ARISTA

Automatisierter Netzwerkbetrieb Status Quo und Zukunft

Arista Networks

Vincentz Petzholtz
Team Lead, Systems Engineering
vincentz@arista.com
+49 (0) 160 91743962

Wer ist Arista Networks?

- Gegründet 2004 von **Andreas von Bechtolsheim**
- Hauptsitz in Santa Clara, Kalifornien
- Börsennotiert seit 2014 aber mehrheitlich in **Privatbesitz**
- Bewertet mit ca. **140 Milliarden €**
- **Jahresumsatz >7 Milliarden** US-Dollar
- Zweitgrößter Hersteller von **Netzwerk Lösungen**

ARISTA

Gründer & Management

Andy Bechtolsheim
Founder, Chief Architect and Chairman

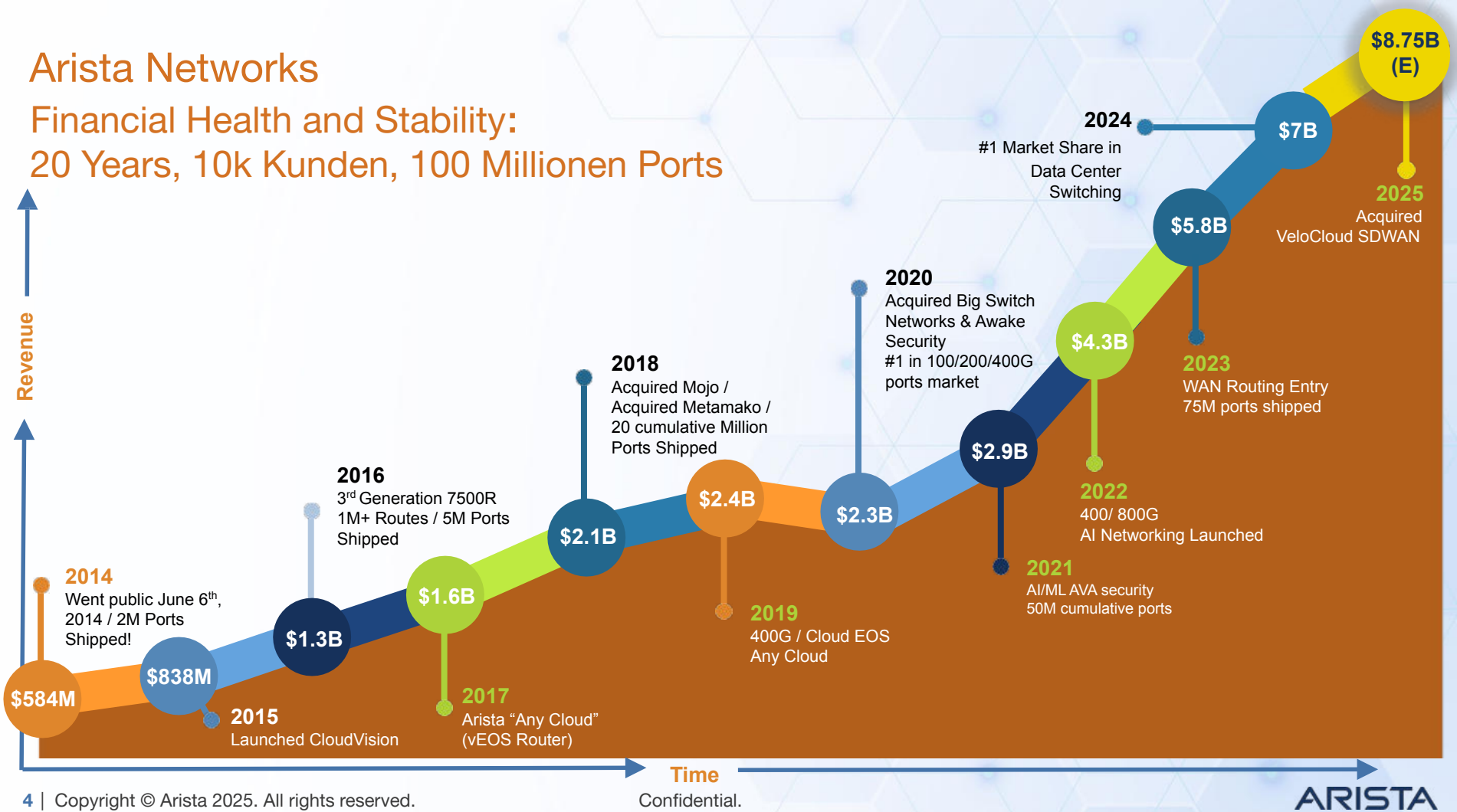
Jayshree Ullal
President and CEO

Kenneth Duda,
CTO, SVP Software Engineering

ARISTA

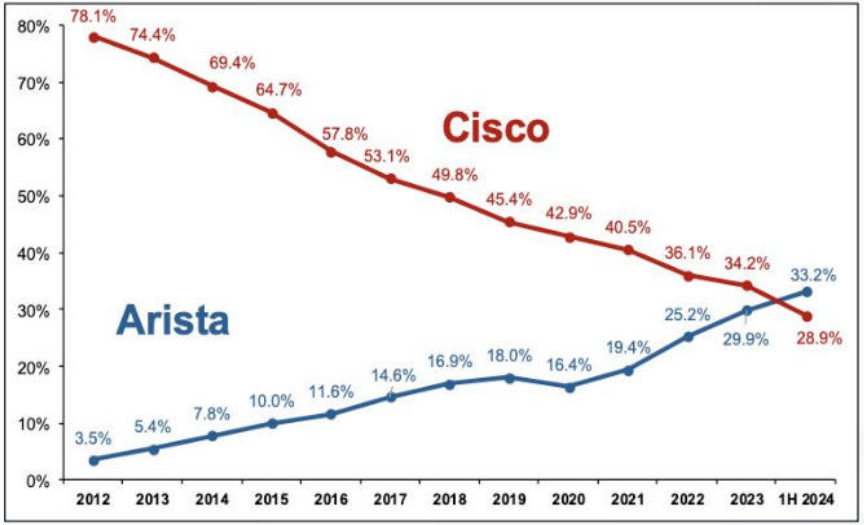
Arista Networks

Financial Health and Stability:
20 Years, 10k Kunden, 100 Millionen Ports

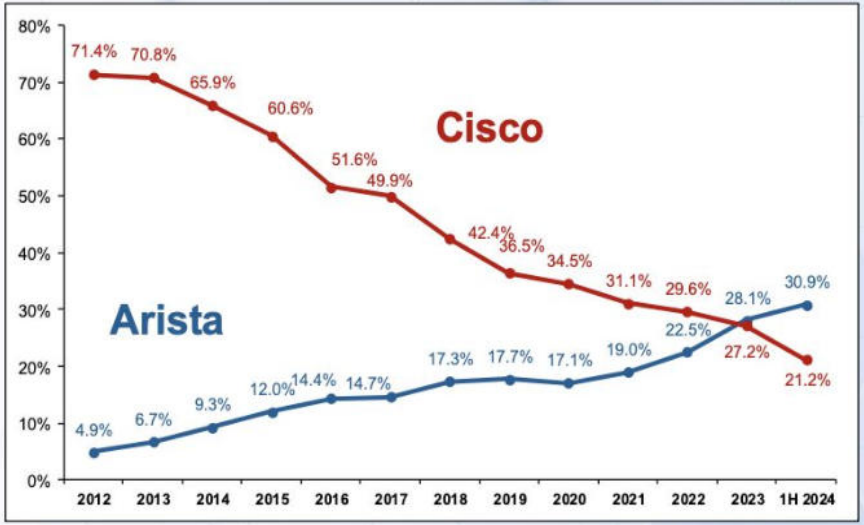


Market Share in Bewegung

Share in Dollars



Share in Ports



Source: Crehan Research Data Center Switch Market Share Report 2Q'24
Note: 10GbE and Higher - Excludes blade switches

Strong, Continual Share Gains Continue Into 2024

Was haben diese Switches gemein?

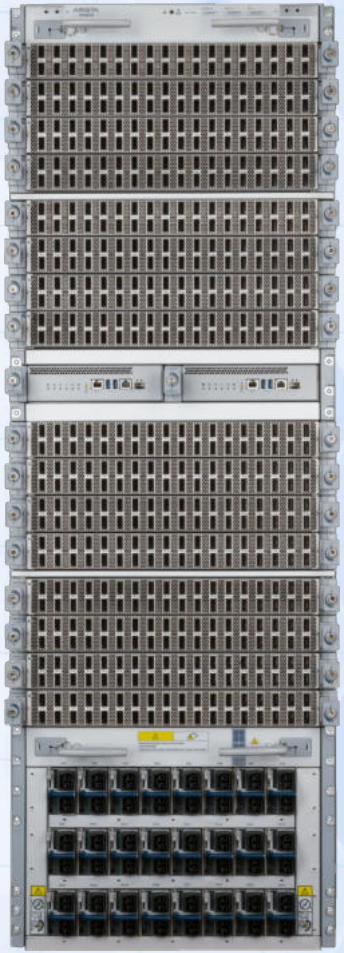
