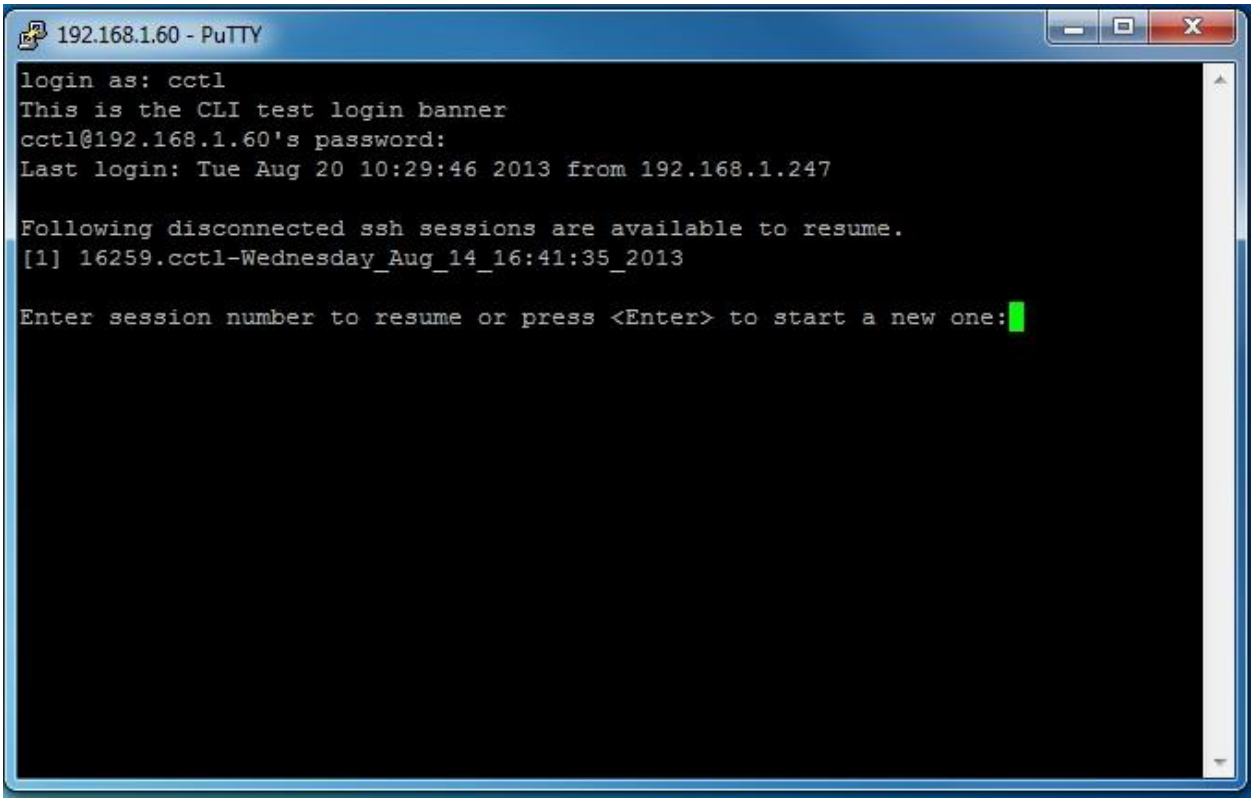
The TOE by default uses local authentication stores for administrative identification and authentication. Configuration of external authentication sources (for remote password authentication) is covered in [**2**] under Managing Users and End-User Portals -> Managing Users and External Identity Stores. This evaluation only covers authentication via the local (internal) database, Active Directory, or LDAP. The TOE doesn't support fallback authentication functions.

3.2.5 Session Termination

Inactivity settings must trigger termination of the administrator session. These settings are configurable by setting the Administration > System > Admin Access > Settings-> Session Timeout setting in the GUI, which defines a session idle timeout period in minutes. After this period elapses, the session times out and access is no longer possible during this session. The administrator may re-initiate the login process to continue work.

For the CLI, this timeout is configured using the command:
terminal session-timeout *minutes*

After this period elapses at the CLI, the session times out and access is no longer possible during this session. The administrator may re-initiate the login process to continue work. The administrator may also resume the access from the previous session by selecting that session after successful authentication and establishment of a new session. See the screen shot below for the options given. Selection of both starts a new administrative session with a new inactivity timer.



Configuration of these settings is limited to the CLI administrator and Super Admin and System Admin group roles on the GUI (see Section 4.1). Each administrator logged onto the TOE can manually terminate his/her session using the “Log Out” link in the web-based GUI or the “exit” or “forceout <username>” commands at the CLI.

3.3 Network Protocols and Cryptographic Settings

3.3.1 Remote Administration Protocols

ISE provides two ways to manage the TOE remotely:

- SSHv2 must be used. Once FIPS mode is enabled as described in Enabling FIPS Mode above, SSHv2 is the only SSH version allowed. Telnet is not allowed for management purposes.
  - To enforce the required AES-CBC 128 bit or AES-CBC 256 bit cipher requirement and SHA macs when connecting to the TOE, the SSH client must request these algorithms. On Linux-based systems this is done with the following SSH syntax:
    ssh -2 –c [aes128-cbc or aes256-cbc] –m [sha macs]
    Note: The hashing method 'none' is NOT to be used in the evaluated configuration.
  - To enable SSH, the CLI admin must enter the following commands from the Cisco ISE Command-Line Interface (CLI) Configuration Mode:
    service sshd enable
  - To enforce the required Diffie-Hellman-Group14-SHA1 SSH key exchanges, the CLI admin must enter the following commands from the Cisco ISE Command-Line Interface (CLI) Configuration Mode:
    service sshd key-exchange-algorithm diffie-hellman-group14-sha1
- HTTPS must be used for connections to the administrative GUI. Note that when connecting to the GUI, both port 80 (HTTP) and 443 (HTTPS) are listening, but port 80 by default is redirected to port 443. This setting cannot be changed.
  It is the administrator's responsibility to configure their HTTPS client per the SSL/TLS Settings in Section 3.3.2.

See Appendix B -> Cisco ISE Ports Reference in [3] for more information on the available ports and interfaces.

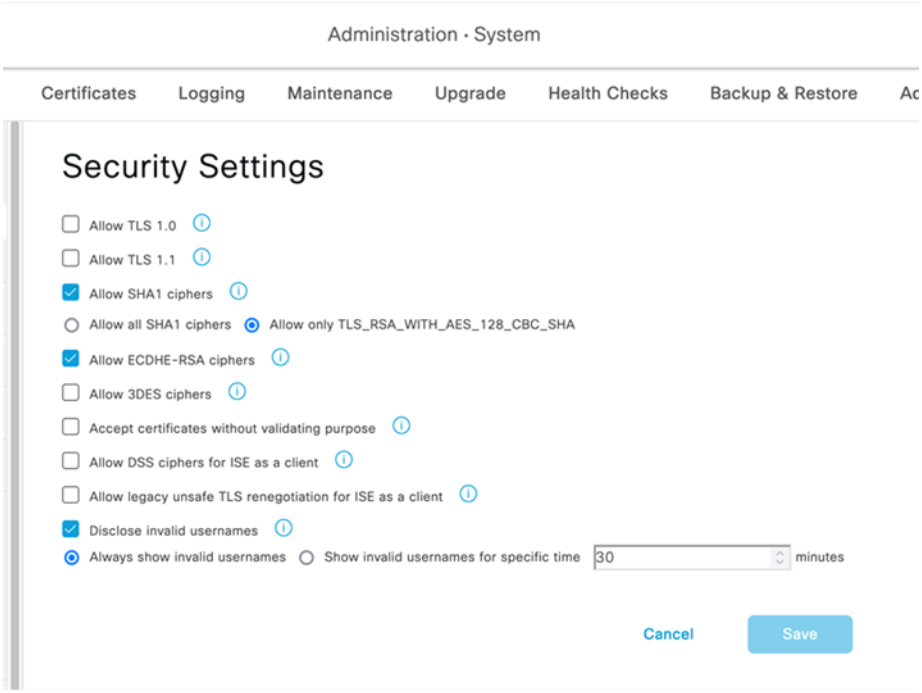
3.3.2 SSL/TLS Settings

The evaluated configuration requires that when connecting to the TOE over TLS1.2, it must be used with one of the following algorithms-

a) TLS_RSA_WITH_AES_128_CBC_SHA as defined in RFC 3268
b) TLS_RSA_WITH_AES_128_CBC_SHA256 as defined in RFC 5246
c) TLS_RSA_WITH_AES_256_CBC_SHA256 as defined in RFC 5246
d) TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256 as defined in RFC 5289
e) TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 as defined in RFC 5289
f) TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384 as defined in RFC 5289
g) TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 as defined in RFC 5289
h) TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256 as defined in RFC 5289
i) TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384 as defined in RFC 5289
j) TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 as defined in RFC 5289
k) TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 as defined in RFC 5289

The SSL/TLS client must be configured for one or more of the above algorithms. See the documentation for your browser for the specific configuration settings. Enabling FIPS mode in the TOE is the first step to limiting the TLS versions supported to 1.2 and also limits the allowed ciphersuites to the list claimed in the FCS_TLSS_EXT.1.2 SFR of the ST. The next step is to uncheck the “Allow TLS 1.0” and “Allow TLS 1.1” checkboxes and check the ‘Allow SHA-1 ciphers” and “Allow ECDHE-RSA” ciphers. This will allow ISE as TLS client to LDAPS servers to only support TLS v1.2.

Menu: Administration > System > Settings
Left-side navigation: Protocols > Security Settings:



Firefox Example Configuration

For Firefox, you should open Firefox > Preferences > and select Use TLS 1.2. Next type “about:config” in the address bar. A warning will come up about changing these settings. Do a search on security and you will see the algorithms listed as: security.ssl3.rsa_aes_128_sha. In order to only enable the mandatory ciphersuites the other non-standard ciphersuites must be disabled in the browser. Double click on each ciphersuite that must be disabled and the Value will turn to false. See Table 7 below for details.

Table 7: Firefox Settings

Preference Name	Status	Type	Value
security.ssl.warn_missing_rfc5746	default	integer	1
security.ssl3.dhe_dss_aes_128_sha	**user set**	**boolean**	**false**
security.ssl3.dhe_dss_aes_256_sha	**user set**	**boolean**	**false**
security.ssl3.dhe_dss_camellia_128_sha	**user set**	**boolean**	**false**
security.ssl3.dhe_dss_camellia_256_sha	**user set**	**boolean**	**false**
security.ssl3.dhe_dss_des_ede3_sha	**user set**	**boolean**	**false**
security.ssl3.dhe_rsa_aes_128_sha	default	boolean	true
security.ssl3.dhe_rsa_aes_256_sha	default	boolean	true
security.ssl3.dhe_rsa_camellia_128_sha	**user set**	**boolean**	**false**
security.ssl3.dhe_rsa_camellia_256_sha	**user set**	**boolean**	**false**
security.ssl3.dhe_rsa_des_ede3_sha	**user set**	**boolean**	**false**
security.ssl3.ecdh_ecdsa_aes_128_sha	**user set**	**boolean**	**false**
security.ssl3.ecdh_ecdsa_aes_256_sha	**user set**	**boolean**	**false**
security.ssl3.ecdh_ecdsa_des_ede3_sha	**user set**	**boolean**	**false**
security.ssl3.ecdh_ecdsa_rc4_128_sha	**user set**	**boolean**	**false**
security.ssl3.ecdh_rsa_aes_128_sha	**user set**	**boolean**	**false**
security.ssl3.ecdh_rsa_aes_256_sha	**user set**	**boolean**	**false**
security.ssl3.ecdh_rsa_des_ede3_sha	**user set**	**boolean**	**false**
security.ssl3.ecdh_rsa_rc4_128_sha	**user set**	**boolean**	**false**
security.ssl3.ecdhe_ecdsa_aes_128_sha	**user set**	**boolean**	**false**
security.ssl3.ecdhe_ecdsa_aes_256_sha	**user set**	**boolean**	**false**
security.ssl3.ecdhe_ecdsa_des_ede3_sha	**user set**	**boolean**	**false**
security.ssl3.ecdhe_ecdsa_rc4_128_sha	**user set**	**boolean**	**false**
security.ssl3.ecdhe_rsa_aes_128_sha	**user set**	**boolean**	**false**
security.ssl3.ecdhe_rsa_aes_256_sha	**user set**	**boolean**	**false**
security.ssl3.ecdhe_rsa_des_ede3_sha	**user set**	**boolean**	**false**
security.ssl3.ecdhe_rsa_rc4_128_sha	**user set**	**boolean**	**false**
security.ssl3.rsa_aes_128_sha	default	boolean	true
security.ssl3.rsa_aes_256_sha	default	boolean	true
security.ssl3.rsa_camellia_128_sha	**user set**	**boolean**	**false**
security.ssl3.rsa_camellia_256_sha	**user set**	**boolean**	**false**
security.ssl3.rsa_des_ede3_sha	**user set**	**boolean**	**false**
security.ssl3.rsa_fips_des_ede3_sha	**user set**	**boolean**	**false**
security.ssl3.rsa_rc4_128_md5	**user set**	**boolean**	**false**
security.ssl3.rsa_rc4_128_sha	**user set**	**boolean**	**false**
security.ssl3.rsa_seed_sha	default	boolean	true

Internet Explorer Example Configuration

To verify TLS is configured Open Internet Explorer > Tools > Internet Options > Advanced – Scroll Down to Security – select TLS 1.2.

In order to prioritize the ciphersuites that internet explorer uses > Start > Run '**gpedit.msc'**

The Local Group Policy Editor will open, then click on > Local Computer Policy > Computer Configuration > Administrative Templates > Network > SSL Configuration Settings – Double click on the SSL Cipher Suite Order > Click Edit Policy

Steps to Edit the SSL Cipher Suite Order

1. Click on the Enabled radio button.
2. The current cipher suites will be listed under the heading SSL Cipher Suites
3. Copy these into a notepad document and save them as a backup.
4. Open a new blank notepad document
5. Enter the following mandatory ciphersuites:

    TLS_RSA_WITH_AES_128_CBC_SHA,TLS_RSA_WITH_AES_256_CBC_SHA

6. Place a comma at the end of every suite name except the last. Make sure there are NO embedded spaces.
7. Remove all the line breaks so that the cipher suite names are on a single, long line.
8. Copy the above ciphersuites (from step 5) and paste into the box that previously had the listing of all supported TLS ciphersuites. The maximum length is 1023 characters.
9. It is necessary to restart the computer after modifying this setting for the changes to take effect.
10. As a reference the following web page was used for these instructions: http://msdn.microsoft.com/en-us/library/windows/desktop/bb870930%28v=vs.85%29.aspx#adding__removing__and_prioritizing_cipher_suites

Instructions for Setting the Reference Identifier for Certificate Validation in TLS:

- When the TOE acts as a TLS client to LDAPS servers, it obtains the reference identifiers from the administrator configured value in the LDAP Identity Source Hostname/IP field. (Administration application. Menu: Administration

> Identity Management > External Identity Sources. Left-Navigation: LDAP. "Connection" tab. Hostname/IP field)

- When the TOE acts as a TLS client to TLS Secure Syslog servers, it obtains the reference identifiers from the administrator configured value in the Remote Logging Targets IP/Host Address field. (Administration application. Menu: Administration > System > Logging. Left-Navigation: Remote Logging Targets. IP/Host Address field)

- The TOE supports the following presented identifier types:

    1. subjectAltName entry of type dNSName (DNS-ID in RFC 6125)
    2. CN-ID as defined in RFC 6125 exact case-sensitive match only (i.e., no wildcards supported in CN-ID)
    3. subjectAltName entry of type iPAddress; and
    4. Wildcards in left-most label subjectAltName entry of type dNSName.

    Certificate pinning is unsupported by the TOE.

Certificate Signing Requests :

The detailed instructions to request signed certificate from a CA are listed in the Section – "Certificate Signing Requests" in Chapter 7 of [2].

Steps for Configuring the Client-side Certificates for TLS Authentication:

The following two steps are required to configure the client-side certificates for TLS authentication -

1. The TLS server Certificate Authority certificates for the TOE Administration application, the LDAPS Server and the Secure Syslog Audit Server must be imported into the "Trusted Certificates" data store. When importing the Trusted Certificate Authority certificate(s), all of the following must be configured:

a) The checkbox “Validate Certificate Extensions” must be checked.
b) The “Trusted For:” fields must be configured as follows: Check the checkbox “Trust for client authentication and Syslog” when the TOE acts as a Secure Syslog client to a Secure Syslog Server and the Trusted Certificate Authority certificate is for the Secure Syslog Server. When the HTTPS client’s certificate authority certificate is being used to authenticate to the TOE using client-certificate authentication, the Certificate Authority Certificate must have the “Trusted for client authentication and Syslog” checkbox checked.
c) Check the checkbox “Trust for authentication within ISE” when the Certificate Authority certificate is for the non-TOE LDAPS Server.

2. The configured TOE Server certificate for usage “EAP Authentication” must contain one of the supported RFC 6125 reference identifiers as configured on the LDAPS Server(s) and Secure Syslog Audit Server(s).

   When the TOE acts as a TLS client to LDAPS servers, it obtains the RFC 6125 reference identifiers from the administrator configured value in the LDAP Identity Source **Hostname/IP** field. (Administration application. Menu: Administration > Identity Management > External Identity Sources. Left-Navigation: LDAP. “Connection” tab. Hostname/IP field)

   When the TOE acts as a TLS client to TLS Secure Syslog servers, it obtains the reference identifiers from the administrator configured value in the Remote Logging Targets **IP/Host Address** field. (Administration application. Menu: Administration > System > Logging. Left-Navigation: Remote Logging Targets. IP/Host Address field).
   The TOE supports the following presented identifier types:
   a) subjectAltName entry of type dNSName (DNS-ID in RFC 6125)
   b) CN-ID as defined in RFC 6125,
   c) subjectAltName entry of type iPAddress; and

d) Wildcards in DNS domain names.

Certificate pinning is unsupported by the TOE.

When ISE acts as a TLS server, it has no prior knowledge of the domain name and IP address of clients connecting to it. Server Identity verification methods as described in RFC 6125, RFC 2818 and other RFCs are intended more for client's verification of server identity through reference identifiers to avoid man-in-the-middle attacks.
ISE will disallow importing ISE certificates with 1024 bit RSA key sizes when ISE is in FIPS mode. For Diffie-Hellman parameter size of 2048 bits, configuring ISE into FIPS mode automatically always sets the TLS server ISE Administration application to use Diffie-Hellman parameter size of 2048 bits.

Steps for Configuring X.509 Certificate Revocation

When ISE (TOE) acts as a TLS client to Secure Syslog Audit Servers, Certificate Revocation List (CRL) servers must be configured for each of the Intermediate and Trust Anchor Root Certificate Authorities. The Certificate Revocation List information in the X.509 CRL Distribution Points extension is not used. Certificate revocation using OCSP responders is unsupported. when ISE acts as a TLS client to Secure Syslog Audit Servers. The steps for configuring Certificate Revocation Lists are detailed below in the section "Steps for Configuring X.509 Certificate Revocation using Certificate Revocation Lists (CRLs)".

When ISE (TOE) acts as a TLS client to LDAP Over TLS (LDAPS) servers, the Administrator may configure revocation checks to OCSP responder(s) and/or CRL server(s). When both OCSP responder and CRL servers are configured, OCSP responder(s) are used to retrieve the certificate revocation status and if a status determination cannot be made, then the CRL server(s) configured are used to check

revocation status. For OCSP the Administrator may either configure the OCSP responder information or configure to use the OCSP responder information contained in the certificate's Authority Information Access (AIA) Extension. For CRL Certificate Revocation List (CRL) servers must be configured for each of the Intermediate and Trust Anchor Root Certificate Authorities. The Certificate Revocation List information in the X.509 CRL Distribution Points extension is not used. The steps for configuring OCSP are detailed below in the section "Steps for Configuring X.509 Certificate Revocation using Online Certificate Status Protocol (OCSP)". The steps for configuring Certificate Revocation Lists are detailed below in the section "Steps for Configuring X.509 Certificate Revocation using Certificate Revocation Lists (CRLs)".

