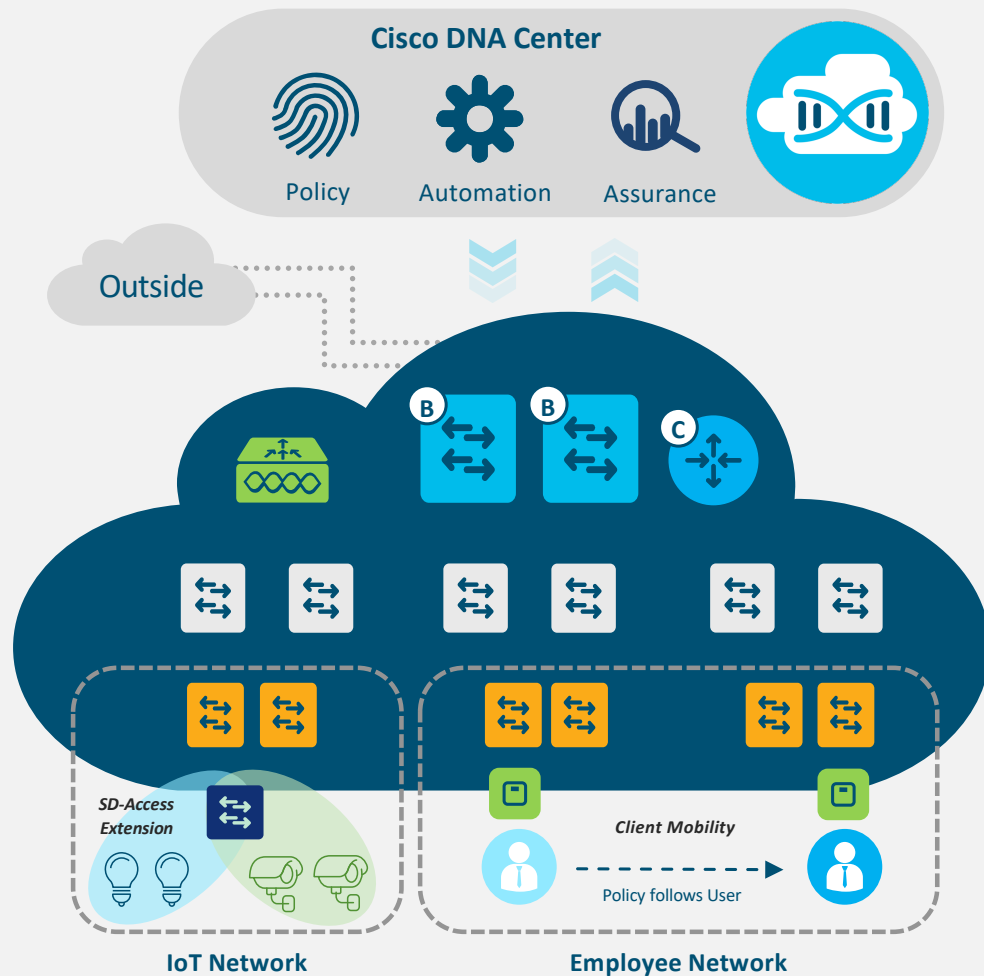# Cisco Catalyst center, devices and discussion

Reggie (Redžinalds Knipšis)
Solutions Engineer for Baltics
april 16, 2024

Cisco DNA Concept

Cisco Software Defined Access
The Foundation for Cisco's Intent-Based Network

Cisco DNA Center

Policy   Automation   Assurance

Outside

B   B   C

SD-Access Extension

IoT Network

Client Mobility

Policy follows User

Employee Network

One Automated Network Fabric

Single fabric for Wired and Wireless with full automation

Identity-Based Policy and Segmentation

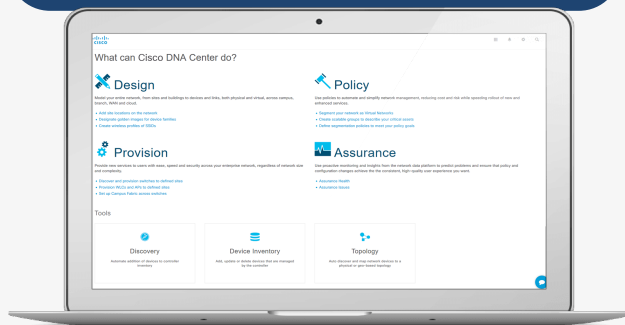Policy definition decoupled from VLAN and IP address

AI-Driven Insights and Telemetry

Analytics and visibility into User and Application experience

Cisco Catalyst Center (ex DNA center)
Command and control center for intent-based networking

Cisco Catalyst Center

Cisco Catalyst Center Appliance

Physical and virtual infrastructure

Cisco and third party

Automation
Automate provisioning, device updates, and device lifecycle management.
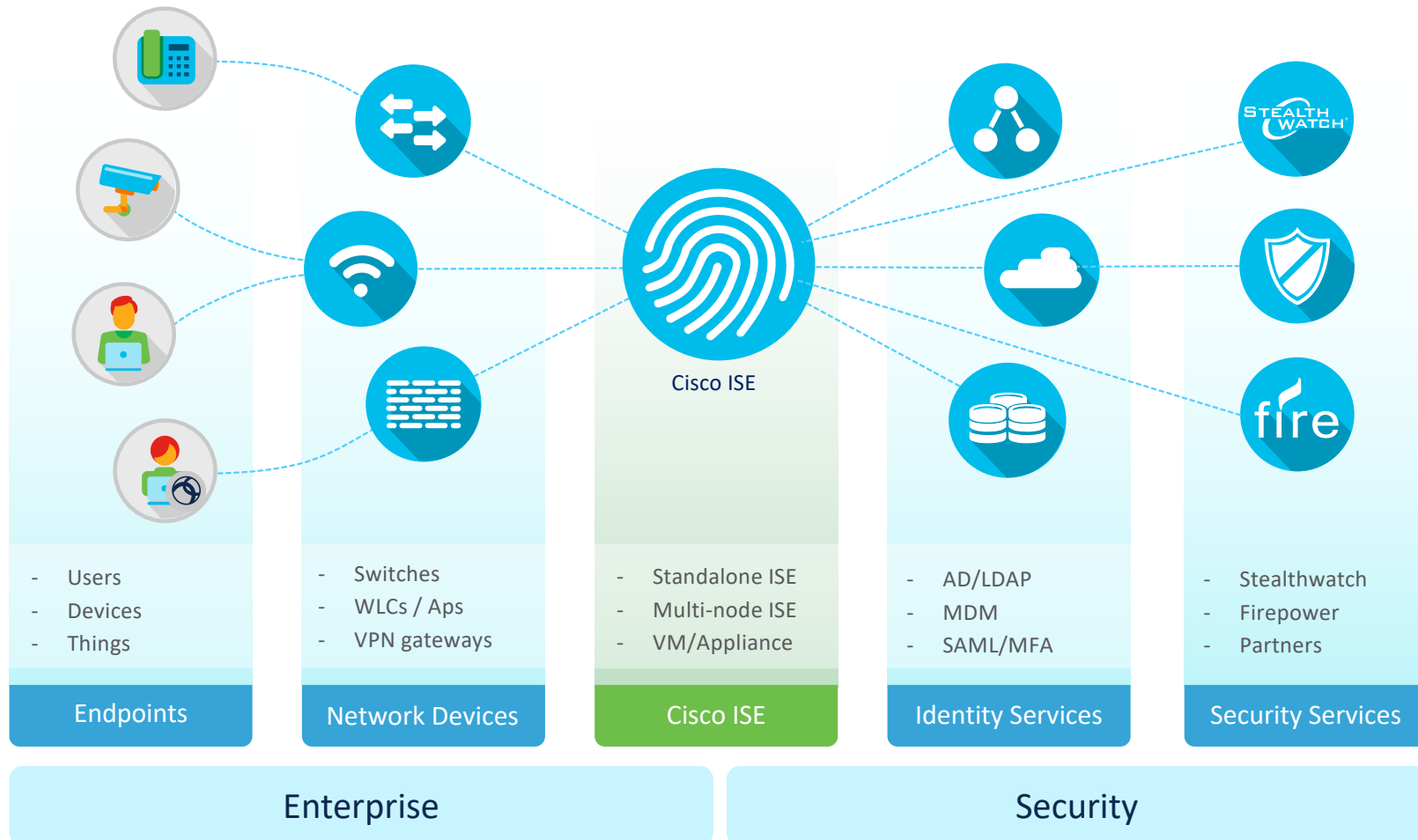
Analytics & Assurance
AI/ML
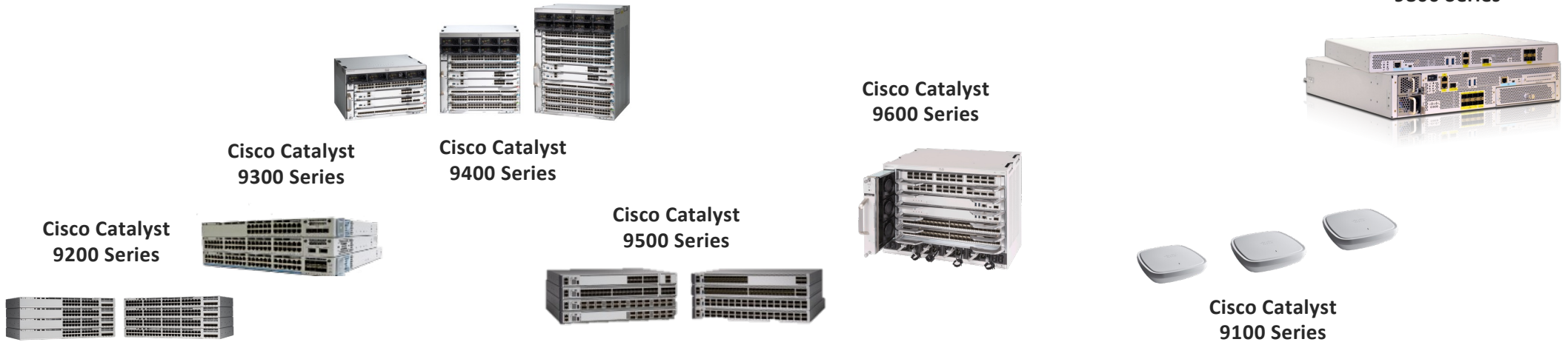Improve network performance and spend less time troubleshooting with AI and Machine Learning.

