Cisco Networking Academy

An Intro to SDN

Software Defined Networking Webinar Series

Speakers: Serges Nanfack
Hostess: Kara Sullivan

29 November 2016

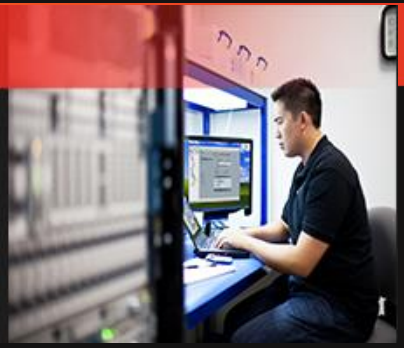
Welcome to the 2nd session of the ***Software Defined Networking*** webinar series!

- Use the Q and A panel to ask questions.
- Use the Chat panel to communicate with attendees and panelists.
- A link to a recording of the session will be sent to all registered attendees.
- Please take the feedback survey at the end of the webinar.

Cisco Networking Academy

Career Advantage **Webinars**

Software Defined Networking Series

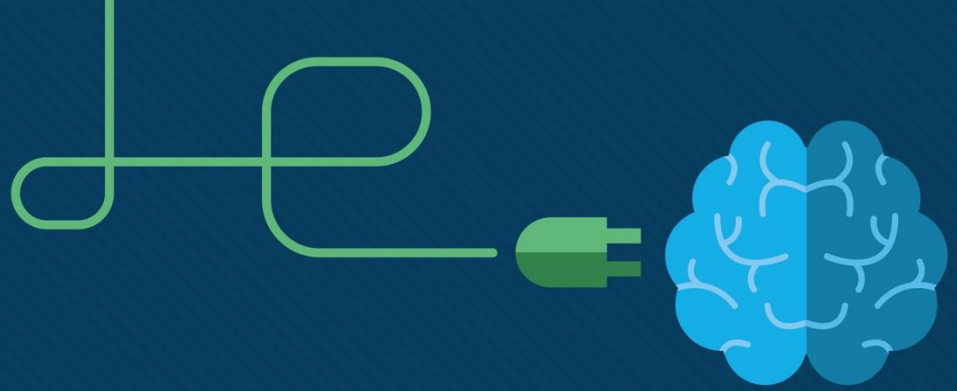


NEXT SESSION:

Applications of SDN in Cisco

TBD, late January time frame

Details will be posted at: bit.ly/SDNSeries



Software Defined Networking

Automating Network Design

Serges Nanfack – Technical Manager Africa
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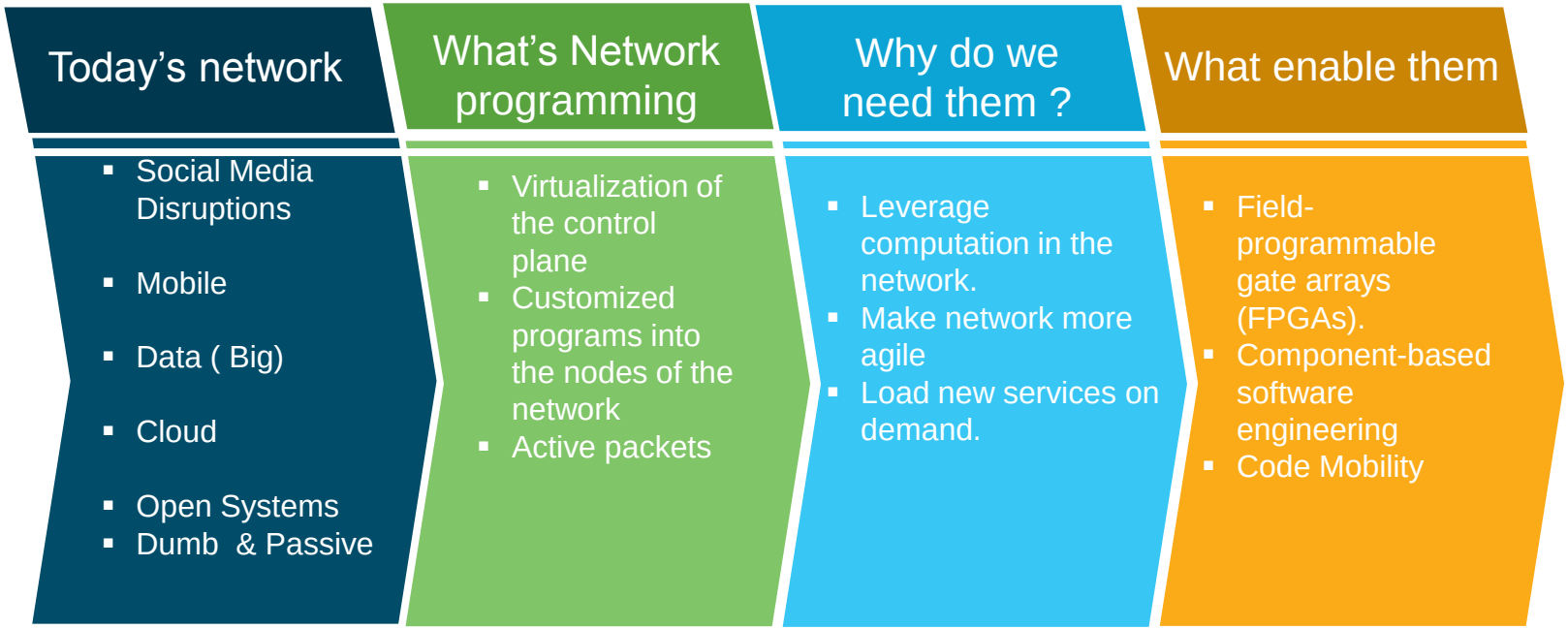
29 November 2016

Last Session



Agenda

1. SDN Architecture
2. OpenFlow
3. Cisco Application Centric Infrastructure – APIC-EM

SDN Architecture

Evolution of the Server Configuration

1990's

+

+

or

Today

Chef

puppet labs

CISCO UCS Manager

openstack CLOUD SOFTWARE

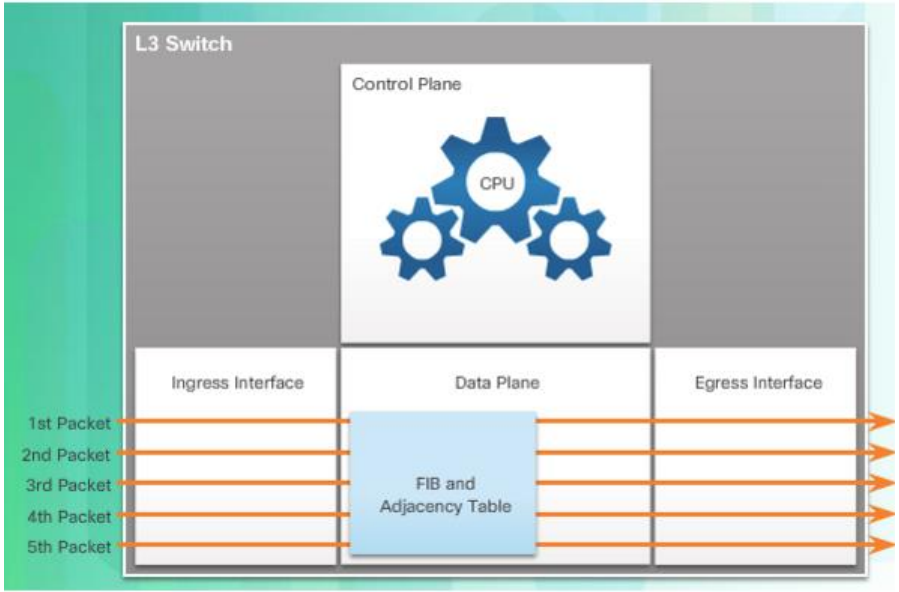
Today's IT Model - Complex, Not Fast Enough

