

ExtremeManagement™

Network Management Solution Description

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Chapter 1: Preface

Purpose

Use this document to understand the Extreme Fabric Orchestrator, and Extreme Configuration and Orchestration Manager Plus and Extreme Visualization Performance and Fault Manager Plus Network Management solutions. This document provides a high-level overview of the following topics:

- Network Management
- Extreme Fabric Orchestrator
- COM Plus and VPFM Plus
- Licensing

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 - 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.

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- 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

Product purchased from Avaya

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Procedure

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2. Type your first and last name.
3. Type the name of your company.
4. Type your email address.
5. Type your job title.
6. Select the industry in which your company operates.
7. Confirm your geographic information is correct.
8. Select the products for which you would like to receive notifications.
9. Click **Submit**.

Chapter 2: New in this document

The following sections detail what is new in this document. This document supports multiple Network Management products of Extreme Networks:

- Extreme Configuration and Orchestration Manager Plus Release 1.1 and Extreme Visualization Performance and Fault Manager Plus Release 1.1
- Extreme Fabric Orchestrator (EFO) Release 1.2

COM Plus and VPFM Plus Release 1.1

The following section provides a brief overview of the new features in this release.

See *COM Plus and VPFM Plus Release Notes* for a list of supported features.

Upgrade a VOSS device without rebooting

The device upgrade without rebooting feature support is extended to VOSS devices.

The user can now choose to upgrade the VOSS devices without rebooting by unselecting **Reboot after image download** checkbox in the Software Version Updater (SVU) task window.

Special characters in task names

Special characters are allowed in task names in all Device Software Management (DSM) portlets such as Configuration Backup and Restore (CBR), Configuration Update Generator (CUG), Device Password Manager (DPM), Software Version Updater (SVU), and TunnelGuard Distributor (TGD).

Device filtering and searching in Device Software Management tasks

The system supports device filtering and searching while adding devices to a task. You can filter the list of devices based on the selected columns. The search field allows you to search for the required device from the device list. The device list auto updates once you start a search. Searching without any search criteria selects all devices listed. The search field searches all columns and when a match occurs the device row is selected and highlighted.

Interactive CLI commands in Configuration Update Generator scripts

The system supports interactive CLI commands in Configuration Update Generator scripts. This feature enables the user to input the details requested by the device. The delay and reconnect interactive CLI commands allow the user to specify the delay in rebooting the device and attempt to reconnect to a disconnected device at a specified interval. The password interactive CLI command ensures that the password is not written in plain text.

Configuration Backup and Restore compare switch configuration updates

The device Configuration Backup and Restore compare feature now uses SmartDiff tool instead of Java Web Start. Using Java Web Start required installation of JRE on the client browser which was not allowed due to security considerations. The SmartDiff tool eliminates the need to install JRE.

SFTP support for Device Software Management of stackable devices

Device Software Management (DSM) now uses Secure File Transfer Protocol (SFTP) for configuration backup and restore operations for stackable devices (ERS3000, ERS4000, ERS5000, VSP7000 series devices). DSM can now successfully transfer files to stackable devices with secure software images. There is no visible change to the user interface. SFTP is used if the stackable device supports it, otherwise TFTP is used.

Note:

There is no change for modular device management (ERS8000, VSP4000, VSP7200, VSP8000, VSP9000 and VOSS White-Box edition devices). DSM uses Secure Copy Protocol (SCP) for file transfers to modular devices. SCP is used if SSH credentials for the device are configured, otherwise TFTP is used.

Configuration UI enhancements

All Configuration UI components now display the System Name along with the IP Address in the <Device System Name> (IP Address) format. If the System Name is not set on the device, only the IP Address is displayed. Displaying System Name along with the IP address enables the Network Administrator to identify the devices easily in a large network.

