You make **possible**

Learning at the Next Level
New Cisco Training and Certifications

Joe Clarke; Distinguished Engineer, Customer Experience
BRKCRT-1203

Cisco's Portfolio Evolution: The new network
To enable automation and IT operations
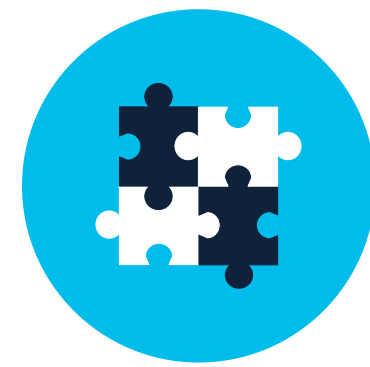
Cisco Leadership

Intent-based Networking

Users, Devices, Apps, Security Intent & Policy

Multi-Domain Solutions

Enterprise, Data Center, Service Provider, Security

APIs and Programmability

Automation, Agility, Scale DevOps & CI/CD

This changes how networking is done.

Software skills are critical.

Apps and Infrastructure

Historically managed separately

Infrastructure

Applications

The IT Team
of the Future

| World of Infrastructure Engineers | + | World of Software Developers |

Cisco will help build this

Agenda

- Introduction

- Motivation for Change

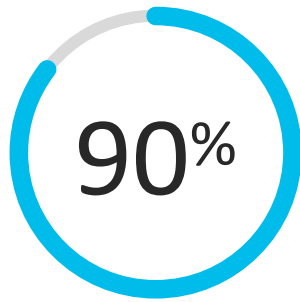- Training and Certification Changes
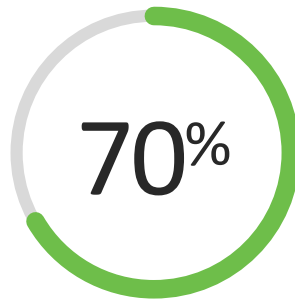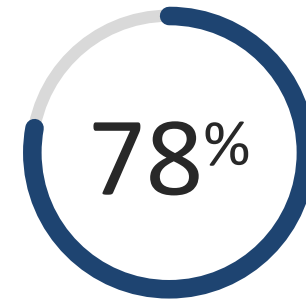
- Evolution of Job Roles

Q&A

Motivation for Change

Certifications Drive Transformative Skills

90%

Of CEOs say their company is facing disruptive change driven by digital technologies

70%

Of CEOs say their company doesn't have the skills to adapt

78%

Of technology execs/managers believe technical certifications are a critical success factor

Cisco Certification Principles

Agility
putting you in the driver's seat

Value
your path to productivity & career advancement

Leadership
the most critical skills for today and tomorrow

Training and Certification Changes

What's the same and what's changed

Same

- Multiple levels of certification
- Learning on your schedule, in your preferred way
- Multiple technology tracks at professional and expert levels
- Recertification exams

Changed

- Streamlined certification paths
- No prerequisites for certification
- Continuing education for all
- Badging recognition for completing training
- Consolidated and updated training and certification
- Your choice of concentration exams at the professional level
- Training resources for professional and expert core exams
- New Emeritus lifetime tenure for CCIE certifications maintained for 20 years continuously
- First of their kind DevNet software certifications

Our Certification Suite
Cisco Certifications

	Associate Level	Specialist Level	Professional Level	Expert Level
Engineering	CISCO CERTIFIED CCNA	CISCO CERTIFIED SPECIALIST	CISCO CERTIFIED CCNP	CISCO CERTIFIED CCIE
Software	CISCO CERTIFIED DEVNET Associate	CISCO CERTIFIED DEVNET SPECIALIST	CISCO CERTIFIED DEVNET Professional	CISCO CERTIFIED DEVNET Expert — Future Offering

The Next-Level Program

Associate Level   **Specialist Level**   **Professional Level**   **Expert Level**

Associate Level

CISCO CERTIFIED CCNA

One Exam

Specialist Level

CISCO CERTIFIED SPECIALIST

One Exam:
Every written proctored exam (except CCNA) = Cisco Certified Specialist

