Ivanti Policy Secure 22.7R1 Security Target

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Revision History

Version	Date	Changes
Version 0.1	June 11, 2024	Initial Release
Version 0.2	August 5, 2024	Vendor comments
Version 0.3	August 12, 2024	Addressed vendor comments
Version 0.4	August 27, 2024	Addressed all comments
Version 0.5	September 30, 2024	Minor corrections
Version 0.6	October 03, 2024	Applied TDs
Version 0.7	October 04, 2024	Addressed lead comments
Version 0.8	December 12, 2024	Addressed ECR comments
Version 0.9	December 23, 2024	Minor updates
Version 1.0	April 04, 2025	Addressed comments from AAR
Version 1.1	May 21, 2025	Addressed peer lead review comments
Version 1.2	June 03, 2025	Addressed ECR comments
Version 1.3	June 20, 2025	Applied TD and addressed ECR comments
Version 1.4	June 26, 2025	Addressed ECR comments

Contents

1 Introduction

The Security Target (ST) serves as the basis for the Common Criteria (CC) evaluation and identifies the Target of Evaluation (TOE), the scope of the evaluation, and the assumptions made throughout. This document will also describe the intended operational environment of the TOE, and the functional and assurance requirements that the TOE meets.

1.1 Security Target and TOE Reference

This section provides the information needed to identify and control the TOE and the ST.

Table 1 – TOE/ST Identification

Category	Identifier
ST Title	Ivanti Policy Secure 22.7R1 Security Target
ST Version	1.4
ST Date	June 26, 2025
ST Author	Intertek Acumen Security
TOE Identifier	Ivanti Policy Secure 22.7R1
TOE Hardware	Physical Appliances: ISA Models 6000, 8000C, 8000F Virtual Appliances: ISA-V Models 6000, 8000
TOE Version	22.7R1
TOE Developer	Ivanti, Inc. 10377 South Jordan Gateway, Suite 110 South Jordan, Utah 84095
Key Words	Network Device, Network Virtual Appliance

1.2 TOE Overview

1.2.1 TOE Type

Ivanti Policy Secure (IPS) is a next-generation Network Access Control (NAC) that enables visibility to understand an organization’s security posture and enforce role-based access and endpoint security policies for network users. IPS allows administrators to define, implement, and enforce policy by enabling endpoint discovery, monitoring, and alerting. For a list of product features and functionality that is excluded from the evaluation, please refer to Section 1.5.

1.2.2 TOE Usage

The TOE is classified as a network device (a generic infrastructure device that can be connected to a network) or a virtual network device (a Virtual Appliance that can be connected to a network) depending on the underlying platform. The TOE software consists of Ivanti Policy Secure (IPS) 22.7R1. The appliance’s software is built on IVE OS 3.0. The TOE includes the IPS application and the IVE OS, along with the underlying platform, which may be either be dedicated TOE hardware or a virtualized environment managed by a VM hypervisor, all of which are delivered with the TOE. The TOE hardware includes either the ISA Models 6000, 8000C, or 8000F. In the case of a virtual deployment, the TOE includes the IPS application and the IVE OS running within a virtual machine that is hosted on the hypervisor.

The TOE provides following security features that are part of the evaluated configuration:

- Secure remote administration of the TOE via HTTPS/TLS web interface
- Secure Local administration of the TOE via a serial console connection
- Secure connectivity with remote audit servers using mutually authenticated TLS
- Identification and authentication of the administrator of the TOE
- CAVP validated cryptographic algorithms
- Self-protection mechanisms such as executing self-tests to verify correct operation
- Secure firmware updates

For a complete list of security features provided by the TOE, please refer to Section 1.3.2.

1.3 TOE Description

This section provides an overview of the TOE architecture, including physical boundaries, security functions, and relevant TOE documentation and references. In the below diagram, the TOE consists of the appliance within the green box. Everything else is not included within the TOE and is part of the TOE environment.

Figure 1 – Representative TOE Deployment of Physical Appliance

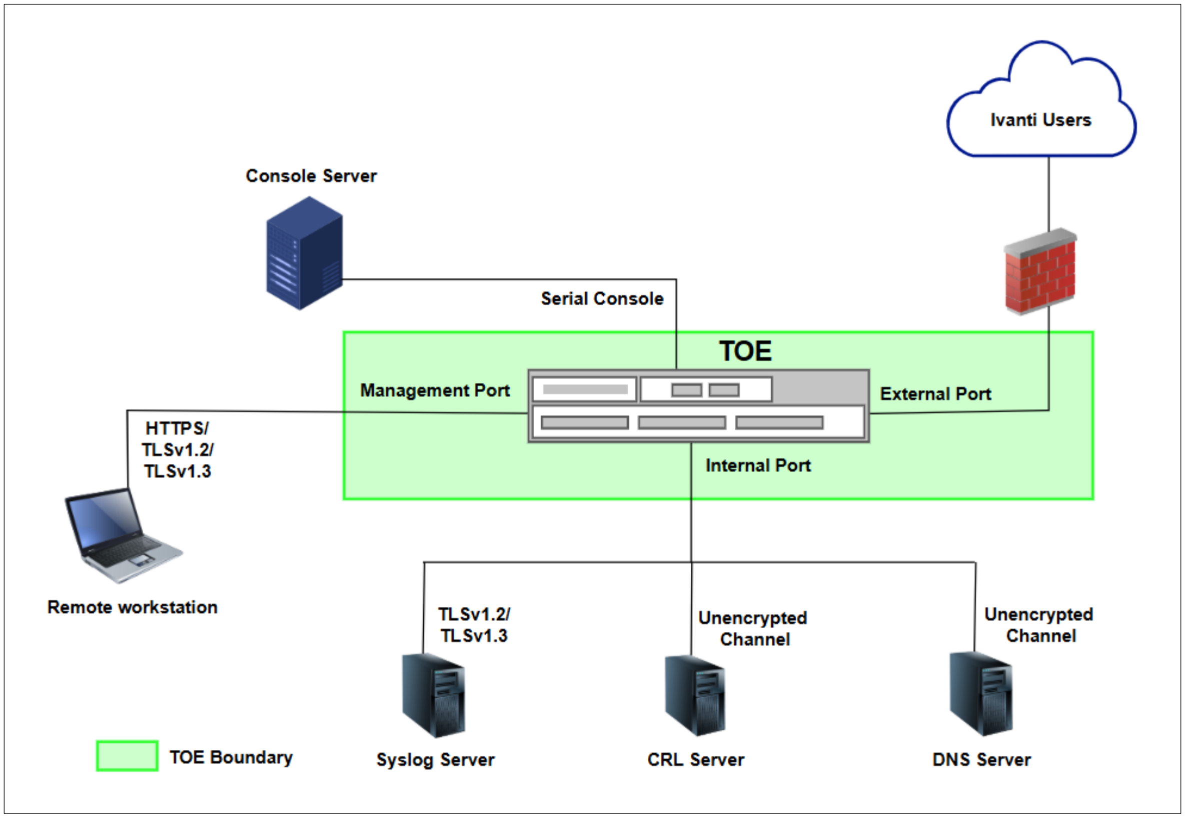
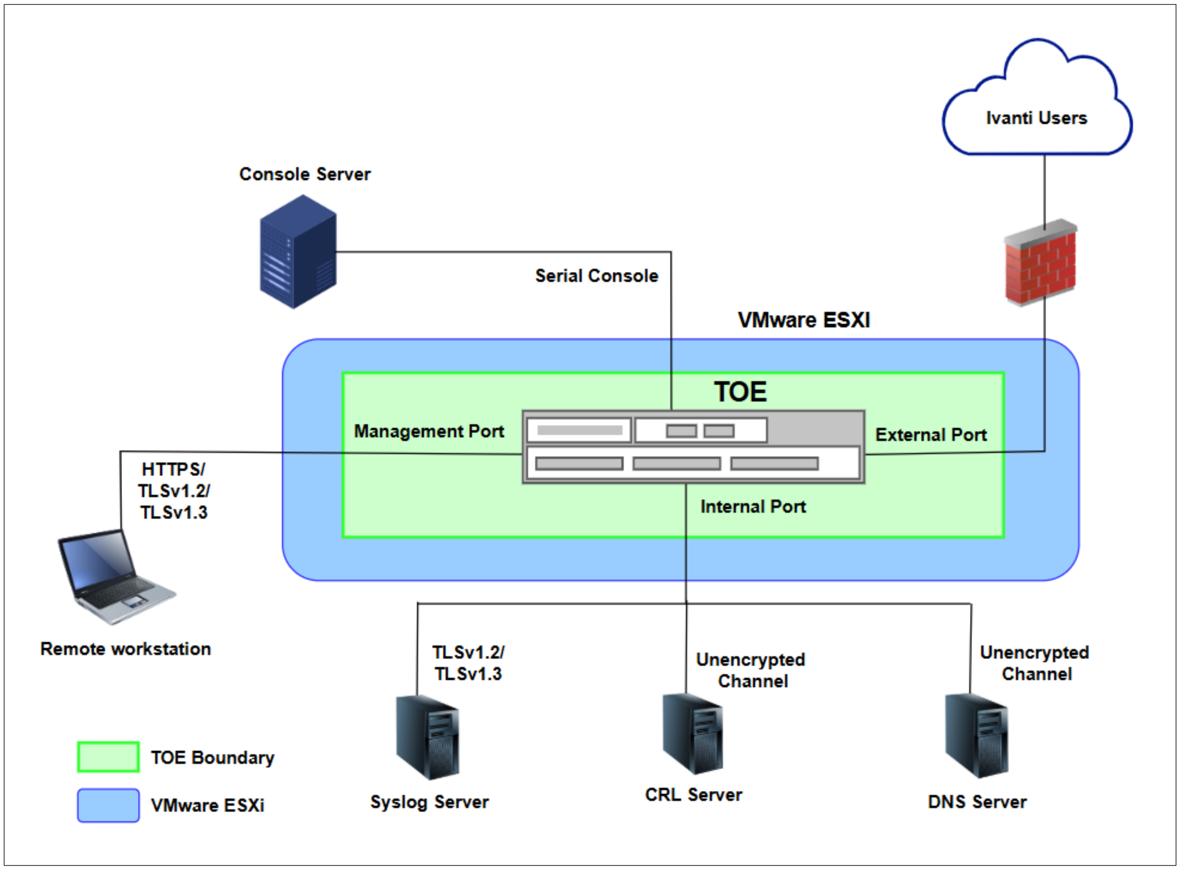


Figure 2 – Representative TOE Deployment of Virtual Appliance



1.3.1 Physical Boundaries

The TOE consists of the following hardware:

- ISA 6000
- ISA 8000C
- ISA 8000F

Running:

- Ivanti Policy Secure (IPS) v22.7R1

These platforms run Ivanti Policy Secure (IPS) v22.7R1. The IPS software is delivered pre-installed on one of the above hardware appliances. The TOE is delivered with the IPS v22.7R1 software installed on one of the ISA appliances. The platforms provide different amounts of processing power and network connectivityoptions as described in Table 2.

Table 2 – TOE Physical Boundary Components

Model	Processor	Network Options
ISA 6000	Intel Core i3 10100E 10th gen (Comet Lake)	2 x 10 Gigabit Copper Ethernet traffic ports 1 x 1GbE Management port 1 x RJ-45 Console Port

ISA 8000C	Intel Xeon Gold 5317 (Ice Lake)	2 x 10 Gigabit Ethernet copper traffic ports with link redundancy 1 x 1GbE Management port 1 x RJ-45 Console Port
ISA 8000F	Intel Xeon Gold 5317 (Ice Lake)	2 x 10 Gigabit fiber traffic ports with link redundancy 1 x 1GbE Management port 1 x RJ-45 Console Port

The TOE can also be a virtual appliance hosted on VMware ESXi 8.0.3, with a Dell PowerEdge R640 powered by an Intel(R) Xeon(R) Gold 6252 (Cascade lake) as the hardware platform. ESXi is a bare-metal hypervisor so there is no underlying operation system. In the evaluated configuration, there are no guest VMs on the hypervisor providing non-network device functionality. The virtual appliance platform is described in Table 3.

Customers can obtain the virtual appliance by contacting Ivanti Support through https://forums.ivanti.com/s/contactsupport?language=en_US. To access the software, customers need to register on the support portal and follow the required process. Please note that authcodes are single-use and cannot be reused. The appliance should be installed on compliant hardware as listed below.

Table 3 - Virtual TOE Models

Model	Processor	Hypervisor
ISA 6000-V (virtual platform) on PowerEdge R640	Intel(R) Xeon(R) Gold 6252 (Cascade lake)	VMware ESXi 8.0.3
ISA 8000-V (virtual platform) on PowerEdge R640	Intel(R) Xeon(R) Gold 6252 (Cascade lake)	VMware ESXi 8.0.3

1.3.2 Security Functions Provided by the TOE

The TOE provides the security functions required by the Collaborative Protection Profile for Network Devices, Version 3.0e, 06 December 2023 [CPP_ND_V3.0E], hereafter referred to as NDcPP v3.0e or NDcPP.

1.3.2.1 Security Audit

The TOE generates audit records for security relevant events. The TOE maintains a local audit log and also sends the audit records to a remote Syslog server as soon as they are generated, in real-time. Audit records sent to the remote server are protected by a TLS connection. Each audit record includes identity (username, IP address, or process), date and time of the event, type of event, and the outcome of the event. The TOE prevents modification to the local audit log. The TSF manages local audit storage using two log files (active and inactive). When the active log file reaches its capacity, the TSF overwrites the inactive log file (if it exists). If no inactive log file is available, the TOE creates a new log file, switches logging to the new file, and generates an audit log indicating the capacity limit was reached.

1.3.2.2 Cryptographic Support

The TOE includes the Ivanti Secure Cryptographic Module that implements CAVP-validated cryptographic algorithms for random bit generation, encryption/decryption, authentication, and integrity protection/verification. These algorithms are used to provide security for the TLS and HTTPS connections for secure management and secure connections to a syslog server. TLS and HTTPS are also used to verify firmware updates. The cryptographic services provided by the TOE are described below.

