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eBook

FABRIC CONNECT KEY CAPABILITIES How to Leverage the Full Value of Your Current or Upcoming Investment



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INTRODUCTION

Did you know that the average smart phone user utilizes only a small percentage of the total features accessible to them?

What about your network? **Are you leveraging your Fabric Connect network to its full potential?** With networking requirements changing rapidly, there might be features that are more relevant today, than when you first deployed your network.

This eBook talks about the major capabilities available within the Fabric Connect technology. The intent is to make you aware of functionality that you may not be leveraging today, so that you can get the most value out of your strategic investment!

If you are just getting started with Fabric Connect, this eBook will help get you acquainted with the technology – but also to *really* get to know Fabric Connect - there is *nothing better* than getting hands-on experience through one of our Fabric Connect Virtual Workshops. Contact your Extreme sales representative to learn more.

WHAT IS FABRIC CONNECT?

A simpler way to design, deploy, manage and troubleshoot networks



"A single, business wide fabric will become the de facto architecture to support modern digital imperatives." - Forrester Research

HOW IT MEETS YOUR BUSINESS IMPERATIVES

DRIVE YOUR TOPLINE



11x faster time to service

IMPROVE OPERATING EFFICIENCY



automation



Advanced management

REDUCE RISK



ENHANCE CUSTOMER EXPERIENCE



Industry's best multicast



Network and application insights

10 THINGS TO KNOW

- It is based on enhanced Shortest Path Bridging (IEEE 802.1Q-2018 clause 27/IETF 6329).
- 2. **One** control plane for any type of network service.
- 3. All services are only ever configured at the Fabric edge and can optionally be dynamically provisioned as users and devices connect to the network through NAC.
- Services extend and retract as users and devices connect and disconnect from the network.
- 5. Fabric infrastructure is completely selfforming and self-provisioning.

- 6. Offers scalable, secure multi-tenancy and network segmentation with ease.
- Stealth topology prevents the use of IP scanning and ensures true isolation between services.
- 8. Offers the simplest, most scalable and most resilient multicast without PIM/DVMRP.
- 9. Extends network-wide from Data Center to remote branch.
- 10. Is field-proven with thousands of global deployments in the most mission critical environments (nuclear power plants, air traffic control, hospitals) with fabrics networks that literally span the globe.

HOW WE ARE ADVANCING THE TECHNOLOGY



1. ENHANCED AUTOMATION







3. CLOUD MANAGEMENT

FABRIC CONNECT KEY CAPABILITIES

KEY CAPABILITIES

This eBook breaks down the major generally available Fabric Connect features by use case.

Although many of these features can fit into more than one use case, we have chosen just one to prevent duplication. For each use case there will be an intro to each section and then each feature will be described with its associated value. Each section as well as feature is hyper-linked for ease of navigation through the book.

<u>OA&M</u>	CFM	Fabric RSPAN	Graceful Restart/overload bit	EDM	Extreme Management Center™	Analytics	ExtremeCloud™ IQ		
<u>Provider</u>	Transp. UNI	Flex UNI							
Branch	IPsec over Fabric Extend	Fragmentation and reassembly	Fabric IPsec Gateway	BFD					
<u>Campus Edge</u>	PVLAN E-Tree	EAPoL w/I-SID	RADIUS assigned Policies	DVR Multi-cast					
Data Center	DVR	VM/End-point tracking	NSX-OVSDB	VXLAN GW					
<u>Security</u>	MACsec	Policy-based segmentation	Stealth topology						
Routing	Inter-VSN Rtg IPv4 and v6	Shared Services	SMLT with SPB IPv4/6	PIM-GW					
Base Services	L2VSN	L3 VSN IPv4 and v6	IP Shortcuts IPv4 and v6	IP Multicast					
Infrastructure	Fabric Attach	Zero touch infrastructure	Auto-Sense ports	Zero-touch on-boarding	Extreme Management Center Agent	ExtremeCloud IQ Agent	Fabric Extend	Fabric Extend IP/VID	Quality of Service
IS-IS									