Security & Policy
Create user and group policies and increase security threat protection.

Identity with ISE is Secures the Enterprise

Cisco ISE

- Users
- Devices
- Things

Endpoints

- Switches
- WLCs / Aps
- VPN gateways

Network Devices

- Standalone ISE
- Multi-node ISE
- VM/Appliance

Cisco ISE

- AD/LDAP
- MDM
- SAML/MFA

Identity Services

- Stealthwatch
- Firepower
- Partners

Security Services

Enterprise

Security

Cisco Catalyst 9000 Family

Cisco Catalyst
9800 Series

Cisco Catalyst
9600 Series

Cisco Catalyst
9300 Series

Cisco Catalyst
9400 Series

Cisco Catalyst
9500 Series

Cisco Catalyst
9200 Series
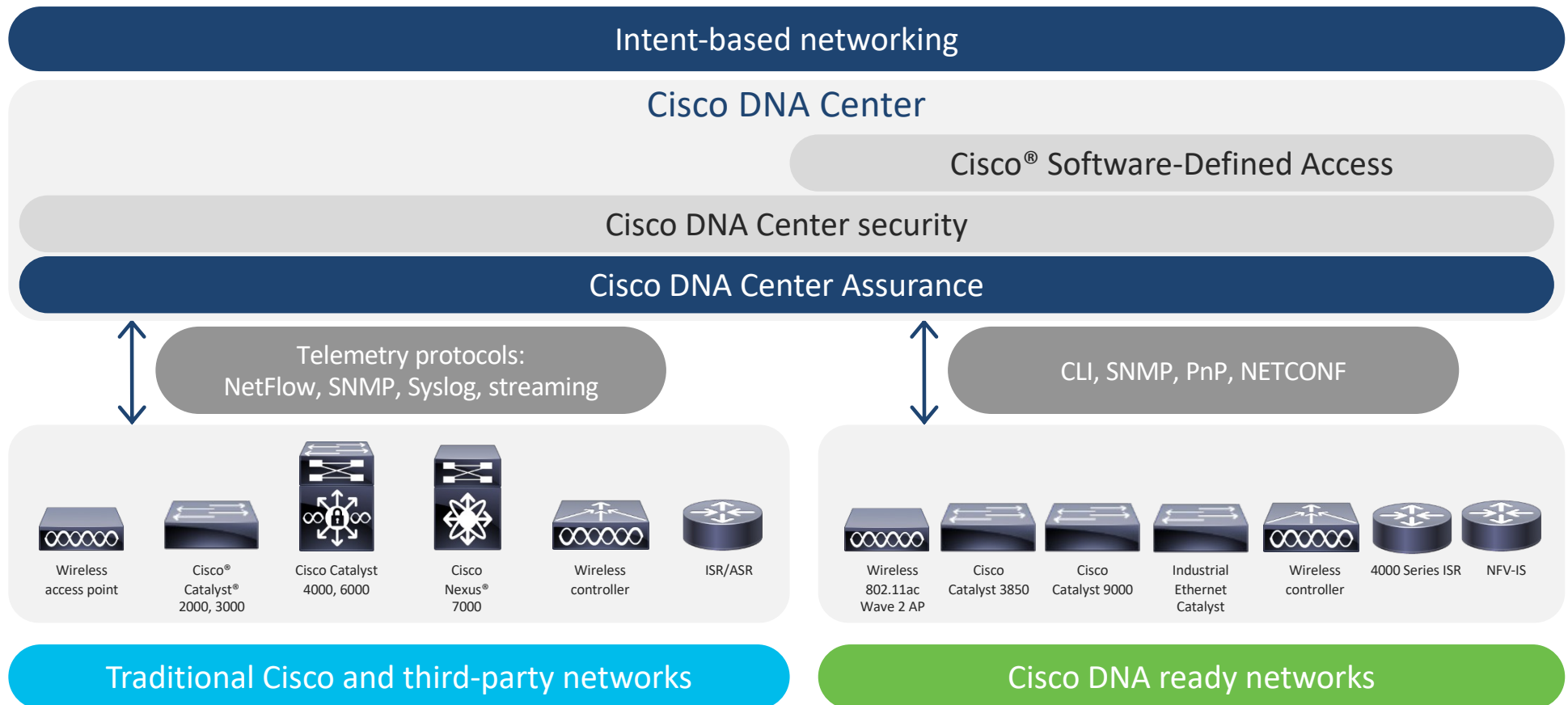
Cisco Catalyst
9100 Series