Steps for Configuring X.509 Certificate Revocation using Certificate Revocation Lists (CRLs)

Configure the CRL information for all Intermediate and Trust Anchor Root Certificate Authority certificates

Select Menu: Administration > System > Certificates
Left-Side: Select Certificate Management > Trusted Certificates

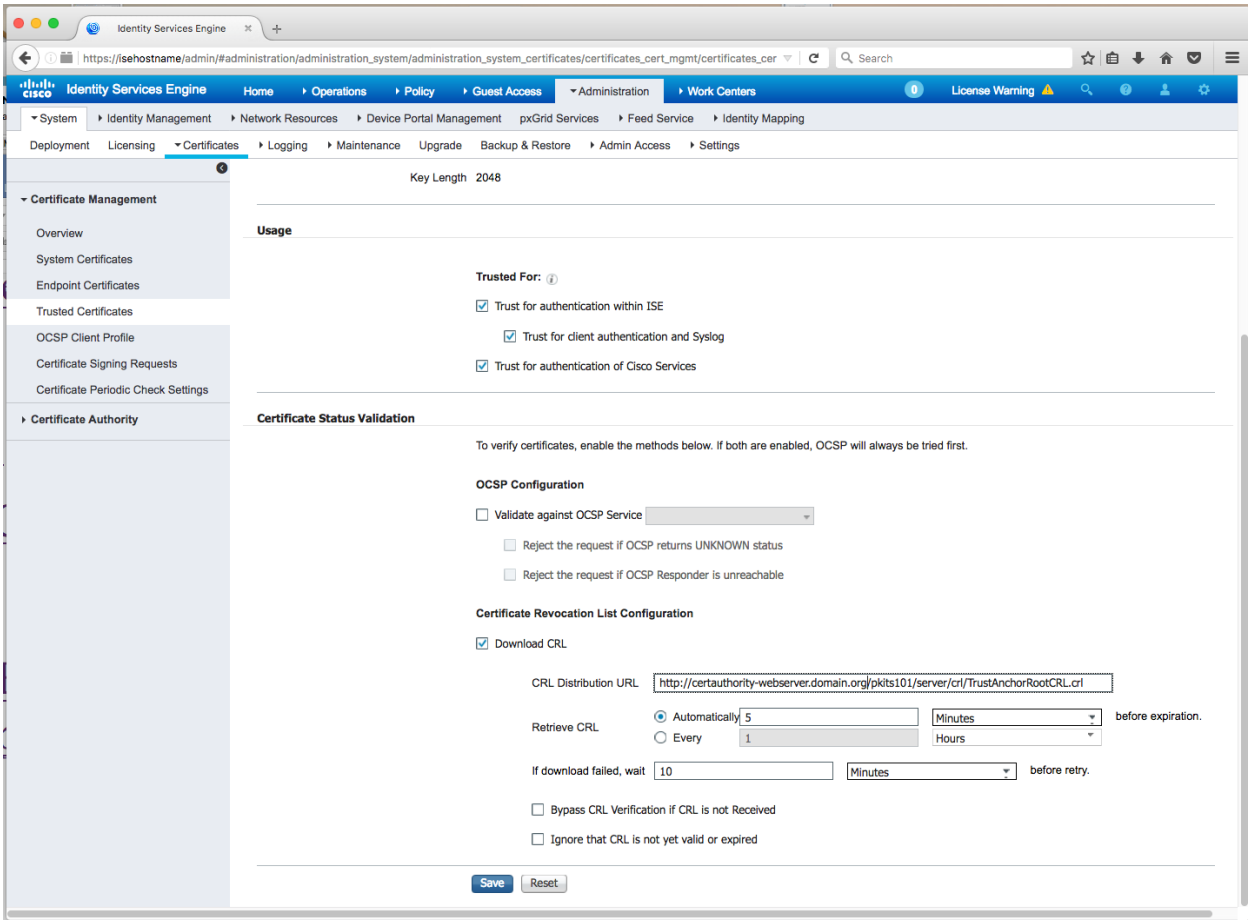
For each Intermediate Certificate Authority and Trusted Anchor Root Certificate Authority, import the X.509 certificate and complete the following fields:

Check the checkbox "Download CRL"
Enter the URL to the CRL file in the "CRL Distribution URL" field

Leave the checkboxes unchecked for "Bypass CRL Verification if CRL is not Received" and "Ignore that CRL is not yet valid or expired".

Press the "Save" button on each of the Trusted Certificate setting pages.

EXAMPLE:



Steps for Configuring X.509 Certificate Revocation using Online Certificate Status Protocol (OCSP) responders

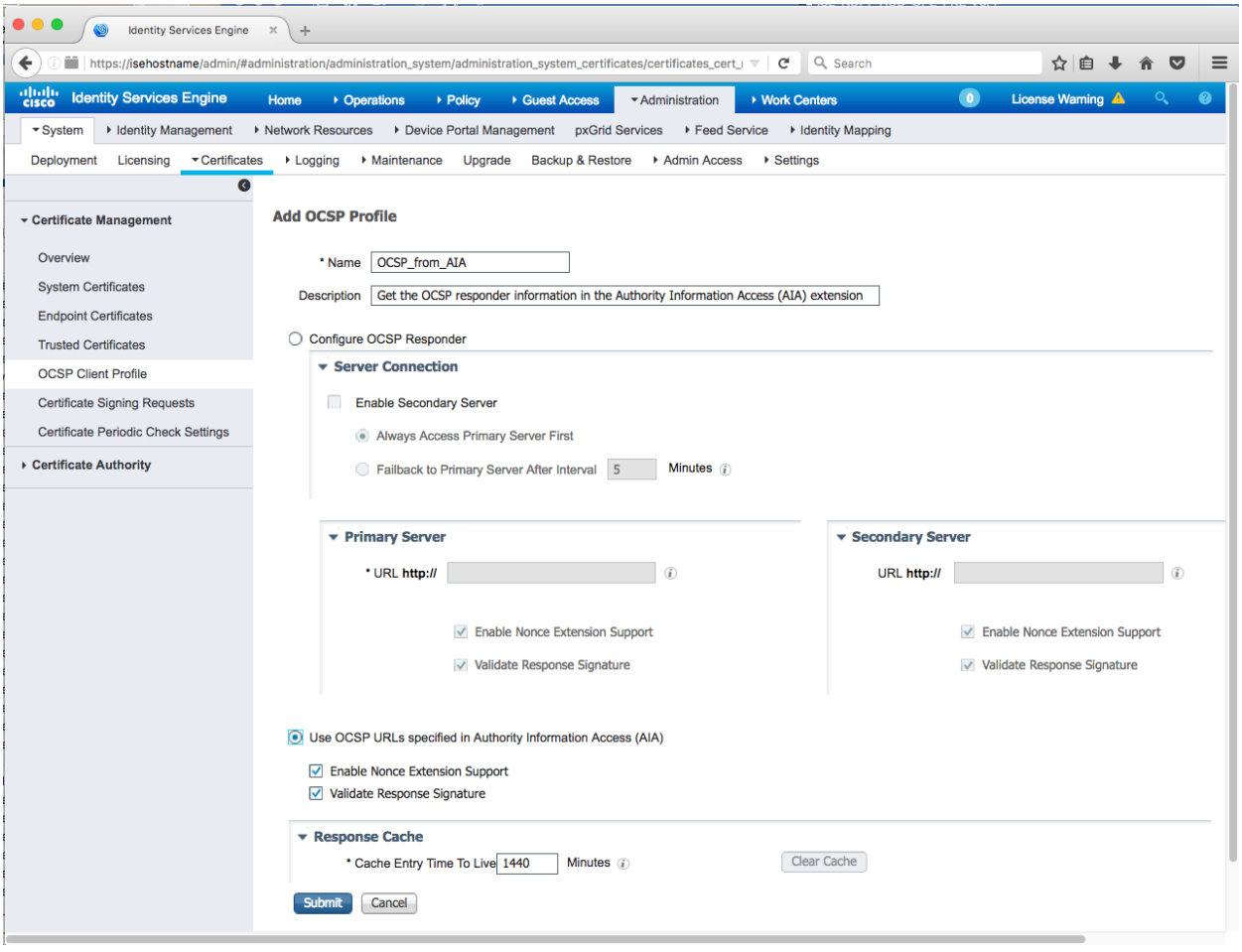
1. Configure the OCSP Responder

Select Menu: Administration > System > Certificates
Left-Side: Select Certificate Management > OCSP Client Profile

Enter Administrator defined values for the Name and Description fields.

To use the OCSP Responder information contained in the X.509 Authority Information Access (AIA) extension, check the radio button for “Use OCSP URLs specified in Authority Information Access (AIA)”.
Check the checkbox for “Enable Nonce Extension Support” when your OCSP responder uses Nonces.
Check the checkbox for “Validate Response Signature”.
Scroll down and press the “Submit” button to save the configuration. Continue to Step 2.

EXAMPLE: Screen shot showing a configuration using the OCSP URLs specified in the Authority Information Access (AIA) extension.



To enter the OCSP Responder information, overriding any OCSP URLs contained in the X.509 Authority Information Access (AIA) extension, complete the following fields:

Primary Server

URL:

Check the checkbox “Enable Nonce Extension Support” if your OCSP responder is configured to use Nonces.

Check the checkbox “Validate Response Signature”

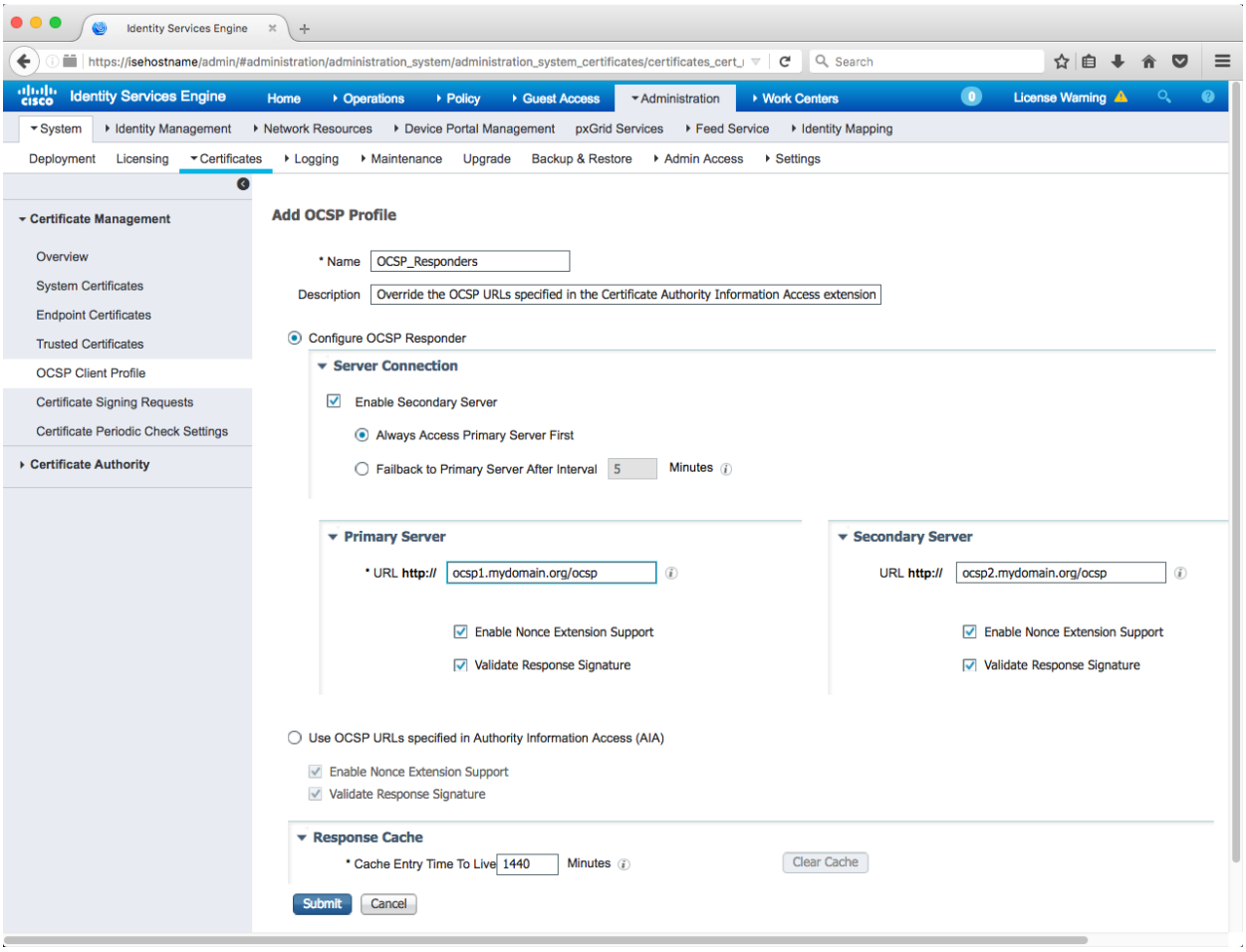
Optionally an Administrator may configure a secondary OCSP responder that is used if the Primary OCSP Responder is unreachable.

To configure a secondary OCSP responder,

1. check the “Enable Secondary Server” checkbox
2. Enter the Secondary Server OCSP Responder URL. Check the checkbox “Enable Nonce Extension Support” when the OCSP responder uses nonces. Check the checkbox “Validate Response Signature”

Scroll down and click the “Submit” button to save the settings.

EXAMPLE:



2. Configure the OCSP responder for all Intermediate and Trust Anchor Root Certificate Authority certificates

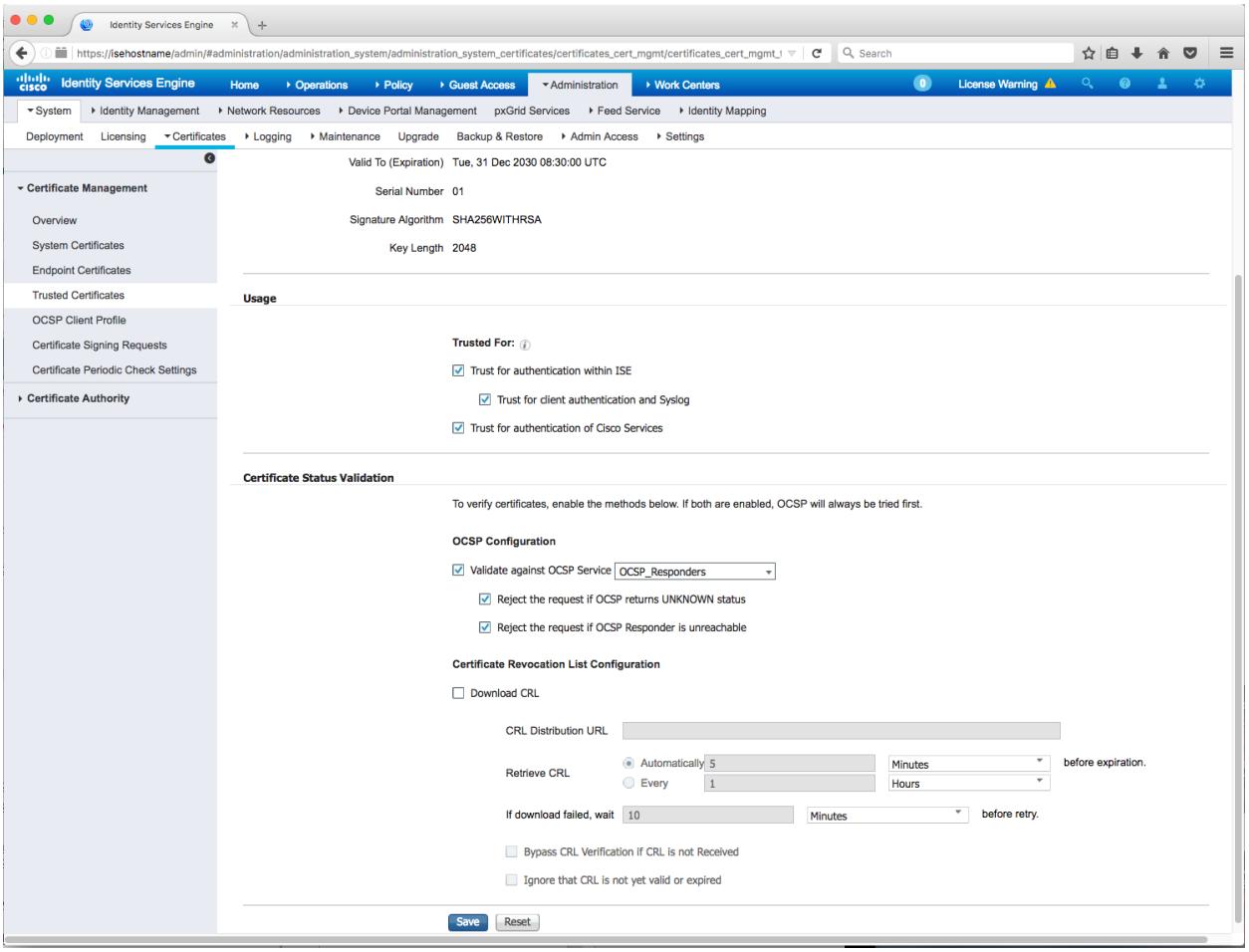
Select Menu: Administration > System > Certificates
Left-Side: Select Certificate Management > Trusted Certificates

For each Intermediate Certificate Authority and Trusted Anchor Root Certificate Authority, import the X.509 certificate and complete the following fields:

Check the checkbox “Validate against OCSP Server” and pulldown the name of the OCSP Client Profile created in step 1.
Check the checkboxes “Reject the request if OCSP returns UNKNOWN status” and “Reject the request if OCSP Responder is unreachable”.

Click the “Save” button to save the settings.

EXAMPLE:



Session Resumption – Session resumption is enabled by default for the TLS server connections and cannot be disabled. Section 4.11 describes the configuration of the EAP-TLS Server session resumption capabilities.

3.3.3 Logging Configuration

The TOE includes logging of all Identification & Authentication and relevant administrator actions at the CLI & GUI by default, but in order to log session idle timeouts (FTA_SSL.3), a debug level must be set:

1. In the GUI choose Administration > System > Logging.
2. Click Logging > Debug Log Configuration from the navigation panel on the left.
3. Click the radio button 'admin-infra' then click 'Edit'.
4. Change the Log Level pulldown value to 'DEBUG'.
5. Press 'Save' button.
6. Click the radio button ‘infrastructure' then click 'Edit'.
7. Change the Log Level pulldown value to 'DEBUG'.
8. Press 'Save' button.

3.3.4 SSH Public-Key Authentication

To configure SSH public key authentication to the command line interface (CLI), run these commands in this section on each ISE node –

1. **Create a CLI user** -
    - Login to the CLI as an admin-role user.
    - Run the Global Configuration username command.

Example showing creation of username foobar with admin-role access.

```
hostname/userid# configure terminal
hostname/userid(config)# username foobar password plain PggZyTzsJVVXp9N
role admin
hostname/userid(config)# end
hostname/userid# copy running-config startup-config
```

2. **Generate SSH RSA keypair for the CLI user created in step 1**.

On a non-TOE host generate a SSH RSA keypair using the OpenSSH 'ssh-keygen' program or a suitable alternative that can format the public key in the format produced by OpenSSH.

EXAMPLE showing a SSH RSA keypair created for user foobar with 4096 bits
/usr/bin/ssh-keygen -v -b 4096 -t rsa -N K99CNYM8tQP2F8M -C foobar@ise-administration-node -f /home/foobar/foobar_ise-administration-node.key
Generating public/private rsa key pair.
Your identification has been saved in /home/foobar/foobar_ise-administration-node.key.
Your public key has been saved in /home/foobar/foobar_ise-administration-node.key.pub.
The key fingerprint is:
6f:af:8c:f3:1b:6f:e0:16:22:30:22:ae:da:96:0c:46 foobar@ise-administration-node
The key's randomart image is:

```
+--[ RSA 4096]----+
|                 |
|                 |
|                 |
|.E. o            |
|o. . o  S        |
|.o    . ..o      |
|oo .   . o+o     |
|..+     .+o+.    |
|o..     .+=+o    |
+-----------------+
```

3. **Copy the public key file to a server reachable by the ISE node (TOE)**

For example copy the public key file to a SFTP server location.
cd /home/foobar
scp foobar_ise-administration-node.key.pub sftpuser@sftp-server:/home/sftpuser/pub/

sftpuser@sftp-server's password:
foobar_ise-administration-node.key.pub 100% 752 0.7KB/s 00:00

4. **Using a web browser, login to the ISE Primary Administration Node as a SuperAdmin role user and configure an ISE 'repository' to enable ISE to retrieve the public key file from the SFTP server.**

Navigate to:
Menu: Administration > System > Maintenance
Left-Side: select 'Repository'
Content: Click 'Add' button.
Repository Name: <Customer Defined Name of Repository>
Protocol: select SFTP or other desired protocol
Location:
Server Name: <hostname or IPv4 address of SFTP server>
Path: <path where the SFTP Username provided in the subsequent fields has Read access and where the SSH RSA public key was copied in step 3>
Credentials:
User Name: <userid of SFTP server>
Password: <password for userid on SFTP server>
Click 'Submit' button to save values

5. **Add SFTP server host key**

Logon as an admin-role user to the CLI of the ISE node where the CLI user was created in step 1.
Run the EXEC command 'crypto host_key add host <FQDN or IPv4 address>'
hostname/userid# crypto host_key add host <FQDN or IPv4 address> where <FQDN or IPv4 address> MUST match the value configured under the SFTP Repository 'Server Name' field value.

6. **Authorize the use of the public key for the user created in step 1.**

- Login to the ISE Command Line Interface (CLI) as the user created in step 1 using the password authentication method.
- Add the SFTP server host key

  Run the EXEC command 'crypto host_key add host <FQDN or IPv4 address>' hostname/userid# crypto host_key add host <FQDN or IPv4 address> where <FQDN or IPv4 address> MUST match the value configured under the SFTP Repository 'Server Name' field value.
- Verify that the SSH RSA public key file is accessible from the ISE SFTP client.

  hostname/userid# show repository sftp | include foobar
  foobar_ise-administration-node.key.pub
  The foobar_ise-administration-node.key.pub filename output after the command indicates that the public key file in the example is present at the SFTP server and the ISE SFTP client is able to perform a file listing for the file.
- Authorize the public key for user

  Run the 'crypto key import <public key filename> repository <repository name>' command to authorize use of the SSH RSA public key in the <public key filename> for the currently logged in CLI user.
  EXAMPLE:
  hostname/foobar# crypto key import foobar_ise-administration-node.key.pub repository sftp
- Verify the authorized SSH RSA public key for the user by running the CLI command 'show crypto authorized_keys'

  EXAMPLE:
  hostname/foobar# show crypto authorized_keys
  Authorized keys for foobar
  ssh-rsa 6f:af:8c:f3:1b:6f:e0:16:22:30:22:ae:da:96:0c:46 foobar@ise-administration-node
  hostname/foobar#

7. **Using a non-TOE SSH client with the private key generated from Step 2 authenticate to the ISE SSH server using public key authentication**.