FABRIC CONNECT INFRASTRUCTURE CAPABILITIES

FABRIC CONNECT INFRASTRUCUTURE BASICS

Building network-wide fabrics consists of:

- FC: Fabric Connect
 - IEEE 802.1aq Shortest Path Bridging (SPB) - RFC 6329
 - IEEE 802.1ah Provider Backbone Bridges (Mac-in-Mac)
- FA: Fabric Attach
 - IEEE 802.1Qcj Automatic Attachment to Provider Backbone Bridging
- FE: Fabric Extend
 - Over the WAN or IP transport using VXLAN - RFC 7348



FABRIC CONNECT INFRASTRUCUTURE BASICS

Understanding the technology foundations:

Control Plane: Based on IS-IS

Service Abstraction Layer: Service Instance ID (I-SID) which is used to uniquely define a Fabric Connect Virtual Service Network (VSN)

Data Plane: IEEE Provider Backbone Bridges (Mac-in-Mac) (IEEE 802.1ah)

Fabric Connect Frame: (User/device MAC addresses are completely hidden from the core)



Backbone Edge Bridges

Fabric Connect services originate and terminate

Backbone Core Bridges

No services originate or terminate.



FABRIC ATTACH OVERVIEW

Extending Fabric Connect to the edge with Fabric Attach

What is it?

- Fabric Attach provides for automatic attachment of users, devices, and VMs to connect to I-SIDs
- It uses extensions to the IEEE 802.1AB Link Layer Discovery Protocol (LLDP) to automatically attach network devices to I-SIDs or VSNs in a Fabric Connect network

What is the value?

- Edge automation with dynamic auto-attach
- Enables non-Fabric Connect enabled access layer switches and APs to communicate seamlessly with the fabric

Requirements

 VOSS v5.0 for FA server capabilities; select switches, APs and endpoints for proxy/client

Fabric Attach



DID YOU KNOW?

Fabric Attach is currently being standardized as IEEE 802.1Qcj.

FABRIC ATTACH

Understanding the technology foundations:

Fabric Attach Control Plane: LLDP (with extensions)

Fabric Attach Data Plane: VLAN

Fabric Attach Elements:

Fabric Attach Server: VSP switches that receive requests to create and map VLANs to I-SIDs (VSNs)

Fabric Attach Proxy: Wiring closet switches (ERS or EXOS) that connect to an upstream FA Server device

Fabric Attach Client: Can be WLAN access points, OpenvSwitch compatible hypervisors or end points, Industrial Ethernet switches (ISW or other) or IP cameras that are running the FA agent



ZERO-TOUCH INFRASTRUCTURE

What is it?

- Enables Fabric Connect/Fabric Attach networks to self-form and self-provision without manual intervention
- Enabled through port autosensing capabilities (see page 13)

What is the value?

- True plug and play infrastructure deployment
- Eliminates the need for technical on-site resources when deploying new switches remotely

Requirements

• VOSS v8.3



Fabric

HOW DOES IT WORK?

Fabric-enabled devices automatically exchange IS-IS area and B-VIDs

Fabric Connect NNIs and Fabric Attach peering links are dynamically provisioned

AUTO-SENSE PORTS

What is it?

 It enables switch ports to autodetect what is connected to it and provision it dynamically without any manual intervention

What is the value?

- Simple automation
- True plug and play deployments

Requirements

• VOSS v8.3



TIP:

See Campus Edge section for more details

ZERO TOUCH ON-BOARDING OVERVIEW

What is it?

- Enables Fabric Connect devices to on-board to either the Extreme Management Center or ExtremeCloud IQ management systems though a secure on-boarding service that is dynamically established
- Enabled by ExtremeCloud IQ and Extreme Management Center agent capabilities (see page 16 and 17)

What is the value?