710P (64 Gb/s)

12x1G, 2x10G

=

EOS-4.30.5M.swi
(same file)

=



7816R3
(460Tb/s)
576x 400G
768x 100G

ARISTA

Was haben diese Switches gemein?

710P (64 Gb/s)

12x1G, 2x10G

=

CloudVision

Common

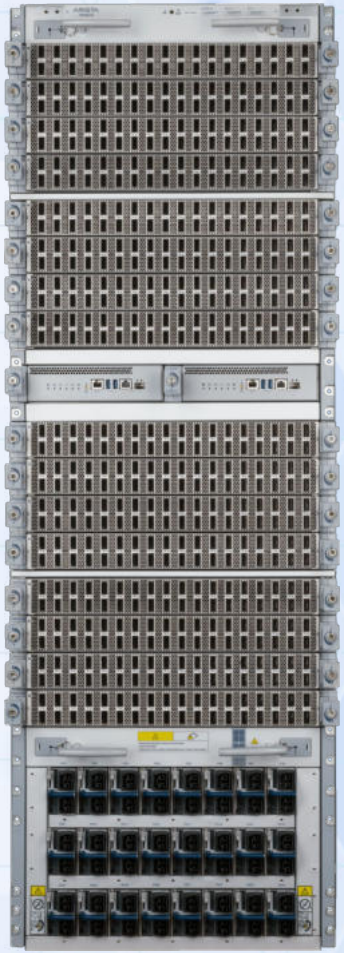
Management

Automation

Telemetry/visibility

Documentation

=



7816R3

(460Tb/s)

576x 400G

768x 100G

ARISTA

Lizenzierung

Feature Lizenzen

- Perpetual
- Vertrauensbasiert
- Keine Seriennummern Bindung
- Keine Lizenz/Registration Keys

Verschlüsselung Lizenzen

- Perpetual
- Seriennummern Bindung
- Lizenz Keys

The Arista Way (Kenneth Duda, 15.05.2023)

We will never compromise on quality.

We know our right to build new products depends on our existing products truly working.

We will never take the privilege of being in your network for granted.

We'd rather apologize 100 times for a missing feature or late release, than apologize even once for melting down your network.

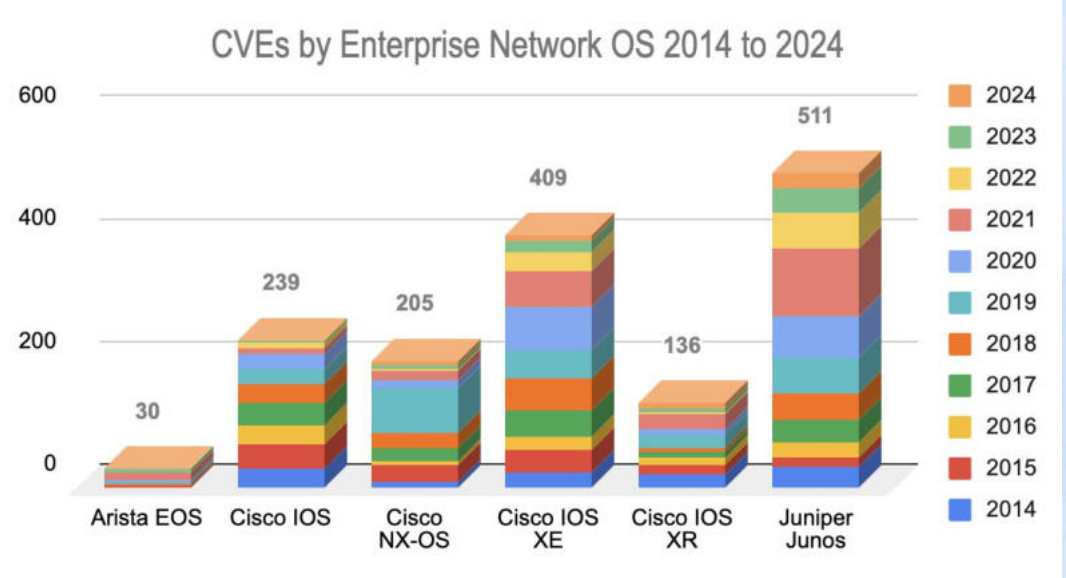
Making the network work takes priority over all new development.

No matter how big or small the customer, no matter how exciting the new feature: new development can wait. Making the network work cannot.

