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The Value of the CCNA for EVERY engineer

Yes, that means you!

Hank Preston, Principal Engineer Learning and Certifications
ccie 38336 r/s | devnet expert 20220001
BRKCRT-1004

Cisco Webex App

Questions?

Use Cisco Webex App to chat with the speaker after the session

How

- 1 Find this session in the Cisco Live Mobile App
- 2 Click “Join the Discussion”
- 3 Install the Webex App or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until November 15, 2024.

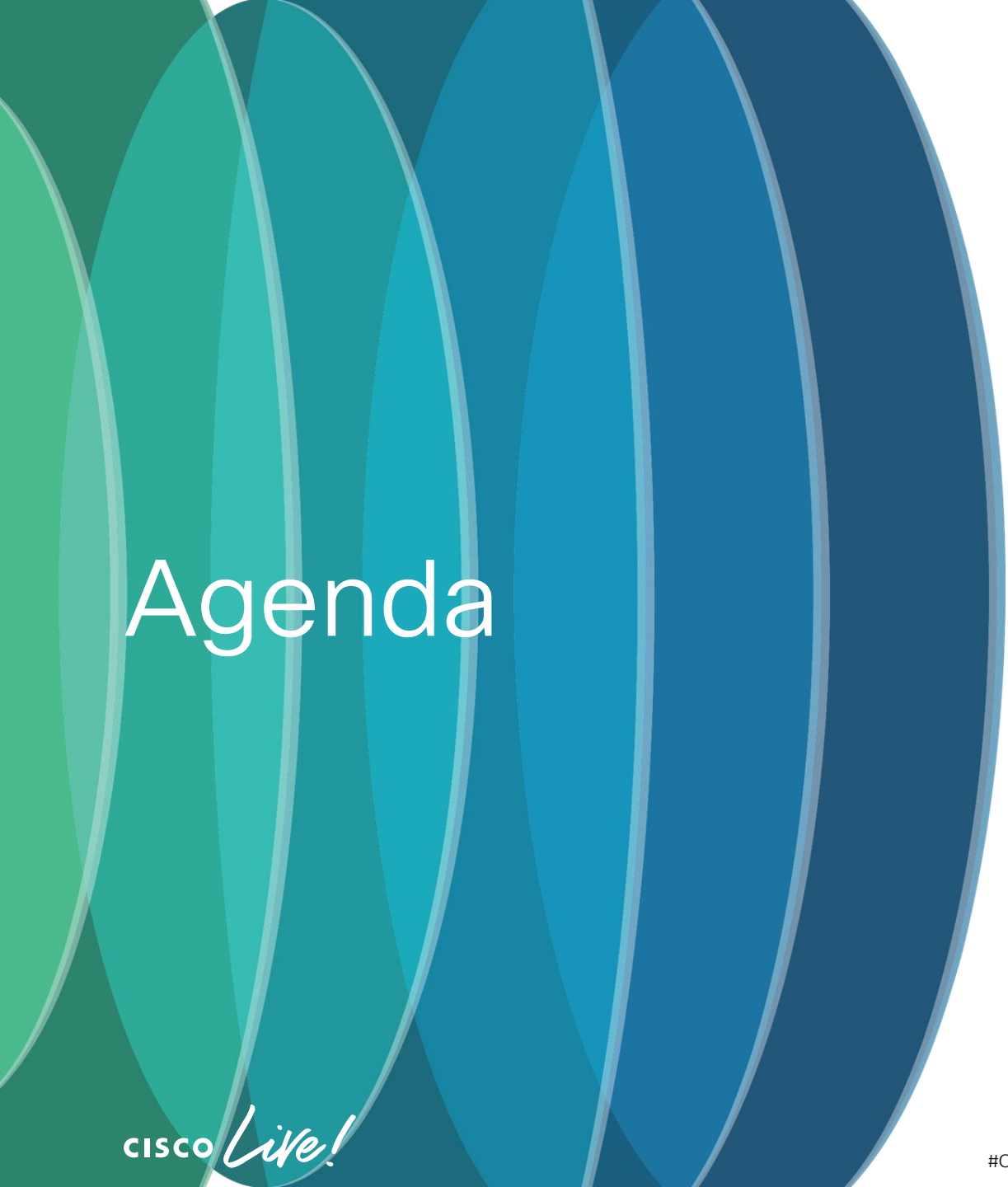


<https://ciscolive.ciscoevents.com/ciscolivebot/#BRKCRT-1004>



What the CCNA Means to Me?