Table 4 - TOE Cryptographic Protocols

Cryptographic Protocol	Use within the TOE
HTTPS/TLS (client)	Secure connection to syslog FCS_HTTPS_EXT.1, FCS_TLSC_EXT.1, FCS_TLSC_EXT.2
HTTPS/TLS (server)	Secure management connections and verification of firmware updates via web browser FCS_HTTPS_EXT.1, FCS_TLSS_EXT.1
AES	Provides encryption/decryption in support of the TLS protocol. FCS_TLSC_EXT.1, FCS_TLSC_EXT.2, FCS_TLSS_EXT.1
DRBG	Deterministic random bit generation used to generate keys. FCS_TLSS_EXT.1, FCS_RBG_EXT.1
Secure hash	Used as part of digital signatures and for hashing passwords prior to storage on the TOE. FCS_COP.1/Hash, FCS_TLSC_EXT.1, FCS_TLSC_EXT.2, FCS_TLSS_EXT.1, FPT_APW_EXT.1
HMAC	Provides keyed hashing services in support of TLS. FCS_COP.1/KeyedHash, FCS_TLSC_EXT.1, FCS_TLSC_EXT.2, FCS_TLSS_EXT.1
ECDSA	Provides key generation and signature generation and verification in support of TLS. FCS_CKM.1, FCS_COP.1/SigGen, FCS_COP.1/SigVer, FCS_TLSC_EXT.1, FCS_TLSC_EXT.2, FCS_TLSS_EXT.1
EC-DH	Provides key establishment for TLS. FCS_CKM.2, FCS_TLSC_EXT.1, FCS_TLSC_EXT.2, FCS_TLSS_EXT.1
RSA	Provide key establishment, key generation, signature generation and verification (PKCS1_V1.5) in support of TLS. FCS_CKM.1, FCS_CKM.2, FCS_COP.1/SigGen, FCS_COP.1/SigVer, FCS_TLSC_EXT.1, FCS_TLSC_EXT.2, FCS_TLSS_EXT.1

Each of these cryptographic algorithms have been validated for conformance to the requirements specified in their respective standards, as identified in Section 6.1 CAVP Algorithm Certificate Details.

1.3.2.3 Identification and Authentication

The TOE authenticates administrative users using a username/password or username/X.509 certificate combination. The TOE does not allow access to any administrative functions prior to successful authentication. The TOE validates and authenticates X.509 certificates for all certificate uses.

The TOE supports passwords consisting of alphanumeric and special characters and enforces minimum password lengths. The TSF supports certificates using RSA or ECDSA signature algorithms.
The TOE only allows users to view the login warning banner and send/receive ICMP packets prior to authentication.

Remote administrators are locked out after a configurable number of unsuccessful authentication attempts.

1.3.2.4 Security Management

The TOE allows users with the Security Administrator role to administer the TOE over a remote web GUI or a local CLI. These interfaces do not allow the Security Administrator to execute arbitrary commands or executables on the TOE. Security Administrators can manage connections to an external Syslog server, as well as determine the size of local audit storage.

1.3.2.5 Protection of the TSF

The TOE implements several self-protection mechanisms. It does not provide an interface for the reading of secret or private keys. The TOE ensures timestamps, timeouts, and certificate checks are accurate by maintaining a real-time clock. Upon startup, the TOE runs a suite of self-tests to verify that it is operating correctly. The TOE also verifies the integrity and authenticity of firmware updates by verifying a digital signature of the update prior to installing it.

1.3.2.6 TOE Access

The TOE can be configured to display a warning and consent banner when an administrator attempts to establish an interactive session over the local CLI or remote web GUI. The TOE also enforces a configurable inactivity timeout for remote and local administrative sessions.

1.3.2.7 Trusted Path/Channels

The TOE uses TLS to provide a trusted communication channel between itself and remote Syslog servers.The trusted channels utilize X.509 certificates to perform mutual authentication. The TOE initiates the TLS trusted channel with the remote server.

The TOE uses HTTPS/TLS to provide a trusted path between itself and remote administrative users. The TOE does not implement any additional methods of remote administration. The remote administrative users are responsible for initiating the trusted path when they wish to communicate with the TOE.

1.3.3 TOE Documentation

The following documents are essential to understanding and controlling the TOE in the evaluated configuration:

- Ivanti Policy Secure 22.7R1 Common Criteria Configuration Guide
- Ivanti Policy Secure 22.7R1 Security Target

1.3.4 References

In addition to TOE documentation, the following reference may also be valuable when understanding and controlling the TOE:

- Collaborative Protection Profile for Network Devices Version 3.0e

1.4 TOE Environment

The following environmental components are required to operate the TOE in the evaluated configuration:

Table 5 – Required Environmental Components

Components	Description
Syslog server	• Conformant with RFC 5424 (Syslog Protocol). • Supporting Syslog over TLS (RFC 5425). • Acting as a TLSv1.3 and/or TLSv1.2 server. • Supporting Client Certificate authentication.
Remote workstation	• Provides remote management of TOE. • Microsoft Edge 101, Google Chrome 102, or Firefox 100. • Supporting TLSv1.3 and/or TLSv1.2. • Allows direct uploads of software image files via the TOE’s GUI.
CRL Server	• Provides CRLs through CRL Distribution Points in certificates. • Uses HTTP protocol for CRL distribution to clients. • Conformant with RFC 5280.
DNS Server	• Translates a Fully qualified domain name (FQDN) into IP addresses for network communication. • Uses UDP and TCP protocols on port 53. • Conformant with RFC 1035.
Console Server	• Provides local access to the console port of network device. • A null modem crossover cable is connected from the console terminal to the device's serial port.
VMware ESXi	• Hosts the virtualized TOE. • Supports hardware virtualization and resource allocation (CPU, memory, storage).

1.5 Product Functionality not Included in the Scope of the Evaluation

The following product functionalities are not included in the CC evaluation:

- Network Security and Application Access Control Integration
- Federation
- Guest Access
- Anti-Malware Protection and Patch Assessment
- Firewall Listening Service
- IPv6 protocol support

These features may be used in the evaluated configuration; however, no assurance as to the correct operation of these features is provided.

The TOE includes the following functionality that is not covered in this Security Target and may not be enabled or used in the CC evaluated configuration:

- DMI Agent
- SNMP Traps
- REST API
- External Authentication Servers for administrator authentication
- Full Disk Encryption

These functionalities are disabled by default, and no administrator configuration is required.

2 Conformance Claims

This section identifies the TOE conformance claims, conformance rationale, and relevant Technical Decisions (TDs).

2.1 CC Conformance Claims

The TOE is conformant to the following:

- Common Criteria for Information Technology Security Evaluations Part 1, Version 3.1, Revision 5, April 2017
- Common Criteria for Information Technology Security Evaluations Part 2, Version 3.1, Revision 5, April 2017 (Extended)
- Common Criteria for Information Technology Security Evaluations Part 3, Version 3.1, Revision 5, April 2017 (Conformant)

2.2 Protection Profile Conformance

This ST claims exact conformance to the following:

- collaborative Protection Profile for Network Devices, Version 3.0e, 06 December 2023 [CPP_ND_V3.0E]

2.3 Conformance Rationale

This ST provides exact conformance to the items listed in the previous section. The security problem definition, security objectives, and security requirements in this ST are all taken from the Protection Profile (PP), performing only the operations defined there.

2.3.1 Technical Decisions

All NIAP TDs issued to date and applicable to NDcPP v3.0e have been considered. Table 6 – Relevant Technical Decisions identifies all applicable TDs.

Table 6 – Relevant Technical Decisions

Technical Decision	Applicable (Y/N)	Exclusion Rationale (if applicable)
TD0836: NIT Technical Decision: Redundant Requirements in FPT_TST_EXT.1	Yes	
TD0868: NIT Technical Decision: Clarification of time frames in FCS_IPSEC_EXT.1.7 and FCS_IPSEC_EXT.1.8	No	The TD addresses IPSEC SFRs, but the device does not support IPSEC.
TD0879: NIT Decision: Correction of Chapter Headings in CPP_ND_V3.0E	Yes	
TD0880: NIT Decision: Removal of Duplicate Selection in FMT_SMF.1.1	Yes	
TD0886 - Clarification to FAU_STG_EXT.1 Test 6	Yes	

Technical Decision	Applicable (Y/N)	Exclusion Rationale (if applicable)
TD0899 - NIT Technical Decision: Correction of Renegotiation Test for TLS 1.2	Yes	
TD0900 - NIT Technical Decision: Clarification to Local Administrator Access in FIA_UIA_EXT.1.3	Yes	
TD0918 - NIT Technical Decision: Addition of FIPS PUB 186-5	Yes	

3 Security Problem Definition

The security problem definition has been taken directly from the claimed PP and any relevant EPs/Modules/Packages specified in Section 2.2 and is reproduced here for the convenience of the reader. The security problem is described in terms of the threats that the TOE is expected to address, assumptions about the operational environment, and any Organizational Security Policies (OSPs) that the TOE is expected to enforce.

3.1 Threats

The threats included in Table 7 – Threats are drawn directly from the PP and any EPs/Modules/Packages specified in Section 2.2.

Table 7 – Threats

ID	Threat
T.UNAUTHORIZED_ADMINISTRATOR_ACCESS	Threat agents may attempt to gain Administrator access to the Network Device by nefarious means such as masquerading as an Administrator to the device, masquerading as the device to an Administrator, replaying an administrative session (in its entirety, or selected portions), or performing man-in-the-middle attacks, which would provide access to the administrative session, or sessions between Network Devices. Successfully gaining Administrator access allows malicious actions that compromise the security functionality of the device and the network on which it resides.
T.WEAK_CRYPTOGRAPHY	Threat agents may exploit weak cryptographic algorithms or perform a cryptographic exhaust against the key space. Poorly chosen encryption algorithms, modes, and key sizes will allow attackers to compromise the algorithms, or brute force exhaust the key space and give them unauthorized access allowing them to read, manipulate and/or control the traffic with minimal effort.
T.UNTRUSTED_COMMUNICATION_CHANNELS	Threat agents may attempt to target Network Devices that do not use standardized secure tunnelling protocols to protect the critical network traffic. Attackers may take advantage of poorly designed protocols or poor key management to successfully perform man-in-the-middle attacks, replay attacks, etc. Successful attacks will result in loss of confidentiality and integrity of the critical network traffic, and potentially could lead to a compromise of the Network Device itself.
T.WEAK_AUTHENTICATION_ENDPOINTS	Threat agents may take advantage of secure protocols that use weak methods to authenticate the endpoints, e.g. a shared password that is guessable or transported as plaintext. The consequences are the same as a poorly designed protocol, the attacker could masquerade as the Administrator or another device, and the attacker could insert themselves into the network stream and perform a man-in-the-middle attack. The result is the critical network traffic is exposed and there could be a loss of

ID	Threat
	confidentiality and integrity, and potentially the Network Device itself could be compromised.
T.UPDATE_COMPROMISE	Threat agents may attempt to provide a compromised update of the software or firmware which undermines the security functionality of the device. Nonvalidated updates or updates validated using non-secure or weak cryptography leave the update firmware vulnerable to surreptitious alteration.
T.UNDETECTED_ACTIVITY	Threat agents may attempt to access, change, and/or modify the security functionality of the Network Device without Administrator awareness. This could result in the attacker finding an avenue (e.g., misconfiguration, flaw in the product) to compromise the device and the Administrator would have no knowledge that the device has been compromised.
T.SECURITY_FUNCTIONALITY_COMPROMISE	Threat agents may compromise credentials and device data enabling continued access to the Network Device and its critical data. The compromise of credentials includes replacing existing credentials with an attacker's credentials, modifying existing credentials, or obtaining the Administrator or device credentials for use by the attacker. Threat agents may also be able to take advantage of weak administrative passwords to gain privileged access to the device.
T.SECURITY_FUNCTIONALITY_FAILURE	An external, unauthorized entity could make use of failed or compromised security functionality and might therefore subsequently use or abuse security functions without prior authentication to access, change or modify device data, critical network traffic or security functionality of the device.

3.2 Assumptions

The assumptions included in Table 8 are drawn directly from PP and any relevant EPs/Modules/Packages.

Table 8 – Assumptions

ID	Assumption
A.PHYSICAL_PROTECTION	The Network Device is assumed to be physically protected in its operational environment and not subject to physical attacks that compromise the security or cPP_ND_v3.0e, 06-Dec-2023 41 interfere with the device's physical interconnections and correct operation. This protection is assumed to be sufficient to protect the device and the data it contains. As a result, the cPP does not include any requirements on physical tamper protection or other physical attack mitigations. The cPP does not expect the product to defend against physical access to the device that allows unauthorized entities to extract data, bypass other controls, or otherwise manipulate the device. For vNDs, this assumption applies to the physical platform on which the VM runs.
A.LIMITED_FUNCTIONALITY	The device is assumed to provide networking functionality as its core function and not provide functionality/services that could be deemed as general purpose computing. For example, the device should not provide a computing platform for general purpose applications (unrelated to networking functionality). If a virtual TOE evaluated as a pND, following Case 2 vNDs as specified in Section 1.2, the VS is considered part of the TOE with only one vND instance for each physical hardware platform. The exception being where components of a distributed TOE run inside more than one virtual machine (VM) on a single VS. In Case 2 vND, no non-TOE guest VMs are allowed on the platform
A.NO_THRU_TRAFFIC_PROTECTION	A standard/generic Network Device does not provide any assurance regarding the protection of traffic that traverses it. The intent is for the Network Device to protect data that originates on or is destined to the device itself, to include administrative data and audit data. Traffic that is traversing the Network Device, destined for another network entity, is not covered by the ND cPP. It is assumed that this protection will be covered by cPPs and PP-Modules for particular types of Network Devices (e.g., firewall).