Stabile Software für stabile Netze

Kosteneinsparungen durch Innovation - Softwarequalität

- **Beste Software Qualität** in der Industrie
- **Geringste** Anzahl an **CVEs***
- **Weniger** Einfallstore für **Angreifer**
- **Weniger Aufwand** für Patching
- Niedrigere Betriebskosten



*Common Vulnerabilities and Exposures - Gemeinsame Schwachstellen und Gefährdungen, erhoben durch US-Regierung

https://cve.mitre.org/about/
https://cve.mitre.org/cgi-bin/cvekey.cgi?keyword=NX-OS
https://cve.mitre.org/cgi-bin/cvekey.cgi?keyword=EOS

ARISTA

Was macht Arista Networks?

Was macht Arista Networks?

Datacenter & Routing

- Leaf & Spine
- Fix & Modular
- Data Center Features
- L2/3, ECMP und VXLAN Fokus
- Echtzeit Telemetrie
- 1/10/25/40/50/100/200/400G/800G

Campus

- Leaf & Spine, Access
- Segmentierung, Visibilität und Sicherheit
- mGig und 25/100G
- PoE Support bis 90W
- Controllerless WiFi
- WiFi 6, 6E, 7

Observability

- SDN gestützte Netzwerk Visibilität
- Proaktive Risikoanalyse
- 360° Rundumsicht
- Integrierte Workload/Applikation und Infrastruktur Visibilität
- Echtzeit Impact Analysis

UNO

DMF

Security

- Ermöglichung von Universal Zero Trust Networking
- AI gestützte Erkennung zum Aufdecken von Angriffen
- Multi-Domain Segmentierungs-Services
- AI Unterstützung zur Vereinfachung von administrativen Aufgaben

agni CloudVision

AVA

ARISTA NDR

EOS

CloudVision

NetDL

ARISTA

Cloud and Data Center

7388X, 7368X, 7358X, 7060X(AI), 7050X Series

- High density leaf & Large radix Spine
- ToR, MoR, EoR options
- Rich DC oriented features
- L2/3, ECMP and VXLAN focused
- Streaming Telemetry and MACsec
- 1/10/25/40/50/100/200/400G

Core Routing & Intensive Workloads

7280R3/R3A, 7500R3, 7800R3/R4(AI), 7700R4(AI) Series

- High scale, full featured routing solutions
- Deep Buffer, VOQ architecture
- High capacity scaling
- MPLS, EVPN, SR + DC features
- Metro and long haul with TunnelSec
- Fixed and Modular form factors
- 1/10/25/40/50/100/200/400G

- Variety of form factors
- Rich segmentation, visibility and security
- Consistent features with DC
- Broad options with mGig and 25/100G
- PoE support up to 90W

7050X3, 750X, 720X, 720P, 710P Series

Campus and Branch

- Highly programmable pipelines
- Complex L2/3/4 operations
- Application specific solutions
- Server offload and acceleration
- Finance, SP, Cloud, Web profiles
- Ultra-low latency and Layer 1

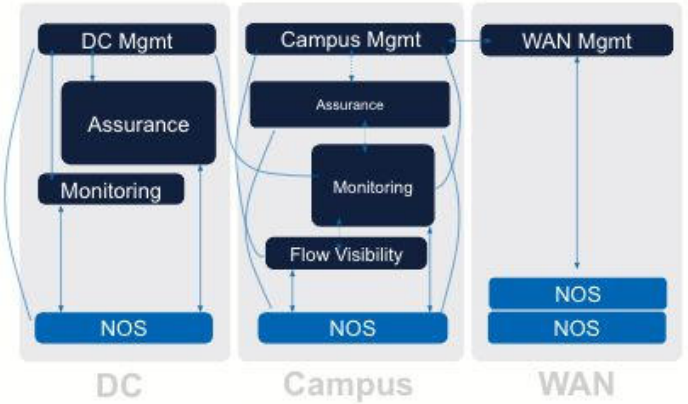
7130, 7170 Series

Specialist Applications

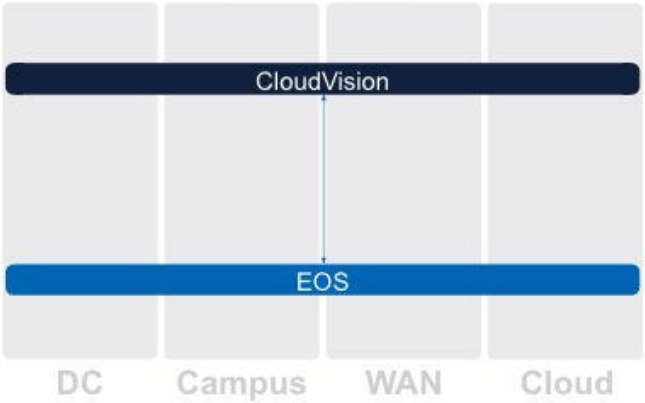
Cloud, Big Data, AI, Storage, Data Center, Broadcast, WAN, SP, IXP, Campus, Multi-cloud

Vereinheitlichung & Vereinfachung

Kosteneinsparungen durch Innovation - 1 Betriebssystem & 1 Management



ARISTA



Netzbetriebs-Teams können ein einheitliches Betriebshandbuch nutzen für:

- Upgrades
- Zertifizierungen
- Lifecycle Management
- Schwachstellen Management
- Netzwerk Design
- Troubleshooting
- Automatisierung
- Management Plattformen
- Ökosystem Integration
- Und mehr…

ARISTA

ARISTA

Automation, Management und Betrieb von Netzen

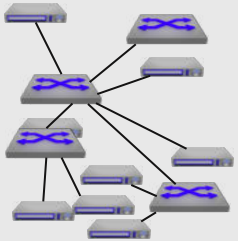
Network Automation - bisherige Evolution

Legacy Enterprise Operations

Modern Production Operations

Cloud/Hyperscale Operations

Anti-Pattern



Patterns

Repeatable design patterns

Runbooks/ITSM

Multi-Vendor/ Open Protocols

ITSM-Led

Monitoring / Telemetry / Observability

Read-Only Automation

Automated

Deployment and Workflow Automation

Testing environments

SW Defined

Database driven Source of Truth

Network CI Pipeline w/ pre-deployment testing

Autonomous

AI-driven Ops

Predictive and Proactive Fault detection and correction

Network Simulation Environments

Years | Quarters | Weeks | Days | Hours | Real-Time

CLI-Led Operations

CLI Enhanced with CV

Infrastructure-as-Code / Network CI

Enterprise Network Evolution

Modern Operating Model

Modern Engineering Blueprints

Autonomous Software-led NaaS

Prescriptive Design Patterns

Repeatable design patterns

Scalable, Federated, Open Protocols

Infrastructure-as-Code

CloudVision | AVD | NetDL | CloudVision CI Pipeline

Workflow Automation, Telemetry-based troubleshooting

Procedural configuration, testing, and documentation generation - no CLI

Arista Continuous Integration Pipelines

Functional Virtual Twins for Simulation

Network-as-a-Service

Autonomous and automated network operations, software-led and delivered

AI-driven Operations: Predictive and Proactive Fault detection and correction

Digital Twinning Simulation Environments

CloudVision Application Platform

NaaS/Infrastructure-as-Code / Network CI

Netzwerk Management Ansätze

Volle Flexibilität

Arista AVD - Architect, Validate, Deploy

- Erweiterbare, netzwerkweite Modelle, die die Konfiguration vereinfachen, Konsistenz gewährleisten und Fehler reduzieren
- Prozedurale Generierung von Konfiguration und Dokumentation
- Validierungsfunktionen durch Testautomatisierung
- Integration mit GitOps, CloudVision und weiteren 3rd Party Tools

