ExtremeSwitching™

ExtremeFabric Release Notes

Software Version ExtremeXOS 22.2

Table of Contents

Preface

Conventions

This section discusses the conventions used in this guide.

Text Conventions

The following tables list text conventions that are used throughout this guide.

Table 1: Notice Icons

Icon	Notice Type	Alerts you to...
	General Notice	Helpful tips and notices for using the product.
	Note	Important features or instructions.
	Caution	Risk of personal injury, system damage, or loss of data.
	Warning	Risk of severe personal injury.
	New	This command or section is new for this release.

Table 2: Text Conventions

Convention	Description
`Screen displays`	This typeface indicates command syntax, or represents information as it appears 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 with brackets, such as **[Return]** 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.

Platform-Dependent Conventions

Unless otherwise noted, all information applies to all platforms supported by ExtremeXOS® software, which are the following:

- ExtremeSwitching® switches
- Summit® switches
- SummitStack™

When a feature or feature implementation applies to specific platforms, the specific platform is noted in the heading for the section describing that implementation in the ExtremeXOS command documentation (see the Extreme Documentation page at http://documentation.extremenetworks.com). In many cases, although the command is available on all platforms, each platform uses specific keywords. These keywords specific to each platform are shown in the Syntax Description and discussed in the Usage Guidelines sections.

Terminology

When features, functionality, or operation is specific to a switch family, such as ExtremeSwitching™ or Summit®, the family name is used. Explanations about features and operations that are the same across all product families simply refer to the product as the switch.

Providing Feedback to Us

We are always striving to improve our documentation and help you work better, so we want to hear from you! We welcome all feedback but especially want to know about:

- Content errors or confusing or conflicting information.
- Ideas for improvements to our documentation so you can find the information you need faster.
- Broken links or usability issues.

If you would like to provide feedback to the Extreme Networks Information Development team about this document, please contact us using our short online feedback form. You can also email us directly at internalinfodev@extremenetworks.com.

Getting Help

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

- **GTAC (Global Technical Assistance Center) for Immediate Support**
    - **Phone:** 1-800-998-2408 (toll-free in U.S. and Canada) or +1 408-579-2826. For the support phone number in your country, visit: www.extremenetworks.com/support/contact
    - **Email:** support@extremenetworks.com. To expedite your message, enter the product name or model number in the subject line.
- **GTAC Knowledge** — Get on-demand and tested resolutions from the GTAC Knowledgebase, or create a help case if you need more guidance.
- **The Hub** — A forum for Extreme customers to connect with one another, get questions answered, share ideas and feedback, and get problems solved. This community is monitored by Extreme Networks employees, but is not intended to replace specific guidance from GTAC.
- **Support Portal** — Manage cases, downloads, service contracts, product licensing, and training and certifications.

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

- Your Extreme Networks service contract number and/or serial numbers for all involved Extreme Networks products
- A description of the failure
- A description of any action(s) 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

Related Publications

ExtremeXOS Publications

- *ACL Solutions Guide*
- *ExtremeXOS 22.2 Command Reference Guide*
- *ExtremeXOS 22.2 EMS Messages Catalog*
- *ExtremeXOS 22.2 Feature License Requirements*
- *ExtremeXOS 22.2 User Guide*
- *ExtremeXOS OpenFlow User Guide*
- *ExtremeXOS Quick Guide*
- *ExtremeXOS Legacy CLI Quick Reference Guide*
- *ExtremeXOS Release Notes*
- *Extreme Hardware/Software Compatibility and Recommendation Matrices*
- *Switch Configuration with Chalet for ExtremeXOS 21.x and Later*
- *Using AVB with Extreme Switches*

Open Source Declarations

Some software files have been licensed under certain open source licenses. More information is available at: www.extremenetworks.com/support/policies/software-licensing

1 Overview

ExtremeFabric Introduction
ExtremeFabric Feature Description
Supported Platforms
ExtremeFabric Limitations
Configuring ExtremeFabric
ExtremeFabric Configuration Example

These release notes document ExtremeFabric, a new feature in ExtremeXOS 22.2.

IMPORTANT: ExtremeFabric Beta Software Notice

ExtremeFabric is available as "Beta Software" (for trial or lab use only) in the ExtremeXOS 22.2 release. Extreme Networks encourages customers to evaluate ExtremeFabric in their test or lab environment and share experiences and feedback on The Hub at: https://community.extremenetworks.com/extreme).

ExtremeFabric Introduction

ExtremeFabric is a network of cooperating interconnected devices that create a highly scalable fabric for any topology, providing fully redundant, multipath routing. The fabric grows dynamically and freely, not bound to any well-known topology such as Clos or Leaf/Spine.