- Simplified deployment
- Eliminates the need for technical staff to be physically on-site for new hardware deployment

Requirements

• VOSS v8.3



EXTREMECLOUD IQ AGENT

What is it?

 ExtremeCloud IQ Agent enables NOS persona selection (on Universal Switches), device onboarding, NOS upgrades and simple edge device configurations to be applied to Fabric Connect/ Fabric Attach devices

What is the value?

- Cloud-based device monitoring
- Simplified license management
- Ease of management and deployment
- Single pane of glass with cloud-wireless products

Requirements

• VOSS v8.2

ExtremeCloud IQ Onboarding Example

Enter the device serial number



Apply policy/configuration template



Add device to the network



EXTREME MANAGEMENT CENTER AGENT

What is it?

 Automates the secure onboarding of devices to the Extreme Management Center centralized management system

What is the value?

- Enables NOS upgrades, device authentication and base configurations to be applied
- Simplified deployment/ configuration
- Eliminates the need for technical staff to be physically on-site for new hardware deployment

Requirements

• VOSS v8.2.5

New devices are automatically discovered



They are put in a "Pending Edit" Status until configured with the appropriate templates

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Administration	eries	ERS5928GTS	XLIR724T210008	B0:AD:AA:FC:90:01	BOSS_v1_Profile	ZTP+ Complete
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FABRIC EXTEND OVERVIEW

What is it?

 Fabric Extend allows you to connect islands of fabrics into a single fabric over a Public/Private WAN/MAN infrastructure

What is the value?

- Ability to save money in WAN costs by tunneling multiple services/ networks within a single service
- Seamless extension of Fabric Connect services across geographically dispersed sites

Requirements

• VOSS 5.0

Fabric Extend Tunnel PCI DSS Service VIDEO Service PATIENT RECORDS Service IMAGING Service Logical view

Fabric Extend



FABRIC EXTEND: IP AND VID

What is it?

• There are two different types of Fabric Extend tunnels depending on whether transport is over a service provider IP-VPN service (FE IP) or over a L2 VPLS service (FE VID)

What is the value?

- Enables flexible WAN service deployment (L2 or L3)
- No requirement for the service provider network to participate in the customer IP route advertising
- Transparent extension of IP multicast to the branch

Requirements

• VOSS 5.0





QUALITY OF SERVICE

What is it?

- Fabric Connect enabled switches are both DiffServ and 802.1Q-Tag/802.1p-bit aware and leverage an 8-class queuing model
- If the traffic is being forwarded within an L2 VSN, the Ethernet p-bits will used to define the priority. If the traffic is being forwarded within an L3 VSN, the DSCP markings will define the priority
- Across the Fabric Connect backbone, the MAC-in-MAC header always carries the p-bits in the Backbone VLAN Q-tag and a Drop Eligible Bit to determine the per hop behavior across each transport node

What is the value?

• Priority of mission critical L2/3 traffic across the Fabric Connect Network

Requirements

• VOSS v3.0 with enhancements up to v7.1.0

Class of Service and ERS/VSP naming	Description
COS 7 Network/Critical	Network Control - Strict Queue, 5-10% shaped
COS 6 Premium	Real Time Voice - Strict Queue, 50% shaped
COS 5 Platinum	Real Time Video - WRR Queue
COS 4 Gold	Non-Real Time Streaming - WRR Queue
COS 3 Silver	Non-Real Time - WRR Queue
COS 2 Bronze	Best Effort - WRR Queue
COS 0 Custom	Scavenger – Low Priority Queue

FABRIC CONNECT BASE SERVICES





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FABRIC CONNECT SERVICES BASICS

Key Benefits:

- Fabric Connect provides the entire suite of today's Layer 2 and Layer 3 (IPv4/6) connectivity services but implements them in a far simpler way than traditional networks
- All Fabric Connect services are based on a single control plane (IS-IS)
- Users, IoT and applications reside in Virtualized Service Networks
- The underlying Fabric infrastructure is decoupled from the Virtualized Service Networks allowing for increased flexibility in deploying/changing services
- Virtual Service Networks are completely isolated from one another and run as ships in the night over the Fabric infrastructure

Fabric Connect Virtualized Services



LAYER 2 VIRTUAL SERVICE NETWORKS

What is it?

