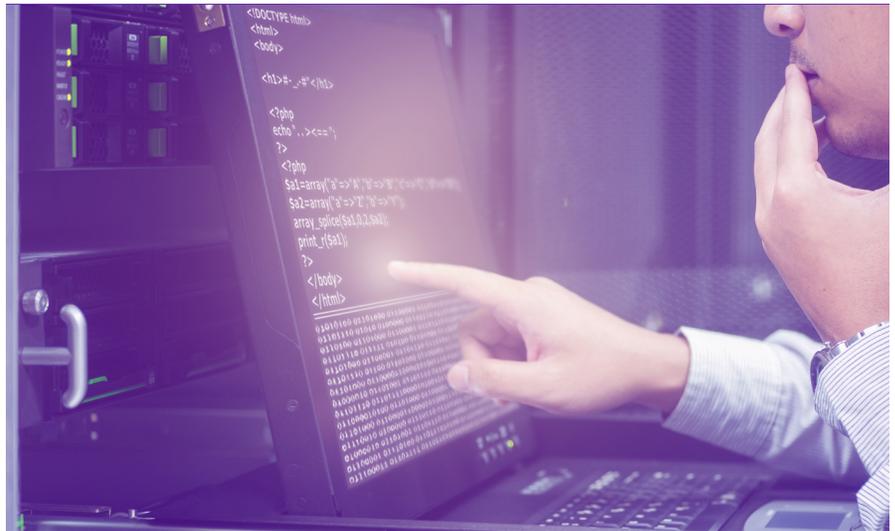


Highlights

Extreme Fabric Orchestrator (EFO) Allows for Network Operators to:

- Automate the creation of virtualized services with the secure dynamic attachment of end points.
- Reduce human configuration errors by enabling mass updates of device configuration, patches and software images across multiple devices.
- Quickly troubleshoot issues through advanced root cause and event management tools.
- Optimize the network by being able to pin point bandwidth saturation issues / trends; top applications driving bandwidth, etc.
- Meet security and compliance initiatives by providing consistent access control and audits.
- Perform inventory and asset management through discovery and visualization tools.
- Track Virtual Machines and synchronize network changes to changes in the VM lifecycle.



Extreme Fabric Orchestrator

Bring visibility, automation and enhanced troubleshooting to your network.

Extreme Fabric Orchestrator Can Help:

Drive Down Time to Service by Weeks/Months

Fabric Orchestrator automates the configuration, provisioning and orchestration of your network to drastically improve time to service.

Avoid Network Downtime

Comprehensive visibility, fault and performance management capabilities pinpoint network vulnerabilities or bottlenecks before they become issues. Bulk configuration and orchestration features eliminate human induced errors.

Reduce Operations Costs

Fabric orchestrator simplifies the management and operation of the network with full fault, configuration, performance and security features.

Build for the Future with Open Technologies

Northbound REST Interfaces will allow for automation and orchestration by open orchestration tools such as OpenStack¹.

Deliver Visibility and Synchronization of Physical and Virtual Resources

Fabric Orchestrator allows critical insight into the virtual machine (VM) lifecycle - from activation, through moves and changes, to deletion - and can automatically provision network devices to “follow” VMs as they migrate between servers.

¹Northbound REST Interfaces and OpenStack are currently planned functionality.