Box by Box

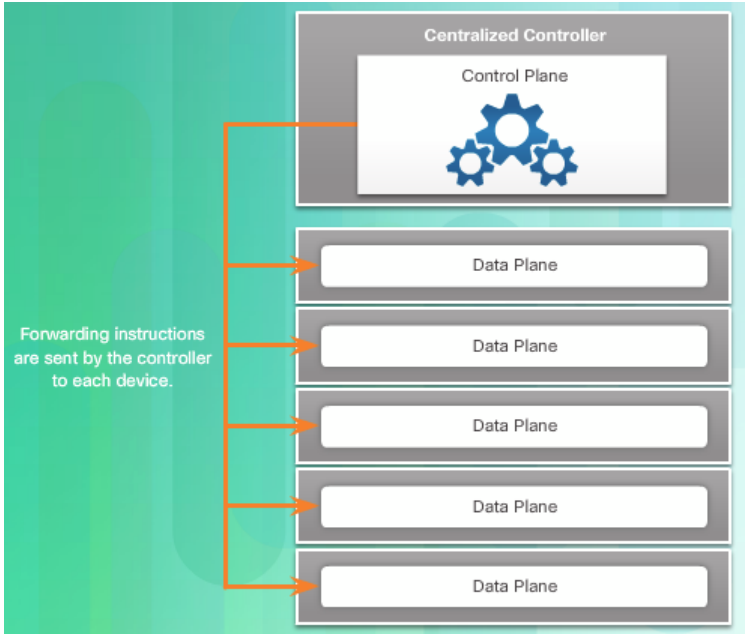
Manual Configuration

Network Virtualization

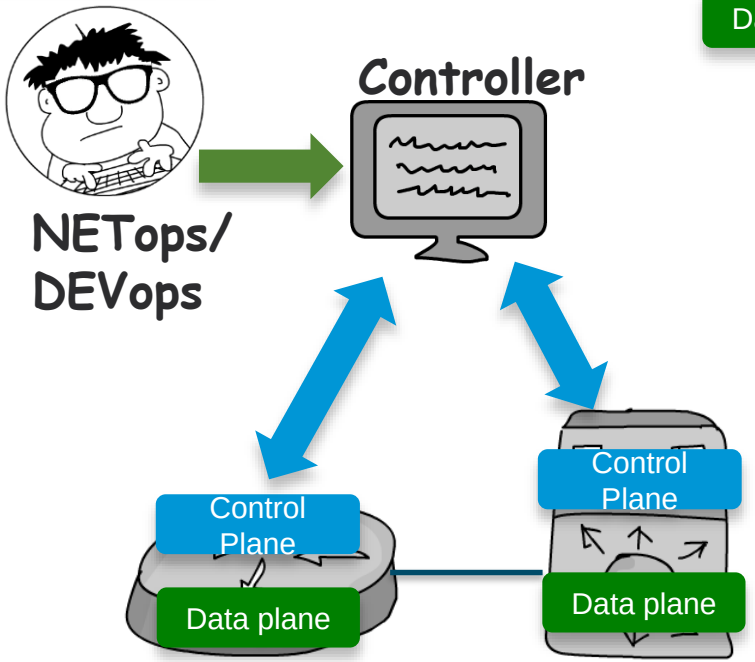
Traditional



Virtualized



The Classis Approach : SDN



Control Plane — Where/How to Send packet

Data plane — Forwarding Packets

"…In the SDN architecture, the **control and data planes are decoupled,** network intelligence and state are logically centralized, and the underlying network infrastructure is abstracted from the applications…"

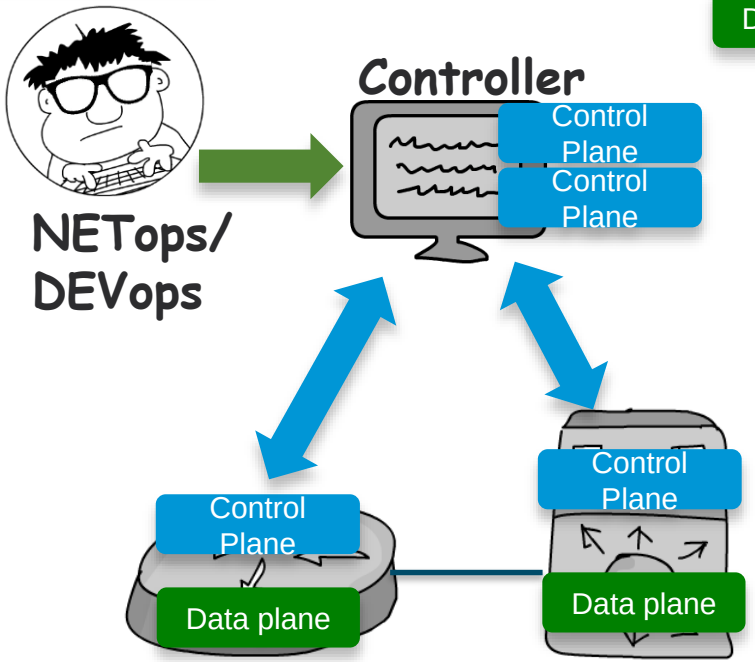
Source: www.opennetworking.org

The Cisco Approach : ACI – Application Centric Infrastructure

Control Plane
Data plane

Where/How to Send packet

Forwarding Packets

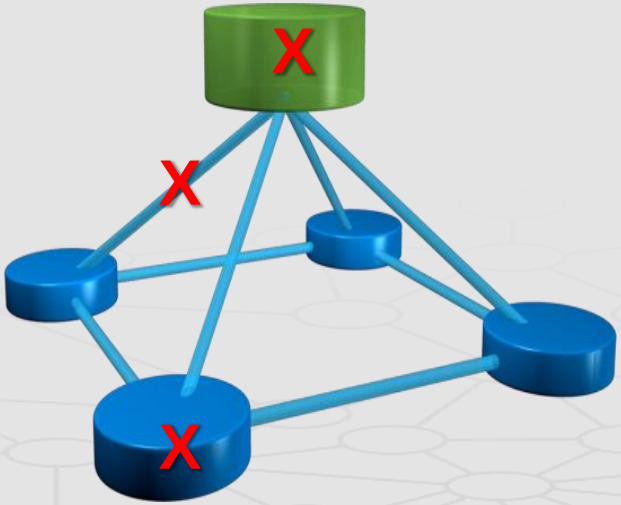


Evolution **NOT REVOLUTION**

EVOLVE FOR EMERGING REQUIREMENTS	• Operational Simplicity • Programmability • Application Aware
PRESERVE WHATS WORKING	• Resiliency • Scale & Security • Rich Feature Set

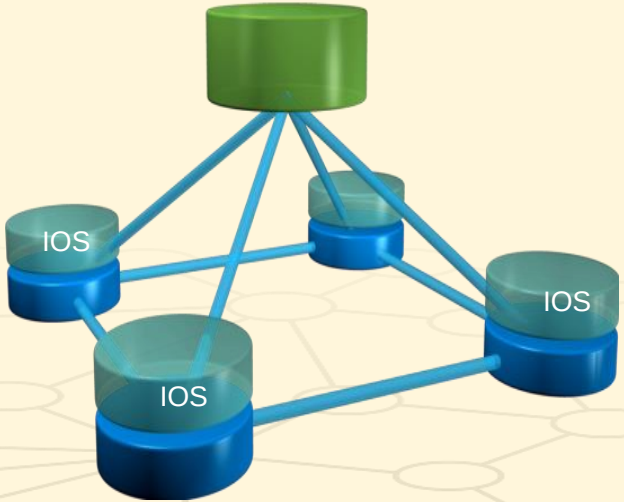
A Hybrid Approach

Pure OpenFlow



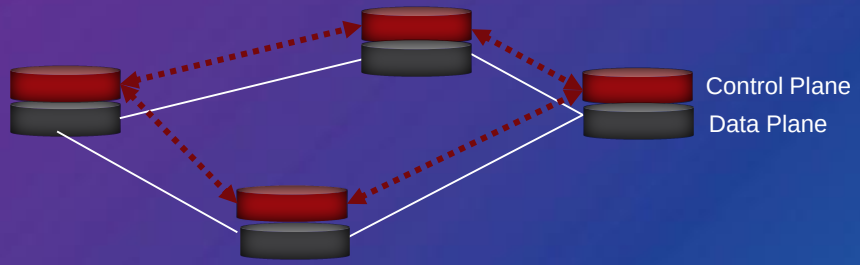
- Controller to network connection can fail
- Needs large number of match entries
- Flow update and network reaction issues

