
TECHNICAL DECISION MAKER PRESENTATION

Cisco Catalyst 9200CX

Prepared as a convenient PDF reference for network planning, platform evaluation, and procurement discussions.

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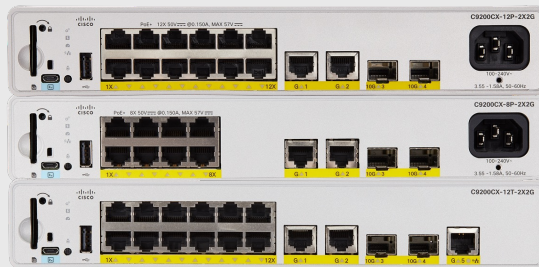


Cisco Catalyst 9200CX Series

Technical Decision Maker

Agenda

- Catalyst 9200CX Series switching overview
- System Architecture
- Cisco IOS® XE Lite
- High availability
- Intent-based networking
- QoS
- Security
- POE innovations
- Programmability
- Application visibility
- Manageability



Extending intent-based networking everywhere

Catalyst 9400 Series
Lead Modular Access



Catalyst 9600 Series
Lead Modular Core



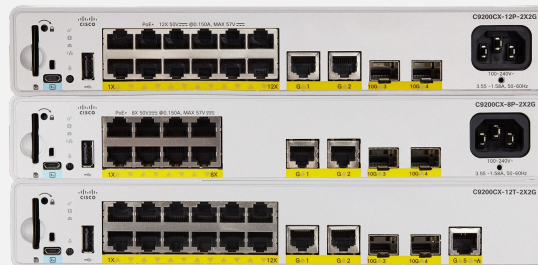
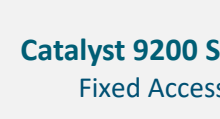
Catalyst 9300 Series
Lead Fixed Access



Catalyst 9500 Series
Lead Fixed Core



Catalyst 9200 Series
Fixed Access



Catalyst 9200CX Series Switches



Fast, Flexible and light ASIC
Cisco UADP 2.0 Mini



Noiseless
Fanless



Security
256-bit MACsec



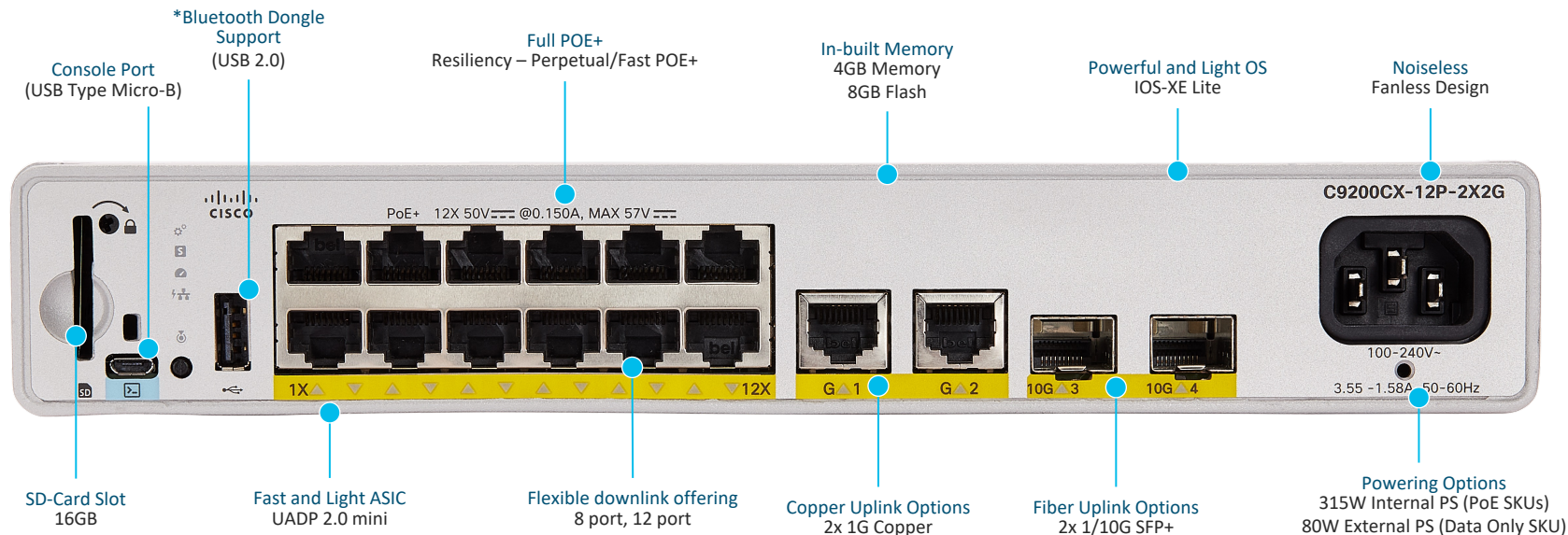
Programmability
YANG Models



SD-Access
Edge Node

**Catalyst 9200CX Series switches built on industry leading Catalyst 9000 switching attributes.
Expanding Catalyst 9200 Capabilities to 8/12 Port Compact Switches.**

The New Catalyst 9200CX Compact Series Switches



* Hardware Capable

Catalyst 9000 Feature Richness Packed in a Compact Form Factor

Cisco Catalyst 9200CX Series

Next generation of compact access switches for intent-based networking



Security



Resiliency

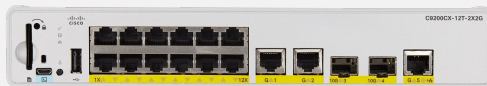


Application
experience

9200 (Fixed Uplinks and Fanless)

Data

*Power via UPOE/UPOE+ Uplink!



C9200CX-12T-2X2G
12x 1G Ports

802.3bt PD Port

3 x 1G Copper and 2 x 1/10G SFP Uplinks

POE+



C9200CX-12P-2X2G
12x 1G Ports



C9200CX-8P-2X2G
8x 1G Ports

2 x 1G Copper and 2 x 1/10G SFP Uplinks

External PS on Data SKU
Fixed Internal PS on PoE+ SKUs

Cisco Catalyst 9200 Series Highlights

UADP 2.0 Mini

Cisco IOS XE Lite Software

SD-Access

MACsec-256 link encryption

Trustworthy solutions

Perpetual/Fast PoE

Programmability

Cold patching

Full Flexible NetFlow
streaming telemetry

* Class 6 802.3bt (60W) needed to power

All Uplink Ports can be simultaneously used. Providing maximum bandwidth when needed.

Cisco Catalyst 9200CX

PoE+ and Data Models

C9200CX-12P-2X2G



- 12 x 1G PoE+
- 2 x 1G copper and 2 x SFP+ uplinks
- Internal AC power supply
- 240W PoE power budget

C9200CX-8P-2X2G



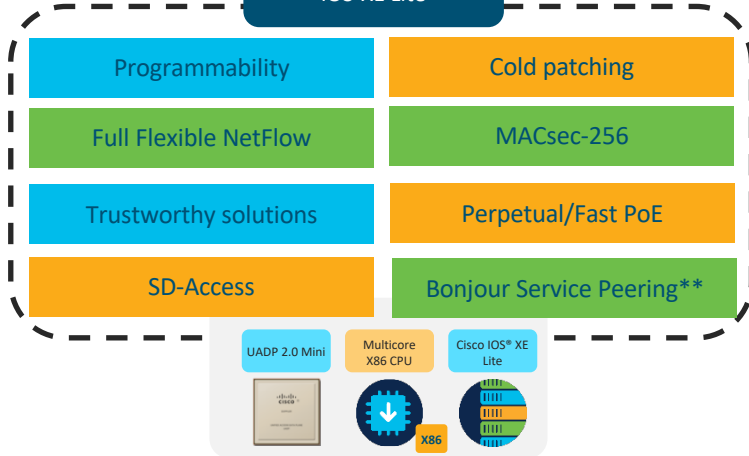
- 8 x 1G PoE+
- 2 x 1G copper and 2 x SFP+ uplinks
- Internal AC power supply
- 240W PoE power budget

C9200CX-12T-2X2G



- 12 x 1G data
- 3 x 1G copper and 2 x SFP+ uplinks
- External power adapter (80W)
- 802.3bt Class 6 powered (60W)*

Powered by Cisco
IOS-XE Lite



Deployment Use Cases



Mobility

Campus, Public Sector, Higher Ed

- 1G/10G Fiber/Copper
- Reduce IDF cable runs



IoT

Hospitality/Cruise Lines

- Powering lights & phones in rooms
- Connecting TVs



Cloud

Retail

- Connecting to POS Machines and Demo Units



Security

Financial Services

- Fewer impenetrable threats
- Less downtime

* 802.3bt Type 3 Class 6 60W needed to power

** Roadmap

Cisco Catalyst 9200CX mGig SKU

Ready for Wi-Fi 6/6E & Smart Building Deployments



Wi-Fi 6/6E with Catalyst 9100 Series APs

AP	PoE power consumption	Link speed	Link Layer Discovery Protocol (LLDP)
C9136I	802.3bt (UPOE)	5G	47.3W
C9162I	802.3bt (UPOE)	2.5G	25.5W
C9164I	802.3bt (UPOE)	2.5G	30W
C9166	802.3bt (UPOE)	5G	30.5W

All Downlink Ports UPOE Capable

Varying Speeds—for IP phones to Wi-Fi 6/6E APs

Large Power Bank for PDs

802.3bt Type 3 Class 6 60W

10MB/100MB/1G/2.5G/5G/10G
mGig Speeds

240W PoE Power Budget

Catalyst 9200CX Compact Family

HVDC Power Supply Units

NEW

HVDC 1G/PoE+

C9200CX-8P-2X2GH



- 8 x 1G PoE+
- 2 x 1G copper and 2 x SFP+ uplinks
- Internal HVDC power supply
- 240W PoE power budget

C9200CX-12P-2X2GH



- 12 x 1G PoE+
- 2 x 1G copper and 2 x SFP+ uplinks
- Internal HVDC power supply
- 240W PoE power budget

NEW

HVDC mGig/UPOE

C9200CX-8UXG-2XH



- 4x mGig/10G + 4 x 1G (802.3bt Type 3 Class 6 60W all ports)
- 2x 1/10G SFP+
- Internal HVDC power supply
- 240W PoE power budget



Saf-D-Grid
Receptacle

Powered
by **AC** or
hVDC

Powering Options

AC (110-240VAC)

Plenum Voltage (277VAC)¹

HVDC (120V-418VDC), 380VDC²

Cabling Options³

Ring terminal to SAF-D-GRID

C14 to SAF-D-GRID

C20 to SAF-D-GRID



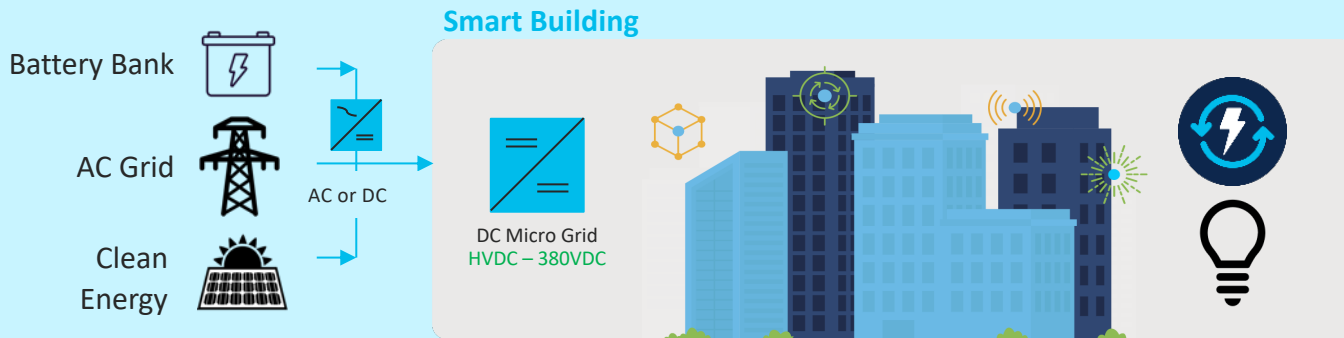
Investment protection
with **MAX** flexibility!

¹ Need a plenum rated enclosure

² 380VDC, commonly used in DC micro grids and Class 4 deployments

³ Cables not provided with switch

Why High Voltage DC?



Benefits



Avoids double conversion. **From DC → AC, then AC → DC:**

- Production of Wind/Solar power is in DC
- Electrical devices with transistors use DC power



Higher voltage helps reduce conductor material required (less copper) or improve transition efficiency:

- Controllability
- Better voltage regulation

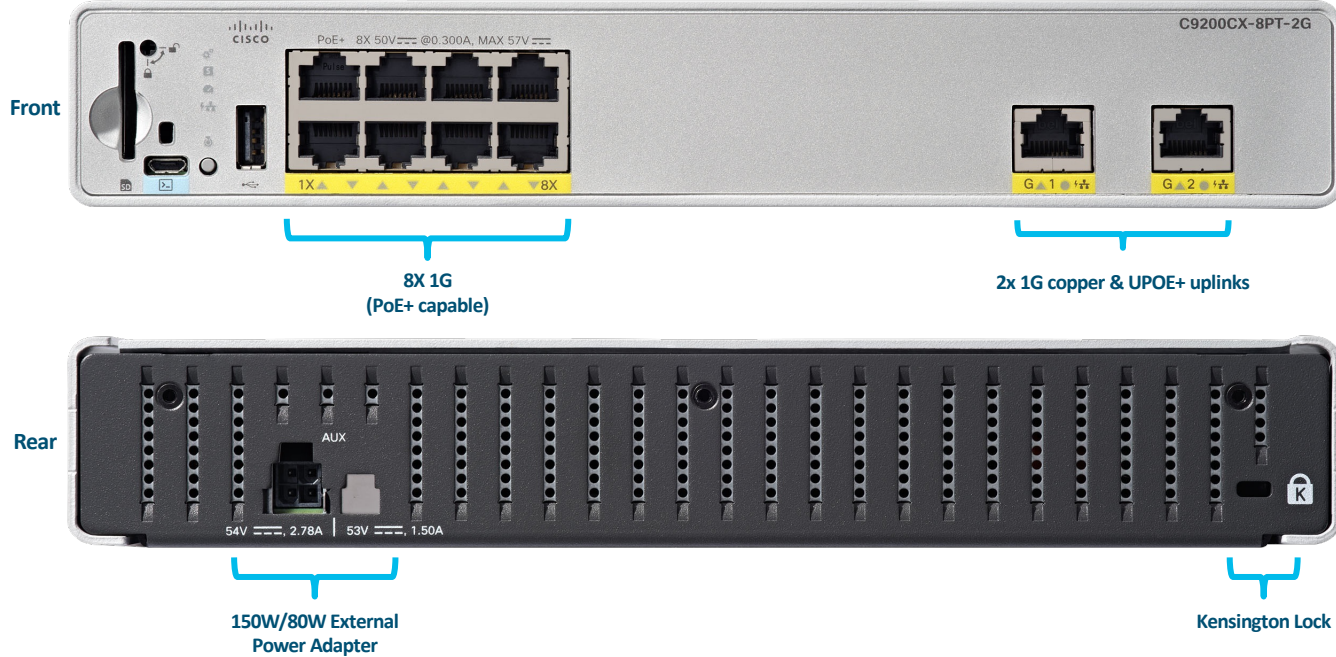


Considerably lower power losses compared to 120VAC when transporting over long distances:

- Offshore power needs/Undersea power lines
- Power transmission for longer distances

Cisco Catalyst 9200CX Pass-through SKU

For Flexible Powering Deployments Requiring PoE Downlinks



C9200CX-8PT-2G

All Downlink Ports PoE+ Capable

10MB/100MB/1G Speeds

Power via PoE+/UPOE/UPOE+ and/or External Power Adapter

240W Max PoE Power Budget*

* When Powered by 2x 802.3bt UPOE+ uplinks in addition to the 150W External Power Adapter

C9200CX-8PT-2G Powering Options

PoE Budget Options



Aux 80W	Aux 150W	PD1	PD2	POE Power Available	Number of 30W PSE Ports	Number of High Priority Ports
-	Present	Class 8	Class 8	249.5	8	3
-	Present	Class 4	Class 8	210	7	2
Present	-	Class 8	Class 8	179.5	6	2
-	Present	Class 6	Class 6	208.5	6	1
	Present	Class 4	Class 4	168.5	5	0
Present		Class 6	Class 6	138.5	4	1
	Present			129.5	3	0
		Class 8	Class 8	99.5	3	1
Present		Class 4		78.5	2	0
		Class 8	Class 6	79	2	0
Present				59.5	1	0
		Class 8	Class 4	30 **	1	0