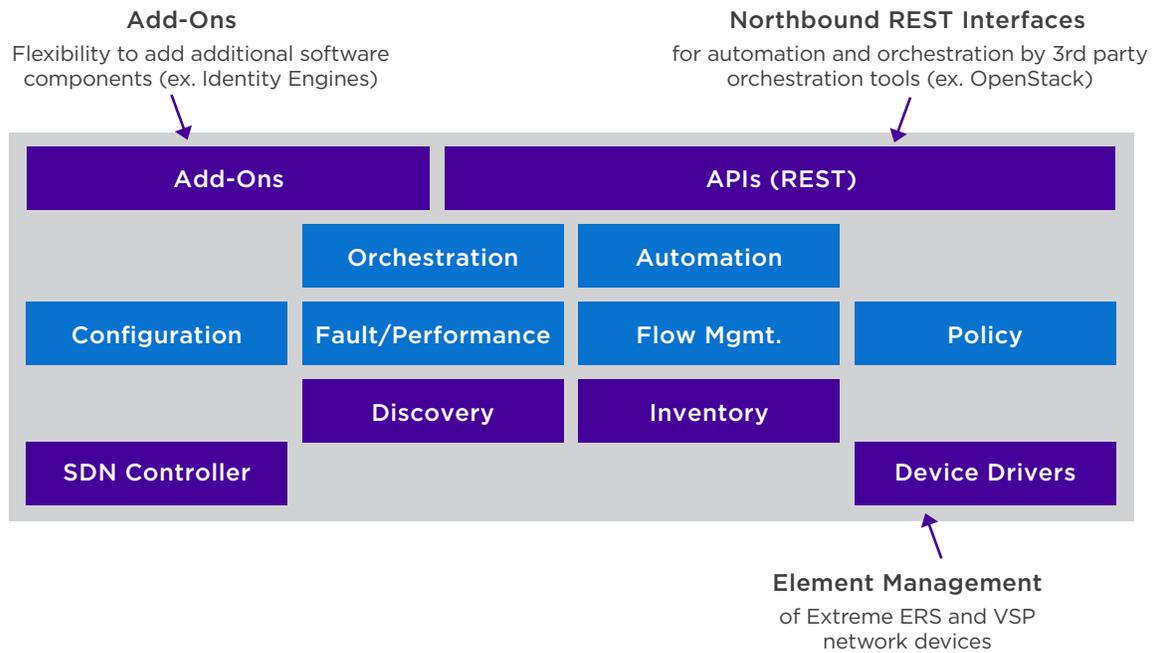


Figure 1 Extreme Fabric Orchestrator Architecture

Comprehensive Management and Operations

EFO is a fully integrated suite of tools which work together to provide a comprehensive, unified view of the network – through a single pane of glass – while streamlining workflows and reducing operational costs. The ability to share information across applications reduces data entry and saves operations staff valuable time.

Key management and operational features include the following:

Discovery and Visualization

EFO provides rich discovery and visualization capabilities of network devices. The application discovers all devices attached to the network – even when equipment from multiple different vendors is deployed². This includes servers, storage servers, switches, routers, IP phones, PCs, VM hosts, OS's in certain instances and more.

Once devices are identified, EFO translates even the most complex network topologies into simple, hierarchy-based maps, giving clear, end-to-end views to identify the relationships that exist among devices. It enables network operators to easily perform impact analysis. The visualization function also includes service-based views

that provide insight into the application allowing for network operators to easily distinguish between physical connectivity and logical- or application connectivity issues.

Fault and Diagnostics

Once issues have been identified through network visualization, EFO can monitor the network for faults. Using information collected from the devices, EFO determines the most likely cause of the network outage by correlating all network events and determining the primary and secondary devices affected. EFO also provides a rich set of event handling features so that if something does happen, the right personnel are immediately notified.

Diagnostic management allows the network operator to run and collect diagnostic data from network devices. EFO provides Layer 2 and 3 diagnostics in an end-to-end connectivity rather than a hierarchical view. Through this capability, data can be exported and printed in graphical format.

EFO also comes with a number of built-in reports to help network operators identify trends. This includes availability per node, and per interface, event history reports, historical views of CPU and memory, historical views of traffic patterns, and more.

²Monitoring and discovery of 3rd party of devices is supported. Configuration and orchestration of third party devices is not supported.

Configuration and Orchestration

EFO facilitates even the most complex of network configurations through simplified, intuitive wizards and easy-to-use templates. Configuration templates are created once, stored and then conveniently applied when needed. These templates can simplify the configuration of technologies, services and protocols across the network including:

- VLANs : Create, view, delete, modify VLANs on one or more devices.
- MLT and SMLT: Create, view, delete, modify membership for one or more devices.
- Routing: Supports IP Routing, OSPF, RIP, ARP, VRRP, IPv6 Routing, IPv6 OSPF and IPv6 VRRP.
- VRF: enables users to configure VRF services via a single GUI workflow.
- Multicast: view and configure devices that use multicast protocols, including viewing of multicast delivery trees. Supports IGMP, DVMRP, PIM-SM, MSDP and Multicast Route protocols.
- Fabric: monitor, configure and troubleshoot Shortest Path Bridging (SPB) parameters on Extreme ERS and VSP platforms; includes Fabric Extend and Fabric Attach.

Bulk configuration features can be used for bulk uploads or downloads of files to or from multiple devices. This feature makes it easy to schedule, update and to deploy updated images or configuration files across the network.