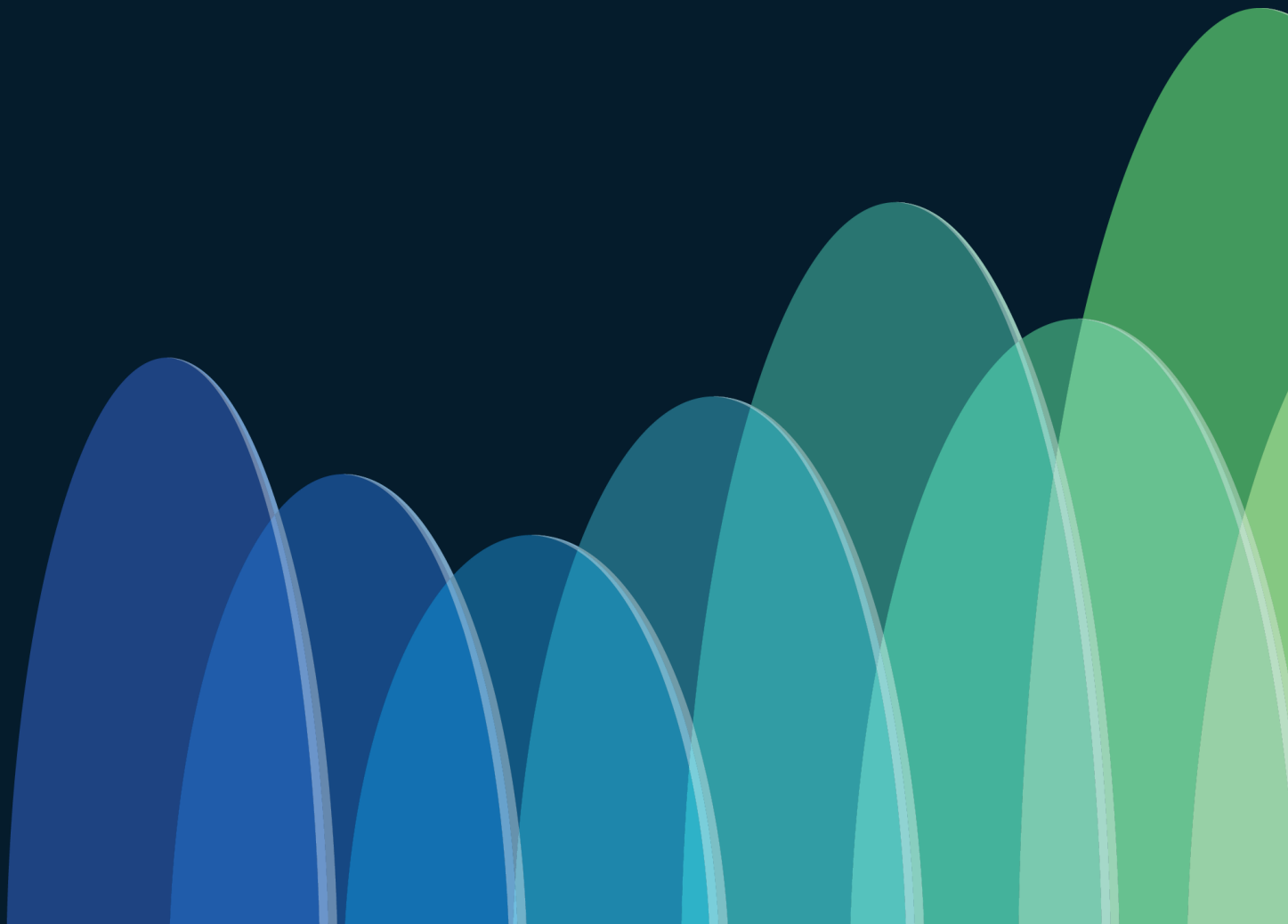




Agenda

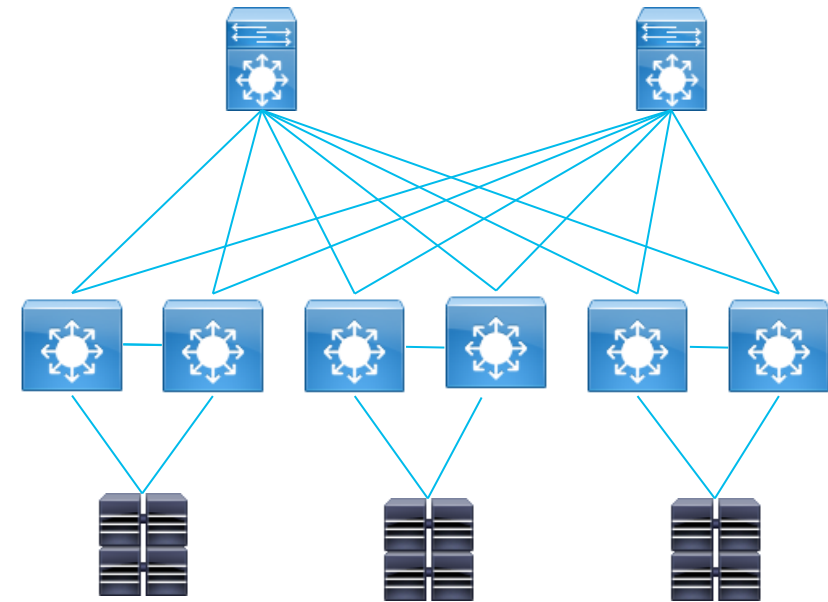
- A tour of IT jobs today
- Fundamental networking skills from the CCNA
- Everything you wanted to know about the CCNA but were afraid to ask!

Tour of IT Jobs