8. **Restrict the Key Exchange Methods supported for the SSH protocol via the CLI**
   - Via the CLI, the admin needs to enter the following configuration commands –
     hostname/admin# conf term
     hostname/admin(config)# service sshd key-exchange-algorithm diffie-hellman-group14-sha1

9. **SSH connections are rekeyed** before 1 hour or 1GB has been transmitted using that key. These rekey settings are the same for all ISE installations regardless of whether ISE is operating in FIPS 140 mode. SSH rekey thresholds are default and cannot be configured by users.

10. **SSH host key algorithms -** The SSH host key algorithms on the TOE are configured by default when the TOE is operating in the CC mode. No additional configuration steps are required.

3.3.5 Synchronizing Configurations Between TOE Iterations

The TOE includes the ability to run ISE in a distributed installation, where multiple ISE devices connect to share logs and configuration data. To configure the TOE in this manner follow [**2**] under Deploy Cisco ISE Nodes -> Set Up Cisco ISE in a Distributed Environment. In this configuration, TLS is used by default to secure the connection with the exception of syslog transfer. To rectify this, the administrator must configure the logging protection as defined in Section 3.3.6 below.

3.3.6 Logging Protection

If an Security administrator wants to backup the logs between iterations of ISE, or send events to another IT entity, then protection must be provided for the

communications. This requires that the TLS remote logging target be created and that UDP syslog be removed.

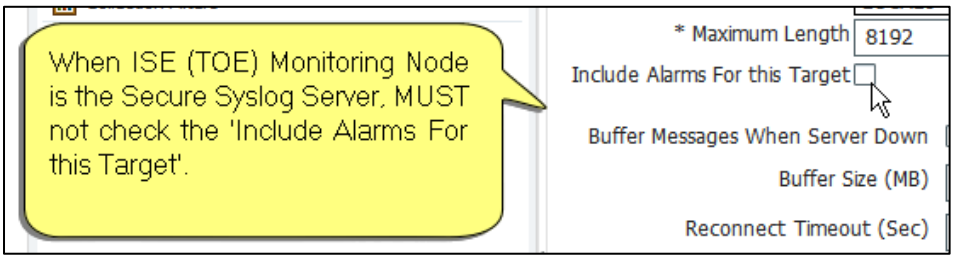
To configure ISE to send secure syslog to a log collector:

1. In the GUI choose Administration > System > Logging.
2. Click Remote Logging Targets from the navigation pane on the left.
    a. Click Add.
    b. Enter the desired fields for the new Remote Secure Syslog Receiver, including Name & IP Address or Fully Qualified Hostname

        In the IP/Host Address field enter the Fully Qualified Hostname when the Secure Syslog Server's X.509 certificate contains a subjectAltName extension of type dNSName or when the subject Common Name value contains the fully qualified domain name of the Secure Syslog Server.

        In the IP/Host Address field enter the IPv4 address when the Secure Syslog Server's X.509 certificate contains a subjectAltName extension of type iPAddress.

    c. Change the pulldown menu for the Target Type to Secure Syslog.
    d. Confirm that the port is set to the default standard Secure Syslog port: TCP 6514.
    e. Click the checkmark next to Buffer Messages When Server Down.
    f. Click the checkmark next to Enable Server Identity Check
    g. Change the pulldown menu for the Select CA Certificate to the Certificate Authority certificate for the Secure Syslog server.
    h. Leave other fields at their default value.
    i. Ensure that the checkbox for "Include Alarms for this Target" remains unchecked. If this box gets checked, it will result in UDP insecure Alarms being sent.



j. Click Submit.

After the 'Submit' is clicked, the newly added syslog node appears in the table of Remote Logging Targets. By default upon adding the Remote Logging Target the Remote Logging Target is Enabled. However, syslog messages are unsent to this Remote Logging Target until the administrator has configured which type of logging audit records desired. The next set of steps describes how to control what types of audit record syslog messages get sent to the Remote Logging Target just added:

1. In the GUI choose Administration > System > Logging.
2. Click Logging Categories from the navigation pane on the left.
3. For every radio button do the following:
   a. Click radio button
   b. Click Edit.
   c. Select the Name of the secure Remote Logging Target configured above under the Targets -> Available box (left side), and press the > button to move it to the Selected box.
   d. Click Save.

Set up Cisco peer ISE nodes to receive secure syslog (another iteration of ISE):

1. In the GUI choose Administration > System > Logging.
2. Click Remote Logging Targets from the navigation panel on the left.
3. Disable the LogCollector.
   e. Click the LogCollector radio button.
   f. Click Edit.
   g. Choose Disabled from the Status drop-down list box.

h. Examine list of log collectors to determine if an additional UDP collector exists (LogCollector2), and if so, repeat steps a-c for that entry.
i. Click Save.

2. Enable the Secure Syslog Collector.
    a. Click the TCPLogCollector radio button.
    b. Click Edit.
    c. Choose Enabled from the Status drop-down list box.
    d. Click Save.

Other TLS-capable syslog targets can also be used as logging targets. Kiwi-syslog is an example of a syslog server that is supports this functionality. Only the Security Administrator role can perform modification and deletion of log files.

4. Secure Management

4.1 User Roles

The ISE 3.1 TOE by default has multiple supported administrative group roles that compose the Security administrator role described in the Security Target [5]. The TOE also allows for customization of other roles. The GUI roles and their configuration are covered in [**2**] under Setting Up Cisco ISE Management Access -> Managing Administrators and Admin Access Policies -> Cisco ISE Administrator Groups. The access table below is provided for reference. Note that not all commands and menus are relevant to the TSF. Those that are have been referenced elsewhere in this document.

In addition to this table, all authenticated GUI roles have access to the Home Tab, where access is given to the following functionality:

- Ability to acknowledge alarms. Thus dismissing these alarms for other administrative users. NOTE: the configuration changes are still present in the Configuration Changes Audit report.
- See the splash window that indicates if the version is an ISE Evaluation Copy
- View the post-login banner
- View the status of each of the ISE nodes, CPU, memory and latency
- View alarms, including the ability to view the details for some alarms. e.g., viewing the details on Configuration Changes in the Configuration Audit Detail are possible for all authenticated users.
- View number of pass and failed end-user/ device authentications
- View number of profiled endpoints

Refer to [1] for available commands and associated roles and privilege levels at the CLI.

Warning: Usage of the Super Admin role, which has access to all functionality, should be limited after installation, and users should be granted roles that give the least privilege necessary to accomplish their work.

Table 8: Default RBAC Menu Access Permissions

Menu Access Name	RBAC Group	Permissible Set of Menu Items
Super Admin Menu Access	Super Admin	• Operations > All menu items • Policy > All menu items • Administration > All menu items
Policy Admin Menu Access	Policy Admin	• Operations > All menu items • Policy > All menu items • Administration > – Identity Management > All menu items – System > Settings
Helpdesk Admin Menu Access	Helpdesk Admin	• Operations > All menu items
Identity Admin Menu Access	Identity Admin	• Operations > All menu items • Administration > – Identity Management > All menu items
Network Admin Menu Access	Network Device Admin	• Operations > All menu items • Administration > – Network Resources > All menu items
System Admin Menu Access	System Admin	• Operations > Authentication, Alarms, Reports, and Troubleshoot • Administration >

		– System > All menu items
RBAC Admin Menu Access	RBAC Admin	• Operations > All menu items • Administration > – Admin Access > All menu items
MnT Admin Menu Access	MnT (Monitoring) Admin	• Operations > All menu items

4.2 Passwords

To prevent administrators from choosing insecure passwords, each password must meet the following requirements:

- At least 15 characters long
- Composed of any combination of characters that includes characters for at least 3 of these four character sets: upper case letters, lower case letters, numbers, and the following special characters: "!", "@", "#", "$", "%", "^", "&", "*", "(", ")"

At: Administration > System > Admin Access > Authentication, the password length can be set as well as additional password policies, such as enforcing the use of multiple character sets.

Configuration of password policies is limited to the Super Admin and System Admin group roles on the GUI.

4.3 User Lockout

To Configure authentication lockout:

- Administration > System > Admin Access > Authentication > Lock/Suspend Settings
- Make sure 'Suspend or Lock Account with Incorrect Login Attempts' is checked
- Specify the number of attempts (ranging from 3 to 20)
- Select 'Lock Account'

- Optional: Configure the Lockout message sent to the user once the account is locked.

To ensure the Administrator account does not get locked out by the number of failed attempts, the Emergency account must be enabled. This requires the use of an enabled local administrator account that has read-write access and web access. The purpose of this account is a work around to ensure administrator access to the TOE is available when remote authentication is not available. Access to this account should be limited and only used in when no other option is available to gain access to the TOE, such as another Authorized Administrator.

4.4 Clock Management

For instructions to manually set the local hardware clock, refer to the **clock** command in [**1**].
Configuration of clock settings is limited to the CLI administrator and Super Admin and System Admin group roles on the GUI.

4.5 Identification and Authentication

Configuration of Identification and Authentication settings is restricted to the CLI administrator and Identity Admin, Super Admin, and System Admin group roles on the GUI.
The ISE 3.1 can be configured to use the following authentication methods:

- Remote authentication (Active Directory and LDAP)
  - Refer to “Authentication Stores” elsewhere in this document for more details.
  - Requires user to provide correct username and password combination to authenticate
- Local authentication
  - administrative password - Requires user to provide correct username and password combination to authenticate

    - public-key based - Requires user to provide correct username and private key combination to authenticate

To limit identification and authentication attempts by the TOE, the following items can be configured to limit based on date/time, concurrent sessions, and IPv4/MAC address.

- Date/Time Range - Administration > System > Admin Access > Authentication > Account Disable Policy
- Concurrent Sessions – Administration > System > Admin Access > Settings > Access > Session
- IPv4/MAC Address - Administration > System > Admin Access > Settings > Access > IP Access

During each login attempt, authentication data is not revealed when credentials are entered, and this is implemented by default. No additional preparatory steps are required for the same.

4.6 Login Banners

The TOE may be configured at the GUI by the System admin and Super admin with pre-login banners for both the CLI and the GUI. These banners will be displayed before the username and password prompts, and by default, they will say “Authorized users only!”. To customize the banner with the required text for your organization, go to the Administration > System > Admin Access > Settings > Access page and do the following:

1. On the left-side menu, double-click on "Settings" then double-click on "Access".
2. Under the GUI Sessions section, check the radio button to the left of "Pre-login banner".
3. Fill in the field with the required banner text for your organization, up to a 1520 character maximum.
4. Under the CLI Sessions section, check the radio button to the left of "Pre-login banner".

5. Fill in the field with the required banner text for your organization, up to a 1520 character maximum.
6. Press the 'Save' button to commit the changes made in steps 1.3 and 1.4.

The CLI banner may also be configured by the CLI admin using the following commands:

banner install pre-login <filename> repository <reponame>

where filename is the file that contains the banner, and reponame is the location of the file. The command ‘banner remove pre-login’ can be used to remove the banner.

The GUI banner will look like the following when configured:

The SSH banner will look like the following when the CLI banner is configured:

ssh admin@generic-domain

Authorized users only!

admin@generic-domain 's password:

Last login: Thu Feb 23 20:23:11 2012 from host-lnx2.generic-domain.com

generic-domain/admin#

4.7 Virtual Private Networks (VPN)

4.7.1 IPsec Overview

The TOE includes an instance of the Embedded Services Router 5921 [ESR], running IOS 15.8(3)M7. The ESR is a software-only solution for routing capabilities. The ESR provides IPsec session capabilities for ISE v3.1 to secure the channel between the TOE and NAS. The TOE allows all privileged administrators to configure Internet Key Exchange (IKE) and IPSEC policies. IPsec provides the following network security services:

- Data confidentiality--The IPsec sender can encrypt packets before transmitting them across a network.
- Data integrity--The IPsec receiver can authenticate packets sent by the IPsec sender to ensure that the data has not been altered during transmission.
- Data origin authentication--The IPsec receiver can authenticate the source of the sent IPsec packets. This service is dependent upon the data integrity service.
- Anti-replay--The IPsec receiver can detect and reject replayed packets.

IPsec provides secure *tunnels* between two peers, such as two routers. The privileged administrator defines which packets are considered sensitive and should be sent through these secure tunnels and specifies the parameters that should be used to protect these sensitive packets by specifying the characteristics of these tunnels. When the IPsec peer recognizes a sensitive packet, the peer sets up the appropriate secure tunnel and sends the packet through the tunnel to the remote peer.

More accurately, these *tunnels* are sets of security associations (SAs) that are established between two IPsec peers. The SAs define the protocols and algorithms to be applied to sensitive packets and specify the keying material to be used by the two peers. SAs are unidirectional and are established per security protocol (AH or ESP).

With IPsec, privileged administrators can define the traffic that needs to be protected between two IPsec peers by configuring access lists and applying these access lists to interfaces using crypto map sets. Therefore, traffic may be selected

on the basis of the source and destination address, and optionally the Layer 4 protocol and port. (The access lists used for IPsec are only used to determine the traffic that needs to be protected by IPsec, not the traffic that should be blocked or permitted through the interface. Separate access lists define blocking and permitting at the interface.)
A crypto map set can contain multiple entries, each with a different access list. The crypto map entries are searched in a sequence--the router attempts to match the packet to the access list specified in that entry.
When a packet matches a permit entry in a particular access list, and the corresponding crypto map entry is tagged as cisco, connections are established, if necessary. If the crypto map entry is tagged as ipsec-isakmp, IPsec is triggered. If there is no SA that the IPsec can use to protect this traffic to the peer, IPsec uses IKE to negotiate with the remote peer to set up the necessary IPsec SAs on behalf of the data flow. The negotiation uses information specified in the crypto map entry as well as the data flow information from the specific access list entry.
Once established, the set of SAs (outbound to the peer) is then applied to the triggering packet and to subsequent applicable packets as those packets exit the router. "Applicable" packets are packets that match the same access list criteria that the original packet matched. For example, all applicable packets could be encrypted before being forwarded to the remote peer. The corresponding inbound SAs are used when processing the incoming traffic from that peer.
Access lists associated with IPsec crypto map entries also represent the traffic that the router needs protected by IPsec. Inbound traffic is processed against crypto map entries--if an unprotected packet matches a permit entry in a particular access list associated with an IPsec crypto map entry, that packet is dropped because it was not sent as an IPsec-protected packet.
Crypto map entries also include transform sets. A transform set is an acceptable combination of security protocols, algorithms, and other settings that can be applied to IPsec-protected traffic. During the IPsec SA negotiation, the peers agree to use a particular transform set when protecting a particular data flow.
The TOE supports reference identifiers as configured by the Administrator to be either FQDN or IP address and compares it to the Subject Alternative Name (SAN)

or the Common Name (CN) fields in the certificate of the peer. The order of comparison is SAN followed by CN. If the TOE successfully matches the reference identifier to the presented identifier, IKE authentication will succeed. The identifier scheme implemented by the TOE guarantees unique identifiers.

4.7.1.1 IKEv1 Transform Sets

An Internet Key Exchange version 1 (IKEv1) transform set represents a certain combination of security protocols and algorithms. During the IPsec SA negotiation, the peers agree to use a particular transform set for protecting a particular data flow.

Privileged administrators can specify multiple transform sets and then specify one or more of these transform sets in a crypto map entry. The transform set defined in the crypto map entry is used in the IPsec SA negotiation to protect the data flows specified by that crypto map entry's access list.

During IPsec security association negotiations with IKE, peers search for a transform set that is the same at both peers. When such a transform set is found, it is selected and applied to the protected traffic as part of both peers' IPsec SAs. (With manually established SAs, there is no negotiation with the peer, so both sides must specify the same transform set.)

Note: *If a transform set definition is changed during operation that the change is not applied to existing security associations, but is used in subsequent negotiations to establish new SAs. If you want the new settings to take effect sooner, you can clear all or part of the SA database by using the* ***clear crypto sa command****.*

The following settings must be set in configuring the IPsec with IKEv1 functionality for the TOE:

TOE-common-criteria # **conf t**

TOE-common-criteria (config)#**crypto isakmp policy 1**

TOE-common-criteria (config-isakmp)# **hash sha**

TOE-common-criteria (config-isakmp)# **encryption aes**

This configures IPsec IKEv1 to use AES-CBC-128 for payload encryption. AES-CBC-256 can be selected with '**encryption aes 256**'.

Note: *the authorized administrator must ensure that the keysize for this setting is greater than or equal to the keysize selected for ESP in Section 4.6.2 below. If AES 128 is selected here, then the highest keysize that can be selected on the TOE for ESP is AES 128 (either CBC or GCM).*

Note: *Both confidentiality and integrity are configured with the hash sha and encryption aes commands respectively. As a result, confidentiality-only mode is disabled.*

TOE-common-criteria (config-isakmp)# **authentication pre-share**

This configures IPsec to use pre-shared keys. X.509 v3 certificates are also supported for authentication of IPsec peers. See Section 4.6.3 below for additional information.

TOE-common-criteria(config-isakmp)# **exit**

TOE-common-criteria(config)# **Crypto isakmp key cisco123!cisco123!CISC address 11.1.1.4**

Note: *Pre-shared keys on the TOE must be at least 22 characters in length and can be composed of any combination of upper and lower case letters, numbers, and special characters (that include: "!", "@", "#", "$", "%", "^", "&", "*", "(", and ")").*

The TOE supports pre-shared keys up to 128 bytes in length. While longer keys increase the difficulty of brute-force attacks, longer keys increase processing time.

TOE-common-criteria (config-isakmp)# **group 14**

This selects DH Group 14 (2048-bit MODP) for IKE, but 19 (256-bit Random ECP), 24 (2048-bit MODP with 256-bit POS), 20 (384-bit Random ECP), 15 (3072 bit MODP), and 16 (4096-bit MODP) are also allowed and supported.

TOE-common-criteria (config-isakmp)# **lifetime 86400**

The default time value for Phase 1 SAs is 24 hours (86400 seconds), but this setting can be changed using the command above with different values.

TOE-common-criteria (config-isakmp)# **crypto isakmp aggressive-mode disable**

Main mode is the default mode and the **crypto isakmp aggressive-mode disable** ensures all IKEv1 Phase 1 exchanges will be handled in the default main mode.

TOE-common-criteria(config-isakmp)#**exit**

4.7.1.2 IKEv2 Transform Sets

An Internet Key Exchange version 2 (IKEv2) proposal is a set of transforms used in the negotiation of IKEv2 SA as part of the IKE_SA_INIT exchange. An IKEv2 proposal is regarded as complete only when it has at least an encryption algorithm, an integrity algorithm, and a Diffie-Hellman (DH) group configured. If no proposal is configured and attached to an IKEv2 policy, then the default proposal is used in the negotiation, and it contains selections that are not valid for the TOE. Thus the following settings must be set in configuring the IPsec with IKEv2 functionality for the TOE:

TOE-common-criteria # **conf t**

TOE-common-criteria (config)#**crypto ikev2 proposal sample**

TOE-common-criteria (config-ikev2-proposal)# **integrity sha1**

TOE-common-criteria (config-ikev2-proposal)# **encryption aes-cbc-128**

This configures IPsec IKEv2 to use AES-CBC-128 for payload encryption. AES-CBC-256 can be selected with '**encryption aes-cbc-256**'. AES-GCM-128 and AES-GCM-256 can also be selected similarly.

Note: *the authorized administrator must ensure that the keysize for this setting is greater than or equal to the keysize selected for ESP in Section 4.6.2 below. If AES 128 is selected here, then the highest keysize that can be selected on the TOE for ESP is AES 128 (either CBC or GCM).*

Note: *Both confidentiality and integrity are configured with the hash sha and encryption aes commands respectively. As a result, confidentiality-only mode is disabled.*

TOE-common-criteria (config-ikev2-proposal)# **group 14**

This selects DH Group 14 (2048-bit MODP) for IKE, but 19 (256-bit Random ECP), 24 (2048-bit MODP with 256-bit POS), 20 (384-bit Random ECP), 15 (3072 bit MODP), and 16 (4096-bit MODP) are also allowed and supported.

TOE-common-criteria (config)#**crypto ikev2 keyring keyring-1**

TOE-common-criteria (config-ikev2-keyring)# **peer peer1**

TOE-common-criteria (config-ikev2-keyring-peer)# **address 0.0.0.0 0.0.0.0**

TOE-common-criteria (config-ikev2-keyring-peer)# **pre-shared-key cisco123!cisco123!CISC**

This section creates a keyring to hold the pre-shared keys referenced in the steps above. In IKEv2 these pre-shared keys are specific to the peer.

Note: *Pre-shared keys on the TOE must be at least 22 characters in length and can be composed of any combination of upper and lower case letters, numbers, and special characters (that include: "!", "@", "#", "$", "%", "^", "&", "*", "(", and ")").*

The TOE supports pre-shared keys up to 128 bytes in length. While longer keys increase the difficulty of brute-force attacks, longer keys increase processing time.

HEX keys generated off system can also be input for IKEv2 using the following instead of the pre-shared-key command above: '**pre-shared-key hex [hex key]**'. *For example:* **pre-shared-key hex 0x6A6B6C**.