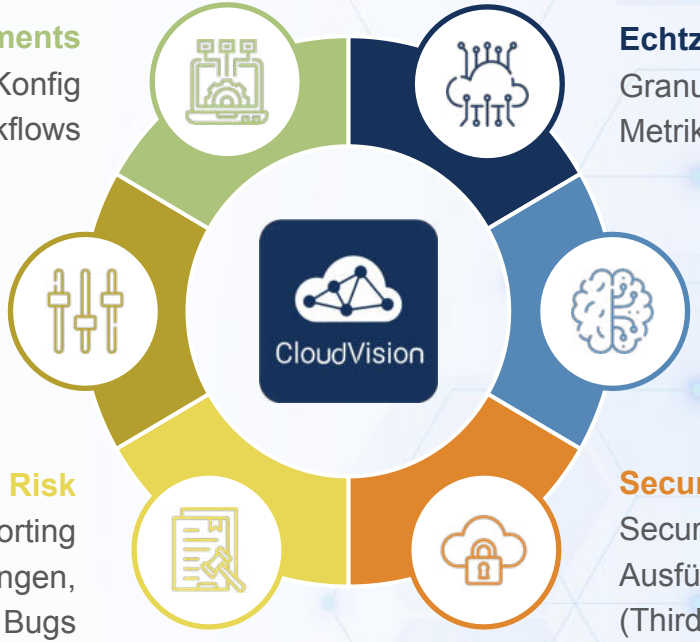
Open sourced: https://avd.arista.com/

CloudVision: Einheitliche Netzwerk Automatisierung

Automatisierte Deployments
Zero Touch, netzwerk-weite Konfig Modelle, Pre-Deployment Workflows

Change Controls
Netzwerke-weite Upgrades, Rollback und Snapshots

Compliance / Risk
Durchgehende Bewertung, Reporting und Korrektur von Abweichungen, Schwachstellen und Bugs



Echtzeit Telemetrie
Granulares “State Streaming” für Metriken, Flows, Events uvm

Cognitive Analytics
Trend Analysen, vorausschauende Algorithmen für Zustand von Netzwerk und Applikationen

Security Services
Security Policy Management / Ausführung, Policy / Identity Integration (Third Party), Wireless IPS

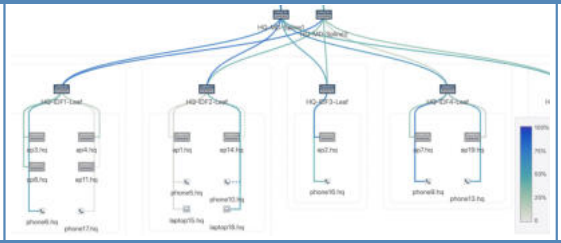
Eine Plattform für konsistenten Netzwerk Betrieb

ARISTA

CloudVision: Prebuilt Advanced Telemetry + Automation

Compliance Dashboards

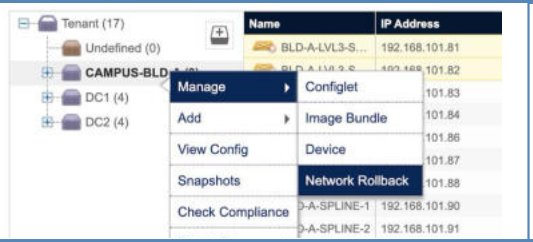
Real-Time Topology Views



Network-Wide Host Search

Hitless Patching

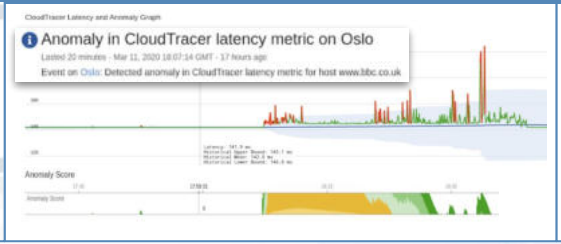
Network-Wide Rollback



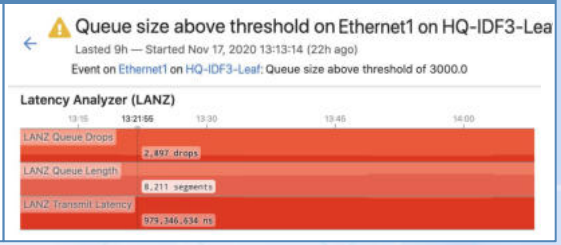
Data Plane & Endpoint Visibility

Monitor Real-Time PoE Usage

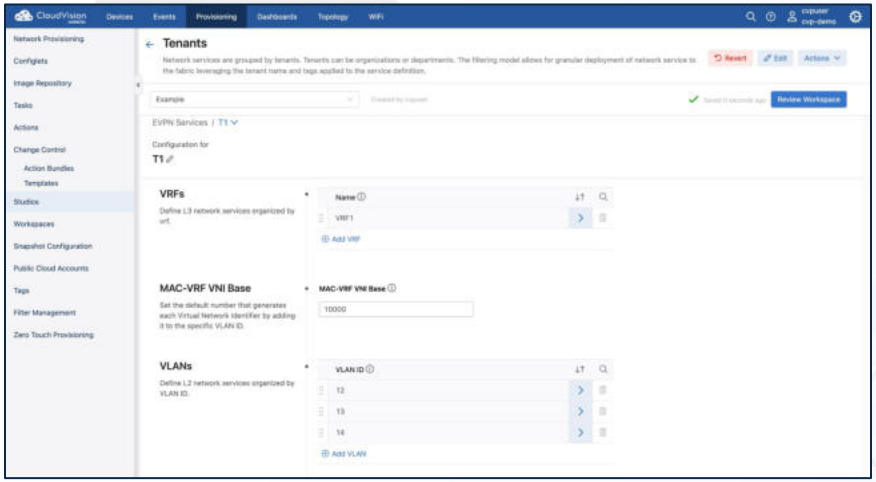
Anomaly Detection



Early Warning on Congestion



CloudVision Studios



Simplified Config Management with New Declarative Model

Key Features → Benefits

- Point-n-Click Network Automation → Instantly spin-up Arista Validated Network Designs with guided workflows
- Flexible Config 'Wizards' → Craft customizable, user-specific workflows
- Network-wide Data models → Abstractions for simpler automation of network-wide changes