ID	Assumption
A.TRUSTED_ADMINISTRATOR	The Security Administrator(s) for the Network Device are assumed to be trusted and to act in the best interest of security for the organization. This includes appropriately trained, following policy, and adhering to guidance documentation. Administrators are trusted to ensure passwords/credentials have sufficient strength and entropy and to lack malicious intent when administering the device. The Network Device is not expected to be capable of defending against a malicious Administrator that actively works to bypass or compromise the security of the device. For TOEs supporting X.509v3 certificate-based authentication, the Security Administrator(s) are expected to fully validate (e.g. offline verification) any CA certificate (root CA certificate or intermediate CA certificate) loaded into the TOE's trust store (aka 'root store', ' trusted CA Key Store', or similar) as a trust anchor prior to use (e.g. offline verification).
A.REGULAR_UPDATES	The Network Device firmware and software is assumed to be updated by an Administrator on a regular basis in response to the release of product updates due to known vulnerabilities.
A.ADMIN_CREDENTIALS_SECURE	The Administrator's credentials (private key) used to access the Network Device are protected by the platform on which they reside
A.RESIDUAL_INFORMATION	The Administrator must ensure 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.
A.VS_TRUSTED_ADMINISTRATOR	The Security Administrators for the VS are assumed to be trusted and to act in the best interest of security for the organization. This includes not interfering with the correct operation of the device. The Network Device is not expected to be capable of defending against a malicious VS Administrator that actively works to bypass or compromise the security of the device.
A.VS_REGULAR_UPDATES	The VS software is assumed to be updated by the VS Administrator on a regular basis in response to the release of product updates due to known vulnerabilities.
A.VS_ISOLATION	For vNDs, it is assumed that the VS provides, and is configured to provide sufficient isolation between software running in VMs on the same physical platform. Furthermore, it is assumed that the VS adequately protects itself from software running inside VMs on the same physical platform.

ID	Assumption
A.VS_CORRECT_CONFIGURATION	For vNDs, it is assumed that the VS and VMs are correctly configured to support ND functionality implemented in VMs.

3.3 Organizational Security Policies

The OSPs included in Table 9 are drawn directly from the PP and any relevant EPs/Modules/Packages.

Table 9 – OSPs

ID	OSP
P.ACCESS_BANNER	The TOE shall display an initial banner describing restrictions of use, legal agreements, or any other appropriate information to which Administrators consent by accessing the TOE.

4 Security Objectives

The security objectives have been taken directly from the claimed PP and any relevant EPs/Modules/Packages and are reproduced here for the convenience of the reader.

4.1 Security Objectives for the TOE

CPP_ND_V3.0e does not define any security objectives that apply to the TOE.

4.2 Security Objectives for the Operational Environment

Security objectives for the operational environment assist the TOE in correctly providing its security functionality. These objectives, which are found in the table below, track with the assumptions about the TOE operational environment.

Table 10 – Security Objectives for the Operational Environment

ID	Objectives for the Operational Environment
OE.PHYSICAL	Physical security, commensurate with the value of the TOE and the data it contains, is provided by the 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. Note: For vNDs the TOE includes only the contents of the its own VM, and does not include other VMs or the VS.
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.
OE.TRUSTED_ADMIN	Security Administrators are trusted to follow and apply all guidance documentation in a trusted manner. For vNDs, this includes the VS Administrator responsible for configuring the VMs that implement ND functionality. For TOEs supporting X.509v3 certificate-based authentication, the Security Administrator(s) are assumed to monitor the revocation status of all certificates in the TOE's trust store and to remove any certificate from the TOE's trust store in case such certificate can no longer be trusted.
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.
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.

ID	Objectives for the Operational Environment
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. For vNDs, this applies when the physical platform on which the VM runs is removed from its operational environment.
OE.VM_CONFIGURATION	For vNDs, the Security Administrator ensures that the VS and VMs are configured to • Reduce the attack surface of VMs as much as possible while supporting ND functionality (e.g., remove unnecessary virtual hardware, turn off unused inter-VM communications mechanisms), and • Correctly implement ND functionality (e.g., ensure virtual networking is properly configured to support network traffic, management channels, and audit reporting). The VS should be operated in a manner that reduces the likelihood that vND operations are adversely affected by virtualisation features such as cloning, save/restore, suspend/resume, and live migration. cPP_ND_v3.0e, 06-Dec-2023 47 If possible, the VS should be configured to make use of features that leverage the VS's privileged position to provide additional security functionality. Such features could include malware detection through VM introspection, measured VM boot, or VM snapshot for forensic analysis.

5 Security Requirements

This section identifies the Security Functional Requirements (SFRs) for the TOE. The SFRs included in this section are derived from Part 2 of the Common Criteria for Information Technology Security Evaluation, Version 3.1, Revisions 5, April 2017, and all international interpretations.

Table 11 – SFRs

Requirement	Description
FAU_GEN.1	Audit Data Generation
FAU_GEN.2	User Identity Association
FAU_STG.1	Protected Audit Trail Storage
FAU_STG_EXT.1	Protected Audit Event Storage
FCS_CKM.1	Cryptographic Key Generation
FCS_CKM.2	Cryptographic Key Establishment
FCS_CKM.4	Cryptographic Key Destruction
FCS_COP.1/DataEncryption	Cryptographic Operation (AES Data Encryption/Decryption)
FCS_COP.1/SigGen	Cryptographic Operation (Signature Generation and Verification)
FCS_COP.1/Hash	Cryptographic Operation (Hash Algorithm)
FCS_COP.1/KeyedHash	Cryptographic Operation (Keyed Hash Algorithm)
FCS_HTTPS_EXT.1	HTTPS Protocol
FCS_RBG_EXT.1	Random Bit Generation
FCS_TLSC_EXT.1	TLS Client Protocol
FCS_TLSC_EXT.2	TLS Client Support for Mutual Authentication
FCS_TLSS_EXT.1	TLS Server Protocol
FIA_AFL.1	Authentication Failure Management
FIA_PMG_EXT.1	Password Management
FIA_UIA_EXT.1	User Identification and Authentication
FIA_UAU.7	Protected Authentication Feedback
FIA_X509_EXT.1/Rev	X.509 Certificate Validation
FIA_X509_EXT.2	X.509 Certificate Authentication
FIA_X509_EXT.3	X.509 Certificate Requests
FMT_MOF.1/Functions	Management of Security Functions Behaviour
FMT_MOF.1/ManualUpdate	Management of Security Functions Behaviour
FMT_MTD.1/CoreData	Management of TSF Data
FMT_MTD.1/CryptoKeys	Management of TSF Data
FMT_SMF.1	Specification of Management Functions
FMT_SMR.2	Restrictions on security roles
FPT_SKP_EXT.1	Protection of TSF Data (for reading of all symmetric)
FPT_APW_EXT.1	Protection of Administrator Passwords
FPT_TST_EXT.1	TSF Testing

Requirement	Description
FPT_STM_EXT.1	Reliable Time Stamps
FPT_TUD_EXT.1	Trusted Update
FTA_SSL.3	TSF-initiated Termination
FTA_SSL.4	User-initiated Termination
FTA_SSL_EXT.1	TSF-initiated Session Locking
FTA_TAB.1	Default TOE Access Banner
FTP_ITC.1	Inter-TSF Trusted Channel
FTP_TRP.1/Admin	Trusted Path

5.1 Conventions

The CC allows the following types of operations to be performed on the functional requirements: assignments, selections, refinements, and iterations. The following font conventions are used within this document to identify operations defined by CC and are applied only to the operations that are available by the PP:

- Assignment: Indicated with *italicized* text;
- Refinement: Indicated with **bold** text and ~~strikethroughs~~;
- Selection: Indicated with underlined text;
- Iteration: Indicated by appending the iteration identifier after a slash, e.g., /SigGen.
- Where operations were completed in the PP and relevant EPs/Modules/Packages/Technical Decisions, the formatting used in the PP has been retained.
- Extended SFRs are identified by the addition of "EXT" after the requirement name.

5.2 Security Functional Requirements

This section includes the security functional requirements for this ST.

5.2.1 Security Audit (FAU)

5.2.1.1 FAU_GEN.1 Audit Data Generation

FAU_GEN.1.1

The TSF shall be able to generate an audit record of the following auditable events:

a) Start-up and shut-down of the audit functions;

b) All auditable events for the not specified level of audit; and

c) *All administrative actions comprising:*

- *Administrative login and logout (name of Administrator shall be logged if individual user accounts are required for Administrators).*
- *Changes to TSF data related to configuration changes (in addition to the information that a change occurred it shall be logged what has been changed).*
- *Generating/import of, changing, or deleting of cryptographic keys (in addition to the action itself a unique key name or key reference shall be logged).*
- *[Resetting passwords (name of related Administrator account shall be logged)];*

d) *Specifically defined auditable events listed in **Table 12**.*

FAU_GEN.1.2

The TSF shall record within each audit record at least the following information:

a) Date and time of the event, type of event, subject identity ~~(if applicable)~~, and the outcome (success or failure) of the event; and

b) For each audit event type, based on the auditable event definitions of the functional components included in the cPP/ST, *information specified in column three of* ***Table 12***.

Table 12 – Security Functional Requirements and Auditable Events

Requirement	Auditable Events	Additional Audit Record Contents
FAU_GEN.1	None.	None.
FAU_GEN.2	None.	None.
FAU_STG.1	None	None
FAU_STG_EXT.1	Configuration of local audit settings.	Identity of account making changes to the audit configuration.
FCS_CKM.1	None.	None.
FCS_CKM.2	None.	None.
FCS_CKM.4	None.	None.
FCS_COP.1/DataEncryption	None.	None.
FCS_COP.1/SigGen	None.	None.
FCS_COP.1/Hash	None.	None.
FCS_COP.1/KeyedHash	None.	None.
FCS_HTTPS_EXT.1	Failure to establish a HTTPS Session.	Reason for failure
FCS_RBG_EXT.1	None	None
FCS_TLSC_EXT.1	Failure to establish a TLS Session	Reason for failure
FCS_TLSC_EXT.2	None	None
FCS_TLSS_EXT.1	Failure to establish a TLS Session	Reason for failure
FIA_AFL.1	Unsuccessful login attempts limit is met or exceeded.	Origin of the attempt (e.g., IP address).
FIA_PMG_EXT.1	None.	None.
FIA_UIA_EXT.1	All use of identification and authentication mechanism.	Origin of the attempt (e.g., IP address).
FIA_UAU.7	None.	None.
FIA_X509_EXT.1/Rev	• Unsuccessful attempt to validate a certificate • Any addition, replacement or removal of trust anchors in the TOE's trust store	• Reason for failure of certificate validation • Identification of certificates added, replaced or removed as trust anchor in the TOE's trust store
FIA_X509_EXT.2	None	None
FIA_X509_EXT.3	None.	None.
FMT_MOF.1/Functions	None.	None.

Requirement	Auditable Events	Additional Audit Record Contents
FMT_MOF.1/ManualUpdate	Any attempt to initiate a manual update	None.
FMT_MTD.1/CoreData	None.	None.
FMT_MTD.1/CryptoKeys	None.	None.
FMT_SMF.1	All management activities of TSF data.	None
FMT_SMR.2	None.	None.
FPT_SKP_EXT.1	None.	None.
FPT_APW_EXT.1	None.	None.
FPT_TST_EXT.1	None.	None.
FPT_STM_EXT.1	Discontinuous changes to time - either Administrator actuated or changed via an automated process	For discontinuous changes to time: The old and new values for the time. Origin of the attempt to change time for success and failure (e.g., IP address).
FPT_TUD_EXT.1	Initiation of update; result of the update attempt (success or failure)	None.
FTA_SSL.3	The termination of a remote session by the session locking mechanism.	None.
FTA_SSL.4	The termination of an interactive session.	None.
FTA_SSL_EXT.1 (if “terminate the session” is selected)	The termination of a local session by the session lock	None.
FTA_TAB.1	None.	None.
FTP_ITC.1	• Initiation of the trusted channel. • Termination of the trusted channel. • Failure of the trusted channel functions.	• None • None • Reason for failure
FTP_TRP.1/Admin	• Initiation of the trusted path. • Termination of the trusted path. • Failure of the trusted path functions.	• None • None • Reason for failure

5.2.1.2 FAU_GEN.2 User Identity Association

FAU_GEN.2.1

For audit events resulting from actions of identified users, the TSF shall be able to associate each auditable event with the identity of the user that caused the event.

5.2.1.3 FAU_STG.1 Protected Audit Trail Storage

FAU_STG.1.1
The TSF shall protect the stored audit records in the audit trail from unauthorized deletion.

FAU_STG.1.2
The TSF shall be able to prevent unauthorised modifications to the stored audit records in the audit trail.

5.2.1.4 FAU_STG_EXT.1 Protected Audit Event Storage

FAU_STG_EXT.1.1
The TSF shall be able to transmit the generated audit data to an external IT entity using a trusted channel according to FTP_ITC.1.

FAU_STG_EXT.1.2
The TSF shall be able to store generated audit data on the TOE itself. In addition [

- *The TOE shall consist of a single standalone component that stores audit data locally*

].

FAU_STG_EXT.1.3

The TSF shall maintain a [*log file*] of audit records in the event that an interruption of communication with the remote audit server occurs.

FAU_STG_EXT.1.4

The TSF shall be able to store [*persistent*] audit records locally with a minimum storage size of [*1 MB*].

FAU_STG_EXT.1.5

The TSF shall [*overwrite previous audit records according to the following rule: [the oldest log file is overwritten by the new log file]*] when the local storage space for audit data is full.

FAU_STG_EXT.1.6

The TSF shall provide the following mechanisms for administrative access to locally stored audit records [*manual export, ability to view locally*].

Application Note: TD0886 has been applied.