Access switching

Core/Dist switching
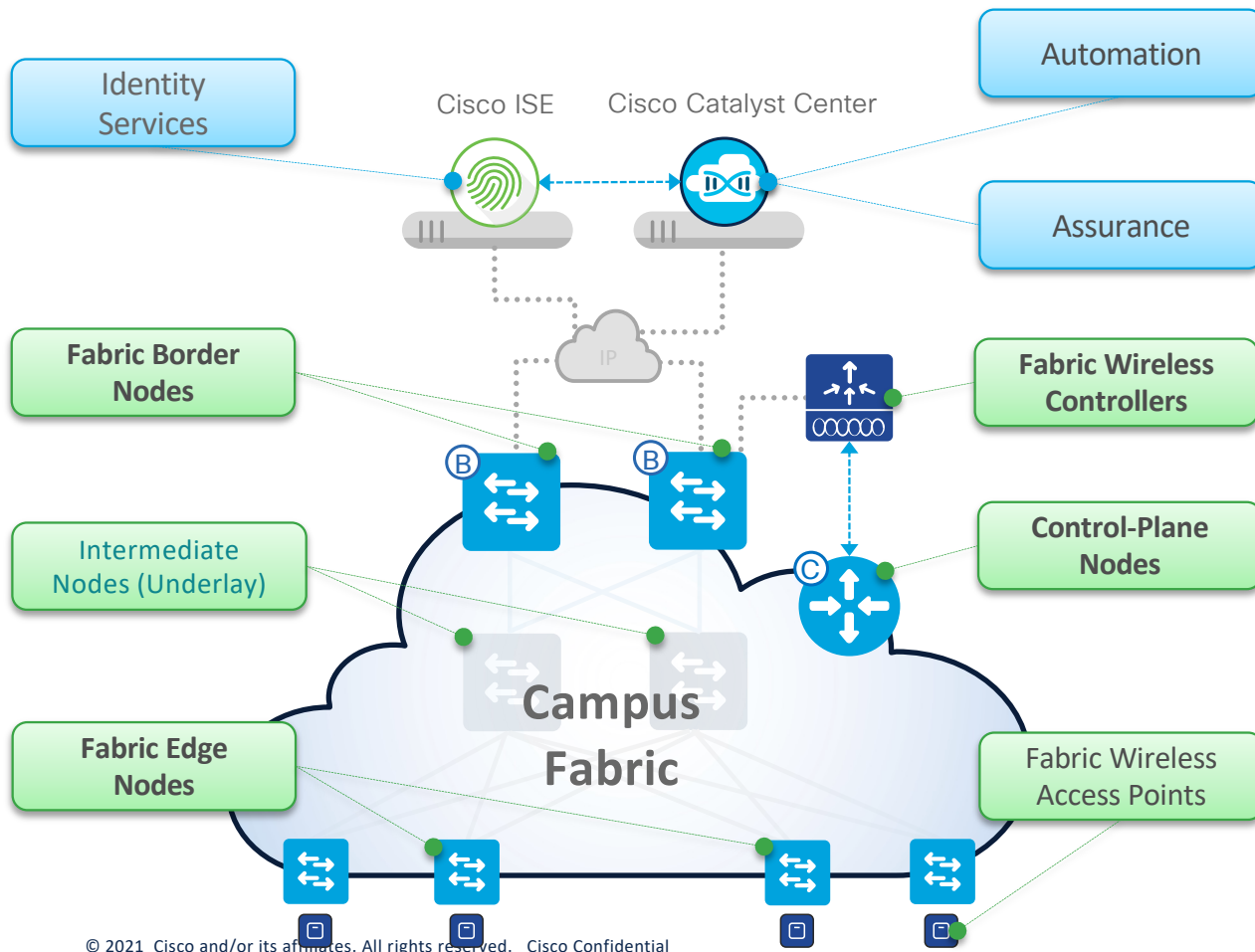
Wireless

IOS-XE
Common Software Architecture

Programmable ASIC
Common Hardware Architecture

Cisco Catalyst Center: Easy to start with Assurance

Intent-based networking

Cisco DNA Center

Cisco® Software-Defined Access

Cisco DNA Center security

Cisco DNA Center Assurance

Telemetry protocols:
NetFlow, SNMP, Syslog, streaming

CLI, SNMP, PnP, NETCONF

| Wireless access point | Cisco® Catalyst® 2000, 3000 | Cisco Catalyst 4000, 6000 | Cisco Nexus® 7000 | Wireless controller | ISR/ASR |

| Wireless 802.11ac Wave 2 AP | Cisco Catalyst 3850 | Cisco Catalyst 9000 | Industrial Ethernet Catalyst | Wireless controller | 4000 Series ISR | NFV-IS |

Traditional Cisco and third-party networks

Cisco DNA ready networks

Cisco SD-Access
Fabric Roles & Terminology

- **Network Automation** – Simple GUI and APIs for intent-based Automation of wired and wireless fabric devices

- **Network Assurance** – Data Collectors analyze Endpoint to Application flows and monitor fabric device status

- **Identity Services** – NAC & ID Services (e.g. ISE) for dynamic Endpoint to Group mapping and Policy definition

- **Control-Plane Nodes** – Map System that manages Endpoint to Device relationships

- **Fabric Border Nodes** – A fabric device (e.g. Core) that connects External L3 network(s) to the SD-Access fabric

- **Fabric Edge Nodes** – A fabric device (e.g. Access or Distribution) that connects Wired Endpoints to the SD-Access fabric

- **Fabric Wireless Controller** – A fabric device (WLC) that connects Fabric APs and Wireless Endpoints to the SD-Access fabric

Key Benefits

Comprehensive automation

1

Before ➡ After

Before	After
Manual device configuration	Adds, changes, and upgrades all automated

Benefits

- Deploy networks in minutes, not days
- Ensure consistency in device configuration
- Lower cost of network operations

How Cisco does it

Policy-based onboarding reduces human error and guarantees uniformity.

Zero-touch provisioning speeds and simplifies adding new devices.

Software image management provides consistency for better network performance.

Process integration with ITSM and IPAM further streamlines operations.

Network changes made easy

1

Intent-based network upgrades

Intent-based network upgrades allow for image standardization, much desired by all network admins

2

Upgrade pre and post checks

Pre and post checks give network admins more control over and visibility into network upgrades

3

Patching support

Patches are supported in Cisco DNA Center from intent to pre and post checks in the same way that we manage regular images

2 Analytics and assurance

Before ➡ After
Hours spent fixing network faults	Resolve issues with a single mouse click

Benefits

- Automatically detect and prioritize issues
- Instant guided remediation for quick resolution
- Increased performance and less time spent

How Cisco does it

Streaming telemetry and contextual data from every device on the network provide complete visibility.

Complex event processing with a series of analytics engines finds anomalies instantly.
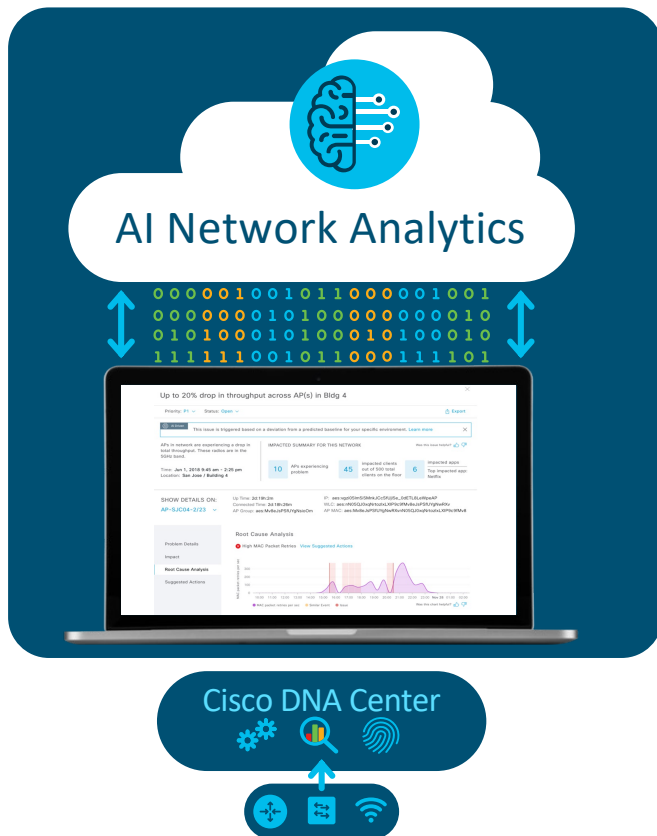
Correlated insights and contextual cognitive analytics accurately pinpoint root cause.

Guided remediation allows for single-click resolution, allowing automation to close the loop.
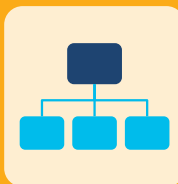
Cisco AI Network Analytics
Machine learning

AI Network Analytics

Cisco DNA Center

Visibility: Personalized baselining

Intelligently define personalized "network normal" using unified global telemetry collected

Insight: Intelligent data analysis

Increase signal to noise, reduce false positives, and accurately identify trends and root causes.