Bringing Agility to Network Config Management

ARISTA

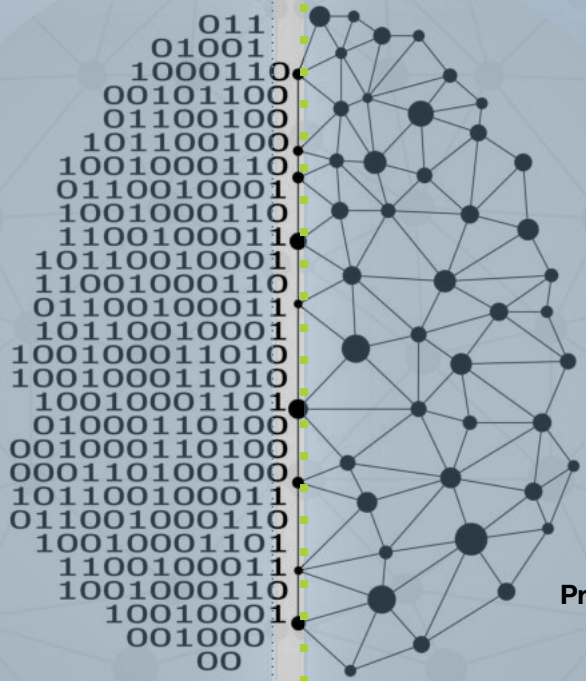
Überall KI / AI

Wohin geht die Reise in Sachen Management von Netzen?

Marketing im KI Zeitalter

ARISTA

ARISTA



AIOps

Observability

AVA

Security

Predictive Analytics

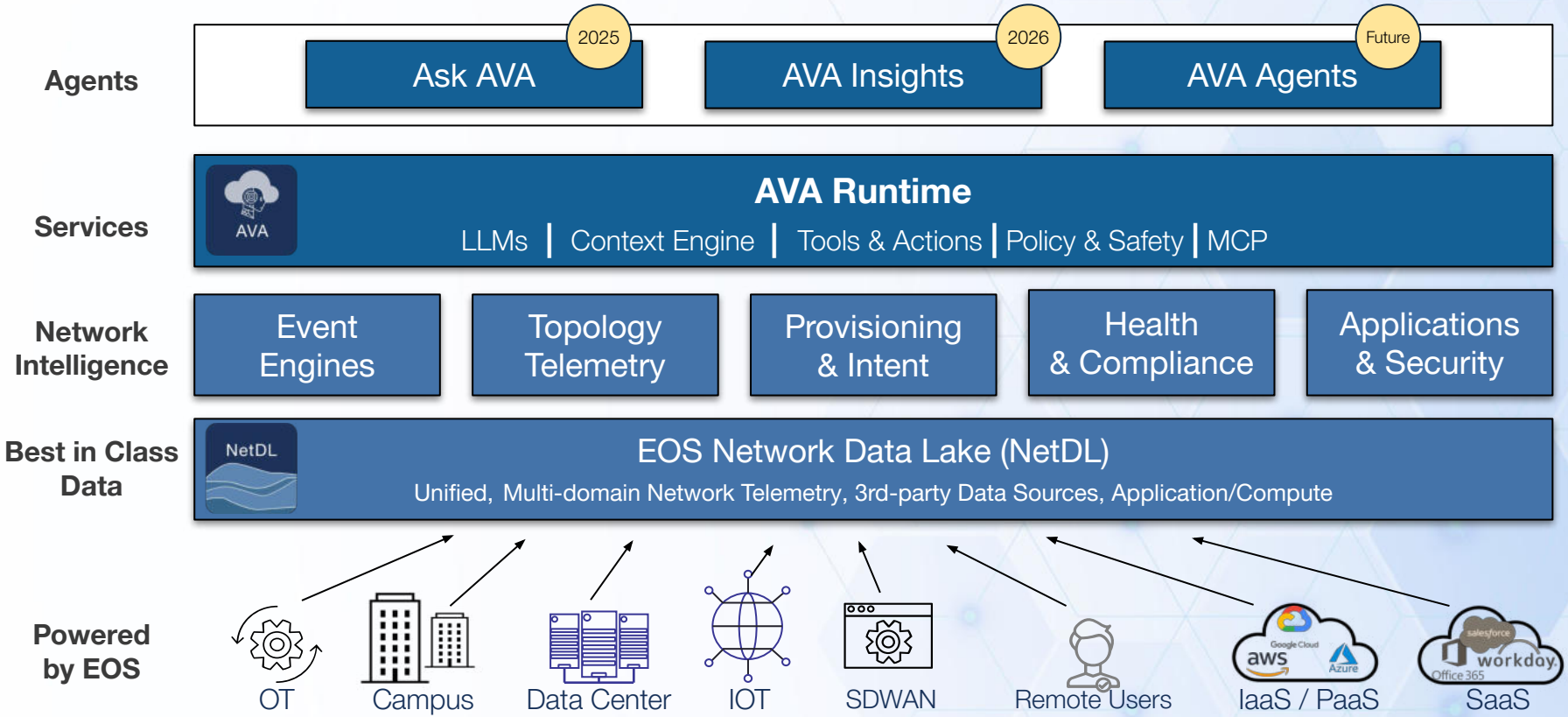
Focus für Kunden/Nutzer

Networking for AI
Arista Etherlink™

AI for Networking
Arista AVA™

ARISTA

KI Stack in der Netzwerkinfrastruktur



AVA - AIOps Network Assistant

Incident detection and resolution

AVA, can you tell me the health of BGP in my New York datacenter?

Knowledge base and how-to's

AVA, how do I create a VLAN trunk and a series of VLANs?

Smarter security and compliance

AVA, what switches are not compliant and how do I fix?