5.2.2 Cryptographic Support (FCS)

5.2.2.1 FCS_CKM.1 Cryptographic Key Generation

FCS_CKM.1.1
The TSF shall generate **asymmetric** cryptographic key in accordance with a specified cryptographic key generation algorithm: [

- *RSA schemes using cryptographic key sizes of [2048 bits, 3072 bits, 4096 bits] that meet the following: FIPS PUB 186-4, "Digital Signature Standard (DSS)", Appendix B.3 or FIPS PUB 186-5, "Digital Signature Standard (DSS)", A.1;*
- *ECC schemes using 'NIST curves' [P-256, P-384, P-521] that meet the following: FIPS PUB 186-4, "Digital Signature Standard (DSS)", Appendix B.4, or FIPS PUB 186-5, "Digital Signature Standard (DSS)", Appendix A.2, or ISO/IEC 14888-3, "IT Security techniques - Digital signatures with appendix - Part 3: Discrete logarithm based mechanisms", Section 6.6.*

] ~~and specified cryptographic key sizes [assignment: *cryptographic key sizes*] that meet the following: [assignment: *list of standards*].~~

Application Note: This SFR has been updated as per TD0918.

5.2.2.2 FCS_CKM.2 Cryptographic Key Establishment

FCS_CKM.2.1
The TSF shall **perform** cryptographic **key establishment** in accordance with a specified cryptographic key **establishment** method: [

- *RSA-based key establishment schemes that meet the following: RSAES-PKCS1-v1_5 as specified in Section 7.2 of RFC 3447, 8017, “Public-Key Cryptography Standards (PKCS) #1: RSA Cryptography Specifications Version 2.2”;*
- *Elliptic curve-based key establishment schemes that meet the following: NIST Special Publication 800-56A Revision* 3, *“Recommendation for Pair-Wise Key Establishment Schemes Using Discrete Logarithm Cryptography”*

] ~~that meets the following: [assignment: list of standards].~~

5.2.2.3 FCS_CKM.4 Cryptographic Key Destruction

FCS_CKM.4.1
The TSF shall destroy cryptographic keys in accordance with a specified cryptographic key destruction method

- *For plaintext keys in volatile storage, the destruction shall be executed by a [single overwrite consisting of [zeroes]];*
- *For plaintext keys in non-volatile storage, the destruction shall be executed by the invocation of an interface provided by a part of the TSF that [*
    - *logically addresses the storage location of the key and performs a* [*[3]-pass*] *overwrite consisting of* [*a pseudorandom pattern using the TSF’s RBG*];

  ]

that meets the following: *No Standard*

5.2.2.4 FCS_COP.1/DataEncryption Cryptographic Operations (AES Data Encryption/Decryption)

FCS_COP.1.1/DataEncryption
The TSF shall perform *encryption/decryption* in accordance with a specified cryptographic algorithm *AES used in* [*CBC, GCM*] *mode* and cryptographic key sizes [*128 bits, 256 bits*] that meet the following: *AES as specified in ISO 18033-3,* [*CBC as specified in ISO 10116, GCM as specified in ISO 19772*].

5.2.2.5 FCS_COP.1/SigGen Cryptographic Operation (Signature Generation and Verification)

FCS_COP.1.1/SigGen
The TSF shall perform *cryptographic signature services (generation and verification)* in accordance with a specified cryptographic algorithm [

- *RSA Digital Signature Algorithm,*
- *Elliptic Curve Digital Signature Algorithm*

]

and cryptographic key sizes [

- *For RSA: modulus 2048 bits or greater*
- *For ECDSA: 256 bits or greater*

]
that meets the following: [

- *For RSA schemes: FIPS PUB 186-4, "Digital Signature Standard (DSS)", Section 5.5, using PKCS #1 v2.1 or FIPS PUB 186-5, "Digital Signature Standard (DSS)", Section 5.4 using PKCS #1 v2.2 Signature Schemes RSASSA-PSS and/or RSASSA-PKCS1v1_5; ISO/IEC 9796-2, Digital signature scheme 2 or Digital Signature scheme 3,*
- *For ECDSA schemes implementing [P-256, P-384, P-521] curves that meet the following: FIPS PUB 186-4, "Digital Signature Standard (DSS)", Section 6 and Appendix D, Implementing "NIST Recommended" curves; or FIPS PUB 186-5, "Digital Signature Standard (DSS)", Section 6 and NIST SP 800-186 Section 3.2.1, Implementing Weierstrass curves; or ISO/IEC 14888-3, "IT Security techniques - Digital signatures with appendix - Part 3: Discrete logarithm based mechanisms", Section 6.6.*

].

Application Note: This SFR has been updated as per TD0918.

5.2.2.6 FCS_COP.1/Hash Cryptographic Operations (Hash Algorithm)

FCS_COP.1.1/Hash
The TSF shall perform *cryptographic hashing services* in accordance with a specified cryptographic algorithm [*SHA-1, SHA-256, SHA-384, SHA-512*] ~~and cryptographic key sizes [*assignment: cryptographic key sizes*~~] and **message digest sizes [*160, 256, 384, 512*] bits** that meet the following: *ISO/IEC 10118-3:2004*.

5.2.2.7 FCS_COP.1/KeyedHash Cryptographic Operation (Keyed Hash Algorithm)

FCS_COP.1.1/KeyedHash
The TSF shall perform *keyed-hash message authentication* in accordance with a specified cryptographic algorithm [*HMAC-SHA-1, HMAC-SHA-256, HMAC-SHA-384*] and cryptographic key sizes *[160 bits, 256 bits, 384 bits used in HMAC]* **and message digest sizes [*160, 256, 384*] bits** that meet the following: *ISO/IEC 9797-2:2011, Section 7 "MAC Algorithm 2"*.

5.2.2.8 FCS_HTTPS_EXT.1 HTTPS Protocol

FCS_HTTPS_EXT.1.1
The TSF shall implement the HTTPS protocol that complies with RFC 2818.

FCS_HTTPS_EXT.1.2
The TSF shall implement the HTTPS ~~protocol~~ using TLS.

5.2.2.9 FCS_RBG_EXT.1 Random Bit Generation

FCS_RBG_EXT.1.1
The TSF shall perform all deterministic random bit generation services in accordance with ISO/IEC 18031:2011 using [*CTR_DRBG (AES)*].

FCS_RBG_EXT.1.2
The deterministic RBG shall be seeded by at least one entropy source that accumulates entropy from [*[3] software-based noise source*] with a minimum of [*256 bits*] of entropy at least equal to the greatest

security strength, according to ISO/IEC 18031:2011 Table C.1 “Security Strength Table for Hash Functions”, of the keys and hashes that it will generate.

5.2.2.10 FCS_TLSC_EXT.1 TLS Client Protocol

FCS_TLSC_EXT.1.1
The TSF shall implement [TLS 1.3 (RFC 8446), TLS 1.2 (RFC 5246)] supporting the following ciphersuites:

[

- TLS_RSA_WITH_AES_128_CBC_SHA as defined in RFC 3268
- TLS_RSA_WITH_AES_256_CBC_SHA as defined in RFC 3268
- TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA as defined in RFC 8422
- TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA as defined in RFC 8422
- TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA as defined in RFC 8422
- TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA as defined in RFC 8422
- TLS_RSA_WITH_AES_128_CBC_SHA256 as defined in RFC 5246
- TLS_RSA_WITH_AES_256_CBC_SHA256 as defined in RFC 5246
- TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256 as defined in RFC 5289
- TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384 as defined in RFC 5289
- TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 as defined in RFC 5289
- TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 as defined in RFC 5289
- TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 as defined in RFC 5289
- TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 as defined in RFC 5289
- TLS_AES_128_GCM_SHA256
- TLS_AES_256_GCM_SHA384

] and no other ciphersuites.

FCS_TLSC_EXT.1.2
The TSF shall verify that the presented identifier matches [*the reference identifier per RFC 6125 Section 6, IPv4 address in the CN or in the SAN*].

FCS_TLSC_EXT.1.3
The TSF shall not establish a trusted channel if the server certificate is invalid [

- *without any administrator override mechanism*

].

FCS_TLSC_EXT.1.4
The TSF shall [*present the Supported Groups Extension with the following curves/groups: [secp256r1, secp384r1, secp521r1] and no other curves/groups*] in the Client Hello.

FCS_TLSC_EXT.1.5
The TSF shall [

- *present the signature algorithms extension with support for the following algorithms: [*
  - *rsa_pkcs1 with sha256(0x0401),*
  - *rsa_pkcs1with sha384(0x0501),*
  - *rsa_pkcs1 with sha512(0x0601),*
  - *ecdsa_secp256r1 with sha256(0x0403),*
  - *ecdsa_secp384r1 with sha384(0x0503),*
  - *ecdsa_secp521r1 with sha512(0x0603)*

- *] and no other algorithms;*

].

FCS_TLSC_EXT.1.6
The TSF [*provides*] the ability to configure the list of supported ciphersuites as defined in FCS_TLSC_EXT.1.1.

FCS_TLSC_EXT.1.7
The TSF shall prohibit the use of the following extensions:

- Early data extension
- Post-handshake client authentication according to RFC 8446, Section 4.2.6.

FCS_TLSC_EXT.1.8
The TSF shall [*not use PSKs*].

FCS_TLSC_EXT.1.9
The TSF shall [*reject [TLS 1.2, TLS 1.3] renegotiation attempts*].

5.2.2.11 FCS_TLSC_EXT.2 TLS Client Support for Mutual Authentication

FCS_TLSC_EXT.2.1
The TSF shall support TLS communication with mutual authentication using X.509v3 certificates.

5.2.2.12 FCS_TLSS_EXT.1 TLS Sever Protocol

FCS_TLSS_EXT.1.1
The TSF shall implement [*TLS 1.3 (RFC 8446), TLS 1.2 (RFC 5246)*] and reject all other TLS and SSL versions. The TLS implementation will support the following ciphersuites:

[

- TLS_RSA_WITH_AES_128_CBC_SHA as defined in RFC 3268
- TLS_RSA_WITH_AES_256_CBC_SHA as defined in RFC 3268
- TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA as defined in RFC 8422
- TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA as defined in RFC 8422
- TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA as defined in RFC 8422
- TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA as defined in RFC 8422
- TLS_RSA_WITH_AES_128_CBC_SHA256 as defined in RFC 5246
- TLS_RSA_WITH_AES_256_CBC_SHA256 as defined in RFC 5246
- TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256 as defined in RFC 5289
- TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384 as defined in RFC 5289
- TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 as defined in RFC 5289
- TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 as defined in RFC 5289
- TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 as defined in RFC 5289
- TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 as defined in RFC 5289
- TLS_AES_128_GCM_SHA256
- TLS_AES_256_GCM_SHA384

] and no other ciphersuites.

FCS_TLSS_EXT.1.2
The TSF shall authenticate itself using X.509 certificate(s) using [*RSA with key size [2048, 3072, 4096] bits; ECDSA over NIST curves [secp256r1, secp384r1, secp521r1] and no other curves*].

FCS_TLSS_EXT.1.3
The TSF shall perform key exchange using: [

- *RSA key establishment with key size [2048, 3072, 4096] bits;*
- *EC Diffie-Hellman key agreement over NIST curves [secp256r1, secp384r1, secp521r1] and no other curves*

].

FCS_TLSS_EXT.1.4
The TSF shall support [*no session resumption*].

FCS_TLSS_EXT.1.5
The TSF [*provides*] the ability to configure the list of supported ciphersuites as defined in FCS_TLSS_EXT.1.1.

FCS_TLSS_EXT.1.6
The TSF shall prohibit the use of the following extensions:

- Early data extension

FCS_TLSS_EXT.1.7
The TSF shall [*not use PSKs*]

FCS_TLSS_EXT.1.8
The TSF shall [*reject [TLS 1.2, TLS 1.3] renegotiation attempts*].

5.2.3 Identification and Authentication (FIA)

5.2.3.1 FIA_AFL.1 Authentication Failure Management

FIA_AFL.1.1
The TSF shall detect when an Administrator configurable positive integer within *[3 to 10]* unsuccessful authentication attempts occur related to *Administrators attempting to authenticate remotely using a password*.

FIA_AFL.1.2
When the defined number of unsuccessful authentication attempts has been met, the TSF shall [*prevent the offending Administrator from successfully establishing a remote session using any authentication method that involves a password until an Administrator defined time period has elapsed].*

5.2.3.2 FIA_PMG_EXT.1 Password Management

FIA_PMG_EXT.1.1
The TSF shall provide the following password management capabilities for administrative passwords:

a. Passwords shall be able to be composed of any combination of upper and lower case letters, numbers, and the following special characters: [*“!”, “@”, “#”, “$”, “%”, “^”, “&”, “*”, “(“, “)”*]

b. Minimum password length shall be configurable to between [*10*] and [*15*] characters.

5.2.3.3 FIA_UIA_EXT.1 User Identification and Authentication

FIA_UIA_EXT.1.1
The TSF shall allow the following actions prior to requiring the non-TOE entity to initiate the identification and authentication process:

- Display the warning banner in accordance with FTA_TAB.1;
- [*[Respond to ICMP Echo messages with an ICMP Echo Reply message]*].

FIA_UIA_EXT.1.2
The TSF shall require each administrative user to be successfully identified and authenticated before allowing any other TSF-mediated actions on behalf of that administrative user.

FIA_UIA_EXT.1.3
The TSF shall provide the following remote authentication mechanisms [*Web GUI password*] and [*no other mechanism*]. The TSF shall provide the following local authentication mechanisms [*password-based*].

Application Note: This SFR has been updated as per TD0900.

FIA_UIA_EXT.1.4
The TSF shall authenticate any administrative user's claimed identity according to each authentication mechanism specified in FIA_UIA_EXT.1.3.

5.2.3.4 FIA_UAU.7 Protected Authentication Feedback

FIA_UAU.7
The TSF shall provide only *obscured feedback* to the **administrative** user while the authentication is in progress **at the local console**.