Launch Wireless Management tool

The system provides the ability to launch a wireless management tool for supported wireless devices. From **Network > Topology**, right click a supported wireless device and choose **Tools > Launch WOS**

Resource monitoring enhancements

The system provides the ability to monitor EFO resources with trending events and alerts covering CPU usage, RAM usage, disk usage, NIC usage, and VM status. You must provide the SSH credentials of the KVM and EFO VMs to enable self resource monitoring. Once configured, you can right click the device and select show dashboard to view the resource usage. Monitoring session limit has been increased to 50 concurrent sessions. Also the system now supports Bridge Protocol Data Unit (BPDU) trap port and slot monitoring.

Upgrade process

A new upgrade process and software bundles are available so you can upgrade COM Plus and VPFM Plus from Release 1.0 to Release 1.1

Extreme Fabric Orchestrator (EFO) Release 1.2

The following section provides a brief overview of the new features in this release.

Device support for new device models and versions

Updated support for newer devices and releases, and provides support for new device discovery, EDM plugins, and license management. For more information, see *Extreme Fabric Orchestrator Release Notes* and *Network Management Supported Devices, Device MIBs, and Legacy Devices Reference*, NN48100–701.

Upgrade a VOSS device without rebooting

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Enhanced RBAC for Configuration Update Generator templates

The system provides the ability to restrict the creation, deletion, or modification of Configuration Update Generator (CUG) templates. All network administrators can execute the templates.

A new EFO Device Config Template Administrator role is available with read-execute and write-execute permissions for Device Config Templates. The pre-existing EFO Network Administrator role is available with read-execute permissions.

Configuration UI enhancements

All Configuration UI components now display the System Name along with the IP Address in the <Device System Name> (IP Address) format. If the System Name is not set on the device, only the IP Address is displayed. Displaying System Name along with the IP address enables the Network Administrator to identify the devices easily in a large network.

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Upgrade process

The process to upgrade EFO infrastructure is updated to support upgrades from Release 1.0 or 1.1 to Release 1.2. Once upgrade bundles are downloaded and transferred to the Server, you can initiate a system upgrade from the KVM hypervisor CLI using an iLO console connection or local connection to the Server. The upgrade process supports Standalone and High Availability system configurations.

Note:

A new EFO appliance ships with a prior release. You must deploy and configure the EFO appliance before upgrading to Release 1.2.

Chapter 3: Overview

Network management overview

The next generation network management solutions from Extreme Networks are Extreme Fabric Orchestrator (EFO) and Extreme Configuration and Orchestration Manager Plus and Extreme Visualization Performance and Fault Manager Plus.

EFO is a unified network and device management platform with full FCAPS functionality for customers with more than 250 network devices or 1000 nodes for monitoring. EFO is a physical pre-staged hardware appliance running RHEL KVM.

Extreme Configuration and Orchestration Manager Plus (COM Plus) provides comprehensive configuration and provisioning functionality for Extreme Networks with 250 devices or less.

Extreme Visualization Performance and Fault Manager Plus (VPFM Plus) provides network monitoring and fault correlation for networks with 1000 managed devices or less. COM Plus and VPFM Plus is a VMware vSphere-based OVA that requires a physical server running VMware ESXi 5.5 or 6.0 to be deployed.

Table 1: Network management product comparison

Features	COM Plus	VPFM Plus	EFO
Supported nodes	250 or less	1000 or less	250 or more for Configuration 1000 or more for Monitoring
Management features	Discovery, Network configuration features, Virtual Service Network (VSN) Manager, Bulk Configuration functionality, VxLAN support, and Fabric Extend.	Discovery, Monitoring, Fault Correlation, Automated and customizable actions for thresholds and events, L2 and L3 Diagnostics Management, Health indicator graphs, and built in reports.	All of the functionality of COM Plus and VPFM Plus, IP Flow Manager, Virtualization Provisioning Service (VPS), advanced monitoring (including third-party devices), VxLAN support, NBI with OAuth support, and Device License Manager
Delivery	Standalone Software virtualized appliance — VMware VSphere only	Standalone Software virtualized appliance — VMware VSphere only	Standalone and active-standby HA pair, pre-installed hardware appliance
Co-existence	Can co-exist with VPFM Plus	Can co-exist with COM Plus	Not Applicable

Management and orchestration

The network management solutions of Extreme Networks offer management features to deliver automation and simplify operational processes.