ExtremeFabric nodes build a secure fabric by running the very scalable Border Gateway Protocol (BGP) to exchange topology information about IP networks. It uses IPv6 as the network layer to transport IPv4 traffic.

Any device connecting to an ExtremeFabric device is an attachment point to the network. The fabric device applies policy rules as it discovers external devices. These devices can be any IP host, LAG-attached servers and bridges, or gateway routers. By default, ExtremeFabric allows connectivity for all attached hosts, allowing for a controller-less operation. However, interconnection (trunk ports) between fabric nodes should not be LAG ports; you should not enable port sharing on trunk ports.

ExtremeFabric uses a combination of the Link Layer Discovery Protocol (LLDP) and external BGP over an IPv6 Transport Layer to create the fabric. ExtremeFabric uses LLDP to discover surrounding nodes and the node's capabilities. LLDP is extended to advertise Extreme Easy Networking capabilities.

ExtremeFabric Feature Description

> **Note**
> ExtremeFabric relies on a default STPD instance "s0" to resolve loops on the default VLAN.

> **Note**
> Extremefabric automatically creates VLANs with tags specified by the create fabric vlans on page 13 command.

> **Note**
> Create fabric uses eBGP adjacencies. The AS number should be different for all devices participating in the fabric.

After executing the command create fabric vlans on page 13, the following series of events occurs, setting up the ExtremeFabric:

1 The ExtremeFabric node automatically creates the fabric VLANs with the specific tags specified by the create fabric vlans on page 13 command. A loopback VLAN is created as well, using the router ID as the IP address.
2 The ExtremeFabric capability is advertised out of all ports using LLDP automatically. This sets up the default VLAN and BGP configurations that are needed for ExtremeFabric.
3 When an ExtremeFabric-capable neighbor is detected out a port, LLDP notifies the ExtremeFabric.
4 ExtremeFabric assigns the LLDP learned port to one of the VLANs within its configured range.
5 ExtremeFabric informs LLDP of the IPv6 link-local address configured on that VLAN along with the BGP router ID and AS number.
6 LLDP sends the ExtremeFabric information (IPv6 link-local, router ID, AS number) to the remote neighbor and learns the remote neighbor information, relaying this back to ExtremeFabric.
7 ExtremeFabric creates an ExtremeFabric route to the learned remote router ID.
8 ExtremeFabric creates and enables the BGP neighbor.
9 The ExtremeFabric is formed and host route updates are received allowing end-to-end connectivity.

> **Note**
> ExtremeFabric relies on VRRP host mobility to learn host routes.

Supported Platforms

For broader customer participation in the "Beta", ExtremeFabric 22.2 software operates on the following switches:

Summit X670-G2, X770, X460-G2, and ExtremeSwitching X870 series switches.

> **Note**
> Please note that final supported switches for ExtremeFabric could change as ExtremeFabric is optimized for enhanced performance and scale once it reaches the "General Availability" milestone.

This feature requires the Core license. For more information about licenses, see the *ExtremeXOS 22.2 Feature License Requirements*.

ExtremeFabric Limitations

The following capabilities are limited or not supported in ExtremeXOS ExtremeFabric:

- The number of hosts in ExtremeFabric network is limited to 16K, except for the Summit X460-G2, which is limited to 12K.
- The maximum number of ExtremeFabric nodes in a network is 64.
- The maximum number of ECMP paths per ExtremeFabric Node is 64.
- VPLS and L2VPN is not supported in conjunction with ExtremeFabric.
- ExtremeFabric is not recommended for stacking.
- IP multicast traffic within ExtremeFabric network is not supported.
- MLAG attachment is not supported.
- VXLAN, private VLANs, and port bridging are not supported.
- VMWARE Vmotion (VM movement) does not work with ExtremeFabric—Vmotion sends out RARP after a VM has moved and ExtremeFabric relies on ARP to learn the IP address of end hosts.
- Automatic detection and resolution of duplicate IP addresses on hosts connected to the fabric is not supported.
- Port sharing (LAG) on fabric ports is not supported in this release.
- Virtual router is not supported.

Configuring ExtremeFabric

To create and enable ExtremeFabric, use the command:

create fabric vlans on page 13

To delete ExtremeFabric, use the command:

delete fabric on page 14

To show the status of ExtremeFabric and the learned ExtremeFabric interfaces and corresponding remote peer information, use the command:

show fabric on page 15

ExtremeFabric Configuration Example

The following example shows a simple leaf/spine topology with users on VLANs, red and blue, noted as 1 and 2.