Action: Accelerated remediation

Create automated resolution options for IT to act on based on machine reasoning algorithms.
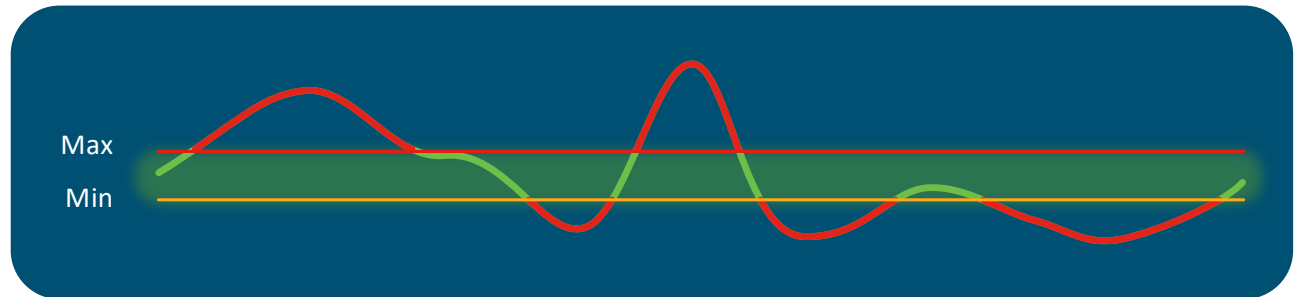
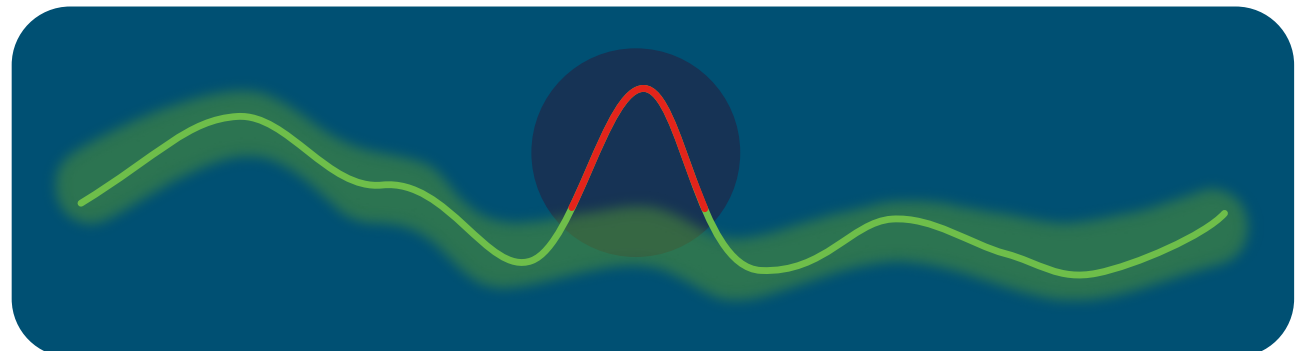# Improve incident alert fidelity for each network
Personalized baselining

Collect global telemetry

Cisco DNA Center

Before: Custom thresholds = alert overload

Max

Min

AI-driven: Dynamic baselines = relevant anomalies

3 Consistent security

How Cisco does it

Before ➡ **After**

| Always chasing new threats | Continuous monitoring and compliance |

Benefits

- Fast and accurate policy compliance auditing
- Minimized operational or security risks
- Security posture hardened by 35%

Cisco® Identity Services Engine enforces policies and compliance while simplifying user access.

Network security analytics uses multilayered machine learning to detect advanced persistent threats.

Cisco Stealthwatch® monitors streaming telemetry to instantly detect zero-day malware.

Encrypted Traffic Analytics identifies security threats within encrypted data.

KNOW
Your
Endpoints

SEE
what they
talk to

Call Manager
PACs
Media Servers
Common Services
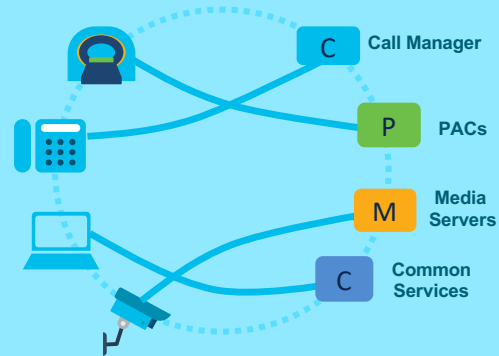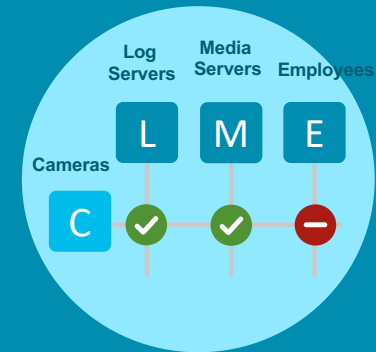
DO/CREATE
the right
policy

Log Servers
Media Servers
Employees
Cameras

Machine learning identifies malware

Malware in encrypted traffic

Security AND privacy

Detection: 99.99% accuracy

Infrastructure view of the data

src ——————————— dst   **Google Search**

src ——————————— dst   **Firefox self-repair**

Data exfiltration

C2 message

Self-signed certificate

src ——————————— dst   **Bestafera malware**
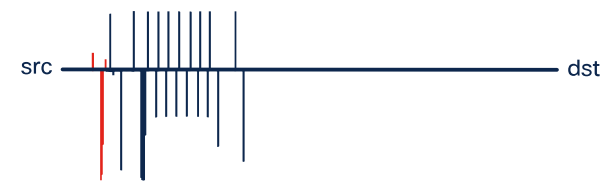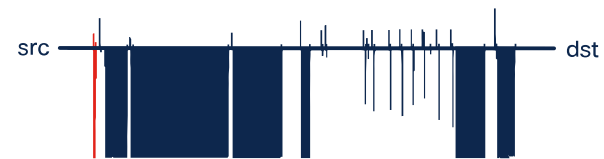
Application Visibility Service (SD-AVC/CBAR)
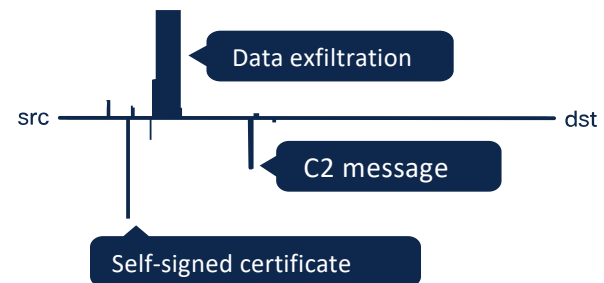
Cisco DNA Application Visibility Service (CBAR)

External Sources

Homegrown Apps

Improved Application Assurance

Analytics and Telemetry

Cat 9k

Cat 8k, ASR1k
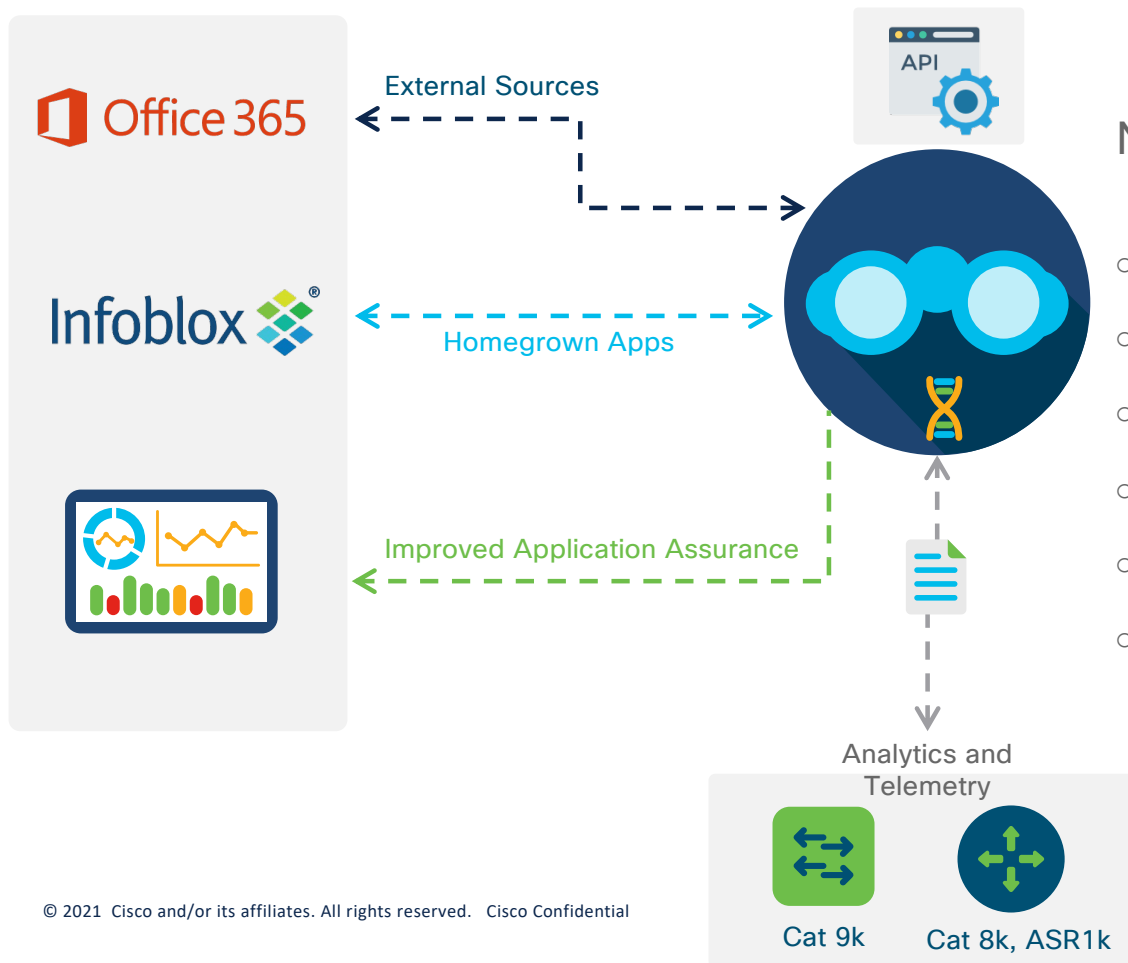
"Application Visibility Service builds on Network Based Application Recognition (NBAR)"