This configures IPsec to use pre-shared keys. X.509 v3 certificates are also supported for authentication of IPsec peers. See Section 4.6.3 below for additional information.

TOE-common-criteria (config)#**crypto logging ikev2**

This setting enables IKEv2 syslog messages.

Note: *The configuration above is not a complete IKE v2 configuration, and that additional settings will be needed. See [18] Configuring Internet Key Exchange Version 2 (IKEv2) for additional information on IKE v2 configuration.*

4.7.2 IPsec Transforms and Lifetimes

Regardless of the IKE version selected, the TOE must be configured with the proper transform for IPsec ESP encryption and integrity as well as IPsec lifetimes.

TOE-common-criteria(config)# **crypto ipsec transform-set example esp-aes 128 esp-sha-hmac**

Note that this configures IPsec ESP to use HMAC-SHA-1 and AES-CBC-128. To change this to the other allowed algorithms the following options can replace 'esp-aes 128' in the command above:

Encryption Algorithm	Command
AES-CBC-256	esp-aes 256
AES-GCM-128	esp-gcm 128
AES-GCM-256	esp-gcm 256

Note: The size of the key selected here must be less than or equal to the key size selected for the IKE encryption setting in 4.6.1.1 and 4.6.1.2 above. If AES-CBC-128 was selected there for use with IKE encryption, then only AES-CBC-128 or AES-GCM-128 may be selected here.

TOE-common-criteria(config-crypto)#**mode tunnel**

This configures tunnel mode for IPsec. Tunnel is the default, but by explicitly specifying tunnel mode, the router will request tunnel mode and will accept only tunnel mode.

TOE-common-criteria(config-crypto)#**mode transport**

This configures transport mode for IPsec.

TOE-common-criteria (config)#**crypto ipsec security-association lifetime seconds 28800**

The default time value for Phase 2 SAs is 1 hour. There is no configuration required for this setting since the default is acceptable, however to change the setting to 8 hours as claimed in the Security

Target the crypto ipsec security-association lifetime command can be used as specified above.

TOE-common-criteria (config)#**crypto ipsec security-association lifetime kilobytes 100000**

This configures a lifetime of 100 MB of traffic for Phase 2 SAs. The default amount for this setting is 2560KB, which is the minimum configurable value for this command. The maximum configurable value for this command is 4GB.

Additional information regarding configuration of IPsec can be found in **[10]**. The IPSEC commands are dispersed within the Security Command References.

- This functionality is available to the Privileged Administrator. Configuration of VPN settings is restricted to the privileged administrator.

4.7.3 Checking Validity

The IOS checks for the validity of certificates and the ExtendedKeyUsage fields by ensuring that the configuration includes - **match eku ocsp-signing.**

crypto pki trustpoint IntermediateCA
subject-name CN=Good CA,O=Test Certificates 2011,C=US
chain-validation continue PKITS-TrustAnchor
revocation-check ocsp
ocsp url url
match eku ocsp-signing

This ensures the validation a peer certificate only if the OCSP-Signing EKU is present in the certificate else validation fails.

4.7.4 NAT Traversal

For successful NAT traversal over an IOS-XE NAT device for an IPsec connection between two IOS-XE peers, the following configuration needs to be used -

On an IOS NAT device (router between the IPsec endpoints):

config terminal

ip nat service list <ACL-number> ESP spi-match

access-list <ACL-number> permit <protocol> <local-range> <remote-range>

end

On each IOS peer (IPsec router endpoints):

config terminal

crypto ipsec nat-transparency spi-matching

end

4.8 X.509 Certificates

The TOE may be configured by the privileged administrators to use X.509v3 certificates to authenticate IPsec peers. RSA certificates are supported. Creation of these certificates and loading them on the TOE is covered in the section – "Configuring Certificate Enrollment for a PKI" in [8], and a portion of the TOE configuration for use of these certificates follows below.

4.8.1 Creation of the Certificate Signing Request

The certificate signing request for the TOE will be created using the RSA key pair and the domain name configured in Section 3.3.1 above.

In order for a certificate signing request to be generated, the TOE must be configured with a, hostname and trustpoint.

1. Enter configure terminal mode:
   Device # **configure terminal**
2. Specify the hostname: **hostname** ***name***
   Device(config)# **hostname asrTOE**
3. Configure the trustpoint: **crypto pki trustpoint** ***trustpoint-name***
   Device (config)#**crypto pki trustpoint ciscotest**
4. Configure an enrollment method: **enrollment** [**terminal, url** ***url***]
   Device (ca-trustpoint)#**enrollment url** http://192.168.2.137:80
5. Configure subject-name settings for the certificate: **subject-name CN=*hostname.domain.com*,OU=*OU-name***
   Device (ca-trustpoint)#**subject-name CN=asrTOE.cisco.com,OU=TAC**

6. Set revocation check method: **revocation-check crl**
   Device (ca-trustpoint)#**revocation-check crl**
   Device (ca-trustpoint)#**exit**
7. Create the certificate signing request: **crypto pki enroll *trustpoint-name***
   Device (config)#**crypto pki enroll ciscotest**

4.8.2 Securely Connecting to a Certificate Authority for Certificate Signing

The TOE must communicate with the CA for Certificate Signing over IPSEC. This authentication will use pre-shared keys.
Following are sample instructions to configure the TOE to support an IPsec tunnel with aes encryption, with 10.10.10.102 as the IPsec peer IP on the CA, 10.10.10.110 as the local TOE IP.

TOE-common-criteria#configure terminal
TOE-common-criteria(config)#crypto isakmp policy 1
TOE-common-criteria(config-isakmp)#encryption aes
TOE-common-criteria(config-isakmp)#authentication pre-share
TOE-common-criteria(config-isakmp)#group 14
TOE-common-criteria(config-isakmp)#lifetime 86400
TOE-common-criteria(config)#crypto isakmp key [insert 22 character preshared key] address 10.10.10.101
TOE-common-criteria(config)#crypto ipsec transform-set sampleset esp-aes esp-sha-hmac
TOE-common-criteria(cfg-crypto-trans)#mode tunnel
TOE-common-criteria(config)#crypto map sample 19 ipsec-isakmp
TOE-common-criteria(config-crypto-map)#set peer 10.10.10.102
TOE-common-criteria(config-crypto-map)#set transform-set sampleset
TOE-common-criteria(config-crypto-map)#set pfs group14
TOE-common-criteria(config-crypto-map)#match address 170
TOE-common-criteria(config-crypto-map)#exit
TOE-common-criteria(config)#interface g0/0

TOE-common-criteria(config-if)#ip address 10.10.10.110 255.255.255.0
TOE-common-criteria(config-if)#crypto map sample
TOE-common-criteria(config-if)#exit
TOE-common-criteria(config)# access-list 170 permit ip 10.10.10.0 0.255.255.255 10.10.10.0 0.255.255.255

4.8.3 Authenticating the Certificate Authority

The TOE must authenticate the CA by acknowledging its attributes match the publicly posted fingerprint. The TOE administrator must verify that the output of the command below matches the fingerprint of the CA on its public site.

1. Authenticate the CA: crypto ca authenticate trustpoint-name
   Device (config)#crypto ca authenticate ciscotest

   Certificate has the following attributes:
   Fingerprint MD5: 8DE88FE5 78FF27DF 97BA7CCA 57DC1217
   Fingerprint SHA1: 271E80EC 30304CC1 624EEE32 99F43AF8 DB9D0280

2. % Do you accept this certificate? [yes/no]: yes

   Trustpoint CA certificate accepted.

4.8.4 Storing Certificates to a Local Storage Location

Certificates are stored to NVRAM by default; however, some routers do not have the required amount of NVRAM to successfully store certificates. All Cisco platforms support NVRAM and flash local storage. Depending on the platform, an authorized administrator may have other supported local storage options including bootflash, slot, disk, USB flash, or USB token. During run time, an authorized administrator can specify what active local storage device will be used to store certificates. For more detailed information see the Public Key Infrastructure

Configuration Guide Guidance document section "How to Configure PKI Storage." - http://www.cisco.com/c/en/us/td/docs/ios-xml/ios/sec_conn_pki/configuration/xe-3s/sec-pki-xe-3s-book.pdf

4.8.5 How to Specify a Local Storage Location for Certificates

The summary steps for storing certificates locally to the TOE are as follows:

1. Enter configure terminal mode:
   Device # configure terminal
2. Specify the local storage location for certificates: crypto pki certificate storage location-name
   Device(config)# crypto pki certificate storage flash:/certs
3. Exit:
   Device(config)# exit
4. Save the changes made:
   Device# copy system:running-config nvram:startup-config
5. Display the current setting for the PKI certificate storage location:
   Device# show crypto pki certificates storage

The following is sample output from the show crypto pki certificates storage command, which shows that the certificates are stored in the certs subdirectory of disk0:

Device# show crypto pki certificates storage
Certificates will be stored in disk0:/certs/

4.8.6 Configuring a Revocation Mechanism for PKI Certificate Status Checking

Perform this task to set up the certificate revocation mechanism--CRLs or OCSP--that is used to check the status of certificates in a PKI.
Use the revocation-check command to specify at least one method (OCSP, CRL, or skip the revocation check) that is to be used to ensure that the certificate of a peer has not been revoked. For multiple methods, the order in which the methods are applied is determined by the order specified via this command.

If the TOE does not have the applicable CRL and is unable to obtain one, or if the OCSP server returns an error, the TOE will reject the peer's certificate--unless an administrator includes the 'none' keyword in your configuration. If the 'none' keyword is configured, a revocation check will not be performed and the certificate will always be accepted.
When using OCSP, nonces, unique identifiers for OCSP requests, are sent by default during peer communications with a OCSP server. The use of nonces offers a more secure and reliable communication channel between the peer and OCSP server. If the OCSP server does not support nonces, an authorized administrator may disable the sending of nonces.
Note: The TOE supports use of OCSP only when using RSA certs.

4.8.7 Manually Overriding the OCSP Server Setting in a Certificate

Administrators can override the OCSP server setting specified in the Authority Information Access (AIA) field of the client certificate or set by the issuing the ocsp url command. One or more OCSP servers may be manually specified, either per client certificate or per group of client certificates by the match certificate override ocsp command. The match certificate override ocspcommand overrides the client certificate AIA field or the ocsp urlcommand setting if a client certificate is successfully matched to a certificate map during the revocation check

4.8.8 Configuring Certificate Chain Validation

Perform this task to configure the processing level for the certificate chain path of peer certificates.
Prerequisites:
The device must be enrolled in your PKI hierarchy.
The appropriate key pair must be associated with the certificate.

1. Enter configure terminal mode:
   TOE-common-criteria# configure terminal
2. Set the crypto pki trustpoint name:
   TOE-common-criteria(config)# crypto pki trustpoint ca-sub1

3. Configure the level to which a certificate chain is processed on all certificates including subordinate CA certificates using the chain-validation [{stop | continue} [parent-trustpoint]] command:
   TOE-common-criteria(ca-trustpoint)# chain-validation continue ca-sub1
4. Use the stop keyword to specify that the certificate is already trusted. This is the default setting.
5. Use the continue keyword to specify that the that the subordinate CA certificate associated with the trustpoint must be validated.
6. The parent-trustpoint argument specifies the name of the parent trustpoint the certificate must be validated against.
7. Exit:
   TOE-common-criteria(ca-trustpoint)# exit

Note: A trustpoint associated with the root CA cannot be configured to be validated to the next level. The chain-validation command is configured with the continue keyword for the trust point associated with the root CA, an error message will be displayed and the chain validation will revert to the default chain-validation command setting.

4.8.9 Certificate Validation

By default the TOE will validate the certificate of the IPsec peer including a Basic Constraints extension. No configuration is required by the administrator. Optionally as a way to test a Basic Constraints extension, the administrator can add subject name restrictions to the CA root trustpoint. Refer to “Configuring Certificate Enrollment for a PKI” in [8]. A portion of an example TOE configuration follows below.

```
TOE-common-criteria (config)# crypto pki certificate map <certificate map name> 1
subject-name co example
TOE-common-criteria (config)# crypto pki trustpoint CAroot
TOE-common-criteria (ca-trustpoint)# enrollment terminal
```

TOE-common-criteria (ca-trustpoint)# match certificate <certificate map name>
TOE-common-criteria (ca-trustpoint)#end

TOE-common-criteria (config)# crypto pki trustpoint CA sub
TOE-common-criteria (ca-trustpoint)# enrollment terminal
TOE-common-criteria (ca-trustpoint)# subject-name CN=example.organization.com,OU=Spiral Dept,O=Example
TOE-common-criteria (ca-trustpoint)# match certificate <certificate map name>
TOE-common-criteria (ca-trustpoint)#end

The administrator should find an error message stating that certificate chain validation has failed because a certificate in the chain was not a valid CA certificate.

4.8.10 Setting X.509 for use with IKE

Once X.509v3 keys are installed on the TOE, they can be set for use with IKEv1 with the commands:

TOE-common-criteria (config)#crypto isakmp policy 1
TOE-common-criteria (config-isakmp)# authentication rsa-sig

And for IKEv2 with the commands:
TOE-common-criteria (config)#crypto ikev2 profile sample
TOE-common-criteria(config-ikev2-profile)#authentication [remote | local] rsa-sig
If an invalid certificate is loaded, authentication will not succeed.

4.8.11 Deleting Certificates

If the need arises, certificates that are saved on the router can be deleted. The router saves its own certificates and the certificate of the CA.
To delete the router's certificate from the router's configuration, the following commands can be used in global configuration mode:

Router# show crypto ca certificates [Displays the certificates stored on router]
Router(config)# crypto ca certificate chain name [Enters certificate chain configuration mode]
Router(config-cert-cha)# no certificate certificate-serial-number [deletes the certificate]

To delete the CA's certificate, the entire CA identity must be removed, which also removes all certificates associated with the CA—router's certificate and the CA certificate. To remove a CA identity, the following command in global configuration mode can be used:
Router(config)# no crypto ca identity name [Deletes all identity information and certificates associated with the CA]

4.9 User Session Establishment – Denial Attributes

4.9.1 Administrator-defined Time and Date Ranges

The following steps need to be taken to deny user session establishment based on Administrator-defined Time and Date Ranges –
Login to the Administration application user interface as a 'Policy Admin' role and configure the following steps:

1. Create Time and Date Condition

   Define one or more date and time ranges when access must be denied
   Menu: Policy > Policy Elements > Conditions
   Left-Side Navigation: Common > Time and Date
   Click 'Add' to add a new Time and Date condition.
   Enter 'Condition Name' value.
   Optionally enter 'Description' value.
   Under 'Standard Settings' section specify the specific dates or time to deny access by clicking the radio button(s) for -

'Specific Date Range', 'Specific Date' and/or 'Specific Hours' and/or 'Specific Days'.
Under the 'Exceptions' section list any exceptions when access must be allowed.

2. Create Authorization Policy Rule for the Time and Date Condition(s)

   Administrator sets an authorization policy rule denying access for the configured time and date range - Menu: Policy > Authorization

a. In applicable row, Pulldown "Edit" and select either "Insert New Row Above" or "Insert New Row Below".

b. Optionally select which identity groups the rule applies to or leave the default of 'All' identities for the rule to apply to all users

c. Under the condition(s) click the "+"

   Choose the "Select Existing Condition from Library" option.
   Condition Name: click the 'Select Condition' pulldown and
   select the 'Time and Date Conditions' >
   name of the time and date condition(s) created in
   step 1.

Multiple time and date conditions may be added with 'AND' or 'OR'.

Other conditions other than 'time and date conditions' may also be added in the rule. For example it is possible to restrict access based on time and date conditions to only certain types of users.

4.9.2 Administrator defined Maximum Concurrent User Sessions

User session establishment can be denied based on Administrator-defined maximum number of concurrent user sessions, maximum number of concurrent sessions per user group and/or maximum number of concurrent sessions per user within a certain user group. This can be achieved by logging into to the Administration application user interface in a 'Policy Admin' role and configuring the steps described in:
http://www.cisco.com/c/en/us/support/docs/security/identity-services-engine-22/204463-Configure-Maximum-Concurrent-User-Sessio.html

4.9.3 Administrator defined list of Endpoint IPv4 addresses and/or subnets, IPv6 addresses and/or subnets, and/or MAC Addresses

The following steps need to be taken to deny user session establishment based on endpoint IPV4/IPV6 addresses, MAC addresses and subnets –

Login to the Administration application user interface as a 'Policy Admin' role and configure the following steps:

1. Create a new End Station Network Condition with IP Address(es) and/or MAC address(es) to deny access to.

   - Define an End Station Network Condition with a list of endpoint address(es) that must be Denied access.

     Menu: Policy > Policy Elements > Conditions
     Left-Side Navigation: Network Conditions > Endstation Network Conditions
     Click 'Add'

   - Under the 'IP Addresses' tab list IPv4 address(es) or subnet(s), and/or IPv6 address(es) or subnet(s) to deny access.

- Under the 'MAC Addresses' tab list the MAC address(es) to deny access.

2. Create an Authentication Policy Rule or Authorization Policy Rule to deny access based on End Station Network Address(es)

   - Administrator sets an authentication policy rule or an authorization policy rule denying access for the specified IP address(es) and/or MAC address(es) defined in step 1.

     Menu: Policy > Authentication; or
     Menu: Policy > Authorization
     Insert New Row within "Dot1X" and/or "MAB"

     - Enter Condition and 'Create New Condition'.
       Select Attribute: Select 'Network Condition' > [Name of EndStation Network Condition created in Step 1.] Equals set value to 'True'

     - Select 'Internal Users' and modify the Identity source from 'Internal Users' to 'Deny Access'.

       Click 'Done' and Click 'Save' button to persist the settings.

4.10 Configuring Radius

To configure Radius:

- Choose Administration > System > Settings.
- From the Settings navigation pane, click Protocols.
- Choose RADIUS.
- Enter the details as required to define the RADIUS settings.
- Click Save to save the settings.

To connect the TOE to an external RADIUS server:

- Choose Administration > External RADIUS Servers
- Select New
- Specify the Name
- Specify the Host IP
- Specify the Shared Secret
- Specify the Authentication Port
- Specify the Accounting Port
- Specify the Server Timeout
- Specify the Connection Attempts
- Click Submit to save the settings.

All Access-Requests sent to the TOE are logged.

4.11 Configuring EAP-TLS

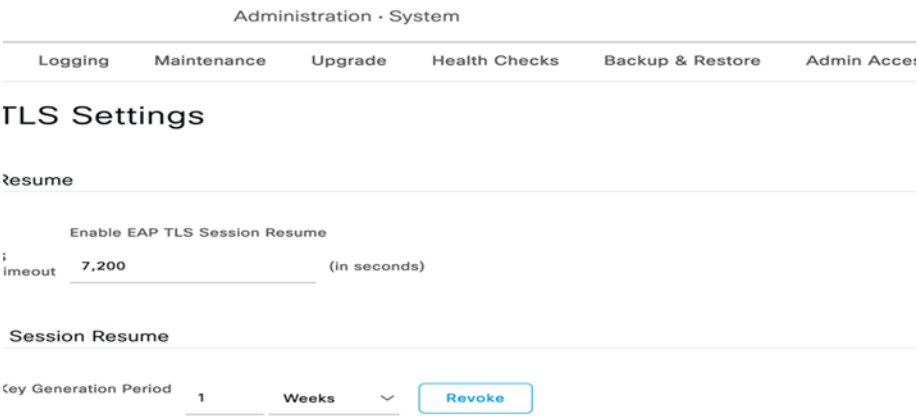
To configure EAP-TLS:

- Choose Administration > System > Settings > Protocols > EAP-TLS.
- Enter the details as required to define the EAP-TLS protocol.
- Click Save to save the EAP-TLS settings.

For EAP-TLS server by default session resumption is disabled.

In the TOE Administration User Interface, the EAP-TLS server session resumption can be enabled by navigation to the menu: Administration > System > Settings Navigate on Left-Side: Protocols > EAP-TLS.

Check the "Enable EAP TLS Session Resume" checkbox



4.12 Verifying Software Version

The TOE allows for the CLI administrator to verify the version of software running by entering the command

show application version ise

The console displays information similar to the following screen. The version must be 3.1 to be in the evaluated configuration.

To check the Cisco Application Deployment Engine (ADE) Release 2.4 operating system (ADE-OS) version, at the system prompt, enter the command

show version

The console displays an output similar to the following:

Cisco Application Deployment Engine OS Release: 2.4

ADE-OS Build Version: 2.4.0.147

4.13 Services on the Box

Appendix B -> Cisco ISE 3400/3500 Series Appliance Ports Reference for the list of Services running on ISE and their available ports and interfaces.

4.14 Secure Connection Recovery

In the event of failure of the secure connections used by the TOE the following should be done:

1. **TOE to TOE for audit data and configuration data**: the secure connection will re-establish once a connection is available again between iterations of the TOE. The administrator should confirm connection settings are still correct for each TOE iteration per Section 3.3.5, above.
2. **TOE to LDAP (and ActiveDirectory)**: the secure connection will re-establish once a connection is available again between the TOE and the remote authentication server. The administrator should confirm connection settings are still correct per [**2**] as referenced in Section 3.2.4, above.
3. **TOE to Syslog server**: When the optional ISE Remote Logging Target configuration field **Buffer Messages When Server Down field** is checked on a Remote Logging target, during failure to reach Secure Syslog servers, the audit data is not lost as the audit records are stored and forwarded as soon as communications is re-established in a store-and-forward manner. When the Buffer Messages when Server Down field is unchecked, audit records may be lost during the period in which secure communications was lost to any Secure Syslog server.

