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CCNA Routing and Switching Study Guide

Chapters 8 & 22: Intelligent Networks

Instructor & Todd Lammle

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Chapter 22 objectives

The ICND2 topics covered in this chapter include:

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Chapter 22 objectives (con't)

The ICND2 topics covered in this chapter include:

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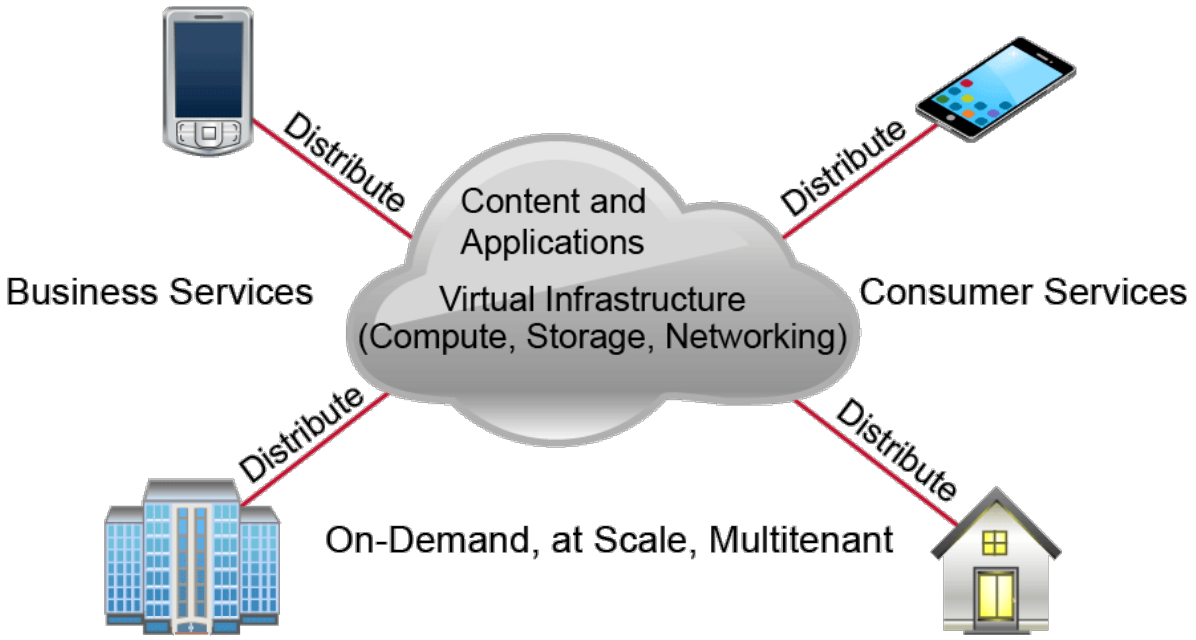
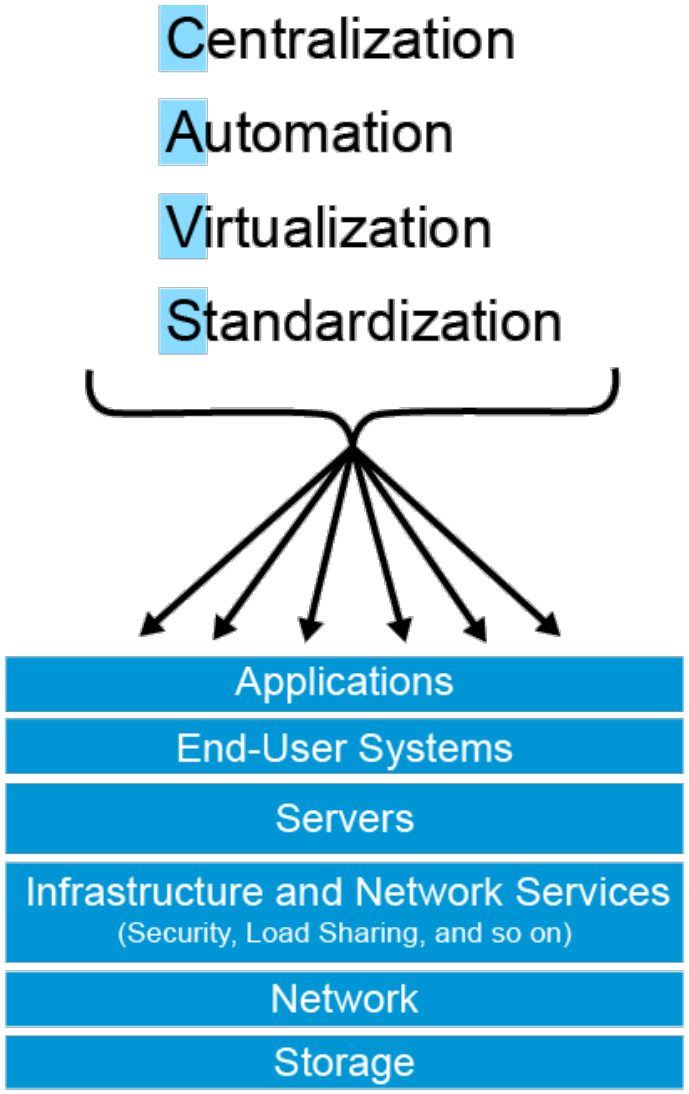
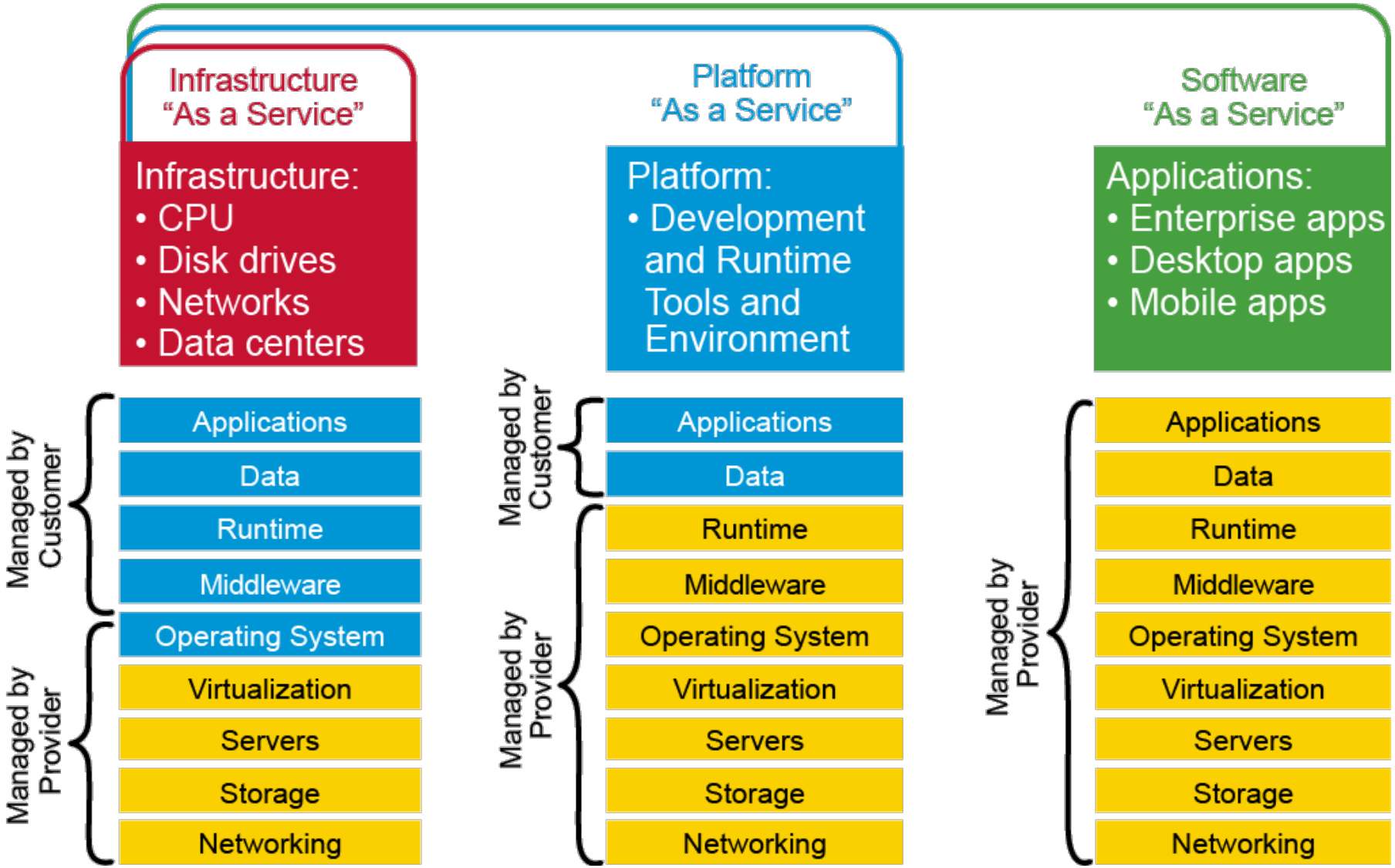
- Figure 8.2