Unified Management

Unified Management is an integrated set of functionality that offers best-in-class monitoring, provisioning, and troubleshooting for network devices of Extreme Networks. It helps reduce the administration, complexity, and related costs of managing the network through a single unified framework. This allows businesses to centralize and streamline their management workflows, while reducing installation, configuration, and maintenance time.

Discovery and visualization

The network management solutions of Extreme Networks provide rich discovery and visualization capabilities of Extreme network devices. The application discovers all devices and nodes attached to the network such as servers, storage servers, switches, routers, IP phones, Avaya Aura® applications, and VM hosts. In addition, it identifies the relationships that exist among devices in the network including topology and links. If the security settings allow it, operating systems and applications on servers can also be part of the discovery process.

Highlights

- Network discovery
 - Support for standards, proprietary, application, and OS-based discovery
 - Device information can be used to provide a network inventory listing
 - Devices can be classified based on their function in the network such as core switches and Internet routers
- Network visualization
 - Hierarchy-based topology and service-based views
 - Device connectivity and their relationships to each other

Configuration and orchestration

Note:

This feature is available with EFO and COM Plus only.

Configuration and orchestration provide topology based network wide configuration and provisioning for the Extreme Networks enterprise family of devices. The network management solutions of Extreme Networks simplify the configuration and provisioning process, so that IT resources can focus on managing the network.

Highlights

- Consolidates configuration, provisioning, and orchestration through topology-driven, Web-based, integrated network management
- Supports multiple concurrent users and includes powerful access controls such as role-based user control functionality

- GUI-driven, network-wide configuration and provisioning of new or existing network devices
- Device element management, inventory, updates, and device and user access control through centralized element management
- Simplified, intuitive wizards and easy-to-use templates that can be reused as required
- A common set of configuration commands can be run on multiple system devices
- Automate routine backups with regular device backups
- Automate the management of security updates
- User-based views allow administrators to create device groupings, which can be assigned to users and displayed on the topology map.
- Advanced event management allows administrators associate colors to trap types or severities. The topology map icons in the trap can be color-highlighted and sent through an email to users.
- Proactive change management compares device configurations with a previous baseline and generates a report or an email.
- IP phone discovery with centralized oversight of related Ethernet switch parameters.
- Scalability to manage large networks
- Automatically synchronize changes to the network. For example, VM configurations such as adding, moving, and changing are monitored and applied automatically to the network.

Monitoring and diagnostics management

Note:

This feature is available with EFO and VPFM Plus only.

Using information collected from the network and the devices, Extreme Networks network management solutions perform status monitoring and send the information required to perform event correlation and root cause analysis (RCA). The system determines the most likely cause of the network outage by correlating all network events and determining the primary and secondary devices affected.

Extreme Networks network management solutions also provide a set of event handling features. An action can be associated with an event so that the action runs automatically when the event appears on a specific device. For example, sending an email notification or paging the appropriate personnel.

Highlights

- SNMP Trap Receiver and Syslog Collector
- Event correlation
- Device status monitoring
- Event handling and scripting
- MIB compiler and browser
- Layer 2 and 3 diagnostics management, including tools such as ICMP ping, SNMP Gets, MIB Walker, and Browser.

Performance management

Extreme Networks network management solutions provide basic performance management features to help two key activities in a customer environment: capacity planning and change monitoring.

The system monitors thresholds on any instance and reports if thresholds reach or exceed. For example, if traffic on a particular link exceeds a pre-determined threshold, such as 30 percent, the system records and reports the performance.

Highlights

- Instance-based performance monitoring (MIB-browser based)
- Long-term (trending) performance monitoring

Application performance management

* Note:

This feature is available with Extreme Fabric Orchestrator (EFO) only.

Extreme Networks network management solutions provide tools to monitor, analyze, and report application behaviors and their bandwidth utilization trends. The system uses standard IP Flow technology combined with analysis using packet capture, trending, and alert notification capabilities.