5. Security Relevant Events

ISE 3.1 can maintain logs in multiple locations: local storage of the generated audit records, and when configured for a syslog backup will simultaneously offload those events to a peer instantiation of ISE or a different log server. ISE 3.1 administrators should review logs at both locations. Instructions for viewing logs are found in Section 5.1 below.

Audit events are simultaneously sent to the external server and the local store upon creation. If the external server is not available the TOE will buffer events until they can be sent.

The audit fields in each audit event will contain at a minimum the following:

Example event: 2013-03-16 01:32:21.512 +00:00 0000000997 60079 NOTICE Administrator-Login: A failure to establish an SSL session was detected, ConfigVersionId=4, AdminIPAddress=10.34.84.155, OperationMessageText=no cipher suites in common, PortNumber=443]

Date: In year-month-day format: 2013-03-16

Time: In hour:minute:second:millisecond format:01:32:21.512

Type of event: Administrator-Login

Subject identity: Available when the action is run by an authorized TOE administrator user such as “user: lab”. In cases where the audit event is not associated with an authorized user, an IP address may be provided for the Non-TOE endpoint and/ or TOE.

IP address: (Optional) May be provided along with the subject identity of a specific authorized TOE administrator: AdminIPAddress=10.34.84.155.

Port number: (Optional) May be provided along with the IP address for connections to the box: PortNumber=443.

Outcome (Success or Failure): Success may be explicitly stated with “success” or “passed” contained within the audit event or is implicit in that there is not a failure or error message. More specifically for failed logins, “authentication failed” will appear in the audit event. For successful logins, “authentication succeeded” will appear in the associated audit event. For failed events “failure” will be denoted in the audit event. For other audit events a detailed description of the outcome may be given in lieu of an explicit success or failure. For example, for termination of an SSH session a detailed description is given in the associated audit event: “Received disconnect from 10.34.85.13: 11: Closed due to user request.”

Additional Audit Information: As described in Column 3 of Table 9 below.

As noted above, the information includes at least all of the required information. Example audit events are included below by Security Functional Requirement.

Audit events can also be viewed at the GUI, where they are displayed with field labels that closely correspond to the required logging fields in the NDcPP. Following

is an example log from the Configuration Audit Log that tracks changes made to the TOE by an administrator.

Logged At:	2013-04-25 22:52:54.076
Server Time:	2013-04-25 22:52:52.637
Administrator:	martinf43
Object Type:	LogSetting
Object Name:	LocalStore
Event:	Changed configuration
IP Address:	172.23.88.43
Interface:	GUI
ISE Server:	All
Source ISE Server:	sec-sns-3495

In this example, the date and time are in the 'Logged At' field; the type of event is in the 'Object Type' field; the subject identity is in the 'Administrator' field; and the outcome is in the 'Event' field where it is noted that the configuration was changed. No event would be generated in this log for failed configuration attempts due to the nature of the GUI. Privileges that are not granted to an administrator role do not even appear on their screen as an option, thus they have no access to them.

The audit server used to collect the auditable events was rsyslog version 8.32.0-1ubuntu4 running on Ubuntu Linux 18.0.4.1.

Table 9: Auditable Events

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
FCO_NRO.1	Client request for which the TOE does not	Identity of the client, contents of	2019-04-04 16:21:09.866 +00:00 0000007538 11036 WARN RADIUS: The Message-Authenticator RADIUS

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
	have a shared secret	EAP-response (if present).	attribute is invalid, ConfigVersionId=88, Device IP Address=172.23.88.60, Device Port=1645, DestinationIPAddress=172.23.88.8, DestinationPort=1812, RadiusIdentifier=67, User-Name=ValidCrtPathTest1EE@pkits, NAS-IP-Address=172.23.88.60, NAS-Port=50004, Service-Type=Framed, Framed-IP-Address=172.23.88.120, Framed-MTU=1500, Called-Station-ID=00-22-0D-10-35-04, Calling-Station-ID=00-0C-29-E4-E7-AC, NAS-Port-Type=Ethernet, cisco-av-pair=service-type=Framed, cisco-av-pair=audit-session-id=AC17583C0003CD1C8A1705EA, AcsSessionID=sec-sns-3615/343554817/57,
FCS_EAP-TLS_EXT.1	Protocol failures Establishment of a TLS session	If failure occurs, record a descriptive reason for the failure	Protocol Failures: 2019-04-04 17:34:28.240 +00:00 0000001760 5400 NOTICE Failed-Attempt: Authentication failed, ConfigVersionId=72, Device IP Address=172.23.88.60, Device Port=1645, DestinationIPAddress=172.23.88.8, DestinationPort=1812,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			RadiusPacketType=AccessRequest, UserName=ValidCrtPathTest1EE@pkits, Protocol=Radius, RequestLatency=2, NetworkDeviceName=surfer_nas_sw, User-Name=ValidCrtPathTest1EE@pkits, NAS-IP-Address=172.23.88.60, NAS-Port=50004, Service-Type=Framed, Framed-IP-Address=172.23.88.120, Framed-MTU=1500, State=37CPMSessionID=AC17583C0003CD578A5976CC;35SessionID=sec-sns-3615/343773157/21;, Called-Station-ID=00-22-0D-10-35-04, Calling-Station-ID=00-0C-29-E4-E7-AC, Event-Timestamp=1554399268, NAS-Port-Type=Ethernet, NAS-Port-Id=GigabitEthernet0/4, EAP-Key-Name=, cisco-av-pair=service-type=Framed, cisco-av-pair=audit-session-id=AC17583C0003CD578A5976CC, NetworkDeviceProfileName=Cisco, NetworkDeviceProfileId=b0699505-3150-4215-a80e-6753d45bf56c, IsThirdPartyDeviceFlow=false, RadiusFlowType=Wired802_1x, SSID=00-22-0D-10-35-04, AcsSessionID=sec-sns-3615/343773157/21,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			SelectedAccessService=EAP_TLS_only, FailureReason=12968 Client didn't provide suitable ciphers, Step=11001, Step=11017, Step=15049, Step=15008, Step=11507, Step=12500, Step=12625, Step=11006, Step=11001, Step=11018, Step=12502, Step=12800, Step=12805, Step=12814, Step=12817, Step=12817, Step=12968, Step=12507, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=61025, Step=11504, Step=11003, NetworkDeviceGroups=IPSEC#Is IPSEC Device#Yes, NetworkDeviceGroups=Location#All Locations, NetworkDeviceGroups=Device Type#All Device Types, EapAuthentication=EAP-TLS, OpenSSLErrorMessage=SSL alert: code=0x228=552 ; source=local ; type=fatal ; message="handshake failure.s3_srvr.c:1459 error:1408A0C1:SSL routines:ssl3_get_client_hello:no shared cipher [error=336109761 lib=20 func=138 reason=193]",

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			OpenSSLErrorStack= 64915:error:1408A0C1:SSL routines:ssl3_get_client_hello:no shared cipher:s3_srvr.c:1459:, CPMSessionID=AC17583C0003CD578A5976CC, EndPointMACAddress=00-0C-29-E4-E7-AC, ISEPolicySetName=Default, TLSCipher=unknown, TLSVersion=TLSv1.2, DTLSSupport=Unknown, Network Device Profile=Cisco, Location=Location#All Locations, Device Type=Device Type#All Device Types, IPSEC=IPSEC#Is IPSEC Device#Yes, Response={RadiusPacketType=AccessReject; }, Establishment of a TLS Session: 2019-04-04 17:32:33.447 +00:00 0000001385 61025 NOTICE EAP-TLS: Open secure connection with TLS peer, ConfigVersionId=72, UserName=ValidCrtPathTest1EE@pkits, ISELocalAddress=172.23.88.8:1812, ISEModuleName=EAP_SERVER, ISEServiceName=EAP-TLS Server,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			PeerAddress=00-0C-29-E4-E7-AC, PeerName=CN=Valid EE Certificate Test1,O=Test Certificates 2011,C=US, PeerAuthenticated=true, CertificateHash=91:94:D0:21:77:56:2D:55:EA:BC:43:96:26:E1:14:A1:84:D4:F1:7F, ConnectionStatus=Succeeded, UniqueConnectionIdentifier =200c84b3-be63-41af-8519-6761ee8eef05, Subject - Common Name=Valid EE Certificate
FCS_RADIUS_EXT.1	Protocol failures Success/Failure of authentication	If failure occurs, record a descriptive reason for the failure	Protocol Failures: 2019-04-05 18:06:25.595 +00:00 0000009568 5400 NOTICE Failed-Attempt: Authentication failed, ConfigVersionId=74, Device IP Address=172.23.88.60, Device Port=1645, DestinationIPAddress=172.23.88.8, DestinationPort=1812, RadiusPacketType=AccessRequest, UserName=bob, Protocol=Radius, RequestLatency=2, NetworkDeviceName=surfer_nas_sw, User-Name=bob, NAS-IP-Address=172.23.88.60, NAS-Port=50004, Service-Type=Framed, Framed-IP-Address=172.23.88.120,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Framed-MTU=1500, State=37CPMSessionID=AC17583C0003D0BA8F9F0481;35SessionID=sec-sns-3615/343773157/32;, Called-Station-ID=00-22-0D-10-35-04, Calling-Station-ID=00-0C-29-E4-E7-AC, Event-Timestamp=1554487585, NAS-Port-Type=Ethernet, NAS-Port-Id=GigabitEthernet0/4, EAP-Key-Name=, cisco-av-pair=service-type=Framed, cisco-av-pair=audit-session-id=AC17583C0003D0BA8F9F0481, NetworkDeviceProfileName=Cisco, NetworkDeviceProfileId=b0699505-3150-4215-a80e-6753d45bf56c, IsThirdPartyDeviceFlow=false, RadiusFlowType=Wired802_1x, SSID=00-22-0D-10-35-04, AcsSessionID=sec-sns-3615/343773157/32, SelectedAccessService=EAP_TLS_only, FailureReason=12003 Failed to negotiate EAP because EAP-MD5 not allowed in the Allowed Protocols, Step=11001, Step=11017, Step=15049, Step=15008, Step=11507, Step=12500, Step=12625, Step=11006, Step=11001, Step=11018, Step=12001, Step=12003,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Step=11504, Step=11003, NetworkDeviceGroups=IPSEC#Is IPSEC Device#Yes, NetworkDeviceGroups=Location#All Locations, NetworkDeviceGroups=Device Type#All Device Types, CPMSessionID=AC17583C0003D0BA8F9F0481, EndPointMACAddress=00-0C-29-E4-E7-AC, ISEPolicySetName=Default, DTLSSupport=Unknown, Network Device Profile=Cisco, Location=Location#All Locations, Device Type=Device Type#All Device Types, IPSEC=IPSEC#Is IPSEC Device#Yes, Response={RadiusPacketType=AccessReject; }, Successful Authentication: 2019-04-05 18:20:10.722 +00:00 0000009932 5200 NOTICE Passed-Authentication: Authentication succeeded, ConfigVersionId=74, Device IP Address=172.23.88.60, DestinationIPAddress=172.23.88.8, DestinationPort=1812, UserName=ValidCrtPathTest1EE@pki

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			ts, Protocol=Radius, RequestLatency=14, NetworkDeviceName=surfer_nas_sw, User-Name=ValidCrtPathTest1EE@pkits, NAS-IP-Address=172.23.88.60, NAS-Port=50004, Service-Type=Framed, Framed-IP-Address=172.23.88.120, Framed-MTU=1500, State=37CPMSessionID=AC17583C0003D0C08FAB7614;35SessionID=sec-sns-3615/343773157/33;, Called-Station-ID=00-22-0D-10-35-04, Calling-Station-ID=00-0C-29-E4-E7-AC, Event-Timestamp=1554488410, NAS-Port-Type=Ethernet, NAS-Port-Id=GigabitEthernet0/4, EAP-Key-Name=, cisco-av-pair=service-type=Framed, cisco-av-pair=audit-session-id=AC17583C0003D0C08FAB7614, NetworkDeviceProfileName=Cisco, NetworkDeviceProfileId=b0699505-3150-4215-a80e-6753d45bf56c, IsThirdPartyDeviceFlow=false, RadiusFlowType=Wired802_1x, SSID=00-22-0D-10-35-04, AcsSessionID=sec-sns-3615/343773157/33, AuthenticationMethod=x509_PKI, SelectedAccessService=EAP_TLS_onl

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			y, SelectedAuthorizationProfiles=Permit Access, IdentityGroup=Endpoint Identity Groups:Profiled, Step=11001, Step=11017, Step=15049, Step=15008, Step=11507, Step=12500, Step=12625, Step=11006, Step=11001, Step=11018, Step=12502, Step=12800, Step=12805, Step=12806, Step=12807, Step=12809, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=12505, Step=11006, Step=11001, Step=11018,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Step=12504, Step=12571, Step=12571, Step=12811, Step=12812, Step=12813, Step=12804, Step=12801, Step=12802, Step=12816, Step=12509, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=61025, Step=15041, Step=15048, Step=15048, Step=22070, Step=22037, Step=12506, Step=24715, Step=15036, Step=24209, Step=24211, Step=15048, Step=15048, Step=15048, Step=15016, Step=22081, Step=22080, Step=11503, Step=11002, SelectedAuthenticationIdentityStores=identity_san_other_upn, AuthenticationStatus=AuthenticationPassed, NetworkDeviceGroups=IPSEC#Is IPSEC Device#Yes, NetworkDeviceGroups=Location#All Locations, NetworkDeviceGroups=Device Type#All Device Types, IdentityPolicyMatchedRule=EAP_TLS_Authentication, AuthorizationPolicyMatchedRule=Bas

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			ic_Authenticated_Access, EapAuthentication=EAP-TLS, Serial Number=01, Subject - Common Name=Valid EE Certificate Test1, Subject Alternative Name=ValidCrtPathTest1EE@pkits, Subject - Organization=Test Certificates 2011, Subject - Country=US, CPMSessionID=AC17583C0003D0C08FAB7614, EndPointMACAddress=00-0C-29-E4-E7-AC, PostureAssessmentStatus=NotApplicable, EndPointMatchedProfile=VMWare-Device, ISEPolicySetName=Default, IdentitySelectionMatchedRule=EAP_TLS_Authentication, StepLatency=33=1838;38=1647;43=1613;48=1651;68=1524, StepData=56=certificate for Valid EE Certificate Test1, StepData=57=certificate for Good CA, StepData=73= Normalised Radius.RadiusFlowType, StepData=74= Network Access.EapAuthentication, StepData=82= Radius.NAS-Port-Type, StepData=83= EndPoints.LogicalProfile,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			StepData=84= Network Access.AuthenticationStatus, allowEasyWiredSession=false, TLSCipher=AES128-SHA, TLSVersion=TLSv1.2, DTLSSupport=Unknown, Subject=CN=Valid EE Certificate Test1,O=Test Certificates 2011,C=US, Subject Alternative Name - Other Name=ValidCrtPathTest1EE@pkits, Issuer=CN=Good CA,O=Test Certificates 2011,C=US, Issuer - Common Name=Good CA, Issuer - Organization=Test Certificates 2011, Issuer - Country=US, Key Usage=0, Key Usage=1, Key Usage=2, Key Usage=3, Extended Key Usage - Name=130, Extended Key Usage - OID=1.3.6.1.5.5.7.3.2, Days to Expiry=4288, AKI=58:01:84:24:1b:bc:2b:52:94:4a:3d:a5:10:72:14:51:f5:af:3a:c9, HostIdentityGroup=Endpoint Identity Groups:Profiled, Network Device Profile=Cisco, Location=Location#All Locations, Device Type=Device Type#All Device Types, IPSEC=IPSEC#Is IPSEC Device#Yes, Name=Endpoint Identity Groups:Profiled,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Response={Class=CACS:AC17583C0 003D0C08FAB7614:sec-sns-3615/343773157/33; EAP-Key-Name=0d:6b:ae:4e:3b:34:7e:e2:b3:37:08:e2:c6:a7:d3:d3:4a:32:ba:14:23:6a:0d:1b:6d:e6:08:39:12:fd:05:0d:41:e9:ea:ac:c8:23:68:ca:e7:81:fd:8e:54:48:fc:ba:40:92:98:91:1d:c3:0f:af:55:26:ab:61:dd:c9:23:5c:de; MS-MPPE-Send-Key=****; MS-MPPE-Recv-Key=****; LicenseTypes=1; }, Failed Authentication: 2019-04-05 18:06:25.595 +00:00 0000009568 5400 NOTICE Failed-Attempt: Authentication failed, ConfigVersionId=74, Device IP Address=172.23.88.60, Device Port=1645, DestinationIPAddress=172.23.88.8, DestinationPort=1812, RadiusPacketType=AccessRequest, UserName=bob, Protocol=Radius, RequestLatency=2, NetworkDeviceName=surfer_nas_sw, User-Name=bob, NAS-IP-Address=172.23.88.60, NAS-Port=50004, Service-Type=Framed, Framed-IP-Address=172.23.88.120,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Framed-MTU=1500, State=37CPMSessionID=AC17583C0003D0BA8F9F0481;35SessionID=sec-sns-3615/343773157/32;, Called-Station-ID=00-22-0D-10-35-04, Calling-Station-ID=00-0C-29-E4-E7-AC, Event-Timestamp=1554487585, NAS-Port-Type=Ethernet, NAS-Port-Id=GigabitEthernet0/4, EAP-Key-Name=, cisco-av-pair=service-type=Framed, cisco-av-pair=audit-session-id=AC17583C0003D0BA8F9F0481, NetworkDeviceProfileName=Cisco, NetworkDeviceProfileId=b0699505-3150-4215-a80e-6753d45bf56c, IsThirdPartyDeviceFlow=false, RadiusFlowType=Wired802_1x, SSID=00-22-0D-10-35-04, AcsSessionID=sec-sns-3615/343773157/32, SelectedAccessService=EAP_TLS_only, FailureReason=12003 Failed to negotiate EAP because EAP-MD5 not allowed in the Allowed Protocols, Step=11001, Step=11017, Step=15049, Step=15008, Step=11507, Step=12500, Step=12625, Step=11006, Step=11001, Step=11018, Step=12001, Step=12003,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Step=11504, Step=11003, NetworkDeviceGroups=IPSEC#Is IPSEC Device#Yes, NetworkDeviceGroups=Location#All Locations, NetworkDeviceGroups=Device Type#All Device Types, CPMSessionID=AC17583C0003D0BA8F9F0481, EndPointMACAddress=00-0C-29-E4-E7-AC, ISEPolicySetName=Default, DTLSSupport=Unknown, Network Device Profile=Cisco, Location=Location#All Locations, Device Type=Device Type#All Device Types, IPSEC=IPSEC#Is IPSEC Device#Yes, Response={RadiusPacketType=AccessReject; },
FIA_AFL.1	The reaching of the threshold for the unsuccessful authentication attempts. Disabling an account due to the	The claimed identity of the user attempting to gain access or the IP where the attempts originated.	reaching of the threshold for the unsuccessful authentication attempts Administration GUI: 2019-04-09 22:43:20.398 +00:00 0000013830 51008 NOTICE Administrator-Login: Administrator authentication failed. Account is disabled due to excessive failed authentication attempts,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
	threshold being reached		ConfigVersionId=125, AdminInterface=GUI, AdminIPAddress=10.24.18.227, AdminName=Evan_Osnos, OperationMessageText=com.cisco.cpm.nsf.api.exceptions.NSFAuthenticationFailed: Account is locked., FailureReason=51008 Administrator authentication failed. Account is disabled due to excessive failed authentication attempts, CLI: 2019-04-30 16:33:38.706 +00:00 0000001853 60082 NOTICE Administrator-Login: A SSH CLI user has attempted to login, however account is locked out, ConfigVersionId=72, AdminInterface=CLI, OperationMessageText=pam_tally2(sshd:auth): user Evan_Osnos2 (1004) tally 4, deny 3, AcsInstance=ise3595, Disabling an account due to the threshold being reached Administration GUI:

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			2019-04-09 22:43:20.384 +00:00 0000013828 52001 NOTICE Configuration-Changes: Changed configuration, ConfigVersionId=125, FailureFlag=false, RequestResponseType=initial, AdminInterface=GUI, AdminIPAddress=172.23.88.45, AdminName=internal-sys-user, ConfigChangeData=object updated: Status Disabled Users=[Evan_Osnos], ObjectType=Network Access Users, ObjectName=Status Disabled, Component=Administration, ObjectInternalID=unknown, CLI: 2019-04-30 16:33:38.706 +00:00 0000001853 60082 NOTICE Administrator-Login: A SSH CLI user has attempted to login, however account is locked out, ConfigVersionId=72, AdminInterface=CLI, OperationMessageText=pam_tally2(sshd:auth): user Evan_Osnos2 (1004) tally 4, deny 3, AcsInstance=ise3595,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
FCS_HTTPS_EXT.1	Failure to establish a HTTPS Session.	Reason for failure.	Failure to establish a HTTPS Session: 2019-04-23 18:56:27.344 +00:00 0000000367 51000 NOTICE Administrator-Login: Administrator authentication failed, ConfigVersionId=72, AdminInterface=GUI, AdminIPAddress=10.40.130.36, AdminSession=AdminGUI_Session, OperationMessageText=Administrator access failed because certificate was not presented, PortNumber=443,
FCS_IPSEC_EXT.1	Failure to establish an IPsec SA.	Reason for failure	2019-05-28 18:27:47.514 UTC: %CRYPTO-4-IKMP_BAD_MESSAGE: IKE message from 172.23.88.60 failed its sanity check or is malformed
FCS_TLSS_EXT.2 / FCS_TLSC_EXT.2	Failure to establish a TLS Session	Reason for failure	Failure to establish a TLS Session: HTTPS (TLS) server for Administration web application: 2019-04-16 02:46:57.214 +00:00 0000010894 60080 NOTICE Administrator-Login: A SSH CLI user has successfully logged in, ConfigVersionId=78, AdminInterface=CLI, OperationMessageText=4347