5.2.3.5 FIA_X509_EXT.1/Rev X.509 Certificate Validation

FIA_X509_EXT.1.1/Rev
The TSF shall validate certificates in accordance with the following rules:

- RFC 5280 certificate validation and certification path validation **supporting a minimum path length of three certificates** .
- The certification path must terminate with a trusted CA certificate designated as a trust anchor.
- The TSF shall validate a certification path by ensuring that all CA certificates in the certification path contain the basicConstraints extension with the CA flag set to TRUE.
- The TSF shall validate the revocation status of the certificate using [*a Certificate Revocation List (CRL) as specified in RFC 5280 Section 6.3*]
- The TSF shall validate the extendedKeyUsage field according to the following rules:
  - *Certificates used for trusted updates and executable code integrity verification shall have the Code Signing purpose (id-kp 3 with OID 1.3.6.1.5.5.7.3.3) in the extendedKeyUsage field.*
  - *Server certificates presented for DTLS/TLS shall have the Server Authentication purpose (id-kp 1 with OID 1.3.6.1.5.5.7.3.1) in the extendedKeyUsage field.*
  - *Client certificates presented for DTLS/TLS shall have the Client Authentication purpose (id-kp 2 with OID 1.3.6.1.5.5.7.3.2) in the extendedKeyUsagefield.*
  - *OCSP certificates presented for OCSP responses shall have the OCSP Signing purpose (id-kp 9 with OID 1.3.6.1.5.5.7.3.9) in the extendedKeyUsage field.*

FIA_X509_EXT.1.2/Rev
The TSF shall only treat a certificate as a CA certificate if the basicConstraints extension is present and the CA flag is set to TRUE.

5.2.3.6 FIA_X509_EXT.2 X.509 Certificate Authentication

FIA_X509_EXT.2.1
The TSF shall use X.509v3 certificates as defined by RFC 5280 to support authentication for [*HTTPS, TLS*] and [*no additional uses*].

FIA_X509_EXT.2.2
When the TSF cannot establish a connection to determine the validity of a certificate, the TSF shall [*accept the certificate*].

5.2.3.7 FIA_X509_EXT.3 X.509 Certificate Requests

FIA_X509_EXT.3.1
The TSF shall generate a Certificate Request as specified by RFC 2986 and be able to provide the following information in the request: public key and [*Common Name, Organization, Organizational Unit, Country*].

FIA_X509_EXT.3.2
The TSF shall validate the chain of certificates from the Root CA upon receiving the CA Certificate Response.

5.2.4 Security Management (FMT)

5.2.4.1 FMT_MOF.1/Functions Management of Security Functions Behaviour.

FMT_MOF.1.1/Functions
The TSF shall restrict the ability to [*modify the behaviour of*] the functions [*transmission of audit data to an external IT entity, handling of audit data*] to *Security Administrators*.

5.2.4.2 FMT_MOF.1/ManualUpdate Management of Security Functions Behavior

FMT_MOF.1.1/ManualUpdate
The TSF shall restrict the ability to enable the function *to perform manual updates* to *Security Administrators.*

5.2.4.3 FMT_MTD.1/CoreData Management of TSF Data

FMT_MTD.1.1/CoreData
The TSF shall restrict the ability to *manage* the *TSF data* to *Security Administrators.*

5.2.4.4 FMT_MTD.1/CryptoKeys Management of TSF Data

FMT_MTD.1.1/CryptoKeys
The TSF shall restrict the ability to *manage* the *cryptographic keys* to *Security Administrators*.

5.2.4.5 FMT_SMF.1 Specification of Management Functions

FMT_SMF.1.1
The TSF shall be capable of performing the following management functions:

- *Ability to administer the TOE remotely;*

- *Ability to configure the access banner;*
- *Ability to configure the remote session inactivity time before session termination;*
- *Ability to update the TOE, and to verify the updates using* digital signature *capability prior to installing those updates;*
- [
    - *Ability to configure local audit behaviour (e.g. changes to storage locations for audit; changes to behaviour when local audit storage space is full; changes to local audit storage size);*
    - *Ability to modify the behaviour of the transmission of audit data to an external IT entity;*
    - *Ability to manage the cryptographic keys;*
    - *Ability to configure the cryptographic functionality;*
    - *Ability to set the time which is used for time-stamps;*
    - *Ability to manage the TOE's trust store and designate X509.v3 certificates as trust anchors;*
    - *Ability to generate Certificate Signing Request (CSR) and process CA certificate response;*
    - *Ability to administer the TOE locally;*
    - *Ability to configure the local session inactivity time before session termination or locking;*
    - *Ability to configure the authentication failure parameters for FIA_AFL.1;*

    ].

Application Note: This SFR has been updated as per TD0880.

5.2.4.6 FMT_SMR.2 Restrictions on Security Roles

FMT_SMR.2.1
The TSF shall maintain the roles:

- *Security Administrator*

FMT_SMR.2.2
The TSF shall be able to associate users with roles.

FMT_SMR.2.3
The TSF shall ensure that the conditions

- *The Security Administrator role shall be able to administer the TOE remotely*

are satisfied.

5.2.5 Protection of the TSF (FPT)

5.2.5.1 FPT_APW_EXT.1 Protection of Administrator Passwords

FPT_APW_EXT.1.1
The TSF shall store administrative passwords in non-plaintext form.

FPT_APW_EXT.1.2
The TSF shall prevent the reading of plaintext administrative passwords.

5.2.5.2 FPT_SKP_EXT.1 Protection of TSF Data (for reading of all symmetric keys)

FPT_SKP_EXT.1.1
The TSF shall prevent reading of all pre-shared keys, symmetric keys, and private keys.

5.2.5.3 FPT_STM_EXT.1 Reliable Time Stamps

FPT_STM_EXT.1.1
The TSF shall be able to provide reliable time stamps for its own use.

FPT_STM_EXT.1.2
The TSF shall [*allow the Security Administrator to set the time*].

5.2.5.4 FPT_TST_EXT.1 TSF Testing

FPT_TST_EXT.1.1
The TSF shall run a suite of the following self-tests [

- *During initial start-up (on power on) to verify the integrity of the TOE firmware and software;*
- *Prior to providing any cryptographic service and [at no other time] to verify correct operation of cryptographic implementation necessary to fulfil the TSF;*
- [no other] *self-tests*

to demonstrate the correct operation of the TSF.

Application Note: This SFR has been updated as per TD0836.

FPT_TST_EXT.1.2
The TSF shall respond to [*[Integrity check failure, Cryptographic failure*]] *by [[for an integrity check failure, the device lets the admin choose to stop or continue booting, for a FIPS cryptographic failure, the device will not boot*]].

5.2.5.5 FPT_TUD_EXT.1 Trusted Update

FPT_TUD_EXT.1.1
The TSF shall provide *Security Administrators* the ability to query the currently executing version of the TOE firmware/software and [*no other TOE firmware/software version*].

FPT_TUD_EXT.1.2
The TSF shall provide *Security Administrators* the ability to manually initiate updates to TOE firmware/software and [*no other update mechanism*].

FPT_TUD_EXT.1.3
The TSF shall provide means to authenticate firmware/software updates to the TOE using a [*digital signature*] prior to installing those updates.

5.2.6 TOE Access (FTA)

5.2.6.1 FTA_SSL_EXT.1 TSF-initiated Session Locking

FTA_SSL_EXT.1.1
The TSF Shall, for local interactive sessions, [

- *terminate the session*]

after a Security Administrator-specified time period of inactivity

5.2.6.2 FTA_SSL.3 TSF-initiated Termination

FTA_SSL.3.1
The TSF shall terminate **a remote** interactive session after a *Security Administrator-configurable time interval of session inactivity.*

5.2.6.3 FTA_SSL.4 User-initiated Termination

FTA_SSL.4.1
The TSF shall allow ~~user~~ **Administrator**-initiated termination of the ~~user's~~ **Administrator's** own interactive session.

5.2.6.4 FTA_TAB.1 Default TOE Access Banners

FTA_TAB.1.1
Before establishing ~~a~~ **an administrative** user session the TSF shall display **a Security Administrator-specified** advisory **notice and consent** warning message regarding ~~unauthorised~~ use of the TOE.

5.2.7 Trusted Path/Channels (FTP)

5.2.7.1 FTP_ITC.1 Inter-TSF Trusted Channel

FTP_ITC.1.1
The TSF shall **be capable of using [*TLS*] to** provide a **trusted** communication channel between itself and ~~another trusted IT product~~ **authorized IT entities supporting the following capabilities: audit server, [*no other capabilities*]** that is logically distinct from other communication channels and provides assured identification of its end points and protection of the channel data from ~~modification or~~ disclosure **and detection of modification of the channel data**.

FTP_ITC.1.2
The TSF shall permit [*the TSF*] to initiate communication via the trusted channel.

FTP_ITC.1.3
The TSF shall initiate communication via the trusted channel for *[**audit server communications**]*.

5.2.7.2 FTP_TRP.1/Admin Trusted Path

FTP_TRP.1.1/Admin
The TSF shall **be capable of using [*TLS, HTTPS*] to** provide a communication path between itself and **authorized** remote **Administrators** ~~users~~ that is logically distinct from other communication paths and provides assured identification of its end points and protection of the communicated data from disclosure **and provides detection of modification of the channel data**.

FTP_TRP.1.2/Admin
The TSF shall permit remote **Administrators** ~~users~~ to initiate communication via the trusted path.

FTP_TRP.1.3/Admin
The TSF shall require the use of the trusted path for *initial Administrator authentication and all remote administration actions*.

5.3 TOE SFR Dependencies Rationale for SFRs

The PP and any relevant EPs/Modules/Packages contain(s) all the requirements claimed in this ST. As such, the dependencies are not applicable since the PP has been approved.

5.4 Security Assurance Requirements

The TOE assurance requirements for this ST are taken directly from the PP and any relevant EPs/Modules/Packages, which is/are derived from Common Criteria Version 3.1, Revision 5. The assurance requirements are summarized in Table 13.

Table 13 – Security Assurance Requirements

Assurance Class	Assurance Components	Component Description
Security Target	ASE_CCL.1	Conformance claims
	ASE_ECD.1	Extended components definition
	ASE_INT.1	ST introduction
	ASE_OBJ.1	Security objectives for the operational environment
	ASE_REQ.1	Stated security requirements
	ASE_SPD.1	Security problem definition
	ASE_TSS.1	TOE Summary Specification
Development	ADV_FSP.1	Basic functionality specification
Guidance Documents	AGD_OPE.1	Operational user guidance
	AGD_PRE.1	Preparative Procedures
Life Cycle Support	ALC_CMC.1	Labelling of the TOE
	ALC_CMS.1	TOE CM coverage
Tests	ATE_IND.1	Independent testing – conformance
Vulnerability Assessment	AVA_VAN.1	Vulnerability survey

5.5 Assurance Measures

The TOE satisfied the identified assurance requirements. This section identifies the Assurance Measures applied by Ivanti to satisfy the assurance requirements. The following table lists the details.

Table 14 – TOE Security Assurance Measures

SAR Component	How the SAR will be met
ADV_FSP.1	The functional specification describes the external interfaces of the TOE; such as the means for a user to invoke a service and the corresponding response of those services. The description includes the interface(s) that enforces a security functional requirement, the interface(s) that supports the enforcement of a security functional requirement, and the interface(s) that does not enforce any security functional requirements. The interfaces are described in terms of their purpose (general goal of the interface), method of use (how the interface is to be used), parameters (explicit inputs to and outputs from an interface that control the behavior of that interface), parameter descriptions (tells what the parameter is in some meaningful way), and error messages (identifies the condition that generated it, what the message is, and the meaning of any error codes).

SAR Component	How the SAR will be met
AGD_OPE.1	The Administrative Guide provides the descriptions of the processes and procedures of how the administrative users of the TOE can securely administer the TOE using the interfaces that provide the features and functions detailed in the guidance.
AGD_PRE.1	The Installation Guide describes the installation, generation, and startup procedures so that the users of the TOE can put the components of the TOE in the evaluated configuration.
ALC_CMC.1	The Configuration Management (CM) documents describe how the consumer identifies the evaluated TOE. The CM documents identify the configuration items, how those configuration items are uniquely identified, and the adequacy of the procedures that are used to control and track changes that are made to the TOE. This includes details on what changes are tracked and how potential changes are incorporated.
ALC_CMS.1	
ATE_IND.1	Vendor will provide the TOE for testing.
AVA_VAN.1	Vendor will provide the TOE for testing. Vendor will provide a document identifying the list of software and hardware components.

6 TOE Summary Specification

This chapter identifies and describes how the Security Functional Requirements identified above are met by the TOE.

Table 15 – TOE Summary Specification SFR Description

Requirement	TSS Description
FAU_GEN.1 / FAU_GEN.2	The TSF generates audit records for the following administrative actions with the administrator role described in the TSS section of FMT_SMR.2: • Administrative login and logout events • Changes to TSF data related to configuration changes • Following cryptographic key operations with a unique key reference/identifier: ○ Generation of a CSR and associated keypair ○ Importing or deleting a certificate • Resetting passwords Additionally, the TSF generates audit records for the following events: • Startup and shutdown of the audit function • Low audit storage space available • Failure to establish a HTTPS/TLS session • Failure to establish a TLS session • Configuration of a new time server • Removal of configured time server • All use of the identification and authentication mechanism (local and remote connections to the TSF) • Unsuccessful attempts to validate a certificate • Initiation of a software update • Result of a software update • Changes to the time • Modification of the behavior of the TSF • Failure of self-tests • Initiation and termination of the trusted channel • Initiation and termination of the trusted path • Attempts to unlock an interactive session • Termination of a session by the session locking mechanism • 'Trust issue' with the certificate, e.g. due to failed path • validation • Use of an 'expired certificate' • Absence of basicConstraints extension • CA flag not set for a certificate presented as a CA • Signature validation failure for any certificate in the certificate path; failure to establish revocation status; revoked certificate Each audit record includes the date and time, type, subject identity (IP address, hostname, and/or username), the outcome (success or failure), and any additional information specified in column three of Table 12 or in SFR section FAU_GEN.1.1. Certificates are identified in the log by the Certificate CN. All generating/importing of changing or deleting of cryptographic keys relate to certificates. Public keys associated with certificates are identified by the certificate CN and the term key size.