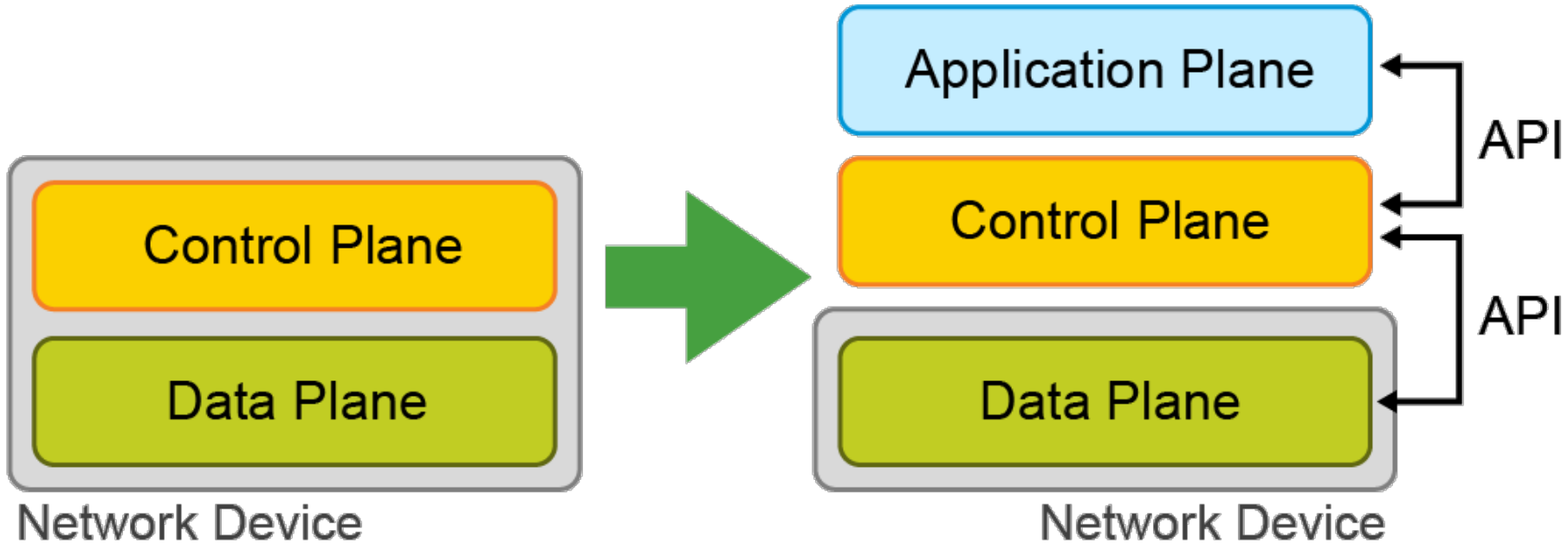

Distribute
Distribute
Content and
Applications
Business Services
Virtual Infrastructure
(Compute, Storage, Networking)
Consumer Services
Distribute
Distribute
On-Demand, at Scale, Multitenant


Centralization
Automation
Virtualization
Standardization
Applications
End-User Systems
Servers
Infrastructure and Network Services
(Security, Load Sharing, and so on)
Network
Storage

8.4


Infrastructure
"As a Service"
Infrastructure:
• CPU
• Disk drives
• Networks
• Data centers
Platform
"As a Service"
Platform:
• Development and Runtime Tools and Environment
Software
"As a Service"
Applications:
• Enterprise apps
• Desktop apps
• Mobile apps
Managed by Customer
Managed by Provider
Applications
Data
Runtime
Middleware
Operating System
Virtualization
Servers
Storage
Networking

