

Apstra Operating System AOS® 2.3

CHALLENGES

- Network admins manually track and verify thousands of elements, even for a small spine-leaf networks with a handful of devices.

SOLUTION

- Apstra AOS®**
A turn-key software that helps networking teams manage data center networks as a cohesive system.

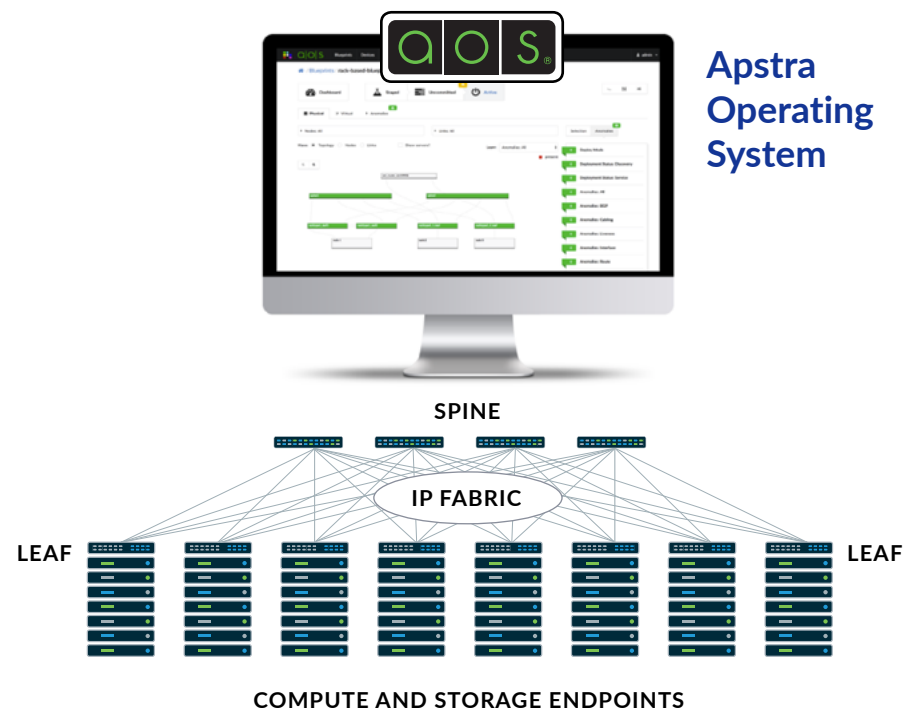
RESULTS

- From the AOS Server GUI customers can design, build, deploy, and operate a spine-leaf network in days, rather than in months, including racking, stacking, cabling and validating all design intent is met in real-time.

Advanced Fabric Operations, Root Cause Identification, and Enterprise Features

Enterprises and cloud service providers are transforming their private data centers by building leaf-spine IP fabrics with EVPN VXLAN. The challenge they face is network admins have to manually track and verify thousands of elements, even for a small spine-leaf networks with a handful of devices. These include logical elements such as ASNs, BGP sessions and routing tables, virtual elements like VNIs, IPs, VXLANs, and physical elements like redundant links, Ethernet interfaces and transceivers. If any one of these components is misconfigured or fails, a cascading effect causes multiple compute, network, and storage nodes to suffer.

Apstra's Intent-Based Data Center Automation has been updated to version 2.3 and includes game-changing new technologies to augment and accelerate network operational capabilities. AOS 2.3 builds on the distributed capabilities of previous releases to provide new operational workflows and automated troubleshooting in a single unified platform. AOS also extends its industry leadership in supporting multiple vendor platforms with the addition of SONiC and Junos OS support. AOS now integrates with VMware vSphere for constant validation of physical to logical networking configurations, ensuring error free deployments of cloud and virtualization technologies.