Hybrid

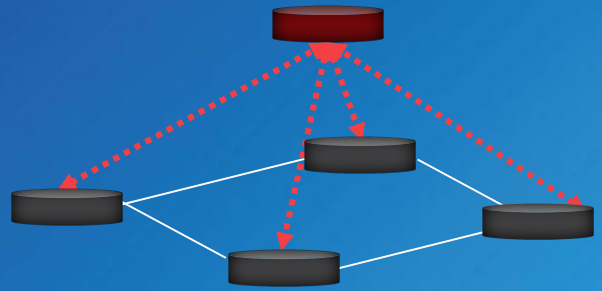


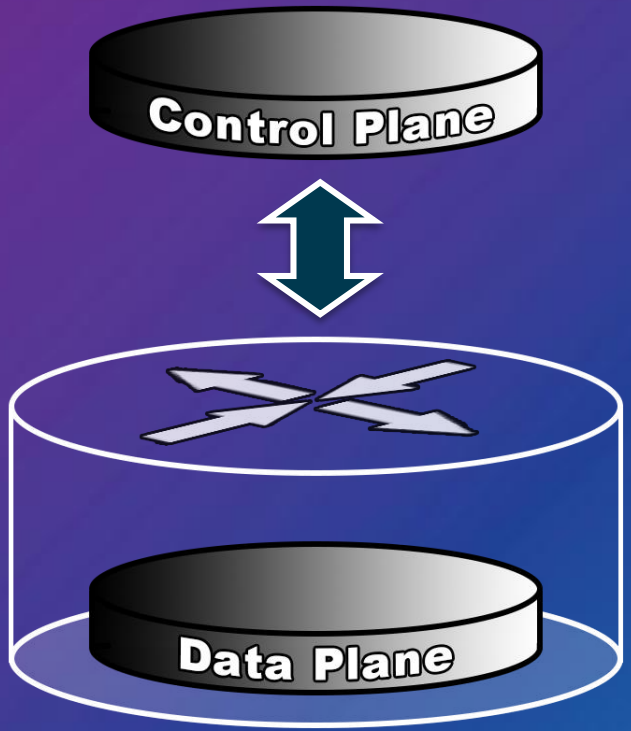
- Network resiliency through proven L2/L3 protocols
- IOS does heavy lifting
- Do fine tuning via SDN
  - Leverage faster network reactions through traditional mechanism
  - Less number of flow updates

Traditional Network Architecture



Network Architecture with SDN

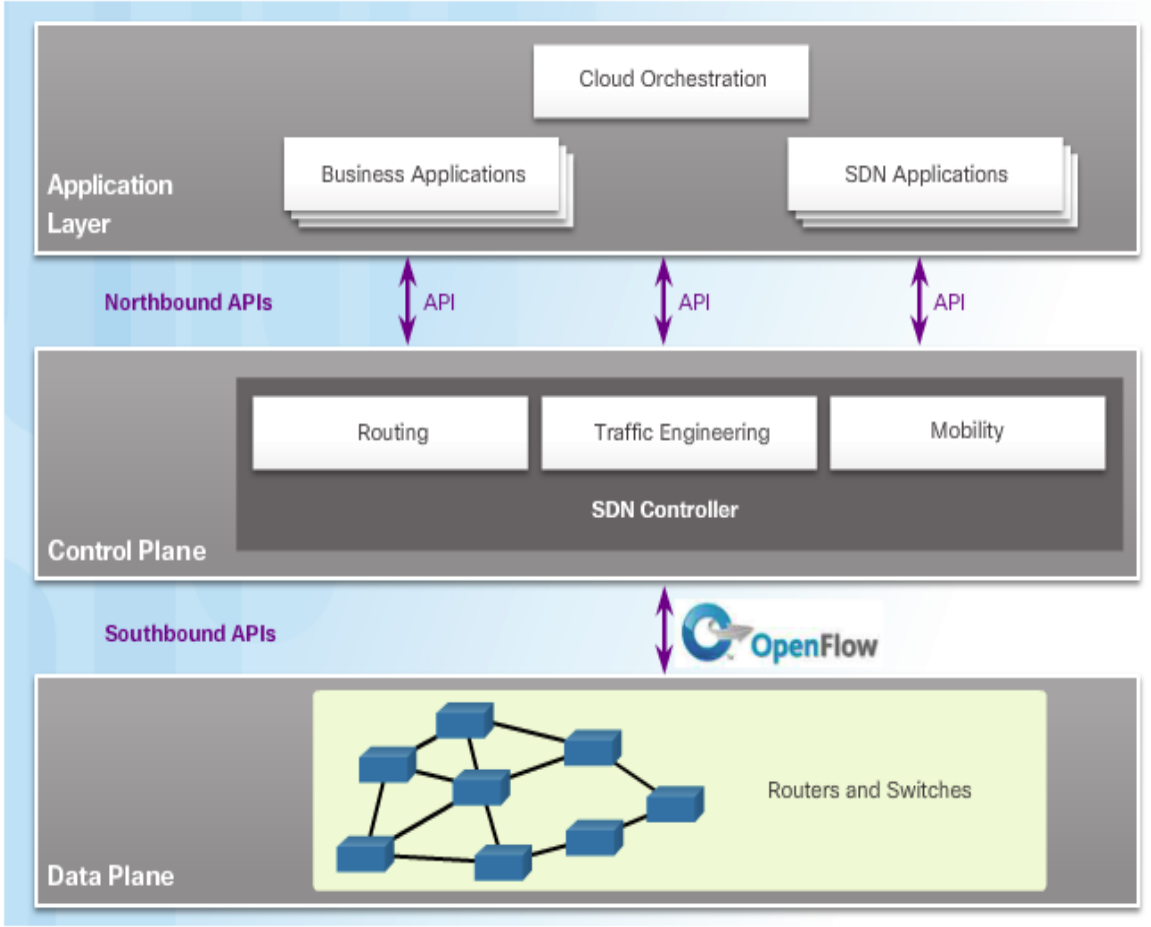




In other words…

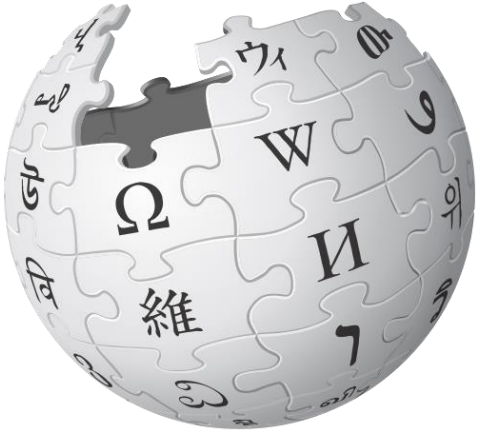
In the SDN paradigm, not all processing happens inside the same device

SDN Framework



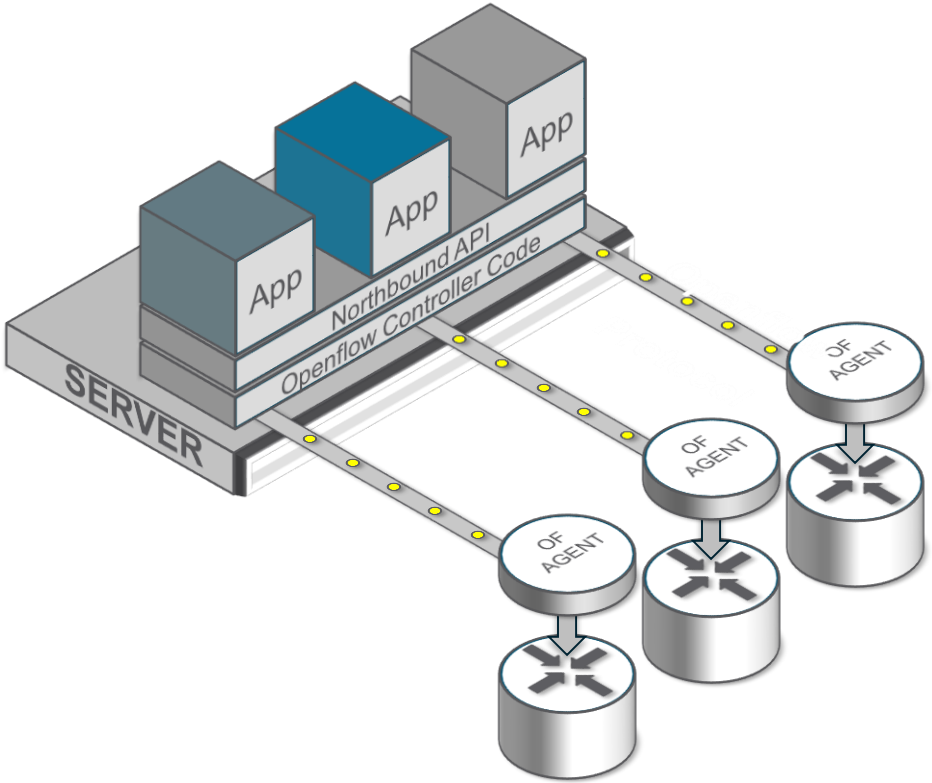
OpenFlow

What is Openflow?