CISCO CERTIFIED DEVNET SPECIALIST

Professional Level

CISCO CERTIFIED CCNP

Two Exams:
1 concentration exam and 1 technology core in any order, but from the same track

Technology Core Exam   Concentration Exam

Enterprise   C C C C C

Security   C C C C C

Service Provider   C C C C C

Collaboration   C C C C C

Data Center   C C C C C

Automation and programmability cross functional course/exam option focused within technology track for CCNP certification

Expert Level

CISCO CERTIFIED CCIE

Lab Exam

L L
L
L
L
L

1 technology core and 1 CCIE lab in same track

CISCO CERTIFIED DEVNET Associate

One Exam

CISCO CERTIFIED DEVNET SPECIALIST

One Exam:
Every DevNet written, proctored exam (except Cisco Certified DevNet Associate) = Cisco Certified DevNet Specialist

CISCO CERTIFIED DEVNET Professional

Two Exams:
1 DevNet core and 1 concentration exam in any order, but from the DevNet track

Technology Core Exam   Concentration Exam

DevNet   C C C C C C C C

CISCO CERTIFIED DEVNET Expert

Future Offering

Future offering

The Next-Level Program

Cisco's Associate Certifications

Associate Level	Knowledge Domains

Engineering — CISCO CERTIFIED CCNA

- Network fundamentals
- Network access
- IP connectivity & services
- Security fundamentals
- Automation and programmability → Fundamentals

Software — CISCO CERTIFIED DEVNET Associate

- Understanding and Using APIs
- Software Development and Design
- Application Deployment and Security
- Infrastructure and Automation
- Network Fundamentals → Basics (IP addressing, router, switch, firewall)

CISCO Live!

Testing Skill as well as Knowledge

Question

Refer to the topology. Using the network 192.168.100.0/24, *configure* subnetting on interfaces Gi1, Gi2, and Gi3 of R1 to accommodate the client requirements.

Topology
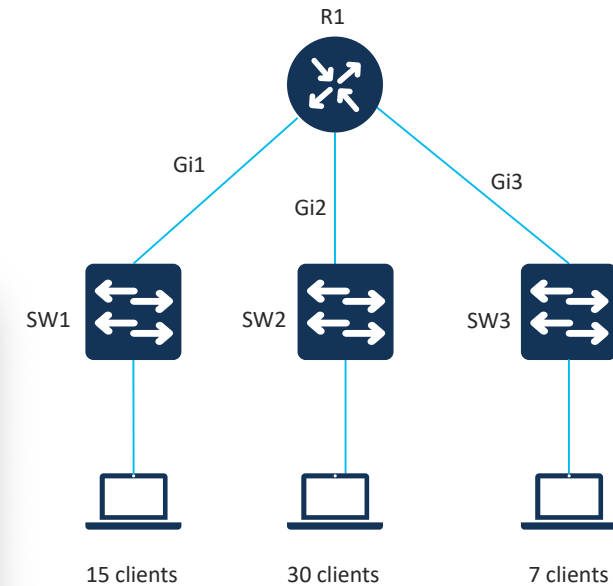

```
ssh R1                                    ⌥⌘4

R1#show run int gi3
Building configuration...

Current configuration : 119 bytes
!
interface GigabitEthernet3
 no ip address
 shutdown
 negotiation auto
 cdp enable
 no mop enabled
 no mop sysid
end

R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#
R1(config)#
R1(config)#
R1(config)#
R1(config)#
R1(config)#
R1(config)#
R1(config)#
R1(config)#
```