** Due to the nature of POE power and the desire to keep the switch up during the loss of a redundant power source, in cases where the PD power limits are low, the available power for pass through is limited to 30W, if higher pass-through power is desired the user must use higher power hosts or an external Auxiliary Adapter

Catalyst 9200CX Family

PoE+ and Data Models

C9200CX-12P-2X2G



- 12 x 1G PoE+
- 2 x 1G copper and 2 x SFP+ uplinks
- Internal AC power supply
- 240W PoE power budget

C9200CX-8P-2X2G



- 8 x 1G PoE+
- 2 x 1G copper and 2 x SFP+ uplinks
- Internal AC power supply
- 240W PoE power budget

C9200CX-12T-2X2G



- 12 x 1G data
- 3 x 1G copper and 2 x SFP+ uplinks
- External power adapter (80W)
- 802.3bt Class 6 powered (60W)

Pass-through Model

C9200CX-8PT-2G



- 8 x 1G PoE+
- 2 x 1G copper & UPOE+ uplinks
- External power adapter (80W/150W) [LVDC support] & 802.3bt UPOE+ ULS
- 240W Max PoE power budget

mGig/UPOE

C9200CX-8UXG-2X



- 4x mGig/10G + 4 x 1G (802.3bt Type 3 Class 6 60W all ports)
- 2x 1/10G SFP+
- Internal AC power supply
- 240W PoE power budget

HVDC Models

C9200CX-12P-2X2GH



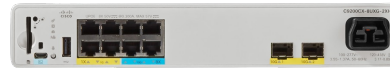
- 12 x 1G PoE+
- 2 x 1G copper and 2 x SFP+ uplinks
- Internal HVDC power supply
- 240W PoE power budget

C9200CX-8P-2X2GH



- 8 x 1G PoE+
- 2 x 1G copper and 2 x SFP+ uplinks
- Internal HVDC power supply
- 240W PoE power budget

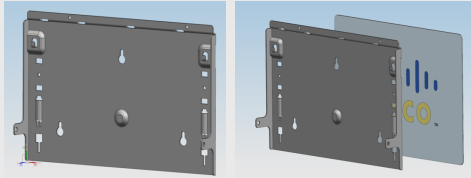
C9200CX-8UXG-2XH



- 4x mGig/10G + 4 x 1G (802.3bt Type 3 Class 6 60W all ports)
- 2x 1/10G SFP+
- Internal HVDC power supply
- 240W PoE power budget

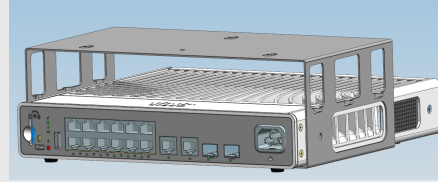
Catalyst 9200CX Mounting Options

Wall Mount (C9K-WALL-TRAY)



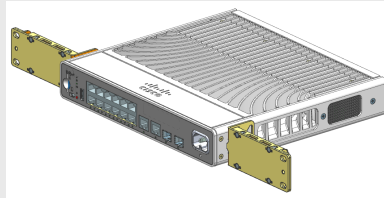
- With mounting tray and screws
- With mounting tray and magnet (in case of metal wall)

Table-Top/Bottom/Shelf Mount (C9K-CMPCT-DESK-MNT)



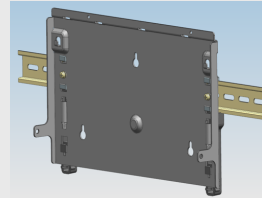
- With mounting tray and screws
- With mounting tray with magnet (in case of metal desk or shelf)

Rack Mount (RACKMNT-19-CMPACT)



- With mounting screws

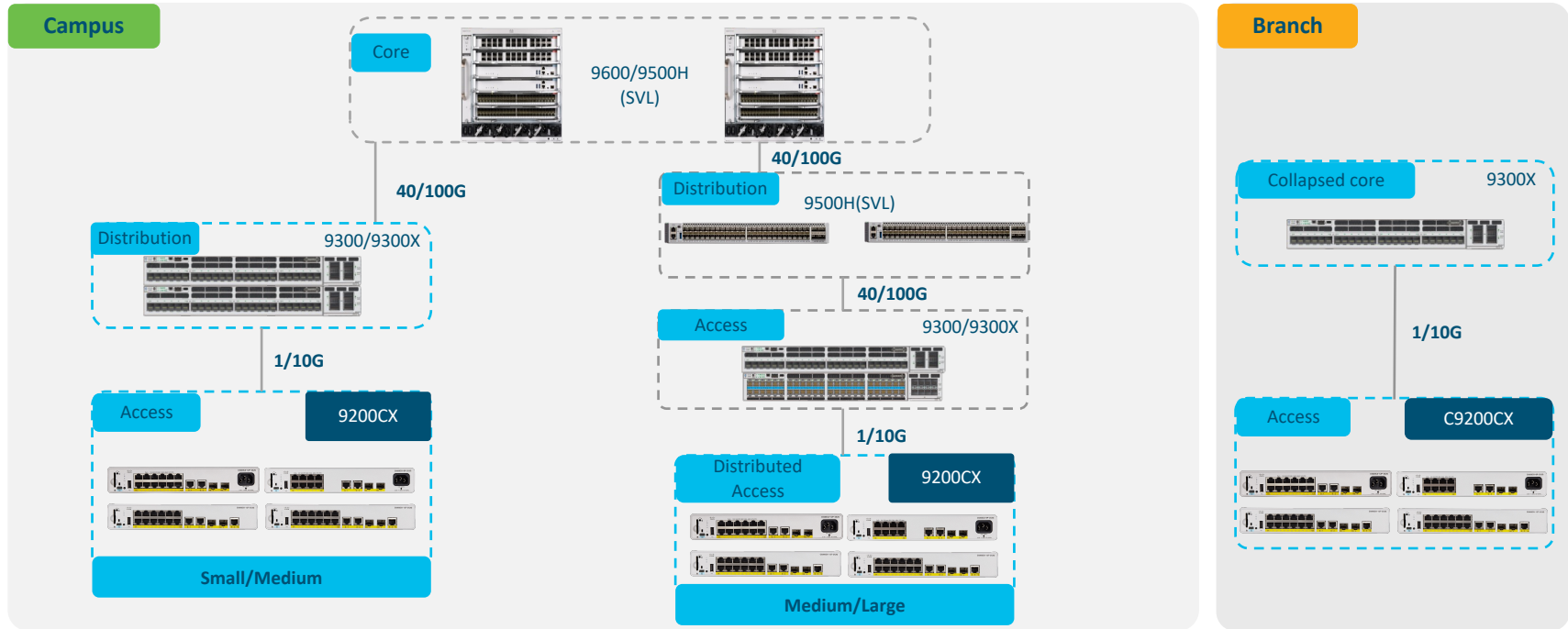
Din Rail Mount (C9K-CMPCT-DIN-MNT)



- With a mounting tray and rail mount

Flexible mounting options for all mounting use-cases

Flexible Design Options with the Catalyst 9200CX in 3 or 4-tier Architecture



Bringing Flexible and Compact Access Switching to the Enterprise Campus

Industry-Specific Markets for Next Generation Compact Switches



Manufacturing and Retail

- Point of sale
- Checkout counter
- Kiosk
- Warehouse
- Work zone



Education

- Classroom
- Dormitory
- Laboratory
- Common study area
- Student service kiosk



Hospitality and Entertainment

- Lobby registration area
- Hotel room
- Conference room
- Gaming slot machine
- Cruise line



Healthcare

- Doctor's office
- Operation room
- Patient check-in counter



Office Workspace

- Conference room
- Germany: work cube
- Japan: work desk

Catalyst 9200CX – Next Generation Compact Switches



	Catalyst® 3560CX models		Catalyst® 9200CX models
Market-Leading Encryption	AES 128-Bit MACsec	+	AES 256-Bit MACsec
Network Visibility	Limited Flexible NetFlow	+	Full Flexible NetFlow
SD Bonjour Services	Not Available	+	Bonjour Service Peering*
Programmability	Basic Scripting with Python	+	YANG Models (RESTCONF, NETCONF, gNMI), ZTP
Application Visibility	Smart Logging, Limited Flexible Net Flow, and AVC	+	Streaming Telemetry (NETCONF Dial-In and gRPC Dial-Out) SD-AVC w/ NBAR2
SDA Fabric	SDA Extended Node Capability	+	SDA Edge Node Capability (16VNs)



innovations



Assurance w/ Cisco DNAC



Wired assurance,
SD-Access, AVC, FNF



MACsec-256



Cisco
TrustSec

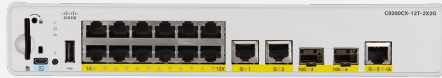
*FCS++ Feature. Not Committed

Cisco Catalyst 9200CX Series

Powering Options for AC Data and PoE Models

1G Downlink and 1G/10G Uplink Models

Data SKU Powered w/ Power Adapter/UPOE+



C9200CX-12T-2X2G

12x1G Downlinks + (3x1G + 2x10G SFP+ Uplinks)

- External power adapter (80W)
 - AC-DC or DC-DC Options
 - Option for space-saving Slimline AC-DC or standard sized DC-DC adapter
- Class 6 802.3bt UPOE powered*
- 802.3bt Uplink also doubles as a 1G Copper



Power adapter

80W AC/DC External
Power Adapter**

PoE+ SKUs Powered w/ Internal PS



C9200CX-12P-2X2G

12x1G Downlinks + (2x1G + 2x10G SFP+ Uplinks)



C9200CX-8P-2X2G

8x1G Downlinks + (2x1G + 2x10G SFP+ Uplinks)

- 315W Internal AC power supply
- 240W PoE power budget
- Providing Type 2 Class 4 30W PoE+ capability to all downlink ports

* Class 6 802.3bt (60W) needed to power

** PID: C9K-80W-ADPT (AC-DC Slim Adaptor)
PID: C9K-ADPT-DC (DC-DC)

C9200CX Dimensions, Weight, and MTBF



	C9200CX-12T-2X2G	C9200CX-12P-2X2G	C9200CX-8P-2X2G	C9200CX-8UXG-2X
Chassis Dimensions (Inches)	1.73 x 10.6 x 6.5	1.73 x 10.6 x 9.6	1.73 x 10.6 x 9.6	1.73 x 10.6 x 9.6
Chassis Dimensions (Centimeters)	4.4 x 26.9 x 16.5	4.4 x 26.9 x 24.4	4.4 x 26.9 x 24.4	4.4 x 26.9 x 24.4
Weight (Pounds)	4.0	6.6	6.6	7.0
Weight (Kilograms)	1.81	2.99	2.99	3.18
MTBF (Hours)	755,270	553,140	569,530	TBD

C9200CX Dimensions, Weight, and MTBF



	C9200CX-8UXG-2XH	C9200CX-12P-2X2GH	C9200CX-8P-2X2GH
Chassis Dimensions (Inches)	1.73 x 10.6 x 9.6	1.73 x 10.6 x 9.6	1.73 x 10.6 x 9.6
Chassis Dimensions (Centimeters)	4.4 x 26.9 x 24.4	4.4 x 26.9 x 24.4	4.4 x 26.9 x 24.4
Weight (Pounds)	7.0	6.6	6.6
Weight (Kilograms)	3.18	2.99	2.99
MTBF (Hours)	TBD	TBD	TBD

Catalyst 9200CX Series Switching Architecture

Architectural simplicity with powerful innovations



Investment Protection
Flexible Pipeline



Enhanced Scale/Buffering
Multicore resource share



120GE
Switching Capacity



6MB
Packet Buffer



1GB DL and 1G/10G UL
Fast Speeds



16K
Netflow Records



Flexible
Programmable Modules

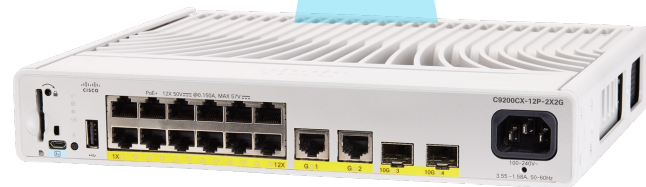
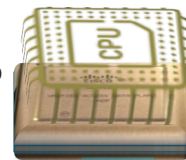