Requirement	TSS Description
FAU_STG.1 / FAU_STG_EXT.1	The TOE is a standalone TOE. The TOE maintains three separate log files locally, namely Events, User Access, and Admin Access. By default, the TSF allocates 200 MB to each log file, but the administrator can configure the file size for each log file up to a maximum of 1024 MB for hardware platforms and 200 MB for virtual platforms. The TSF divides local audit storage between two audit files: active and inactive. During initial setup, only the active log file exists. When this file first reaches its capacity, the TSF creates an inactive log file, moves the existing audit records into it, and continues writing new logs to a refreshed active file. From that point on, whenever the active file reaches capacity, its contents are pushed to the inactive file, overwriting its previous contents, and the active file is refreshed to store new audit logs. An audit log entry is generated each time the active file reaches capacity. The TSF protects audit data from unauthorized modification and deletion through the restrictive administrative interfaces. While the file system is not directly exposed to the administrative user via the HTTPS GUI or local CLI, the administrator is provided with specific options within the GUI to clear audit logs or modify audit settings. These actions require the administrator to be positively identified and authenticated. The TSF implements Syslog over TLS using either TLS v1.2 or TLS v1.3. The TSF supports TLS with mutual authentication using X509v3 certificates to secure communications with the Syslog server. Logs are sent to the Syslog servers in real-time. The logs are also stored locally in case the connection to the remote syslog server cannot be established. The trusted channel with the Syslog server is described in greater detail in the FCS_TLSC_EXT.2 description. The TSF implements local logging by maintaining log files of audit records. The logs are stored in a persistent format, ensuring that audit records are preserved across reboots or power cycles. The minimum configurable storage size that can be allocated for each of the three log files is 1 MB.
FCS_CKM.1	The TSF supports the generation of RSA 2048 bit, 3072 bit, 4096 bit keys for TLS client authentication, TLS server authentication, and RSA key establishment meeting FIPS PUB 186-4 requirements. The also TSF generates ECDSA P-256, P-384 and P-521 keys for TLS client authentication, TLS server authentication, and TLS ECDHE key establishment meeting FIPS PUB 186-4 and FIPS PUB 186-5 requirements.
FCS_CKM.2	The TSF uses both elliptic curve-based and RSA-based key establishment in support of TLS. When the TOE is configured with a server certificate containing an RSA key, the TSF acts as the TLS server and employs RSA-based key establishment (RSAES-PKCS1-v1_5). When configured with a server certificate containing an ECDSA key, the TSF acts as the TLS server and utilizes the elliptic curve-based establishment scheme aligned with NIST SP 800-56A Rev. 3 For syslog server, The TSF acts as the client during communication with the Syslog server. The key establishment scheme selection depends on the negotiated TLS ciphersuite: • For ECDHE ciphersuites, the TSF utilizes ECDHE. • For other TLS ciphersuites, the TSF employs RSA-based key establishment.

Requirement	TSS Description
	See FCS_TLS* description below for more details.
FCS_CKM.4	The TSF stores the following persistent keys on internal Hard Disk Drives in plaintext: • HTTPS/TLS Private Host Key – generated using the DRBG and FCS_CKM.1 or entered by the Security Administrator. • Syslog/TLS Private Client Key – generated using the DRBG and FCS_CKM.1 or entered by the Security Administrator. The HTTPS/TLS Private Host Key and the Syslog/TLS Private Client key are zeroized from the disk when the Security Administrator deletes the key, replaces the key, or zeroizes the entire TOE. The TSF zeroizes the HTTPS/TLS Private Host Key and the Syslog/TLS Private Client key on the hard disk drives by overwriting the file location with data from /dev/random three times. Each overwrite calls /dev/random ensuring that a different pseudo random pattern is used each time. The TSF stores loads the persistent keys into RAM when they are used and the TSF also stores the following ephemeral keys in RAM: • TLS Session keys – Established according to FCS_CKM.2 and derived using the TLS KDF • DRBG State – Derived from the entropy source HTTPS/TLS keys are zeroized from RAM when the HTTP or Syslog process terminates. The TLS Session keys are zeroized from RAM when the associated TLS session is terminated. The DRBG state and all ephemeral keys are zeroized when the TSF is shutdown, suffers loss of power, or restarted. The TSF zeroizes keys in RAM by writing zeros to the memory location one time and performing a read verify to ensure that the memory location was set to all zeros. If the read verify fails, the TSF repeats the zeroization process. The above key destruction methods apply to all configurations and circumstances, except one. The only situation where the key destruction may be prevented would be if the system suffers a crash or loss of power. This situation only impacts the keys that are stored on the disk. Since the TOE is inaccessible in this situation, administrative zeroization cannot be performed. However, the TOE enables full disk encryption by default using a LUKS-based mechanism in both physical and virtual deployments. The disk is partitioned into Logical Volumes (LVM), and only applicable partitions are encrypted such as those containing customer data or persistent keys. For example, the boot partition is not encrypted because it is not part of the LVM structure. The encryption keys used for LVM partitions are stored within an encrypted coreboot.img, which itself resides in the unencrypted boot partition. The TOE does not store any keys in encrypted form; all keys are stored in plaintext in volatile memory.

Requirement	TSS Description
	For additional details on Cryptographic Key Destruction, please refer to Table 17 – Zeroization.
FCS_COP.1/DataEncryption	The TOE provides AES encryption/decryption in CBC and GCM modes with 128-bit and 256-bit keys.
FCS_COP.1/SigGen	The TOE supports signature generation and verification with RSA 2048 bit, 3072 bit and 4096 bit with SHA-1/256/384/512 in accordance with FIPS PUB 186-4 and FIPS PUB 186-5. The TOE also supports ECDSA with NIST curves P-256, P-384 and P-521 keys with SHA-1/256/384/512 in accordance with FIPS PUB 186-4 and FIPS PUB 186-5. These signatures support TLS authentication.
FCS_COP.1/Hash	The TOE provides cryptographic hashing services for key generation using SHA-256 as specified in NIST SP 800-90 DRBG. SHA-1, SHA-256, and SHA-384 are used in support of TLS. SHA-256 is used for each executable file to perform the integrity checking and password obfuscation. SHA-512 is not used in TLS but is used solely for verifying the firmware manifest signature.
FCS_COP.1/KeyedHash	TLSv1.2 and TLSv1.3: • Master Secret Derivation: ○ HMAC-SHA256: Key sizes of 128 bits (ECDH P-256) or 192 bits (RSA, ECDH P-384), block size 512 bits, output length 256 bits. ○ HMAC-SHA384: Key sizes of 256 bits (ECDH P-256) or 384 bits (RSA, ECDH P-384), block size 1024 bits, output length 384 bits. • Key Block Derivation: ○ HMAC-SHA256: Key size 384 bits, block size 512 bits, output length 256 bits. ○ HMAC-SHA384: Key size 384 bits, block size 1024 bits, output length 384 bits. • Message Authentication: ○ HMAC-SHA1: Key size 160 bits, block size 512 bits, output length 160 bits. ○ HMAC-SHA256: Key size 256 bits, block size 512 bits, output length 256 bits. ○ HMAC-SHA384: Key size 384 bits, block size 1024 bits, output length 384 bits.
FCS_RBG_EXT.1	The TOE implements a DRBG in accordance with ISO/IEC 18031:2011 using a CTR DRBG with AES-256. The TSF seeds the CTR_DRBG using 256-bits of data that contains at least 256 bits of entropy. The TSF gathers and pools entropy from 3 software based noise sources. • Device Specific randomness • Input layer timing randomness • Interrupt randomness The entropy sources are discussed in greater detail in the Entropy documentation.
FCS_HTTPS_EXT.1	The TSF implements the server side of the HTTPS protocol in accordance with RFC 2818. It uses a TLS session to secure the HTTP session, providing a trusted communication channel. All MUST and REQUIRED requirements specified in RFC 2818 are followed.

Requirement	TSS Description
	The TSF supports TLSv1.2 and TLSv1.3 for HTTPS/TLS. If the TSF receives a ClientHello message that requests TLSv1.1 or earlier, the TSF sends a fatal handshake_failure message and terminates the connection. When configured with an RSA certificate, the TSF supports the following TLSv1.2 ciphersuites for connections to the TOE: • TLS_RSA_WITH_AES_128_CBC_SHA • TLS_RSA_WITH_AES_256_CBC_SHA • TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA • TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA • TLS_RSA_WITH_AES_128_CBC_SHA256 • TLS_RSA_WITH_AES_256_CBC_SHA256 • TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 • TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 When configured with an ECDSA certificate, the TSF supports the following TLSv1.2 ciphersuites for connections to the TOE: • TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA • TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA • TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256 • TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384 • TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 • TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 The TSF supports the following TLSv1.3 ciphersuites for connections to the TOE: • TLS_AES_128_GCM_SHA256 • TLS_AES_256_GCM_SHA384 The TOE conforms to RFC 5246, section 7.4.3 for key exchange. When the TSF selects an ECDHE ciphersuite, it sends the client secp256r1, secp384r1 or secp521r1 key agreement parameters. The TSF prefers secp256r1 if the client indicates support for all three curves in the ClientHello message.
FCS_TLSC_EXT.1 / FCS_TLSC_EXT.2	The TSF implements a TLSv1.2 and TLSv1.3 client to secure communications with the Syslog server. The TSF supports and proposes the following cipher suites in the ClientHello message, grouped by TLS version: TLS 1.2 Cipher Suites: • TLS_RSA_WITH_AES_128_CBC_SHA • TLS_RSA_WITH_AES_256_CBC_SHA • TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA • TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA • TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA • TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA • TLS_RSA_WITH_AES_128_CBC_SHA256 • TLS_RSA_WITH_AES_256_CBC_SHA256 • TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256 • TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384

Requirement	TSS Description
	• TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 • TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 • TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 • TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 TLS 1.3 Cipher Suites: • TLS_AES_128_GCM_SHA256 • TLS_AES_256_GCM_SHA384 The Security Administrator can configure the TSF to support TLS v1.2, TLS v1.3 or both for both the TSF TLS client and server. The Security Administrator can enable and disable individual ciphersuites as well as specify the preferred ordering of ciphersuites. The TSF establishes reference identifiers for the remote server as follows: • When the server is specified using a domain name, as per RFC 6125 Section, the TSF verifies that the domain name matches a Subject Alternative Name DNS Name field in the certificate using exact or wildcard matching specified in Section 3.1 of RFC 2818. If the certificate does not contain any Subject Alternative Name fields, the TSF matches the domain name against the Common Name in the certificate. • When the server is specified using an IP address, the TSF verifies that the IP address exactly matches a Subject Alterative Name IP Address field in the certificate using the rules specified in Section 3.1 of RFC 2818. If the certificate does not contain any Subject Alternative Name fields, the TSF matches the IP address against the Common Name in the certificate. When the reference identifier is an IP address, the TOE converts it to a binary representation in network byte order. For IPv4 addresses, the TOE enforces the canonical dotted-decimal format as defined in RFC 3986, before conversion to binary. The TOE compares the binary IP address against all the IP Address entries in the Subject Alternative Name. The TOE does not support using IPv6 addresses as a reference identifier. The TSF does support wildcards but does not support certificate pinning and determines if the certificate is valid for the specified server based on the DNS name or IP address of the server. Wildcards are supported only at the left-most label of the identifier. In either instance, the TSF will not establish the connection if the peer certificate does not successfully authenticate the peer according to X.509 authentication. The TSF supports the following Supported Groups in the ClientHello message: • secp256r1 • secp384r1 • secp521r1

Requirement	TSS Description
	The TOE automatically sends the Supported Groups extension when an ECDHE ciphersuite is selected, and this behavior does not require administrator intervention. The TSF supports the signature_algorithms_extension as defined in TLS 1.2 and later versions. The extension is included in the ClientHello message with the following set of signature algorithms: • rsa_pkcs1 with sha256 • rsa_pkcs1with sha384 • rsa_pkcs1 with sha512 • ecdsa_secp256r1 with sha256 • ecdsa_secp384r1 with sha384 • ecdsa_secp521r1 with sha512 The device presents the signature_algorithms extension in the ClientHello message by default and it cannot be configured. The TSF supports TLS with mutual authentication using X509v3 certificates to secure communications with the Syslog server. When the Syslog server sends the Certificate Request message, the TSF replies with a Client Certificate message. The Client Certificate message includes the certificate that the Security Administrator configured to authenticate to the Syslog server. The TOE does not support the use of Pre-Shared Keys (PSKs) in TLSv1.3, making out-of-band provisioning of PSKs not possible in the evaluated configuration.
FCS_TLSS_EXT.1	The TSF supports TLSv1.2 and TLSv1.3 for HTTPS/TLS. If the TSF receives a ClientHello message that requests TLSv1.1 or earlier, the TSF sends a fatal handshake_failure message and terminates the connection. The TSF supports and proposes the following cipher suites in the ClientHello message, grouped by TLS version: TLS 1.2 Cipher Suites: • TLS_RSA_WITH_AES_128_CBC_SHA • TLS_RSA_WITH_AES_256_CBC_SHA • TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA • TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA • TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA • TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA • TLS_RSA_WITH_AES_128_CBC_SHA256 • TLS_RSA_WITH_AES_256_CBC_SHA256 • TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256 • TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384 • TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 • TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 • TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 • TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 TLS 1.3 Cipher Suites:

Requirement	TSS Description
	• TLS_AES_128_GCM_SHA256 • TLS_AES_256_GCM_SHA384 The Security Administrator can enable and disable individual ciphersuites as well as specify the preferred ordering of ciphersuites. The TOE conforms to RFC 5246, section 7.4.3 for key exchange. The TSF supports the following algorithms and key sizes for authenticating itself to TLS clients and establishing keys: • RSA: 2048, 3072, and 4096-bit RSA keys. • ECDSA: secp256r1, secp384r1 or secp521r1 curves. The TSF prefers the secp256r1 curve when selecting an ECDHE ciphersuite if the client indicates support for all three curves in the ClientHello message. The TSF does not support session resumption. When acting as a server, the TSF listens on port 443 for HTTPS connections. The TSF uses HTML over HTTPS to present the administrative users with a secure management interface. The TSF uses TLS to provide a secure connection between the TSF and remote Security Administrators. The TOE does not support the use of Pre-Shared Keys (PSKs) in TLSv1.3, making out-of-band provisioning of PSKs not possible in the evaluated configuration.
FIA_AFL.1	The Security Administrator can configure the number of unsuccessful login attempts allowed for a remote administrator before a lockout occurs and can set the duration of the lockout. The number of attempts can be configured within a range of 3 to 10. The lockout duration can be configured between 3 and 999 minutes. If a Security Administrator enters an incorrect password the configured number of times, the administrator is locked out and cannot log in through any remote interface on the TOE. Once the lockout duration has expired, the administrator is permitted to authenticate to the TOE again. Lockouts are not enforced on the TOE’s local console interface. This ensures that authentication failures do not result in a situation where no administrator access is available.
FIA_PMG_EXT.1	The TSF supports administrator password composition to include any combination of upper and lower case letters, numbers, and the following special characters “!”, “@”, “#”, “$”, “%”, “^”, “&”, “*”, “(“, “)” with the password length configurable by the administrator to a minimum range of 10 to 15 characters. The TOE supports a maximum password length of up to 999 characters.
FIA_UIA_EXT.1	The TSF utilizes HTTPS, which operates over the TLS protocol (supporting TLSv1.2 and TLSv1.3), to secure a remote administration web GUI session. When connecting over HTTPS, the TSF presents Security Administrators with a username and password prompt; The Security Administrator using password authentication is considered authenticated if the username and the SHA-256 hash of the password matches the stored username and SHA-256 password hash. A successful authentication takes the user to the System Status page.