o Guided workflow for enabling AVC on multiple devices

o Classify >1400 applications with NBAR2

o Recognize SaaS applications

o Add and recognize custom applications

o Improved classification with controller based architecture

o Dynamically enrich the classification library throughout the network, by

    o Connecting to authoritative public and private sources

    o Sharing classification results between network devices

Endpoint Analytics

Classification based on Deep Packet Inspection

ML Analytics

DPI

CMDB Connector

3rd Party Visibility Tool

Multifactor Classification

Model: **Optima CT 540**

Manufacturer: **General Electric (GE)**

Operating System: **MS Windows 7**

Endpoint Type: **CT Scanner**

Deep Packet Inspection

DICOM: GE CT540

L7

L6

Probes

Powered by NBAR (SD-AVC Agent)

DHCP Class-ID **MSFT**

GE Optima CT Scanner 540
(Runs Windows 7)

ML Analytics

Endpoint Profiling

Data **Aggregation**

Group Based Policy Analytics

Group-Based Policy Analytics
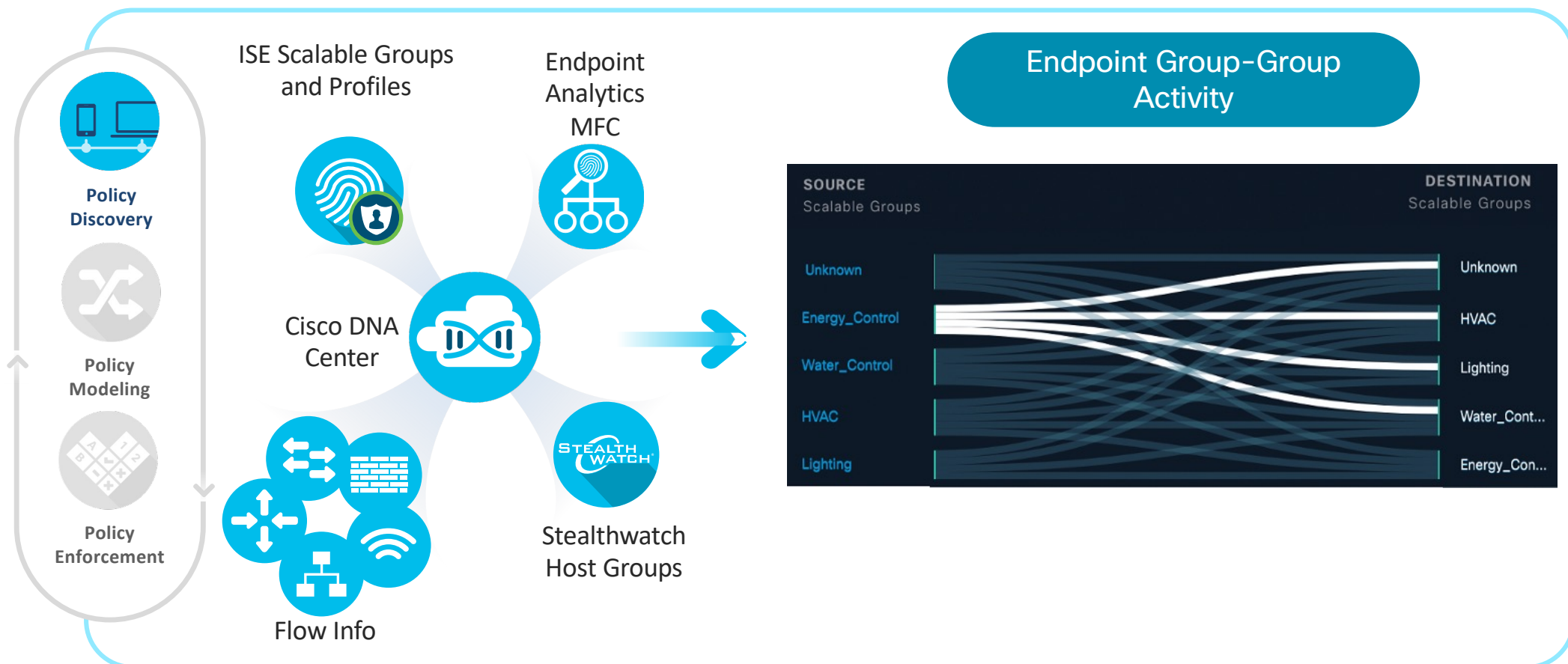
Catalyst 9000 Switching Portfolio

Cisco SD-Access
Fabric Roles & Terminology

Cisco ISE Cisco Catalyst Center

Identity Services

Automation

Assurance

Fabric Border Nodes

Fabric Wireless Controllers

Intermediate Nodes (Underlay)

Control-Plane Nodes

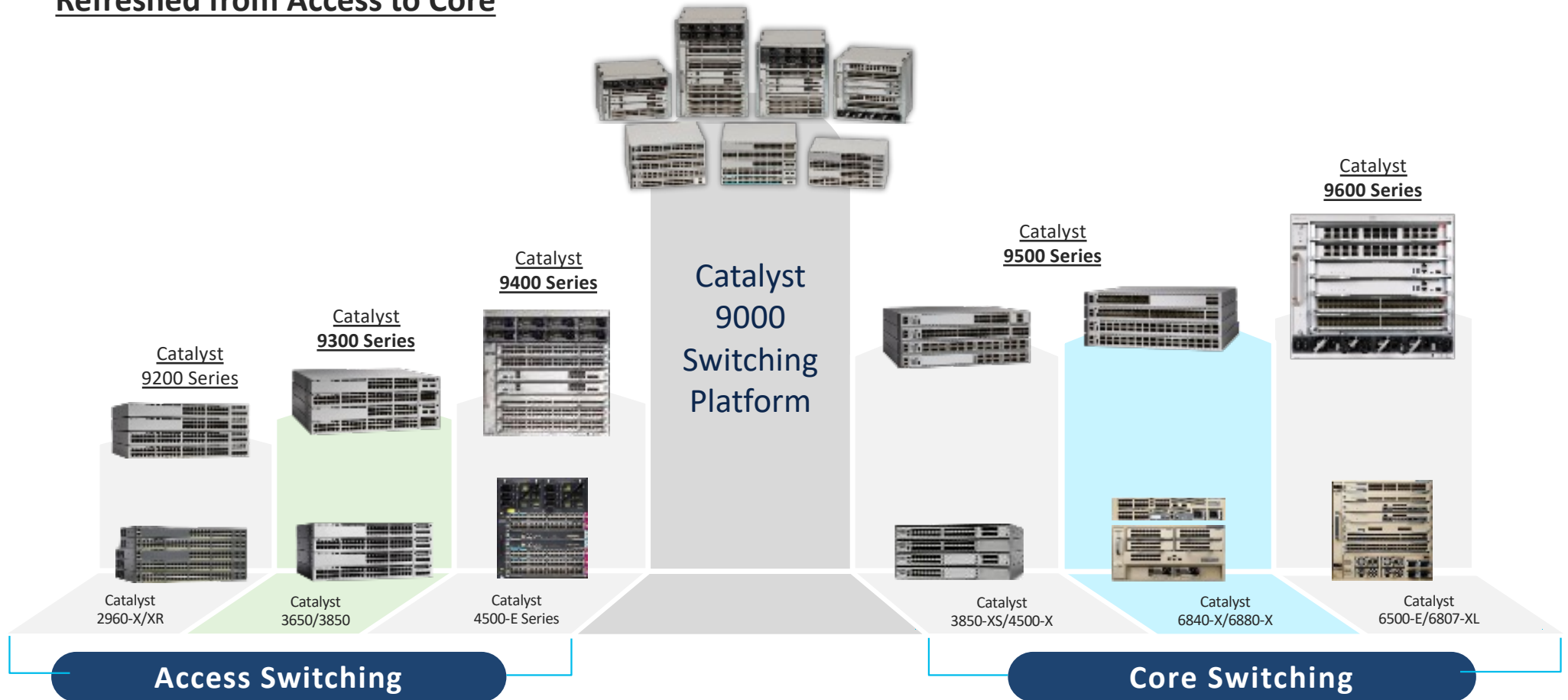Campus Fabric

Fabric Edge Nodes

Fabric Wireless Access Points

- **Network Automation** – Simple GUI and APIs for intent-based Automation of wired and wireless fabric devices

