KEYSIGHT Vision Series Network Packet Broker User Guide

Contents

Keysight

KEYSIGHT Vision Series Network Packet Broker

About this Guide

Overview

This guide provides supplemental instructions to achieve the Common Criteria evaluated configuration of the Keysight Vision Series Network Packet Broker v5.7.1 and related information.

Audience

This guide is intended for system administrators and the various stakeholders involved in the Common Criteria evaluation. It is assumed that readers will use this guide in conjunction with the related documents listed in Table 3.

Terminology

Table 1: Terminology

Term	Definition
AES	Advanced Encryption Standard
CRC	Cyclic Redundancy Check
DRBG	Deterministic Random Bit Generator
ECB	Electronic Codebook
HMAC	Hashed Message Authentication Code
KAT	Known Answer Test
NDRNG	Non-Deterministic Random Number Generator
NPB	Network Packet Broker
SHA	Secure Hash Algorithm
TOE	Target of Evaluation

About the Common Criteria Evaluation

The Common Criteria for Information Technology Security Evaluation (ISO/IEC 15408) is an international standard for security certification of IT products and systems. More information is available at https://www.commoncriteriaportal.org/

Protection Profile Conformance

The Common Criteria evaluation was performed against the requirements of the Network Device collaborative Protection Profile (NDcPP) v2.2e available at https://www.niap-ccevs.org/Profile/PP.cfm

Evaluated Software and Hardware

The Target of Evaluation (TOE) includes the Keysight Vision Series Network Packet Broker v5.7.1 software running on hardware appliances:

- Vision ONE
- Vision 7300/7303
- Vision E40
- Vision E100
- Vision E10S
- Vision X
- TradeVision

Evaluated Functions

The following functions have been evaluated under Common Criteria:

- **Protected Communications. The TOE provides secure communication channels:**
  - Serial Console. Administrative interface via direct serial connection.
  - GUI/Web API. Administrative web GUI/Web API via HTTPS.
  - Logs. Logs sent to syslog via TLS.
  - NTP. NTP communications make use of SHA-1 message digests.
  - LDAP. The TOE uses an LDAP authentication server via TLS.
- **Secure Administration. The TOE enables secure management of its security functions, including:**
  - Administrator authentication with passwords
  - Configurable password policies
  - Role Based Access Control
  - Access banners
  - Management of critical security functions and data
  - Protection of cryptographic keys and passwords
- Trusted Update. The TOE ensures the authenticity and integrity of software updates through digital signatures.
- System Monitoring. The TOE generates logs of security relevant events. The TOE stores logs locally and is capable of sending log events to a remote audit server.
- Self-Test. The TOE performs a suite of self-tests to ensure the correct operation and enforcement of its security functions.
- Cryptographic Operations. The cryptographic algorithms used in the above functions have been validated for correct implementation.

  NOTE: No claims are made regarding any other security functionality.

Evaluation Assumptions

The following assumptions were made in performing the Common Criteria evaluation. The guidance shown in the table below should be followed to uphold these assumptions in the operational environment.

Table 2: Evaluation Assumptions

Assumption	**Guidance**
Physical security, commensurate with the value of the TOE and the data it contains, is provided by the environment.	Ensure that the device is hosted in a physically secure environment, such as a locked server room.
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.	Do not install other software on the device hardware.
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.	The Common Criteria evaluation focused on the management plane of the device.
Security Administrators are trusted to follow and apply all guidance documentation in a trusted manner.	Ensure that administrators are trustworthy – e.g. implement background checks or similar controls.
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.	Apply updates regularly according to your organization's policies.
The Administrator's credentials (private key) used to access the TOE must be protected on any other platform on which they reside.	Administrators should take care to not disclose credentials and ensure private keys are stored securely.
The Security Administrator ensures that there is no unauthorized access possible for sensitive residual information (e.g. cryptographic keys, keying material, PINs, passwords etc.) on networking equipment when the equipment is discarded or removed from its operational environment.	Administrators should sanitize the device before disposal or transfer out of the organization's control.

Conventions

The following conventions are used in this guide:

- CLI Command <replaceable> – This style indicates to you that you can type the word or phrase on the command line and press [Enter] to invoke a command. Text within <> is replaceable. For example:
  Use the cat <filename> command to view the contents of a file
- [key] or [key-combo] – key or key combination on the keyboard is shown in this style. For example:
  The [Ctrl]-[Alt]-[Backspace] key combination exits your graphical session and returns you to the graphical login screen or the console.
- GUI => Reference – denotes a sequence of GUI screen interactions. For example:
  Select File => Save to save the file.
- [REFERENCE] Section – denotes a document and section reference from Table 3. For example:
  Follow [USER] Configuring Users to add a new user.

Related Documents

This guide supplements the below documents which are available from https://support.ixiacom.com
Table 3: Related Documents

Reference	**Document**
[INSTALL]	Please refer to the Installation Guide of your TOE device. Vision ONE Installation Guide 9 13-2419-01 Rev-F TradeVision Installation Guide 913-2421-01 Rev-C Vision Edge 40 100 Installation Guide 913-2450-01 Rev-D Vision Edge 10S Installation G uide 913-2529-01 Rev-D Vision 7300 7303 Installation Guide 913-2530-01 Rev-D Vision X Installation Guide 913-2542-01 Rev-D Ixia Vision 7300 7303 Startup Guide 913-2413-01 Rev-B Rev-C Vision Edge 10S Startup Guide 913-2414-01 Rev C Ixia Vision E40 E100 Startup Guide 913-2415-01 Rev-C Vision ONE Startup Guide 913-2416-01 Rev-D Vision X Quick Start Guide Digital 913-2499-01 Rev-E TradeVision Quick Start Guide v5.7.1 913-2818-01 Rev-A
[USER]	Please refer to the User Guide of your TOE device. TradeVision Network Packet Broker v5 .7.1, 913-2817-01 Rev A

Reference	Document
	Vision 7300/7303 Network Packet Broker v5.7.1, 913-2811-01 Rev A Vision Edge 10S Network Packet Broker v5.7.1, 913-2816-01 Rev A Vision Edge 40/100 Network Packet Broker v5.7.1, 913-2813-01 Rev A Vision ONE Network Packet Broker v5.7.1, 913-2812-01 Rev A Vision X Network Packet Broker v5.7.1, 913-2810-01 Rev A

NOTE: The information in this guide supersedes related information in other documentation.