> **Note**
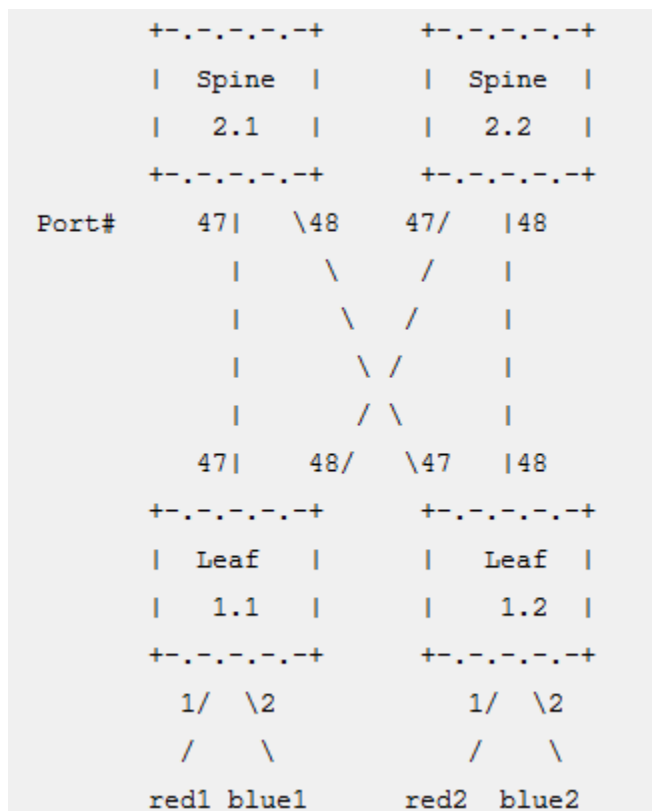> A Core license must be installed on all devices.

The following commands reserve 64 VLANs, which is the maximum. It is recommended to reserve more than needed, so that you can add links without recreating the fabric.

Devices labeled with router IDs 10.255.x.y:

```
        +-.-.-.-.-+        +-.-.-.-.-+
        |  Spine  |        |  Spine  |
        |   2.1   |        |   2.2   |
        +-.-.-.-.-+        +-.-.-.-.-+
 Port#     47|   \48    47/    |48
            |     \     /     |
            |      \   /      |
            |       \ /       |
            |       / \       |
            |      /   \      |
           47|    48/   \47   |48
        +-.-.-.-.-+        +-.-.-.-.-+
        |  Leaf   |        |   Leaf  |
        |   1.1   |        |    1.2  |
        +-.-.-.-.-+        +-.-.-.-.-+
          1/  \2              1/  \2
          /    \              /     \
        red1 blue1        red2  blue2
```

Leaf 1

```
Configure vlan default delete ports 1-2
create vlan "red" tag 100
Configure vlan red add ports 1 untagged
create vlan "red" tag 100
configure vlan "red" ipaddress 10.1.1.1/24
enable ipforwarding vlan "red"

create vrrp vlan "red" vrid 1
configure vrrp vlan "red" vrid 1 priority 255
configure vrrp vlan "red" vrid 1 host-mobility on
configure vrrp vlan "red" vrid 1 add 10.1.1.254
enable vrrp vlan "red" vrid 1

create vlan " blue" tag 200
configure vlan "blue" ipaddress 10.1.2.1/24
Configure vlan blue add ports 2 untagged
enable ipforwarding vlan "blue"

create vrrp vlan "blue" vrid 1
configure vrrp vlan "blue" vrid 1 priority 255
configure vrrp vlan "blue" vrid 1 host-mobility on
configure vrrp vlan "blue" vrid 1 add 10.1.2.254
enable vrrp vlan "blue" vrid 1

create fabric vlans 2001-2064 routerid 10.255.1.1 AS-number 4278124801
```

Leaf 2

```
Configure vlan default delete ports 1-2
create vlan "red" tag 100
configure vlan red add ports 1 untagged
configure vlan "red" ipaddress 10.1.1.1/24
enable ipforwarding vlan "red"

create vrrp vlan "red" vrid 1
configure vrrp vlan "red" vrid 1 priority 255
configure vrrp vlan "red" vrid 1 host-mobility on
configure vrrp vlan "red" vrid 1 add 10.1.1.1
enable vrrp vlan "red" vrid 1

create vlan " blue" tag 200
configure vlan "blue" ipaddress 10.1.2.1/24
configure vlan blue add ports 2 untagged
enable ipforwarding vlan "blue"

create vrrp vlan "blue" vrid 1
configure vrrp vlan "blue" vrid 1 priority 255
configure vrrp vlan "blue" vrid 1 host-mobility on
configure vrrp vlan "blue" vrid 1 add 10.1.2.1
enable vrrp vlan "blue" vrid 1
create fabric vlans 2001-2064 routerid 10.255.1.2 AS-number 4278124802
```