- The ability to stretch a VLAN to any point in the network
- Support for E-Line (point-topoint), E-LAN (any-to-any) and E-Tree (hub and spoke) services

What is the value?

- Edge provisioning only
- Scalability of Layer 2 services

Requirements

• VOSS v3.0



Layer 2 Virtual Service Network



LAYER 3 VIRTUAL SERVICE NETWORKS

What is it?

• The ability to use VRFs to support multi-tenancy and/or network segmentation with fully segmented routing tables

What is the value?

- Edge provisioning only
- Scalability of Layer 3 VPN services
- Functionality of a MPLS IP-VPN without the complexity

Requirements

• VOSS v3.0/higher scaling in v6.0; requires a premier license to activate





IPv4/6 SHORTCUTS

What is it?

• The ability to efficiently route traffic through the fabric using the Global Routing Table. Rather than a route look-up at every hop; traffic is efficiently switched across the fabric

What is the value?

- Edge provisioning only
- A single routing instance for IPv4 and IPv6 for efficient IPv4 to IPv6 migration/co-existence

Requirements

• VOSS v3.0



Routing across a Fabric Connect Network



IP MULTICAST

What is it?

• The ability to support multicast traffic across the fabric without needing to deploy complex legacy multicast protocols. Multicast traffic can be constrained within either IP Shortcuts, L2 VSNs or L3 VSNs

What is the value?

- Edge provisioning only
- Eliminates the need for complex, slow and erratic protocols such as PIM and DVMRP
- Performance, scale, ease of deployment
- Unique in the industry!

Requirements

 VOSS v3.1, increased scale v6.0; premier license is required when multicast is constrained within a L3 VSN





*Multicast can also be virtualized within a L2/L3 service

FABRIC CONNECT ROUTING CAPABILTIES

INTER-VSN ROUTING FOR IPv4/v6

What is it?

 The ability for any VSP node to be able to route between two or more Layer 2 Virtual Service Networks using a VRF or Global Routing Table IP Shortcuts

What is the value?

- Ease of implementation
- Flexible network design options

Requirements

• VOSS v3.0



SHARED SERVICES BETWEEN TENANTS

What is it?

- Shared services between tenants are enabled by a feature called IS-IS Accept Policies that creates L3 Hub and Spoke topologies
- It allows users on different Layer 3 VSNs to remain completely isolated from each other while still accessing shared services

What is the value?

• Efficient multi-tenancy since it allows different tenants to be completely isolated while safely accessing shared services

Requirements

• VOSS v4.1

Shared Services between Tenants in a Fabric Connect Network



SMLT WITH FABRIC CONNECT IPv4/IPv6

What is it?

- Split Multilink Trunking provides active/active loop-free redundant paths for non-fabric devices attached to a Fabric Connect network
- For active/active IP Gateway redundancy with SMLT (or across multiple SMLT domains), there are two options. VRRP with Back-up/Master extensions or Routed Split-Multilink Trunking

What is the value?

• Active/active connectivity for Layer 2 and Layer 3 traffic flows

Requirements

• VOSS v4.2.1

Fabric Connect with SMLT

(active/active L2 connectivity)



IP Gateway Redundancy Options



DID YOU KNOW?

Distributed Virtual Routing can also be used as an alternative to VRRP and RSMLT for both Campus's and Data Centers. See pages 40 and 48 for details.

PIM GATEWAY

What is it?

• The ability to connect any Fabric Connect L3 VSN or IP Shortcut to a PIM-SM or PIM-SSM domain

What is the value?