SDM Templates
Flexibility

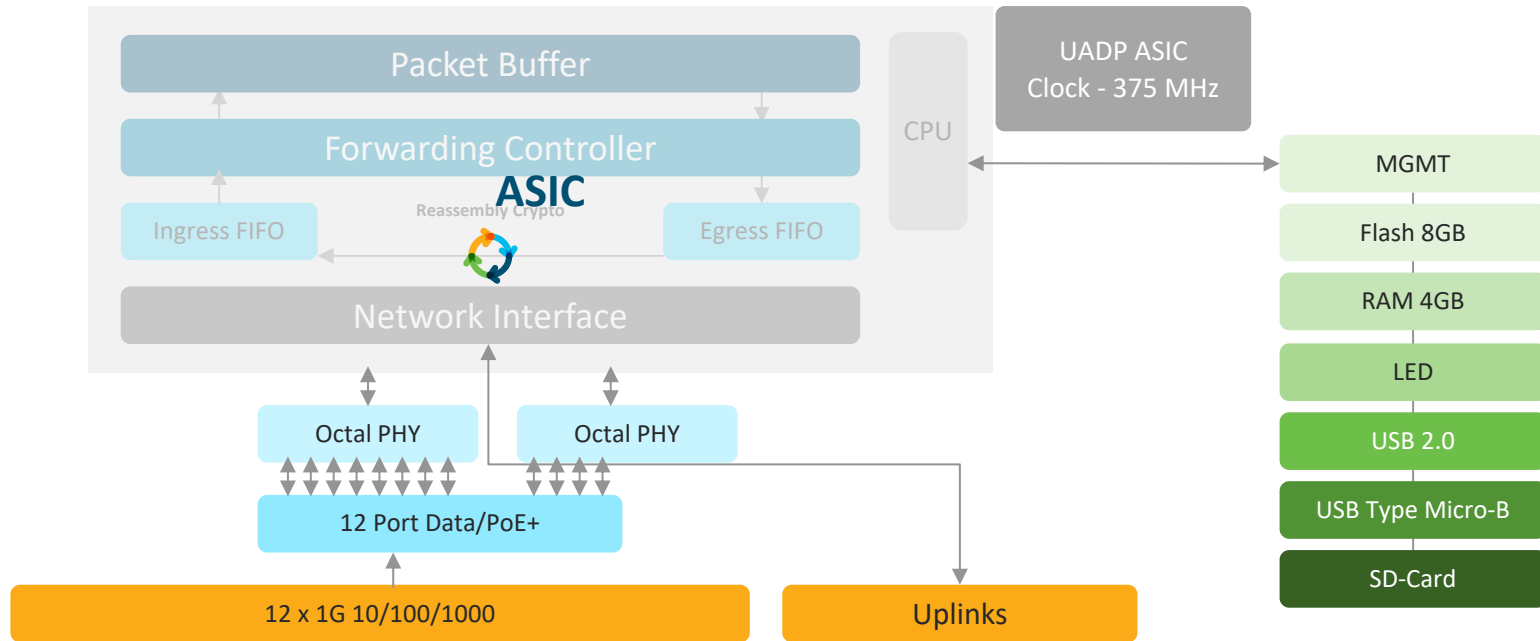


Up to 2X to 4X
forwarding + TCAM

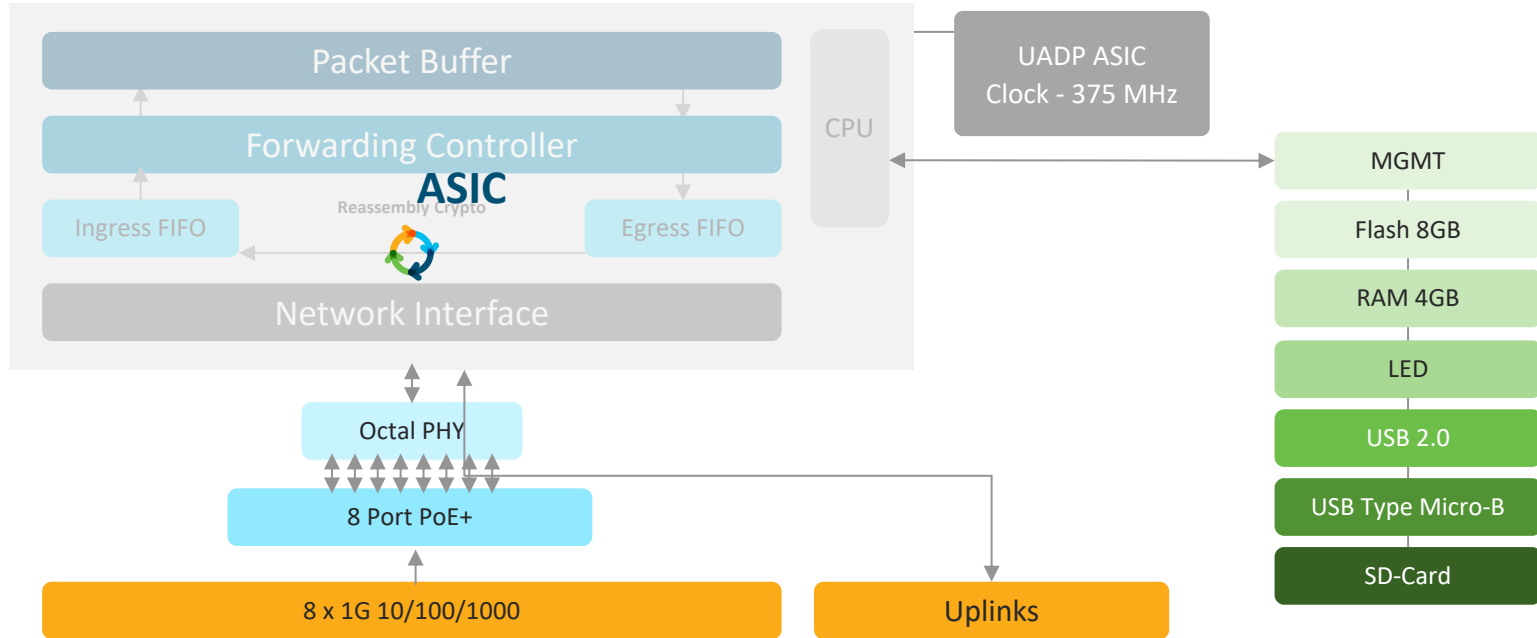
System-on-a-Chip
UADP 2.0 Mini



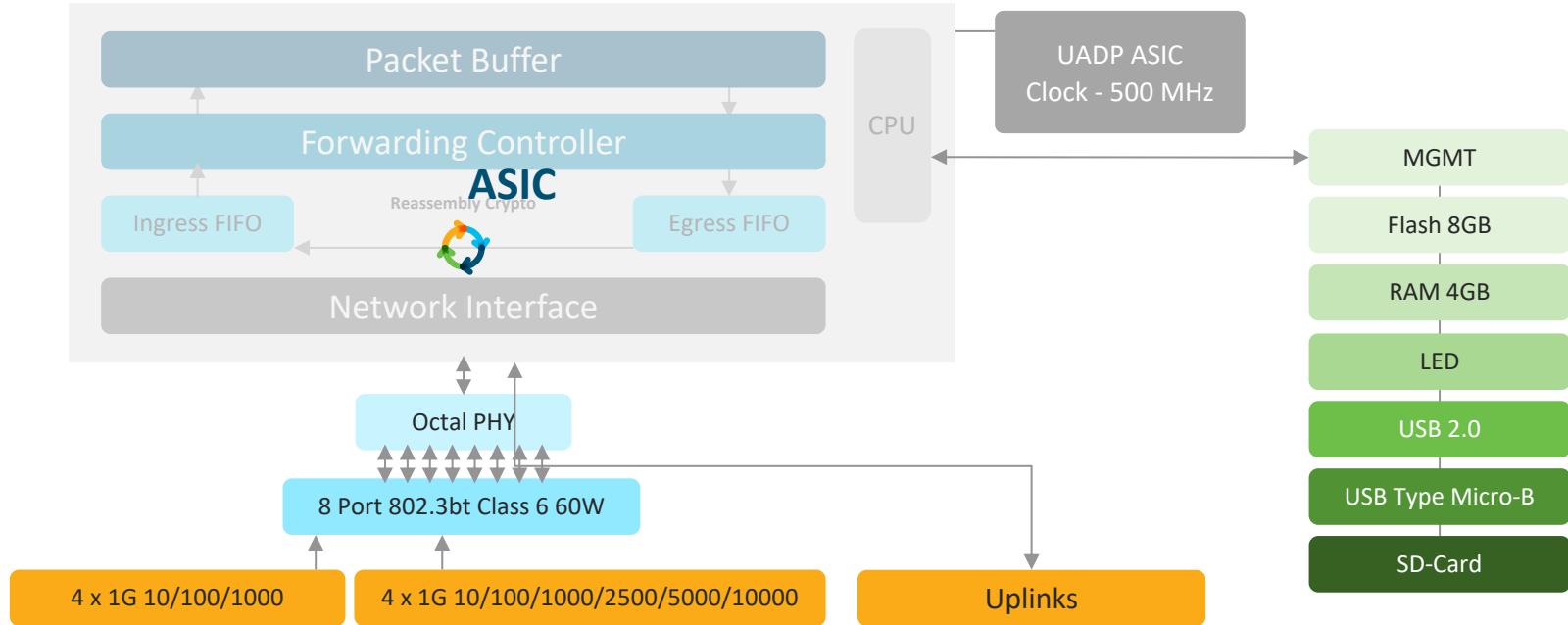
Catalyst 9200CX Series switches – 1G 12 Port Layout



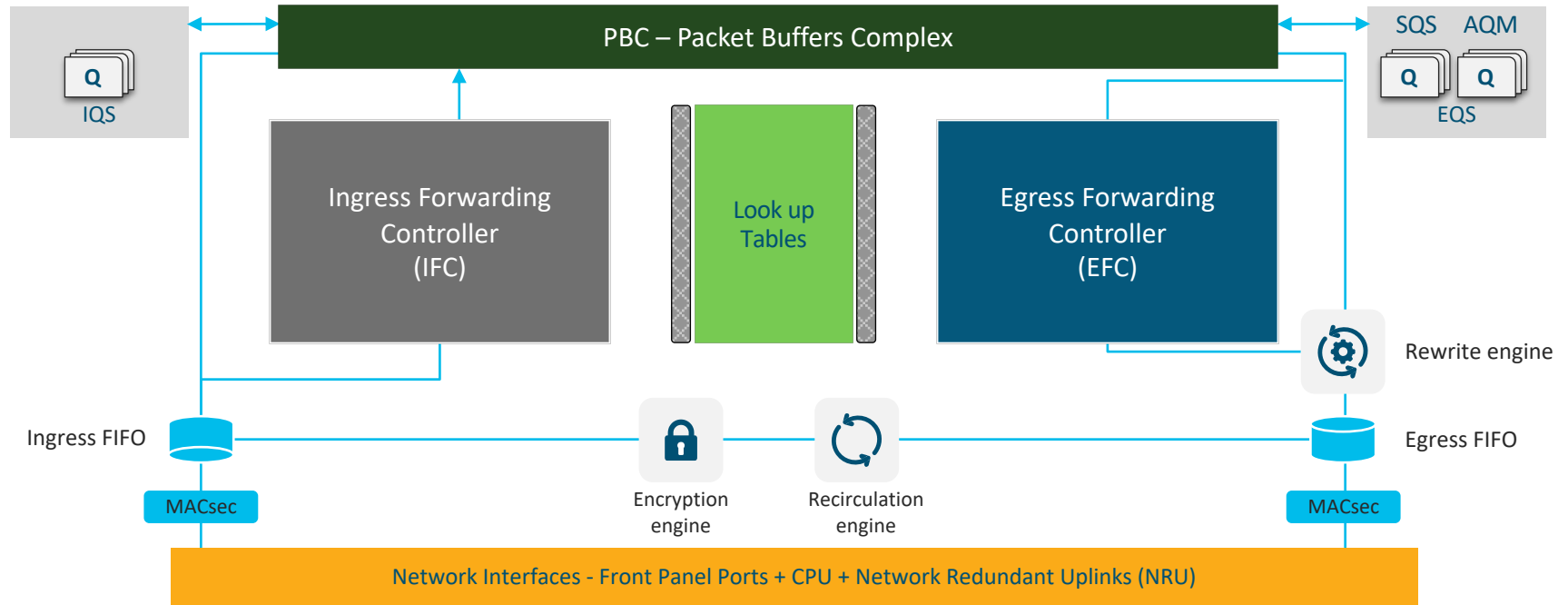
Catalyst 9200CX Series switches – 1G 8 Port Layout



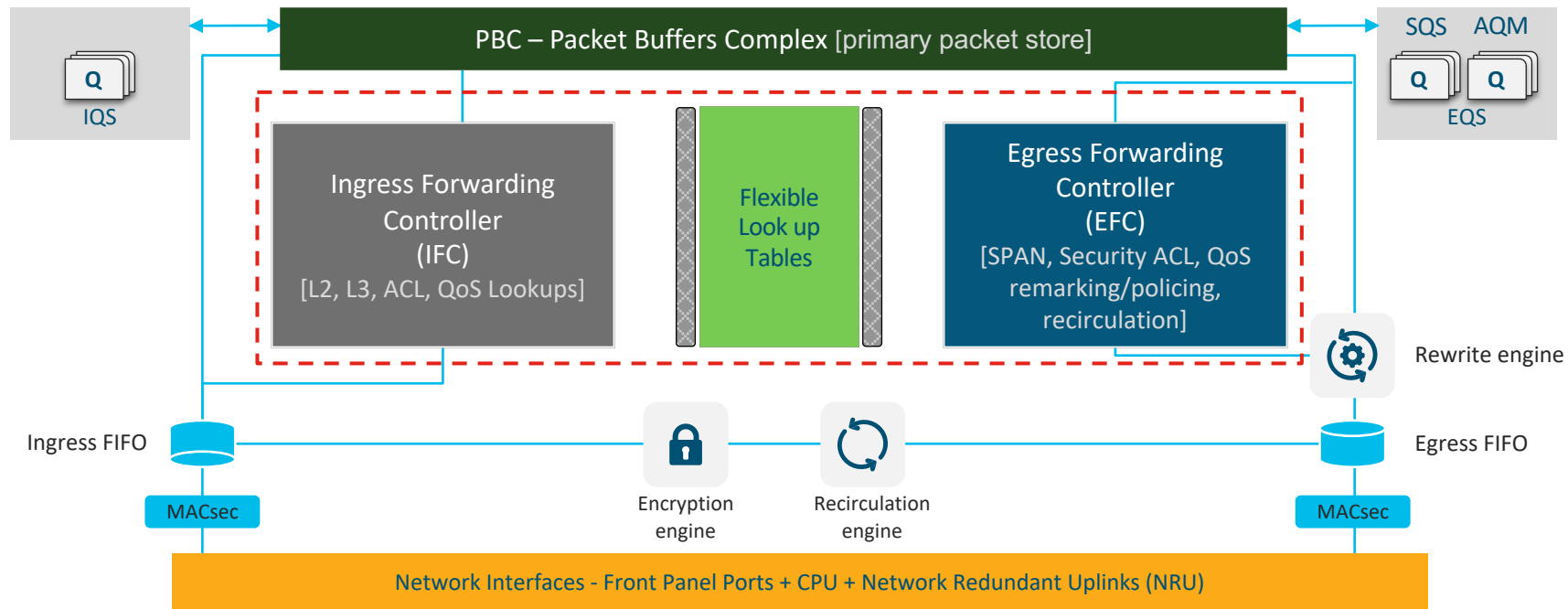
Catalyst 9200CX Series switches – mGig 8 Port Layout



UADP 2.0 Mini – Core Architecture



UADP 2.0 Mini – Programmable Pipelines



The programmable pipelines of UADP 2.0 Mini allow the Catalyst 9200CX to upgrade the the ASIC micro-code. Enabling for fabric enhancements like Network Services Header (NSH) and Group Policy Option (GPO) through micro-code upgrades.

ASIC to port Mapping Catalyst 9200CX Series – 12 Port

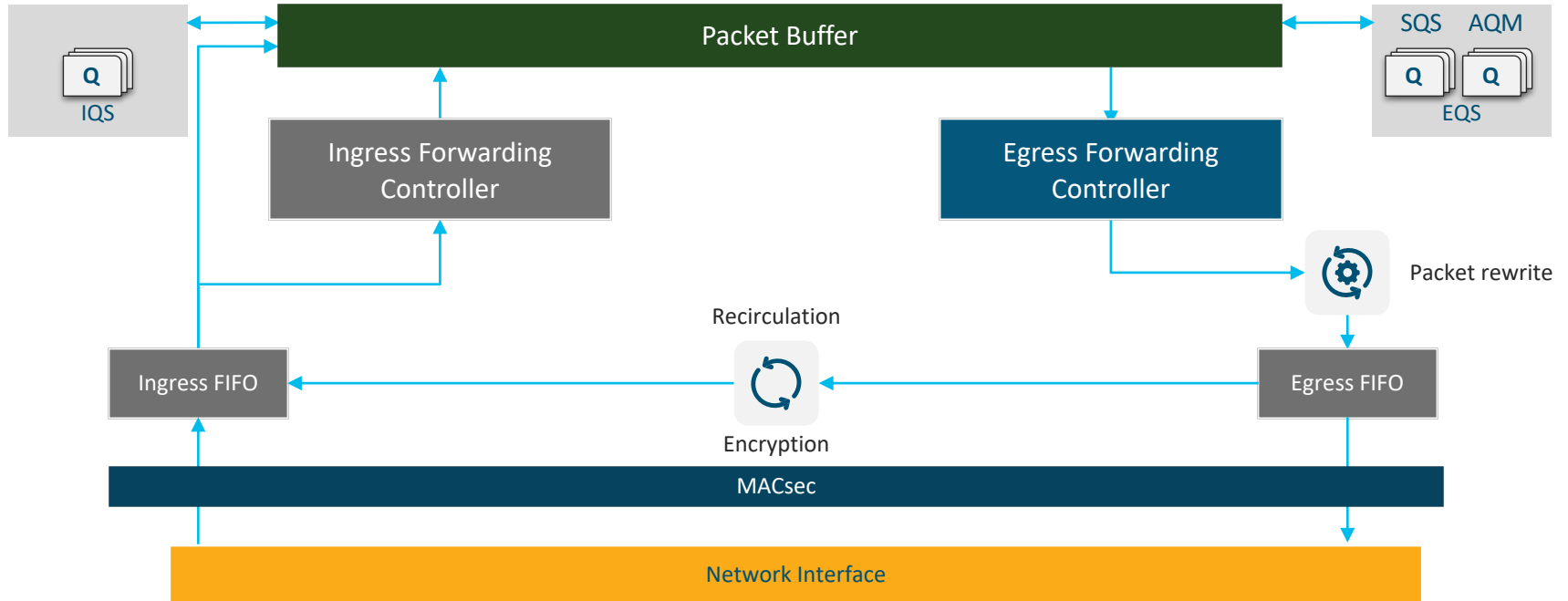
```
Switch#show platform software fed swi 1 ifm mappings
Interface      IF_ID      Inst  Asic  Core  Port  SubPort  Mac  Cntx  LPN  GPN  Type  Active
GigabitEthernet1/0/1  0x8        0    0    0    4     0       21   4    1    1    NIF   Y
GigabitEthernet1/0/2  0x9        0    0    0    5     0       20   5    2    2    NIF   Y
GigabitEthernet1/0/3  0xa        0    0    0    6     0       23   6    3    3    NIF   Y
GigabitEthernet1/0/4  0xb        0    0    0    7     0       22   7    4    4    NIF   Y
GigabitEthernet1/0/5  0xc        0    0    0    8     0        6   8    5    5    NIF   Y
GigabitEthernet1/0/6  0xd        0    0    0    9     0        5   9    6    6    NIF   Y
GigabitEthernet1/0/7  0xe        0    0    0   10     0       49  10    7    7    NIF   Y
GigabitEthernet1/0/8  0xf        0    0    0   11     0        7  11    8    8    NIF   Y
GigabitEthernet1/0/9  0x10       0    0    0   12     0       17  12    9    9    NIF   Y
GigabitEthernet1/0/10 0x11       0    0    0   13     0       16  13   10   10    NIF   Y
GigabitEthernet1/0/11 0x12       0    0    0   14     0       19  14   11   11    NIF   Y
GigabitEthernet1/0/12 0x13       0    0    0   15     0       18  15   12   12    NIF   Y
GigabitEthernet1/1/1  0x14       0    0    0   16     0        3  16   13   13    NIF   Y
GigabitEthernet1/1/2  0x15       0    0    0   17     0       48  17   14   14    NIF   Y
TenGigabitEthernet1/1/3 0x16       0    0    0    0     0        4   0   15   15    NIF   Y
TenGigabitEthernet1/1/4 0x17       0    0    0    1     0        0   1   16   16    NIF   Y
GigabitEthernet1/1/5  0x18       0    0    0   18     0        2  18   17   17    NIF   Y
```