Highlights

- IPFIX collector that supports IPFIX (Netflow v5 and v9) flows
- Real time analysis of the flow to provide trending and traffic pattern
- View of top 10 customers of network resources at various levels within network hierarchy

Virtualization provisioning

* Note:

This feature is available with Extreme Fabric Orchestrator (EFO) only.

Extreme Networks network management solutions provide VM agnostic lifecycle management and support for multiple vCenters in a large data center. With service profiling definition, you can create fabric connections per service. The EFO network follows VM and supports dynamic fabric provisioning.

Highlights

- Hypervisor VM agnostic lifecycle management
- Support for multiple vCenters in a large data center
- Service profiling definition allowing creation of fabric connections per service
- Supports dynamic fabric provisioning

Extreme Fabric Orchestrator (EFO) overview

EFO is a single, pre-installed, easily deployable appliance with a web-based multi-user solution. EFO integrates all its tools in a single device. EFO includes a set of management applications that

helps lower the TCO, delivers automation, and simplifies operational processes. The following is a list of the network management applications.

Table 2: Network management applications

Application	Description
Configuration	Provides an intuitive interface to configure and manage the Extreme Networks Enterprise family of devices from a discovered network.
Bulk Provisioning	Provides the tools to perform a variety of management tasks across multiple device types using a web-based interface.
Monitoring	Monitors the managed objects and reduces troubleshooting issues because of a more complete view of the network.
IP Flow	Collects and analyzes IP flows from IPFIX-, NetFlow v5- and NetFlow v9-enabled devices. All management functions are provided through a web-based user interface.
Virtualization	Connects the vCenter server to the configuration application to help the data center administrator configure the network changes that apply to the data center. Monitors the virtual infrastructure and provisions the network.

EFO delivers enterprise-class reliability, efficiency, and scaling to mission-critical networks around the globe. Thus, significantly reducing the cost of managing networks.

EFO features

EFO provides the following features:

Hardware appliance

The appliance is a HP DL360 Generation 9 server shipped with a RHEL KVM OS pre-staged to boot into a quick and easy EFO software deployment utility, all software and tools are integrated in a single device to reduce deployment time and complexity.

Unified management

The system provides unified management of wired, wireless, physical, and virtual resources to provide a single point to monitor and manage all Extreme Networks elements.

Integrated user interface

The system has an integrated user interface for a common user experience, with data-driven menus, that simplifies management of all Extreme Networks systems.

Customizable dashboards

EFO customizable dashboards has the following capabilities:

- **View Mode and Edit Mode:** The dashboard loads in the View mode, where you can view all the widgets created. Click Edit mode to customize the dashboard view.
- **Multiple layout options:** You can change the layout of the dashboard from the several layout options at any time and can save it with the title. When the layout is changed, all the widgets get rearranged according to the chosen layout.

- **Configuring and customizing each widget:** The widgets are the content of the dashboard. A widget can be selected from a library of widgets and can be customized in the Edit mode of the Dashboard. When a widget is maximized, the single widget is displayed in a popup on the full screen mode.
- **Drag, Drop and Moving Widgets:** You can change the location of each widget by dragging and dropping option.

Two-click application access

You can access any application from the web interface in two clicks. Click or move the mouse pointer over an application on the menu bar located at the top of the window to access the primary level application page. The tools within the primary applications may require more clicks.

Fabric Management

EFO automates the Extreme Networks experience with Fabric Connect and creates mapping between Extreme Networks endpoints and infrastructure. EFO enables VMware-automated virtual machine orchestration, and automates the creation of end-to-end connectivity and uniform quality of experience. EFO is an appliance with auto-attach to Extreme Networks fabric, known as Extreme OVS.

EFO supports the consolidated view and provisioning of the Fabric Attach feature on multiple devices. EFO supports the consolidated view and provisioning of VxLAN tunnels and per-device configuration of the VxLAN tunnels (using EDM plugins). EFO also supports the configuration of Fabric Extend tunnels between two isolated SPB setups.

EFO supports ISID management, the color-coding of Fabric Attach ports, the configuration of an FA server for each port, and the ability to display the topology of Fabrics connected over the Fabric Extend tunnel.