- IP Multicast Interworking between a traditional multicast network and a Fabric Connect network
- Seamless migration/co-existence

Requirements

• VOSS v6.0

PIM Gateway Implementation



SECURITY ATTRIBUTES

FABRIC CONNECT SECURITY BASICS

Key Benefits:

Traffic separation is an essential component to network security. Fabric Connect offers the following capabilities:

- Service separation/segmentation: Fabric Connect Layer 2/3 VSNs are isolated by design. They run as ships in the night over the Fabric infrastructure. This isolation even allows for overlapping IP/MAC addresses between VSNs
- Address separation: Is provided between the access and core. User/ device MAC addresses are completely hidden from the core of the network
- Routing separation: Layer 3 VSNs offer fully segmented routing tables at scale

Stealth networking refers to the use of Ethernet Switched Paths to forward traffic which provide strong inherent security and prevent the use of IP scanning to discover the network topology



DID YOU KNOW?

A user or device in one VSN can't communicate with a user or device in another VSN unless configured to do so.

MACsec ENCRYPTION

What is it?

 MACsec is a hop-by-hop security capability which encrypts/ decrypts packets between connected switches or devices

What is the value?

 Provides increased security/data protection at the Ethernet link layer

Requirements

- Requires a MACsec feature license to activate
- Supported on select platforms



POLICY-BASED SEGMENTATION

What is it?

- When an Extreme NAC solution is deployed in the network, access to secure Fabric Connect VSNs/segments can be controlled
- When a user or device connects to the network, it is authenticated, dynamically assigned a VLAN/I-SID as well as a role-based policy
- These assignments follow the user/device as they change locations

What is the value?

- Controlled access to only required resources
- Ability to lock down communication of IoT devices to only authorized hosts, preventing machine to machine attacks within a segment
- Configuration dynamically applied and deleted from edge ports as users connect and disconnect from the network

Requirements

 VOSS v8.3 (for VOSS-enabled edge switches); Fabric Attach capable switches with ExtremeControl



STEALTH ATTRIBUTES

What is it?

• All traffic in a Fabric Connect network is forwarded using Ethernet Switched Paths. Also, because IS-IS runs directly over Ethernet, there are not any IP addresses anywhere in the core

What is the value?

- Prevention of lateral movement through concealment of the core network topology
- Without IP in the aggregation/ core, IP scanning techniques commonly used by hackers won't work

Requirements

• VOSS v3.0



DID YOU KNOW?

A Fabric Connect network topology is dark when scanned by a malicious actor. This helps prevent lateral movement.

DATA CENTER CAPABILITIES

FABRIC CONNECT DATA CENTER BASICS

Key Benefits:

- Simplifies Virtual Machine Mobility by stretching Layer 2 VLANs within and between Data Centers
- Simplifies Data Center Interconnect by enabling active/ active, full mesh connectivity
- Simplifies multi-tenant and micro-segmented networks
- Can be deployed over any physical topology
- Dynamic auto-attach features for ESX, Hyper-V and KVMbased hypervisor environments
- East/West and North/South traffic optimization to reduce latency and provide an enhanced quality of experience for critical applications

Fabric Connect Multi-site Data Center



DISTRIBUTED VIRTUAL ROUTING (DVR)

What is it?

- DVR brings IP host-based routing to Fabric Connect
- It distributes the routing function to every node in a stretched VLAN (to eliminate tromboning) without having to provision any routing functionality on the ToR or leaf nodes
- Injects "selected" host routes into WAN routers so that users accessing the DC follow the most direct route to the correct Data Center (when multiple DCs are deployed)

What is the value?

- East/West traffic optimization: eliminates tromboning for server-to-server communications
- North/South traffic optimization: reduces latency for user to server communications over the WAN in multi-site networks

Requirements

• VOSS v6.0

The Challenge with Centralized Routing: Traffic Tromboning



Distributed Virtual Routing: Eliminates Tromboning



VIRTUAL MACHINE/ENDPOINT TRACKING

What is it?

