Extreme OS ONE Switching and Routing v22.2.2.0 GNOI Reference Guide

Services, RPCs, and Operational Management

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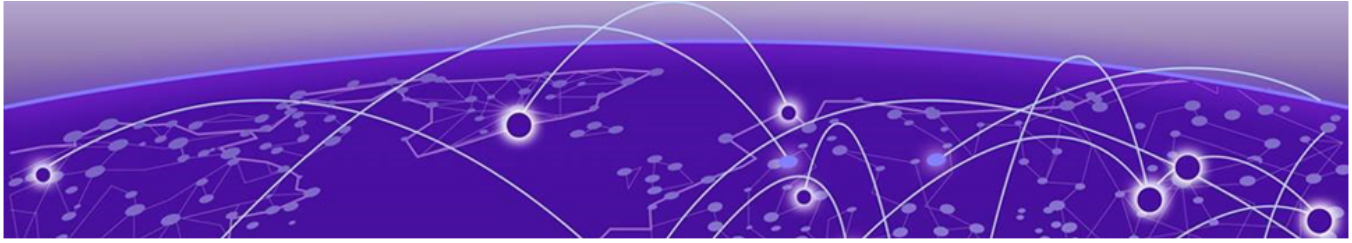

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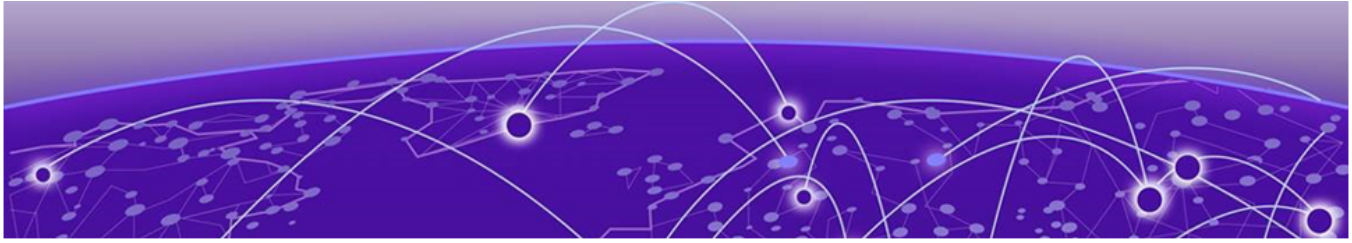

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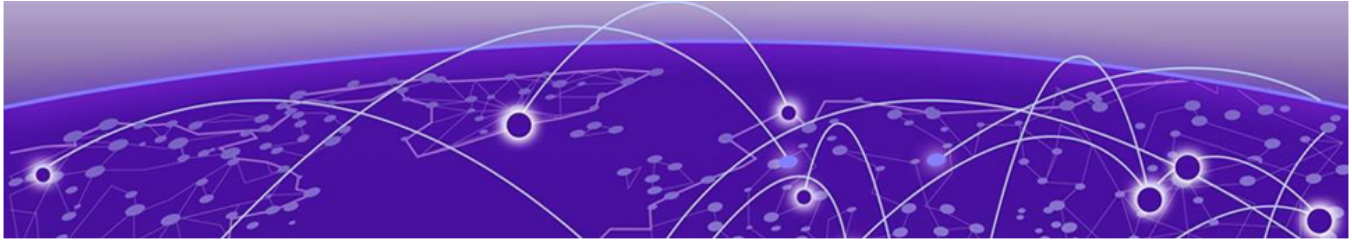

Abstract

The Extreme OS ONE SR v22.2.2.0 gNOI Reference Guide details gRPC Network Operations Interface (gNOI) services for the supported Extreme hardware platforms. OpenConfig-compliant protocols include file operations and OS package management. Platform-specific extensions cover authentication via JWT, certificate management, configuration state transitions, firmware lifecycle, and network protocol services. Advanced RPCs enable virtual machine control, programmable component firmware upgrades, SSH server management, system reboot, and automated tech support file collection. All services are implemented using gRPC transport, with protocol buffer definitions available on GitHub.

Preface

Read the following topics to learn about:

- The meanings of text formats used in this document.
- Where you can find additional information and help.
- How to reach us with questions and comments.

Text Conventions

Unless otherwise noted, information in this document applies to all supported environments for the products in question. Exceptions, like command keywords associated with a specific software version, are identified in the text.

When a feature, function, or operation pertains to a specific hardware product, the product name is used. When features, functions, and operations are the same across an entire product family, such as Extreme Networks switches, the product is referred to as *the switch*.