Increased scalability

This release of EFO provides an increase in a number of the concurrent user sessions. EFO supports scaling to a maximum of 10/20/30 concurrent user sessions for 250/1500/5000 node licenses, respectively. Out of the maximum sessions (10/20/30) for EFO, only a maximum of 10/15/15 concurrent user sessions (for 250/1500/5000 node licenses) can access configuration features.

EFO provides scaling of up to 5,000 devices (Extreme Networks switches) for configuration workflows and up to 30,000 nodes for monitoring.

RESTful Northbound API framework with OAuth 2.0 authorization support

EFO provides support for Northbound APIs to retrieve basic information on the discovered devices. Extreme Networks and third-party developed clients can access the APIs using OAuth-based 2.0 authorization. Access to the APIs is restricted only to registered clients and users of the Northbound Interface APIs. APIs filters and sorts the responses and displays in XML/JSON format.

The following table shows the Northbound web service APIs supported in this release:

API	Description
Discovery API	1. Provides the list of all the domains

Table continues...

API	Description
	2. Provides statistics of the domain like number of ip phones, switches, routers etc.
Devices API	Provides list of devices present in a domain
Inventory API	Provides all the information about the device like port, power supply, fans, sensors, chassis etc.

High Availability

EFO provides a High Availability (HA) framework to support redundancy at the hardware, hypervisor, and application levels. To provide High Availability for EFO you must have a HA license, and two hardware appliances, one configured as an active Leader server and another as a standby Master server. The two hardware appliances must be inter-connected through appliance port NIC3. On failover, all data on the active server is replicated to the Standby server.

Out of Band device management option

The EFO deployment configuration provides an option to create and configure an out of band device network. Out of Band management (OOB) allows you to provision separate network for the management of EFO appliance from the network used for the switches. During deployment, you can specify if you need to use the Out of Band management. OOB management can be enabled or disabled any time after the deployment if the NICs are connected appropriately. EFO appliance uses different port NICs for In Band and Out of Band Management.

- Port NIC1 is used for In Band Network.
- Port NIC2 is used for Out of Band network.

The OOB network devices connect to appliance port NIC2. If you do not create an out of band device network, all devices must connect In Band through appliance port NIC1.

Device License Manager

EFO provides a device license manager to simplify and support license management for Extreme Networks L2 and L3 switches. You can view the list of devices and discover the license information. You can download the device licence for the licensed number of devices and manage (checkout, install, un-install, check-in and migrate) these licenses using EFO.

COM Plus and VPFM Plus overview

COM Plus and VPFM Plus are the next generations of the Extreme Configuration and Orchestration Manager and Extreme Visualization Performance and Fault Manager products. COM Plus and VPFM Plus are combined as a single software install with features available according to the licenses. The software is a VMware-based OVA that requires a physical server running VMware ESXi 5.5 or 6.0. The following is a list of COM Plus and VPFM Plus management applications.

Table 3: COM Plus and VPFM Plus network management applications

Application	Description
Configuration (COM Plus)	Provides an intuitive interface to configure and manage the Extreme Networks Enterprise family of devices from a discovered network.
Bulk Provisioning (COM Plus)	Provides the tools to perform a variety of management tasks across multiple device types using a web-based interface.
Monitoring (VPFM Plus)	Monitors the managed objects and reduces troubleshooting issues because of a more complete view of the network.

COM Plus and VPFM Plus features

COM Plus and VPFM Plus provide the following features.

Single installation for configuration, monitoring, or both

COM Plus and VPFM Plus is a single installable for the end-to-end configuration and monitoring of small networks. The product and features that are available is based on the licensing. COM Plus and VPFM Plus is easy and quick to deploy and you can license to enable one or both products with the single software installation.

Integrated user interface

The system has an integrated user interface for a common user experience, with data-driven menus, that simplifies management of all Extreme Networks systems.

Customizable dashboards

COM Plus has a Home page dashboard that provides a real-time statistical view of the various management functions on the system in the form of widgets. You can add, edit, and delete the widgets and customize them to fit your needs.