EFO restricts device access to authorized personnel. Access can be defined by a user's role, allowing them to configure edge devices while blocking access to the core, for example. In this way, administrators avoid overlapping jurisdictions, and users are prevented from unintentionally altering critical settings. In addition, advanced auditing tools allow managers to quickly debug and correct misconfigured devices. EFO logs every change on every device on the network. These logs can be examined for deviations from recommended settings and best-practices and can be reset and restored remotely.

Virtualization Management and Provisioning

EFO allows insight into the virtual machine (VM) lifecycle from activation, through moves and changes, to deletion – and can automatically provision network devices to “follow” VMs as they migrate between servers.

Specifically, EFO can apply predefined templates to switch ports when VMs are created and/or moved to a new host. Port templates include the connectivity services (VLAN and iSIDs for Fabric-enabled devices) as well as, QoS, ACLs, port shaping, and bandwidth limiting parameters that can be applied (at a VM level) to the port of the edge device connected to the server. This ensures that as VM migrate between servers, the right network connectivity services are already in place. For example, a user could create a rule saying that if a new Microsoft® Outlook VM is created, VLAN ID 100 should automatically be assigned to it, giving that new VM connectivity without any user intervention.

EFO also builds an end-to-end view of the virtualized network – showing servers, VMs and network devices – which can help an enterprise's network and server administrator team's work more efficiently together when troubleshooting issues.

Performance Management

EFO performance management tools can also be used for capacity planning and change monitoring. In the latter case, EFO enables network operators to monitor modifications to the network – such as the addition of a new switch – and observe how the device performs in the short term. From a longer-term perspective, the EFO performance management capability also provides crucial information that can help you address your capacity planning requirements. For example, if traffic on a particular link begins to exceed a pre-determined threshold, such as 30 percent, the EFO can record and report on the performance. If the trend continues, you can plan changes to your network accordingly to address growing traffic.

Application Optimization

EFO provides tools to monitor, analyze and report application behaviors and their bandwidth utilization trends. Data collected gives valuable insight into the traffic running across the network as well as who's generating the traffic. An easy-to-read dashboard provides useful Top-10 reports and tracks where excessive resources are being used.