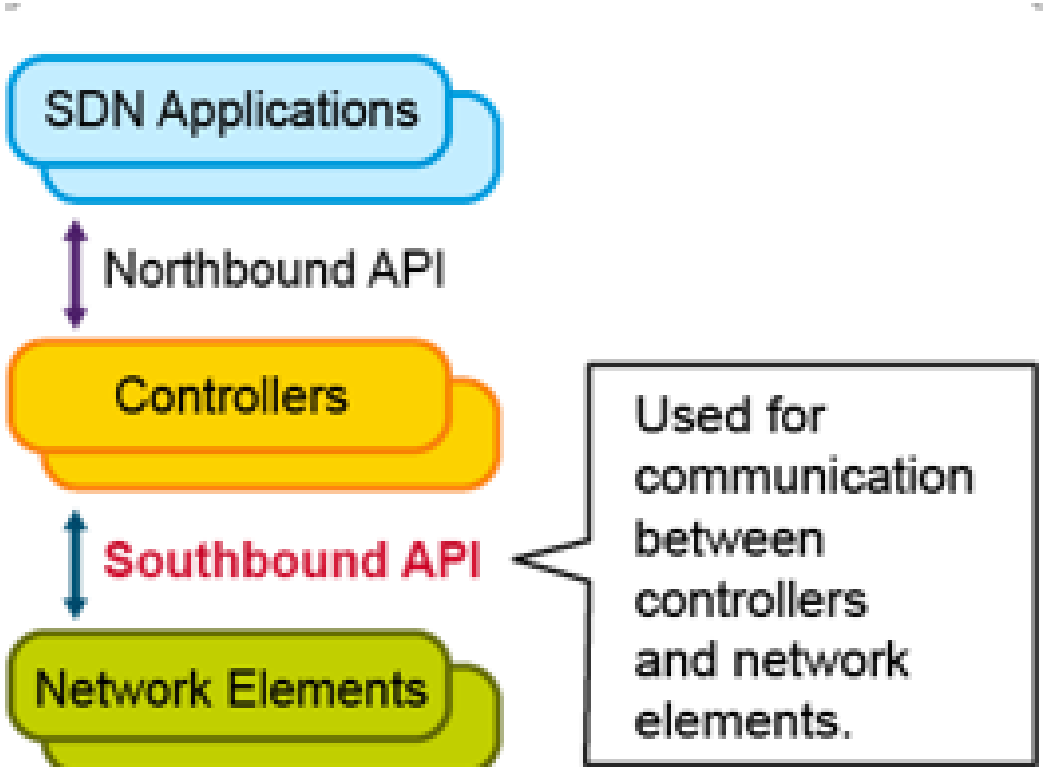
8.5



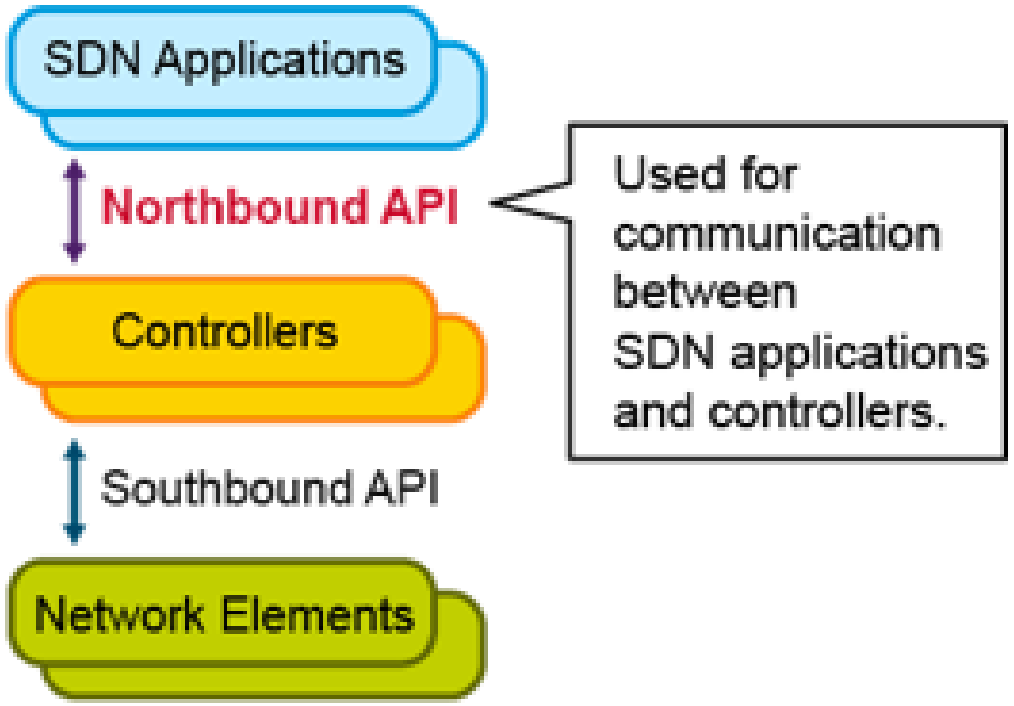
Traditional Network Architecture

SDN Architecture

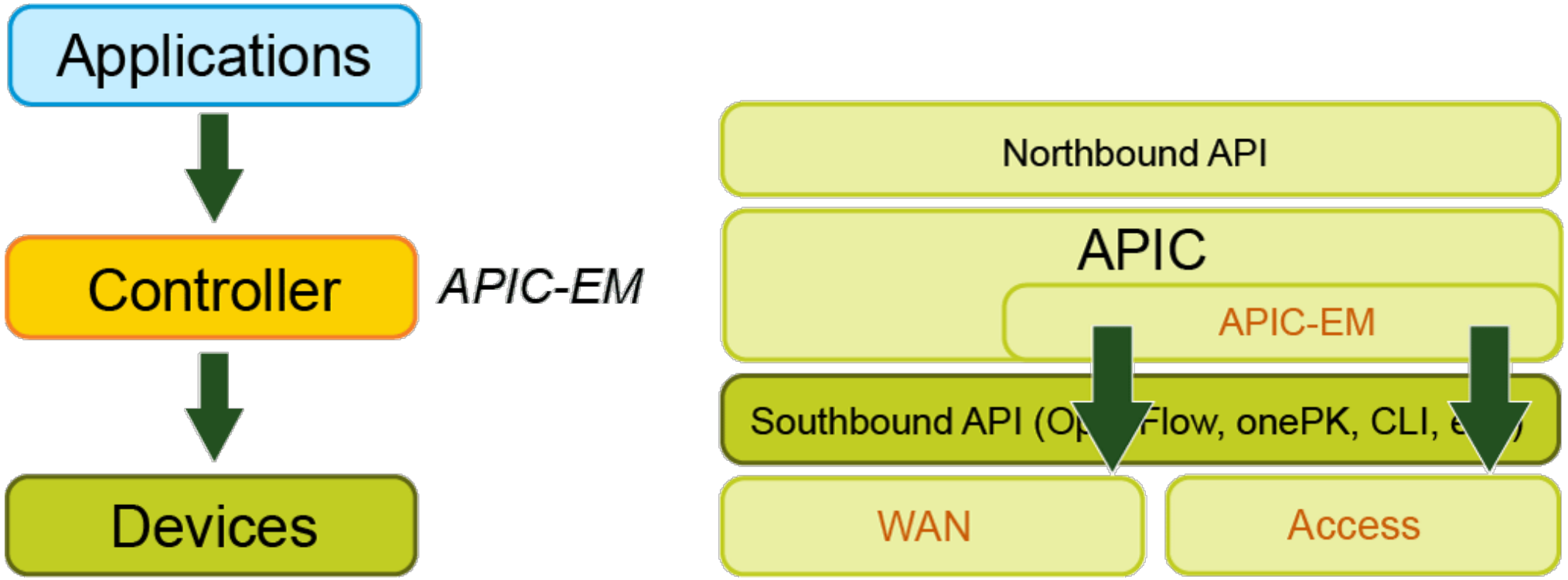
8.6


SDN Applications
Northbound API
Controllers
Southbound API
Network Elements
