

 **AXOS SM X**

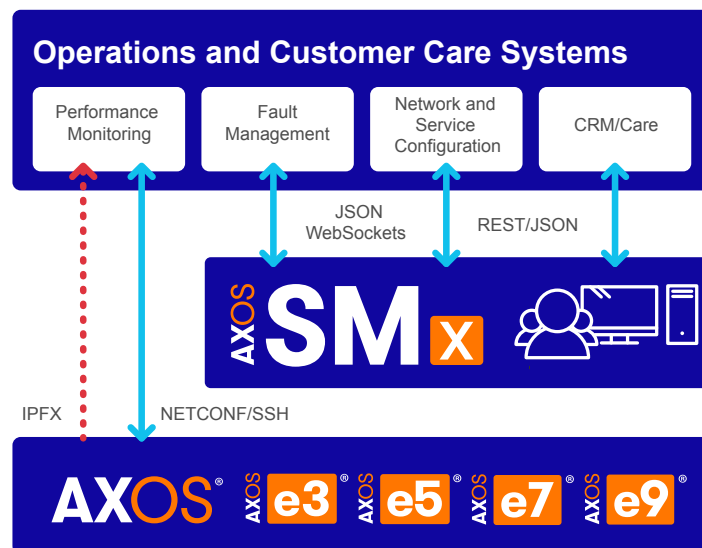
# Enabling the power of **AXOS**®

There is a real opportunity for service providers to simplify their OSSs by introducing a highly automated and dynamic approach to service operations. As API-based approaches are now used deep inside the network, increased automation and highly dynamic operational processes can now extend from the OSS into the cloud control domain. Automation is key, and by automating manual back-office integration functions, service providers can immediately begin to decrease time to market while simultaneously reducing their service delivery intervals.



AXOS is an open Linux-based componentized Operating System designed for Software Defined Access networks to accelerate Broadband service delivery.

AXOS SMx is the latest addition to the Calix AXOS family of connectors, which allow service providers to bridge the gap from older technologies to next generation solutions via cutting-edge software. Built to give service providers another option for their transition to SDN beyond the native AXOS NETCONF/YANG interfaces, AXOS SMx gives them the flexibility to deploy an SDN network with automated workflows today using existing back-office business systems.



SMx is the Calix next generation service delivery and assurance platform designed specifically for AXOS systems. SMx leverages the Open Daylight (ODL) SDN controller platform and the latest web technologies, to create a horizontally scalable domain controller for managing carrier deployments. SMx is designed with virtualization in mind, and capable IPFX NETCONF/SSH of management and control of current generation Calix Physical Network Functions (PNF), and designed to support future Calix Virtual Network Functions (VNF).

SMx leverages the power of AXOS systems to deliver and control services on Fiber-to-the-Node, Fiber-to-the-Distribution Point and Fiber-to-the-Premises networks. It is designed to manage G.Fast and VDSL2 based copper as well as GPON, 10G XGS-PON and NGPON2 systems, and future anyPHY and anyPON PNF or VNF systems.

## SMX DELIVERS:

- Element and network state visibility
- Workflow based configuration and policies
- Command Center point-and-click GUI
- Dashboards, network topology views
- Software image management



## Integration and Automation

Calix SMx solution is designed to automate delivery and management of Gigabit and 10 Gigabit Ethernet high speed Internet, RF video, IPTV video, SIP and MGCP voice over IP services across the entire Calix access network. Calix SMx software is designed to simplify integration of AXOS platforms into Business (BSS) and Operations (OSS) Support Software by normalizing Service Delivery and Assurance APIs across anyPHY systems. The APIs are also designed to integrate with higher layer domain SDN controllers to allow providers automate functions at the Element Management (EML) or Network Element Layer (NEL).