Secure Acceptance and Update

Obtaining the TOE

Your Ixia Network Packet Broker will be delivered via commercial courier. Perform the following checks upon receipt (return the device if either of the checks fail):

- Confirm that the correct device has been delivered
- Inspect the packaging to confirm that there are no signs of tampering

Follow instructions at [INSTALL] Order of Installation and Setup to setup the TOE.

Verifying the TOE

After logging in as a system administrator select System > Version to check current version of the software.
See section 2.4 below for the instructions on updating the TOE.

Power-on Self-Tests

On start-up, the system will run a series of self-tests:

- POST. The system runs Power-On diagnostic Self-Test (POST) every time it starts until disabled. Refer [USER] Run POST tests and Get POST Results.
- FIPS Self-tests. The TOE checks the integrity of the system files at the startup. See [USER] Startup System Integrity Check section of the Government Security Configuration Guide chapter.
  The TOE runs FIPS-Approved power-up self-tests (during power-up or reboot of the TOE) and conditional self-tests. Refer [USER] Enable Server FIPS Encryption section of the Government Security Configuration Guide chapter. If any of the self-tests fail to produce the expected outcome, an error message indicating the failure and a timestamp of when the error occurred is written to the local logfile buffer, the module enters a critical error state, and the appliance shuts down.
  The FIPS-Approved power-up and conditional self-test failures result in the following error message: FIPS self test failed as of <timestamp> with error: $1.
  The $1 is a placeholder for an error that differs depending on the self-test. The error options are listed below for each self-test:
- AES -ECB KATs (Encryption/Decryption)
    - Failed self test on encryption: AES

    - Failed self test on decryption: AES
- RSA KATs (Signature Generation/Signature Verification)
    - Self test signature generate failed.: RSA
    - Self test signature verify failed.: RSA
    - Self test SVE encryption KAT failed.: RSA/SVE
    - Self test SVE decryption KAT failed.: RSA/SVE
    - Self test SVE failed.: RSA/SVE
    - vi) Exception on self test: signing requires private key: RSA

      vii) Exception on self test: verification requires public key: RSA
- SHA -1 KAT
    - Self test failed : SHA-1
- SHA-256 KAT
    - Self test failed : SHA-256
- HMAC (with SHA-1) KAT
    - Self test failed : SHA-1/HMAC
- HMAC (with SHA-256) KAT
    - Self test failed : SHA-256/HMAC
- Hash DRBG KAT
    - Self test SHA-1.2 failed, expected [] got []: SHA-1
- Pairwise Consistency Test (PCT) for RSA keypairs
    - Consistency test failed: RSA
- Continuous test on DRBG
    - Duplicate block detected in DRBG output
- Continuous test on NDRNG
    - Duplicate block detected in EntropySource output
- DRBG Health Checks
    - **Generate**

      Self test SHA-1.1 failed, expected [] got []: SHA-1
    - **Instantiate**

      Not enough entropy for security strength required: SHA-1
    - **Reseed**

      Exception on self test: Insufficient entropy provided by entropy source: SHA-1

      All of the above errors result in a critical error state and an administrator must reboot the TOE to run the self tests again by using the appliance's power button. Once the self-tests successfully pass, the appliance will start up successfully. The log messages displaying the error messages can then be viewed via the Syslog viewer.

Updating the TOE

Authorized administrators can acquire digitally signed upgrade files from Ixia Technical Support or directly from the Ixia Customer Support Portal from the following location: https://support.ixiacom.com/software-downloads/43006
Follow instructions at [USER] To upgrade the software on your system section of the Appendix C Software Upgrade/Downgrade and Cold Spare Upgrade Procedures for updating the TOE.
The TOE verifies the digital signature of the upgrade files using RSA 2048-bit public key. Refer [USER]

Upgrade/Downgrade Guidelines to/from Release 4.5 or Higher/Lower.

Configuration Guidance

Installation

Follow the instructions of [USER] augmented by the configuration steps in the following sections.

Administration Interfaces

Only the following administration interfaces may be used:

- Console. Directly connected peripherals via mini USB port, RS-232 (DB9) serial cable, or serial-based RJ-45 port. See [USER] Craft Port Connection to connect using serial port.
  - Follow instructions at [USER] Configure the serial (CRAFT) port console section of the Government Security Configuration Guide chapter to configure session time out and enter an appropriate login banner for the serial console.
  - User may terminate the local session by selecting Logout from Main Menu. See [USER] Using the Console Authentication options section of the Serial (CRAFT) Port Console Access and Authentication chapter.
- HTTPS. Web-based Graphical User Interface via HTTPS.
  - Refer [USER] Government Security Configuration Guide chapter to login to the web console as a System Administrator and perform the actions listed in Configure Government Security Settings.
    NOTE: The settings in Configure Government Security Settings indicate that all “Enhanced security settings should be enabled” however HTTP should be set to disabled.
  - User may use the Logout button to terminate the current Web Console session.
  - Session termination is supported and may be configured via System > Settings >Session timeout. See [USER] Configure the (Web Console) Session Timeout.
  - Banner messages are supported and may be configured via System > Settings > Login banner. See [USER] Adding a Login Banner.
  - See [USER] Configure Server Certificate for Web API Communication for instructions on configuring certificates and generate signing requests.
    NOTE: The Web API is not interactive and does not display a banner. The administrators shall only use basic authentication when interacting with Web API.

Cryptography

FIPS mode can be enabled at System > Settings > FIPS encryption. Refer [USER] Enable Server FIPS Encryption.

Default Passwords

admin. The default administrator account used to access both serial and web console. On serial, follow instructions at [USER] Reset Administrator Password to change the default password. On web console, user will be prompted to change the password on first use. See [USER] Force Password Change on First Use section of the Authentication, Authorization, and Accounting (AAA) chapter.
NOTE: Once an additional administrator account is added, the default administrator account must be modified so that it can only log in to the serial (CRAFT) port console. See [USER] Configure the default administrator account.