Lablets

Professional Core & Specialist Certification Exams

Enterprise	Security	Service Provider	Collaboration	Data Center	DevNet
• Implementing and Operating Cisco Enterprise Network Core Technologies	• Implementing and Operating Cisco Security Core Technologies	• Implementing and Operating Cisco Service Provider Network Core Technologies	• Implementing and Operating Cisco Collaboration Core Technologies	• Implementing and Operating Cisco Data Center Core Technologies	• Developing Applications using Cisco Core Platforms & APIs
• Implementing Cisco Enterprise Advanced Routing and Services	• Securing Networks with Cisco Firepower	• Implementing Cisco Service Provider Advanced Routing Solutions	• Implementing Cisco Collaboration Applications	• Implementing Cisco Storage Area Networking	• Implementing DevOps Solutions and Practices using Cisco Platforms
• Designing Cisco Enterprise Wireless Networks	• Implementing Secure Solutions with Virtual Private Networks	• Implementing Cisco Service Provider VPN Services	• Implementing Cisco Advanced Call Control and Mobility Services	• Implementing Cisco Application Centric Infrastructure	• Developing Solutions using Cisco IoT & Edge Platforms
• Implementing Cisco Enterprise Wireless Networks	• Securing Email with Cisco Security Appliances	• Automating and Programming Cisco Service Provider Solutions	• Implementing Cisco Collaboration Cloud and Edge Solutions	• Designing Cisco Data Center Infrastructure	• Developing Applications for Cisco Webex and Webex Devices
• Designing Cisco Enterprise Networks	• Securing the Web with Cisco Web Security Appliance		• Automating and Programming Cisco Collaboration Solutions	• Troubleshooting Cisco Data Center Infrastructure	• Automating and Programming Cisco Enterprise Solutions
• Implementing Cisco SD-WAN Solutions	• Implementing and Configuring Cisco Identity Services Engine			• Automating and Programming Cisco Data Center Solutions	• Automating and Programming Cisco Security Solutions
• Automating and Programming Cisco Enterprise Solutions	• Automating and Programming Cisco Security Solutions				• Automating and Programming Cisco Service Provider Solutions
					• Automating and Programming Cisco Collaboration Solutions
					• Automating and Programming Cisco Data Center Solutions

Enterprise Core Exam Topics

1.0 Architecture

1.1 Explain the different design principles used in an enterprise network
- 1.1.a Enterprise network design such as Tier 2, Tier 3, and Fabric Capacity planning
- 1.1.b High availability techniques such as redundancy, FHRP, and SSO

1.2 Analyze design principles of a WLAN deployment
- 1.2.a Wireless deployment models (centralized, distributed, controller-less, controller based, cloud, remote branch)
- 1.2.b Location services in a WLAN design

1.3 Differentiate between on-premises and cloud infrastructure deployments

1.4 Explain the working principles of the Cisco SD-WAN solution
- 1.4.a SD-WAN control and data planes elements
- 1.4.b Traditional WAN and SD-WAN solutions

1.5 Explain the working principles of the Cisco SD-Access solution
- 1.5.a SD-Access control and data planes elements
- 1.5.b Traditional campus interoperating with SD-Access

1.6 Describe concepts of wired and wireless QoS
- 1.6.a QoS components
- 1.6.b QoS policy

1.7 Differentiate hardware and software switching mechanisms
- 1.7.a Process and CEF
- 1.7.b MAC address table and TCAM
- 1.7.c FIB vs. RIB

2.0 Virtualization

2.1 Describe device virtualization technologies
- 2.1.a Hypervisor type 1 and 2
- 2.1.b Virtual machine
- 2.1.c Virtual switching

2.2 Configure and verify data path virtualization technologies
- 2.2.a VRF
- 2.2.b GRE and IPsec tunneling

2.3 Describe network virtualization concepts
- 2.3.a LISP
- 2.3.b VXLAN

3.0 Infrastructure

3.1 Layer 2
- 3.1.a Troubleshoot static and dynamic 802.1q trunking protocols
- 3.1.b Troubleshoot static and dynamic EtherChannels
- 3.1.c Configure and verify common Spanning Tree Protocols (RSTP and MST)

3.2 Layer 3
- 3.2.a Compare routing concepts of EIGRP and OSPF (advanced distance vector vs. linked state, load balancing, path selection, path operations, metrics)
- 3.2.b Configure and verify simple OSPF environments, including multiple normal areas, summarization, and filtering (neighbor adjacency, point-to-point and broadcast network types, and passive interface)
- 3.2.c Configure and verify eBGP between directly connected neighbors (best path selection algorithm and neighbor relationships)