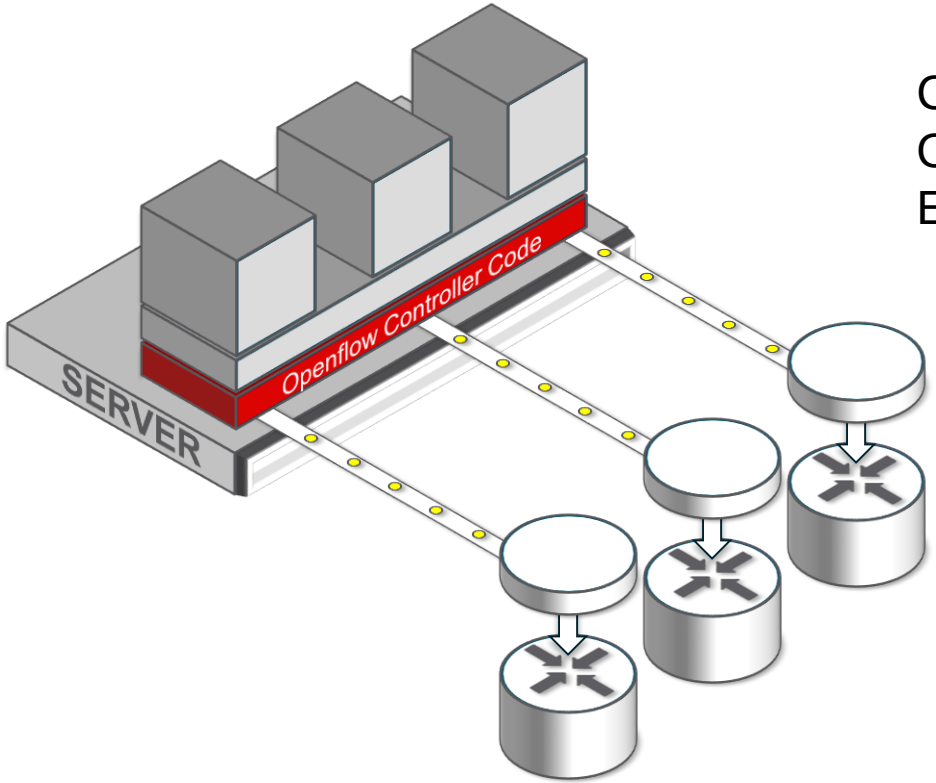
OpenFlow is a communications protocol that gives access to the forwarding plane of a network switch or router over the network

Four part to Openflow



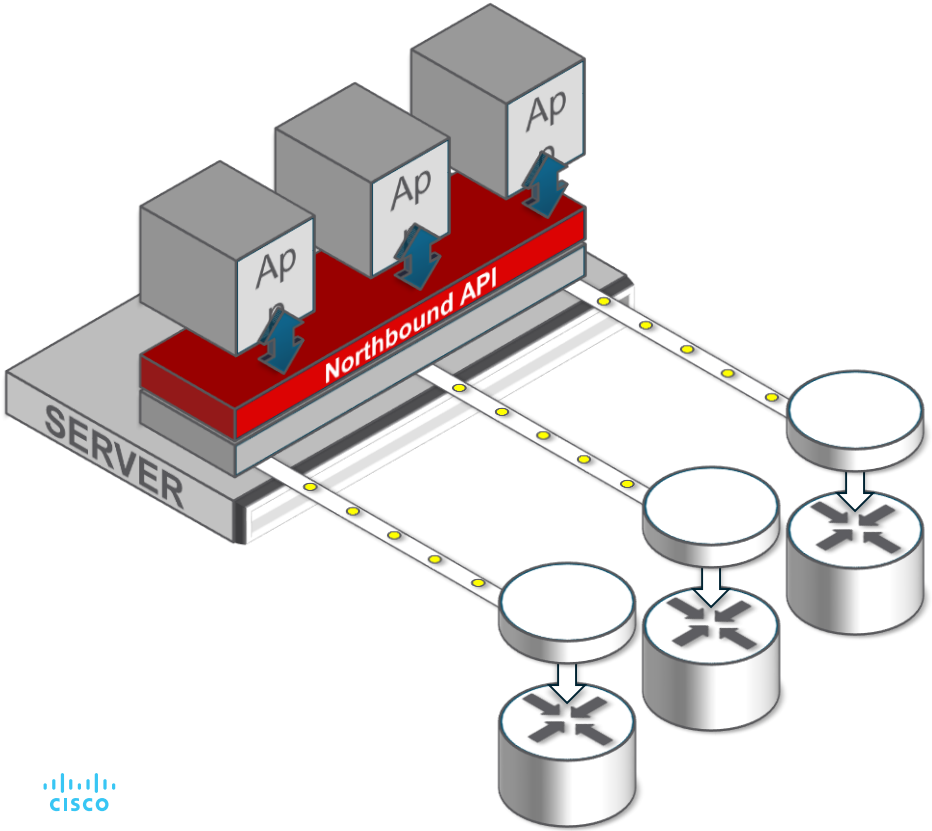
- Openflow Controller
- Northbound API
- Openflow Device Agent
- Openflow Protocol

Openflow Controller



Central Administration and Operations point for Network Elements

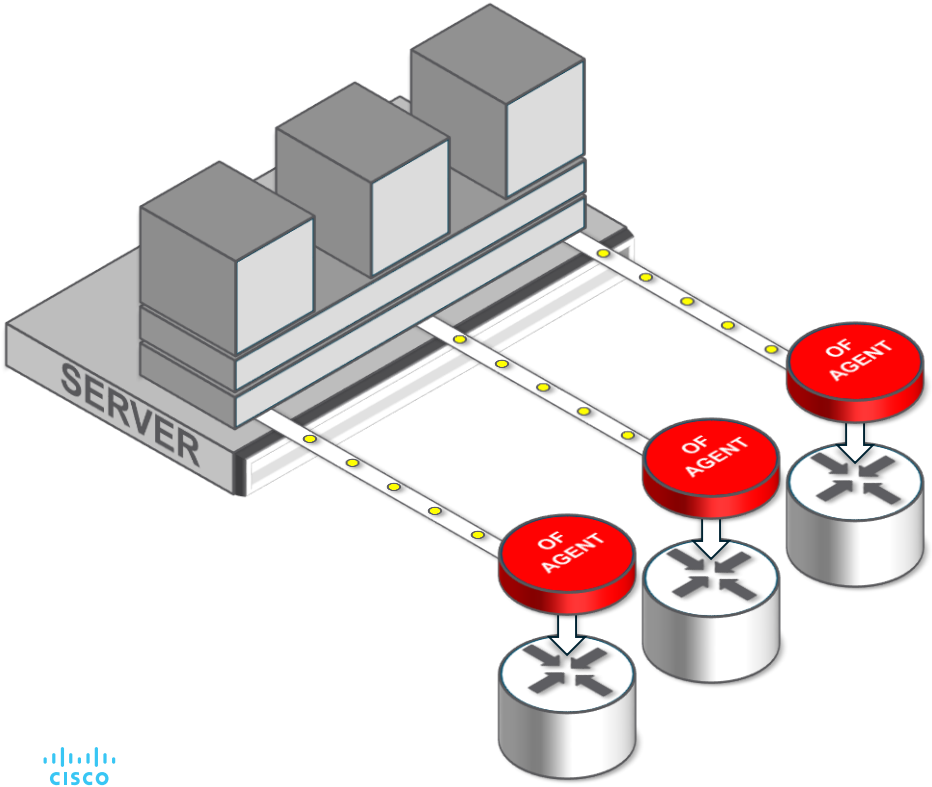
Openflow Controller | Northbound API



Northbound API
Integral part of Controller

"Network enabled" application can make use of Northbound API to request services from the network…