Proactive problem solving

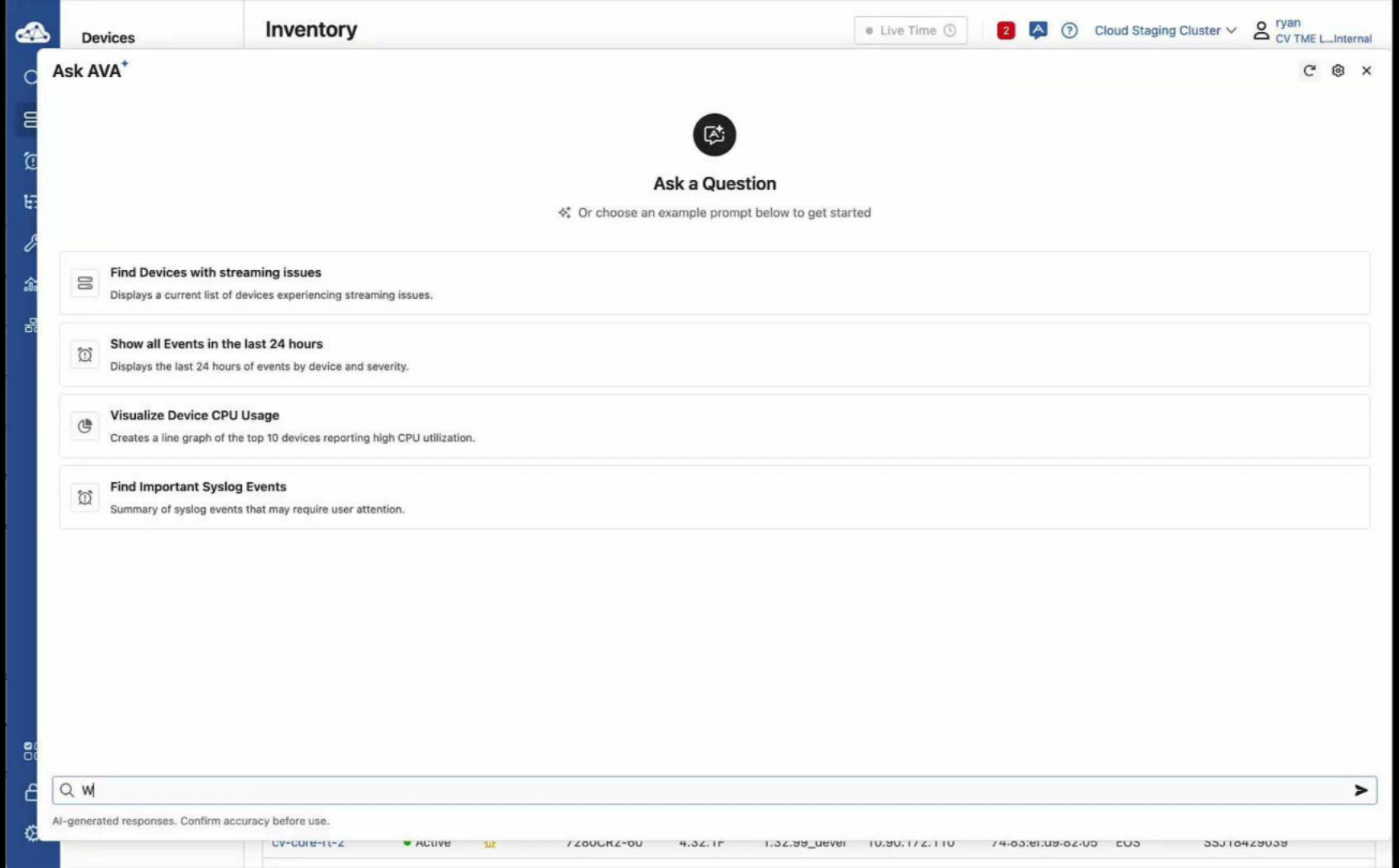
AVA, what switches show health trends that may be an issue?

Cost optimization & scalability

AVA, tell me about branch uplinks that are below 50% utilized?

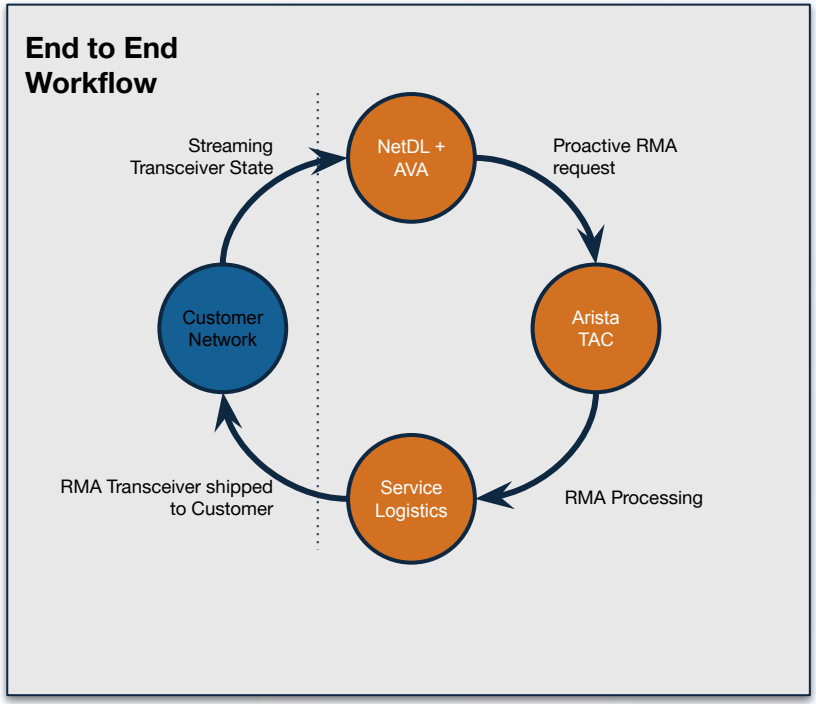
Enhanced network performance

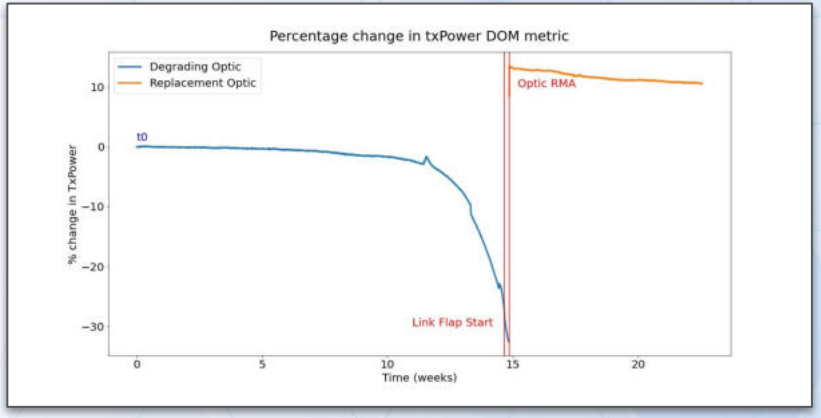
AVA, is my AI cluster experiencing performance issues? Nodes?


Devices
Inventory
Live Time
2
Cloud Staging Cluster
ryan
CV TME L...Internal
Ask AVA
Ask a Question
Or choose an example prompt below to get started
Find Devices with streaming issues
Displays a current list of devices experiencing streaming issues.
Show all Events in the last 24 hours
Displays the last 24 hours of events by device and severity.
Visualize Device CPU Usage
Creates a line graph of the top 10 devices reporting high CPU utilization.
Find Important Syslog Events
Summary of syslog events that may require user attention.
W
AI-generated responses. Confirm accuracy before use.