3.3 Wireless
- 3.3.a Describe Layer 1 concepts, such as RF power, RSSI, SNR, interference noise, band and channels, and wireless client devices capabilities
- 3.3.b Describe AP modes and antenna types
- 3.3.c Describe access point discovery and join process (discovery algorithms, WLC selection process)
- 3.3.d Describe the main principles and use cases for Layer 2 and Layer 3 roaming
- 3.3.e Troubleshoot WLAN configuration and wireless client connectivity issues

3.4 IP Services
- 3.4.a Describe Network Time Protocol (NTP)
- 3.4.b Configure and verify NAT/PAT
- 3.4.c Configure first hop redundancy protocols, such as HSRP and VRRP
- 3.4.d Describe multicast protocols, such as PIM and IGMP v2/v3

4.0 Network Assurance

4.1 Diagnose network problems using tools such as debugs, conditional debugs, trace route, ping, SNMP, and syslog

4.2 Configure and verify device monitoring using syslog for remote logging

4.3 Configure and verify NetFlow and Flexible NetFlow

4.4 Configure and verify SPAN/RSPAN/ERSPAN

4.5 Configure and verify IPSLA

4.6 Describe Cisco DNA Center workflows to apply network configuration, monitoring, and management

4.7 Configure and verify NETCONF and RESTCONF

5.0 Security

5.1 Configure and verify device access control
- 5.1.a Lines and password protection
- 5.1.b Authentication and authorization using AAA

5.2 Configure and verify infrastructure security features
- 5.2.a ACLs
- 5.2.b CoPP

5.3 Describe REST API security

5.4 Configure and verify wireless security features
- 5.4.a EAP
- 5.4.b WebAuth
- 5.4.c PSK

5.5 Describe the components of network security design
- 5.5.a Threat defense
- 5.5.b Endpoint security
- 5.5.c Next-generation firewall
- 5.5.d TrustSec, MACsec
- 5.5.e Network access control with 802.1X, MAB, and WebAuth

6.0 Automation

6.1 Interpret basic Python components and scripts

6.2 Construct valid JSON encoded file

6.3 Describe the high-level principles and benefits of a data modeling language, such as YANG

6.4 Describe APIs for Cisco DNA Center and vManage

6.5 Interpret REST API response codes and results in payload using Cisco DNA Center and RESTCONF

6.6 Construct EEM applet to automate configuration, troubleshooting, or data collection

6.7 Compare agent vs. agentless orchestration tools, such as Chef, Puppet, Ansible, and SaltStack

Cisco's Expert Certifications

Then	→	Now

Then:

CCIE \<track\> written	+	CCIE \<track\> Practical	=	CISCO CERTIFIED CCIE

Now:

Technology Core \<track\>	+	CCIE \<track\> Lab	=	CISCO CERTIFIED CCIE

Diagnose

Analyze symptoms of networking issues, identify and describe root cause.

Troubleshoot

Resolve networking problems.

Configuration

Implement solutions given a set of constraints and requirements.