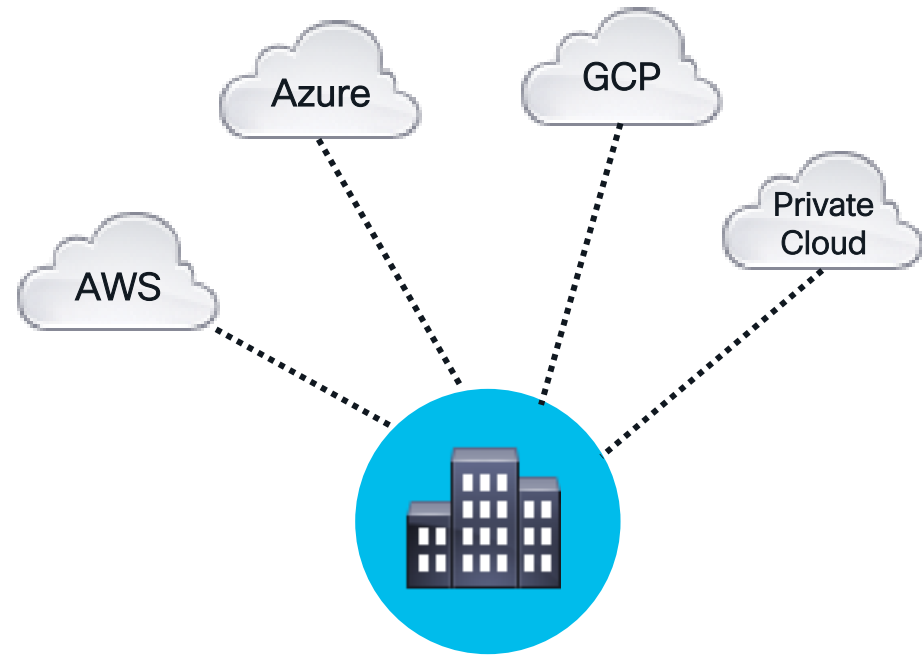
Compute and app hosting engineer

- Network fabrics are core to application resiliency and redundancy
- Microservice architecture utilise the network for interconnectivity
- Hybrid cloud results in distributed workloads and storage