Used for communication between controllers and network elements.

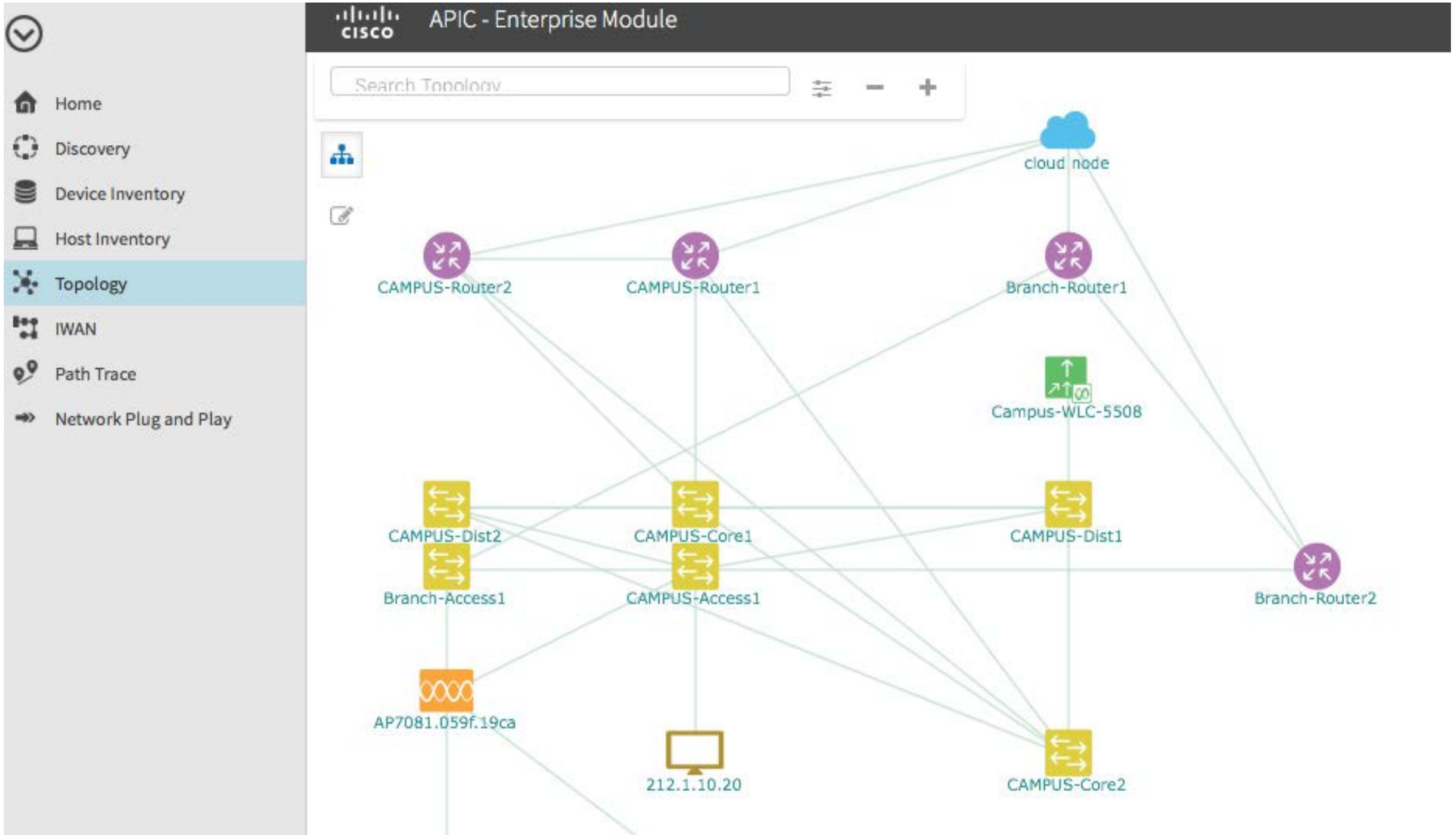
8.7


SDN Applications
Northbound API
Controllers
Southbound API
Network Elements
Used for communication between SDN applications and controllers.