3 hours

5 hours

Automation

Network Programmability

Network Lifecycle

Design · Deploy · Operate · Optimize
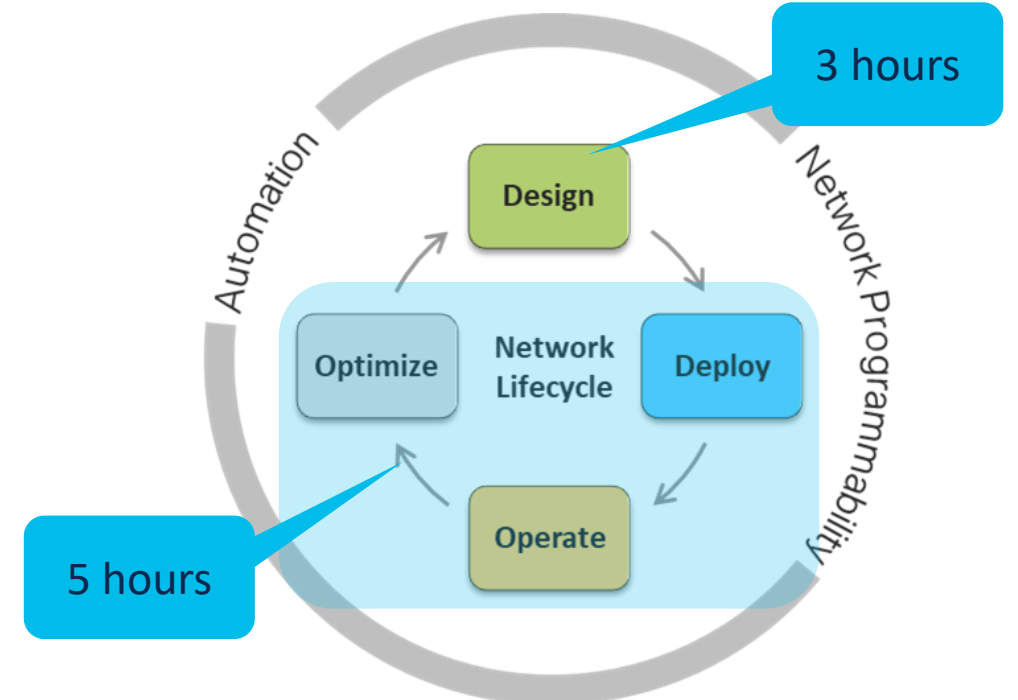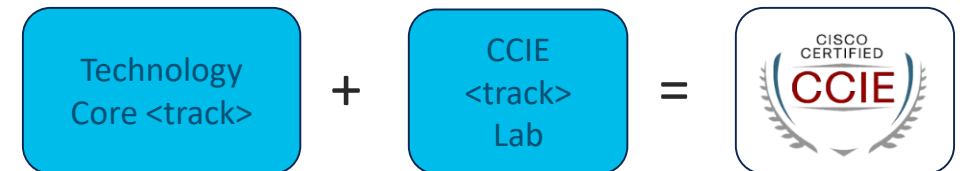
Recertification To Promote Continual Learning

Certified individuals at every level (Associate, Specialist, Professional, and Expert) can now recertify by earning credits within 3 years by completing continuing education activities

Take an exam or

Complete continuing education activities, such as:

- Attend Cisco Live technical sessions
- Author exam items
- Complete online training courses
- Complete instructor-led training
- …and more

Or a mix of both!

Know Routing? Dive Into NVF With Virtualization Training

Evolution of Job Roles

Is the new network engineer a software developer?

The new network engineer embraces software to scale, augment, and improve operations, workflows, and design.
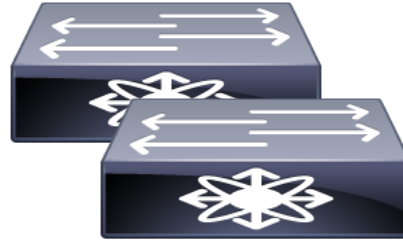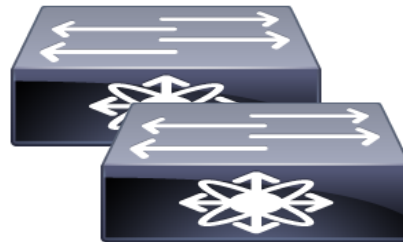
An Example: Provisioning VLANs

The Old Way

Let's say you need to provision a new VLAN across your data centre...
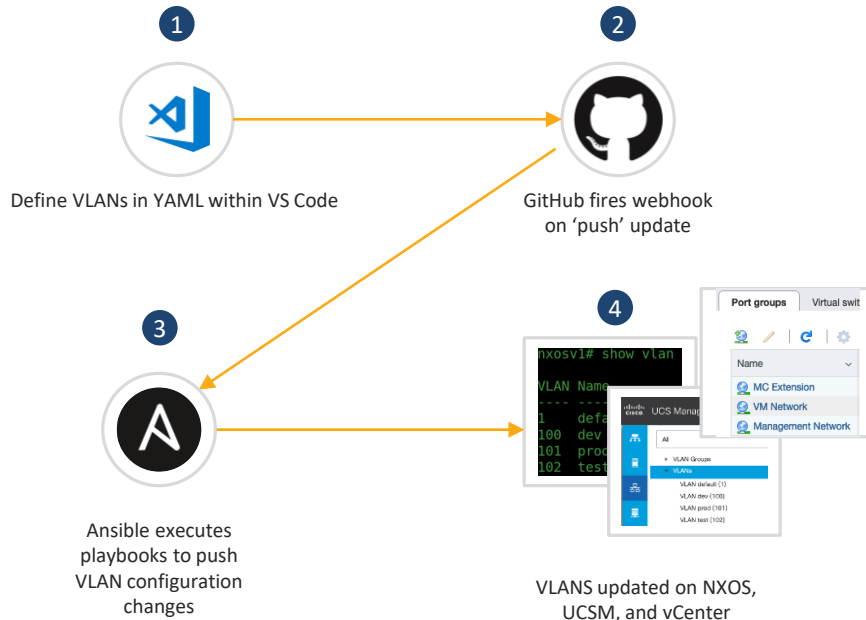