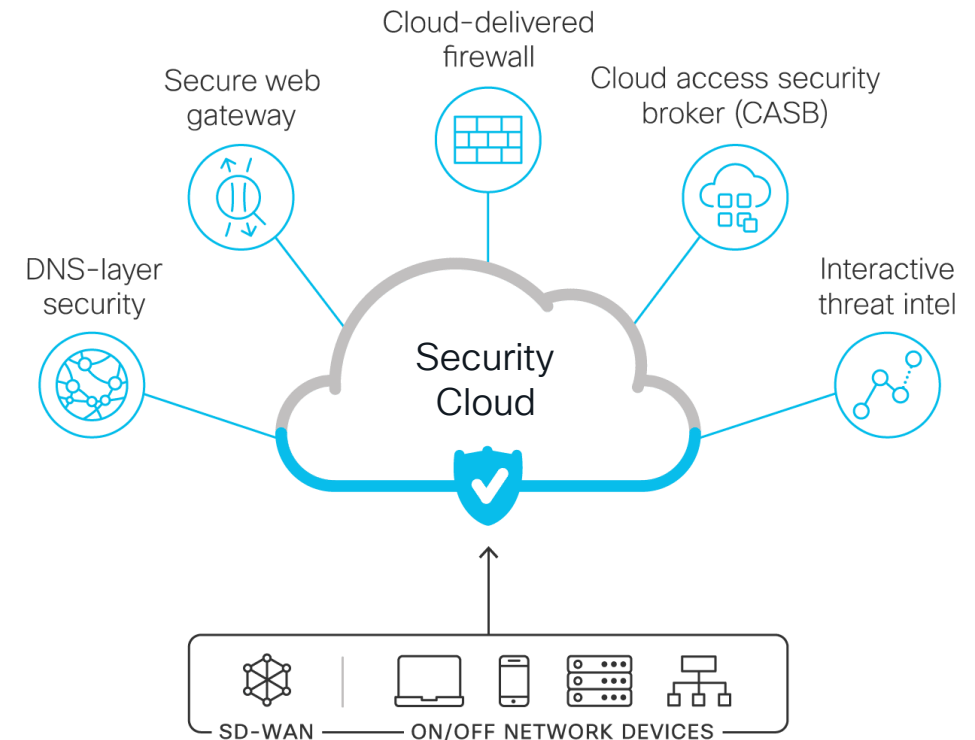
Application developer

- The shift to the cloud requires an understanding of both Enterprise and Public Cloud networking
- As applications become more distributed latency, loss and throughput have drastic impact on app performance
- Hybrid Cloud relies on multiple network technologies



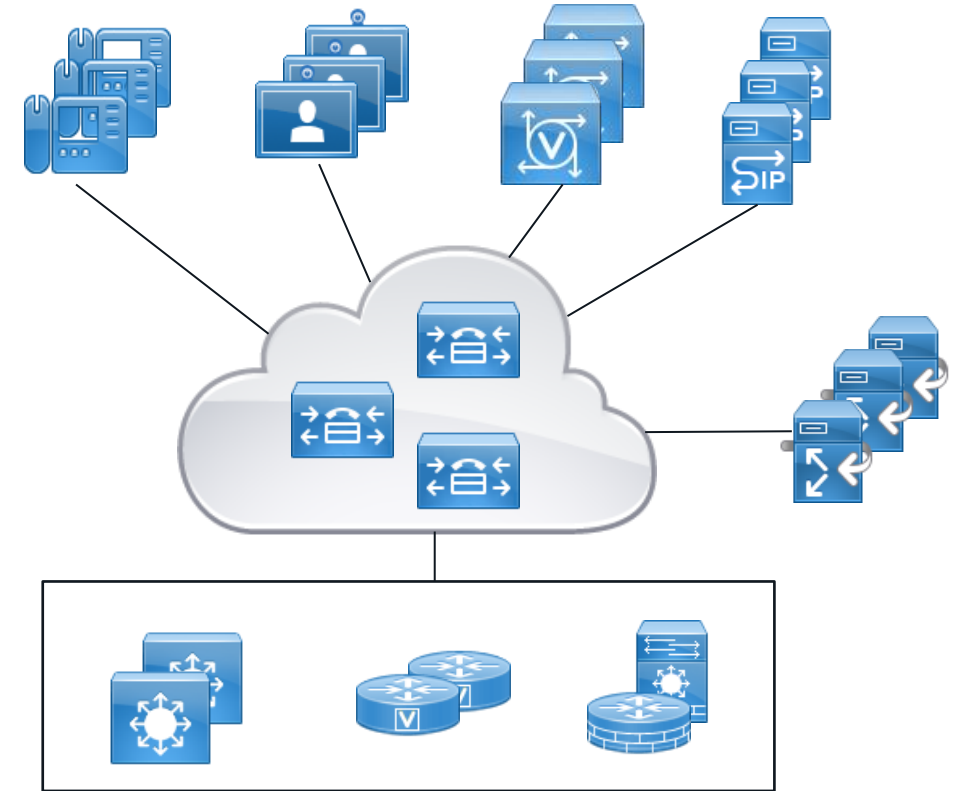
Cyber security engineers

- Threat Detection and Prevention based on deep understanding of network protocols
- The network is a source of access control and segmentation
- Vulnerability assessment requires comprehension of network architectures