VPFM Plus supports the Home page dashboard as well as a Network monitoring dashboard that displays information about the health of the system and consists of different widgets that delve deeper into the network health. You can add, edit, delete, and clone widgets to customize your Network monitoring dashboard.

Two-click application access

You can access any application from the web interface in two clicks. Click or move the mouse pointer over an application on the menu bar located at the top of the window to access the primary level application page. The tools within the primary applications may require more clicks.

Fabric management

COM Plus and VPFM Plus provide a complete end-to-end solution for Fabric management.

Migrate data from legacy COM and VPFM products

Existing customers on the latest versions of COM and VPFM can migrate to COM Plus and VPFM Plus.

Chapter 4: Specifications

Reference configurations

EFO is a hardware appliance that operates virtualized management modules on a RedHat Enterprise Linux (RHEL) Kernel-based Virtual Machine (KVM) Hypervisor. For information on EFO deployments, see *Deploying Extreme Fabric Orchestrator*, NN48100–101.

COM Plus and VPFM Plus is a VMware-based OVA. You must have a server running VMware ESXi 5.5 or 6.0 to deploy COM Plus and VPFM Plus.

COM Plus and VPFM Plus support vCenter and standalone ESXi deployments. For vCenter, COM Plus and VPFM Plus deploy as a vApp. For ESXi, COM Plus and VPFM Plus deploy as three different VMs. For information on COM Plus and VPFM Plus deployments, see *Deploying COM Plus and VPFM Plus*, NN48110–101.

Licensing

EFO licensing

Licensing in EFO uses the System Manager WebLM as the license server to add or remove licenses.

Each EFO appliance requires a license. The licenses are node locked to the appliance and the WebLM server, hence they cannot be transferred from one appliance to the other. The type of license you purchase determines the device count and features available for each application. The Advanced Monitoring license includes all of the applications and features.

 **Important:**

High Availability (HA) requires a HA license installed on the leader EFO appliance. For HA the standby EFO appliance does not require additional stand-alone node licenses.

License activations in PLDS require the HostID of the WebLM server and Monitoring VM HostID for inclusion in the license file. The HostID of the WebLM server is displayed on the Server Properties page of the WebLM.

License type

The following list outlines the types of EFO licenses:

- 250-Node

! Important:

- Carefully consider your starting license. You cannot go from the 250–Node license to the 1500–Node license by way of an EFO upgrade. If you know that you will need more than 250 nodes, start with the 1500–Node license.
- EFO supports upgrade from 1500–Node license to 5000–Node license.

- 1500-Node
- 5000-Node
- Additional 10000–Node for Monitoring
- High Availability

The following table outlines the device count for each module.

Table 4: Device count for modules

Application	250-Node	1500-Node	5000-Node
Configuration	250	1,500	5,000
Monitoring	1,000	6,000	<ul style="list-style-type: none"> • The device count is 20,000 (without +10000 Monitoring add-on license) • The device count is 30,000 (with +10000 Monitoring add-on license)
IP Flow	10	10	10
Virtualization	220	220	220

The following table outlines the device count for the EFO Monitoring module.

Table 5: Device counts for Monitoring

Managed Devices	250-Node	1500-Node	5000-Node
Extreme Networks Switches	250	1,500	5,000
UC, CC, phones, Extreme Networks solution (EMC, HP), Servers, VMs, 3rd party Switches, other managed objects	750	4,500	<ul style="list-style-type: none"> • The device count is 15,000 (without +10000 Monitoring add-on license) • The device count is 25,000 (with +10000 Monitoring add-on license)
Total	1,000	6,000	<ul style="list-style-type: none"> • 20,000 (5,000+15,000) • 30,000 (25,000+5,000)

Additional features

At the time of acquiring a license, you must select any additional features you wish to access along with the license type. This include the Advanced Monitoring features.

The Advanced Monitoring feature is available for all license types and can be enabled or disabled based on your requirement.

If you wish to purchase any additional features after you acquire a license, you can contact Avaya support to receive a new license for EFO from PLDS. You must replace the existing license with the new license on the WebLM server.