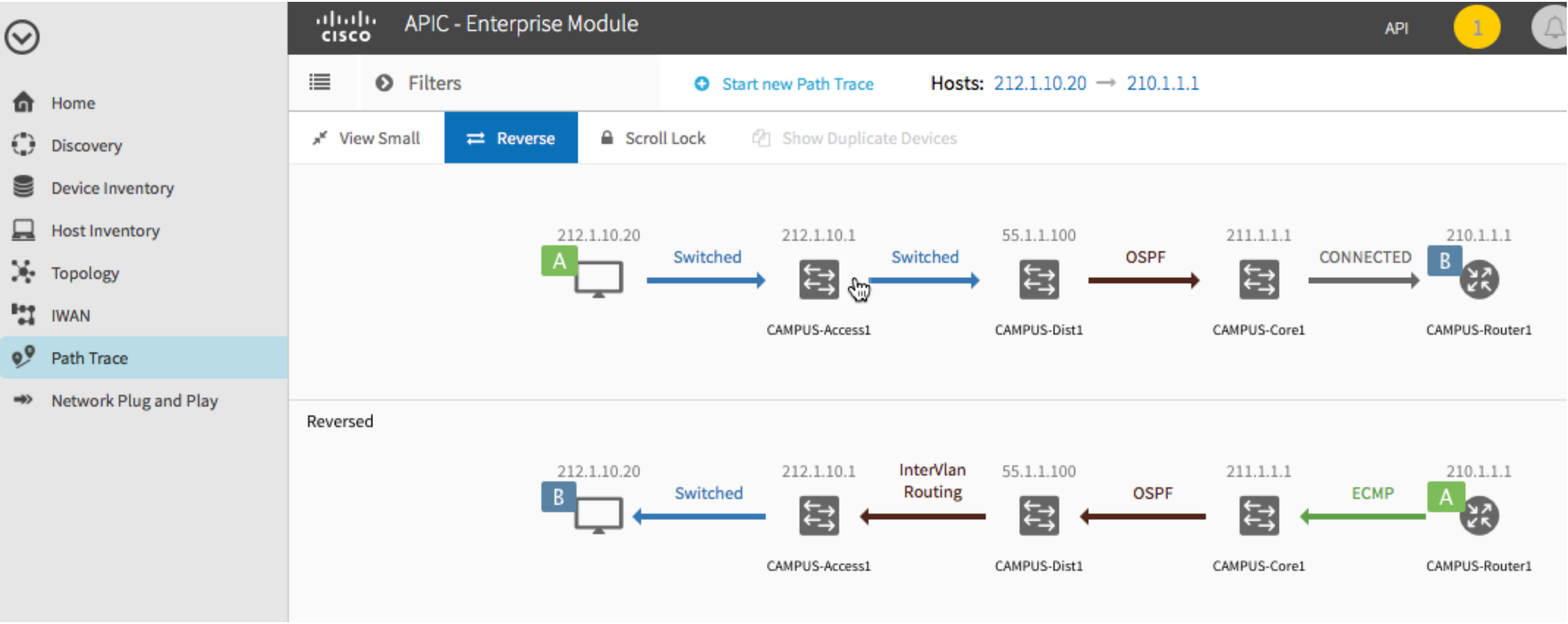
8.8


Applications
Controller
Devices
APIC-EM
Northbound API
APIC
APIC-EM
Southbound API (Op Flow, onePK, CLI, e
WAN
Access

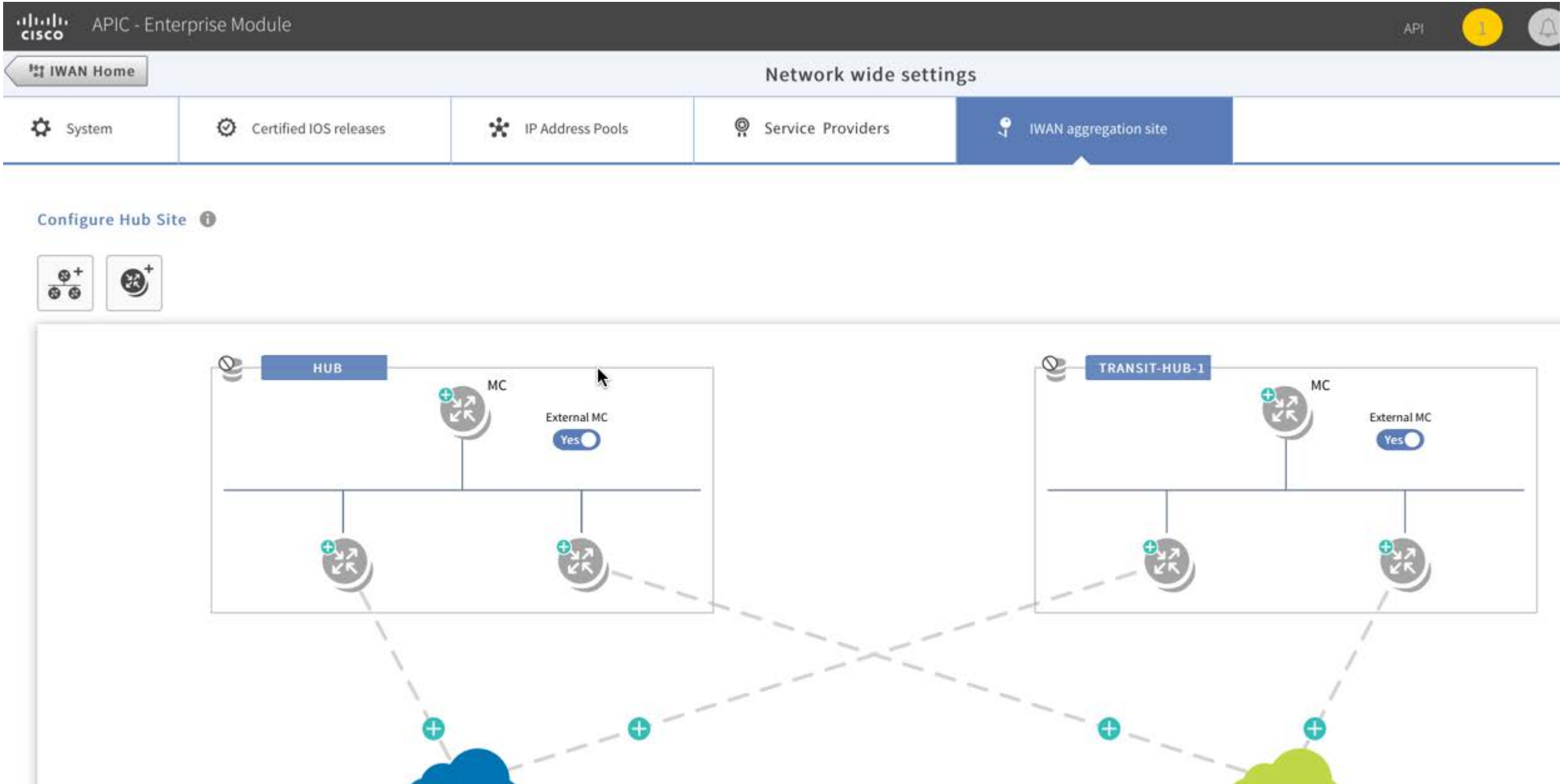
F8.9


APIC - Enterprise Module
Search Topology
Home
Discovery
Device Inventory
Host Inventory
Topology
IWAN
Path Trace
Network Plug and Play
cloud node
CAMPUS-Router2
CAMPUS-Router1
Branch-Router1
Campus-WLC-5508
CAMPUS-Dist2
CAMPUS-Core1
CAMPUS-Dist1
Branch-Access1
CAMPUS-Access1
Branch-Router2
AP7081.059f.19ca
212.1.10.20
CAMPUS-Core2