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Connection Refused: handshake_failure, AcsInstance=Apr, EAP-TLS server: 2019-04-16 02:10:39.596 +00:00 0000010316 5400 NOTICE Failed-Attempt: Authentication failed, ConfigVersionId=76, Device IP Address=172.23.88.60, Device Port=1645, DestinationIPAddress=172.23.88.8, DestinationPort=1812, RadiusPacketType=AccessRequest, UserName=ValidCrtPathTest1EE@pkits, Protocol=Radius, RequestLatency=3, NetworkDeviceName=surfer_nas_sw, User-Name=ValidCrtPathTest1EE@pkits, NAS-IP-Address=172.23.88.60, NAS-Port=50004, Service-Type=Framed, Framed-IP-Address=172.23.88.120, Framed-MTU=1500, State=37CPMSessionID=AC17583C0003F30FC4D9C5B4;34SessionID=sec-sns-3615/344725172/5;, Called-Station-ID=00-22-0D-10-35-04, Calling-Station-ID=00-0C-29-E4-E7-

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			AC, Event-Timestamp=1555380639, NAS-Port-Type=Ethernet, NAS-Port-Id=GigabitEthernet0/4, EAP-Key-Name=, cisco-av-pair=service-type=Framed, cisco-av-pair=audit-session-id=AC17583C0003F30FC4D9C5B4, NetworkDeviceProfileName=Cisco, NetworkDeviceProfileId=b0699505-3150-4215-a80e-6753d45bf56c, IsThirdPartyDeviceFlow=false, RadiusFlowType=Wired802_1x, SSID=00-22-0D-10-35-04, AcsSessionID=sec-sns-3615/344725172/5, SelectedAccessService=EAP_TLS_only, FailureReason=12507 EAP-TLS authentication failed, Step=11001, Step=11017, Step=15049, Step=15008, Step=11507, Step=12500, Step=12625, Step=11006, Step=11001, Step=11018, Step=12502, Step=12800, Step=12805, Step=12806, Step=12807, Step=12808, Step=12809, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=12571, Step=12571, Step=12811, Step=12814, Step=12817, Step=12507, Step=12505, Step=11006, Step=11001, Step=11018, Step=12504, Step=61025, Step=11504, Step=11003, NetworkDeviceGroups=IPSEC#Is IPSEC Device#Yes, NetworkDeviceGroups=Location#All Locations, NetworkDeviceGroups=Device Type#All Device Types, EapAuthentication=EAP-TLS, OpenSSLErrorMessage=SSL alert: code=0x22E=558 ; source=local ; type=fatal ; message="certificate unknown.s3_srvr.c:3581 error:14089086:SSL routines:ssl3_get_client_certificate:certificate verify failed

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			[error=336105606 lib=20 func=137 reason=134]", OpenSSLErrorStack= 207687:error:14089086:SSL routines:ssl3_get_client_certificate:certificate verify failed:s3_srvr.c:3581:, CPMSessionID=AC17583C0003F30FC4D9C5B4, EndPointMACAddress=00-0C-29-E4-E7-AC, ISEPolicySetName=Default, StepData=47=certificate for Valid EE Certificate Test1, StepData=48=certificate for Good CA, TLSCipher=unknown, TLSVersion=TLSv1.2, DTLSSupport=Unknown, Network Device Profile=Cisco, Location=Location#All Locations, Device Type=Device Type#All Device Types, IPSEC=IPSEC#Is IPSEC Device#Yes, Response={RadiusPacketType=AccessReject; }, Secure Syslog Client: 2019-04-16 03:41:48.136 +00:00 0000012153 34140 WARN System-Management: ISE failed secure syslog connection because of unknown certificate in syslog server certificate

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			chain, ConfigVersionId=81, DestinationPort=26514, LoggerName=InvalidcAFalseTest2EE, LDAPS client: 2019-05-27 17:47:59.788 +00:00 0000000724 24030 ERROR External-LDAP: SSL connection error was encountered, ConfigVersionId=77, UserName=internetofeverything@windsurfer.cisco.com, SelectedAccessService=AuthenticateUserAPI, AcsSessionID=ise3595/348352324/5, AuthenticationMethod=PAP_ASCII, DetailedInfo=SSL alert: code=0x22A=554 ; source=local ; type=fatal ; message="Server certificate identity verification failed: host name didnt match SAN DNS.s3_clnt.c:1290 error:14090086:SSL routines:ssl3_get_server_certificate:certificate verify failed [error=336134278 lib=20 func=144 reason=134]", CurrentIDStoreName=LDAPS_AD_windsurfer_cisco_com, CPMSessionID=ise3595:userauth5,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Response={LdapOperationStatus=ProcessError; },
FCS_SSHS_EXT.1	Failure to establish an SSH session	Reason for failure	Failure to establish an SSH Session: 2019-04-11 02:09:43.997 +00:00 0000018810 60188 NOTICE Administrator-Login: An attempted SSH connection has failed, ConfigVersionId=125, AdminInterface=CLI, OperationMessageText=Unable to negotiate with 10.24.37.37 port 54094: no matching cipher found. Their offer: aes128-cbc [preauth], AcsInstance=ise3595,
FIA_UIA_EXT.1	All use of the identification and authentication mechanism.	Provided user identity, origin of the attempt (e.g., IP address).	GUI with Username/Password - SUCCESS: 2019-03-29 15:44:55.795 +00:00 0000002176 51001 NOTICE Administrator-Login: Administrator authentication succeeded, ConfigVersionId=72, AdminInterface=GUI, AdminIPAddress=10.24.0.186, AdminSession=AdminGUI_Session, AdminName=foobar, OperationMessageText=Administrator authentication successful,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			GUI with Username/Password - FAILURE: 2019-03-29 15:46:21.279 +00:00 0000002335 51021 NOTICE Administrator-Login: Administrator authentication failed. Wrong password., ConfigVersionId=72, AdminInterface=GUI, AdminIPAddress=10.24.0.186, AdminName=foobar, GUI with client certificate authentication – SUCCESS: 2019-04-02 00:16:00.165 +00:00 0000000061 51001 NOTICE Administrator-Login: Administrator authentication succeeded, ConfigVersionId=72, AdminInterface=GUI, AdminIPAddress=10.24.114.221, AdminSession=AdminGUI_Session, AdminName=httpstestclient@windsurfer.cisco.com, OperationMessageText=Administrato

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			r access successful. Certificate authenticated, PortNumber=443, GUI with client certificate authentication - FAILURE: 2019-04-23 18:56:27.344 +00:00 0000000367 51000 NOTICE Administrator-Login: Administrator authentication failed, ConfigVersionId=72, AdminInterface=GUI, AdminIPAddress=10.40.130.36, AdminSession=AdminGUI_Session, OperationMessageText=Administrator access failed because certificate was not presented, PortNumber=443, Local Console Username/Password – SUCCESS: 2019-04-01 07:59:46.917 +00:00 0000009268 60184 NOTICE Administrator-Login: A console CLI user has successfully logged in, ConfigVersionId=72, AdminInterface=CLI, OperationMessageText=LOGIN ON tty1 BY foobar, AcsInstance=ise3595,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Local Console Username/Password – FAILURE: 2019-04-01 08:03:23.469 +00:00 0000009273 60185 NOTICE Administrator-Login: A console CLI user has attempted unsuccessfully to login, ConfigVersionId=72, AdminInterface=CLI, OperationMessageText=FAILED LOGIN 1 FROM tty1 FOR foobar, Authentication failure, AcsInstance=ise3595, SSH Username/Password – SUCCESS: 2019-04-01 08:04:32.486 +00:00 0000009276 60115 NOTICE Administrator-Login: A CLI user has logged in from SSH, ConfigVersionId=72, AdminInterface=CLI, AdminIPAddress=10.40.130.34, AdminName=foobar, OperationMessageText=User 'foobar'

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			logged in to CLI SSH session from SSH client IP: 10.40.130.34, AcsInstance=ise3595, SSH Username/Password – FAILURE: 2019-04-01 08:10:21.177 +00:00 0000009282 60081 NOTICE Administrator-Login: A SSH CLI user has attempted unsuccessfully to login, ConfigVersionId=72, AdminInterface=CLI, OperationMessageText=Failed password for foobar from 10.40.130.34 port 51369 ssh2, AcsInstance=ise3595, SSH Public key authentication - SUCCESS: 2019-04-01 08:25:21.146 +00:00 0000009304 60080 NOTICE Administrator-Login: A SSH CLI user has successfully logged in, ConfigVersionId=72, AdminInterface=CLI, OperationMessageText=Accepted publickey for foobar from 172.23.88.59 port 50396 ssh2: RSA SHA256:slV0kPUiW0bq1N1hzbkIguv7

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			PYcooaL0C+gYRRxdkVc, AcsInstance=ise3595, SSH Public key authentication - FAILURE: 2019-04-01 08:29:03.117 +00:00 0000009312 60188 NOTICE Administrator-Login: An attempted SSH connection has failed, ConfigVersionId=72, AdminInterface=CLI, OperationMessageText=Received disconnect from 172.23.88.59:50422: 11: Closed due to user request. [preauth], AcsInstance=ise3595,
FIA_UAU_EXT.2	All use of the identification and authentication mechanism.	Origin of the attempt (e.g., IP address).	See events for FIA_UIA_EXT.1 above.
FIA_X509_EXT.1/ Rev	Unsuccessful attempt to validate a certificate	Reason for failure	Unsuccessful attempt to validate a certificate 2019-02-26 10:32:32.808 +00:00 0000003355 34140 WARN System-Management: ISE failed secure syslog connection because of

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			unknown certificate in syslog server certificate chain, ConfigVersionId=77, DestinationPort=26514, LoggerName=InvalidcAFalseTest2EE , 2019-02-26 10:32:32.809 +00:00 0000003356 34133 WARN System-Management: TLS handshake with syslog server failed, ConfigVersionId=77, DestinationPort=26514, LoggerName=InvalidcAFalseTest2EE ,
FIA_X509_EXT.1/ Rev	Addition of Trust Anchors in the TOE Trust Store	Identification of certificates added, replaced or removed as trust anchor in the TOE's trust store	Addition of Trust Anchor Certificate in the TOE Trust Store: 2019-02-26 15:11:37.974 +00:00 0000007207 52000 NOTICE Configuration-Changes: Added configuration, ConfigVersionId=78, AdminInterface=GUI, AdminIPAddress=10.24.51.218, AdminName=foobar, ConfigChangeData=Certificate added¥, Name = C=US, O=U.S. Government, OU=DoD, OU=PKI, CN=DoD JITC Root CA 2¥, Description = C=US, O=U.S.

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Government, OU=DoD, OU=PKI, CN=DoD JITC Root CA 2¥, Additional details:¥, Issued To = ¥CN=DoD JITC Root CA 2¥OU=PKI¥OU=DoD¥O=U.S. Government¥C=US¥, Issued By = DoD JITC Root CA 2¥, Serial Number = 5¥, Valid From = Fri Jul 15 03:31:31 UTC 2005¥, Valid To = Thu Jul 04 03:31:31 UTC 2030, ObjectType=Trust Certificate, ObjectName=C=US, O=U.S. Government, OU=DoD, OU=PKI, CN=DoD JITC Root CA 2, UserAdminFlag=Admin, OperatorName=foobar, AcsInstance=ise3595, Addition of Intermediate Certificate in the TOE Trust Store: 2206 52000 NOTICE Configuration-Changes: Added configuration, ConfigVersionId=72, AdminInterface=GUI, AdminIPAddress=10.40.130.46, AdminName=foobar, ConfigChangeData=Certificate added¥, Name = C=US, O=Test Certificates 2011,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			CN=basicConstraints Critical cA False CA¥, Description = C=US, O=Test Certificates 2011, CN=basicConstraints Critical cA False CA¥, Additional details:¥, Issued To = ¥CN=basicConstraints Critical cA False CA¥O=Test Certificates 2011¥C=US¥, Issued By = Trust Anchor¥, Serial Number = 17¥, Valid From = Fri Jan 01 08:30:00 UTC 2010¥, Valid To = Tue Dec 31 08:30:00 UTC 2030, ObjectType=Trust Certificate, ObjectName=C=US, O=Test Certificates 2011, CN=basicConstraints Critical cA False CA, UserAdminFlag=Admin, OperatorName=foobar, AcsInstance=ise3595,
FIA_X509_EXT.1/ Rev	Replacement of Trust Anchors in the TOE's Trust Store	Identification of certificates added, replaced or removed as trust anchor in the TOE's trust store	Not Applicable. ISE Disallows replacing a Trust Anchor certificate in the TOE Trust Store.
FIA_X509_EXT.1/ Rev	Removal of Trust Anchors in the TOE's Trust Store	Identification of certificates added, replaced or removed as trust	Removal of Trust Anchors in TOE Trust Store: 2019-02-26 15:14:35.409 +00:00 0000007298 52002 NOTICE

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
		anchor in the TOE's trust store	Configuration-Changes: Deleted configuration, ConfigVersionId=79, AdminInterface=GUI, AdminIPAddress=10.24.51.218, AdminName=foobar, ConfigChangeData=Certificate deleted¥, Certificate Name=C=US, O=U.S. Government, OU=DoD, OU=PKI, CN=DoD JITC Root CA 2, ObjectType=Trust Certificate, ObjectName=C=US, O=U.S. Government, OU=DoD, OU=PKI, CN=DoD JITC Root CA 2, UserAdminFlag=Admin, OperatorName=foobar, AcsInstance=ise3595,
FMT_MOF.1/ ManualUpdate	Any attempt to initiate a manual update	None.	2019-04-29 19:05:00.333 +00:00 0000046646 60108 NOTICE System-Management: Application patch started, ConfigVersionId=76, AdminInterface=GUI, AdminIPAddress=10.40.130.38, AdminName=foobar, OperationMessageText=Patch Install initiated with bundle - ise-patchbundle-2.6.0.156-Patch1-19042908.SPA.x86_64.tar.gz, repo - tmplocalpatchinstallrepo, AcsInstance=ise3595,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
FMT_SMF.1	All management activities of TSF data.	None	Table 10: Auditable Administrative Events
FPT_STM.1	Changes to the time.	The old and new values for the time. Origin of the attempt to change time for success and failure (e.g., IP address).	[old time shown in preceding record timestamp] 2019-02-25 12:17:13.438 +00:00 0000000049 58020 NOTICE System-Management: Clock set, ConfigVersionId=46, FailureFlag=false, RequestResponseType=final, AdminInterface=CLI, AdminIPAddress=127.0.0.1, AdminName=foobar, OperationMessageText=Modified the Local Time from Feb 25 20:11:24 2019 to feb 25 12:12:12 2019, AcsInstance=ise3595,
FPT_TUD_EXT.1	Initiation of update; result of the update attempt (success or failure)	No additional information.	2019-04-29 19:05:00.333 +00:00 0000046646 60108 NOTICE System-Management: Application patch started, ConfigVersionId=76, AdminInterface=GUI, AdminIPAddress=10.40.130.38, AdminName=foobar,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			OperationMessageText=Patch Install initiated with bundle - ise-patchbundle-2.6.0.156-Patch1-19042908.SPA.x86_64.tar.gz, repo - tmplocalpatchinstallrepo, AcsInstance=ise3595, 2019-04-29 19:17:57.227 +00:00 0000000064 60126 NOTICE System-Management: Application patch installation failed, ConfigVersionId=47, AdminInterface=GUI, AdminIPAddress=10.40.130.38, AdminName=foobar, OperationMessageText=Error while trying to reboot , AcsInstance=ise3595, [2.6.0.156]
FTA_SSL.3	The termination of a remote session by the session locking mechanism.	No additional information.	Client-Certificate Authentication Method: 2019-05-24 23:08:53.969 +00:00 0000001005 51002 NOTICE Administrator-Login: Administrator logged off, ConfigVersionId=72, AdminInterface=GUI, AdminIPAddress=10.24.65.13, AdminSession=AdminGUI_Session, AdminName=httpstestclient@windsur

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			fer.cisco.com, OperationMessageText=User logged out, Password Authentication Method: 2019-04-01 23:29:58.714 +00:00 0000001325 51002 NOTICE Administrator-Login: Administrator logged off, ConfigVersionId=72, AdminInterface=GUI, AdminIPAddress=10.24.114.221, AdminSession=AdminGUI_Session, AdminName=foobar, OperationMessageText=User logged out, LDAPS to Active Directory External Authentication Method: 2019-05-27 18:11:32.968 +00:00 0000001666 51002 NOTICE Administrator-Login: Administrator logged off, ConfigVersionId=79, AdminInterface=GUI, AdminIPAddress=10.24.90.81, AdminSession=AdminGUI_Session, AdminName=internetofeverything@windsurfer.cisco.com, OperationMessageText=User logged out,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Console: 2019-04-01 08:02:16.451 +00:00 0000009272 60206 NOTICE Administrator-Login: A CLI user has logged out from console, ConfigVersionId=72, AdminInterface=CLI, AdminIPAddress=127.0.0.1, AdminName=foobar, OperationMessageText=User 'foobar' logged out from CLI console tty /dev/tty1, AcsInstance=ise3595, SSH: 2019-04-01 08:05:59.007 +00:00 0000009277 60116 NOTICE Administrator-Login: A CLI user has logged out from SSH, ConfigVersionId=72, AdminInterface=CLI, AdminIPAddress=10.40.130.34, AdminName=foobar, OperationMessageText=User 'foobar' logged out from CLI SSH session from SSH client IP: 10.40.130.34, AcsInstance=ise3595,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
FTA_SSL.4	The termination of an interactive session.	No additional information.	Client-Certificate Authentication Method: 2019-05-24 23:08:53.969 +00:00 0000001005 51002 NOTICE Administrator-Login: Administrator logged off, ConfigVersionId=72, AdminInterface=GUI, AdminIPAddress=10.24.65.13, AdminSession=AdminGUI_Session, AdminName=httpstestclient@windsurfer.cisco.com, OperationMessageText=User logged out, Password Authentication Method: 2019-04-01 23:29:58.714 +00:00 0000001325 51002 NOTICE Administrator-Login: Administrator logged off, ConfigVersionId=72, AdminInterface=GUI, AdminIPAddress=10.24.114.221, AdminSession=AdminGUI_Session, AdminName=foobar, OperationMessageText=User logged out, LDAPS to Active Directory External Authentication Method:

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			2019-05-27 18:11:32.968 +00:00 0000001666 51002 NOTICE Administrator-Login: Administrator logged off, ConfigVersionId=79, AdminInterface=GUI, AdminIPAddress=10.24.90.81, AdminSession=AdminGUI_Session, AdminName=internetofeverything@windsurfer.cisco.com, OperationMessageText=User logged out, Console: 2019-04-01 08:02:16.451 +00:00 0000009272 60206 NOTICE Administrator-Login: A CLI user has logged out from console, ConfigVersionId=72, AdminInterface=CLI, AdminIPAddress=127.0.0.1, AdminName=foobar, OperationMessageText=User 'foobar' logged out from CLI console tty /dev/tty1, AcsInstance=ise3595, SSH:

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			2019-04-01 08:05:59.007 +00:00 0000009277 60116 NOTICE Administrator-Login: A CLI user has logged out from SSH, ConfigVersionId=72, AdminInterface=CLI, AdminIPAddress=10.40.130.34, AdminName=foobar, OperationMessageText=User 'foobar' logged out from CLI SSH session from SSH client IP: 10.40.130.34, AcsInstance=ise3595,
FTP_ITC.1 FTP_ITC.1(2)	Initiation of the trusted channel. Termination of the trusted channel. Failure of the trusted channel functions.	Identification of the initiator and target of failed trusted channels establishment attempt.	Initiation of the trusted channel: 2019-04-16 04:26:05.492 +00:00 0000013342 60155 NOTICE System-Management: Secure communication with syslog server established, ConfigVersionId=87, OperationMessageText=Secure communication with syslog server at 172.23.88.23:16514 established. , 2019-05-27 19:04:26.002 +00:00 0000001741 61025 NOTICE EAP-TLS: Open secure connection with TLS peer, ConfigVersionId=79, AdminInterface=Secure_LDAP, AdminIPAddress=172.23.88.54, AdminName=system,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			CertificateHash=A4:92:28:F9:AE:1F:48:E0:36:C8:80:8E:61:9C:BF:B3:19:F2:50:32, UniqueConnectionIdentifier=7a3fd7f2-cea8-49e2-a1ac-15b528e2c0ea, OperationMessageText=LDAP secure connection established, 2019-05-17T17:59:30.632557-07:00 ipsec-sns-3615.windsurfer.cisco.com 71072: *May 18 00:59:25.652 UTC: IKEv2-INTERNAL:(SESSION ID = 5,SA ID = 1):SM Trace-> SA: I_SPI=9CDF607BBCC6A8B9 R_SPI=67782EF817CDD5C4 (R) MsgID = 9 CurState: READY Event: EV_RECV_INFO_REQ Termination of the trusted channel: 2019-04-16 04:26:59.705 +00:00 0000013368 34126 WARN System-Management: Remote syslog target is unavailable, ConfigVersionId=87, DestinationPort=16514, LoggerName=securesyslog_sec_cel_003, 2019-05-27 19:04:59.904 +00:00 0000001870 34160 INFO System-

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
			Management: LDAPS connection terminated successfully, ConfigVersionId=79, LdapServer=ip=172.23.88.54; subject=CN=surfer-ad-01.windsurfer.cisco.com, 2019-05-28T08:39:16.848754-07:00 ipsec-sns-3615.windsurfer.cisco.com 255583: *May 28 15:39:11.412 UTC: IKEv2-INTERNAL:(SESSION ID = 5,SA ID = 4):SM Trace-> SA: I_SPI=7180820731A05A8B R_SPI=68F4CD4CCF698A83 (R) MsgID = A CurState: EXIT Event: EV_FREE_NEG Failure of the trusted channel functions: See events for FCS_TLSC_EXT.2 above.
FTP_TRP.1/Admin	Initiation of the trusted channel. Termination of the trusted channel.	Identification of the claimed user identity.	Initiation of the trusted channel: 2019-04-18 17:48:07.810 +00:00 0000026643 60080 NOTICE Administrator-Login: A SSH CLI user has successfully logged in,

Requirement	Auditable Events	Additional Audit Record Contents	Sample Record and Location
	Failures of the trusted path functions.		ConfigVersionId=107, AdminInterface=CLI, OperationMessageText=7728 Connection established (TLS), AcsInstance=Apr, Termination of the trusted channel: 2019-04-18 17:48:07.809 +00:00 0000026639 60080 NOTICE Administrator-Login: A SSH CLI user has successfully logged in, ConfigVersionId=107, AdminInterface=CLI, OperationMessageText=7725 Connection closed, AcsInstance=Apr, Failures of the trusted path functions: See events for FCS_IPSEC_EXT.1, FCS_SSHS_EXT.1 and FCS_TLSS_EXT.1 above.