Openflow Device Agent

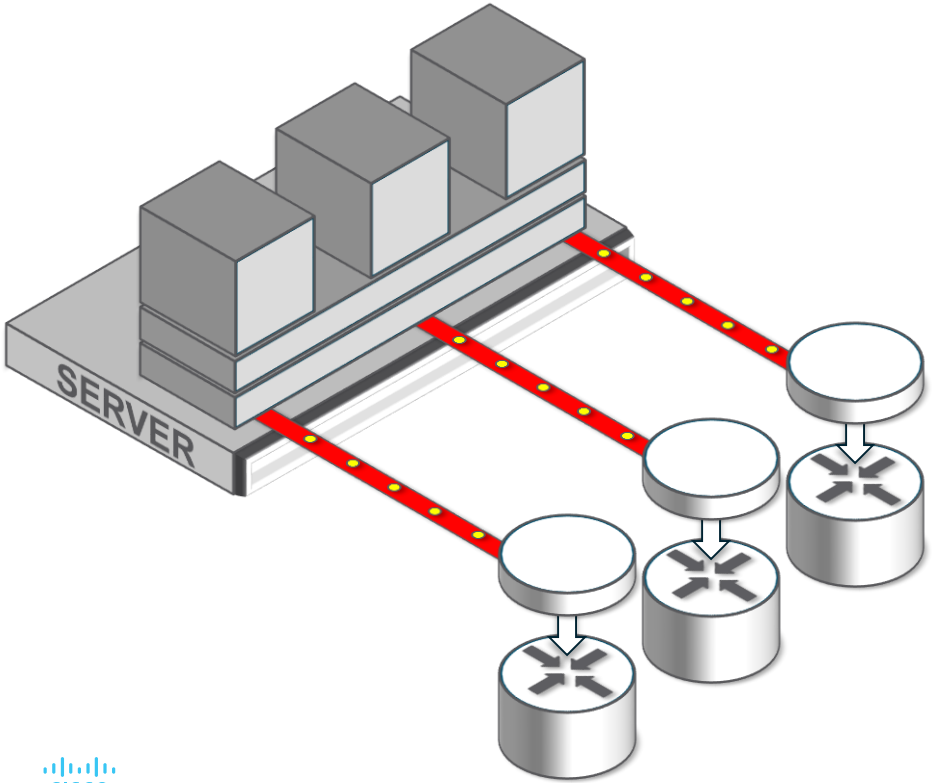


Agent runs on the network device

Agent receives instructions from Controller

Agent programs device tables

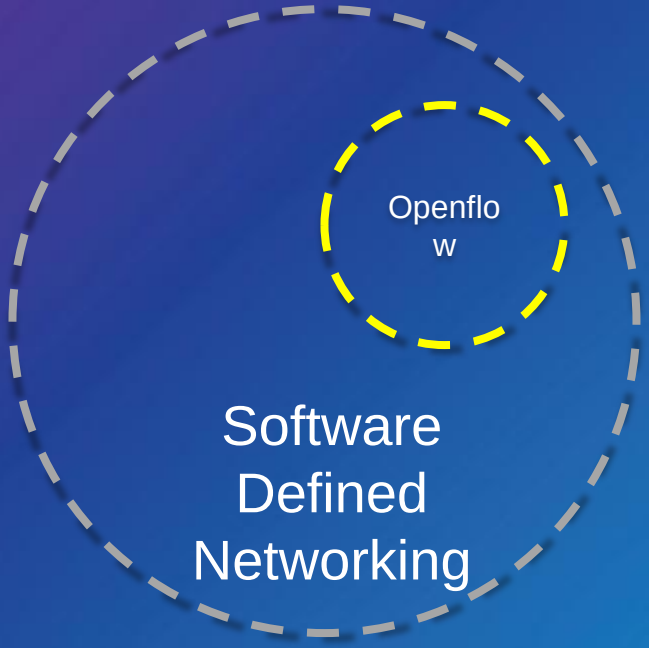
Openflow Protocol



Openflow Protocol is…

"A mechanism for the Openflow Controller to communicate with Openflow Agents…"