Setting Time

The TOE supports the use of NTP servers which can be accessed via System > Settings > NTP. Refer [USER] Enabling and Configuring NTP Servers.

Audit Logging

The Common Criteria evaluation confirmed that the log events listed at Annex A: Log Reference are generated by the TOE.

A syslog must be configured to store the logs as follows:

- To enable, refer to [USER] Configure Syslog Servers and Adding or Modifying External Syslog Servers sections.
- Syslog must be used with TLS per the instructions at [USER] Enabling TLS Encryption of the Syslog Support chapter.

The TOE also stores logs locally. See [USER] How local syslog files work – appending and overwriting files section of the About Local Syslog Viewer chapter for details on overwriting logs.

Administrator Authentication

Follow instructions at [USER] Configure the Web API Service to configure the number of successive unsuccessful authentication attempts and period of inactivity.

NOTE: On the web API, administrator can configure settings for tokens used to authenticate calls to the web API. Refer [USER] Web console/API settings.

Refer [USER] Password Policies for details about Default Password guidelines and various password policies.

For LDAP authentication enable the following configuration settings.

- Under System>Settings>Remote Services>Authentication, choose LDAP from the radio button menu.
- Keep LDAP Mode and Authorization in the default settings.
- For a new server, enter the DNS name, set Enable TLS checkbox to true, and set the port to 636.
- Add the Root Certificate under LDAP Server Authentication Certificate by uploading the certificate and entering the same value in Server/Host as the DNS setting for the server.

TLS Communication

The communication between the Vision NPB system and the syslog server as well as HTTP communications between users and the NPB are protected by TLS encryption. Follow instructions at [USER] Enabling TLS Encryption section of the Syslog Support chapter to enable TLS communications with a Syslog server. Follow instructions at [USER] Configure Server Certificate for Web API Communication to enable TLS over HTTP communications. Follow the instructions at [USER] Uploading a Custom Server Certificate to upload the newly signed CSR.

When a connection is broken, no plaintext is sent. The reconnect re-initiates the TCP handshake and TLS handshake. TLS will be reused when the connection is re-established.

TOE supports Subject Alternate Name (SANs) and Common Name (CN) as reference identifiers. When the TLS client receives an X.509 certificate from the server, the client will compare the reference identifier with the established Subject Alternative Names (SANs) in the certificate. If a SAN is available and does not match the reference identifier, then the verification fails, and the channel is terminated. If there are no SANs of the correct type (DNS name) in the certificate, then the TOE will compare the reference identifier to the Common Name (CN) in the certificate Subject. If there is no CN, then the verification fails and the channel is terminated. If the CN exists and does not match, then the verification fails and the channel is terminated. Otherwise, the reference identifier verification passes and additional verification actions can proceed.

For Syslog communication, only DNS names are supported as acceptable reference identifiers. IP addresses are not allowed for reference identity.

Annex A: Log Reference

Format
Each audit record includes the following fields:

- Timestamp
- Severity Level (CRITICAL, ALERT, ERROR, WARNING, NOTICE, INFO)
- Message (including user if applicable and indication of success or failure)

Refer [USER] Syslog Message Format section of the APPENDIX G NPB Syslog Messages for more details about format of the logs.
Events
The TOE generates the following log events.

Requirement	**Audit Events**	**Examples**
FAU_GEN.1	Start-up and	Jan 29 08:32:52 10.19.17.10 1 2020-01-
	shutdown of the	29T13:32:52.215Z 10.19.17.10 VisionONE – – – 0
	audit functions	AppStack Syslog init complete
		Jan 29 08:32:53 10.19.17.10 1 2020-01-
		29T13:32:52.557Z 10.19.17.10 VisionONE – – – 1
		Syslog server 10.100.0.2 (Port: 514, Facility:
		LOCAL0, Tls Enabled: false) came on-line
		Jan 29 08:32:53 10.19.17.10 1 2020-01-
		29T13:32:52.563Z 10.19.17.10 VisionONE – – – 2
		System 6322 ready

		Jan 29 08:32:53 10.19.17.10 1 2020-01-
		29T13:32:52.564Z 10.19.17.10 VisionONE – – – 3
		FIPS integrity check completed as of Wed Jan 29
		13:29:44 UTC 2020
		Jan 29 08:32:53 10.19.17.10 1 2020-01-
		29T13:32:52.564Z 10.19.17.10 VisionONE – – – 4
		BouncyCastle FIPS selftest completed as of Wed
		Jan 29 13:29:46 UTC 2020
		Jan 29 08:32:53 10.19.17.10 1 2020-01-
		29T13:32:52.564Z 10.19.17.10 VisionONE – – – 5
		OpenSSL FIPS selftest completed as of Wed Jan 29
		13:29:46 UTC 2020
		Jan 29 08:32:53 10.19.17.10 1 2020-01-

		29T13:32:52.565Z 10.19.17.10 VisionONE – – – 6
		FIPS selftest completed successfully of Wed Jan 29
		13:29:46 UTC 2020
		Jan 29 08:32:53 10.19.17.10 1 2020-01-
		29T13:32:52.592Z 10.19.17.10 VisionONE – – – 7
		Config.ser read

Requirement	Audit Events	Examples
		Jan 29 08:32:56 10.19.17.10 1 2020-01-
		29T13:32:56.206Z 10.19.17.10 VisionONE – – – 8
		Server ready
		Jan 22 17:23:02 10.19.17.10 1 2020-01-
		22T22:23:02.032Z 10.19.17.10 VisionONE – – – 264
		“admin” restart system
		Jan 29 08:25:35 10.19.17.10 1 2020-01-
		29T13:25:35.512Z 10.19.17.10 VisionONE – – – 1132