Table 1: Notes and warnings

Icon	Notice type	Alerts you to...
	Tip	Helpful tips and notices for using the product
	Note	Useful information or instructions
	Important	Important features or instructions
	Caution	Risk of personal injury, system damage, or loss of data
	Warning	Risk of severe personal injury

Table 2: Text

Convention	Description
`screen displays`	This typeface indicates command syntax, or represents information as it is displayed on the screen.
The words *enter* and *type*	When you see the word *enter* in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says *type*.
Key names	Key names are written in boldface, for example **Ctrl** or **Esc**. If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press **Ctrl**+**Alt**+**Del**
Words in italicized type	Italics emphasize a point or denote new terms at the place where they are defined in the text. Italics are also used when referring to publication titles.
NEW!	New information. In a PDF, this is searchable text.

Table 3: Command syntax

Convention	Description
bold text	Bold text indicates command names, keywords, and command options.
italic text	Italic text indicates variable content.
`[ ]`	Syntax components displayed within square brackets are optional. Default responses to system prompts are enclosed in square brackets.
`{ x | y | z }`	A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options.
x | **y**	A vertical bar separates mutually exclusive elements.
< >	Nonprinting characters, such as passwords, are enclosed in angle brackets.
...	Repeat the previous element, for example, *member*[*member*...].
\	In command examples, the backslash indicates a “soft” line break. When a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

Documentation and Training

Find Extreme Networks product information at the following locations:

Current Product Documentation
Release Notes
Hardware and Software Compatibility for Extreme Networks products
Extreme Optics Compatibility
Other Resources such as articles, white papers, and case studies

Open Source Declarations

Some software files have been licensed under certain open source licenses. Information is available on the Open Source Declaration page.

Training

Extreme Networks offers product training courses, both online and in person, as well as specialized certifications. For details, visit the Extreme Networks Training page.

Help and Support

If you require assistance, contact Extreme Networks using one of the following methods:

Extreme Portal

Search the GTAC (Global Technical Assistance Center) knowledge base; manage support cases and service contracts; download software; and obtain product licensing, training, and certifications.

The Hub

A forum for Extreme Networks customers to connect with one another, answer questions, and share ideas and feedback. This community is monitored by Extreme Networks employees, but is not intended to replace specific guidance from GTAC.

Call GTAC

For immediate support: (800) 998 2408 (toll-free in U.S. and Canada) or 1 (408) 579 2800. For the support phone number in your country, visit www.extremenetworks.com/support/contact.

Before contacting Extreme Networks for technical support, have the following information ready:

- Your Extreme Networks service contract number, or serial numbers for all involved Extreme Networks products
- A description of the failure
- A description of any actions already taken to resolve the problem
- A description of your network environment (such as layout, cable type, other relevant environmental information)
- Network load at the time of trouble (if known)
- The device history (for example, if you have returned the device before, or if this is a recurring problem)
- Any related RMA (Return Material Authorization) numbers

Subscribe to Product Announcements

You can subscribe to email notifications for product and software release announcements, Field Notices, and Vulnerability Notices.

1. Go to The Hub.
2. In the list of categories, expand the **Product Announcements** list.
3. Select a product for which you would like to receive notifications.
4. Select **Subscribe**.
5. To select additional products, return to the **Product Announcements** list and repeat steps 3 and 4.

You can modify your product selections or unsubscribe at any time.

Send Feedback

The User Enablement team at Extreme Networks has made every effort to ensure that this document is accurate, complete, and easy to use. We strive to improve our documentation to help you in your work, so we want to hear from you. We welcome all feedback, but we especially want to know about:

- Content errors, or confusing or conflicting information.
- Improvements that would help you find relevant information.
- Broken links or usability issues.

To send feedback, email us at Product-Documentation@extremenetworks.com.

Provide as much detail as possible including the publication title, topic heading, and page number (if applicable), along with your comments and suggestions for improvement.

About gNOI

gNOI (gRPC Network Operations Interface) is a modern, gRPC-based protocol developed by the OpenConfig working group. It is designed specifically for performing operational and lifecycle management tasks on network devices, complementing configuration and telemetry protocols like gNMI.

gNOI uses gRPC for transport and shares the same configuration as gNMI. To send gNOI requests, a client implementing the gNOI interface is required.

The gRPC micro-service definitions are available as proto files on GitHub (OpenConfig gNOI Services, Extreme Services for OS ONE, and Extreme Services for OS ONE Switching).

Note
For more information, refer to the appropriate proto files.