Trial version

EFO provides a trial version of 15 days which will be available soon after the configuration of EFO on the hardware appliance for the first time. You do not require any trial license file to run the trial version. The standard license will be active during the trial period.

Grace Period

A grace period of 30 days is available in case of any of the following scenarios :

- The absence of a valid license after the trial period expires or at any given time.
- If after installing license there is any loss of connectivity to the license (WebLM) server.

For more information about licenses, see *Administration using Extreme Fabric Orchestrator*, NN48100–600.

COM Plus and VPFM Plus licensing

Licensing in COM Plus and VPFM Plus uses the System Manager WebLM as the license server to add or remove license files.

Each COM Plus and VPFM Plus software virtualized appliance requires a license.

License activation in PLDS requires the HostID of the WebLM server and Monitoring VM HostID for inclusion in the license file. The HostID of the WebLM server is displayed on the Server Properties page of the WebLM.

License type

A single license file is available and the features for both COM Plus and VPFM Plus are specified in the single license file. The following list describes the device count rules for the COM Plus and VPFM Plus products licensed individually or together.

Table 6: COM Plus and VPFM Plus licensing

COM Plus	VPFM Plus	Switch nodes (maximum)	End point nodes (maximum)
Base 50	None	50	None
Incr 150	None	150	None
Incr 250	None	250	None

Table continues...

COM Plus	VPFM Plus	Switch nodes (maximum)	End point nodes (maximum)
Base 50	Base 500	50	450
Incr 150	Base 500	150	450
Incr 250	Base 500	250	450
Base 50	Incr 1000	50	950
Incr 150	Incr 1000	150	950
Incr 250	Incr 1000	250	950
None	Base 500	50	450
None	Incr 1000	50	950

*** Note:**

Switch nodes are Extreme Networks L2 or L3 switches.

End point nodes are UC, CC, phones, Extreme Networks solution (EMC, HP), Servers, VMs, 3rd party switches, and other managed objects.

! Important:

COM Plus license is required to enable device configuration.

VPFM Plus license is required to enable device monitoring.

PLDS support

Avaya Product Licensing and Distribution System (PLDS) enables you to perform licensing and entitlement management.

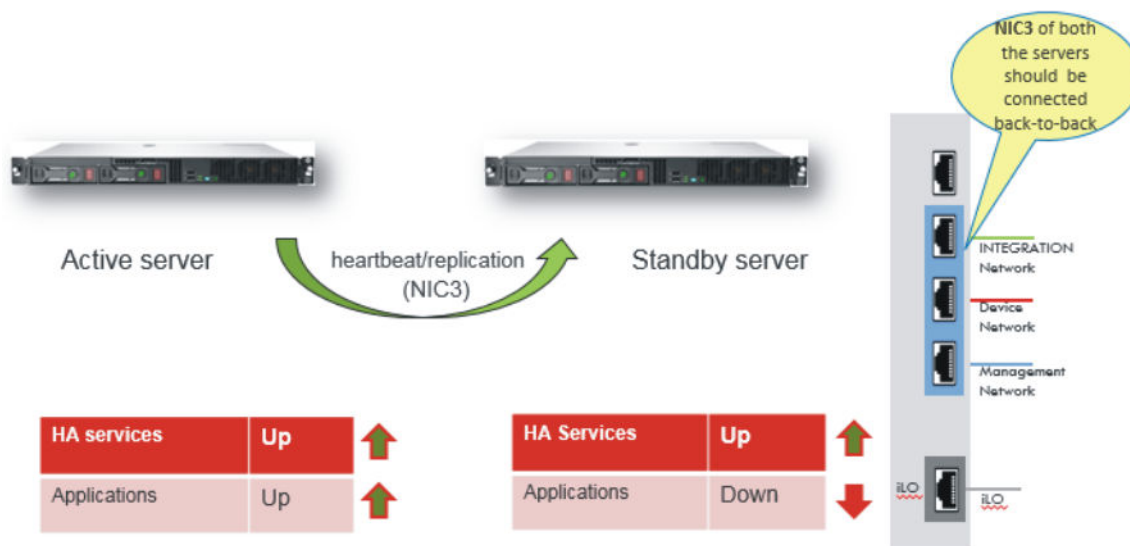
All licensing activities are performed through the Avaya PLDS Portal at <http://plds.avaya.com>.