Collaboration engineers

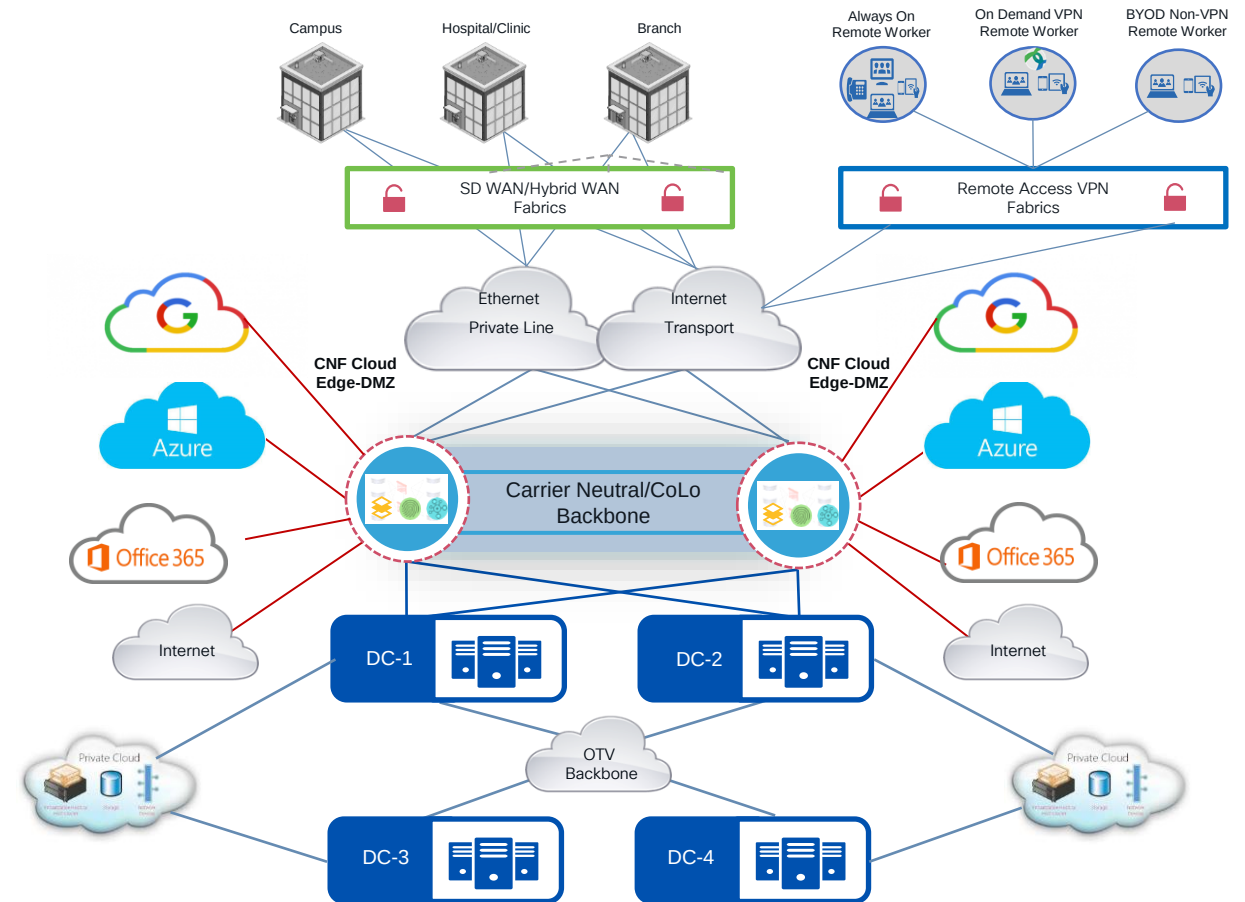
- Collaboration signaling is foundationally built on network protocols
- Many collaboration functions are implemented in network infrastructure
- Migration of collaboration resources to the cloud requires deeper understanding of the network



Network Engineers

“A Journey of a thousand miles begins with a single step”

- Lao Tzu (5th century BC)