Catalyst 9200CX-12T-2X2G

Switch	Ports	Model	SW Version	SW Image	Mode
*1	17	C9200CX-12T	17.9.1	CAT9K_LITE_IO-SXE	Bundle

Packet walks

UADP 2.0 Mini Block Diagram



Abbreviations used

iFC

Ingress Forwarding Controller

PBC

Packet Buffer Complex

IQS

Ingress Queues

SIF

Stack Interface

EQS

Egress Queueing and scheduling

eFC

egress Forwarding Controller

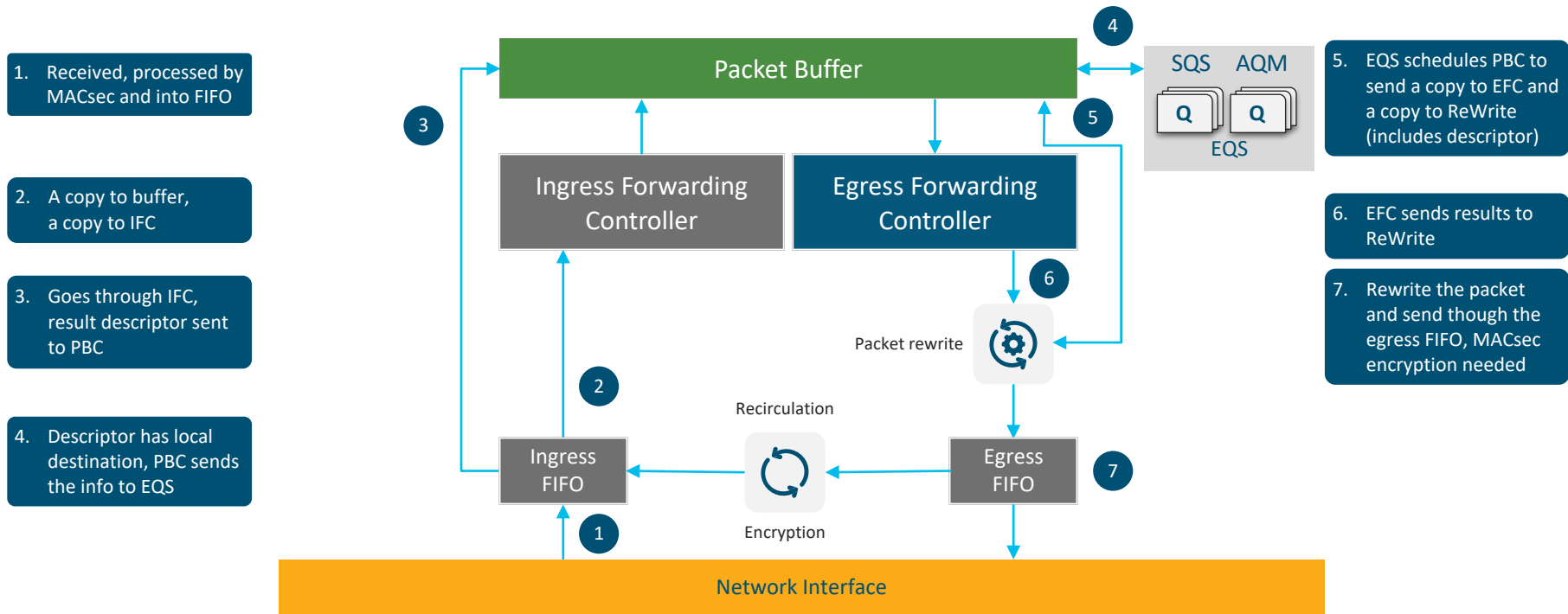
SQS

Stack Queueing and scheduling

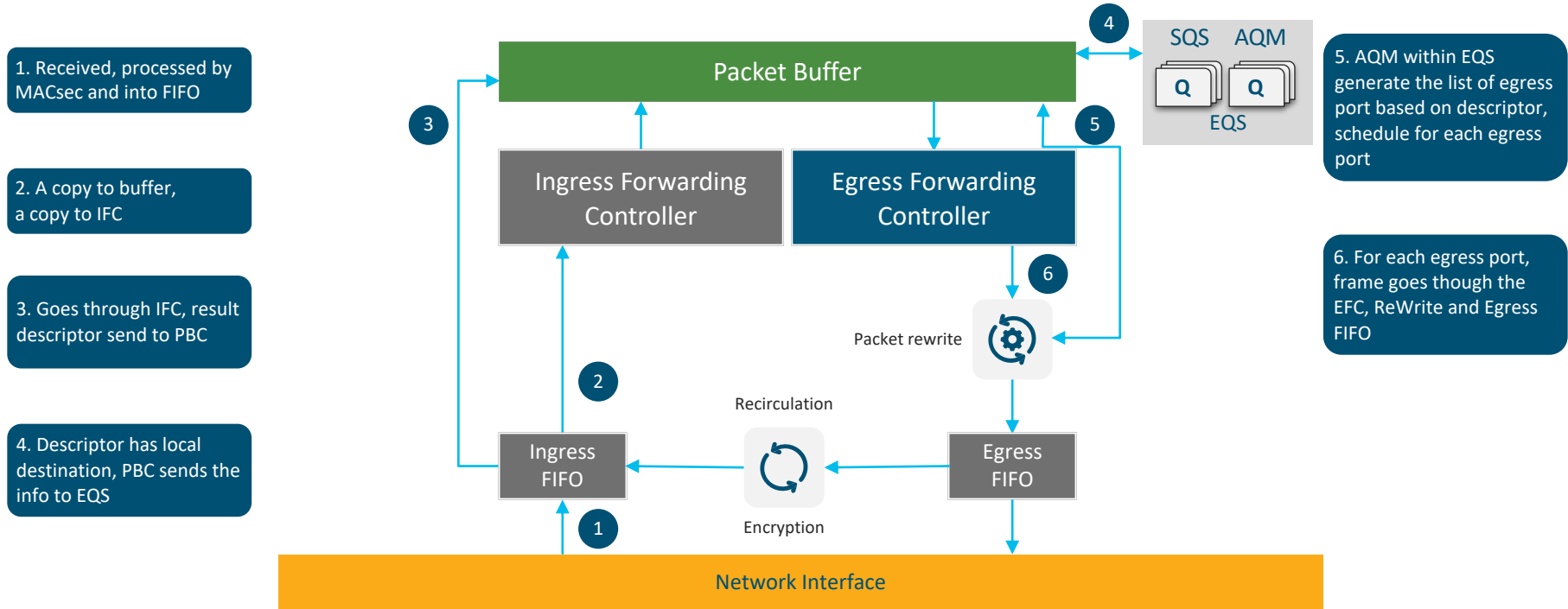
SPQ

Supervisor Packet Queueing

Local Switching: Within the ASIC



Multicast: Egress local



TCAMs, Buffers and Scale

Catalyst 9200CX Scale Enhancements

Forwarding Resources

	C9200/CX	C3560CX
MAC	32k	16k
Host Route	10k	4k
IGMP Groups	1k	1k
Indirect Route	4k	1k
Multicast Route	1k	1k
SGT	2k	2k

Feature Resources

	C9200/CX	C3560CX
Security ACL • PACL • VACL • RACL	1k	375
QoS ACL	1k	375
NetFlow Entries	16k	8k

Higher Scale in the Same Form Factor

Scale and TCAM partition

Switch#show platform hardware fed switch active fwd-asic resource tcam utilization 0

CAM Utilization for ASIC [0]

Table	Max Values	Used Values	
Unicast MAC addresses		16384/256	14/21
L3 Multicast entries		1024/256	0/7
L2 Multicast entries		1024	9
Directly or indirectly connected routes		10240/4096	2/19
QoS Access Control Entries		1024	40
Security Access Control Entries		1408	125
Ingress Netflow ACEs		128	8
Policy Based Routing ACEs		512	9
Egress Netflow ACEs		128	8
Flow SPAN ACEs		256	13
Control Plane Entries		512	213
Tunnels	128		17
Lisp Instance Mapping Entries		128	3
SGT_DGT	2048/256	0/1	
CLIENT_LE	2048/64	0/0	
INPUT_GROUP_LE		1024	0
OUTPUT_GROUP_LE		1024	0
Macsec SPD		128	2

Packet buffers

Ingress Buffers

For ingress queues and scheduler (IQS) (dedicated and shared)

Egress Stack Buffers

For egress Stack Queues and Scheduler (SQS) (dedicated and shared)

Egress Port Buffers

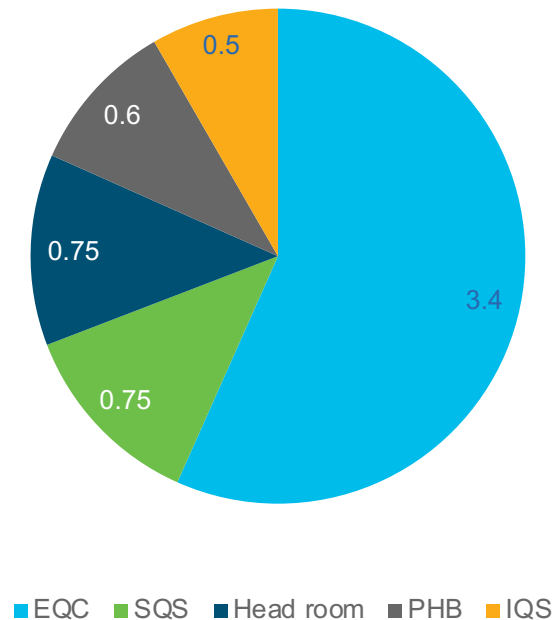
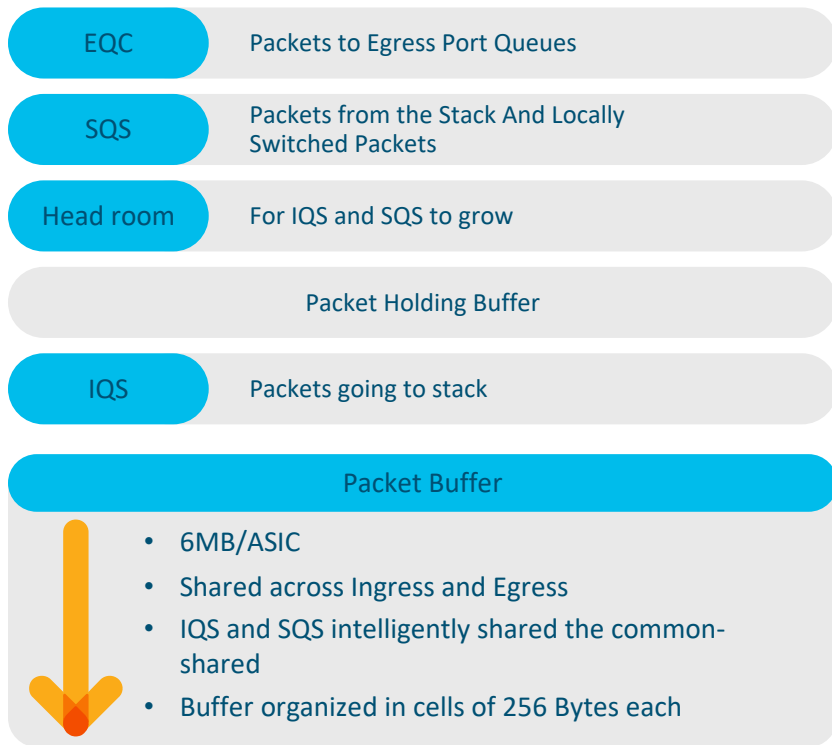
For egress port queues (AQM)

Temporary Buffers

For packet from the Stack or CPU

Allocation: Dedicated buffers are used first

6MB packet buffer

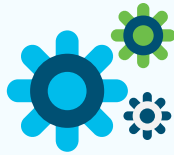


QoS scalability

QoS Scale Numbers	
Class-maps (Ingress)	1,024
Class-maps (egress)	512
Table-maps (ingress)	16
Table-maps (egress)	16
Aggregate Policers	1k
Wired Queues/port	8 queues
Buffer/ASIC	6 MB

Cisco IOS-XE Lite

Cisco IOS XE



Single Release

Feature Consistency
Run Any Feature Anywhere
(RAFA)



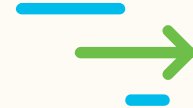
Simplicity

Plug-n-Play
Enhanced Web UI
Simplified Lifecycle
Management



Operational Efficiency

Faster Troubleshooting
Modularized Upgrades
Support Install and Bundle
Modes for bootup



Cisco IOS-XE

Same Cisco IOS-XE code base as
Catalyst
9000 family

Cisco IOS XE Lite: Powering the Catalyst 9200CX Series switches

Optimized for Catalyst 9200CX Series switches



Same image across all Catalyst 9200/9200L/9200CX Series switches



Consistent

- Same code base of Cisco IOS XE



Light

- Optimized for lower memory on Catalyst 9200CX Series switches
- Reduced image size by 50%



Optimized

- Removed unused libraries
- IOSd optimizations
- Bash Optimizations



Modern

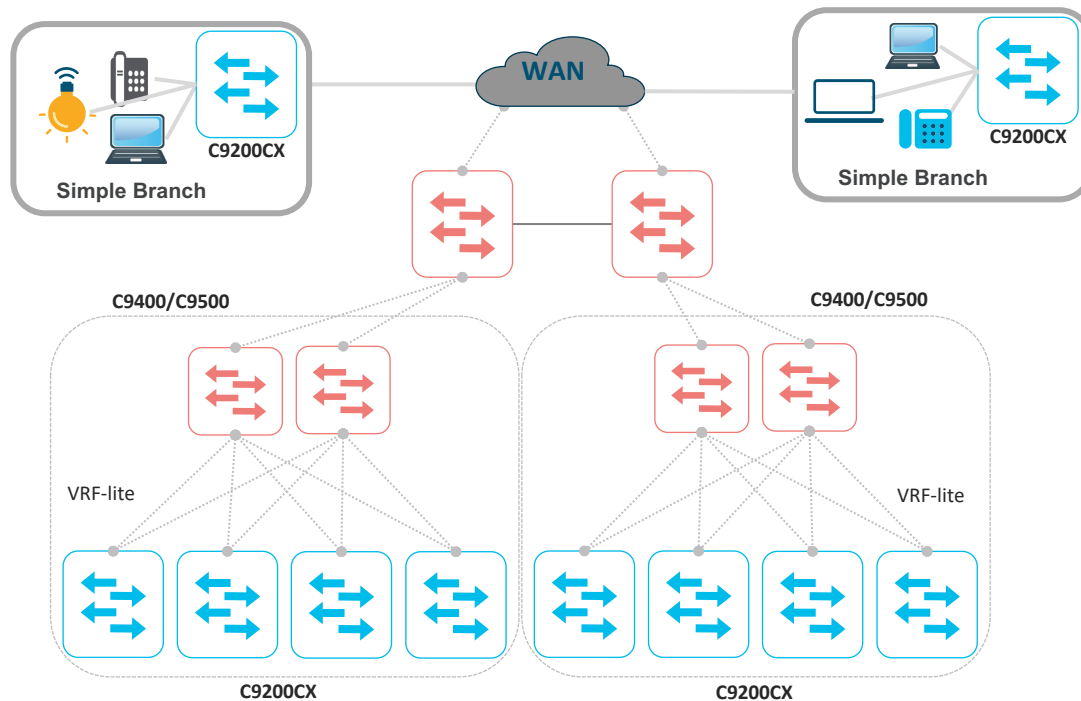
- Model-driven programmability
- Streaming telemetry
- Network monitoring