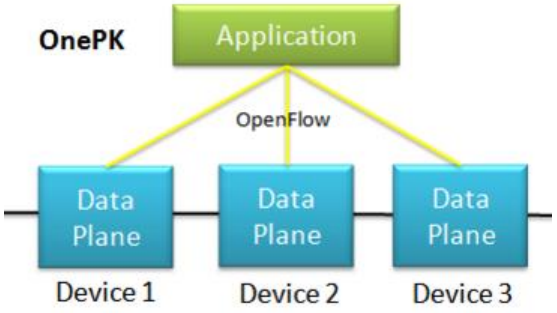
Openflow does not equal SDN



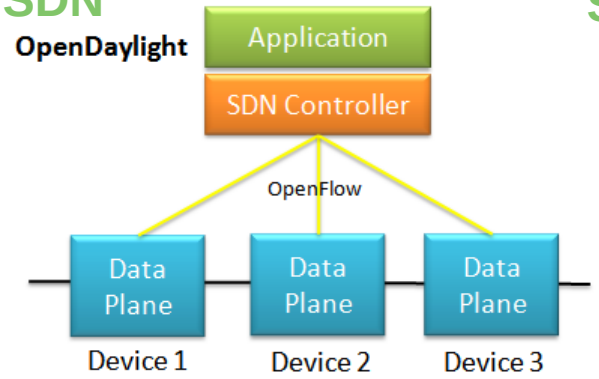
Openflow is one flavor of SDN

SDN types

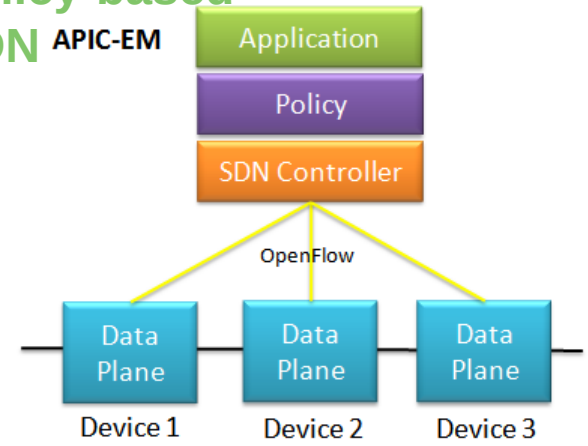
Device-based SDN



Controller-based SDN



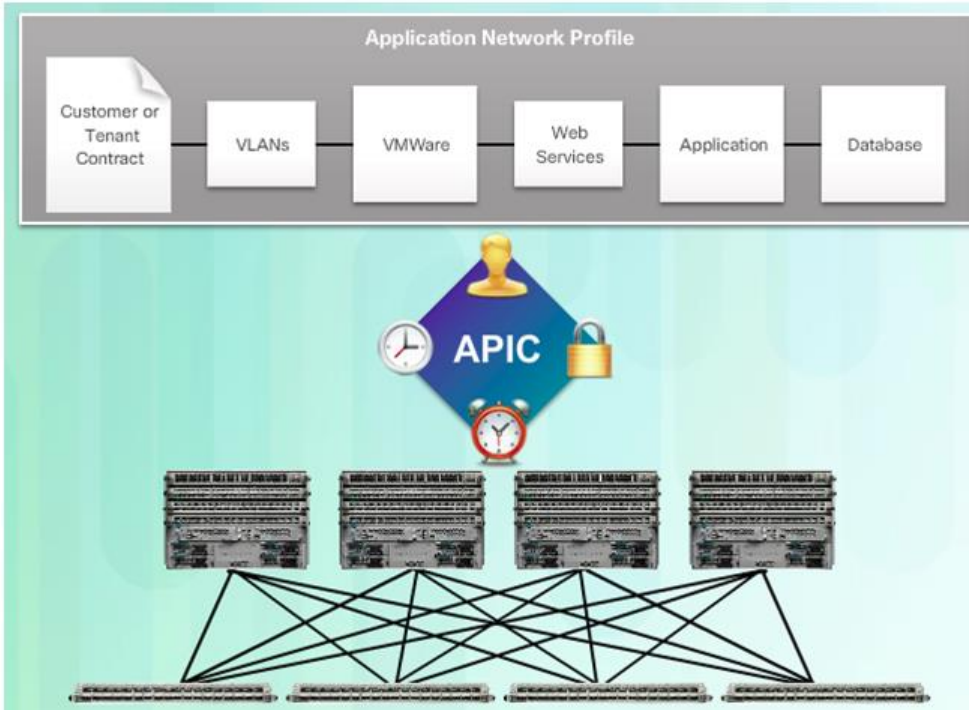
Policy-based SDN



Enabling Network Virtualization

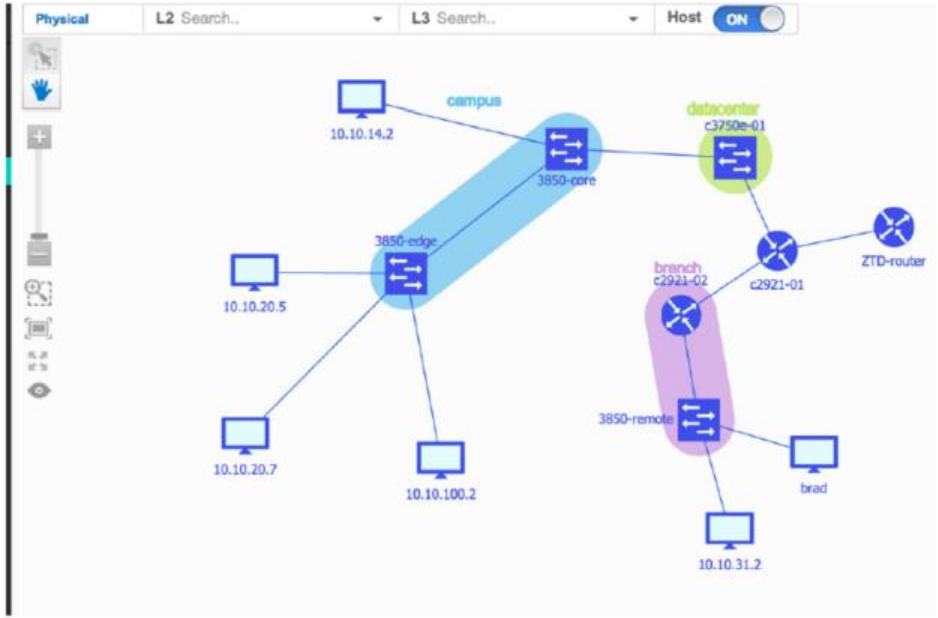
Cisco Application Centric Infrastructure – APIC EM

Core components of Cisco ACI



- Application Network profile:
  Collection of end-points groups
- Application policy Infrastructure Controller:
  is the brain of the ACI architecture
- Cisco Nexus 9000 Series Switches

APIC –EM features



- Discovery
- Device inventory
- Host Inventory
- Topology
- Policy
- Policy Analysis

Cisco APIC - Enterprise Module: Initial Deployment Scenarios

Security Automation

Network-Wide Rapid Threat Detection and Mitigation (Sourcefire)

QoS Provisioning

Easy QoS

Follow Me QoS

Compliance Assurance

IWAN: Path Optimization

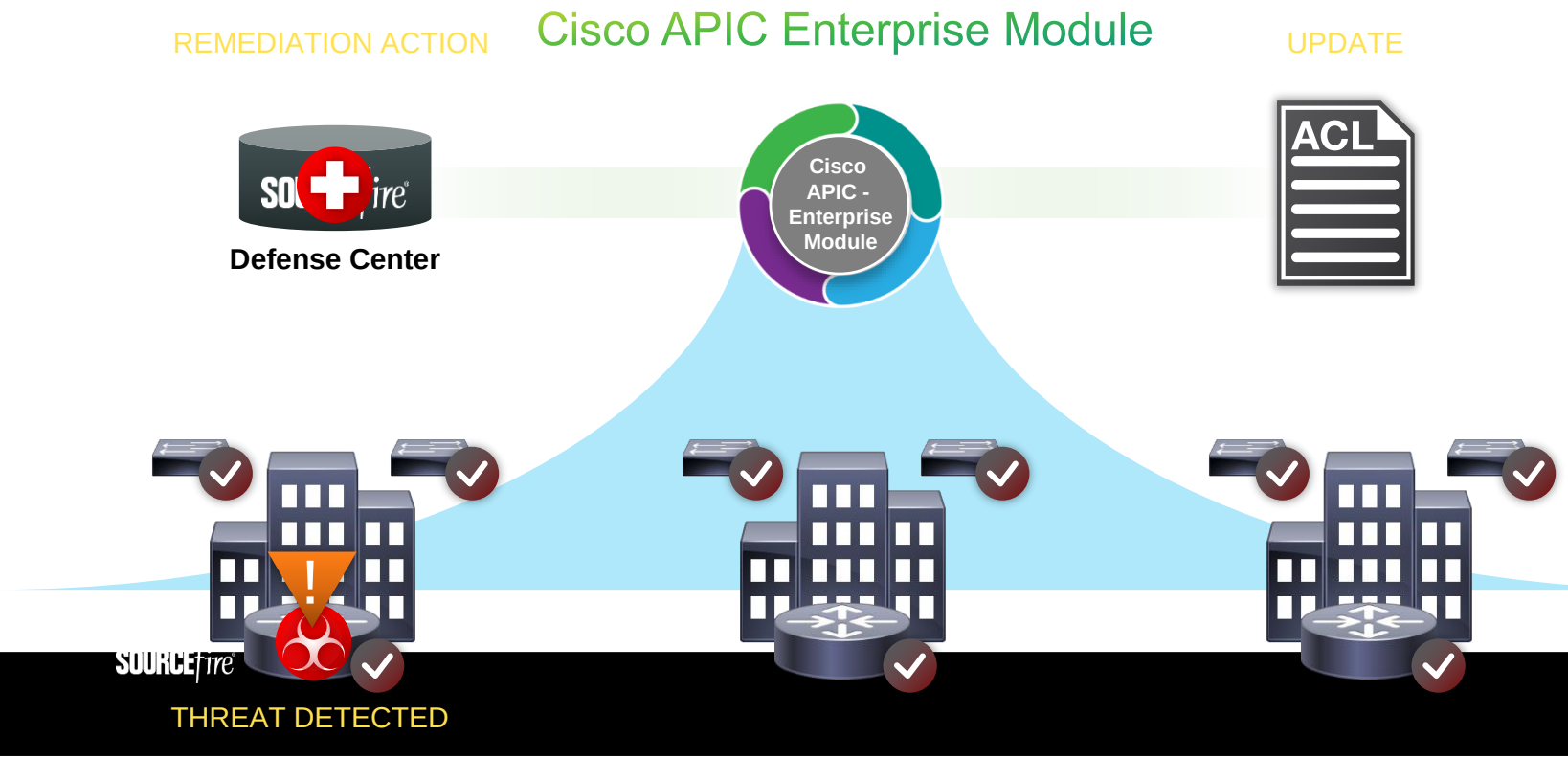
Automated Performance Routing (PfR) Configuration