Requirement	TSS Description
	The TSF utilizes a local serial CLI which presents Security Administrators with a username and password prompt. The Security Administrator is considered authenticated if the username and password provided match the credentials configured in the TSF. A successful login takes the user to the CLI menu. Prior to successful identification and authentication, the TSF displays the TOE access banner specified in FTA_TAB.1 and responds to ICMP Echo messages with ICMP Echo Reply messages for both the remote web GUI and the local console CLI.
FIA_UAU.7	When the user is entering their password over the local console, the TSF does not echo any characters back.
FIA_X509_EXT.1/Rev	When a certificate is used (to identify the TSF or identify an external entity to the TSF), the TSF verifies certificates by checking the following: 1. The current date between the "Valid from" and "Valid to" dates. 2. The certificate is not listed on the CRL. If the TSF has a cached response that has not expired, the TSF uses the cached response in lieu of querying the CRL server. 3. The certificate chain is valid if: • Each certificate in the certificate chain passes the checks described in #1 and #2. • Each certificate (other than the first certificate) in the certificate chain has the Subject Type=CA flag set. • Each certificate is signed by: ○ a certificate in the certificate chain, or ○ a trusted root CA that has been installed in the TSF The TSF verifies the validity of a certificate in the following situations: • Intermediate CA certificate: When an Intermediate CA certificate is uploaded to the TOE's trust store, the TSF verifies its authenticity and validity, including revocation status, before accepting it into the trust anchor store. • Syslog Server Certificate Verification: When the TSF connects to a Syslog server, it verifies the server's certificate to confirm its authenticity and validity, including revocation status, before establishing a trusted connection. • Client Certificate Authentication: When the TSF uses its client certificate to authenticate with the Syslog server, it verifies that its own certificate is valid and correctly issued. If the Client Authentication EKU is absent, the TSF rejects the certificate during upload and does not allow it to be used for mutual authentication with the Syslog server. If the Security Administrator loads a certificate with a Subject Type=CA, the TSF does not validate the certificate path. X.509 certificates are not used for trusted updates. The rules for extendedKeyUsage fields are followed in all instances; Server Authentication purpose is checked for all presented Server certificates. The TOE's trust anchor store is expected to include both CA and Intermediate CA certificates. When an Intermediate CA certificate is

Requirement	TSS Description
	uploaded to the TOE's trust store, the TOE performs revocation checking on that certificate as part of the validation process. During authentication, the TOE performs revocation checking only on the leaf certificate, regardless of whether a full certificate chain or only the leaf certificate is presented. No different handling is applied based on the structure of the certificate chain.
FIA_X509_EXT.2	When establishing a connection to the Syslog server, the TSF uses the certificate presented by the Syslog server to verify the server's identity. The TSF establishes reference identifiers for the remote server as follows: • When the server is specified using a domain name, the TSF verifies that the domain name matches a Subject Alternative Name DNS Name field in the certificate using exact or wildcard matching specified in Section 3.1 of RFC 2818. If the certificate does not contain any Subject Alternative Name fields, the TSF matches the domain name against the Common Name in the certificate. • When the server is specified using an IP address, the TSF verifies that the IP address exactly matches a Subject Alterative Name IP Address field in the certificate using the rules specified in Section 3.1 of RFC 2818. If the certificate does not contain any Subject Alternative Name fields, the TSF matches the IP address against the Common Name in the certificate. Once the TSF has verified that the certificate identifiers are valid for the Syslog server, the TSF verifies the validity of the certificate as described in FIA_X509_EXT.1/Rev. The TSF presents its own certificate to the Syslog server. This certificate is configured specifically for authentication to the Syslog server by the Security Administrator. Additionally, the TSF presents its device certificate when a remote user connects to the TOE via the web GUI. If the TSF cannot contact the CRL server or the server does not respond, the TSF logs the failure and considers the certificate valid. If any of the other FIA_X509_EXT.1/Rev validity checks fail, the TSF rejects the certificate and does not establish the connection.
FIA_X509_EXT.3	The TSF allows Security Administrators to generate Certificate Signing Requests. The TSF requires the Security Administrator to specify the following values: • Common Name • Organization • Locality • State • Country • Key Type (RSA or ECDSA) • Key Length (2048, 3072, 4096, P-256, P-384, P-521) The TSF allows the Security Administrator to specify an Organization Unit and additional random data used when generating the key pair. This information is optional for creating Certificate Signing Requests.

Requirement	TSS Description
FMT_MOF.1/Functions / FMT_MOF.1/ManualUpdate	The TSF implements the Security Administrator role to authorized administrators of the TOE. The TSF allows the Security Administrators to administer the TSF via CLI through a serial cable connected to the TOE and a web GUI over a remote HTTPS channel. The TSF permissions restrict access to these management functions to users that have been identified, authenticated, and authorized with the Security Administrator role. The web GUI allow the Security Administrator to perform the following TSF management functions using the instructions provided in the administrative guide: • Ability to administer the TOE remotely • Ability to configure the access banner • Ability to configure the remote session inactivity time before session termination • Ability to update the TOE, and to verify the updates using digital signature capability prior to installing those updates • Ability to configure local audit behaviour (e.g. changes to storage locations for audit; changes to behaviour when local audit storage space is full; changes to local audit storage size) • Ability to modify the behaviour of the transmission of audit data to an external IT entity • Ability to manage the cryptographic keys • Ability to configure the cryptographic functionality • Ability to set the time which is used for time-stamps • Ability to manage the TOE's trust store and designate X509.v3 certificates as trust anchors • Ability to generate Certificate Signing Request (CSR) and process CA certificate response • Ability to administer the TOE locally • Ability to configure the local session inactivity time before session termination or locking • Ability to configure the authentication failure parameters for FIA_AFL.1 The local console allows the Security Administrator to perform the following TSF management functions using the instructions provided in the administrative guide: • Ability to update the TOE, and to verify the updates using digital signature capability prior to installing those updates The administrative interfaces provided by the TSF do not allow any of these functions to be accessed by unauthenticated or unauthorized users. The TOE provides a trust store to store certificates. The permissions on the trust store restrict access so that only Security Administrator users can import or delete certificates from the trust store. Security Administrator users can also view the certificates stored in the trust store. Non Security Administrator users can only view the certificates but cannot import or delete them. The TSF restricts the ability to modify the behavior of audit-related functions to Security Administrators. For the transmission of audit data to an external IT entity, Security Administrators can configure the destination address, TLS protocol, and source port for communication

Requirement	TSS Description
	with an external syslog server. Audit forwarding is automatically enabled when this configuration is present and automatically disabled when the configuration is removed; there is no separate control to explicitly enable or disable the feature. With respect to the handling of audit data, Security Administrators have control over local audit management functions, including the ability to clear existing logs and configure the maximum log size. When the local audit storage space becomes full, the TOE automatically overwrites the oldest audit records. This log overwrite behavior is fixed and cannot be configured by the Security Administrator.
FMT_MTD.1/CoreData	The only functions accessible prior to authentication are the display of the configurable warning and consent banner and the automated response to ICMP echo messages with ICMP echo reply messages. No management of TSF data can be performed through any interface prior to login. Only administrators can login to the administrative interface, ensuring that access to TSF data is disallowed for non-administrative users. The administrative interfaces provided by the TSF do not allow any other functions other than the ones mentioned above to be accessed by unauthenticated or unauthorized users. The TOE provides a trust store to handle the X.509v3 certificates. The permissions on the trust store restrict access so that only Security Administrator users can import or delete certificates from the trust store. Security Administrator users can also view the certificates stored in the trust store. Non Security Administrator users can only view the certificates but cannot import or delete them.
FMT_MTD.1/CryptoKeys	The TOE restricts the ability to manage configured X.509 certificates (public and private key pairs) to security administrators via GUI. The Security Administrator can generate and delete the cryptographic keys associated with CSRs as follows: • For Client Authentication certificates, the administrator navigates to System > Configuration > Certificates > Client Auth Certificates, where options are available to generate a CSR and delete an existing CSR. These actions respectively generate or delete the associated cryptographic key pair. • For Device certificates, the administrator navigates to System > Configuration > Certificates > Device Certificates, where similar options exist to generate or delete a CSR, with the corresponding generation or deletion of the associated cryptographic keys.
FMT_SMF.1	The TSF implements the Security Administrator role to authorized administrators of the TOE. The TSF allows the Security Administrators to administer the TSF via CLI through a serial cable connected to the TOE and a web GUI over a remote HTTPS channel. The TSF permissions restrict access to these management functions to users that have been identified, authenticated, and authorized with the Security Administrator role. The web GUI allow the Security Administrator to perform the following TSF management functions using the instructions provided in the administrative guide: • Ability to administer the TOE remotely • Ability to configure the access banner

Requirement	TSS Description
	• Ability to configure the remote session inactivity time before session termination • Ability to update the TOE, and to verify the updates using digital signature capability prior to installing those updates • Ability to configure local audit behaviour (e.g. changes to storage locations for audit; changes to behaviour when local audit storage space is full; changes to local audit storage size) • Ability to modify the behaviour of the transmission of audit data to an external IT entity • Ability to manage the cryptographic keys • Ability to configure the cryptographic functionality • Ability to set the time which is used for time-stamps • Ability to manage the TOE's trust store and designate X509.v3 certificates as trust anchors • Ability to generate Certificate Signing Request (CSR) and process CA certificate response • Ability to administer the TOE locally • Ability to configure the local session inactivity time before session termination or locking • Ability to configure the authentication failure parameters for FIA_AFL.1 The local console allows the Security Administrator to perform the following TSF management functions using the instructions provided in the administrative guide: • Ability to update the TOE, and to verify the updates using digital signature capability prior to installing those updates The administrative interfaces provided by the TSF do not allow any of these functions to be accessed by unauthenticated or unauthorized users. The TSF implements local logging by maintaining log files of audit records. The logs are stored in a persistent format, ensuring that audit records are preserved across reboots or power cycles. The minimum storage size allocated for audit records is 1 MB.
FMT_SMR.2	Individual accountability is maintained by ensuring that every user is assigned a unique account with specific roles that determine their access level and privileges. The following user roles are supported by the TOE: • System Administrator: Who has full read and write access to the administrative interface via both the remote web GUI and local console CLI. • Read-only-Administrators: System Administrator can enable these roles whose write access is restricted and can only read web GUI. (In the evaluated configuration, the read-only user does not have access to the local console CLI)
FPT_APW_EXT.1	The TSF does not store plaintext passwords. The TSF stores the SHA-256 hash of each users' password. Additionally, the TSF does not provide a user interface to view the password hashes.
FPT_SKP_EXT.1	The TSF stores symmetric keys, and private keys in plaintext on the hard disk; however, it does not provide an interface to allow any user to view any of these values.