VLAN 3

VLAN 3

VLAN 3

VLAN 3

An Example: Provisioning VLANs

Embracing Automation

1 Define VLANs in YAML within VS Code

2 GitHub fires webhook on 'push' update

3 Ansible executes playbooks to push VLAN configuration changes

4 VLANS updated on NXOS, UCSM, and vCenter

```yaml
---
vlans:
  - id: 3
    name: PUBLIC_INTERNET
    vm_name: Public Internet
    is_stretched: true
    standard_svi_v4: true
    standard_svi_v6: true
  - id: 100
    name: CROSS_DC_VMs
    vm_name: CROSS DC VMs
    is_stretched: true
    standard_svi_v4: true
    standard_svi_v6: true
```
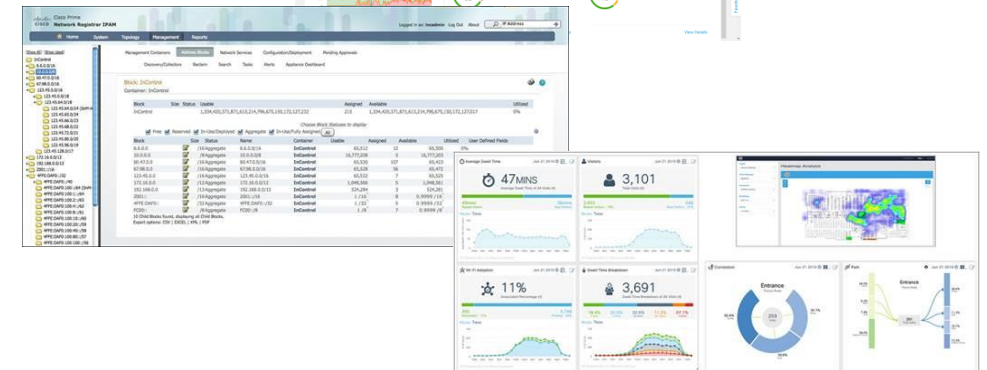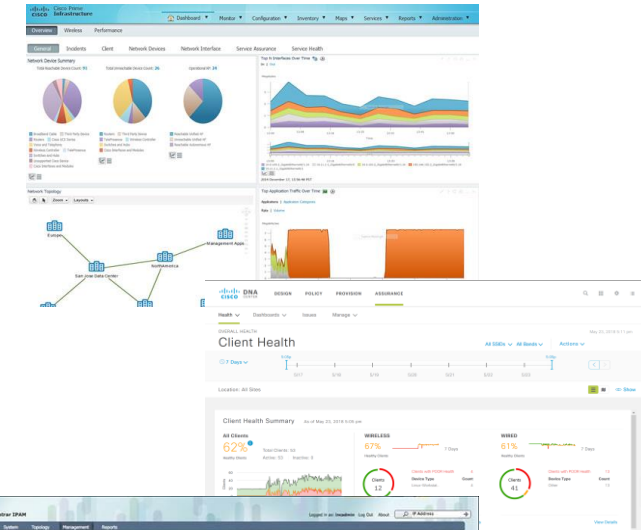
VLAN 3   VLAN 3   VLAN 3   VLAN 3
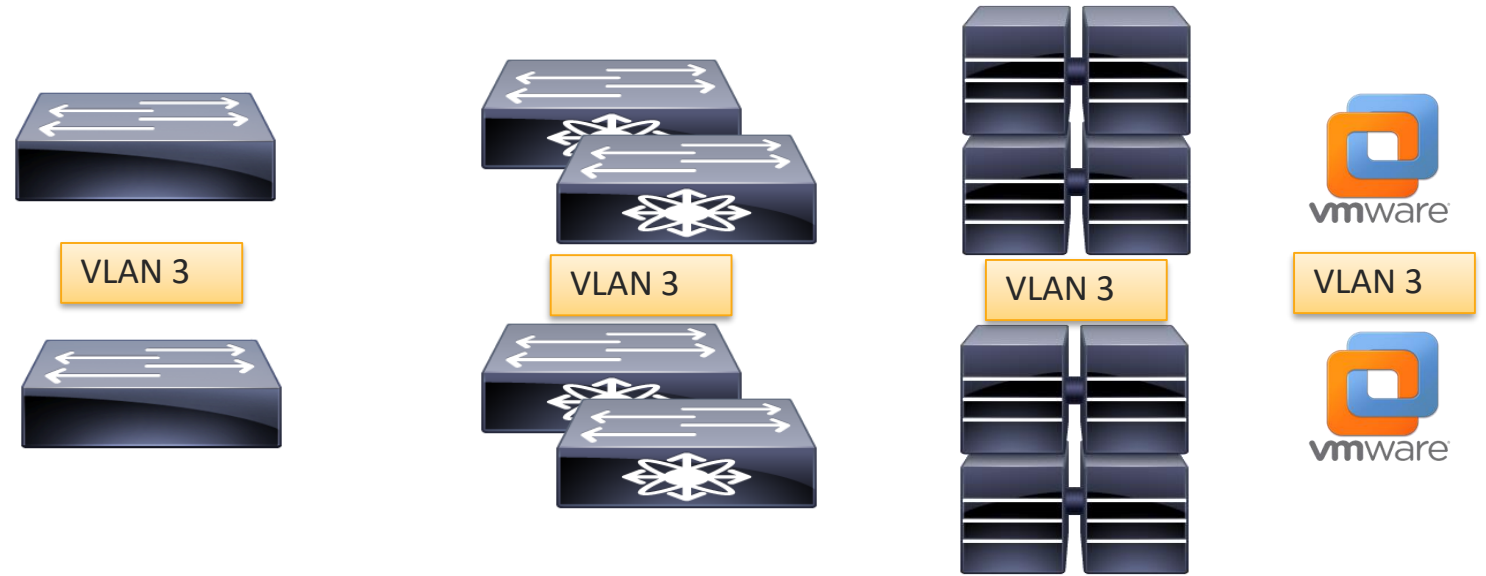
An Example: Help Desk Support