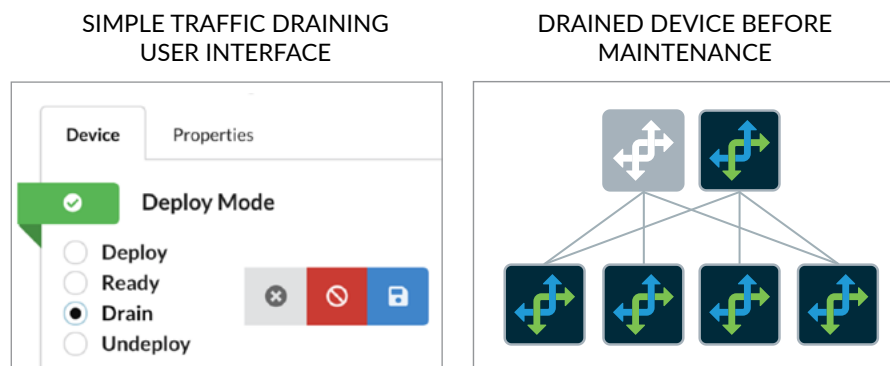
**Apstra
Operating
System**



Advanced Fabric Operations

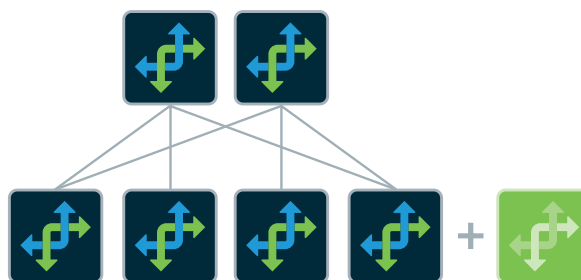
Device Maintenance Mode

AOS now supports graceful traffic draining and undraining for individual devices, allowing operators to remove an active fabric switch without impacting existing IP flows. This has the immediate benefit of enabling maintenance operations in the middle of the business day. Because maintenance functions are linked to the AOS Intent model, monitoring systems are automatically aware of these changes and do not need to be disabled manually. When devices are returned to service system monitors are immediately enabled, guaranteeing no downtime for system visibility and performance monitoring.



Fabric Expansion

Fabrics can now be expanded seamlessly without interruption, enabling just in time capacity additions. Using existing models for rack designs, running blueprints can be scaled out horizontally with the same consistent features, resource allocations, and integrated automation. As racks are added, they are immediately monitored according to all of the existing rules and system checks already in place. Sophisticated Intent-Based Analytics (IBA) probes are updated automatically in real time to deal with new capacity and validation of the new topology.