Highly available

- Modularized feature block
- Status Recovery
- Failure Isolation

BGP Support on Catalyst 9200CX



Support for both eBGP and iBGP

Support for IPv4 and IPv6

Feature parity with C3560CX



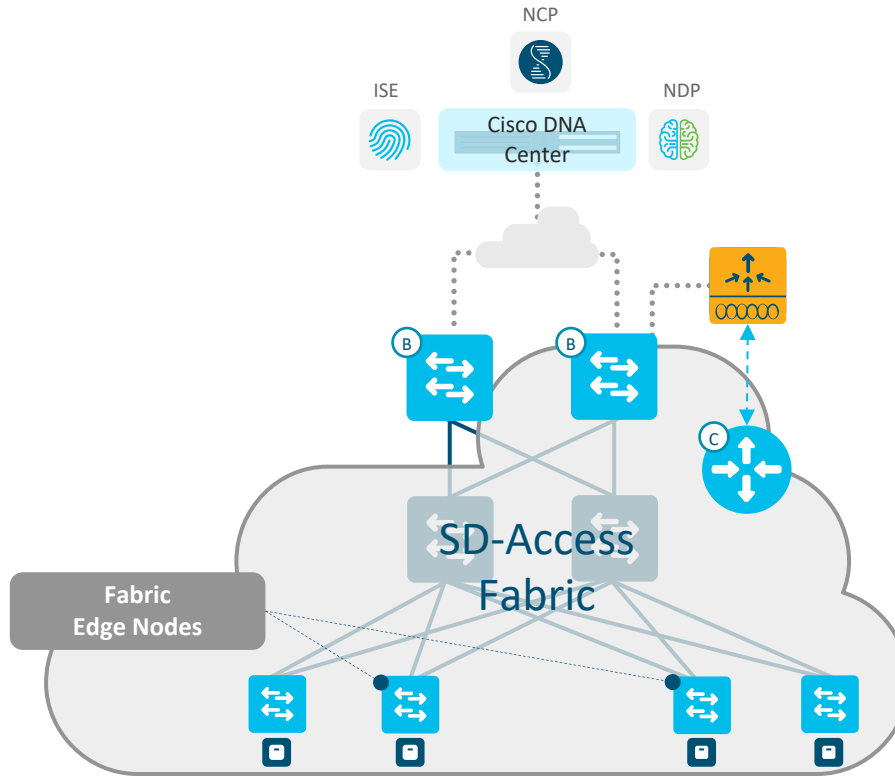
Scale

BGP Neighbors	16
BGP Routes	4k
v6 BGP Routes	2k

* BGP-EVPN not supported
 ** Network Advantage License Required

Intent-Based Networking

Fabric Edge Node for SD-Access



Fabric Edge Nodes – A fabric device that connects wired endpoints to the SD-Access Fabric

Provides first-hop services for Users/Devices connected to a fabric

Supports:

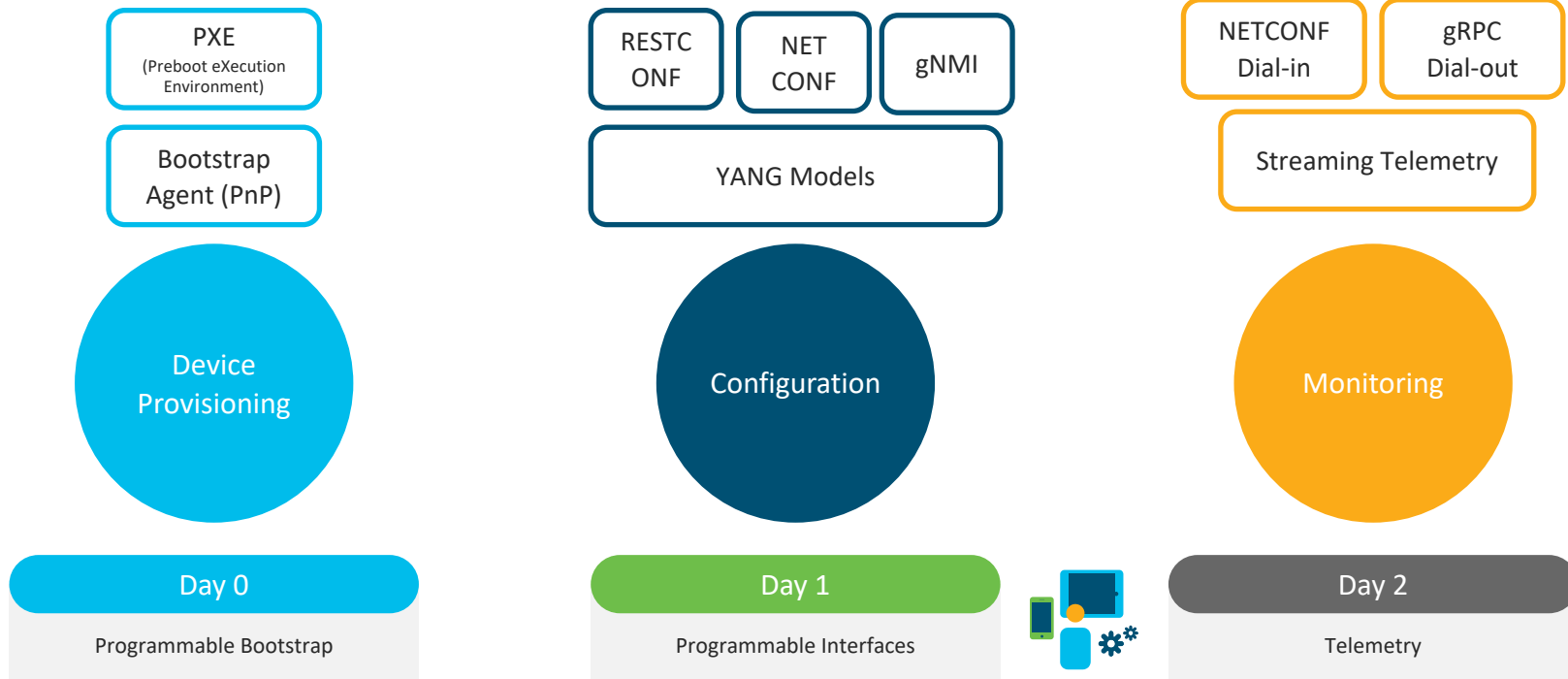
- LISP
- VxLAN

Scale:



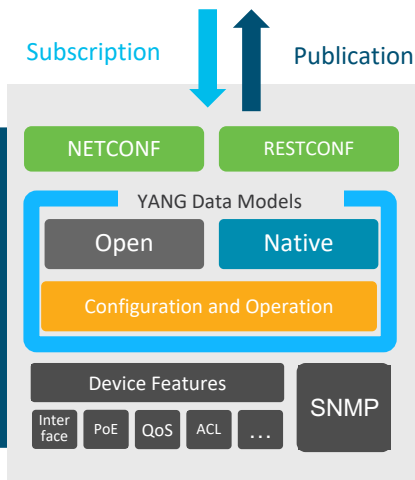
C9200CX	
Number of User VRFs	16

Programmability and automation



Model driven telemetry

- Support for any YANG subtree
- Structured data
- XML encoding
- Periodic or On-change
- Reduced CPU Load



Export enriched, consistent and concise data with context from devices
for a better user and operator experience

Cold Patching

SMU is an emergency point fix positioned for expedited delivery to a customer in case of a network down or revenue affecting scenario.

Cold Patching: Install of a SMU will require a system reload in the first release. It is traffic impacting.



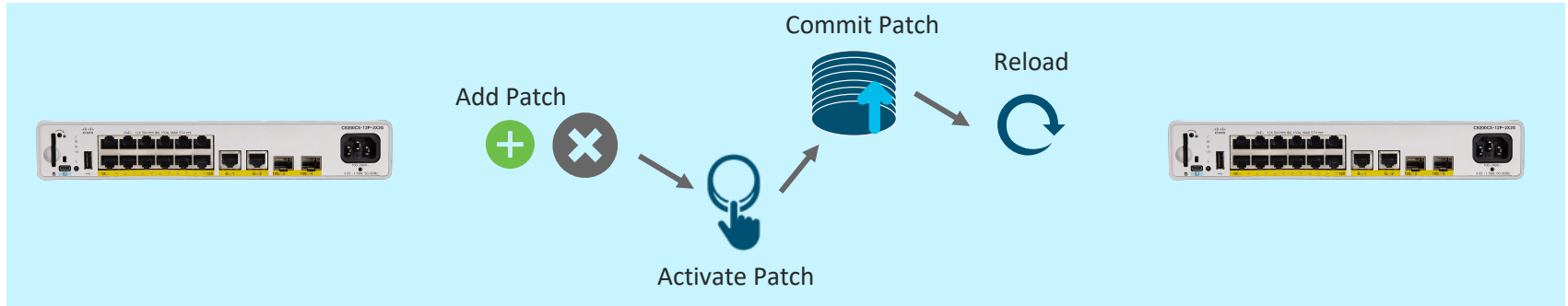
Install Add



Install Activate



Install Commit



Cisco DNA Center Automation with Network Plug and Play (PnP)

Direct costs

- Pre-staging and shipping costs
- Travel costs

Complexity

- Configuration errors
- Different products, Cisco IOS® Software releases

Security

- Third party not secure
- Rogue devices

Time/productivity

- Manual process
- Shipping, storage, travel



Order equipment



Staging site



Manual installer



Technician



Deploy device on site



Order equipment



Cisco DNA Center Automation with Plug and Play



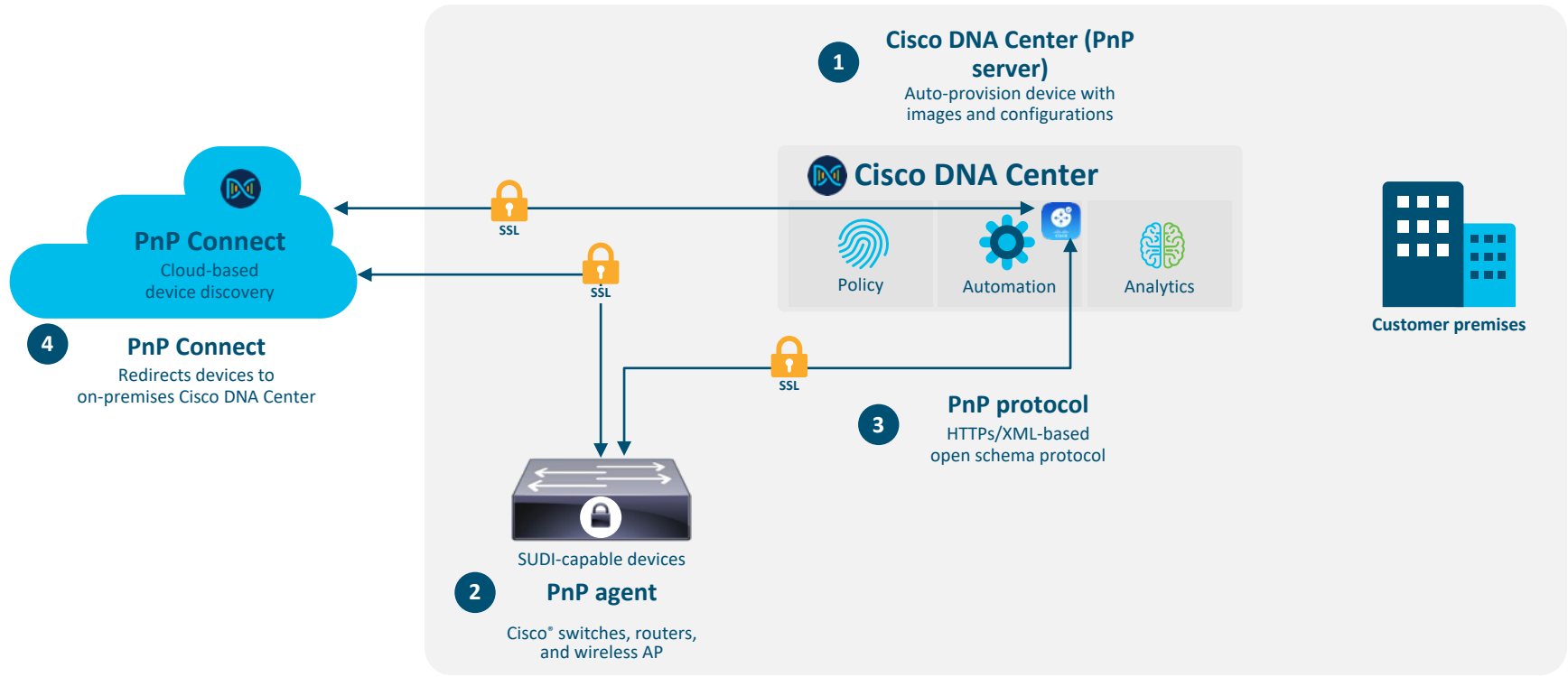
Deploy device on site

~50%

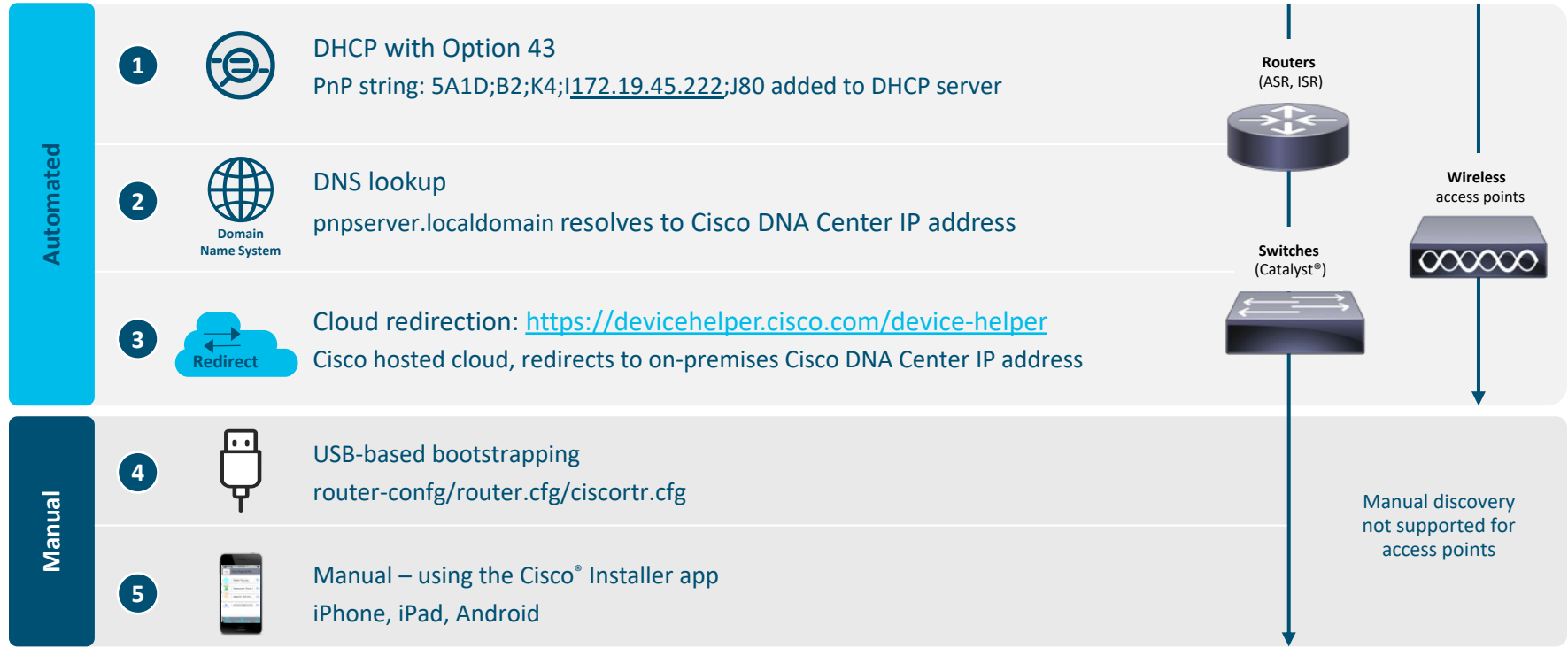
Day-0 OpEx savings*

- Drop-ship devices
- Centralized device discovery (DHCP, DNS, cloud)
- Nontechnical installer at site
- Template-based configurations
- Secure SUDI authentication

PnP solution components



PnP server discovery options



Network Plug and Play (PnP)

Solution Summary

- Network PnP is a **simple**, highly **secure**, and **scalable** automated network device deployment solution from Cisco
- Agent supported on **end-to-end** Cisco IOS® Software products
- Cisco® **DNA Center** is the central server for the solution
- **Open Standard** Protocol: Customers and partners can adapt PnP server into their own processes or build their own server based on open protocols
- **Programmability**: Cisco DNA Center allows scripting (python) to automate server workflows