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Cisco Catalyst Switching Portfolio

Refreshed from Access to Core

Catalyst 9000 Switching Platform

Catalyst 9200 Series

Catalyst 9300 Series

Catalyst 9400 Series

Catalyst 9500 Series

Catalyst 9600 Series

Catalyst 2960-X/XR

Catalyst 3650/3850

Catalyst 4500-E Series

Catalyst 3850-XS/4500-X

Catalyst 6840-X/6880-X

Catalyst 6500-E/6807-XL

Access Switching

Core Switching

Cisco Catalyst 9000 – Flexible deployments

Multi-tier deployments

25G/40G/100G

1G/2.5G/5G

Core

Distribution

Access

Layer 3 Core + MPLS PE

Distribution

Core

Distribution

Site 1

CE

Site 2

CE

MPLS

PE

PE

CE

Site 3

VRFs
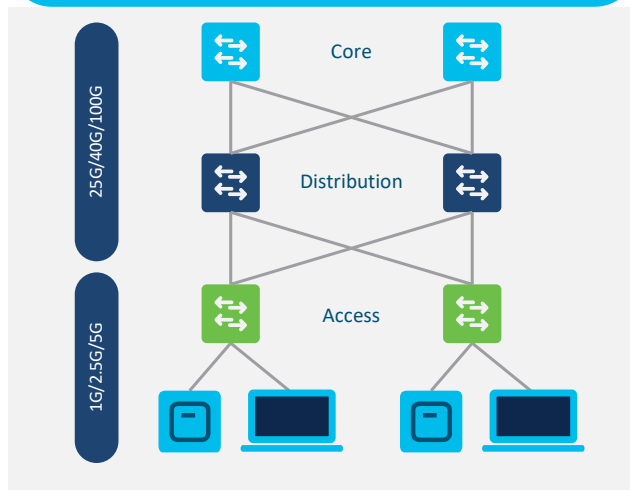
Customer-managed MPLS backbone
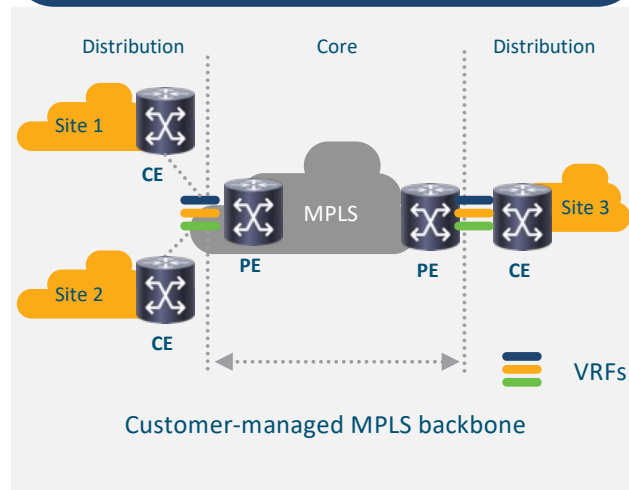
Fabrics: SDA + EVPN-VXLAN

Fabric
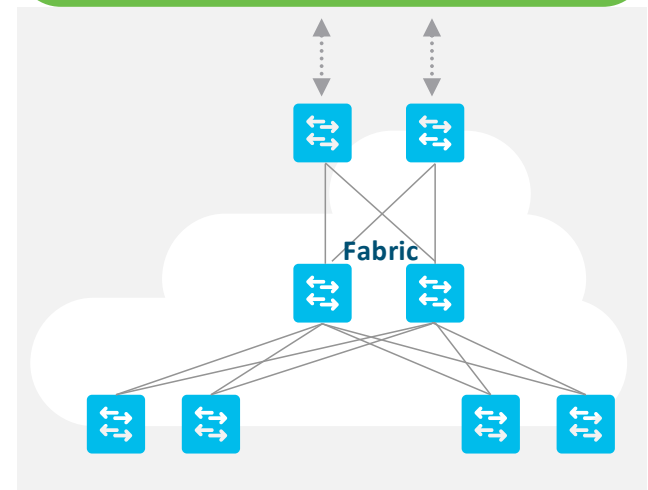
Cisco turn-key Solutions
- SD-Access
- Cisco DNA Assurance
- Cisco DNA Service for Bonjour
- Cisco DNA Application Visibility Service
- Encrypted Traffic Analytics
- DNAC Cloud

Do-It-Yourself (DIY) Solutions
- EVPN-VXLAN
- MPLS/VPLS
- Traditional 2/3-tier topologies
- Application Hosting
- Programmability – YANG models with Netconf, Restconf, GNMI APIs

One platform. Any place. Any speed (1G to 400G)

Cisco Catalyst 9200 Series
Next generation of entry-level access switches for intent-based networking

Security
Resiliency
Application experience

Fixed Uplinks

48 ports Full POE+/Partial POE+/Data,1G/10G Uplink

48 ports Full POE+, 12xmGig, 10G Uplink
48 ports Full POE+, 8xmGig, 25G Uplink

24 ports Full POE+/Data, 1G/10G Uplink

24 ports Full POE+, 8xmGig, 10G Uplink
24 ports Full POE+, 8xmGig, 25G Uplink

Modular Uplinks NEW

Recommended for small scale SDA deployments

48 ports Full POE+/Partial PoE+/Data
48 port Full POE+ with 32 VN**

48 ports Full POE+, 8xmGig

24 ports Full POE+/Data
24 ports Full PoE+ with 32 VN**

24 ports Full POE+, 8xmGig

Cisco Catalyst 9200 Series highlights

UADP 2.0 mini
Cisco IOS XE Software
Limited-scale SD-Access
MACsec-128 link encryption
Trustworthy solutions
Perpetual/Fast PoE
Programmability
Cold patching
Full Flexible NetFlow streaming telemetry

Modular fans

Higher Efficiency AC FRU Power Supplies

Modular uplinkS

FRU Fan

FRU PSU

Silver Rated
125W

Platinum Rated
600W

Platinum Rated
1000W

FRU Uplinks*

NEW   NEW

4x 1G   4x 10G   2x 25G   2x 40G

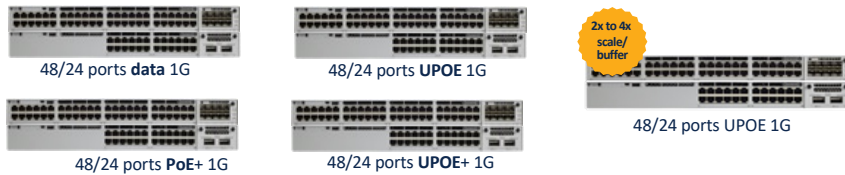*C9200 1G skus support 1/10G uplinks while C9200 mGig will support 10/25/40G uplinks
**C9200 32 VN skus only support 1/10G uplinks and these skus cannot be stacked with other C9200 skus

Cisco Catalyst 9300 Series
Extended Catalyst 9300 Series with Catalyst 9300X models

Catalyst® 9300 models with **modular uplinks**
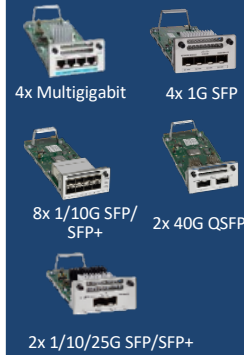
1G copper ports with PoE/Cisco UPOE®/UPOE+