CloudVision und AVA in Action -> ‘Auto RMA’

Example: Transceiver Failure Detection + TAC Integration





- Engineering team worked closely with 2 large customers
- 22K optics monitored through CloudVision over 1 year
- 16 failures predicted and then confirmed
- 0 false positives
- Deploying across all CVaaS customers now
- Starting proactive RMAs with TAC

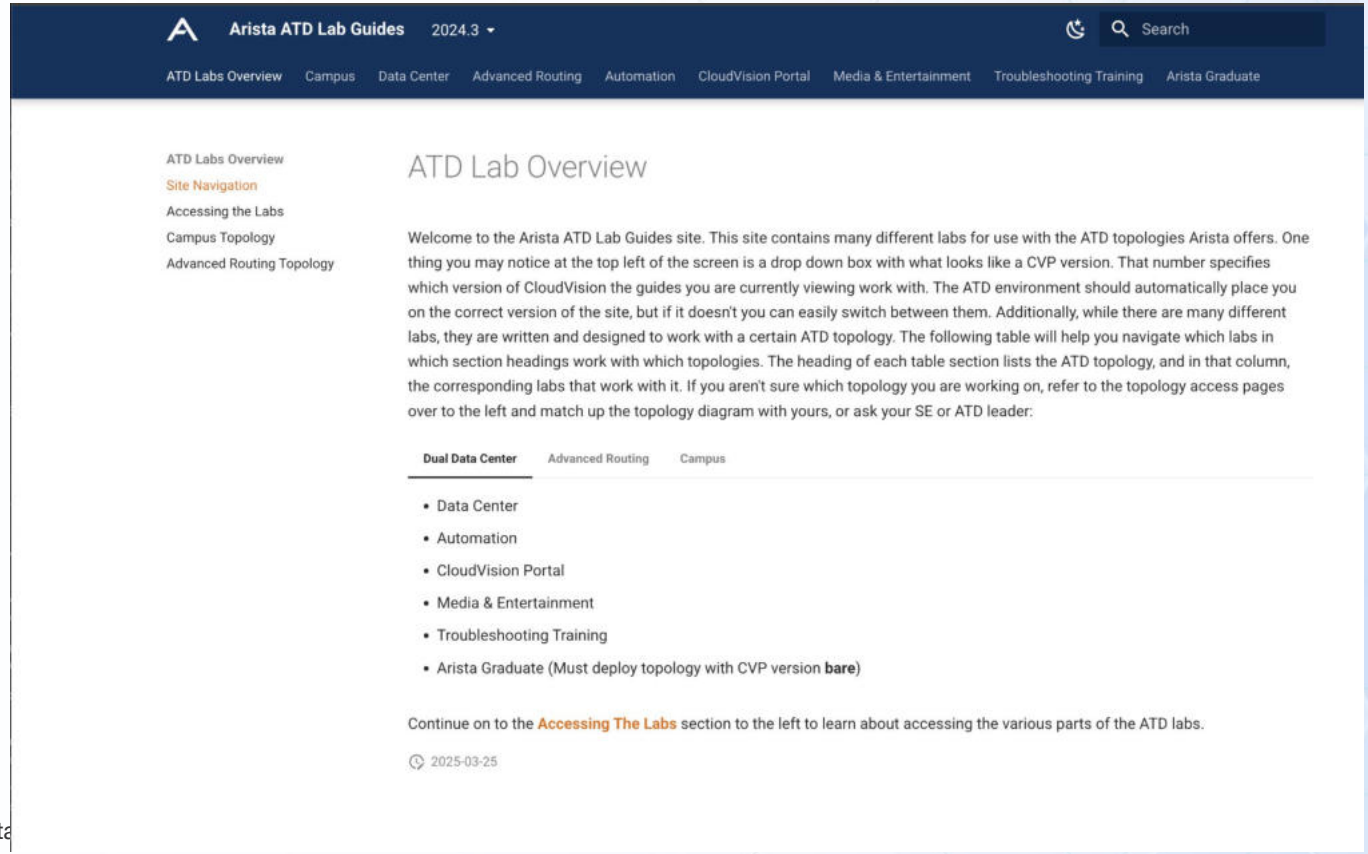
ARISTA

Probefahrt?

Jederzeit mit dem Arista Test Drive

Arista Test Drive

We provide the car … you drive!



Arista Test Drive

We provide the car … you drive!

ARISTA

- Lab Guides
- Console Access
- Programmability IDE
- WebUI
- CVP
- Event Alert API
- Jenkins
- IPAM

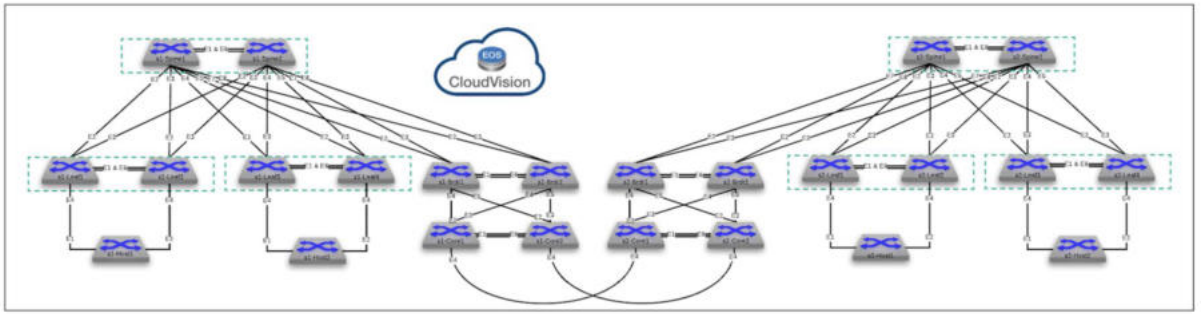
Arista Dual Data Center Lab

Welcome to the Arista Dual Data Center Lab! Please use the links on the left to navigate through the lab.

Time Remaining: 07:22:16

Topology

Click on a device to access CLI.



CVP 2024.3.1 is currently UP

No pending tasks in CVP.

Usernames and Passwords

Use the following usernames and passwords to access the ATD:

Device	Username	Password
Lab Credentials	arista	aristai9d9
Programmability IDE		aristai9d9
WebUI		@rista1

ARISTA

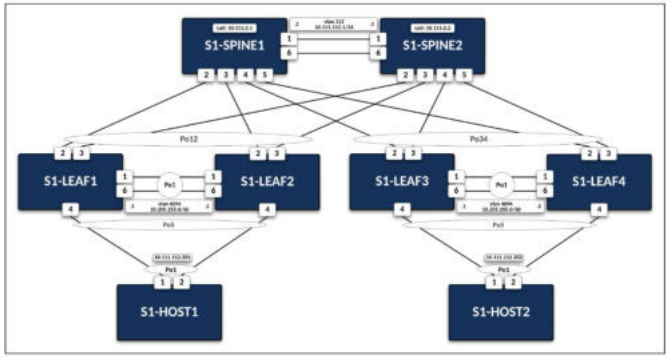
Arista Test Drive

Arista ATD Lab Guides 2024.3 Search

ATD Labs Overview | Campus | Data Center | Advanced Routing | Automation | CloudVision Portal | Media & Entertainment | Troubleshooting Training | Arista Graduate

Data Center
- Overview
- Layer 2 Leaf-Spine
  - Preparing The Lab
  - Lab Tasks
- Layer 3 Leaf-Spine (BGP)
- Layer 3 Leaf-Spine (OSPF)
- VXLAN
- L2 EVPN Services
- L3 EVPN Services
- L2 and L3 EVPN - Symmetric IRB with MLAG
- L2 and L3 EVPN - Symmetric IRB with All-Active Multihoming
- CloudVision Studios

Layer 2 Leaf-Spine Lab



Note

The manually entered commands that are part of this lab are equivalent to `L2LS_s1-leaf4_complete`.