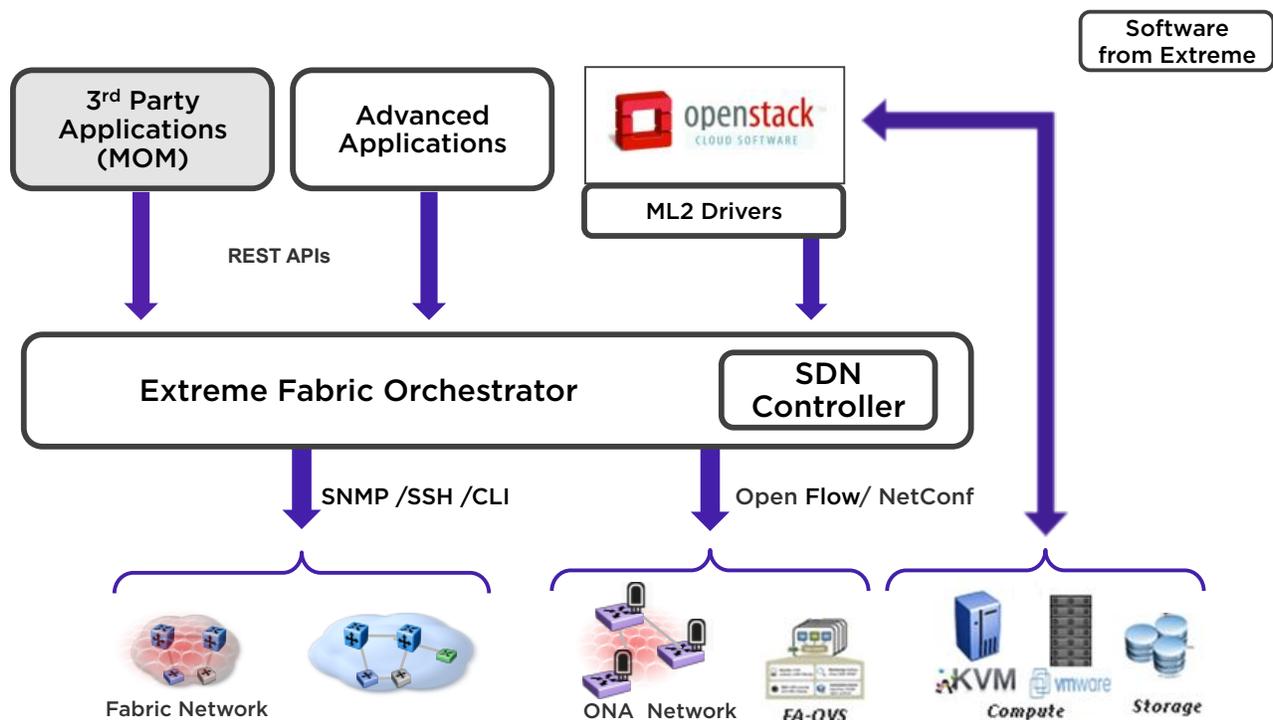


Figure 2 EFO's Architectural Vision

Features Enabling End to End Orchestration

With future support for Northbound APIs, and OpenStack cloud orchestration, this product is designed to deliver automation of both Fabric and traditional networks.

Northbound APIs²

Integration with cloud management systems, manager-of-managers systems, and custom applications are enabled through a series of northbound Application Programming Interfaces (APIs), delivering simple and uniform SDN and Fabric programmability.

OpenStack Orchestration³

OpenStack is an open source cloud operating system which simplifies creation and movement of applications and virtual machines in public or private cloud environments. It provides a control layer that sits above all the virtualized resources (compute, storage and networking) within the Data Center, allowing these to be orchestrated – as a single service entity – through a set of APIs and a common dashboard. Extreme Fabric Orchestrator will enable customers who deploy OpenStack to automate their fabric networks in coordination with their compute and storage resources.

Extreme Fabric Orchestrator: Deployment and Operation

Extreme Fabric Orchestrator is packaged in a convenient, easy to deploy, self-managed appliance based solution. Some of the benefits include:

Simple, Fast Deployments, Ready in Less Than an Hour

Rather than having to deploy separate servers for separate management and controller functions, the Extreme Fabric Orchestrator has all applications pre-installed on a single appliance based solution. This enables customers reduce their deployment time from days down to 60 minutes.

Self-Managed Solution with Single Click Upgrades and Patches

Traditional management solutions require a significant amount of time and resources to manage and maintain. The Extreme Fabric Orchestrator offers a management console which offers single click upgrades and patches for all the applications which reside on the appliance so that the system remains current without manual intervention.

²APIs are currently planned functionality

³ OpenStack ML2 drivers are currently planned functionality.

Automatic Integration of New Devices

With traditional management platforms there can commonly be a 2-3 month delay between the introduction of a new product and when that product is fully integrated into the company's management systems. With Fabric Orchestrator, as soon as a new device is deployed into the customer's network, the appliance can automatically download the appropriate element management plugins from the Extreme Support portal. This enables basic management support for the new device without delay or operator intervention.

Summary

With more and more pressure to do more with less, Extreme Fabric Orchestrator represents a pragmatic solution to fully automating and effectively managing the underlying network. It can accelerate time to service, reduce human induced errors and significantly drive down operating costs. With a full range of management capabilities ranging from traditional management features like Fault and Performance Monitoring, Configuration, Security combined with future SDN programmability features, Fabric Orchestrator provides the single-point solution with ease of use and extensibility required in today's IT environments. It differentiates itself by providing a broad, comprehensive, yet easy to use solution to manage both physical and virtual networks.

Specifications

Devices Managed

- Virtual Services Platform 9000
- Virtual Services Platform 8000
- Virtual Services Platform 7000
- Virtual Services Platform 4000
- Ethernet Routing Switch 5000
- Ethernet Routing Switch 4000
- Ethernet Routing Switch 3500
- Ethernet Routing Switch 2500
- Ethernet Routing Switch 1600
- WLAN 8100 / 2300
- Belden Switches

Appliance Specifications

- HP DL360 Gen9 Server
- Intel E5-2697v2 12 core 2 socket CPU
- 128 GB Memory
- 4x600 GB 15000 RPM SAS drive configured with RAID 5
- 2x HP 500W Flex Slot Platinum Hot Plug Power Supply Kit

Software Supported Operating Systems

- RHEL 7.1 x64 OS running Redhat KVM Hypervisor
- RHEL 5.7 x64 OS for Primary SMGR virtual machine
- RHEL 6.6 x64 OS for all other virtual machine



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