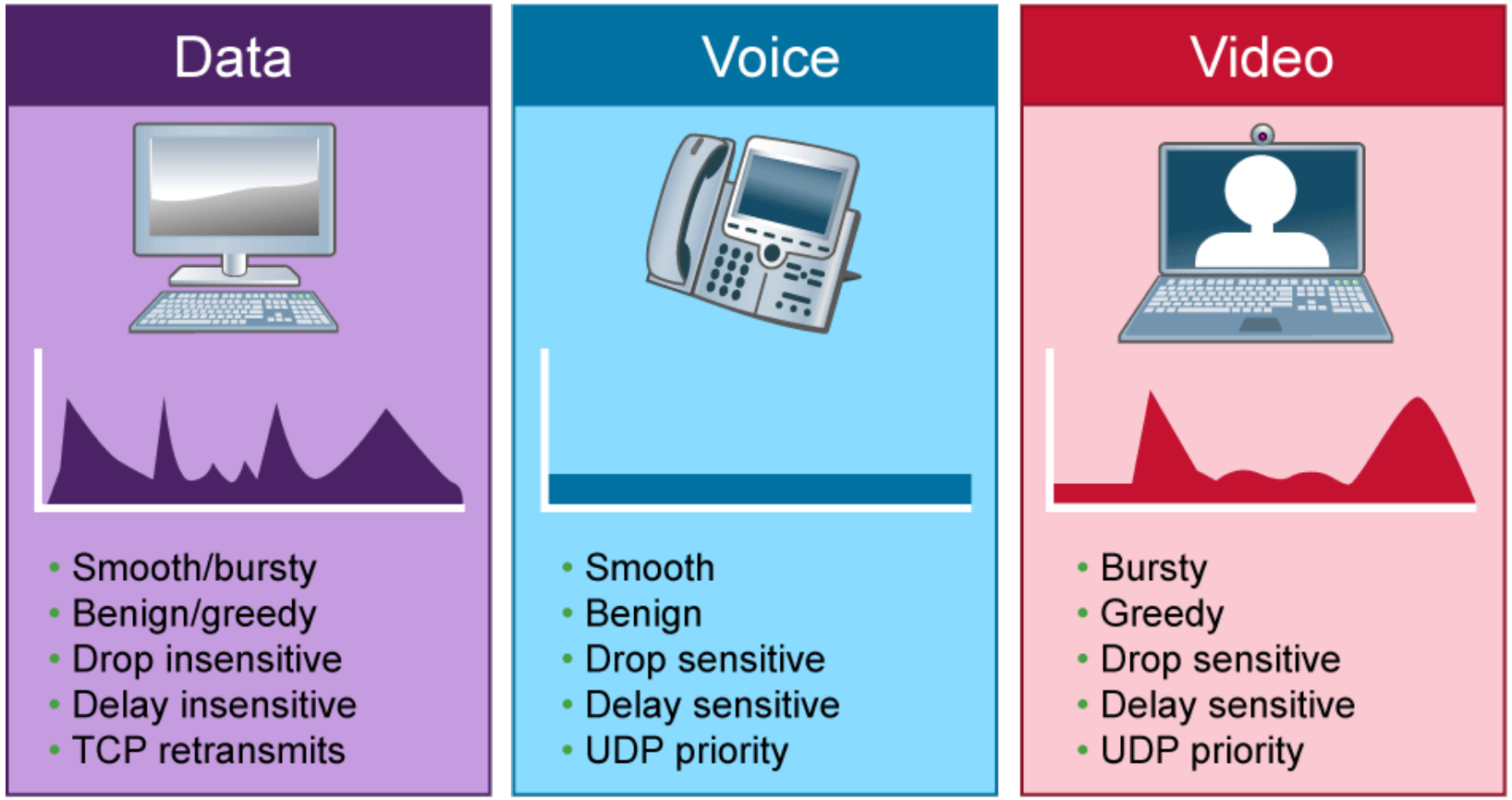
F8.10


APIC - Enterprise Module
API
1
Home
Discovery
Device Inventory
Host Inventory
Topology
IWAN
Path Trace
Network Plug and Play
Filters
Start new Path Trace
Hosts: 212.1.10.20 → 210.1.1.1
View Small
Reverse
Scroll Lock
Show Duplicate Devices
212.1.10.20
A
Switched
212.1.10.1
Switched
55.1.1.100
OSPF
211.1.1.1
CONNECTED
210.1.1.1
B
CAMPUS-Access1
CAMPUS-Dist1
CAMPUS-Core1
CAMPUS-Router1
Reversed
212.1.10.20
B
Switched
212.1.10.1
InterVlan Routing
55.1.1.100
OSPF
211.1.1.1
ECMP
210.1.1.1
A
CAMPUS-Access1
CAMPUS-Dist1
CAMPUS-Core1
CAMPUS-Router1