Table 10: Auditable Administrative Events

Requirement	Management Action to Log & Sample Log
FAU_GEN.1: Audit data generation	Logging starting:

Requirement	Management Action to Log & Sample Log
	2019-03-25 16:06:32.279 +00:00 0000000036 60155 NOTICE System-Management: Secure communication with syslog server established, ConfigVersionId=5, OperationMessageText=Secure communication with syslog server at 127.0.0.1:6514 established. , Shut-down of the audit functions: 2019-03-27 10:00:07.862 +00:00 0000003196 58002 NOTICE Process-Management: ISE process stopped, ConfigVersionId=72, FailureFlag=false, RequestResponseType=final, AdminInterface=CLI, AdminIPAddress=127.0.0.1, AdminName=system, OperationMessageText=Stopping M&T Log Processor, AcsInstance=ise3595, Changing logging settings (CLI): 2019-05-28 16:38:42.110 +00:00 0000005566 60083 NOTICE System-Management: Syslog Server configuration change, ConfigVersionId=72, AdminInterface=CLI, AdminIPAddress=127.0.0.1, AdminName=foobar, OperationMessageText=Log level has been modified to 7, AcsInstance=sec-sns-3615, Changing logging settings (GUI): 2019-04-02 17:23:27.068 +00:00 0000000757 52001 NOTICE Configuration-Changes: Changed configuration, ConfigVersionId=124, FailureFlag=false, RequestResponseType=initial, AdminInterface=GUI,

Requirement	Management Action to Log & Sample Log
	AdminIPAddress=172.23.88.45, AdminName=foobar, ConfigChangeData=Local Storage Period = 91 days, ObjectType=UPSLogSettings, ObjectName=LocalStore, OperationMessageText=LoggingCategories "Administrative and Operational Audit" has been edited successfully., Clearing logs: 2019-04-02 17:24:49.647 +00:00 0000000825 57000 NOTICE Configuration-changes: Deleted rolled-over local log file(s), ConfigVersionId=125, AdminInterface=GUI, AdminIPAddress=172.23.88.45, AdminName=foobar, OperationMessageText=LocalStore Logs deleted Successfully,
FAU_STG_EXT.1: Protected audit event storage	Configuration of syslog receipt settings: 2019-04-02 17:19:47.184 +00:00 0000000638 52000 NOTICE Configuration-Changes: Added configuration, ConfigVersionId=122, AdminInterface=GUI, AdminIPAddress=172.23.88.45, AdminName=foobar, ConfigChangeData=Object created:¥,Port = 16514¥,IP Address = 172.23.88.23¥,Facility Code = LOCAL6¥,Length = 8192¥,Description = run server auditserver_sanip_matching_newcert.sh¥,Include Alarms = FALSE¥,status = ENABLED¥, Buffer Message = TRUE¥,Buffer Size = 100¥,Reconnect Time out = 30¥,Certificate = CN=windsurfer-SURFER-AD-01-CA,DC=windsurfer,DC=cisco,DC=com¥,Validation = FALSE¥,, ObjectType=UPSLogTarget, ObjectName=python_secure_syslog_svr,

Requirement	Management Action to Log & Sample Log
	2019-04-02 17:21:47.921 +00:00 0000000721 52001 NOTICE Configuration-Changes: Changed configuration, ConfigVersionId=123, FailureFlag=false, RequestResponseType=initial, AdminInterface=GUI, AdminIPAddress=172.23.88.45, AdminName=foobar, ConfigChangeData=Object modified:¥, Log Severity Level = DEBUG¥,Local Logging = enable¥,Assigned Targets = {InvalidcAFalseTest2EE,python_secure_syslog_svr,rsyslog_ubuntu_02}, ObjectType=UPSCategory, ObjectName=Administrative and Operational Audit, OperationMessageText=LoggingTargets "LogCollector" has been edited successfully., 2019-04-02 17:09:34.719 +00:00 0000000328 52001 NOTICE Configuration-Changes: Changed configuration, ConfigVersionId=96, FailureFlag=false, RequestResponseType=initial, AdminInterface=GUI, AdminIPAddress=172.23.88.45, AdminName=foobar, ConfigChangeData=Object modified:¥,Port = 20514¥,IP Address = 127.0.0.1¥,Facility Code = LOCAL6¥,Length = 1024¥,Description = Syslog Target for Log Collector¥,Include Alarms = FALSE¥,Old status = ENABLED New status = DISABLED¥,, ObjectType=UPSLogTarget, ObjectName=LogCollector, OperationMessageText=LoggingTargets "LogCollector" has been edited successfully.,
FCS_SSHS_EXT.1: SSH	Configuration of SSH settings 2019-04-10 22:23:50.236 +00:00 0000017103 60086 NOTICE System-Management: ADEOS SSH Service configuration change, ConfigVersionId=125, FailureFlag=false, RequestResponseType=initial, AdminInterface=CLI,

Requirement	Management Action to Log & Sample Log
	AdminIPAddress=127.0.0.1, AdminName=foobar, OperationMessageText=Service sshd configuration has been modified to OFF, AcsInstance=ise3595, 2019-04-10 22:25:42.763 +00:00 0000017104 60086 NOTICE System-Management: ADEOS SSH Service configuration change, ConfigVersionId=125, FailureFlag=false, RequestResponseType=initial, AdminInterface=CLI, AdminIPAddress=127.0.0.1, AdminName=foobar, OperationMessageText=Service sshd configuration has been modified to ON, AcsInstance=ise3595, 2019-05-28 16:46:42.611 +00:00 0000005574 60086 NOTICE System-Management: ADEOS SSH Service configuration change, ConfigVersionId=72, FailureFlag=false, RequestResponseType=initial, AdminInterface=CLI, AdminIPAddress=127.0.0.1, AdminName=foobar, OperationMessageText=SSHD key-exchange algorithm has been set to ecdh-sha2-nistp384, AcsInstance=sec-sns-3615,
FCS_TLSS_EXT.2: TLS Server Protocol / FCS_TLSC_EXT.2: TLS Client Protocol	Configuration of TLS: including certificates: 2019-04-15 16:51:12.709 +00:00 0000028016 52001 NOTICE Configuration-Changes: Changed configuration, ConfigVersionId=126, FailureFlag=false, RequestResponseType=initial, AdminInterface=GUI, AdminIPAddress=10.40.130.46, AdminName=foobar, ConfigChangeData=object updated: Allow 3DES ciphers=false¥,Allow TLS 1.1=false¥,Show invalid usernames for specific timelimit=false¥,Allow SHA1WithAES128 ciphers=true¥,Accept certificates without validating purpose=false¥,Disclose invalid usernames=true¥,Allow TLS 1.0=false¥,Allow DSS ciphers for ISE as a client=false¥,Allow

Requirement	Management Action to Log & Sample Log
	SHA1 ciphers=true¥,Allow legacy unsafe TLS renegotiation for ISE as a client=false, ObjectType=Security Settings, ObjectName=Security Settings, Component=UNKNOWN, ObjectInternalID=unknown, 2019-04-15 17:49:34.201 +00:00 0000000400 52000 NOTICE Configuration-Changes: Added configuration, ConfigVersionId=73, AdminInterface=GUI, AdminIPAddress=10.40.130.46, AdminName=bob@windsurfer.cisco.com, ConfigChangeData=Local certificate was imported ¥, Name = DC=windsurfer, DC=cisco, DC=com, CN=SNS-3615¥, Use for protocols = MGMT¥, Additional details:¥, Issued To = SNS-3615¥, Issued By = bulabog-beach¥, Subject = ¥CN=SNS-3615¥DC=com¥DC=cisco¥DC=windsurfer¥, Serial Number = 3a212db900010000002b¥, Valid From = Mon Oct 29 17:05:11 UTC 2018¥, Valid To = Tue Oct 27 17:05:11 UTC 2026, ObjectType=CertificateImport, ObjectName=CertificateImport, UserAdminFlag=Admin, OperatorName=bob@windsurfer.cisco.com, AcsInstance=sec-sns-3615, 2019-04-15 18:32:05.593 +00:00 0000000843 52001 NOTICE Configuration-Changes: Changed configuration, ConfigVersionId=74, FailureFlag=false, RequestResponseType=initial, AdminInterface=GUI, AdminIPAddress=10.40.130.46, AdminName=bob@windsurfer.cisco.com, ConfigChangeData=Local certificate (DC=windsurfer, DC=cisco, DC=com, CN=SNS-3615) was updated¥,Name = DC=windsurfer, DC=cisco, DC=com, CN=SNS-3615¥,Description = ¥,Protocols = EAP¥,Expiration TTL = No

Requirement	Management Action to Log & Sample Log
	changes were made¥, Additional details:¥, Issued To = SNS-3615¥, Issued By = bulabog-beach¥, Subject = ¥CN=SNS-3615¥DC=com¥DC=cisco¥DC=windsurfer¥, Serial Number = 3a212db900010000002b¥, Valid From = Mon Oct 29 17:05:11 UTC 2018¥, Valid To = Tue Oct 27 17:05:11 UTC 2026, ObjectType=EditCertificate, ObjectName=EditCertificate, UserAdminFlag=Admin, OperatorName=bob@windsurfer.cisco.com, AcsInstance=sec-sns-3615,

FIA_PMG_EXT.1: Password management	Setting length requirement for passwords: 2019-04-24 17:53:08.194 +00:00 0000001852 52001 NOTICE Configuration-Changes: Changed configuration, ConfigVersionId=72, FailureFlag=false, RequestResponseType=initial, AdminInterface=GUI, AdminIPAddress=10.40.130.29, AdminName=httpstestclient@windsurfer.cisco.com, ConfigChangeData=object updated: accountLockOrSuspend=disable¥,disableAdminAfterPeriodOfInactivity=false¥,nadPasswordTimer=10¥,displayPasswordExpirationReminder=true¥,requirePasswordChangeAfterPeriodOfInactivity=false¥,maxDaysForPasswordExpiration=45¥,denyDictWordInPassword=false¥,encodedDictFile=¥,maxPasswordLength=127¥,passwordPolicyEmailContent=This account has been locked. For this account to become unlocked, please contact your IT helpdesk.¥,specialCharsRequiredInPassword=true¥,noOfIncorrectLoginAttempts=3¥,maxSuccessiveFailedAttemptsBeforeAdminDisabled=5¥,allowCharsRepeatedFourOrMoreTimesInPassword=true¥,passwordChangeDelta=3¥,noPreviousPasswordChk=true¥,advancedCustomization=0¥,disableUserIfPasswordNotChangedAfterExpiration=true¥,lowerCaseAlphaCharsRequiredInPassword=true¥,nadPasswordRequirement=false¥,allowIllegalStringInPassword=true¥,passwordChangeDeltaChk=false¥,lockoutEnabled=true¥,dictionaryType=defaultDictionary¥,maxDaysOfInactivityBeforePasswordChange=0¥,maxDaysForPasswordExpirationReminderDisplay=30¥,maxGenerationsPasswordUniqueAcross=3¥,accountSuspendTime=15¥,allowUserNameInPassword=false¥,digitCharsRequiredInPassword=true¥,disableAdminAfterSuccessiveFailedAttempts=false¥,passwordReuse=15¥,adminGuiSessionTimeout=60¥,minPasswordLength=15¥,upperCaseAlphaCharsRequiredInPassword=true¥,maxDaysOfInactivityBeforeAdminDisabled=0¥,allowCiscoIn

Requirement	Management Action to Log & Sample Log
	Password=true¥,illegalPasswordString=, ObjectType=Password Policy, ObjectName=NSFAdminPasswordConfig, Component=Administration, ObjectInternalID=21013cb2-d030-4fb1-9ba2-35757634d770,
FIA_UIA_EXT.1: User identification and authentication	See events for FIA_UIA_EXT.1.
FMT_SMF.1: Specification of management functions	Configuring users with local/ remote access to ISE: 2019-04-24 18:51:27.536 +00:00 0000003007 60193 NOTICE System-Management: RSA key configuration has been modified, ConfigVersionId=72, AdminInterface=CLI, AdminIPAddress=127.0.0.1, AdminName=foobar, OperationMessageText=Authorized key in for user foobar imported, AcsInstance=sec-sns-3615, 2019-04-24 18:59:49.685 +00:00 0000003212 60084 NOTICE System-Management: ADEOS CLI user configuration change, ConfigVersionId=72, AdminInterface=CLI, AdminIPAddress=127.0.0.1, AdminName=foobar, OperationMessageText=Added user alice with role: Admin state: Enabled successfully, AcsInstance=sec-sns-3615, 2019-04-24 19:00:48.715 +00:00 0000003241 60084 NOTICE System-Management: ADEOS CLI user configuration change, ConfigVersionId=72, AdminInterface=CLI, AdminIPAddress=127.0.0.1, AdminName=foobar, OperationMessageText=Added user bob with role: User state: Enabled successfully, AcsInstance=sec-sns-3615,

Requirement	Management Action to Log & Sample Log
	Configuring the banner displayed prior to authentication: See FTA_TAB.1 row below. Configuring any cryptographic functions: See FCS rows above.
FMT_SMR.2: Restrictions on Security roles	Configuring administrative users with specified roles (Add administrative user): 2019-04-24 19:20:22.045 +00:00 0000003727 52000 NOTICE Configuration-Changes: Added configuration, ConfigVersionId=72, AdminInterface=GUI, AdminIPAddress=10.40.130.29, AdminName=httpstestclient@windsurfer.cisco.com, ConfigChangeData=object created: firstName=Joshua¥,password=**********¥,passwordIDStore=Internal Users¥,Name=joshua, ObjectType=Administrators, ObjectName=joshua, Component=Administration, ObjectInternalID=19ee0be6-b543-4cd9-99e6-e097fdcffee7, Configuring administrative users with specified roles (Delete administrative user): 2019-04-24 22:15:15.463 +00:00 0000019907 52002 NOTICE Configuration-Changes: Deleted configuration, ConfigVersionId=73, AdminInterface=GUI, AdminIPAddress=10.24.125.60, AdminName=foobar, ConfigChangeData=object deleted: Name=joshua, ObjectType=Administrators, ObjectName=joshua, Component=Administration, ObjectInternalID=dcc50e92-7164-4569-9836-2d50d489ce78,

Requirement	Management Action to Log & Sample Log
FPT_STM.1: Reliable time stamps	Manual changes to the system time: 2019-02-25 12:17:13.438 +00:00 0000000049 58020 NOTICE System-Management: Clock set, ConfigVersionId=46, FailureFlag=false, RequestResponseType=final, AdminInterface=CLI, AdminIPAddress=127.0.0.1, AdminName=foobar, OperationMessageText=Modified the Local Time from Feb 25 20:11:24 2019 to feb 25 12:12:12 2019, AcsInstance=ise3595,
FPT_TUD_EXT.1: Trusted update	Software updates: 2019-04-29 19:05:00.333 +00:00 0000046646 60108 NOTICE System-Management: Application patch started, ConfigVersionId=76, AdminInterface=GUI, AdminIPAddress=10.40.130.38, AdminName=foobar, OperationMessageText=Patch Install initiated with bundle - ise-patchbundle-2.6.0.156-Patch1-19042908.SPA.x86_64.tar.gz, repo - tmplocalpatchinstallrepo, AcsInstance=ise3595, 2019-04-29 19:17:57.227 +00:00 0000000064 60126 NOTICE System-Management: Application patch installation failed, ConfigVersionId=47, AdminInterface=GUI, AdminIPAddress=10.40.130.38, AdminName=foobar, OperationMessageText=Error while trying to reboot , AcsInstance=ise3595,
FTA_SSL_EXT.1: TSF-initiated session locking	Setting the console timeout value: Viewed with: show logging application localStore/iseLocalStore.log tail: 0000000106 1 0 2013-12-18 20:42:55.388 +00:00 0000000347 60189 NOTICE System-Management: Terminal Session

Requirement	Management Action to Log & Sample Log
	timeout has been modified, ConfigVersionId=4, AdminInterface=CLI, AdminIPAddress=10.154.25.94, AdminName=martinf43, OperationMessageText=Terminal session-timeout is set to 0, AcsInstance=sec-sns-3595,
FTA_SSL.3: TSF-initiated termination	Setting GUI timeout value: 2019-05-28 17:10:24.676 +00:00 0000005745 52001 NOTICE Configuration-Changes: Changed configuration, ConfigVersionId=72, FailureFlag=false, RequestResponseType=initial, AdminInterface=GUI, AdminIPAddress=10.24.56.143, AdminName=httpstestclient@windsurfer.cisco.com, ConfigChangeData=object updated: SessionTimeout=7, ObjectType=SessionTimeout, ObjectName=SessionTimeout, Component=Administration, ObjectInternalID=21013cb2-d030-4fb1-9ba2-35757634d770,
FTA_SSL.4: User-initiated termination	See events for FTA_SSL.4
FTA_TAB.1: Default TOE access banners	Configuring the GUI banner displayed prior to authentication: 2019-02-25 19:54:51.759 +00:00 0000013075 52000 NOTICE Configuration-Changes: Added configuration, ConfigVersionId=71, AdminInterface=GUI, AdminIPAddress=10.40.130.42, AdminName=foobar, ObjectType=GUIPreLoginBanner, ObjectName=GUIPreLoginBanner, OperationMessageText=GUI Pre login banner has been configured, AcsInstance=ise3595, Configuring the CLI banner displayed prior to authentication:

Requirement	Management Action to Log & Sample Log
	2019-02-25 19:54:51.815 +00:00 0000013077 52000 NOTICE Configuration-Changes: Added configuration, ConfigVersionId=71, AdminInterface=GUI, AdminIPAddress=10.40.130.42, AdminName=foobar, ObjectType=CLIPreLoginBanner, ObjectName=CLIPreLoginBanner, OperationMessageText=CLI Pre login banner has been configured, AcsInstance=ise3595,
FTP_TRP.1: Trusted path	See events for FTP_TRP.1/Admin

5.1 Viewing Audit Records

From Command Line Interface:

1. Successfully authenticate to the Command Line Interface (CLI) as an admin-role user.

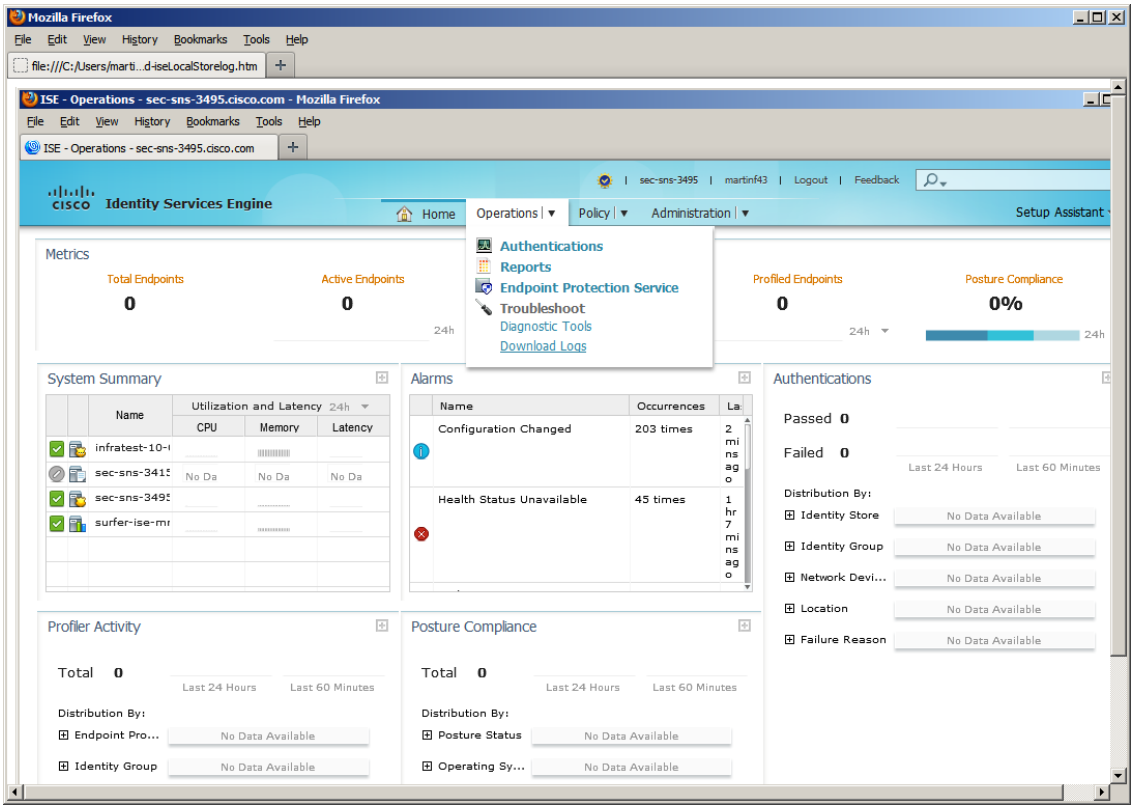
2. Run the command shown above each sample log in Table 10 and 11 above (i.e. '**show logging application localStore/iseLocalStore.log tail**').