- Extreme Management Center/ ExtremeControl[™] capability that can dynamically assign moving Virtual Machines (VMs) to the correct IP Subnet (VLAN/I-SID) at their destination location
- Works for both VMware and Microsoft HyperV virtual server environments

What is the value?

- Dynamic provisioning of switch ports as VMs move within and between Data Centers
- Visibility of VM environment through API integration between Extreme Management Center and VMware ESXi and Microsoft HyperV

Requirements

- Extreme Management Center/ ExtremeControl
- VOSS v8.1.1



VMWARE NSXv INTERWORKING

What is it?

 Fabric Connect Virtual Network Services can be seamlessly and redundantly extended from the NSXv domain to the Fabric Connect domain by mapping the Virtual Network ID (VNIs) to the Fabric Connect services (or I-SID's) directly within the NSXv controller

What is the value?

 Seamless interworking with VMware's NSXv

Requirements

• VOSS v7.1



VXLAN GATEWAY

What is it?

- VXLAN Gateway translates
 Fabric Connect Layer 2/3 VSNs into a VXLAN Service
- Provides the mapping of I-SIDs into VXLAN Network Identifiers (VNI's)

What is the value?

- Third party interoperability with VXLAN compatible devices
- Seamless extension of end-to-end services between the Fabric Connect and VXLAN infrastructures

Requirements

• VOSS v6.0



CAMPUS EDGE CAPABILITIES

FABRIC CONNECT CAMPUS EDGE BASICS

Key Benefits of the Fabric Edge:

- Significant reduction in manual provisioning that is currently required at the network edge (MLAG, VLANs, IP multicast, Fabric Attach, etc)
- Fabric infrastructure automation (automation of all Fabric Connect and Fabric Attach links)
- Dynamic authentication, service provisioning and policy assignment of users and devices when RADIUS is deployed
- Centralized management though on-premise or cloud-based management tools
- Edge network design simplification



EAPoL/MAC WITH I-SID

What is it?

 When a client or IoT device is plugged into a VOSS edge switch, it will detect the client, authenticate it (through an Extreme NAC solution) and then based on its credentials, it will be assigned the right I-SID or Fabric Connect VSN

What is the value?

- Dynamic moves, adds and changes
- Elimination of manual provisioning by eliminating the need to preconfigure any VLANs on edge switch ports
- Enhanced security since unauthorized devices will not be allowed to connect to the network

Requirements

• VOSS v8.3

Extreme Network Access Control



RADIUS-ASSIGNED POLICIES

What is it?

 When a client or IoT device is plugged into a VOSS edge switch, it will detect the client, authenticate it, assign the right service and assign a user-based policy (ACL) that follows the user as they connect and disconnect from the network

What is the value?

- Dynamic moves, adds and changes
- Enhanced edge security by controlling access to network services and applications

Requirements

• VOSS v8.3

Extreme Network Access Control



DVR MULTICAST

What is it?

 Fabric edge architecture that enables default gateway configuration per I-SID as well as the ability to centrally provision VRFs and multicast

What is the value?

- Enables customers with distributed networks to replace VRRP
- Keeps the edge nodes simple and lightweight by centralizing VRF/multicast provisioning on aggregation (MDF) nodes only

Requirements

• VOSS v8.3



E-TREE SERVICE WITH A PRIVATE-VLAN

What is it?

- Layer 2 hub and spoke topology where spokes can only communicate via the hub
- Prevents direct spoke-to-spoke (peer-to-peer) communication

What is the value?

• Enhanced security for services utilized by IoT devices since it prevents machine to machine attacks

Requirements

• VOSS v3.0.1



BRANCH CAPABILITIES

FABRIC CONNECT BRANCH BASICS

Key Benefits:

- Secure branch office connectivity over public and private WANs
- Edge only provisioning for new services/network changes across the distributed network
- Reduced WAN charges by the ability to transport many Fabric Connect services within a single Service Provider circuit/ connectivity service.
- Reduces the number of distributed firewalls by using the Fabric Connect network to extend secure zones/microsegments to the branch office.
- Simple extension of multicast capabilities across the WAN into the branch office
- Consistent architecture. Consistent operations.