		Power down system
	Administrative	Feb 5 12:24:56 10.19.17.10 1 2020-02-
	login and logout	05T17:24:56.462Z 10.19.17.10 VisionONE – – – 4731
		Successful login Web GUI (ID: testadmin, Source
		URL: 10.100.1.126, X-Forwarded-Host: WEB_GUI,
		Token: Token
		ZmNjM2Y5YWYwNGRlNWZlNjYwNDNiMzljMWUwN
		TkwYTNmMWUzYTA4YmI2NTE5ZmVmNmQ0YjhkO
		TA1ZDQ5Njk4ZA==)
		Feb 5 12:26:33 10.19.17.10 1 2020-02-
		05T17:26:33.525Z 10.19.17.10 VisionONE – – – 4734
		Session logout Web GUI (ID: testadmin, Source
		URL: 10.100.1.126, X-Forwarded-Host: WEB_GUI,
		Token: Token
		ZmNjM2Y5YWYwNGRlNWZlNjYwNDNiMzljMWUwN
		TkwYTNmMWUzYTA4YmI2NTE5ZmVmNmQ0YjhkO

	TA1ZDQ5Njk4ZA==)
Changes to TSF	Feb 14 08:34:26 10.19.17.10 1 2020-02-
data related to	14T13:34:26.313Z 10.19.17.10 VisionONE – – – 320
configuration	“testadmin” changed System:
changes	ENHANCED_SECURITY_SETTINGS=removeTacSs
	h=false, validateCertCrl=true,
	validateRootCertUse=true, syslogUnknownCert=true,
	crlServerAddr=,
	SYSLOG_TLS_HANDSHAKE_ENABLED=true
Generating/import	Jan 9 12:30:15 10.19.17.10 1 2020-01-
of, changing, or	09T17:30:15.101Z 10.19.17.10 VisionONE – – – 156
deleting of	“admin” zeroized any existing key pair and created
cryptographic	new public/private key pair for TLS
keys	
Resetting	Feb 4 15:02:53 10.19.17.10 1 2020-02-
passwords	04T20:02:53.596Z 10.19.17.10 VisionONE – – – 2232
	“testuser” changed User “testuser”:

		PASSWORD_LAST_CHANGED=Feb 04, 2020
		20:02:53 GMT, PASSWORD=****,
		PASSWORD_HISTORY=****

Requirement	**Audit Events**	**Examples**
FCS_HTTPS_E	Failure to	Jan 8 11:05:12 10.19.17.10 1 2020-01-
XT.1	establish a	08T16:05:15.197Z 10.19.17.10 VisionONE – – – 2154
	HTTPS Session	AppStack “system” “/10.100.1.126:60318” TLS
		handshake failure. Exception caught:
		javax.net.ssl.SSLHandshakeException: no cipher
		suites in common.
FCS_NTP_EXT. 1	Configuration of a new time server Removal of configured time server	Feb 5 10:43:11 10.19.17.10 1 2020-02- 05T15:43:11.326Z 10.19.17.10 VisionONE – – – 2541 “testadmin” changed System: NTP_SERVER_LIST=Enabled=true [10.19.17.2:123 (Auth Enabled:true, Key Id:100, Key Type: SHA1, Key:****)]

FCS_TLSC_EX	Failure to	Jan 29 09:23:32 10.19.17.10 1 2020-01-
T.1	establish a TLS	29T14:23:32.019Z 10.19.17.10 VisionONE – – – 386
	Session	Connection has been shutdown:
		javax.net.ssl.SSLHandshakeException:
		java.security.cert.CertificateException: No name
		matching services.example.com found TLS
		handshake failure.
FCS_TLSS_EXT	Failure to	Jan 8 11:05:12 10.19.17.10 1 2020-01-
.1	establish a TLS	08T16:05:15.197Z 10.19.17.10 VisionONE – – – 2154
	Session	AppStack “system” “/10.100.1.126:60318” TLS
		handshake failure. Exception caught:
		javax.net.ssl.SSLHandshakeException: no cipher

		suites in common.
FIA_AFL.1	Unsuccessful login attempts limit is met or exceeded.	Jan 14 10:14:30 10.19.17.10 1 2020-01- 14T15:14:30.596Z 10.19.17.10 VisionONE – – – 1004 “testadmin” login failed user is locked after a predefined number of consecutive unsuccessful logins or based on a configurable number of days of inactivity where the user has not been logged in, and DoD security policies are enabled
FIA_UIA_EXT.1	All use of identification and authentication mechanism.	Jan 14 15:21:42 10.19.17.10 1 2020-01- 14T20:21:42.875Z 10.19.17.10 VisionONE – – – 1266 “test” login failed, 10.100.1.126, invalid user id or password, Session type: Web GUI
FIA_UAU_EXT.2	All use of identification and authentication mechanism.	Jan 14 15:14:14 10.19.17.10 1 2020-01- 14T20:14:14.579Z 10.19.17.10 VisionONE – – – 1238 “testuser” login failed, 10.100.1.126, invalid user id or password, Session type: Web GUI
		Jan 14 15:14:19 10.19.17.10 1 2020-01- 14T20:14:19.239Z 10.19.17.10 VisionONE – – – 1243 Successful login Web GUI (ID: testuser, Source URL: 10.100.1.126, X-Forwarded-Host: WEB_GUI, Token:

Requirement	**Audit Events**	**Examples**

		Token Y2UyYjY3M2QzMGE5MDY0Njc3NzhkOTU2MTRhY zA3ODQ3YzkzY2M0NjZmNDg4YmViZmFmNjM2Mm MyYWQ1 ODRhYQ==)
FIA_X509_EXT.	Unsuccessful	
1/Rev	attempt to validate a	See **Table 5: x509 Audit Logs** below.
	certificate	
FIA_X509_EXT.	TOE is unable to	
2	verify the validity of th e certificate	See **Table 5: x509 Audit Logs** below.
	due to network	
	connection	
	problem	
FIA_X509_EXT.	Create CSR	Jan 9 12:30:15 10.19.17.10 1 2020-01-
3		09T17:30:15.156Z 10.19.17.10 VisionONE – – – 157
		“admin” zeroized any existing key pair and created
		new public/private key, then created a new certificate
		signing request (CSR) for TLS