Requirement	TSS Description
FPT_STM_EXT.1	The TOE relies on time and date data from a local real-time clock. The Security Administrator is responsible for manually managing and updating this clock regularly, as per organizational policy. The TSF uses the system time to timestamp audit log records, to determine user session timeouts, and to determine certificate validity. These uses of time do not require an accuracy finer than one second, and the frequency of updating the time keeps the clock drifting under one second.
FPT_TST_EXT.1	The TSF performs the following hardware self-tests at power-on: • Cryptographic library tests: ○ HMAC-SHA-256 integrity check of the library ○ HMAC-SHA-1 KAT ○ HMAC-SHA-256 KAT ○ HMAC-SHA-384 KAT ○ AES 128 ECB Encrypt and Decrypt KAT ○ AES 256 GCM Encrypt and Decrypt KAT ○ RSA 2048 SHA-256 Sign and Verify KAT ○ ECDSA P-224 SHA-512 Sign and Verify PCT ○ DRBG AES-CTR-256 KAT (invoking the instantiate, reseed, and generate functions) • Firmware checks: ○ SHA-512 digital signature verification of the manifest file. ○ SHA-256 integrity check of each executable file in the TSF using the pre-calculated hashes from the manifest file. The Cryptographic library test and the Firmware checks provide a high level of assurance that the firmware has not been tampered with and that the cryptographic algorithms are working properly. The Cryptographic library tests verify that each cryptographic algorithm specified in FCS_COP.1 requirements is passing a KAT. The KAT demonstrates that the algorithm is functioning properly by invoking the algorithm with hard coded keys and messages and comparing the result to a pre-computed, known to be correct value. The ECDSA PCT shows that the ECDSA algorithm is functioning properly by signing a known value with a known key and verifying that verifying the computed signature indicates that the signature is valid. Successful completion of the device startup indicates that all required power-on self-tests have run and passed without error. These include the Known Answer Tests for AES, HMAC, SHA, DRBG, and RSA, as well as the Pairwise Consistency Test for ECDSA. If the cryptographic library tests fail, the TSF will not start up. If an integrity check fails, the TSF will let the admin choose between Reboot, Rollback, or Continue Booting. The TOE is delivered as a single package containing both firmware (IVE OS, bootloaders, kernel) and IPS application software for administrative access and system configuration.
FPT_TUD_EXT.1	The TSF allows the Security Administrator to install software updates. The Security Administrator obtains candidate updates by downloading them on a remote workstation from the Ivanti Secure website. When the Security Administrator uploads a firmware update using HTTPS web GUI, the TSF performs an RSA 2048 SHA-512 digital signature verification of the update using the Ivanti Secure firmware update public key. The public key is distributed as part of the firmware package. Ivanti Secure retains control

Requirement	TSS Description
	over the private key used to sign firmware updates. If the digital signature check is successful, the TSF installs the update. If the digital signature check detects tampering with the update and/or signature, the TSF presents the user with an error message and discards the update. A trusted update cannot be installed on the TOE with a delayed activation. The TSF allows the Security Administrator to view the currently running version of firmware from the System Maintenance > Platform page of the web GUI. The current software version can also be found on the local console, where the version details are displayed after the user logs in.
FTA_SSL.3 / FTA_SSL.4 / FTA_SSL_EXT.1	The TOE acts as a server for remote sessions accessed through the management interface. The local and Remote administrative sessions can be terminated by users using the instructions provided below: • To log out of the remote web GUI, go to the user type icon on the top right of the screen and click logout. • To exit a local console session, choose option 11 Exit Serial Console Session on the local serial console. The Security Administrator can set the TOE so that local and remote sessions are terminated after a Security Administrator-configured period of inactivity. The default inactivity timeout is 10 minutes, and the configurable range is from 5 to 9999999 minutes. Although the inactivity timeout is configurable within a wide range, it is strongly recommended that the Security Administrator configure the timeout value between 5 to 15 minutes.
FTA_TAB.1	The TSF enables Security Administrators to configure an access banner provided with the authentication prompt. The banner can provide warnings against unauthorized access to the TOE as well as any other information that the Security Administrator wishes to communicate. The TSF presents the access banner prior to authentication when a user connects via either the remote web GUI or the local console CLI. The banner is applied uniformly across both GUI and CLI administrative access methods and can be configured during initial setup. The remote web GUI is accessed over a secure HTTPS connection using TLSv1.2 or TLSv1.3, while the local console CLI is accessed through a direct serial console connection. This behavior is described in the FIA_UIA_EXT.1, FIA_UAU_EXT.2 description.
FTP_ITC.1	The TSF acts as a client and communicates with the external syslog server using Syslog over TLS. The communication includes authentication, ensuring the integrity and confidentiality of logs transmitted to the syslog server. The TSF implements Syslog over TLS using TLS v1.2 or TLS v1.3, supporting mutual authentication with X.509 certificates. Logs are sent to the syslog server in real-time and stored locally if the connection is unavailable. The TSF ensures assured identification of the syslog server by verifying its certificate using domain name or IP address matching, as per RFC 2818. This verification is supported for both the CN and SAN fields in the server certificate. The implementation of Syslog over TLS and the associated secure communications are described in more detail in FCS_TLSC_EXT.1 and FCS_TLSC_EXT.2.
FTP_TRP.1/Admin	The TSF provides a trusted path for remote administration using HTTPS over TLS. All communications are protected using TLS version 1.2 or 1.3, ensuring confidentiality and integrity between the administrator and the

Requirement	TSS Description
	TOE. The details of this implementation are described more in FCS_HTTPS_EXT.1 and FCS_TLSS_EXT.1.

6.1 CAVP Algorithm Certificate Details

Each of these cryptographic algorithms have been validated as identified in the table below.

Table 16 – CAVP Algorithm Certificate References

SFR	Algorithm Description	Implementation name	CAVP Alg.	Key Size/Curves/ Modulus	CAVP Cert #	Operating Environments
FCS_CKM.1	RSA schemes using cryptographic key sizes of [2048 bits, 3072 bits, 4096 bits] that meet the following: FIPS PUB 186-4, "Digital Signature Standard (DSS)", Appendix B.3 or FIPS PUB 186-5, "Digital Signature Standard (DSS)", A.1	Ivanti Secure Cryptographic Module	RSA KeyGen (FIPS186-4)	Modulus: 2048, 3072, 4096	A6649	IVE OS 3.0 on Intel Xeon Gold 5317 (Ice Lake), IVE OS 3.0 on Intel Core i3 10100E 10th gen (Comet Lake), IVE OS 3.0 on VMware ESXi 8.0.3 running on Intel(R) Xeon(R) Gold 6252 (Cascade Lake)
	ECC schemes using 'NIST curves' [P-256, P-384, P-521] that meet the following: FIPS PUB 186-4, "Digital Signature Standard (DSS)", Appendix B.4, or FIPS PUB 186-5, "Digital Signature Standard (DSS)", Appendix A.2, or ISO/IEC 14888-3, "IT Security techniques - Digital signatures with appendix - Part 3: Discrete logarithm based mechanisms", Section 6.6	Ivanti Secure Cryptographic Module	ECDSA KeyGen (FIPS186-4), ECDSA KeyGen (FIPS186-5)	Curves: P-256, P-384, P-521	A6649	
FCS_CKM.2	RSA-based key establishment schemes that meet the following: RSAES-PKCS1-v1_5 as specified in	Ivanti Secure Cryptographic Module	None: CCTL tested as per the PP/SD Evaluation Activities.	Modulus: 2048, 3072, 4096	Tested with known-good imple	

SFR	Algorithm Description	Implementation name	CAVP Alg.	Key Size/Curves/ Modulus	CAVP Cert #	Operating Environments
	Section 7.2 of RFC 8017, "Public-Key Cryptography Standards (PKCS) #1: RSA Cryptography Specifications Version 2.2"				mentation	
	Elliptic curve-based key establishment schemes that meet the following: NIST Special Publication 800-56A Revision 3, "Recommendation for Pair-Wise Key Establishment Schemes Using Discrete Logarithm Cryptography"	Ivanti Secure Cryptographic Module	KAS-ECC-SSC (Sp800-56Ar3) (Domain Parameter Generation Methods: P-256, P-384, P-521)	Curves: P-256, P-384, P-521	A6649	
FCS_COP.1 /DataEncryption	AES as specified in ISO 18033-3 used in [CBC as specified in ISO 10116, GCM as specified in ISO 19772] mode and cryptographic key sizes [128 bits, 256 bits]	Ivanti Secure Cryptographic Module	AES-CBC AES-GCM	Key size: 128, 256	A6649	
FCS_COP.1 /SigGen and SigVer	For RSA schemes: FIPS PUB 186-4, "Digital Signature Standard (DSS)", Section 5.5, using PKCS #1 v2.1 or FIPS PUB 186-5, "Digital Signature Standard (DSS)", Section 5.4 using PKCS #1 v2.2 Signature Schemes RSASSA-PSS and/or RSASSA-PKCS1v1_5; ISO/IEC 9796-2, Digital	Ivanti Secure Cryptographic Module	RSA SigGen (FIPS186-4), RSA SigGen (FIPS186-5) RSA SigVer (FIPS186-4), RSA SigVer (FIPS186-5)	Modulus: 2048, 3072, 4096	A6649	

SFR	Algorithm Description	Implementation name	CAVP Alg.	Key Size/Curves/ Modulus	CAVP Cert #	Operating Environments
	signature scheme 2 or Digital Signature scheme 3					
	For ECDSA schemes implementing [P-256, P-384, P-521] curves that meet the following: FIPS PUB 186-4, "Digital Signature Standard (DSS)", Section 6 and Appendix D, Implementing "NIST Recommended" curves; or FIPS PUB 186-5, "Digital Signature Standard (DSS)", Section 6 and NIST SP 800-186 Section 3.2.1, Implementing Weierstrass curves; or ISO/IEC 14888-3, "IT Security techniques - Digital signatures with appendix - Part 3: Discrete logarithm based mechanisms", Section 6.6	Ivanti Secure Cryptographic Module	ECDSA SigGen (FIPS186-4, ECDSA SigGen (FIPS186-5) ECDSA SigVer (FIPS186-4), ECDSA SigVer (FIPS186-5)	Curves: P-256, P-384, P-521	A6649	
FCS_COP.1 / Hash	[SHA-1, SHA-256, SHA-384, SHA-512] and message digest sizes [160, 256, 384, 512] bits that meet the following: ISO/IEC 10118-3:2004.	Ivanti Secure Cryptographic Module	SHA-1 SHA-256 SHA-384 SHA-512	Key size: 160, 256, 384, 512	A6649	
FCS_COP.1 / KeyedHash	[HMAC-SHA-1, HMAC-SHA- 256, HMAC-SHA-384] and cryptographic key sizes [160 bits,	Ivanti Secure Cryptographic Module	HMAC-SHA-1 HMAC-SHA2-256	Key size: 160, 256, 384	A6649	

SFR	Algorithm Description	Implementation name	CAVP Alg.	Key Size/Curves/ Modulus	CAVP Cert #	Operating Environments
	256 bits, 384 bits used in HMAC] and message digest sizes [160, 256, 384] bits that meet the following: ISO/IEC 9797-2:2011, Section 7 “MAC Algorithm 2”.		HMAC-SHA2-384			
FCS_RBG_EXT.1	CTR_DRBG (AES) in accordance with ISO/IEC 18031:2011	Ivanti Secure Cryptographic Module	CTR_DRBG (AES-256)	Key size: 256	A6649	

6.2 Cryptographic Key Destruction

The table below describes the key zeroization provided by the TOE and as referenced in FCS_CKM.4.

Table 17 – Zeroization

Keys/CSPs	Purpose	Storage Location	Method of Zeroization
HTTPS/TLS Private Host Key	Generated using the DRBG and FCS_CKM.1 or entered by the Security Administrator.	Persistent keys on internal Hard Disk Drives in plaintext	The HTTPS/TLS Private Host Key and the Syslog/TLS Private Client key are zeroized from the disk when the Security Administrator deletes the key, replaces the key, or zeroizes the entire TOE. These keys are zeroized from RAM when the HTTP or Syslog process terminates, the TSF is shutdown, suffers loss of power, or restarted.
Syslog/TLS Private Client Key	Generated using the DRBG and FCS_CKM.1 or entered by the Security Administrator.	Persistent keys on internal Hard Disk Drives in plaintext	The HTTPS/TLS Private Host Key and the Syslog/TLS Private Client key are zeroized from the disk when the Security Administrator deletes the key, replaces the key, or zeroizes the entire TOE. These keys are zeroized from RAM when the HTTP or Syslog process terminates, the TSF is shutdown, suffers loss of power, or restarted.
TLS Session keys	Established according to FCS_CKM.2 and derived using the TLS KDF	The TSF stores loads the persistent keys into RAM when they are used and the TSF also stores the following ephemeral keys in RAM	The TLS Session keys are zeroized from RAM when the associated TLS session is terminated, the TSF is shutdown, suffers loss of power, or restarted.
DRBG State	Derived from the entropy source	The TSF stores loads the persistent keys into RAM when they are used and the TSF also stores the following ephemeral keys in RAM	The DRBG state is zeroized when the TSF is shutdown, suffers loss of power, or restarted.

7 Acronym Table

Acronyms should be included as an Appendix in each document.

Table 18 – Acronyms

Acronym	Definition
AES	Advanced Encryption Standard
CA	Certificate Authority
CAVP	Cryptographic Algorithm Validation Program
CBC	Cipher Block Chaining
CC	Common Criteria
CLI	Command Line Interface
CN	Common Name
CRL	Certificate Revocation List
CRL	Certificate Revocation List
CSR	Certificate Signing Request
CTR	Counter Mode
DMI	Desktop Management Interface
DN	Domain Name
DNS	Domain Name System
DRBG	Deterministic Random Bit Generator
EC	Elliptic Curve
EC-DH	Elliptic Curve Diffie-Hellman
ECDHE	Elliptic Curve Diffie-Hellman Ephemeral
ECDSA	Elliptic Curve Digital Signature Algorithm
EP	Extended Package
GCM	Galois Counter Mode
GUI	Graphical User Interface
HMAC	Hash-based Message Authentication Code
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICMP	Internet Control Message Protocol
IP	Internet Protocol
IPS	Ivanti Policy Secure
ISO/IEC	International Organization for Standardization/International Electrotechnical Commission.
KDF	Key Derivation Function
MAC	Message Authentication Code
MB	Megabyte
ND	Network Device

Acronym	Definition
NDcPP	Network Device Collaborative Protection Profile
NIAP	Nation Information Assurance Partnership
NIST	National Institute of Standards and Technology
NIT	New Item Ticket
OCSP	Online Certificate Status Protocol
OID	Object Identifier
OS	Operating System
OSP	Organizational Security Policies
PIN	Personal Identification Number
pND	Physical Network Device
PP	Protection Profile
PSK	Pre-Shared Key
RAM	Random Access Memory
RFC	Request for Comments
RSA	Rivest, Shamir & Adleman
SAML	Security Assertion Markup Language
SAN	Subject Alternative Name
SFR	Security Functional Requirement
SHA	Secure Hash Algorithm
SNMP	Simple Network Management Protocol
SP	Special Publication
SSL	Secure Sockets Layer
SSO	Single Sign-On
ST	Security Target
TD	Technical Decision
TLS	Transport Layer Security
TOE	Target of Evaluation
TSF	TOE Security Functionality
TSS	TOE Summary Specification
UI	User Interface
VM	Virtual Machine
vND	Virtual Network Device
VS	Virtual System