Fabric Connect Extension to the Remote Branch Office

IPsec OVER FABRIC EXTEND

What is it?

 IPsec over Fabric Extend encrypts Fabric Extend tunnels so that connectivity to remote sites can be extended over broadband connections

What is the value?

 Allows customers to reduce their WAN costs by leveraging the public Internet as either primary or back-up connectivity

Requirements

• VOSS v8.0.50 (XA1400)



Fabric Connect Virtualized Service Networks

IMAGING Service

FRAGMENTATION AND REASSEMBLY

What is it?

• Fragmentation and reassembly is supported for Fabric Extend tunnels (both encrypted and not encrypted) and is required when the WAN MTU is <1594 bytes

What is the value?

 Avoids packet loss when frame sizes being transmitted over the WAN are larger than the WAN MTU

Requirements

• VOSS v8.0.50 (XA1400)

Fragmentation and reassembly over the WAN



FABRIC IPsec GATEWAY

What is it?

• A VM-based solution that is deployed on-board a Fabric Connect enabled device that provides Fabric Extend IPsec tunnel aggregation. It also includes fragmentation and reassembly

What is the value?

 Offers the ability to deploy a VSP 7400 at the head-end to aggregate tunnels from multiple IPsec connected branch offices

Requirements

- VOSS v8.2 (select platforms)
- Premier license is required to activate Integrated Application Hosting



BIDIRECTIONAL FORWARDING DETECTION

What is it?

 BFD delivers fast fault detection for a path failure with the IP underlay when Fabric Extend (with and without IPsec encryption) is being used

What is the value?

 Faster failure detection of IP underlay (Service Provider WAN) issues

Requirements

• VOSS v8.2

Bidirectional Forwarding Detection





SERVICE PROVIDER CAPABILITIES

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FABRIC CONNECT SERVICE PROVIDER BASICS

Key Benefits:

- Fast time to service in enabling new customer services
- Reduced operations costs by having a simpler, more plug and play network environment
- Ability to meet/exceed customer SLAs through a resilient network architecture
- Simplified multi-tenancy and micro-segmentation with simple end point provisioning
- Powerful analytics to show network, application and client data/health
- Centralized management with on-premise and cloud-based operations



TRANSPARENT UNI

What is it?

- Transparent UNI's are used to deliver point to point (E-LINE) services across a Fabric Connect Network and is when the UNI is an entire Ethernet port or MLT bundle
- Transparent UNI's are not VLAN tag aware. All packets with and without a VLAN q-tag are transported into the VSN

What is the value?

• Simple and quick deployment of point-to-point services

Requirements

• VOSS v3.1



FLEX UNI

What is it?

- Flex UNI's are used to enable Layer 2 Virtual Service Networks where a specific VLAN-ID on a Port or MLT is mapped to a UNI
- VLAN-ID only has local significance on the Ethernet port/MLT

What is the value?

- Different VLAN-ids on different (or same – Stackable only) ports can be assigned to same I-SID
- Allows for overlapping VLAN-ID/ IP addresses

Requirements

 VOSS v5.0; ERS5900 v7.0, ERS4900 v7.1



OPERATIONS, ADMINISTRATION, AND MAINTENANCE

FABRIC CONNECT OAM BASICS

Key Benefits:

- Powerful on-box OAM capabilities through standardsbased Ethernet OAM capabilities (IEEE and ITU) as well as a user friendly on-box web interface
- Centralized management available through Extreme Management Center and increasingly through ExtremeCloud IQ
- Powerful analytics are available with ExtremeAnalytics[™] and ultimately through ExtremeCloud IQ
- Simplified RSPAN capabilities to mirror select traffic to traffic analyzers for performance monitoring, IoT and security solutions and troubleshooting/ debugging tools

Extreme Management Center, ExtremeCloud IQ or hybrid management



On-premise (Extreme Management Center)

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Cloud-based (ExtremeCloud IQ)

CONNECTIVITY FAULT MANAGEMENT

What is it?