		Jan 9 13:29:49 10.19.17.10 1 2020-01-
		09T18:29:49.913Z 10.19.17.10 VisionONE – – – 213
		“admin” zeroized any existing key pair and created
		new public/private key, then created a new certificate
		signing request (CSR) for Syslog
		Validating a response message to a Certification
		Request without a valid certification path results in
		the function failing
		Jan 9 13:36:22 10.19.17.10 1 2020-01-
		09T18:36:22.986Z 10.19.17.10 VisionONE – – – 215
		“admin” certificate upload failed for Syslog. No
		certificate chain found for the certificate in the file.
		Jan 9 13:38:27 10.19.17.10 1 2020-01-
		09T18:38:27.175Z 10.19.17.10 VisionONE – – – 216
		“admin” certificate upload failed for Syslog. Invalid

		certificate: Issuer: CN=Root
		CA,OU=CC1801,O=Lightship
		Security,L=Ottawa,ST=ON,C=CA Serial:
		dd323450cef24303. Error: certificate does not verify
		with supplied key
		Jan 9 12:39:04 10.19.17.10 1 2020-01-
		09T17:39:04.203Z 10.19.17.10 VisionONE – – – 167
		“admin” certificate upload failed for TLS. No
		certificate chain found for the certificate in the file.
		Jan 9 12:43:10 10.19.17.10 1 2020-01-
		09T17:43:10.889Z 10.19.17.10 VisionONE – – – 168
		“admin” certificate upload failed for TLS. Invalid
		certificate: Invalid certificate: Issuer: CN=Root

Requirement	**Audit Events**	**Examples**

		CA,OU=CC1801,O=Lightship Security,L=Ottawa,ST=ON,C=CA Serial: dd323450cef24303. Error: certificate does not verify with supplied key
FMT_MOF.1/	Any attempt to	Jan 29 08:18:08 10.19.17.10 1 2020-01-
ManualUpdate	initiate a manual	29T13:18:08.086Z 10.19.17.10 VisionONE – – – 1129
	update	“testadmin” initiated software install using file NVOS-
		5.3.0.11-73xx-62xx-20200128-144855-5e9315.zip
FMT_MOF.1/	Modification of the	Feb 6 08:49:50 10.19.17.10 1 2020-02-
Functions	behaviour of the	06T13:49:50.050Z 10.19.17.10 VisionONE – – – 653
	transmission of	“testadmin” changed System:
	audit data to an	SYSLOG_SERVER_LIST=[10.100.0.2 (Port: 514,
	external IT entity,	Facility: LOCAL0, Tls Enabled: false),
	the handling of	services.example.com (Port: 514, Facility: LOCAL0,

	audit data, the	Tls Enabled: true)]
	audit functionality	
	when Local Audit	
	Storage Space is	
	full.	
FMT_SMF.1	All management activities of TSF data.	Feb 14 08:58:03 10.19.17.11 1 2020-01- 31T01:09:10.593Z 10.19.17.11 Vision E40 – – – 157 “admin” changed System: PASSWORD_POLICIES=Enabled (Type=FIPS_DOD_SECURITY, Expiration days=0, Minimum password length=15, User inactive days=35, Max failures allowed=3, Days to track successful logins=7)
FPT_TUD_EXT.	Initiation of	Jan 29 08:18:08 10.19.17.10 1 2020-01-
1	update; result of	29T13:18:08.086Z 10.19.17.10 VisionONE – – – 1129
	the update	“testadmin” initiated software install using file NVOS-
	attempt (success	5.3.0.11-73xx-62xx-20200128-144855-5e9315.zip

	or failure)	
		Jan 29 08:46:45 10.19.17.10 1 2020-01-
		29T13:46:45.290Z 10.19.17.10 VisionONE – – – 170
		Software install succeeded
FPT_STM_EXT.	Discontinuous	Feb 5 11:07:05 10.19.17.10 1 2020-02-
1	changes to time –	06T00:07:05.454Z 10.19.17.10 VisionONE – – – 2551
	either	System Sync internal clock with NTP server:
	Administrator	10.19.17.2. Time changed from 2020-02-05 16:07:03
	actuated or	GMT to 2020-02-06 00:07:04 GMT
	changed via an	
	automated	
	process.	

FTA_SSL_EXT. 1	The termination of a local session by the session	Feb 6 11:31:37 10.19.17.10 1 2020-02- 06T16:31:37.614Z 10.19.17.10 VisionONE – – – 190

Requirement	Audit Events	Examples
	locking mechanism.	Session timeout Serial Console (ID: testadmin, localhost)
FTA_SSL.3	The termination of	Feb 5 12:16:37 10.19.17.10 1 2020-02-
	a remote session	05T17:16:37.972Z 10.19.17.10 VisionONE – – – 3964
	by the session	Session logout Web GUI (ID: testadmin, Source
	locking	URL: 172.16.100.30, X-Forwarded-Host: WEB_GUI,
	mechanism.	Token: Token
		ZGM5ZGVmZGJjNzMzNjY0OWFjY2U5MDNjMjUxN2
		YwZmU4NjYxYzBiZWU1MDU1YTBjODY4YTIxN2Mz
		MmE3ZDEyNQ==)
FTA_SSL.4	The termination of	Feb 5 12:26:33 10.19.17.10 1 2020-02-

	an interactive	05T17:26:33.525Z 10.19.17.10 VisionONE – – – 4734
	session.	Session logout Web GUI (ID: testadmin, Source
		URL: 10.100.1.126, X-Forwarded-Host: WEB_GUI,
		Token: Token
		ZmNjM2Y5YWYwNGRlNWZlNjYwNDNiMzljMWUwN
		TkwYTNmMWUzYTA4YmI2NTE5ZmVmNmQ0YjhkO
		TA1ZDQ5Njk4ZA==)
FTP_ITC.1	Initiation of the	Feb 10 11:58:03 10.19.17.10 1 2020-02-
	trusted channel.	10T16:58:03.305Z 10.19.17.10 VisionONE – – – 859
	Termination of the	“services.example.com/fd00:c0de:0:0:10:100:0:97e9:
	trusted channel.	6514″ TLS trusted channel initiated. Interface:
	Failure of the	Syslog.
	trusted channel functi ons.	Feb 10 11:58:03 10.19.17.10 1 2020-02- 10T16:58:03.305Z 10. 19.17.10 VisionONE – – – 860 !