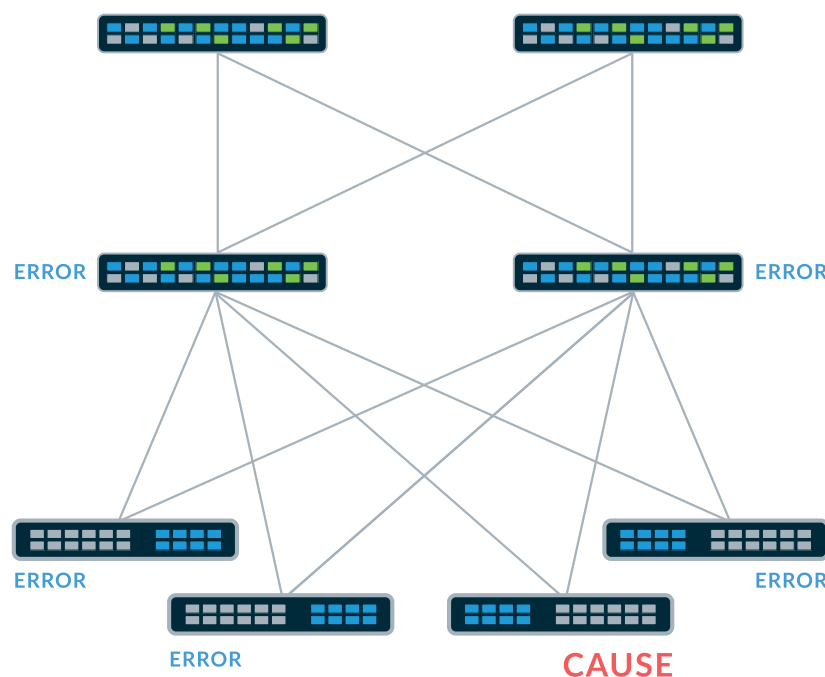
NOS Management and Validation

AOS now manages vendor device OS images through a unified portal. Once devices have been gracefully drained of traffic, AOS can stage the new device OS on each device and manage the reboot process. When the devices have been completely tested and validated by Intent-Based Analytics probes they can be placed back into service. AOS also checks the device OS versions on all devices constantly, ensuring that older operating systems cannot be accidentally deployed. The certified device OS level can be specified for each vendor, hardware platform, device role, or fabric.

Root Cause Identification

Introducing Root Cause Identification

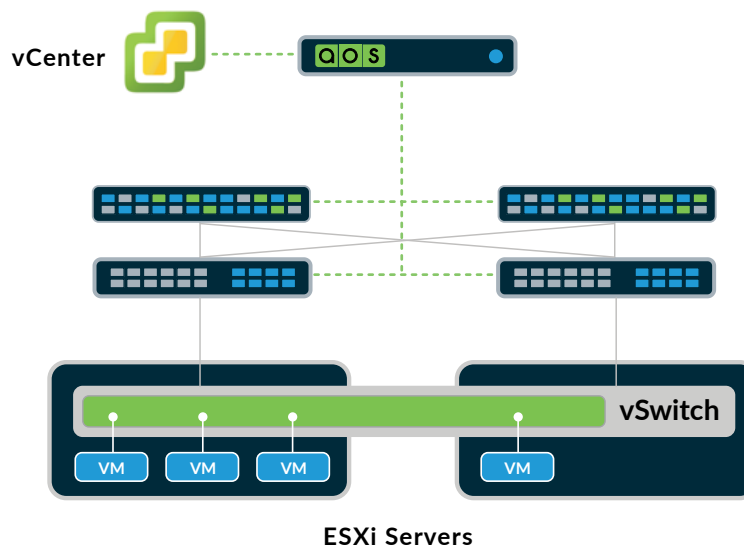
Apstra has developed a revolutionary system for identifying root cause problems by studying system telemetry in real time. Since AOS understands the intent of the architect and the operator, it is uniquely positioned to pinpoint and isolate problems without a massive influx of false positive alerts. Root Cause Identification constantly studies incoming telemetry to find gray failures, performance degradation, and new outages.



Enterprise Features

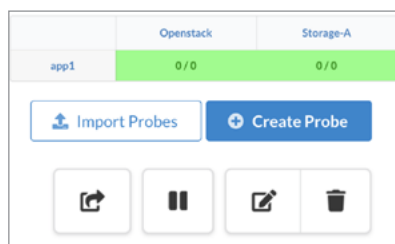
VMware vSphere Integration

The vast majority of enterprises use vSphere ESXi to host their virtualized workloads, enabling better resource utilization and consistency of deployments. ESXi manages the virtual networking within each host server and the physical connection to the network switches according to the business objectives. Frequently, there are mismatches between the physical and logical switch configuration that can strand VMs on isolated segments or even allow two tenants to coexist in the same virtual network. AOS eliminates these problems by merging vSphere's view of the network with the actual physical and overlay network configuration. Missing or misaligned VLANs trigger anomalies in AOS that inform the operator that there is some sort of inconsistency between the network policies. AOS can then be used to rectify any issues that exist in the physical network.



Intent Based Analytics Enhancements

AOS 2.3 builds on the success of Intent Based Analytics and provides many requested enhancements. Operators can now pause, import, and export existing IBA probes through the user interface. Apstra has developed 35+ probes that can be easily deployed to running systems in minutes. Probes can be customized for each environment and tailored to the business SLAs. Increased visibility of system behavior can be achieved with the new Intent-Based Analytics Dashboards, which can be customized to match the business application dependencies.