From the Administration GUI:

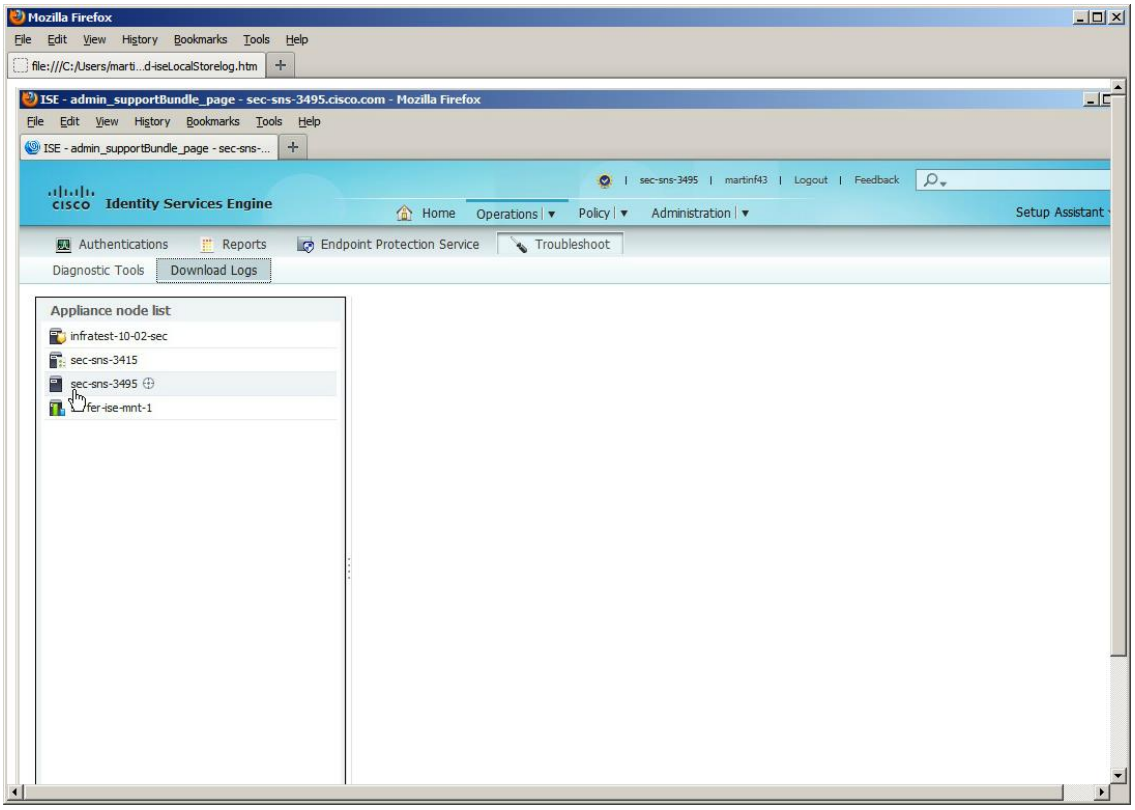
The iseLocalStore.log can be remotely downloaded by running the following steps:

1. Successfully authenticate to the Administration GUI as a SuperAdmin role user.

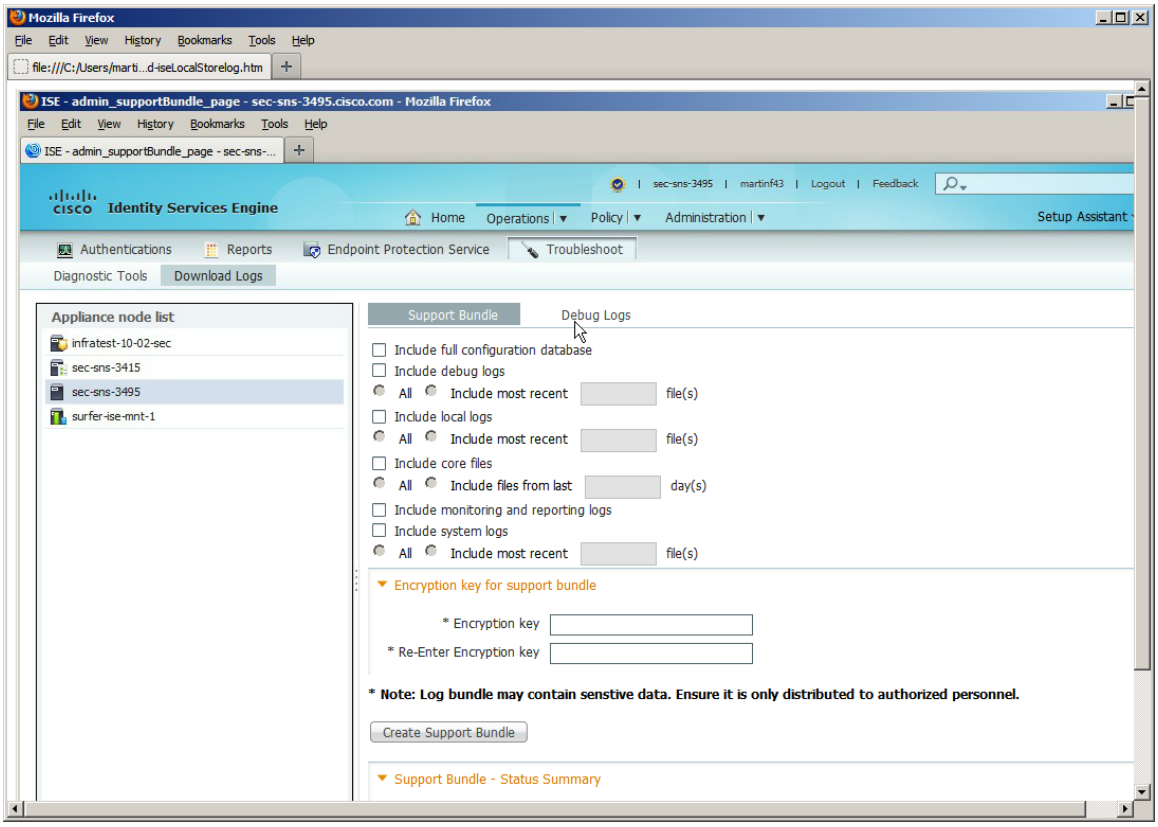
2. Navigate to the Menu: Operations > Download Logs



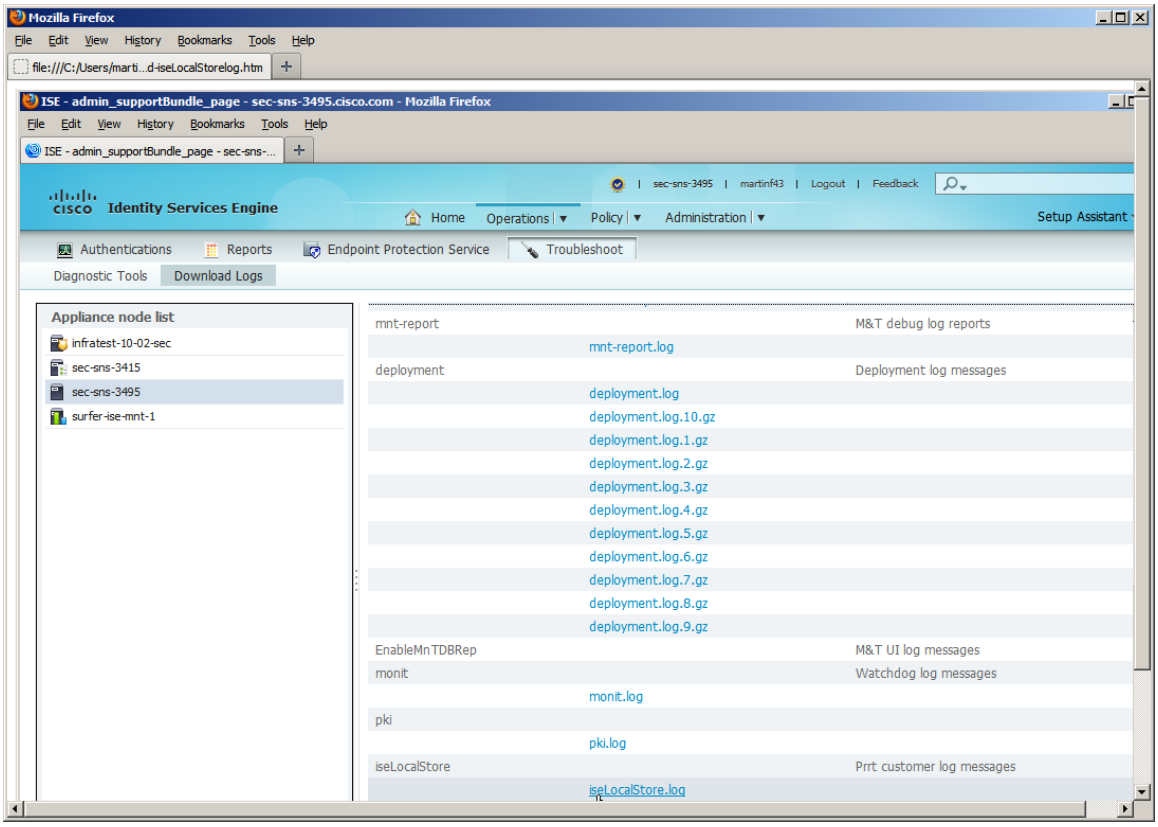
3. On the left-side navigate to the ISE node where the audit event was generated in iseLocalStore.log:



4. Click the ‘Debug Logs’ tab in the content area:



5. Scroll down the list of log files until the iseLocalStore.log filename appears. Click on the iseLocalStore.log link.



6. The iseLocalStore.log file may be downloaded or viewed with any external program.

5.2 Deleting Audit Records

5.2.1 Local Logs Storage Settings and Deletion

From the Administration > System > Logging > Local Log Settings page a System admin or a Super admin is able to configure the storage period for logs in days and delete the existing log file. The administrator may delete all of the rolled over log files by the "Delete Local Logs Now" selection in the administration application. After the configured storage period of time has passed for logs the events exceeding the age are automatically deleted.

TCP syslog buffers events in a local file that is limited to a total of 100MB. The limit is specified as a file size, not a specific number of events. Overwriting is handled by wrapping to the beginning of the file (overwriting the oldest events). The value of 100MB is configurable and the lowest value for the configuration is 10 MB and the allowed increments need to be whole numbers. On the TOE, the local log files rotate after a certain size threshold is reached. The TOE creates separate log files for each day. The number of days of local log files is configurable, with the default of keeping records only up to last 7 days. From the Administration > System > Logging > Local Log Settings page an administrator is able to configure the storage period for logs in days and delete the existing log file. Only the Security Administrator may delete all of the rolled over log files by the "Delete Local Logs Now" selection in the administration application. The ISE RBAC (Role-Based Access Control) policy does not allow for any user that is not a Security Administrator to delete log files. No user can modify log files because there is no mechanism that allows this.

5.2.2 External Platform Logs Storage Settings and Deletion

Logs received from external platforms, including other iterations of ISE, are stored in the M&T (Monitoring and Troubleshooting) log on the ISE platform. To configure log storage settings and clear these logs, login to the command line interface (CLI) of the ISE Monitoring persona node as an admin-role user. Then run the EXEC level command **application configure ise** followed by entering selection **9** to Purge M&T Operational Data. Then enter any legal number of days to retain data (1-90) and confirm request with y (yes) response. See example below for context.

hostname/username# **application configure ise**

```
Selection ISE configuration option
[1]Reset Active Directory settings to defaults
[2]Display Active Directory settings
[3]Configure Active Directory settings
[4]Restart/Apply Active Directory settings
[5]Clear Active Directory Trusts Cache and restart/apply Active
Directory settings
[6]Enable/Disable ERS API
[7]Reset M&T Session Database
```

```
[8]Rebuild M&T Unusable Indexes
[9]Purge M&T Operational Data
[10]Reset M&T Database
[11]Refresh M&T Database Statistics
[12]Display Profiler Statistics
[13]Exit
9
Enter number of days to be retained in purging MnT Operational
data [between 1 to 90 days]
For instance, Entering 20 will purge MnT Operational data older
than 20 days
Enter 'exit' to return to the main menu without purging
Enter days to be retained: 90
You are about to purge M&T data older than 90 from your database.
Are you sure you want to proceed? y/n [n]: y
M&T Operational data older than 90 is getting removed from
database
```

6. Modes of Operation

An ISE has several modes of operation, these modes are as follows:

Booting – while booting, ISE drops all network traffic until the image and configuration has loaded. This mode of operation automatically progresses to the Normal mode of operation. If a special image has been loaded on the system (as received from Cisco TAC), then the system goes from booting to Rescue Admin CLI.

Rescue Admin CLI - booting to the rescue admin CLI password recovery image (on an image received from Cisco TAC) allows modification of a CLI administrator user in the event the password is forgotten. Once the password is reset, the ISE reloads and enters booting mode.

Safe Mode – Once ISE has booted, a CLI admin-role user can put the device into Safe Mode by issuing the following commands: ‘applicaton stop ise’ followed by ‘application start ise safe’.
This "safe mode" exists in the event a customer misconfigures their access controls that prevents them from being able to administer ISE from the Administration console GUI. Once the configuration has been corrected in safe mode, the ISE reloads and enters booting mode.
Normal - The ISE image and configuration is loaded and the TOE is operating as configured. It should be noted that all levels of administrative access occur in this mode and that all ISE based security functions are operating. This is the expected mode of operation for the TOE.

Following operational error ISE reboots (once power supply is available) and enters booting mode.
ISE also has two modes of operation in respect to cryptographic functionality:
Non-FIPS mode – The TOE ships in non-FIPS mode, which does not place any restrictions on the cryptography used on the system.

FIPS mode – In FIPS mode, the ISE utilizes the cryptography described in [[**5**] for all claimed cryptographic operations. When FIPS mode is enabled, the Cisco ISE administrator interface displays a FIPS mode icon to the left of the node name in the upper-right of the page. Along with Normal mode, this is the expected mode of operation for the TOE.

ISE uses a cryptographic module, that runs a suite of self-tests during the TOE initial start-up to verify its correct operation. These tests check the integrity of the code, and the correct operation of each cryptographic algorithm and method used (i.e. AES-CBC, SHA-1, etc.) If any of the tests fail, the administrative web-based UI will not be accessible, and the security administrator will for a limited time window be able to login to the CLI on the KVM (keyboard, video, mouse) console to run the CLI command – "*show application status ise*" to determine that services have been disabled because "FIPS INTEGRITY CHECK HAS FAILED". Eventually the administrator will be unable to login to the CLI even on the KVM as all services are shutdown including the ability to login to the CLI. After authenticating, a fatal error is displayed and the user is only allowed to press <Enter> to logout and no other actions can be performed. The error message is: "ERROR: ISE SERVICES HAVE BEEN DISABLED BECAUSE FIPS INTEGRITY CHECK HAS FAILED! EITHER REIMAGE FROM ISE INSTALLATION MEDIA, OR CONTACT CISCO TECHNICAL SUPPORT CENTER FOR INSTRUCTIONS ON DIAGNOSING THE FAILURE. Press <Enter> to logout".

7. Security Measures for the Operational Environment

Proper operation of the TOE requires functionality from the environment. It is the responsibility of the Security administrator of the TOE to ensure that the Operational Environment provides the necessary functions, and adheres to the environment security objectives listed below. The environment security objective identifiers map to the environment security objectives as defined in the Security Target.

Table 11: Operational Environment Security Measures

Environment Security Objective	Operational Environment Security Objective Definition	Privileged and Semi-privileged administrator responsibility
OE.PHYSICAL	Physical security, commensurate with the value of the TOE and the data it contains, is provided by the environment.	Administrators must ensure the TOE is installed and maintained within a secure physical location. This can include a secured building with key card access or within the physical control of an authorized administrator in a mobile environment.
OE.NO_GENERAL_PURPOSE	There are no general-purpose computing capabilities (e.g., compilers or user applications) available on the TOE, other than those services necessary for the operation, administration and support of the TOE.	Administrators will make sure there are no general-purpose computing capabilities (e.g., compilers or user applications) available on the TOE.

Environment Security Objective	Operational Environment Security Objective Definition	Privileged and Semi-privileged administrator responsibility
OE.NO_THRU_TRAFFIC_PROTECTION	The TOE does not provide any protection of traffic that traverses it. It is assumed that protection of this traffic will be covered by other security and assurance measures in the operational environment.	Administrators need to ensure that the security provided by the TOE is complemented by other security measures in the operational environment that provides protection to the traffic traversing the TOE.
OE.TRUSTED_ADMIN	TOE Administrators are trusted to follow and apply all administrator guidance in a trusted manner.	Administrators must be properly trained in the usage and proper operation of the TOE and all the provided functionality per the implementing organization's operational security policies. These administrators must follow the provided guidance.
OE.UPDATES	The TOE firmware and software is updated by an administrator on a regular basis in response to the release of product updates due to known vulnerabilities.	Administrators ensure that the TOE is updated with the latest firmware and software patches to keep it secure from threats to known vulnerabilities.

Environment Security Objective	Operational Environment Security Objective Definition	Privileged and Semi-privileged administrator responsibility
OE.ADMIN_CREDENTIALS_SECURE	The administrator's credentials (private key) used to access the TOE must be protected on any other platform on which they reside.	Administrators need to ensure to keep their credentials used to access the TOE, secure and protected
OE_RESIDUAL INFORMATION	The Security Administrator ensures that there is no unauthorized access possible for sensitive residual information (e.g. cryptographic keys, keying material, PINs, passwords etc.) on networking equipment when the equipment is discarded or removed from its operational environment.	Administrators ensure to destroy and sensitive residual information once discarded from the operational environment.
OE.NAS	Authentication requests that are provided to the TOE for validation are centrally collected by a NAS and transmitted to the TOE through this component.	Administrators ensure that authentication requests are centrally located before transmitted to the TOE.

8. Related Documentation

Use this document in conjunction with the ISE 3.1 documentation at the following location:

- http://www.cisco.com/

Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

8.1 World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following sites:

- http://www.cisco.com
- http://www-china.cisco.com
- http://www-europe.cisco.com

8.2 Ordering Documentation

Cisco documentation is available in the following ways:
Registered Cisco Direct Customers can order Cisco Product documentation from the Networking Products MarketPlace:
http://www.cisco.com/web/ordering/root/index.html

Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:
http://www.cisco.com/go/subscription

Non-registered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, in North America, by calling 800 553-NETS (6387).

8.3 Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click Feedback in the toolbar and select Documentation. After you complete the form, click Submit to send it to Cisco.

You can e-mail your comments to bug-doc@cisco.com.

To submit your comments by mail, for your convenience many documents contain a response card behind the front cover. Otherwise, you can mail your comments to the following address:

Cisco Systems, Inc., Document Resource Connection

170 West Tasman Drive

San Jose, CA 95134-9883

We appreciate your comments.

9. Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain documentation, troubleshooting tips, and sample configurations from online tools. For Cisco.com registered users, additional troubleshooting tools are available from the TAC website.
Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information and resources at anytime, from anywhere in the world. This highly integrated Internet application is a powerful, easy-to-use tool for doing business with Cisco.
Cisco.com provides a broad range of features and services to help customers and partners streamline business processes and improve productivity.
Through Cisco.com, you can find information about Cisco and our networking solutions, services, and programs. In addition, you can resolve technical issues with online technical support, download and test software packages, and order Cisco learning materials and merchandise. Valuable online skill assessment, training, and certification programs are also available.
Customers and partners can self-register on Cisco.com to obtain additional personalized information and services. Registered users can order products, check on the status of an order, access technical support, and view benefits specific to their relationships with Cisco.
To access Cisco.com, go to the following website:

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