Fundamental Networking Skills

OSI Model

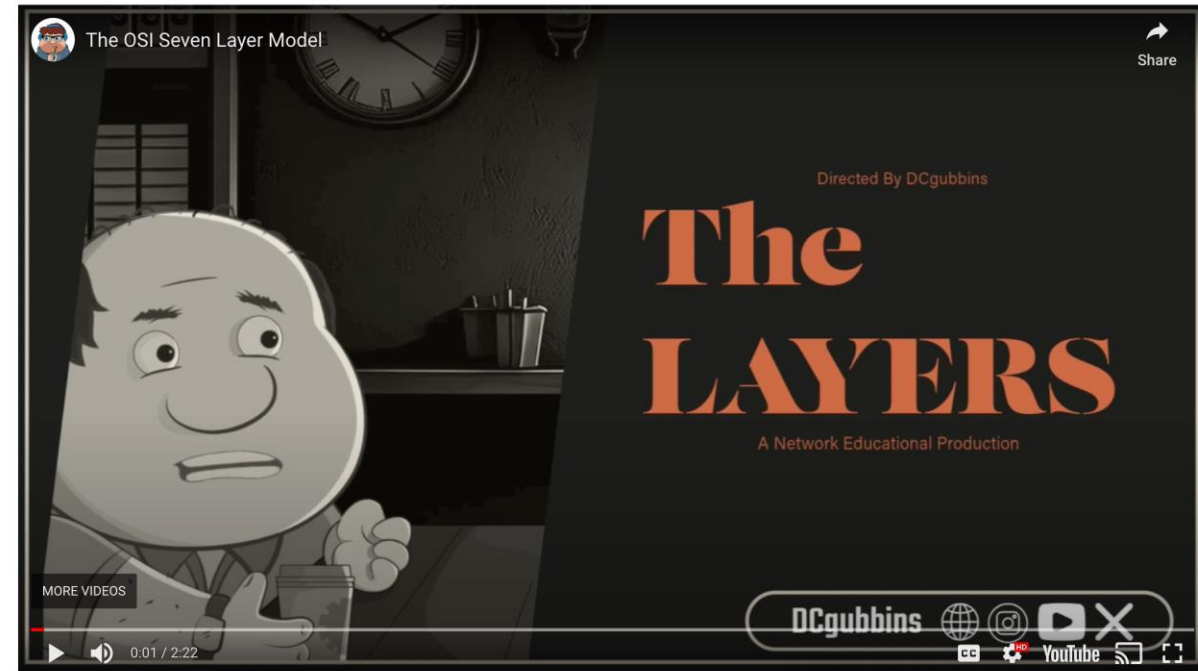


Yes – the OSI model still matters

7	Application Layer	Human-machine layer where apps can access network services
6	Presentation Layer	Ensures that data is in usable format and where encryption occurs
5	Session Layer	Maintains connections and is responsible for controlling ports/sessions
4	Transport Layer	Transmits data using protocols like TCP and UDP
3	Network Layer	Decides which physical path the data will take
2	Data Link Layer	Defines the format of data on the network
1	Physical Layer	Transmits raw bit streams over the network

For a dark, noir
take on the OSI
layers...

THE OSI SEVEN LAYERS



Carl teaches early in career network engineer Alanah the fabled OSI Seven Layer Model

In the depths of the digital realm, where pulses of data dance in the ether, there exists a model known only as "The Layers." Legend has it that within these seven layers lies the embodiment of _the network!

[The OSI Seven Layers](#)