 IEEE802.1ag CFM provides Layer 2 OAM capabilities for Ethernet links, trunks and I-SIDs. It provides ping, Traceroute, Tracetree and Tracemroute (for multicast) for the different hierarchies

What is the value?

- Standards-based tools for managing and troubleshooting the Fabric Connect network
- Tracemroute for multicast is unique in the industry. No other multicast technology can provide this level of visibility

Requirements

• VOSS v3.0

802.1ag maintenance levels/hierarchy



FABRIC RSPAN

What is it?

 Fabric RSPAN mirrors port, VLAN or flow-based traffic to a Fabric Connect I-SID. This mirrored traffic can be sent to one or more switches within the Fabric Connect network for analysis by central or distributed collectors/analyzers

What is the value?

- Simplified configuration compared to traditional SPAN/RSPAN
- Efficient replication of mirrored traffic using L2 multicast
- Ability to save money by not having to deploy traffic sniffers or in-line sensors for 3rd party monitoring or security solutions

Requirements

• VOSS v6.0



GRACEFUL RESTART WITH OVERLOAD BIT

What is it?

 An overload bit is sent by a Fabric Connect device to inform other devices, not to use that node for transit traffic. When a node receives an overload bit, it will know not to include the node that generated the overload bit in shortest path calculations

What is the value?

- Ensures that overloaded switches/ or switches that are being upgraded or need to be taken out of service for maintenance are not part of the shortest path from any source to any destination
- Minimizes traffic loss during planned maintenance

Requirements

• VOSS v6.0



ENTERPRISE DEVICE MANAGER (EDM)

What is it?

• Web GUI-based device manager that enables on-box monitoring and configuration

What is the value?

- Intuitive and simple web-based device manager that is easy to use
- Available with VSP, ERS and Universal Switching Platforms (running VOSS) at no added cost

Requirements

• VOSS v3.0

Enterprise Device Manager



EXTREME MANAGEMENT CENTER

What is it?

• Delivers centralized on-premises management, policy, analytics and compliance capabilities to Fabric Connect networks

What is the value?

- Provides a 360-degree view of users, applications, devices and the network
- Consistent policy and analytics
 across devices
- Delivers zero-touch provisioning, fabric visualization and management, automated service assignment to on-boarded users and devices and application visibility
- Optional integration into the ExtremeCloud IQ Navigator tier through migration to ExtremeCloud IQ site engine (coming)

Requirements

 VOSS 6.1.1; Extreme Management Center v8.1/v8.2.3 for Fabric Manager

Fabric Manager



APPLICATION TELEMETRY/ANALYTICS

What is it?

 Represents the data (sFlow, and other) that is collected from the network infrastructure, that is then is transmitted to an analytics engine (ExtremeAnalytics) where it is mapped, processed, and analyzed to provide valuable insights into both the network and the applications

What is the value?

- Faster troubleshooting; enhanced QoE and strengthened security
- No external probes required for an Extreme-based infrastructure
- Traffic is sampled not mirrored so it doesn't impact the performance of the network

Requirements

- VOSS 7.1, VSP 8600 6.2, XOS 22.4, ERS 7.7
- Extreme Management Center 8.2

ExtremeAnalytics



EXTREMECLOUD IQ

What is it?

 Delivers centralized cloud-based management, capabilities for cloud-enabled VOSS/EXOS switches and APs

What is the value?

- Powerful AI/ML driven insights
- Ease of deployment
- Scalability
- Continuous innovation and development

Requirements

 Select VSP/EXOS switches and Extreme Mobility APs



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