Extreme OS ONE Switching and Routing

OpenConfig gNOI Services on page 12
Extreme Services on page 13

Use the following sections to learn about the Extreme gNOI protocols that are supported by Extreme OS ONE Switching and Routing.

OpenConfig gNOI Services

file

Table 4: file remote procedure calls

RPC	Purpose
Get	Get reads and streams the contents of a file from the target.
TransferToRemote	Transfers the contents of a file from the target to a specified remote location.
Put	Streams data into a file on the target.
Stat	Returns metadata about a file on the target.
Remove	Removes the specified file from the target.

os

Table 5: os remote procedure calls

RPC	Purpose
Install	Transfers an OS package into the Target. No concurrent Install RPCs MUST be allowed to the same Target
Activate	Sets the requested OS version as the version which is used at the next reboot, and reboots the Target if the 'no_reboot' flag is not set.
Verify	Checks the running OS version

Extreme Services

ACL

Method	Description
ClearACLCounters	ClearACLCounters clears ACL counters.

Auth

Auth service provides authentication and authorization related APIs.

Method	Description
Authenticate	Authenticate validates user credentials and returns a JWT access token and refresh token. This RPC is typically called by clients to obtain tokens for subsequent authenticated requests.
GetAccessToken	GetAccessToken accepts a valid refresh token and generates a new access token. This allows clients to refresh their session without re-authenticating.
ListRoles	ListRoles returns all the available roles in the system. Useful for clients to discover role-based access control options.
GetLoggedInUsers	GetLoggedInUsers fetches all currently authenticated users in the system. This can be used for monitoring or administrative purposes.
UnlockUser	UnlockUser unlocks a user account that has been locked due to failed login attempts or administrative action. Only privileged users should be allowed to invoke this RPC.
GetLockedUsers	GetLockedUsers returns a list of all users whose accounts are currently locked. Useful for administrators to monitor and manage locked accounts.

Method	Description
GenerateCertificate	GenerateCertificate generates a new certificate for the switch, given the certificate ID and subject details. This is typically used for device identity or secure communication setup.
GetCertificates	GetCertificates returns information about all certificates present on the target, including their usage and associated endpoints.
GetTlsMinVersion	GetTlsMinVersion returns the minimum TLS version configured on the target. This helps clients determine the security posture of the device.

BFD

Method	Description
ClearBFDCounters	ClearBFDCounters clears BFD counters.

BGP

Method	Description
ClearMacRoute	L2vpn-evpn clear rpc-services
ClearArpNdRoute	ClearArpNdRoute clears BGP EVPN ARP/ND routes from the routing table.
ClearPfxRoute	ClearPfxRoute clears BGP EVPN prefix routes from the routing table. Used to refresh IP prefix advertisements in EVPN.
ClearImrRoute	ClearImrRoute clears BGP EVPN IMR routes from the routing table.
ClearRouteByType	ClearRouteByType clears BGP EVPN routes by specific route type. Allows selective clearing of specific EVPN route types (ES-AD, MAC/IP, IMET, ESR, or IP-PREFIX).
ClearMacVrfMacRoute	MAC-VRF clear rpc-services
ClearMacVrfImrRoute	ClearMacVrfImrRoute clears IMR routes from MAC-VRF routing table (within a specific bridge domain).
ClearMacVrfArpNdRoute	ClearMacVrfArpNdRoute clears ARP/ND routes from MAC-VRF routing table. Used to refresh neighbor information within a specific bridge domain context.
ClearMacVrfRouteByType	ClearMacVrfRouteByType clears routes by type from MAC-VRF routing table. Allows selective clearing of MAC, IMR, ARP, ND, or ALL route types within a bridge domain.
ClearPeerGroup	ClearPeerGroup clears BGP peer group sessions and associated routes. Supports SOFT, SOFTIN, and HARD clear modes for different reset behaviors.

CommandHistory

Method	Description
CLIHistory	CLIHistory will display command history of the given user.

ConfigManagement

The ConfigManagement service provides an interface for config related operations on Target.

Method	Description
CopyDefaultToRunning	CopyDefaultToRunning RPC is used for copying default-config to running-config. This leads to auto reboot of the device on success.
CopyFileToRunning	CopyFileToRunning RPC is used for copying file to running-config.
CopyRunningToFile	CopyRunningToFile RPC is used for copying running-config to a specified configuration file.
CopyFileToBackupConfig	CopyFileToBackupConfig RPC is used to create a backup-config file by copying a config file from various sources such as remote file, USB or disk. Optionally supports apply-on-next-reboot flag (defaults to false) to replay the backup-config on immediate reboot.
CopyRunningConfigToBackupConfig	CopyRunningConfigToBackupConfig RPC is used to create a backup-config file by copying the current running configuration to the backup config location. Optionally supports apply-on-next-reboot flag (defaults to false) to replay the backup-config on immediate reboot.
RemoveBackupConfig	RemoveBackupConfig RPC is used to delete the backup-config file and clear any pending apply-on-next-reboot requests.
CopyBackupConfigToFile	CopyBackupConfigToFile RPC is used to copy the backup-config file to a specified destination file location for export or archival purposes.