		services.example.com/fd00:c0de:0:0:10:100:0:97e9:
		6514!
		Feb 10 11:58:03 10.19.17.10 1 2020-02-
		10T16:58:03.306Z 10.19.17.10 VisionONE – – – 861
		“services.example.com/fd00:c0de:0:0:10:100:0:97e9:
		6514″ TLS handshake succeeded. Interface: Syslog.
FTP_TRP.1/ Admin	Initiation of the trusted path. Termination of the trusted path. Failure of the trusted path functions.	Jan 8 17:14:57 10.19.17.10 1 2020-01- 08T22:14:57.480Z 10.19.17.10 VisionONE – – – 2273 AppStack “system” “/10.100.1.126:32902” TLS trusted channel initiated. Jan 8 17:14:58 10.19.17.10 1 2020-01- 08T22:14:58.503Z 10.19.17.10 VisionONE – – – 2274 AppStack “system” “/10.100.1.126:32902” TLS trusted channel terminated.

X.509 Reason for Failure	**Sample Syslog Audit Log**	**Sample LDAP Audit Log**
Valid certificate chain	Feb 9 16:40:09 10.19.17.40 1	Feb 9
is broken (e.g.	2022-02-09T21:40:09.655Z	16:41:46

intermediate CA	10.19.17.40 Vision E10S – – – 1003	10.19.17.40 1
certificate is missing)	!Exception caught:	2022-02-
	javax.net.ssl.SSLException:	09T21:41:46.
	Connection has been shutdown:	573Z
	javax.net.ssl.SSLHandshakeExcept	10.19.17.40
	ion:	Vision E10S –
	sun.security.validator.ValidatorExce	– – 1008
	ption: PKIX path building failed:	LDAP
	sun.security.provider.certpath.SunC	StartTLS TLS
	ertPathBuilderException: unable to	Connection
	find valid certification path to	Issue
	requested target. Cause:	validateTlsSe
	javax.net.ssl.SSLHandshakeExcept	ssionWithSer
	ion:	ver |
	sun.security.validator.ValidatorExce	LDAPExcepti
	ption: PKIX path building failed:	on(resultCod

	sun.security.provider.certpath.SunC	e=80 (other),
	ertPathBuilderException: unable to	errorMessage
	find valid certification path to	='sun.security
	requested target.	.validator.Vali
	kali.example.com/10.19.17.111:651	datorExceptio
	4!	n: PKIX path
		building
		failed:
		sun.security.p
		rovider.certpa
		th.SunCertPa
		thBuilderExce
		ption: unable
		to find valid
		certification
		path to

		requested
		target',
		ldapSDKVersi
		on=5.1.4,
		revision=d0a7
		b2f8e3d485d
		a16f9b5b8ce
		251fb7602a4
		22e)
Uploading an expired	Jun 22 14:58:16 10.19.17.40 1	Jun 25
Root CA certificate	2021-06-22T18:58:16.830Z	15:52:14
	10.19.17.40 Vision E10S – – – 2904	10.19.17.40 1

	"admin" certificate upload failed for	2021-06-
	Syslog. The trusted root file is an	25T19:52:14.

invalid custom certificate. Error:	056Z
java.security.cert.CertificateExcepti	10.19.17.40
on: Certificate expired: Issuer:	Vision E10S –
CN=Root	– – 1329
CA,OU=CC1917,O=Lightship	“admin”
Security,L=Ottawa,ST=ON,C=CA	certificate
Serial: 4cf659fde0e3fed9.	upload failed
	for LDAP.
	The uploaded
	file contains
	non-root
	certificates:
	java.security.
	cert.Certificat

	eException:
	Certificate
	expired:
	Issuer:
	CN=Root
	CA,OU=CC1
	917,O=Lights
	hip
	Security,L=Ot
	tawa,ST=ON,
	C=CA Serial:
	4cf659fde0e3
	fed9.

Expired certificates	Feb 9 16:45:21 10.19.17.40 1	Feb 9
(Intermediate or Leaf	2022-02-09T21:45:21.032Z	16:47:27
certificates)	10.19.17.40 Vision E10S – – – 1027	10.19.17.40 1
	!Exception caught:	2022-02-
	javax.net.ssl.SSLException:	09T21:47:27.
	Connection has been shutdown:	400Z
	javax.net.ssl.SSLHandshakeExcept	10.19.17.40
	ion:	Vision E10S –
	sun.security.validator.ValidatorExce	– – 1035
	ption: PKIX path validation failed:	LDAP
	java.security.cert.CertPathValidator	StartTLS TLS
	Exception: validity check failed.	Connection
	Cause:	Issue

	javax.net.ssl.SSLHandshakeExcept	validateTlsSe
	ion:	ssionWithSer
	sun.security.validator.ValidatorExce	ver |
	ption: PKIX path validation failed:	LDAPExcepti
	java.security.cert.CertPathValidator	on(resultCod
	Exception: validity check failed.	e=80 (other),
	kali.example.com/10.19.17.111:651	errorMessage
	4!	='sun.security
		.validator.Vali
		datorExceptio
		n: PKIX path
		validation
		failed:

		java.security. cert.CertPath Validat orExce ption: validity check failed', ldapSDKVersi on=5.1.4, revision=d0a7 b2f8e3d485d a16f9 b5b8ce 251fb7602a4 22e)

Revoked certificate	Feb 9 15:52:39 10.19.17.40 1 2022-02-09 T20:52:39.463Z 10.19.17.40 Vision E10S – – – 542 !Exception caught: javax.net.ssl.SSLException: Connection has been shutdown: javax.net.ssl.SSLHandshakeExcept ion: sun.security.validator.ValidatorExce ption: PKIX path validation failed: java.security.cert.CertPathValidator Exception: Certificate has been revoked, reason: UNSPECIFIED, revocation date: Wed Jun 23 14:34:53 GMT 2021, authority: CN=Root CA, OU=CC1917, O=Lightship Security, L=Ottawa, ST=ON, C=CA, extension OIDs: []. Cause: javax.net.ssl.SSLHandshakeExcept ion: sun.security.validator.ValidatorExce ption: PKIX path validation failed: java.security.cert.CertPathValidator Exception: Certificate has been revoked, reason: UNSPECIFIED, revocation date: Wed Jun 23 14:34:53 GMT 2021, authority: CN=Root CA, OU=CC1917, O=Lightship Security, L=Ottawa, ST=ON, C=CA, extension OIDs: []. kali.example.com/10.19.17.111:651 4!	Feb 9 15:58:43 10.19.17.40 1 2022-02- 09T20:58:43. 262Z 10.19.17.40 Vision E10S – – – 611 TLS certificate revoked failure. Certificate revoked: CN=Intermediate CA,OU=CC1 917,O=Lights hip Security,L=Ot tawa,ST=ON, C=CA