Automated WAN Policy Compliance Assurance

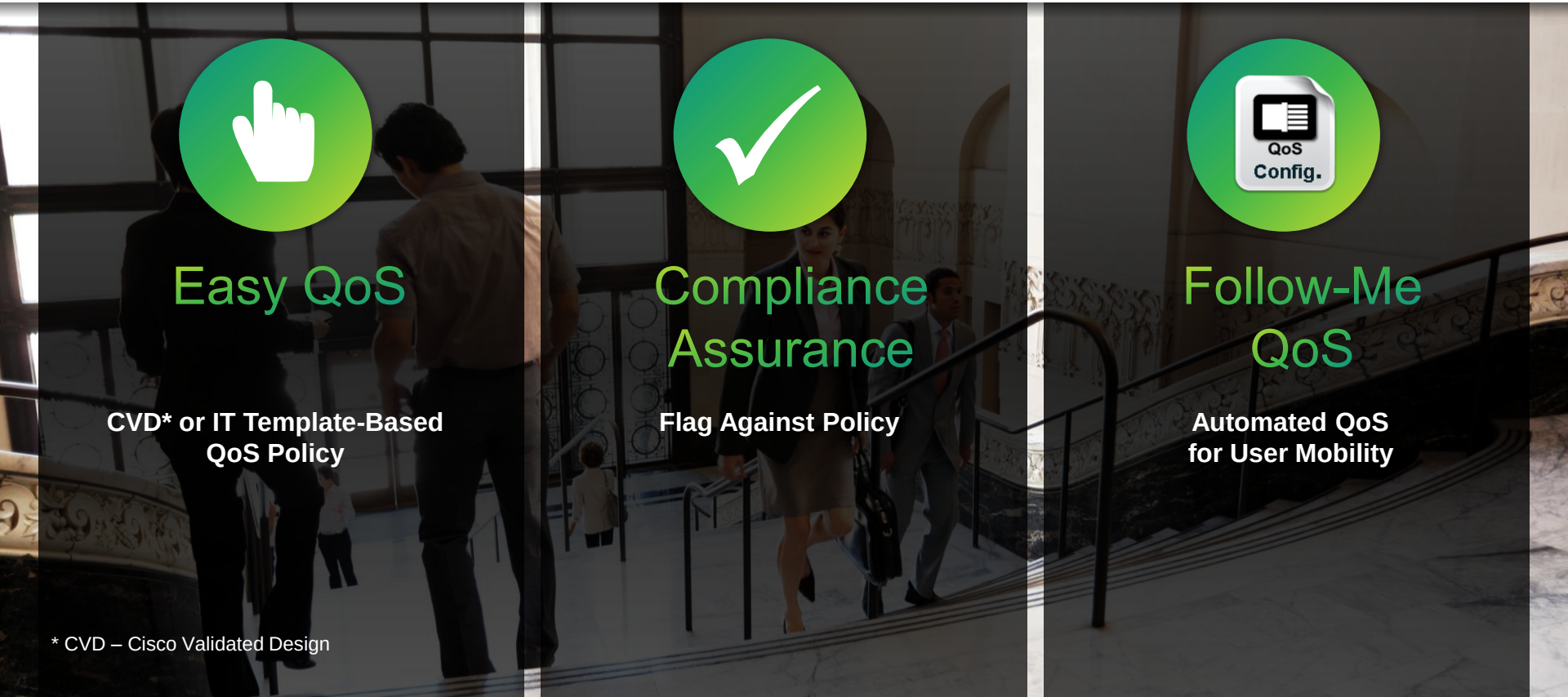
Solving the Most Pressing, Complex and Tedious IT Problems