The Old Way

Help! The network's down

An Example: Help Desk Support

Using ChatOps

Help! The network's down

Zan Crnivec 1/28/20, 01:31

Live where is zcrnivec ?

Live NOC Bot 1/28/20, 01:31

Hey, Zan. Working on that for you...

zcrnivec is a **LIGHTWEIGHTWIRELESS** client of vendor type **Apple, Inc.**, connected to **AP_GV6_A_9.2** via **Core1-WLC9** on interface **noc_clients** with MAC address **e0:5f:45:67:93:53** and IP address **10.100.99.144** in **VLAN 100** located in **CiscoLive2020 > Hall6-Hub > H6-L0**.

zcrnivec is a **LIGHTWEIGHTWIRELESS** client of vendor type **Intel Corporate**, connected to **AP_GV6_C_6.2** via **Core1-WLC9** on interface **noc_clients** with MAC address **5c:87:9c:bd:7a:59** and IP address **10.100.99.174** in **VLAN 100** located in **CiscoLive2020 > Hall6-Hub > H6-L0**.

zcrnivec is a WIRELESS client associated to SSID **CL-NOC** located in **CiscoLive2020/Hall6-Hub/H6-L0** with health score **-1/10** [ONBOARDED health: -1 CONNECTED health: -1]

Live NOC Bot 1/28/20, 01:31

zcrnivec's location from CMX

Training for new job roles
Network Automation Developer

Professional certification	Technology concentrations

DevNet Professional

Cisco Specialist: Enterprise Core
Deliver network engineering excellence

Cisco DevNet Specialist: Enterprise Automation
Automate network operations

Cisco DevNet Specialist: DevOps
Integrate network operations with DevOps tools and pipelines