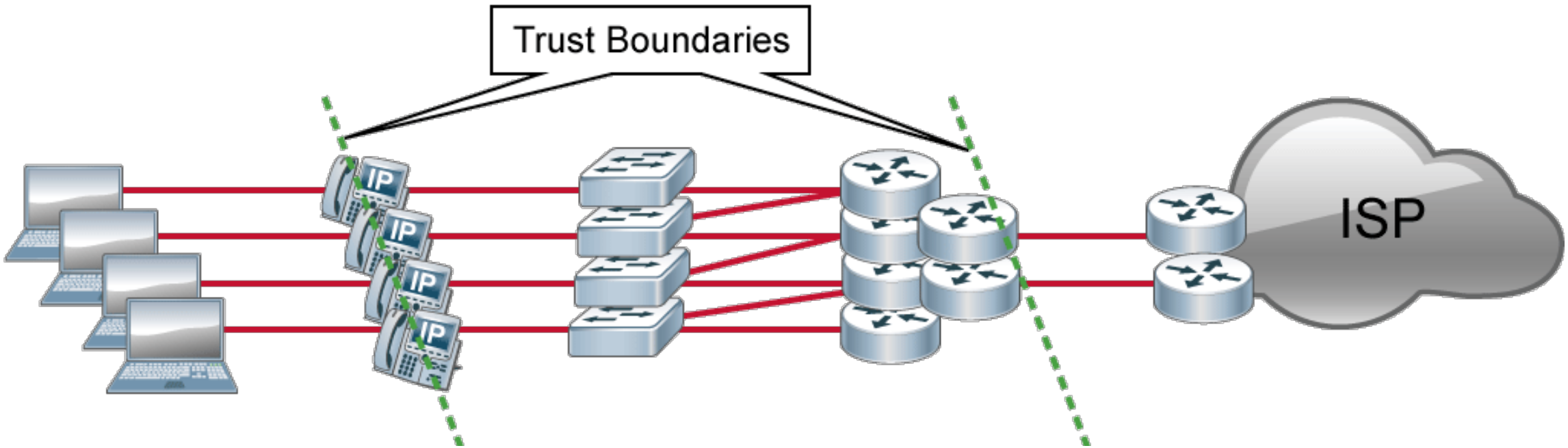
F8.11


APIC - Enterprise Module
API
IWAN Home
Network wide settings
System
Certified IOS releases
IP Address Pools
Service Providers
IWAN aggregation site
Configure Hub Site
HUB
MC
External MC
Yes
TRANSIT-HUB-1
MC
External MC
Yes

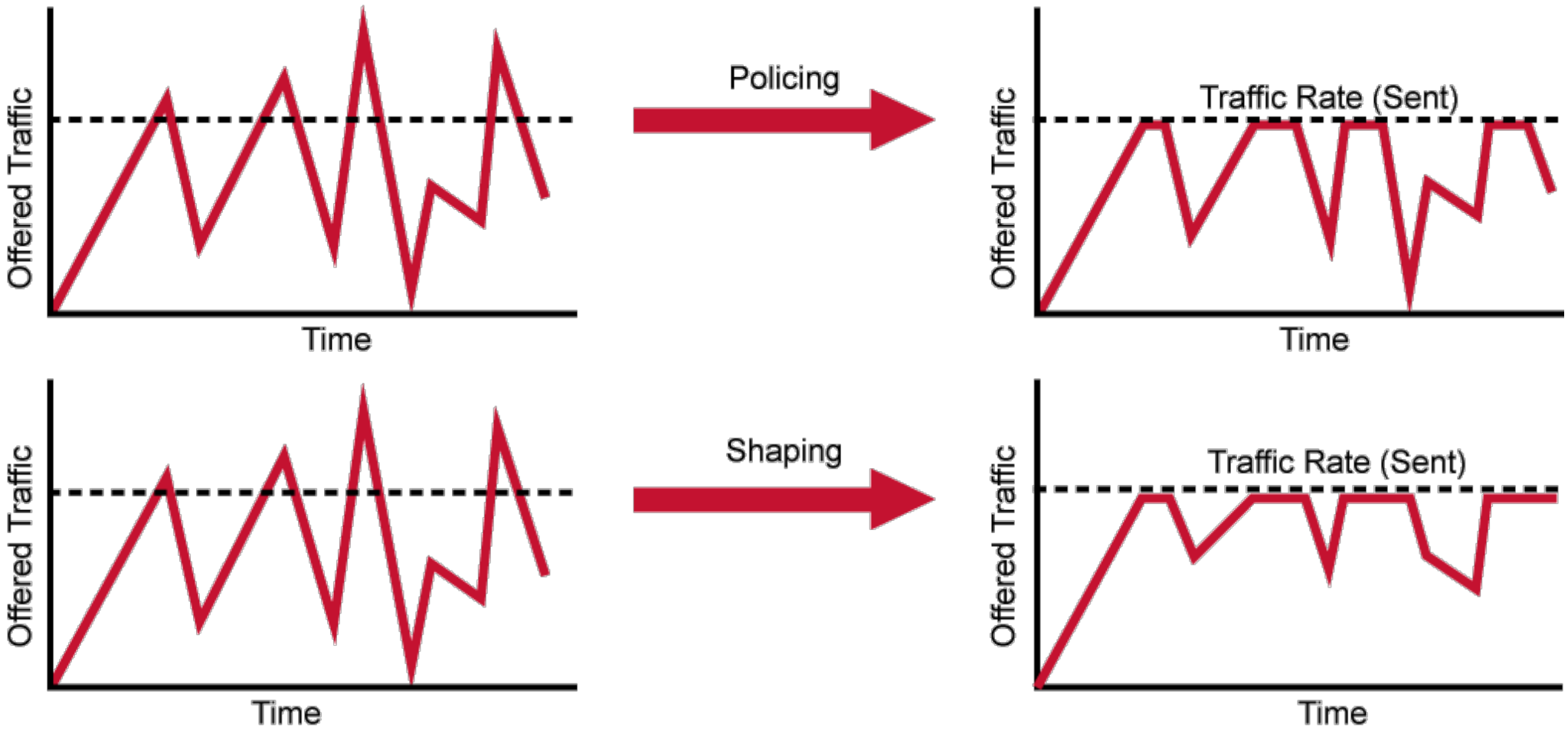
F8.12


Data
Smooth/bursty
Benign/greedy
Drop insensitive
Delay insensitive
TCP retransmits
Voice
Smooth
Benign
Drop sensitive
Delay sensitive
UDP priority
One-Way Requirements
Latency ≤ 150 ms
Jitter ≤ 30 ms
Loss ≤ 1%
Bandwidth (30–128 Kbps)
Video
Bursty
Greedy
Drop sensitive
Delay sensitive
UDP priority
One-Way Requirements
Latency ≤ 200–400 ms
Jitter ≤ 30–50 ms
Loss ≤ 0.1–1%
Bandwidth (384 Kbps–20 + Mbps)