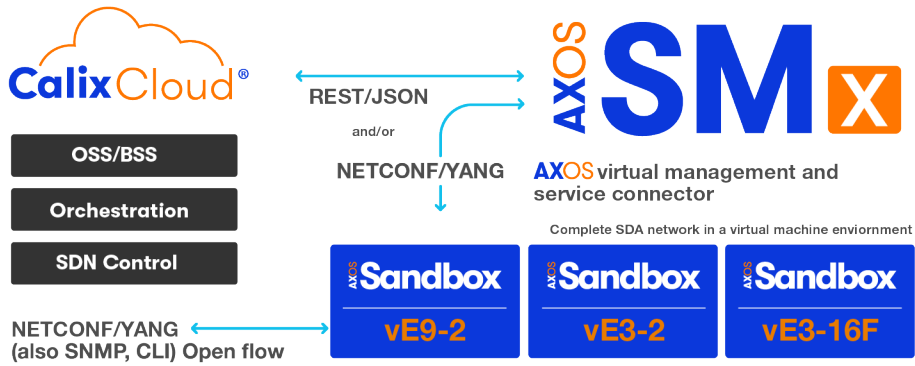
Additionally, Calix SMx integrates with AXOS Sandbox to accelerate back office even prior to hardware availability.

## Architecture

SMx implements a micro-services architecture designed to automate service delivery and management on Calix anyPON and anyPHY systems. These services are exposed through a published open REST/JSON API to simplify back office integration. It exposes its API through a Swagger interface integrated in the application server platform, and leverages that API to implement its browser based GUI to ensure consistency between BSS/OSS and SMx. SMx implements a virtualized high available architecture that clusters cloud application and persistence servers for resiliency and scale. SMx support full FCAPS management for AXOS systems. Persistent Management Agent (PMA) ODL plugin and tenant application, conformant to BBF WT-301 architecture, to provide persistence for both pre-configured and offline systems. This enables the provider to fully configure systems and services before they are deployed.

Persistent Management Agent Aggregator (PMAA) ODL tenant application that provides service delivery and assurance functions, as well as service and network persistence. User and Application Programmer (API) Interfaces: SMx was designed from the ground up with integration and automation in mind. It's REST/JSON APIs are designed to enable full programmability from back office systems and SDN domain controllers. The web base User Interface is a façade that leverages the API and provides work flow business logic for OAM&P and administrative functions.

## Service Support



SMx implements a micro-services architecture that leverages ODL and the latest Cloud technologies to deliver a highly available horizontally scalable architecture designed to manage thousands of AXOS systems. The architecture implements a service oriented architecture to support delivery of network services including:

Voice	Video
SIP	IPTV
MGCP	RF*

Internet Data	Business Services
Up to 1 G per second on copper	CE 2.0*
Up to 10 G per second on fiber*	SAT*
L3 service flows	SOAM*
L2 service flows	
Wi-Fi	



SMx delivers a rich set of management and control functions required to operationalize AXOS systems. Service delivery and management functions are designed to take advantage of AXOS anyPHY and anyPON architecture to provide platform and PHY neutral service configuration leveraging service templates that abstract platform and technology to provide a simple consistent work flow for copper and fiber based systems.

Key management and control functions are highlighted below:

Configuration Management	Performance Management
Node discovery and Network configuration	Real time statistics
Service administration and provisioning	Node, port service performance
Bulk configuration changes	Collection scheduling (Y.1731*)
Software management and upgrades	Reporting*
Configuration backup and restore	

Accounting	Security
Logging and reporting	CE 2.0*
Usage data collection scheduling (IPFIX*)	Reporting
	Secure NBI/SBI communications

**Note:** \*Coming soon.



### System Specifications

SMx supports all AXOS based systems (running AXOS Releases 2.x and higher). SMx supports the latest major AXOS release for each system, plus two previous major AXOS software releases

### System Requirements

SMx is fully virtualized and supports VMWare ESXi. minimum and mid-scale requirements

### Supported Systems

E5-16F MDU, E3-16F DPU, E3-2\* ROLT, E7-2\*, E9-2\*

### Min. AXOS Software Required

AXOS R2.1, 2.2, 2.3, AXOS R3.0, AXOS R3.1, AXOS R4.0

### Min. System Requirements

Linux CentOS 7 64bit or Linux RedHat 7 64bit, 32 GB RAM, 8 cores, Minimum of 250 GB

### AXOS Systems Support:

E7-2 NGPON-2, E7-2 GPON-8 r2, E3-2 GPON, E9-2 NG1601, E9-2 GP1611, E5-16F, E3-16F

### Learn more about SMx

More information about SMx:  
<https://www.calix.com/software-defined-access/software-defined-access-integration-with-dpx.html>

Or, contact your Calix sales representative.