48/24 ports **data** 1G

48/24 ports **UPOE** 1G

2x to 4x scale/buffer

48/24 ports UPOE 1G

48/24 ports **PoE+** 1G

48/24 ports **UPOE+** 1G

Multigigabit models with UPOE

48/24 ports Multigigabit

1G fiber

48/24 ports SFP 1G

Catalyst® 9300X models with modular uplinks

Shipping

1/10/25G Fiber

24/12 ports SFP+ 1G/10G/25G

mGig Copper models

24/48 mGig with UPOE+

48 mGig port Data only

StackWise® and StackPower cables

50CM-1M-3M

30CM-150CM

9300 Uplinks

4x Multigigabit

4x 1G SFP

8x 1/10G SFP/SFP+

2x 40G QSFP

2x 1/10/25G SFP/SFP+

9300X Uplinks

4x 100/40G* QSFP

2x 100/40G QSFP

8x 10G-Mgig

8x 25/10/1G**

Catalyst 9300 models with **Fixed uplinks**

1G Copper Data & PoE

4x1G or 4x10G fixed Uplinks

48/24 ports **PoE+/data** 1G
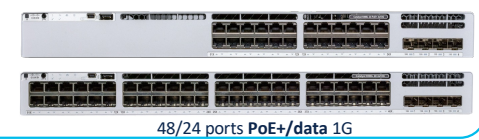
Multigigabit models with UPOE

4x1G or 4x10G fixed Uplinks

48/24 ports **PoE+** 1G
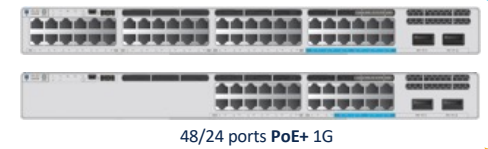
Catalyst® 9300LM models with Fixed uplinks

NEW

4x25G Fixed Uplinks

40x 1G + 8 x mgig/10G

24 x 1G UPOE

48 x 1G Data

48 x 1G UPOE

Optional StackKit

Stack Adapters

50CM-1M-3M
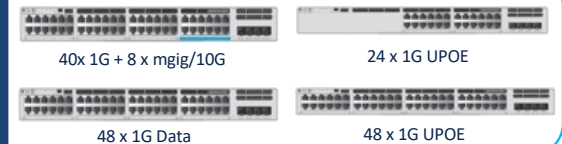
Platinum-rated power supplies				Modular fans	External Storage
Common components					**USB 3.0** 120/240GB
315W AC	715W AC/DC	1100W AC	1900W AC		

*Supported on 48HX and 24Y

Cisco Catalyst 9400 Series

IEEE 802.3BT 100W PoE ready

Redundancy is now table stakes

480G BW per slot

4-slot **7-slot** **10-slot**
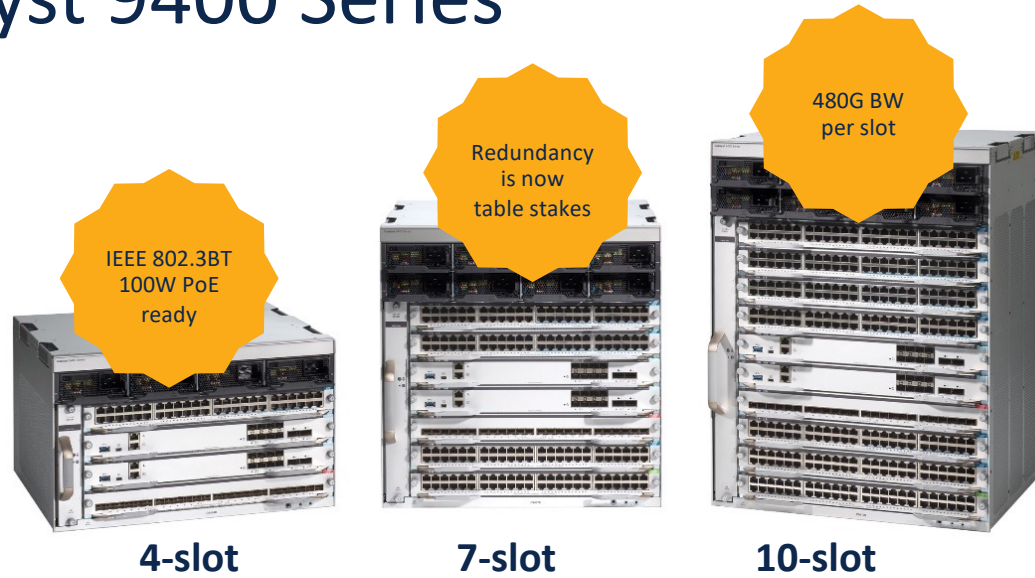
Supervisor	Access line cards	Core line cards	Power supply
• Sup-1: Access optimized	• 24x Multigigabit UPOE + 24x Cisco UPOE®	• 24x 10G SFP+	• 3200W AC
• Sup-1XL: Core optimized	• 48x Multigigabit UPOE +	• 48x 1G SFP	• 2100W AC
• Sup-1XL-Y: Core optimized	• 48x UPOE	• 24x 1G SFP	• 3200W DC
	• 48x PoE+		
	• 48x data		
	'48x5G mGig Copper LC '		

Cisco Catalyst 9500 Series
Purpose-built fixed core/aggregation switches

UADP 2.0	UADP 3.0	Silicon One Q200

UADP 2.0
- 40G at the price of 10G
- Industry's first 40G enterprise switch
- Optimized 10G switch for midsize backbone

C9500-16X
C9500-40X
C9500-24Q
C9500-12 Q

UADP 3.0
- Up-to 48 25 GE Ports
- Industry's first 100G enterprise switch
- Flexible templates

C9500-24Y4C
C9500-48Y4C
C9500-32QC
C9500-32C

Silicon One Q200
- Reversible Bi-directional Airflow
- Ultra Deep 8GB Buffers
- High route scale (2M) and Mac scale (256K)

C9500X-28C8D

C9500X-60L4D

| **Catalyst® 9500X - Extending Cisco® Catalyst® 4500-X and 6800 Series leadership in fixed core** |
|---|
| Upto 26x throughput (6 Tbps) |
| Upto 48x performance (8 Bpps) |
| No oversubscription |
| 8x 400GE Density |
| Pluggable SSD storage |
| USB 3.0 |
| 8x memory and 4x flash |
| 8 core CPU |
| Customizable templates |
| Cisco StackWise® Virtual* |

Modular fans

Modular uplinks

Modular power supplies

Storage for application hosting

*Supported on 9500 and 9500H. Roadmap for 9500X

Cisco Catalyst 9600 Series
C9606R chassis port density
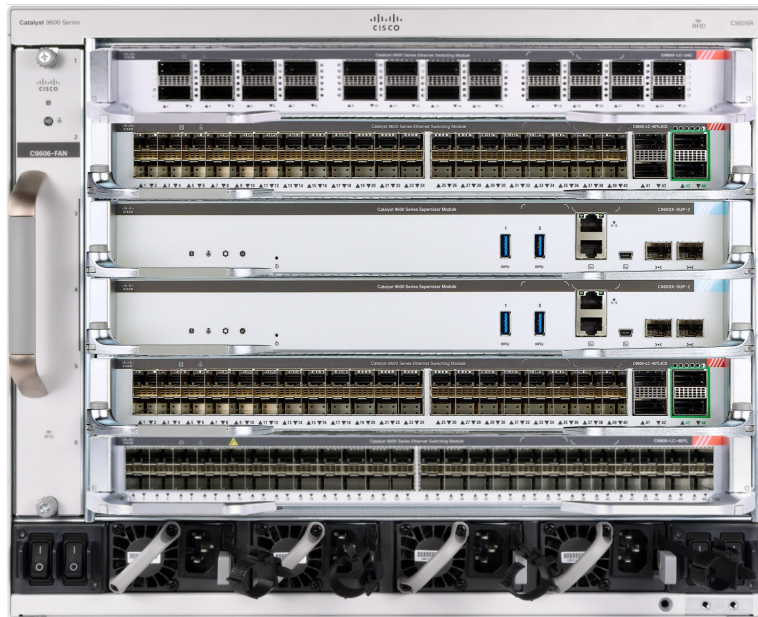
Line Rate non-blocking

Port speed	Density with C9600-Sup-1	Density with C9600X-Sup-2	Maximum chassis density
400G	NA	8	32
200G	NA	16*	64
100G	48	96	128
50G	NA	192*	192
40G	96	96	128
25G	192	192	192
10G	192	192	192
5G	192	NA	192
2.5G	192	NA	192
1G	192	NA	192