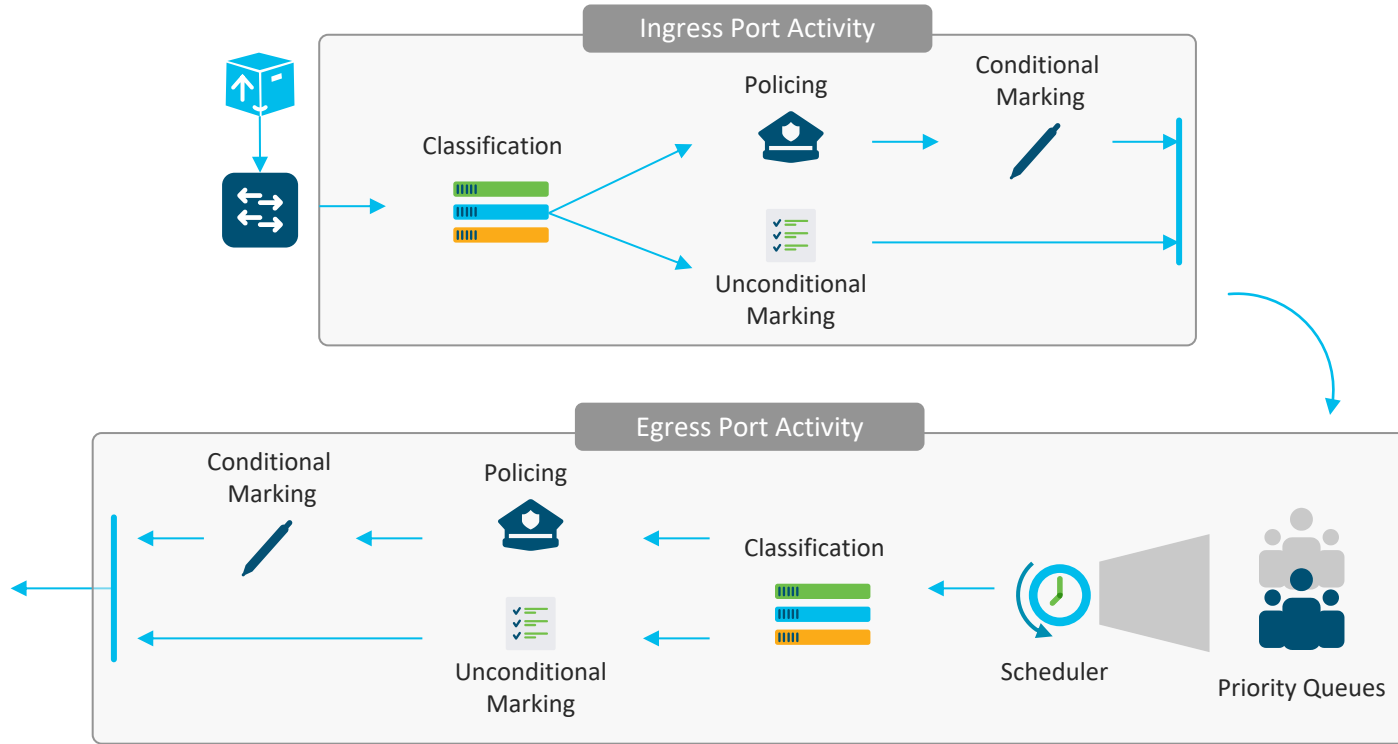
Benefits

- No pre-staging of devices
- Unskilled installer at remote site
- GUI-based workflows
- Highly secure and scalable
- Zero-touch RMA

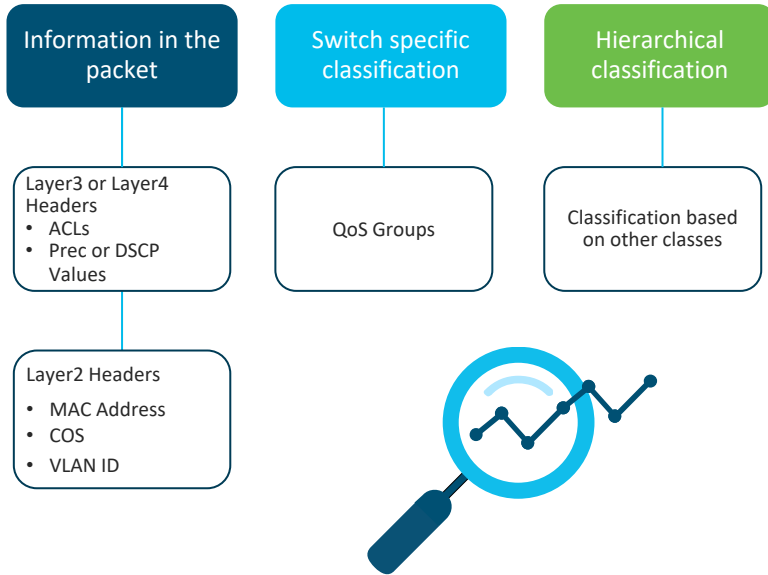


QoS

QoS Activities on Ingress and Egress



Packet classification



A class-map can be defined as a logical OR only, i.e. “match-any” “match-all” is also supported on Catalyst 9000 switches (default)

```
switch(config-cmap)# class-map match-any VOICE
switch(config-cmap)#match ?
access-group  Access group
any           Any packets
class-map     Class map
cos           IEEE 802.1Q/ISL class of service/user priority values
dscp         Match DSCP in IPv4 and IPv6 packets
group-object  Match object-group
ip           IP specific values
mpls         Multi Protocol Label Switching specific values
non-client-nrt Match non-client NRT
precedence   Match Precedence in IPv4 and IPv6 packets
protocol     Protocol
qos-group    Qos-group
vlan         VLANs to match
wlan        802.11-specific values
```

Marking



Conditional
Policer
based marking



Unconditional
Explicit marking



Table Map
based marking

Marking with 'set'
Marking with Table Maps

Catalyst9200CX(config-pmap-c)#set ?

cos Set IEEE 802.1Q/ISL class of service/user priority
dscp Set DSCP in IP(v4) and IPv6 packets
ip Set IP specific values
precedence Set precedence in IP(v4) and IPv6 packets
qos-group Set QoS Group
wlan Set WLAN

```
[class-maps omitted for brevity]
policy-map MARKING-POLICY
class VOIP
  set dscp ef
class MULTIMEDIA-CONFERENCING
  set dscp af41
class SIGNALING
  set dscp cs3
class TRANSACTIONAL-DATA
  set dscp af21
class BULK-DATA
  set dscp af11
class SCAVENGER
  set dscp cs1
class default
  set dscp dscp table COS2DSCP
```

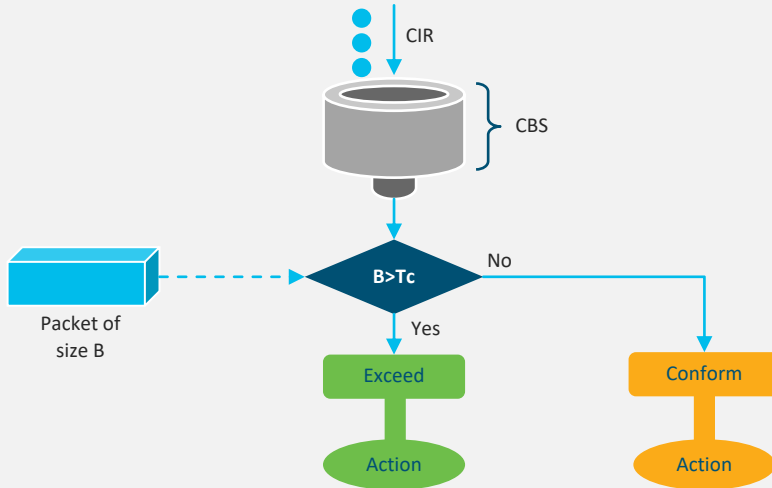
```
table-map COS2DSCP
map from 5 to 46
default copy
```

Cisco Catalyst 9200CX Series Switches

Traffic policing

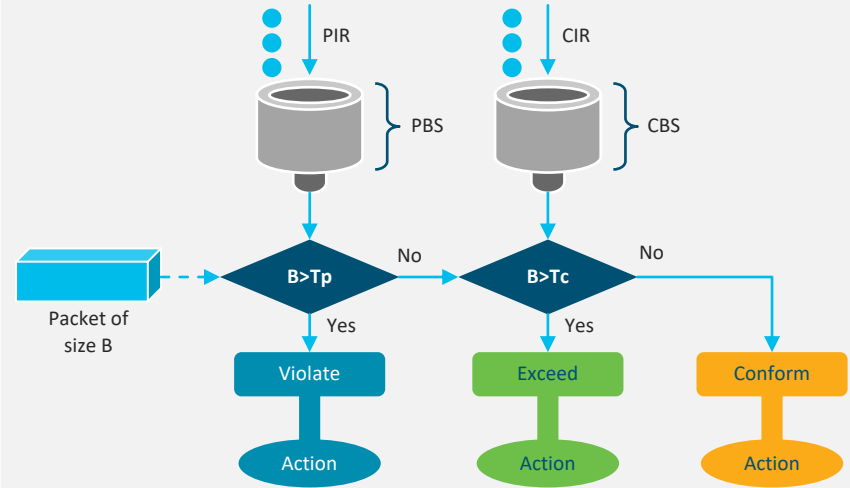
CIR – Committed Information Rate
PIR – Peak Information Rate
PBS- Peak Burst Size
CBS – Committed Burst Size

1 rate 2 color



```
police cir 100000000 bc 3125000  
conform-action set-dscp-transmit af41  
exceed-action drop
```

2 rate 3 color



```
police cir percent 10 pir percent 50  
conform-action transmit  
exceed-action set-dscp-transmit af11  
violate-action drop
```

Security

**Security Features
on Catalyst 9200CX
Series switches**



- **IEEE 802.1x**
- **MACsec-256**
- **Trustworthy solutions**
- **IPV6 First hop security**

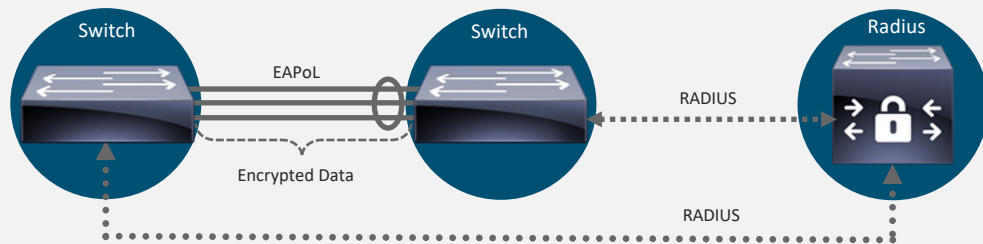
MACsec-256

Securing the network via link encryption

MACsec encryption performed at hardware

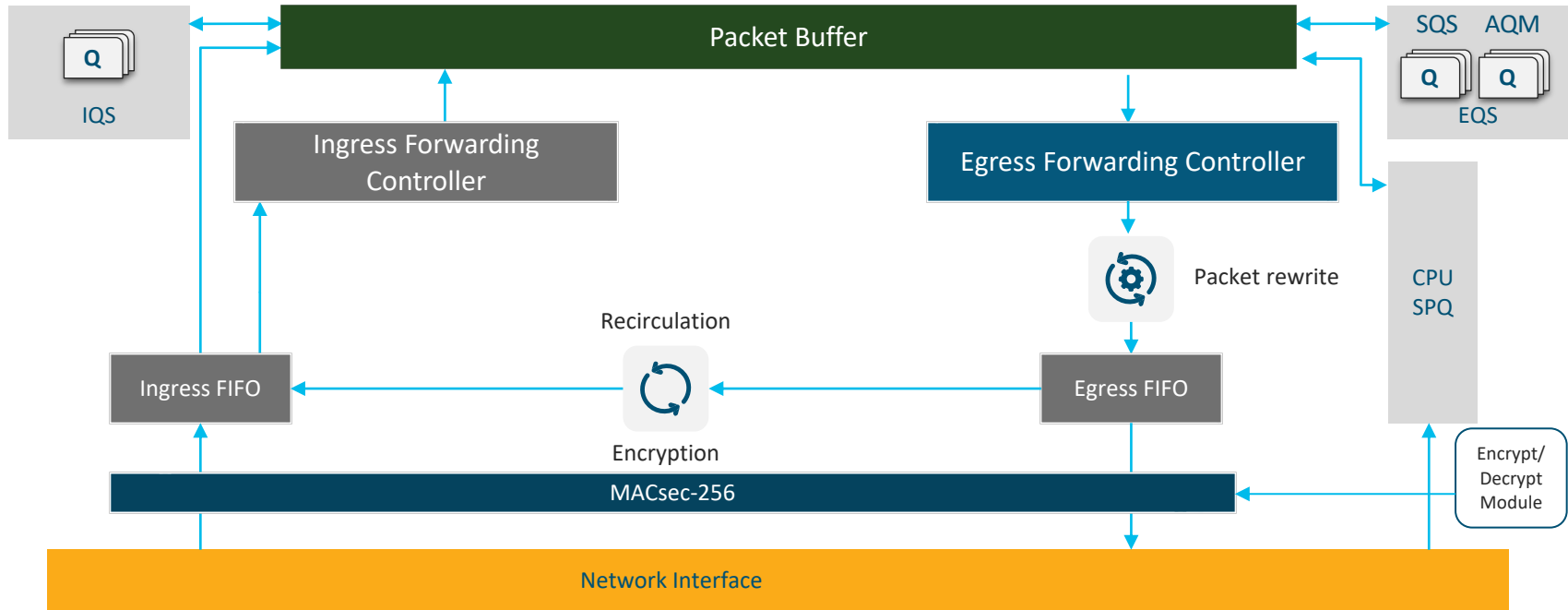
Switch to Switch (can be any front panel port or Network Module ports) but usually uses the network module uplink ports

MACsec is not supported on the Port-channel Logical Link but it can be enabled on the port-members individually (MKA Mode only)



	MACsec	Catalyst 9200CX SKUs	
		SW	License
Switch to Switch	256 Bits SAP	17.9.1	Network-Advantage
	256 Bits MKA	17.9.1	Network-Advantage
Host to Switch	256 Bits MKA	17.9.1	Network-Advantage

Where is MACsec performed in Hardware?