DbAudit

DbAudit defines the RPC service.

Method	Description
LatestMetadata	LatestMetadata returns the sync_version and last_update_timestamp of the last configuration change.

Firmware

The complete interface for Extreme firmware installation on a target device is as follows. The Client progresses through 4 RPCs: 1) SelectPackage - download/copy the firmware package file onto target device - provided by system.proto 2) Activation - install/activate the downloaded/copied firmware package - provided by os.proto 3) Verification - verify that the install was successful - provided by os.proto 4) Commit - commit the activated firmware package - provided by this proto

Method	Description
PreValidate	For any of below operations, No concurrent RPCs allowed. To pre-validate a firmware package updating on the target. Checks like image file extension, versions compatibility based on image file name given.
Commit	To commit a firmware package into the target. For a firmware package already in committed state, no action is required.
Rollback	To rollback the App package into the target, from current version to rollback version. During base rollback, reboot is not triggered to maintain consistency with gNMI behavior. If required, the user must manually perform a reboot based on the status message.
Uninstall	To uninstall the App package into the target.

IAH

Method	Description
VmControlCommand	Virtual Machine Control RPC
VmImport	Virtual Machine import RPC
IahFileInfo	IAH file info RPC
VmSnapshot	VM snapshot RPC
TpvmUpgrade	TPVM upgrade RPC

Interface

Method	Description
ClearInterfaceCounters	ClearInterfaceCounters clears interface counters.

Khi

Key Health Indicator (KHI) gNMI service definition.

Method	Description
GetBios	Get BIOS related info.
GetCpu	Get average CPU usage related info.
GetCpuThreads	Get instantaneous top 10 cpu threads info.

Method	Description
GetRam	Get RAM usage related info.
GetMem	Get Virtual Memory usage related info.
GetRfs	Get Primary Root Filesystem usage related info.
GetPartition	Get Partition usage related info of config, appdata, usrdata, secondary partition.
GetHost	Get Host related info.
GetMsUsage	Get Micro service related telemetry info of memory and cpu usage.
GetDiskUsage	Get HDD Usage related info.

LACP

Method	Description
ClearLACPCounters	ClearLACPCounters clears LACP counters.

License

Method	Description
SetEula	SetEula Accept or Decline EULA (End User License Agreement)
GetLicense	Get all licenses on the device Optionally set type in request to EULA_INFO, to get EULA statement.

LLDP

Method	Description
ClearLLDPCounters	ClearLLDPCounters clears LLDP counters.

MaintenanceMode

Method	Description
SetMaintenanceMode	SetMaintenanceMode sets maintenance mode.

MLAG

Method	Description
ClearMLAGCounters	ClearMLAGCounters clears MLAG counters.

Programmable

The complete interface for Extreme programmable component firmware upgrade is as follows. The Client progresses through 1 RPC: 1) Upgrade - flash firmware file onto target programmable component

Method	Description
Upgrade	Upgrade flashes a firmware file onto the target programmable component.

QOS

Method	Description
ClearQOSCounters	ClearQOSCounters clears QOS counters.

Ssh

Method	Description
RestartSSHServer	RestartSSHServer will restart SSH server service.

SystemUtils

Method	Description
RebootSystem	Reboot the system.

TablesNetwork

Method	Description
ClearRoute	ClearRoute clears all routes from vrf address family or a route entry.
ClearMacRoute	ClearMacRoute clears all mac addresses from a bridge-domain or a single entry.
ClearArpNdRoute	ClearArpNdRoute clears all ArpNdR routes from a bridge-domain or a single entry.
ClearMacMoveDetection	ClearMacMoveDetection clears all entries from ShutPortList.

TechSupport

Method	Description
StartTechSupport	StartTechSupport initiates tech support data collection.
ListTechSupport	ListTechSupport lists all tech support files.

Method	Description
ClearTechSupport	ClearTechSupport clears tech support files.
ListAutoTechSupport	ListAutoTechSupport lists auto-generated tech support files.

VLAN

Method	Description
ClearBridgeDomainCounters	ClearBridgeDomainCounters clears Bridge Domain counters.