* Roadmap

Catalyst 9000 Wireless Portfolio

Cisco's complete Wi-Fi 6E wireless stack

Enabling next-generation mobility powered for Wi-Fi 6

Cisco® Catalyst® 9800
Series Wireless Controllers

Cisco Catalyst 9100
Access Points

Managed by
Cisco DNA Center
Translate business intent into network policy
and capture actionable insights

Digitized by
Cisco DNA Spaces
Digitize people, spaces, and things
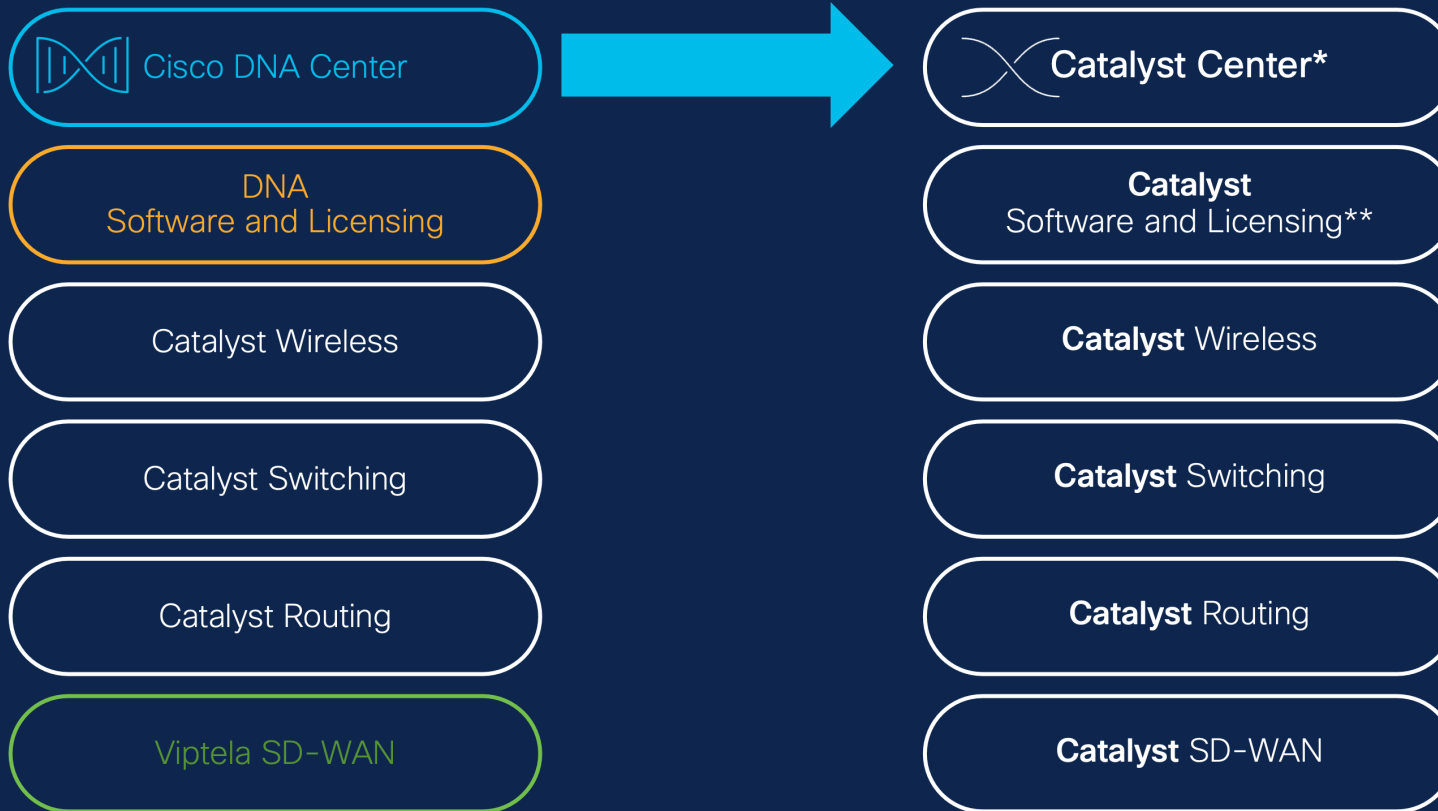
Resilient   Secure   Intelligent

Some recent changes and roadmap things

# Extending the power of **Cisco Catalyst**

Simple… Predictable… Scalable…

Cisco DNA Center	→ Catalyst Center*
DNA Software and Licensing	**Catalyst** Software and Licensing**
Catalyst Wireless	**Catalyst** Wireless
Catalyst Switching	**Catalyst** Switching
Catalyst Routing	**Catalyst** Routing
Viptela SD-WAN	**Catalyst** SD-WAN

Catalyst Center operational evolution and vision

Scaling to meet your enterprise needs

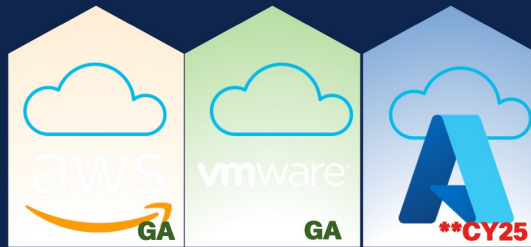There is no scale difference between DN2 & DN3 appliances

M L XL

M L XL

3-XL
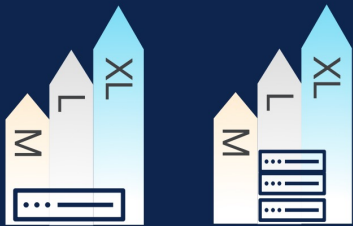
Physical appliances

Single appliance

HA cluster

3x scale With XL Appliances

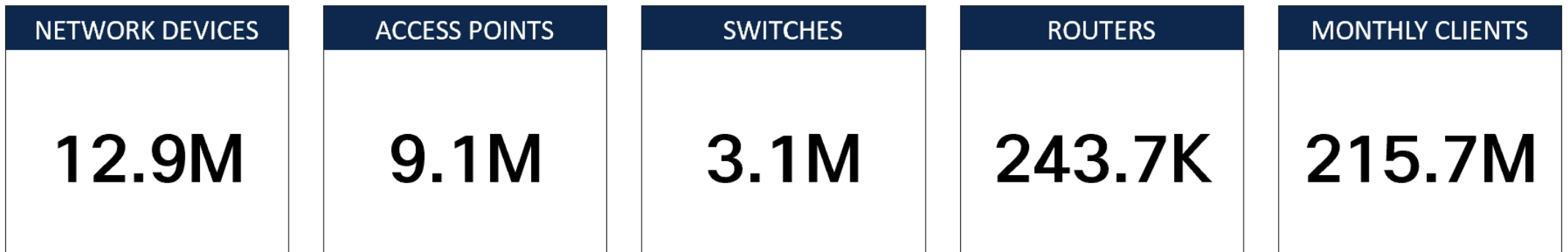Virtual **Appliance** Scale parity with DNx-HW-APL(44 core appliance)

aws
GA

vmware
GA

Azure
**CY25

Scale Up

VA Vertical Scale

Scale Down
Planning

Virtual appliances
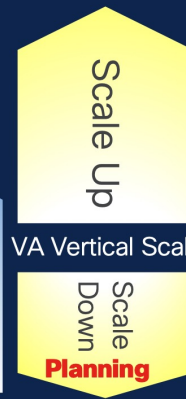
Manager of Managers

**CY24

Ending

Cisco Catalyst Center Connected devices summary

NETWORK DEVICES	ACCESS POINTS	SWITCHES	ROUTERS	MONTHLY CLIENTS
12.9M	9.1M	3.1M	243.7K	215.7M

Last Updated: 18th March 2024 | Source: Catalyst Center Adoption Dashboard

Links

SDA design guide https://www.cisco.com/c/en/us/td/docs/solutions/CVD/Campus/cisco-sda-design-guide.html

Catalyst Center with ISE deployment guide https://www.cisco.com/c/en/us/td/docs/solutions/CVD/Campus/cisco-dnac-ise-deploy-guide.html

Cisco Live sessions (many) https://www.ciscolive.com/on-demand/on-demand-library.html?search=&search.technology=option_1605022914986#/

Compatibility matrixes:
 https://www.cisco.com/c/dam/en/us/td/docs/Website/enterprise/catalyst_center_compatibility_matrix/index.html
 https://www.cisco.com/c/dam/en/us/td/docs/Website/enterprise/prime_legacy_device_compatibility_matrix/index.html