Trustworthy solution

Catalyst 9200CX Series switches provides strong resistance against today's threats

HW Anchored Secure Boot

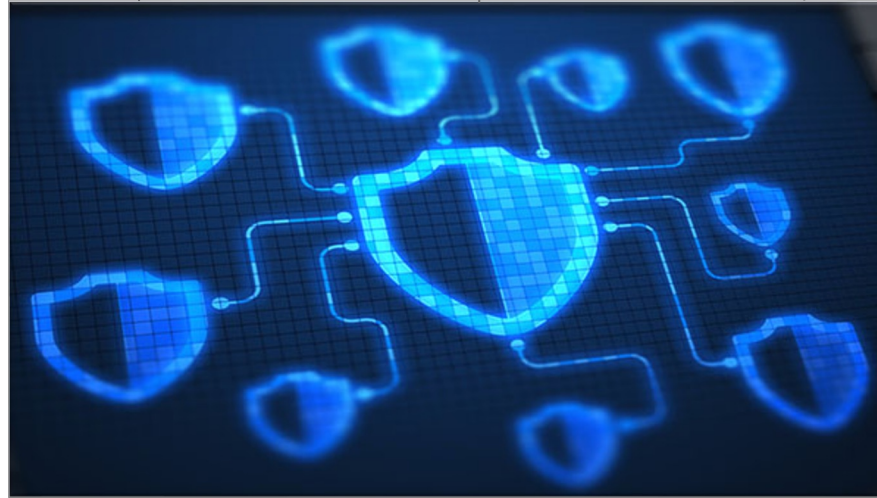
Image Signing and Secure Boot work together to ensure that authentic Cisco SW boots up on a Cisco Platform

Secure Unique Device Identification

Tamperproof ID for the device

Trust Anchor Module

HW Authenticity Check



IPv6 First-Hop Security (FHS)

Securing Enterprise IPv6 Networks



IPv6 First-Hop Security

RA Guard



Protection:

- Rogue or malicious RA
- MiM attacks

DHCPv6 Guard



Protection:

- Invalid DHCP offers
- DoS attacks
- MiM attacks

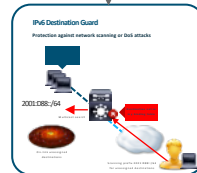
Source/Prefix Guard



Protection:

- Invalid source address
- Invalid prefix
- Source address spoofing

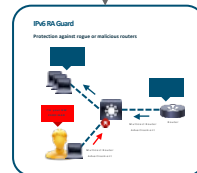
Destination Guard



Protection:

- DoS attacks
- Scanning
- Invalid destination address

ND Multicast Suppress



Reduces:

- Control traffic necessary for proper link operations to improve performance

Core Features

Advance Features

Scalability and Performance

Robust Security for Emerging BYOD Trends

PoE Innovations

Cisco innovations in PoE deliver a robust low voltage infrastructure

2-event classification

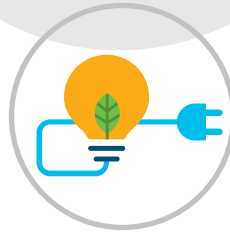
- Fast power negotiation without LLDP
- Physical layer negotiation < 1s

Perpetual PoE

- Uninterrupted PoE power during control plane reboot

Fast PoE

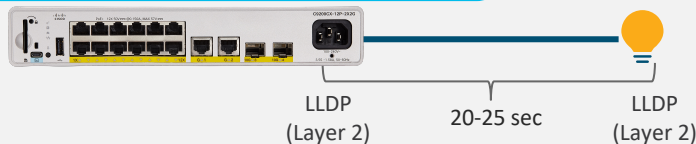
- Bypasses IOS control plane boot
- Restores power to PD within 30 sec of power resumption



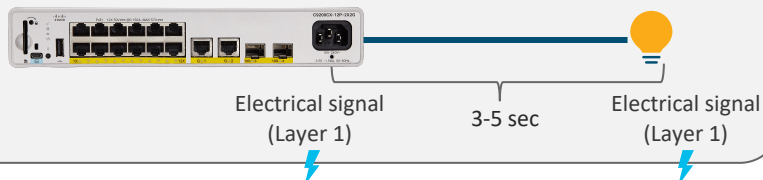


2-Event classification

Without 2-Event Classification



With 2-Event Classification (Hardware Based)



Switch> enable

Switch# configure terminal

Switch(config)# interface gigabitethernet1/0/1

Switch(config-if)#

power inline port 2-event

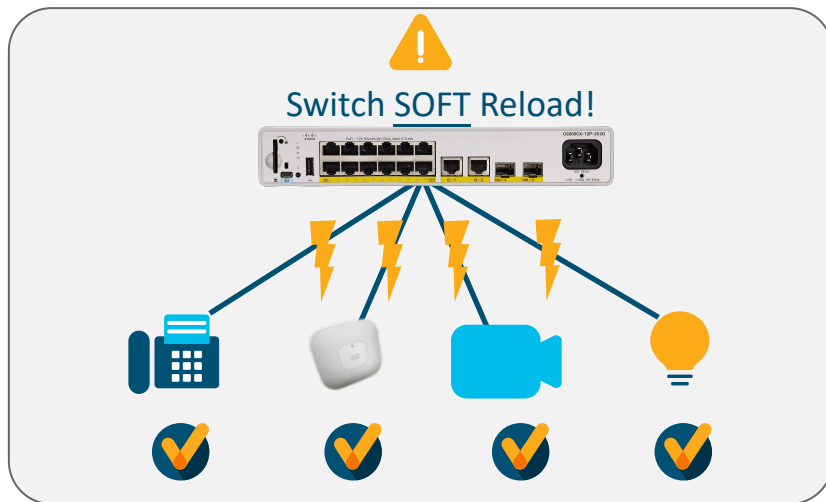
Switch(config-if)# end

- Class 4 PD gets 30W even before the link comes up, otherwise 15.4W
- Type-2 PSE sends classification voltage (2nd Handshake) pulse to Class 4 PD (PoE+, 12.96-25.5 W) confirming it is a high-power capable PSE
- 30W of power is allocated for PD (PD draws up to 25.5W)
- Both PSE and PD need to support 2-Event
- No waiting for CDP/LLDP exchange for PoE+ power levels



Perpetual PoE

PoE devices connected to switch stay powered even on Switch Reload!



```
Switch> enable
```

```
Switch# configure terminal
```

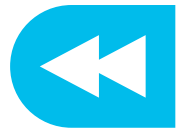
```
Switch(config)# interface gigabitethernet1/0/1
```

```
Switch(config-if)#
```

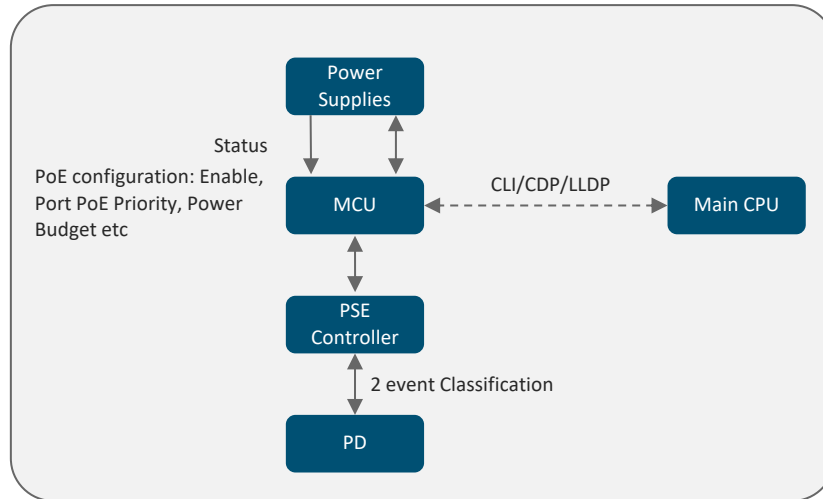
```
power inline port perpetual-poe-ha
```

```
Switch(config-if)# end
```

- PoE devices continue to get Last Negotiated Power
- Applicable to “Soft” Reload – image upgrade, software crash, manual reboot
- Not applicable during power outage to switch/FEP removed
- Not applicable when switch is in hibernation mode



Fast PoE



```
Switch> enable
Switch# configure terminal
Switch(config)# interface gigabitethernet1/0/1
Switch(config-if)#power inline port
perpetual-poe-ha
Switch(config-if)#power inline port poe-ha
Switch(config-if)# end
```

- Restores power to PD in less than 30 seconds post restoration of power
- Works even before IOS comes up
- Allocates last power (stored in NVRAM) drawn from PDs

Application visibility and control

Full flexible NetFlow

Key Differences – Catalyst 9200CX Series switches vs Catalyst 2960CX/3560CX Series switches

Catalyst 9200CX Series switches



- Both ingress and egress
- 16K Flows/ASIC
- Match on Layer2 VLAN header as well

Catalyst 2960CX/3560CX Series switches

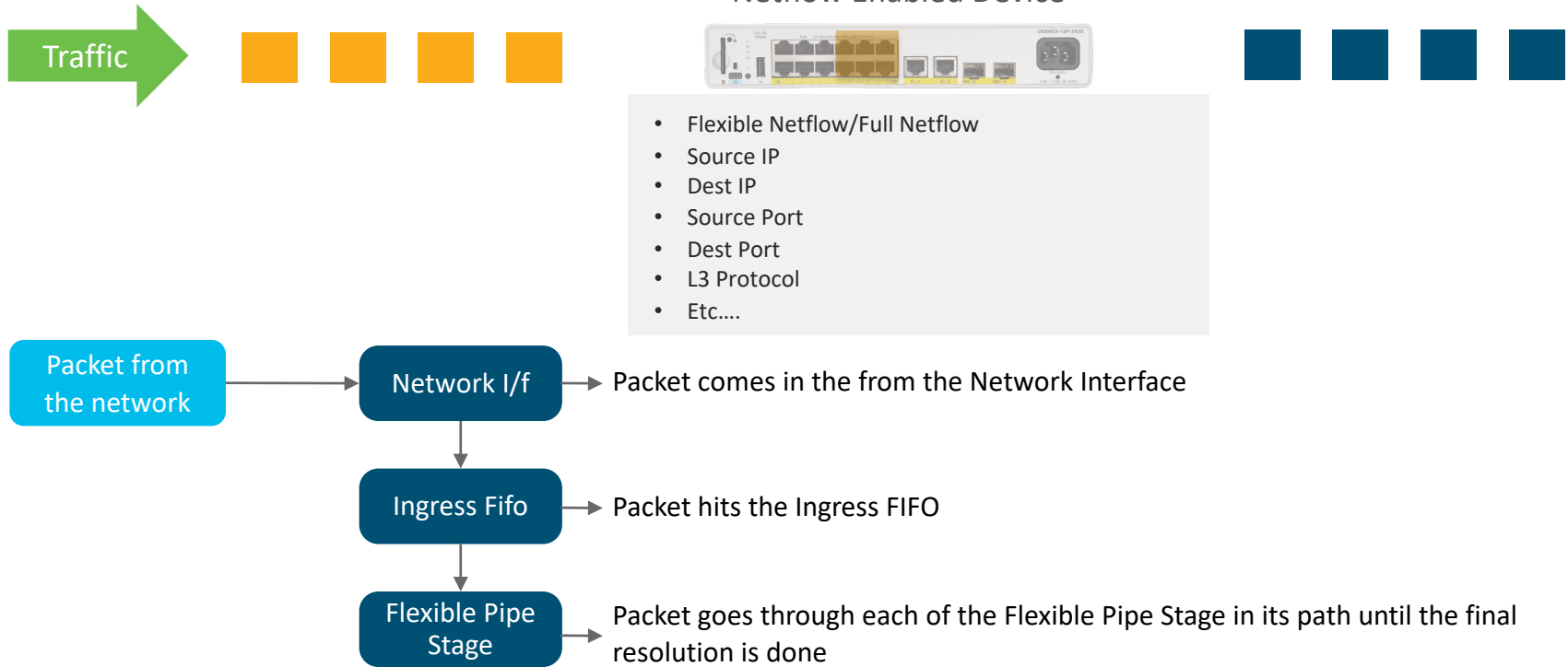


- Only ingress
- 8K Flow/ASIC
- No match on Layer2 VLAN Header

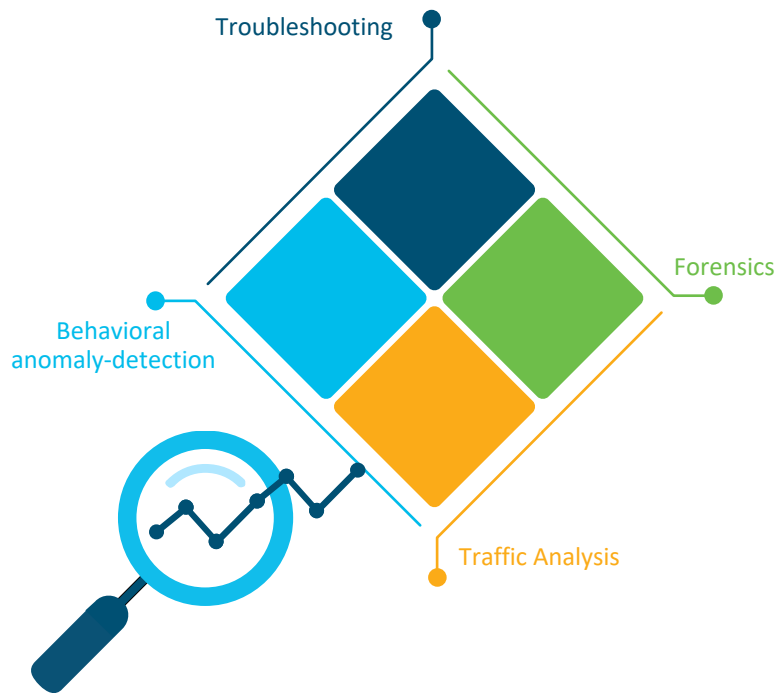
Ingress and Egress FnF supported on all ports, VLANs on C9200CX

Full Flexible NetFlow

Packet Processing



Benefits of Full Flexible NetFlow



Multiple monitors per interface



Configuration

- Traffic type support
- Ipv4
- Ipv6
- datalink



Interface type

- Switchport
- Non switchport (routed port)
- Vlan configure
- Port-channel member interface

Multiple monitors for different traffic types per interface per direction

Application Visibility and Control

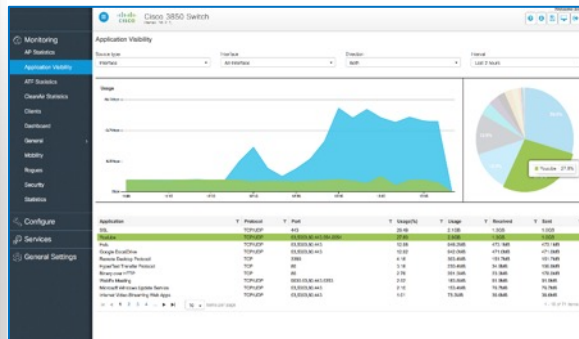
Granular Detection, Advanced Monitoring & Business Logic Based Policies

Know Your Applications



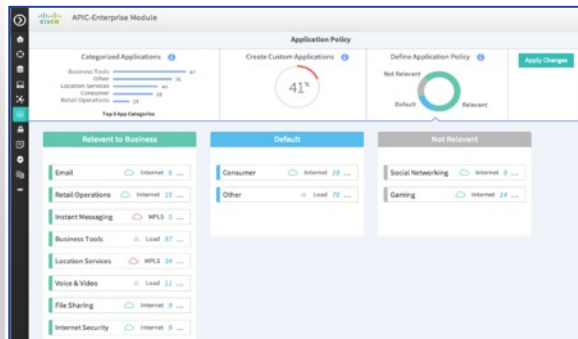
Granular App Detection
Encrypted Application

Monitor Your Applications



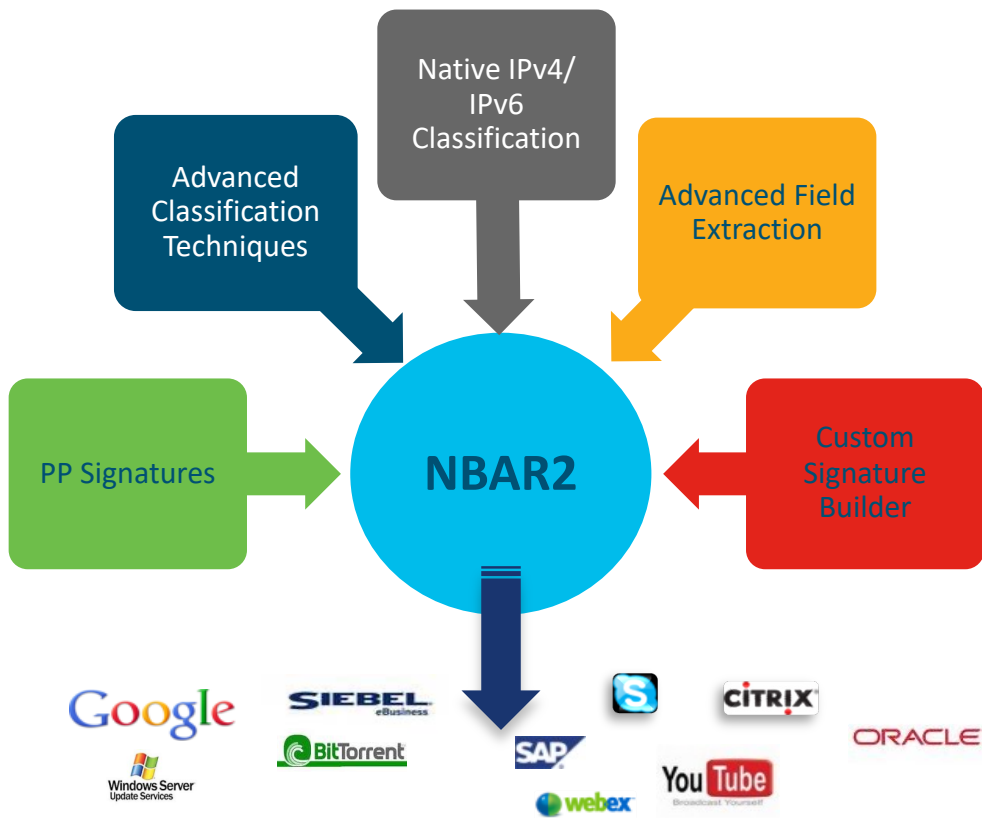
Fault Isolation, Troubleshooting
Performance Assessment

Control Your Applications



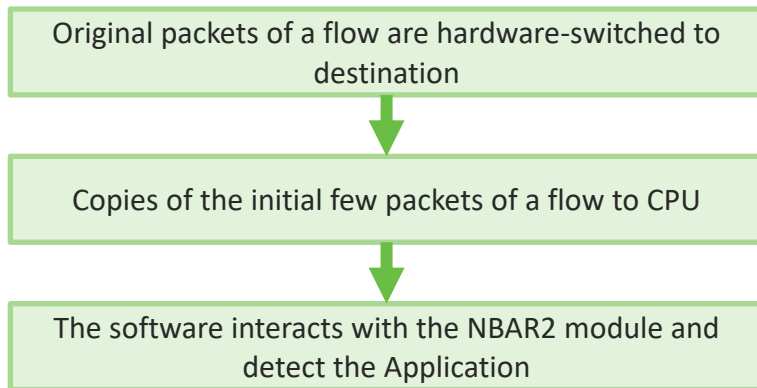
Prioritized Applications,
Bandwidth Management

Network Based Application Recognition 2 (NBAR2)



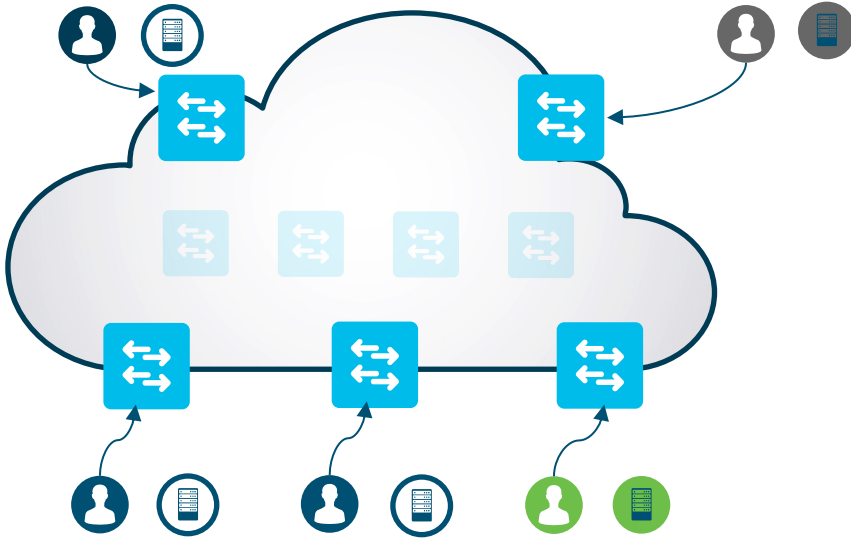
-  Optimize the application experience in the network
-  Hitless Protocol Pack update allows adding more applications

How it Works?