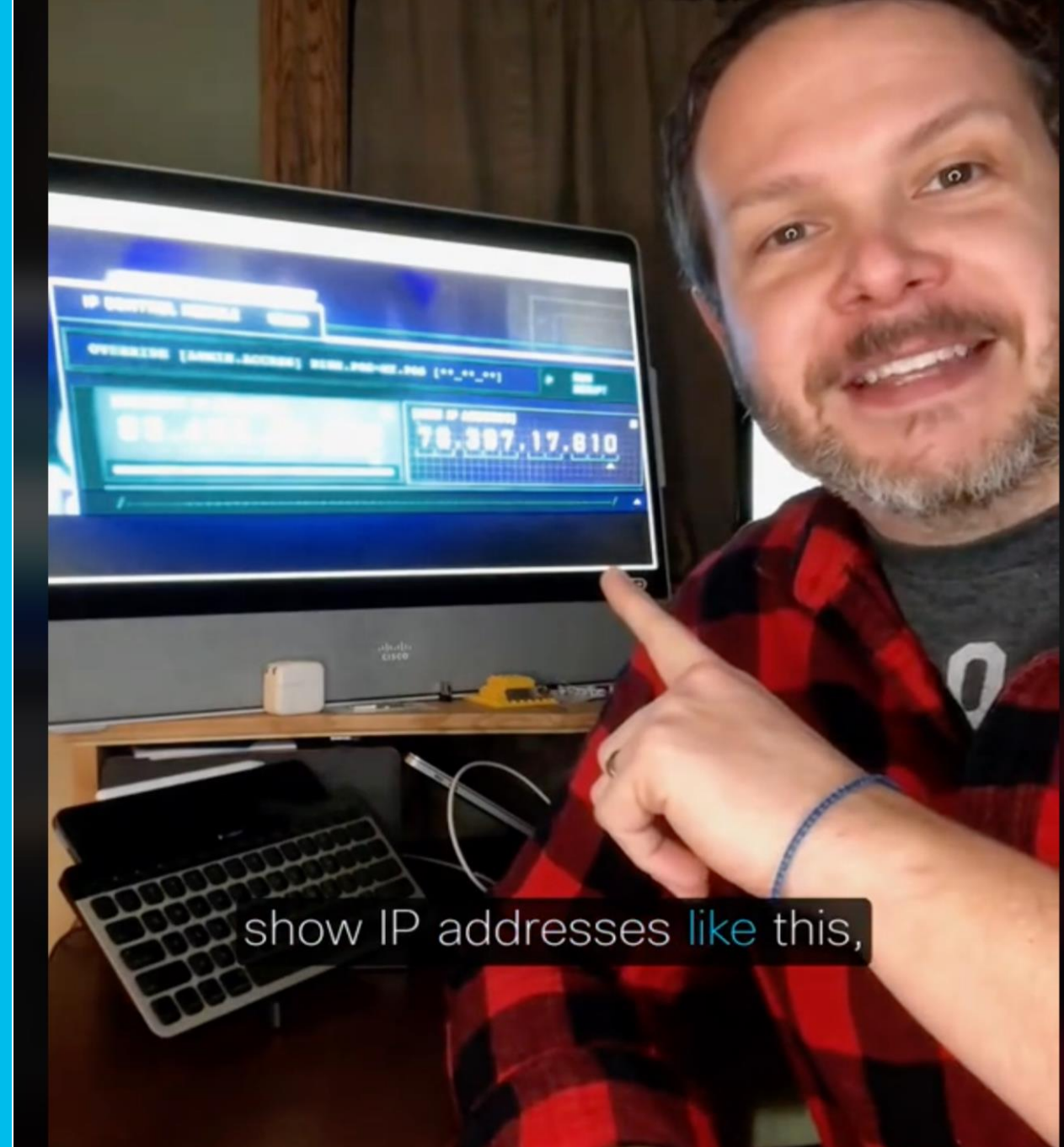
IP Addressing



Nothing more fundamental to networking than IP addresses!

[Checkout the Video!](#)

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show IP addresses like this,

“What is your IP address?”

- Localhost addresses
- IPv4 and IPv6 address
- Container workloads
- Public and Private IPs and NAT

```
$ ip -c address show
```

```
1: lo: <LOOPBACK,UP,LOWER_UP>  
    inet 127.0.0.1/8 scope host lo  
        valid_lft forever preferred_lft forever  
2: ens192: <BROADCAST,MULTICAST,UP,LOWER_UP>  
    inet 10.192.1.51/24 brd 10.192.1.255  
        valid_lft forever preferred_lft forever  
    inet6 fe80::250:56ff:fe98:5c1d/64 scope link  
        valid_lft forever preferred_lft forever  
5: docker0: <BROADCAST,MULTICAST,UP,LOWER_UP>  
    inet 10.241.0.1/24 brd 10.241.0.255  
        valid_lft forever preferred_lft forever  
    inet6 fe80::42:27ff:fe60:2628/64 scope link  
        valid_lft forever preferred_lft forever  
7: vethbdeabee@if6: <BROADCAST,MULTICAST,UP,LOWER_UP>  
    inet6 fe80::6c7a:a2ff:feeb:18ff/64 scope link  
        valid_lft forever preferred_lft forever
```

```
$ curl ipinfo.io/ip  
173.37.204.132
```

IP addressing...