Preparing The Lab

1. Log into the LabAccess jumpserver:

   a. Type `l2ls` at the Main Menu prompt.

   Info

   Did you know the **l2ls** script is composed of Python code that uses the CloudVision Portal REST API to automate the provisioning of CVI
   The configlets that are configured via the REST API are `L2LS_s1-spine1`, `L2LS_s1-spine2`, `L2LS_s1-leaf1`, `L2LS_s1-leaf2`, `L2LS_s1-L2LS_s1-leaf4`.

   b. The script will pre-configure the topology with the exception of **s1-Leaf4**. The main task is to configure this dev

Arista ATD Lab Guides 2024.3 Search

ATD Labs Overview | Campus | Data Center | Advanced Routing | Automation | CloudVision Portal | Media & Entertainment | Troubleshooting Training | Arista Graduate

Data Center
- Overview
- Layer 2 Leaf-Spine
- Layer 3 Leaf-Spine (BGP)
- Layer 3 Leaf-Spine (OSPF)
- VXLAN
- L2 EVPN Services
- L3 EVPN Services
- L2 and L3 EVPN - Symmetric IRB with MLAG
- L2 and L3 EVPN - Symmetric IRB with All-Active Multihoming
- CloudVision Studios

Data Center Labs

Layer 2 Leaf-Spine

This lab builds a layer 2 leaf-spine underlay fabric utilizing MLAG and vARP.

→ Access This Lab

Layer 3 Leaf-Spine (BGP)

This lab builds a layer 3 leaf-spine fabric utilizing the BGP protocol for underlay routing.

→ Access This Lab

Layer 3 Leaf-Spine (OSPF)

This lab builds a layer 3 leaf-spine fabric utilizing the OSPF protocol for underlay routing.

→ Access This Lab

VXLAN

This lab builds a layer 3 leaf-spine fabric utilizing the BGP protocol for underlay routing, and VXLAN for layer 2 extension across leaf pairs.

→ Access This Lab

L2 EVPN Services

This lab builds a layer 3 leaf-spine fabric utilizing the BGP protocol for underlay routing. It uses the BGP EVPN address family and VXLAN for layer 2 extension across leaf pairs, using the default vrf.

→ Access This Lab

L3 EVPN Services

This lab builds a layer 3 leaf-spine fabric utilizing the BGP protocol for underlay routing. It uses the BGP EVPN address family and VXLAN for layer 2 extension across leaf pairs, using a non-default vrf for endpoint traffic.

→ Access This Lab

L2 and L3 EVPN - Symmetric IRB with MLAG

This lab builds a layer 3 leaf-spine fabric utilizing the BGP protocol for underlay routing. It uses the BGP EVPN address family and VXLAN for layer 2 extension across leaf pairs, using a non-default vrf for endpoint traffic, and MLAG as the multihoming model for the hosts connected to the leaf pairs.

→ Access This Lab

L2 and L3 EVPN - Symmetric IRB with All-Active Multihoming

This lab builds a layer 3 leaf-spine fabric utilizing the BGP protocol for underlay routing. It uses the BGP EVPN address family and VXLAN for layer 2 extension across leaf pairs, using a non-default vrf for endpoint traffic, and the AA LAG ESI groups multihoming model for the hosts connected to the leaf pairs.

→ Access This Lab

Arista Test Drive

We provide the car … you drive!

```
****************************************
*****Jump Host for Arista Test Drive*****
****************************************


==========Main Menu==========

Please select from the following options:
1. Reset All Devices to Base ATD (reset)
2. Layer 2 Leaf-Spine Lab (l2ls) - Site 1 Only
3. Layer 3 Leaf-Spine Lab with BGP (l3ls) - Site 1 Only
4. Layer 3 Leaf-Spine Lab with OSPF (l3ls-ospf) - Site 1 Only
5. VXLAN Static Flood List Lab (vxlan) - Site 1 Only
6. CloudVision Portal Lab (cvp) - Site 1 Only
7. CVP lab for Studios L3LS/EVPN (studiosl3ls)


97. Additional Labs (labs)
98. SSH to Devices (ssh)
99. Exit LabVM (quit/exit) - CTRL + c

What would you like to do?:
```

```
****************************************
*****Jump Host for Arista Test Drive*****
****************************************


==========Device SSH Menu==========

Screen Instructions:

* Select specific screen - Ctrl + a <number>
* Select previous screen - Ctrl + a p
* Select next screen - Ctrl + a n
* Exit all screens (return to menu) - Ctrl + a \

Please select from the following options:
1. s1-brdr1 (s1-brdr1)
2. s1-brdr2 (s1-brdr2)
3. s1-core1 (s1-core1)
4. s1-core2 (s1-core2)
5. s1-host1 (s1-host1)
6. s1-host2 (s1-host2)
7. s1-leaf1 (s1-leaf1)
8. s1-leaf2 (s1-leaf2)
9. s1-leaf3 (s1-leaf3)
10. s1-leaf4 (s1-leaf4)
11. s1-spine1 (s1-spine1)
12. s1-spine2 (s1-spine2)
13. s2-brdr1 (s2-brdr1)
14. s2-brdr2 (s2-brdr2)
15. s2-core1 (s2-core1)
16. s2-core2 (s2-core2)
17. s2-host1 (s2-host1)
18. s2-host2 (s2-host2)
19. s2-leaf1 (s2-leaf1)
20. s2-leaf2 (s2-leaf2)
21. s2-leaf3 (s2-leaf3)
22. s2-leaf4 (s2-leaf4)
23. s2-spine1 (s2-spine1)
24. s2-spine2 (s2-spine2)

Other Options:
95. Connect to CVP Console (console) - Type 'console cvp1' after connecting
96. Screen (screen) - Opens a screen session to each of the hosts
97. Back to Previous Menu (back)
98. Shell (shell/bash)
99. Back to Main Menu (main/exit) - CTRL + c

What would you like to do?
```

ARISTA

Thank You

www.arista.com