Uploading a Root CA certificate with cRLsign key usage bit NOT set	Feb 9 17:05:12 10.19.17.40 1 2022-02-09 T22:05:12.729Z 10.19.17.40 Vision E10S – – – 1054 “admin” certificate upload failed for Syslog. The trusted root file is an invalid custom certificate. Error: java.security.cert.CertificateException: CA key usage cRLSign bit not set to TRUE for CA certificate	Feb 9 17:02:57 10.19.17.40 1 2022-02- 09T22:02:57. 831Z 10.19.17.40 Vision E10S – – – 1052

	Issuer: CN=Root	“admin”
	CA,OU=CC1917,O=Lightship	certificate
	Security,L=Ottawa,ST=ON,C=CA	upload failed
	Serial: 80b2cc696ae1bcc8.	for LDAP.
		The uploaded
		file contains
		non-root
		certificates:

	java.security.
	cert.Certificat
	eException:
	CA key usage
	cRLSign bit
	not set to
	TRUE for CA
	certificate
	Issuer:
	CN=Root
	CA,OU=CC1
	917,O=Lights
	hip
	Security,L=Ot
	tawa,ST=ON,
	C=CA Serial:

		80b2cc696ae
		1bcc8.
Intermediate CA	Feb 9 19:35:16 10.19.17.40 1	Feb 9
certificate with	2022-02-10T00:35:16.006Z	16:16:17
cRLsign key usage bit	10.19.17.40 Vision E10S – – – 1551	10.19.17.40 1
NOT set	“kali.example.com/10.19.17.111:65	2022-02-
	14″ TLS handshake failure.	09T21:16:17.
	Interface: Syslog. Exception	330Z
	caught: javax.net.ssl.SSLException:	10.19.17.40
	Connection has been shutdown:	Vision E10S –
	javax.net.ssl.SSLHandshakeExcept	– – 961 LDAP
	ion:	StartTLS TLS
	sun.security.validator.ValidatorExce	Connection
	ption: PKIX path validation failed:	Issue
	java.security.cert.CertPathValidator	setupAndCon
	Exception: Could not determine	nectLdapSsl |

	revocation status. Cause:	LDAPExcepti
	javax.net.ssl.SSLHandshakeExcept	on(resultCod
	ion:	e=80 (other),
	sun.security.validator.ValidatorExce	errorMessage
	ption: PKIX path validation failed:	='LDAPS
	java.security.cert.CertPathValidator	Connection
	Exception: Could not determine	Issue with
	revocation status.	General
		Security
		Execption CA
		key usage
		cRLSign bit
		not set to
		TRUE for CA
		certificate

		Issuer: CN=Root CA,OU=CC1 917,O=Lights hip Security,L=Ot ta wa,ST=ON, C=CA Serial: c96f28121eb 955ca.', ldapSDKVersi on=5.1.4, revision=d0a7 b2f8e3d485d a16f9 b5b8ce 251fb7602a4 22e)

Modified/Tampered Certificates	Feb 9 17:24:49 10.19.17.40 1 2022-02-09T22:24:49.854Z 10.19.17.40 Vision E10S – – – 1070 “kali.example.com/10.19.17.111:65 14” TLS handshake failure. Interface: Syslog. Exception caught: javax.net.ssl.SSLException: Connection has been shutdown: javax.net.ssl.SSLProtocolException : unknown object in getInstance: org.bouncycastle.asn1.DERSet. Cause: javax.net.ssl.SSLProtocolException : unknown object in getInstance: org.bouncycastle.asn1.DERSet.	Feb 9 17:26:17 10.19.17.40 1 2022-02- 09T22:26:17. 834Z 10.19.17.40 Vision E10S – – – 1076 LDAP StartTLS TLS Connection Issue validateTlsSe ssionWithSer ver | LDAPExcepti on(resultCod e=80 (other), errorMessage =’unknown object in getInstance: org.bouncyca stle.asn1.DE RSet’, ldapSDKVersi on=5.1.4, revision=d0a7 b2f8e3d485d a16f9 b5b8ce 251fb7602a4 22e)

Modified/Tampered Signature (signatureValue) in **Certificate**	Feb 9 17:29:10 10.19.17.40 1 2022-02-09 T22:29:10.133Z 10.19.17.40 Vision E10S – – – 1095 !Exception caught:	Feb 9 17:29:53 10.19.17.40 1 2022-02-
	javax.net.ssl.SSLException:	09T22:29:53.
	Connection has been shutdown:	056Z
	javax.net.ssl.SSLHandshakeExcept	10.19.17.40
	ion:	Vision E10S –
	sun.security.validator.ValidatorExce	– – 1100
	ption: PKIX path validation failed:	LDAP
	java.security.cert.CertPathValidator	StartTLS TLS
	Exception: signature check failed.	Connection
	Cause:	Issue
	javax.net.ssl.SSLHandshakeExcept	validateTlsSe

ion:	ssionWithSer
sun.security.validator.ValidatorExce	ver |
ption: PKIX path validation failed:	LDAPExcepti
java.security.cert.CertPathValidator	on(resultCod
Exception: signature check failed.	e=80 (other),
kali.example.com/10.19.17.111:651	errorMessage
4!	='sun.security
	.validator.Vali
	datorExceptio
	n: PKIX path
	validation
	failed:
	java.security.
	cert.CertPath
	ValidatorExce
	ption:
	signature