High Availability

High Availability (HA) ensures devices recover quickly from a failure by:

- Eliminating single points of failure.
- Detecting failures.

To ensure high availability and redundancy, the system uses two SDN appliances on two HP ProLiant DL360 Gen9 servers.



Active-Standby

The virtual machines of the appliance that function in active stand-by are the following: platform, config, and monitoring virtual machines (VMs).

As part of active-standby a fully redundant instance of the appliance and server node takes over if the primary node fails.

In active-standby for the solution, one appliance and server is the primary server (known as the leader in the solution) and is active. A second appliance and server (known as the master in the solution) is inactive.

If the cluster engine determines one of the VMs needs to restart in the case of a failover of one of the system components, the information from the primary server (the leader), is replicated on the secondary server (the master), which then becomes the primary server.

The load balancer also runs in active-active. The load balancer clusters the servers with a single virtual IP address and distributes client requests between those servers dependent on specific criteria. If the load balancer experiences a failover, the secondary load balancer takes over the primary load balancer position.

Active-Active

The Management Server Console (MSC), OpenDayLight Controller (ODLC), and SDN Engine VMs on both the leader (primary) and master (secondary) servers function in active-active. In active-active mode, all three VMs run on both the leader (primary) and master (secondary) appliances and servers.

Cluster engine

The cluster engines on the primary and secondary server act as watchdogs, watching the system to ensure the various services or VMs are running properly. The cluster engines consists of three parts:

- Cluster engine virtual machine
- Cluster engine client

- Cluster engine server

The cluster engines appear as one, and share a management virtual IP address. When you log into the virtual IP address through VNC, you log into the primary cluster engine (the leader master), but you have access to a view of both cluster engines.

The cluster engine does the following:

- Monitors the health of all virtual machines and processes.
- Takes corrective measures if a process or virtual machine fails.
- Applies the corrective mechanism.
- Detects planned and unplanned failovers.
- Performs the failover.
- Provides API interfacing for clients to get/set clustering parameters.

Load balancer

The load balancer is a clustering technology that uses a distributed algorithm to load balance network traffic, enhancing the scalability and availability of mission critical operations.

The load balancer also provides high availability by detecting failures and automatically redistributing traffic to the remaining operational VMs. So, for instance, if one of the SDN Engines fails, the load balancer detects the failure, and ensures the other SDN Engine takes over.

The load balancer itself runs in active-active mode. If the primary load balancer fails, the secondary load balancer takes over and becomes the primary load balancer.

Browser support

Network Management supported browsers

The EFO and COM Plus and VPFM Plus user interface supports the following web browsers:

- Internet Explorer, version 11
- Mozilla Firefox, versions 47 and above
- Safari on macOS 10.8 Mountain Lion and above

Software upgrade and patching

Upgrading is the process of updating the existing managed elements software version with a new version. The managed elements include the virtual machine, applications for all the elements, and devices that are managed by the system.

Software Patch (Update or Feature Pack) is an incremental change to the major release in terms of new features and bug fixes. The process of applying this patch is software patching.

Solution Software Director (SSD)- EFO

Solution Software Director (SSD) uses the PLDS API to query for entitlement information. You can manually download required software bundles and other files from PLDS, and upload to SSD.

You can perform software upgrade and patching using SSD through the web interface. SSD runs on the Management Server Console (MSC) and is only accessible for authorized users.

 **Note:**

Internet connectivity is required to use PLDS.

Solution Software Director (SSD)- COM Plus and VPFM Plus

Solution Software Director (SSD) uses the PLDS API to query for entitlement information. You can manually download required software bundles and other files from PLDS, and upload to SSD.

You can perform software upgrade and patching using SSD through the web interface. SSD runs on the Monitoring VM and is only accessible for authorized users.