SD-AVC

Network Wide Application Visibility and Control



Enable AVC where the endpoints onboard
(access ports)

Asymmetric traffic is supported only with
SD-AVC

Cisco DNAC Components



Application
Policy

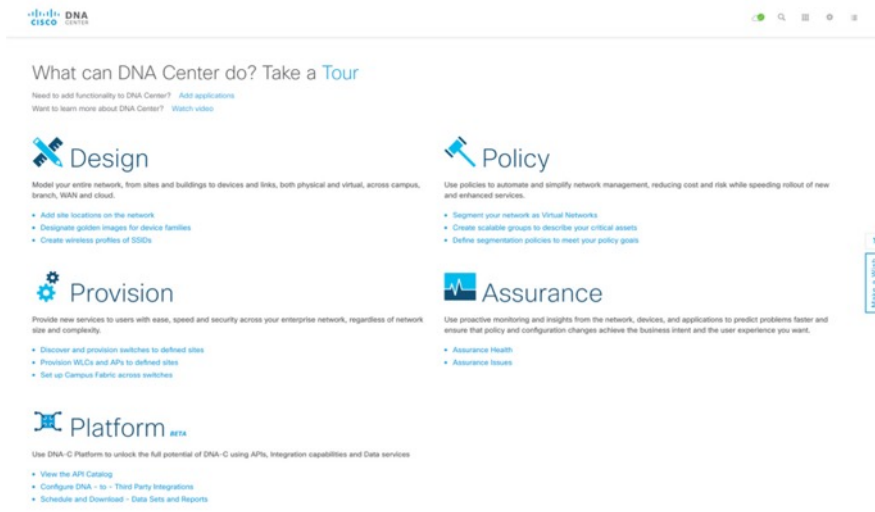


Application
Recognition
Service

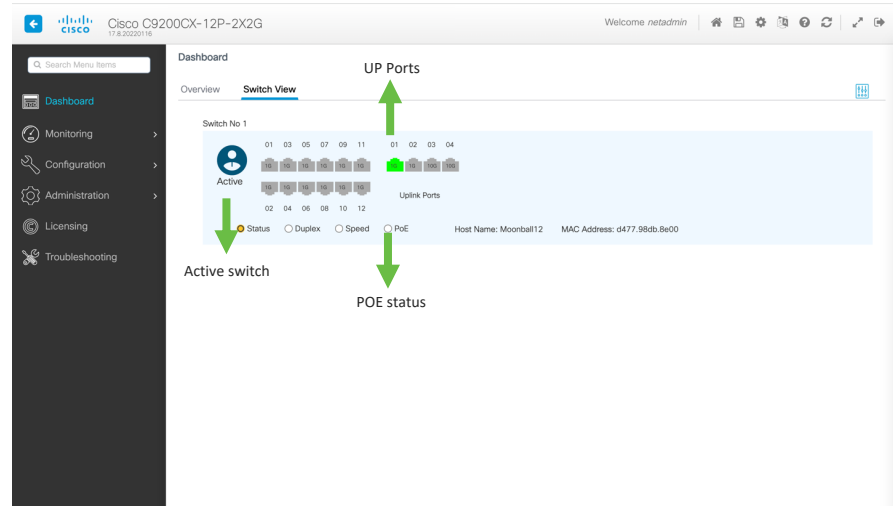


Application
Assurance

Manageability



DNAC
Part of the Larger Network



WebUI
Small Branch - CPC Migration

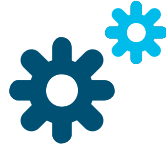
Catalyst 9200CX can be Managed Multiple Ways

Embedded WebUI

Ease of Access



Build Configurations



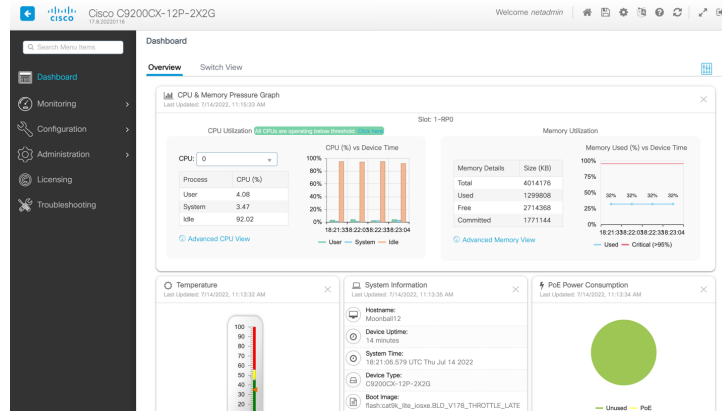
Intuitive Interface



Switch View



Troubleshooting
Made Fun



Switch View

The screenshot displays the 'Switch View' interface for a Cisco C9200CX-12P-2X2G switch. The interface includes a top navigation bar with the Cisco logo, device name, and user information. A left sidebar contains a search bar and a menu with options: Dashboard, Monitoring, Configuration, Administration, Licensing, and Troubleshooting. The main content area is titled 'Dashboard' and 'Switch View'. It shows 'Switch No 1' with a status of 'Active'. Below this, there are two rows of port status indicators. The first row shows ports 01, 03, 05, 07, 09, 11, and 01 (highlighted in green). The second row shows ports 02, 04, 06, 08, 10, 12, and 01 (highlighted in green). A green arrow points from the 'Active' status to the text 'Active Switch'. Another green arrow points from the highlighted port 01 in the first row to the text 'UP Ports'. A third green arrow points from the highlighted port 01 in the second row to the text 'POE Status'. Below the port indicators, there are radio buttons for 'Status', 'Duplex', 'Speed', and 'PoE'. The 'Status' radio button is selected. To the right of these radio buttons, the 'Host Name' is 'Moonball12' and the 'MAC Address' is 'd477.98db.8e00'.

Dashboard

Overview **Switch View**

Switch No 1

Active

UP Ports

POE Status

Active Switch

Host Name: Moonball12 MAC Address: d477.98db.8e00

Troubleshooting Made Fun!

The screenshot shows the Cisco NetAdmin interface for a Cisco C9200CX-12P-2X2G switch. The left sidebar contains a menu with the following items: Dashboard, Monitoring, Configuration, Administration, Licensing, and Troubleshooting (highlighted in blue). The main content area is titled 'Troubleshooting' and contains five cards:

- Logs**: Manage Syslog, Webserver Log, License Log. An annotation 'View Syslogs' with a green arrow points to this card.
- Core Dump and System Report**: View the list of core files and System Reports captured in the device. An annotation 'Check the Core Files' with a green arrow points to this card.
- Debug Bundle**: Capture require info like CLI outputs, logs as a single bundle for error reporting and debugging.
- Packet Capture**: Capture packets with different filter options to feed into Wireshark for debugging.
- Ping and Trace Route**: Check Ping-ability and Trace route info of a target destination through different sources. An annotation 'Ping and Traceroute' with a green arrow points to this card.

The interface also includes a top navigation bar with the Cisco logo, device name, date, and a 'Welcome netadmin' message. A search bar is located at the top of the sidebar.

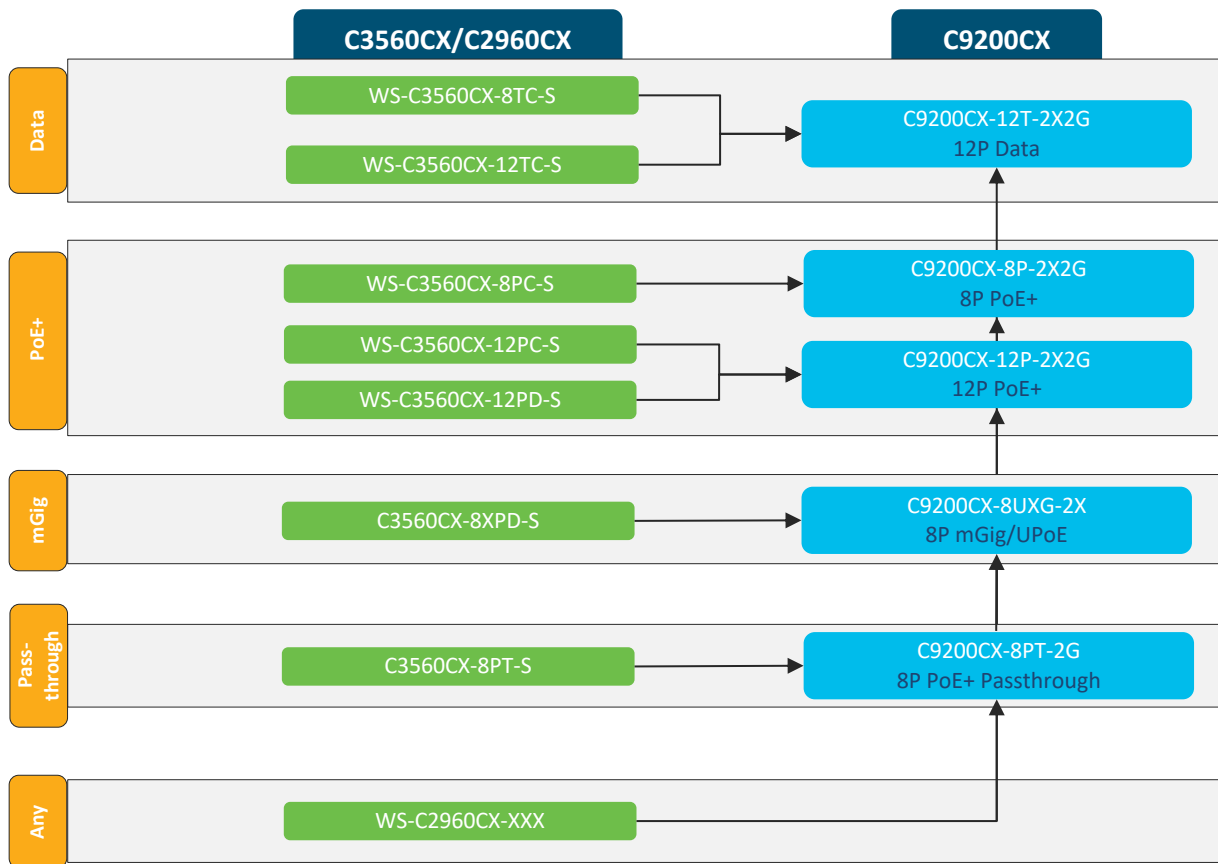
References

Catalyst 9200CX Hardware Comparison

	Catalyst 9200CX Series mGig/802.3bt switches	Catalyst 9200CX Series POE+ switches	Catalyst 9200CX Series Data-Only switch	Catalyst 3560CX Series switches
CPU	4 Core @500Mhz Embedded ARM	4 Core @375Mhz Embedded ARM	4 Core @375Mhz Embedded ARM	Dual Core CPU@600MHz
DRAM (DDR3)	4GB	4GB	4GB	512MB
Flash On board	8GB	8GB	8GB	128MB
Buffer	6MB/ASIC	6MB/ASIC	6MB/ASIC	4MB/ASIC
Power Supply	315W (Internal)	315W (Internal)	80W (External) or UPOE+ UL Powered	300W (Internal) or UPOE+ UL Powered
Switching Bandwidth	60GB	60GB	60GB	32GB
MACsec	256-Bit MACsec	256-Bit MACsec	256-Bit MACsec	802.1X-2010(MKA) PSK Support for Switch-2-Switch
Max PoE Budget	240W	240W	-	240W
Max Depth	9.6" (24.4cm)	9.6" (24.4cm)	6.5" (16.5cm)	10.6" (26.9cm)

Cisco Catalyst Compact Switch

Product Transitions



C9200CX-8PT-2G

Powering Mix Options

POE Class	POE Type	Host PSE Power (W)	IEEE PD Power (W) MAX	Available power on C9200CX after conversion
8	4	90	71.3	60.5
7	4	75	62	49
6	3	60	51	40
5	3	45	40	31
4	2	30	25.5	21.5/ 20 *

Power Classes less than 4 will not be used for the Power Budget.

* A single class 4 30W host is sufficient to power the system with no power for pass-through. If it is used in addition to another power source, then the available power is slightly less due to power sharing loss. Power from 30W Host will power up the system but should only be considered 20W when added to other supplies.

Class 8 PD Host						
Aux 80W	Aux 150W	PD1	PD2	POE Power Available	Number of 30W PSE Ports	Number of High Priority Ports
Present				59.5	1	0
	Present			129.5	3	0
		Class 8		39	1	0
		Class 8	Class 8	99.5	3	1
Present		Class 8	Class 8	179.5	6	2
	Present	Class 8	Class 8	249.5	8	3

Class 6 PD Host						
Aux 80W	Aux 150W	PD1	PD2	POE Power Available	Number of 30W PSE Ports	Number of High Priority Ports
Present				59.5	1	0
	Present			129.5	3	0
		Class 6		18.5	0	0
		Class 6	Class 6	58.5	1	0
Present		Class 6	Class 6	138.5	4	1
	Present	Class 6	Class 6	208.5	6	1

Class 4 PD Host

Aux 80W	Aux 150W	PD1	PD2	POE Power Available	Number of 30W PSE Ports	Number of High Priority Ports
Present		Class 4		78.5	2	0
	Present	Class 4	Class 4	168.5	5	0
Present		Class 6	Class 6	138.5	4	1
	Present	Class 4	Class 8	210	7	2

No Aux Supplies and Class 4

Aux 80W	Aux 150W	PD1	PD2	POE Power Available	Number of 30W PSE Ports
		Class 8	Class 6	79	2
		Class 8	Class 4	30 **	1
		Class 6	Class 4	30 **	0
		Class 4	Class 4	18.5	0

** Due to the nature of POE power and the desire to keep the switch up during the loss of a redundant power source, in cases where the PD power limits are low, the available power for pass through is limited to 30W, if higher pass-through power is desired the user must use higher power hosts or an external Auxiliary Adapter





Turn this technical overview into a purchase-ready BOM

Send the exact model or BOM and your deployment requirements. Layer23-Switch can review compatibility, availability, and quote options.

- ✓ Exact model or Cisco PID and quantity
- ✓ Port count, media type, PoE budget, and uplink speed
- ✓ Redundancy, licensing, support, and accessory needs
- ✓ Ship-to country, target date, and lead-time constraints

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SCAN TO REQUEST A QUOTE

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