		check failed’,
		ldapSDKVersi
		on=5.1.4,
		revision=d0a7
		b2f8e3d485d
		a16f9b5b8ce
		251fb7602a4
		22e)
Modified/Tampered	Feb 9 17:32:26 10.19.17.40 1	Feb 9
public key of a	2022-02-09T22:32:26.500Z	17:33:19
certificate	10.19.17.40 Vision E10S – – – 1119	10.19.17.40 1
	!Exception caught:	2022-02-
	javax.net.ssl.SSLException:	09T22:33:19.
	Connection has been shutdown:	062Z
	javax.net.ssl.SSLHandshakeExcept	10.19.17.40
	ion:	Vision E10S –

	sun.security.validator.ValidatorExce	– – 1124
	ption: PKIX path validation failed:	LDAP
	java.security.cert.CertPathValidator	StartTLS TLS
	Exception:	Connection
	java.security.cert.CertificateParsing	Issue
	Exception: java.io.IOException:	validateTlsSe
	subject key, RSA modulus has a	ssionWithSer
	small prime factor. Cause:	ver |
	javax.net.ssl.SSLHandshakeExcept	LDAPExcepti
	ion:	on(resultCod
	sun.security.validator.ValidatorExce	e=80 (other),
	ption: PKIX path validation failed:	errorMessage

	java.security.cert.CertPathValidator Exception: java.security.cert.CertificateParsing Exception: java.io.IOException: subject key, RSA modulus has a small prime factor. kali.example.com/10.19.17.111:651 4!	=’sun.security .validator.Vali datorExceptio n: PKIX path validation failed: java.security. cert.CertPath ValidatorExce ption: java.security. cert.Certificat eParsingExce ption: java.io.IOExc eption: subject key, RSA modulus has a small prime factor’, ldapSDKVersi on=5.1.4, revision=d0a7 b2f8e3d485d a16f9 b5b8ce 251fb7602a4 22e)
Uploading a Root CA certificate that does not contain the basicConstraints extension **OR** **has basicConstraints extension in which the CA flag is set to FALSE**	Feb 9 17:36:52 10.19.17.40 1 2022-02-09 T22:36:52.842Z 10.19.17.40 Vision E10S – – – 1137 “admin” certificate upload failed for Syslog. CA flag in basic constraints not set to TRUE for CA certificate Issuer: CN=Root CA,OU=CC1917,O=Lightship Security,L=Ottawa,ST=ON,C=CA Serial: 80b2cc696ae1bcc8.	*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).
Intermediate CA	Feb 9 17:50:16 10.19.17.40 1	Feb 9
Certificate that does	2022-02-09T22:50:16.120Z	17:51:33
not contain the	10.19.17.40 Vision E10S – – – 1236	10.19.17.40 1
basicConstraints	!Exception caught:	2022-02-
extension	javax.net.ssl.SSLException:	09T22:51:33.
	Connection has been shutdown:	055Z
OR	javax.net.ssl.SSLHandshakeException:	10.19.17.40 Vision E10S –
has basicConstraints	sun.security.validator.ValidatorExce	– – 1249
extension in which the	ption: PKIX path validation failed:	LDAP
CA flag is set to	java.security.cert.CertPathValidator	StartTLS TLS
FALSE.	Exception: basic constraints check failed: this is not a CA certificate.	Connection Issue

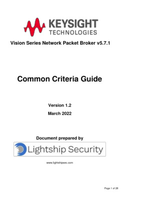
	Cause:	validateTlsSe
	javax.net.ssl.SSLHandshakeExcept	ssionWithSer
	ion:	ver |
	sun.security.validator.ValidatorExce	LDAPExcepti
	ption: PKIX path validation failed:	on(resultCod
	java.security.cert.CertPathValidator	e=80 (other),
	Exception: basic constraints check	errorMessage
	failed: this is not a CA certificate.	='sun.security
	kali.example.com/10.19.17.111:651	.validator.Vali
	4!	datorExceptio
		n: PKIX path
		validation
		failed:
		java.security.
		cert.CertPath

		ValidatorExce
		ption: basic
		constraints
		check failed:
		this is not a
		CA
		certificate’,
		ldapSDKVersi
		on=5.1.4,
		revision=d0a7
		b2f8e3d485d
		a16f9b5b8ce
		251fb7602a4
		22e)

Unable to perform	Feb 9 19:42:15 10.19.17.40 1	Feb 9
validation checking	2022-02-10T00:42:15.178Z	19:45:30
(CRL	10.19.17.40 Vision E10S – – – 1654	10.19.17.40 1
issuerunreachable)	“kali.example.com/10.19.17.111:65	2022-02-
	14″ TLS handshake failure.	10T00:45:30.
	Interface: Syslog. Exception	683Z
	caught: javax.net.ssl.SSLException:	10.19.17.40
	Connection has been shutdown:	Vision E10S –

	javax.net.ssl.SSLHandshakeExcept	– – 1659 TLS
	ion:	certificate
	sun.security.validator.ValidatorExce	validation
	ption: PKIX path validation failed:	failure.
	java.security.cert.CertPathValidator	Exception
	Exception: Unable to determine	while trying to
	revocation status due to network	obtain CRL
	error. Cause:	from URL
	javax.net.ssl.SSLHandshakeExcept	http://ca.exa
	ion:	mple.com:80
	sun.security.validator.ValidatorExce	80/int1.crl.pe
	ption: PKIX path validation failed:	m:
	java.security.cert.CertPathValidator	Connection
	Exception: Unable to determine	refused
	revocation status due to network	(Connection
	error.	refused)

Documents / Resources

 KEYSIGHT TECHNOLOGIES Vision Series Network Packet Broker v5.7.1 Common Criteria Guide Version 1.2 March 2022 Document prepared by Lightship Security www.lightshipsec.com Page 1 of 28	KEYSIGHT Vision Series Network Packet Broker [pdf] User Guide Vision Series, Network Packet Broker, Broker

References

- java.io
- javax.net
- Lightship Security | Certification at the Speed of Development
- Ixia Network|Security|Application Performance
- Ixia Network|Security|Application Performance
- Ixia Identity Portal

- Common Criteria : New CC Portal
- Lightship Security | Certification at the Speed of Development
- NIAP: Protection Profiles