Cisco APIC - EM: Automatic Threat Detection and Mitigation

Network Wide Security Deployed Rapidly



QoS Use Case Summary



Easy QoS

CVD* or IT Template-Based QoS Policy

Compliance Assurance

Flag Against Policy

Follow-Me QoS

Automated QoS for User Mobility

* CVD – Cisco Validated Design

Cisco APIC Enterprise Module: Easy QoS

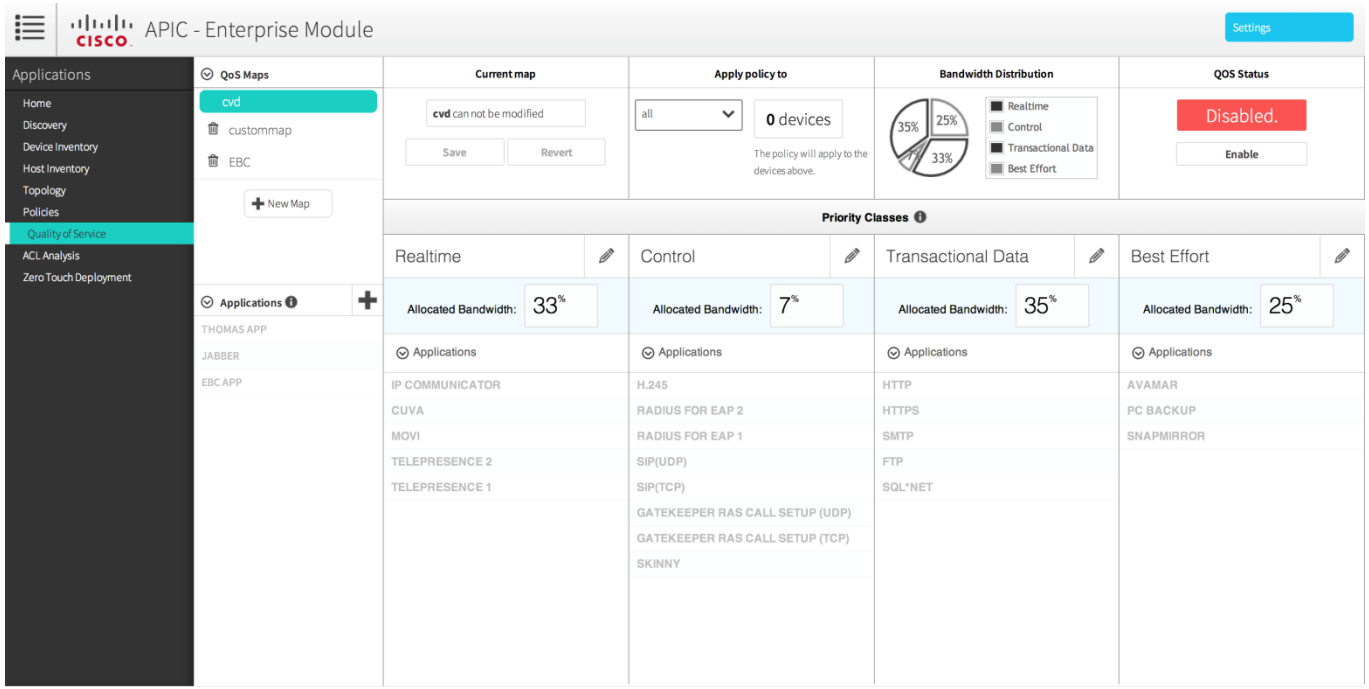
QoS Management Automation

Cisco APIC Enterprise Module

Cisco Validated Design Based Templates

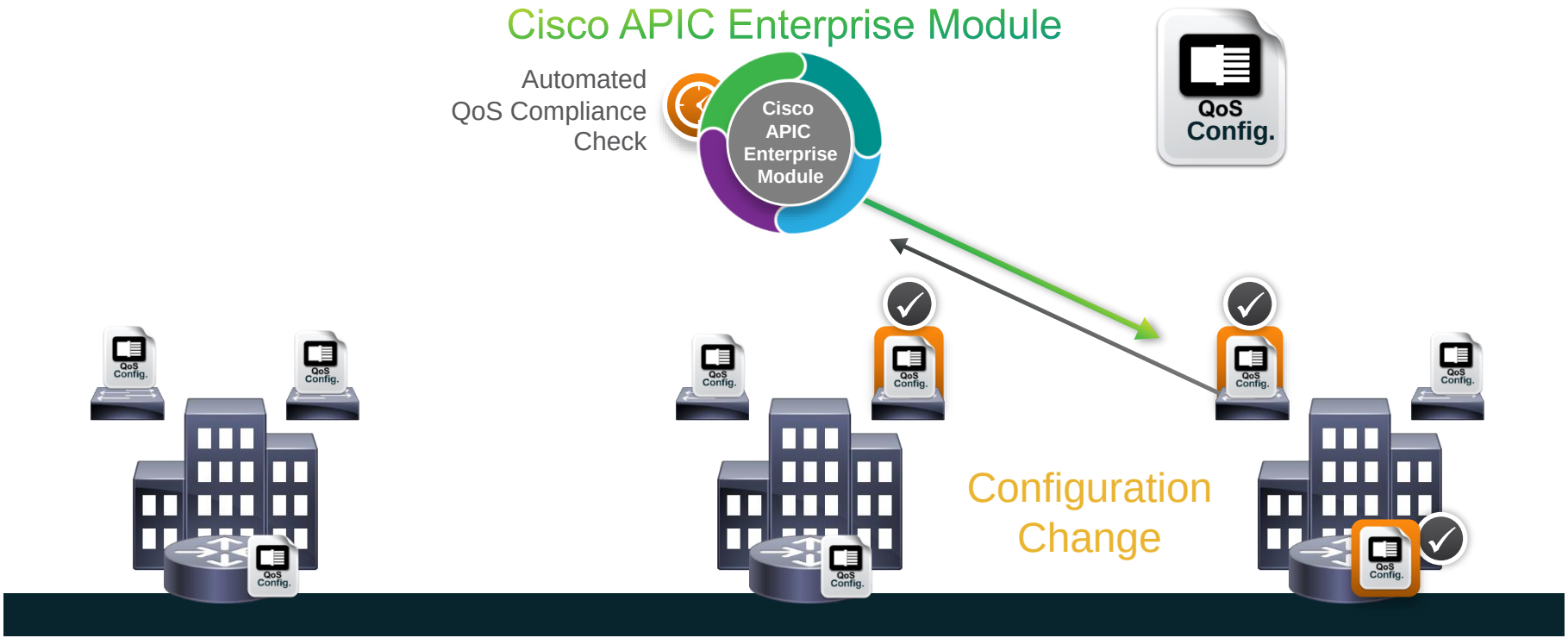
Cisco APIC – EM : QoS Provision

QoS Management Automation



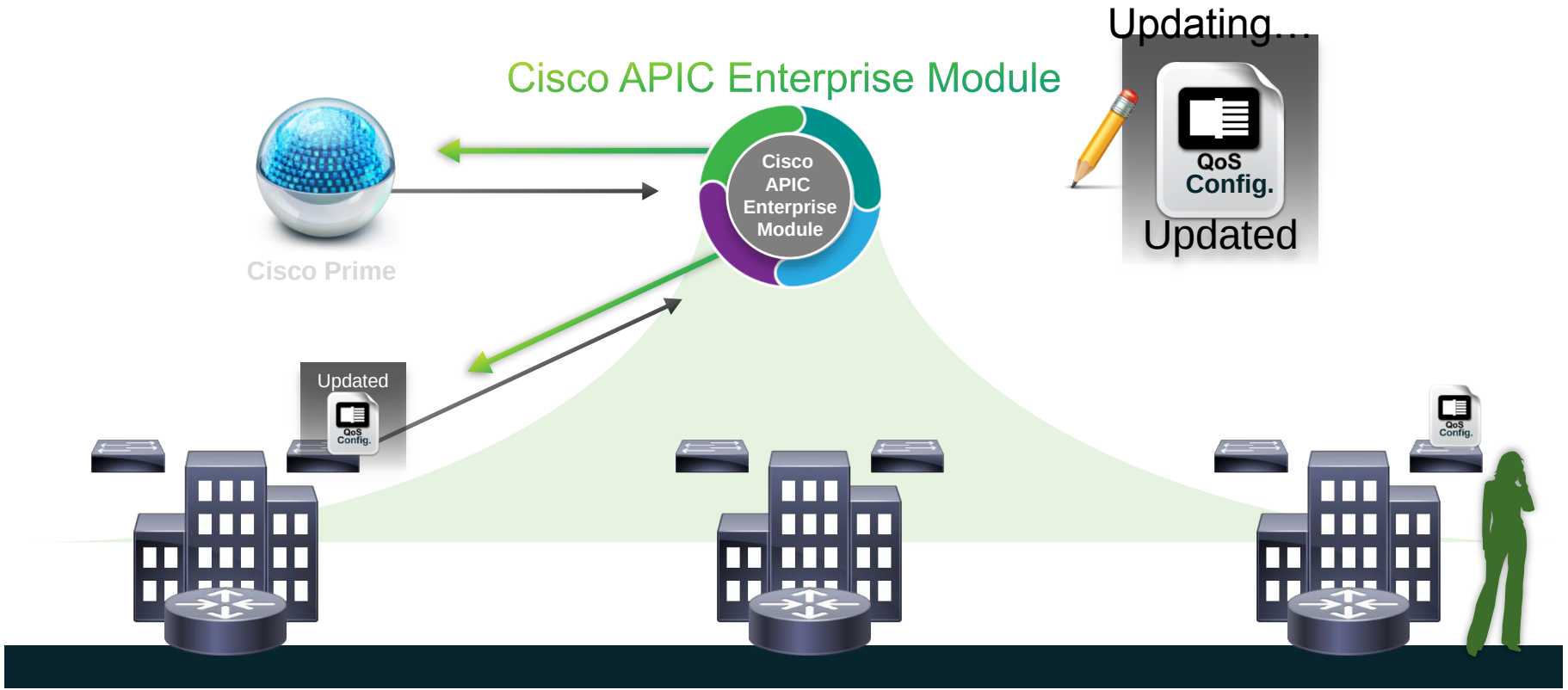
Cisco APIC Enterprise Module: QoS Compliance

QoS Management Automation



Cisco APIC Enterprise Module: Follow-Me QoS

QoS Management Automation



Cisco on Cisco:
Deploying HD Jabber Video Across Cisco

IT Task:
Update QoS Classification Configuration on All Cisco Edge Devices

75,000 Employees,160 Sites Globally
7,000 Switches and 29,000 Routers

Before: Weeks

5-7 Lines of Manual Configuration on Every Edge Device

Manually Customize Configuration for Each Type and Model of Device

Ad-hoc Script for Scale

Manual Quarterly Compliance Check

After: Hours

Automated Configuration for Every Edge Device

Automatically Customized Configuration For Each Type and Model of Device

Just a Click

Automatic Compliance Check Whenever Desired

Pages of Interest

- www.opennetworking.org
- www.openstack.org
- Cisco application policy interface controller (apic)

Q&A

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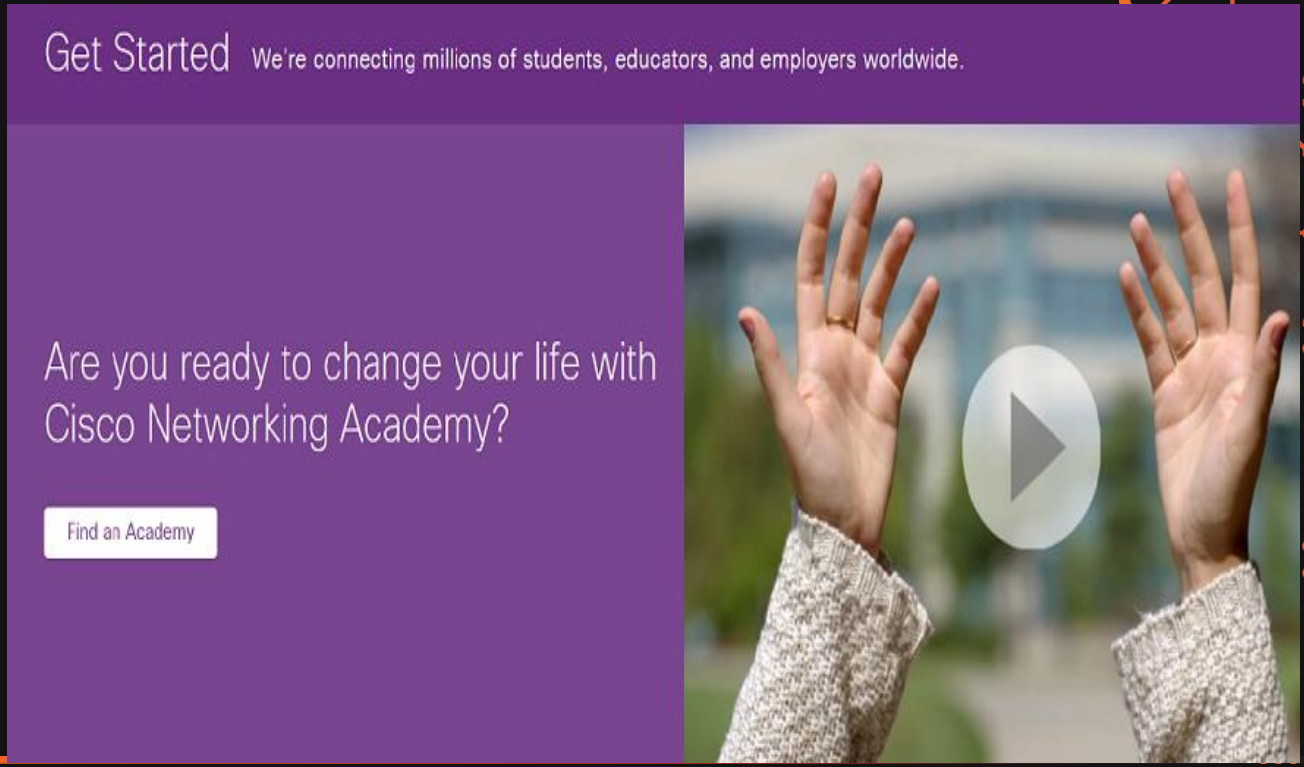
- Scroll Down to

  Get Started
- Click *Find an Academy*
- *Need Help?*

  karsulli@cisco.com




CISCO