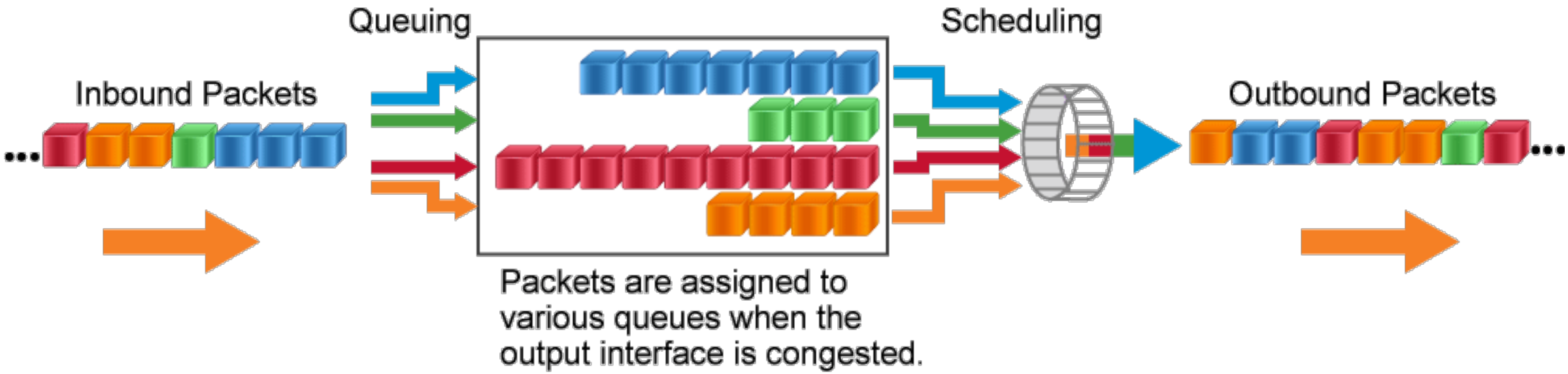
F8.13



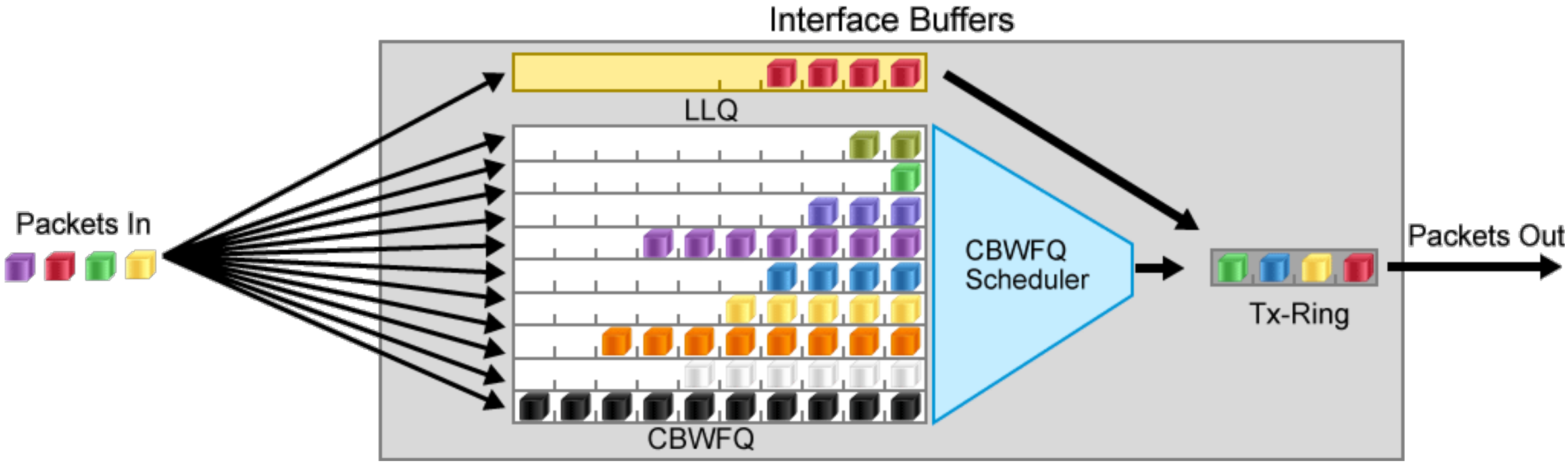
F8.14


Offered Traffic
Time
Policing
Traffic Rate (Sent)
Offered Traffic
Time
Offered Traffic
Time
Shaping
Traffic Rate (Sent)
Offered Traffic
Time

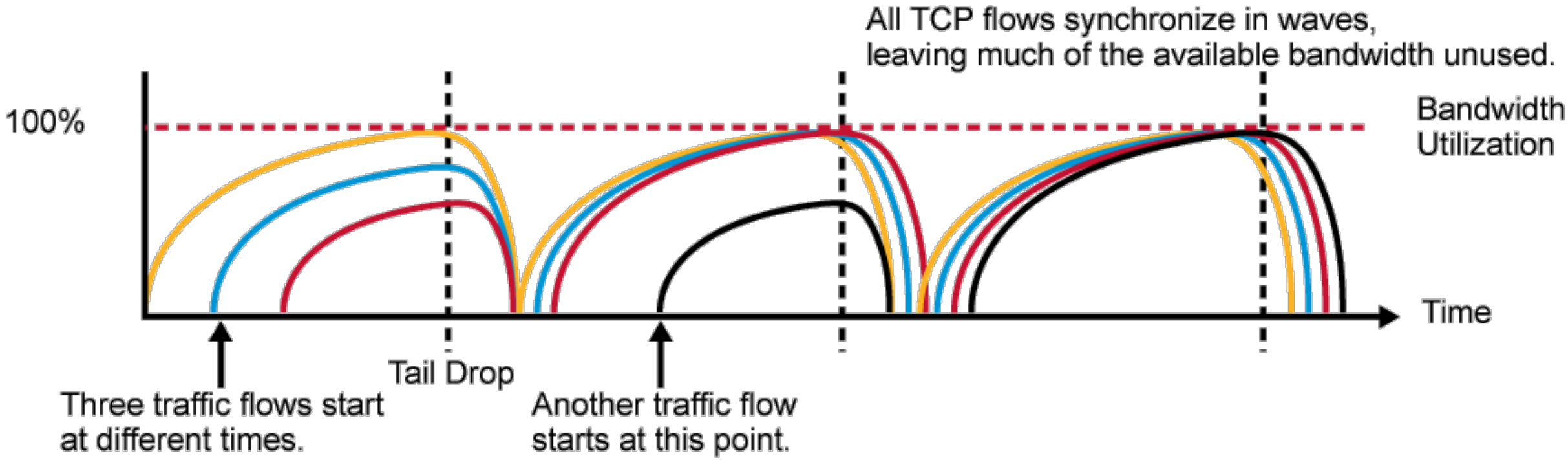
F8.15


Queuing
Scheduling
Inbound Packets
Outbound Packets
Packets are assigned to various queues when the output interface is congested.

F8.16


Interface Buffers
LLQ
Packets In
CBWFQ
Scheduler
Tx-Ring
Packets Out
CBWFQ

F8.17


All TCP flows synchronize in waves,
leaving much of the available bandwidth unused.
100%
Bandwidth
Utilization
Time
Tail Drop
Three traffic flows start
at different times.
Another traffic flow
starts at this point.

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Written Labs and Review Questions

- Read through the Exam Essentials section together in class.
- Open your books and go through all the written labs and the review questions.
- Review the answers in class.

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