Spine 1

```
# create fabric vlans 2001-2064 routerid 10.255.2.1 AS-number 4278125057
# show fabric

Router ID: 10.255.2.1
AS       : 4278125057

VLAN            Neighbor IP Address          Router ID        Remote AS
--------------- ---------------------------- --------------- ----------
FBRC_VLAN_2001  fe80::204:96ff:fe97:fcd5     10.1.1.1         4278124801
FBRC_VLAN_2002  fe80::204:96ff:fe97:fdd5     10.1.1.2         4278124802
. . .
FBRC_VLAN_2064  None
```

Spine 2

```
# create fabric vlans 2001-2064 routerid 10.255.2.2 AS-number 4278125058
# show fabric

Router ID: 10.255.2.2
AS       : 4278125058

VLAN            Neighbor IP Address          Router ID        Remote AS
--------------- ---------------------------- --------------- ----------
FBRC_VLAN_2001  fe80::204:96ff:fe97:fcd5     10.1.1.1         4278124801
FBRC_VLAN_2002  fe80::204:96ff:fe97:fdd5     10.1.1.2         4278124802
. . .
FBRC_VLAN_2064  None
```

2 ExtremeFabric Limits

This chapter summarizes the supported limits in ExtremeFabric.

Table 3: ExtremeFabric Limits

Metric	Product	Limit
ExtremeFabric (nodes)—maximum number of ExtremeFabric nodes.	Summit X670-G2, X770, X460-G2, ExtremeSwitching X870	64
ExtremeFabric (attached hosts)—maximum number of attached hosts.	Summit X670-G2, X770, X460-G2, ExtremeSwitching X870	16,000

3 ExtremeFabric Commands

create fabric vlans
delete fabric
show fabric

This section provides information about all of the ExtremeFabric commands.

create fabric vlans

create fabric vlans *vlan_list* **routerid** *ipaddress* **AS-number** *asNumber*

Description

This command creates and enables ExtremeFabric using a range of supplied VLANs (which ExtremeFabric uses), the router ID, and AS number. This command creates the VLAN list, configures the VLANs with an IPv6 link-local address, and enables IPv6 forwarding. It also creates a loopback VLAN with an IP address of the BGP router ID. Within BGP, the router ID, AS number, and easyBGP capability are configured along with redistribution of host-mobility routes.

Syntax Description

vlans	Designates the VLANs that ExtremeFabric uses.
vlan_list	VLAN list (range is 2–4,094).
routerid	Designates a BGP router ID.
ipaddress	Specifies the BGP router ID as an IP address in IPv4 format (x.y.z.w).
AS-number	Designates unique BGP Autonomous System (AS) number.
asNumber	Specifies the AS number (1–4,294,967,295).

Default

N/A

Usage Guidelines

Save and reboot is required if ECMP exceeds 16.

Example

The following example creates a fabric with VLANs 500 through 505, using BGP router ID at 10.3.4.2 with AS 52:

```
create fabric vlans 500-505 routerid 10.3.4.2 AS-number 52
```

History

This command was first available in ExtremeXOS 22.2.

Platform Availability

This command is available on the Summit X460-G2, X670-G2, X770, and the ExtremeSwitching X870 series switches.

This feature requires the Core license. For more information about licenses, see the *ExtremeXOS 22.2 Feature License Requirements*.

delete fabric

```
delete fabric
```

Description

This command deletes ExtremeFabric, removing all of the ExtremeFabric configuration. This command deletes the VLAN list, loopback, and configuration created with enabling ExtremeFabric.

Syntax Description

This command has no arguments or variables.

Default

N/A

Example

The following example deletes the ExtremeFabric:

```
delete fabric
```

History

This command was first available in ExtremeXOS 22.2.

Platform Availability

This command is available on the Summit X460-G2, X670-G2, X770, and the ExtremeSwitching X870 series switches.

This feature requires the Core license. For more information about licenses, see the *ExtremeXOS 22.2 Feature License Requirements*.

show fabric

```
show fabric
```

Description

This command displays the status of ExtremeFabric and the learned ExtremeFabric interfaces and corresponding remote peer information.

Syntax Description

This command has no arguments or variables.

Default

N/A

Example

The following example shows the status of ExtremeFabric:

```
#show fabric
Enabled : Yes
RouterId : 67.89.21.1
AS : 64512
VLAN Neighbor IP Address Router Id Remote AS
---------- ----------------------------- --------------- ----------
VLAN_0705 fe80::204:96ff:fe98:8096 0.0.0.100 64513
VLAN_0704 fe80::204:96ff:fe98:7432 7.8.9.102 64514
VLAN_0703 fe80::204:96ff:fe98:4251 10.4.5.19 64515
```

History

This command was first available in ExtremeXOS 22.2.

Platform Availability

This command is available on the Summit X460-G2, X670-G2, X770, and the ExtremeSwitching X870 series switches.

This feature requires the Core license. For more information about licenses, see the *ExtremeXOS 22.2 Feature License Requirements*.