Summary

AOS is the operating system for Intent-Based Data Center Automation. It enables network engineers and operators to quickly and reliably design-build-operate a spine-leaf network. It applies to any size network, and scales to the largest data centers.

AOS 2.3 Features and Specifications

Services:

- BGP Layer 3 Clos fabric with multi-tenancy EVPN (RFC 7432)
- Intra-rack (VLAN), or inter-rack (VXLAN)
- Layer 3 VXLAN routing
- Layer 3 server routing with dual attachment
- IPv6 fabric
- Extensible services (intent, resources, expectations)
- DHCP relay
- VRFs

Telemetry:

- LLDP, BGP, EVPN, Config Deviation
- Interface counters
- Routing table verification
- Host, transceiver, interface, LAG / MLAG
- MAC and ARP
- Server and devices health
- Intent-based anomaly detection
- Telemetry streaming via protocol buffers
- Extensible telemetry collection

Root Cause Identification*

Intent-Based Analytics (IBA):

- East-west traffic
- MLAG imbalance
- Headroom
- ECMP imbalance
- Hot / cold fabric ports
- Interface flapping
- BGP (VRF aware)*
- Default gateway count*
- MLAG domain*
- TCAM usage*
- OS version*
- Interface bandwidth*
- Interface errors*
- Interface discards (sustained packet discards)*
- SFP*
- Interface buffers*
- BUM traffic*
- PIM state on a Leaf, Spine, Border Leaf*
- PIM RP on Leaf, Spine*

- PIM Anycast RP on Border Leaf*
- PIM MRoute Anomalies on Border Leaf*
- VTEP*
- STP state*
- STP state changes (Flag STP State Changes)*

An open source catalog of IBA probe configurations is available, to enable an ecosystem with customers, partners, and other third parties

Device OS:

- Cisco NX-OS and vNX-OS
- Arista EOS and vEOS
- Juniper Junos OS
- Cumulus Linux and CVX
- Dell OpenSwitch (OPX)
- Microsoft SONiC
- Ubuntu Servers with Free-Range-Routing (FRR)
- CentOS Servers



AOS 2.2 Features and Specifications (Cont.)

Platform:

- Staged/Commit Workflows
- Multi User Authentication
- RBAC with custom roles
- LDAP and TACACS+ Integration
- Device lifecycle management
- Resource management
- Advanced Configlets*
- Interactive network visualization
- Extensible on-box or off-box device agents
- AOS backup / restore

- RESTful APIs
- Graph model and GraphQL/QE API
- AOS-CLI
- AOS Developer SDK* (Python)
- HTTPS, AOS server security hardening
- Headless operation

AOS Extensibility Tool For the Community (AOS ETC):

- AOS Extensibility Tool for the Community (AOS ETC):
- Zero Touch Provisioning (ZTP) Server
- Demo Tools

- Template Catalog
- 3rd Party Tool Integration (Google Protocol Buffers)
- Legacy Devices Integration

Maintenance workflows:

- Scale-out Maintenance*
- NOS Management*
- Device Maintenance Mode*
- Replacement Maintenance
- Decommission Maintenance
- Addition and deletion of virtual networks and endpoints

* New features introduced in AOS 2.3



apstra®

About Apstra

Apstra® Intent-Based Data Center Automation increases application availability and reliability, simplifies deployment and operations, and dramatically reduces costs for Enterprise, Cloud Service Provider, and Telco data centers. Apstra empowers Intent-Based Data Centers through its pioneering Intent-Based Networking, distributed system architecture, and vendor-agnostic overlay. Headquartered in Menlo Park, California and privately funded, Apstra is a Gartner Cool Vendor and Best of VMworld winner.

For more information, visit www.apstra.com, contact sales@apstra.com or follow [@Apstralnc](https://twitter.com/Apstralnc)

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