Training for new job roles
DevSecOps Engineer

CCNP Security

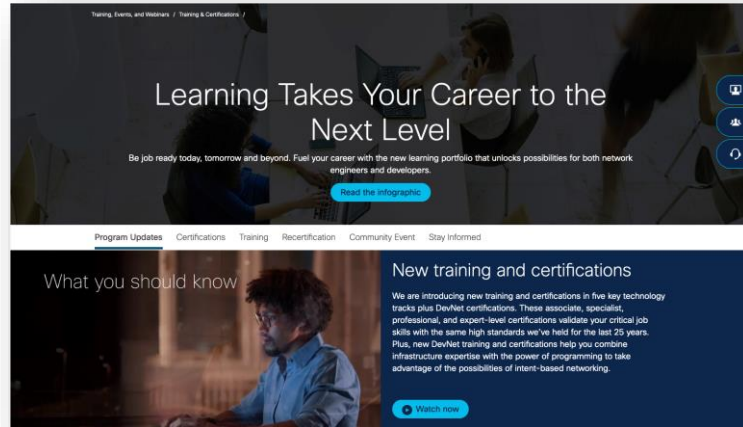**Cisco Specialist: Security**
Automate security operations

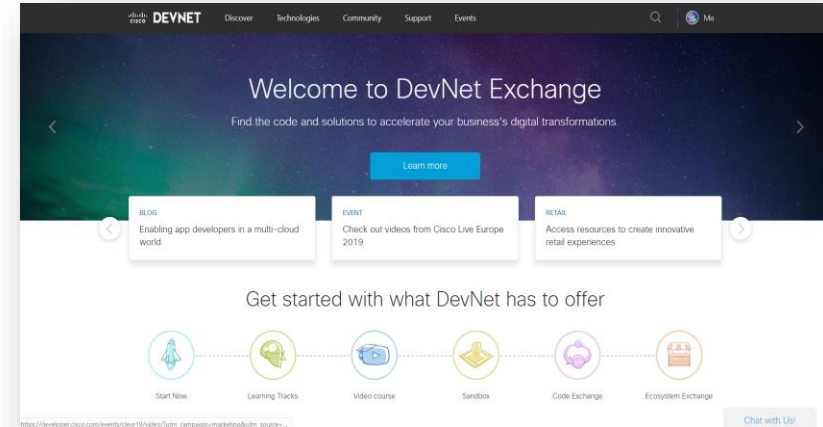**DevNet Specialist: DevOps**
Securely deploy applications

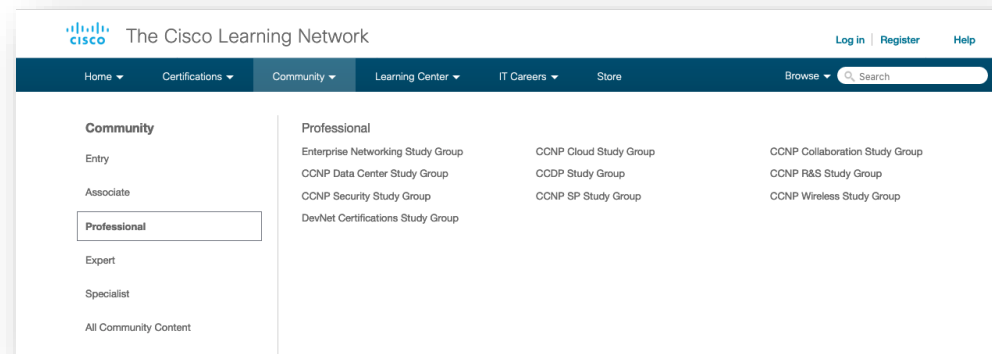**DevNet Specialist: Webex**
Build chat bots for alerting

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Find training, and explore certification resources

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Sandbox environments at **developer.cisco.com**

Join study groups to learn from others and prepare for
Your certification journey at **learningnetwork.cisco.com**

Thank you

You make **possible**

#CiscoLiveAPJC