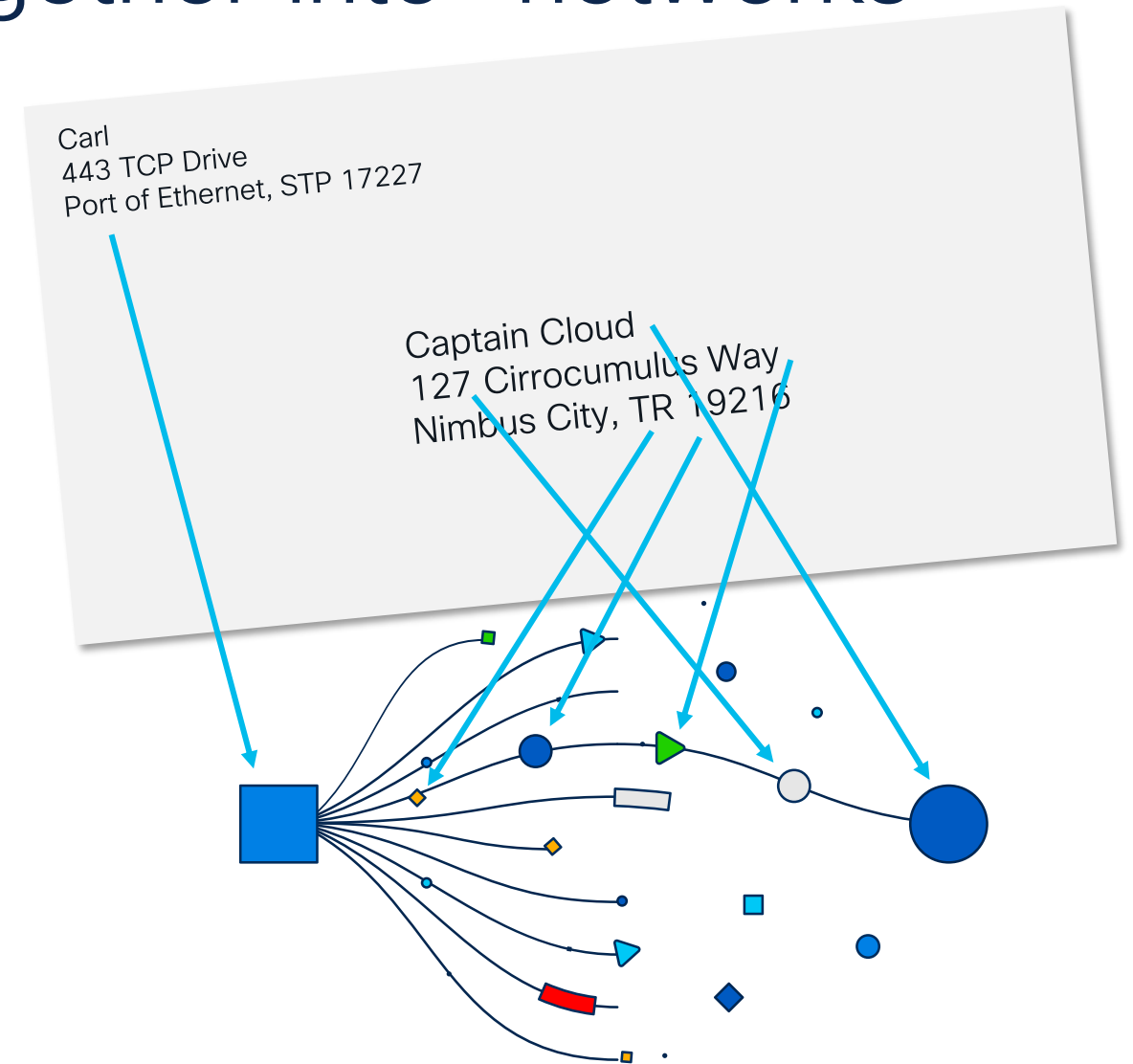
- Network communications is the sending and receiving of "packets"
- Every host needs an "address" to communicate
- Inaccurate or poorly designed addressing WILL cause problems

Carl
443 TCP Drive
Port of Ethernet, STP 17227

Captain Cloud
127 Cirrocumulus Way
Nimbus City, TR 19216

Bringing IP addresses together into “networks”

- With 15+ billion network hosts on the Internet, addresses must be organised
- Groups of addresses are “networks” or “subnets”
- Routing works by sending traffic “towards” a destination until it finally arrives there



Network Security



Trivia Question

When was the first
cyber attack?

1834 in France

. - . . - / - - - .
. - . - . - / - - . - - . .
. / - - . . . - . . . - . .
. . - - - -



Trivia Question
When was the first
global Internet
attack?

November 2, 1988





Be like Bryan... protect the network!

Network security means a lot...

- The “Triple-As” and “Five-W’s”
- Secure protocols – remember the blancs!
- Understanding risk – tracking threats, vulnerabilities, exploits, etc
- Don’t leave doors open – configure a secure network
- Design and build a secure architecture

Network Services

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More than just passing packets...

- Visiting your favourite web sites
- Seamlessly roam between home, school, restaurant, sports arena, etc
- Excuse me... do you have the time?

DNS – domain name system

The reason we don't need to memorise IP Addresses for every website or cloud application

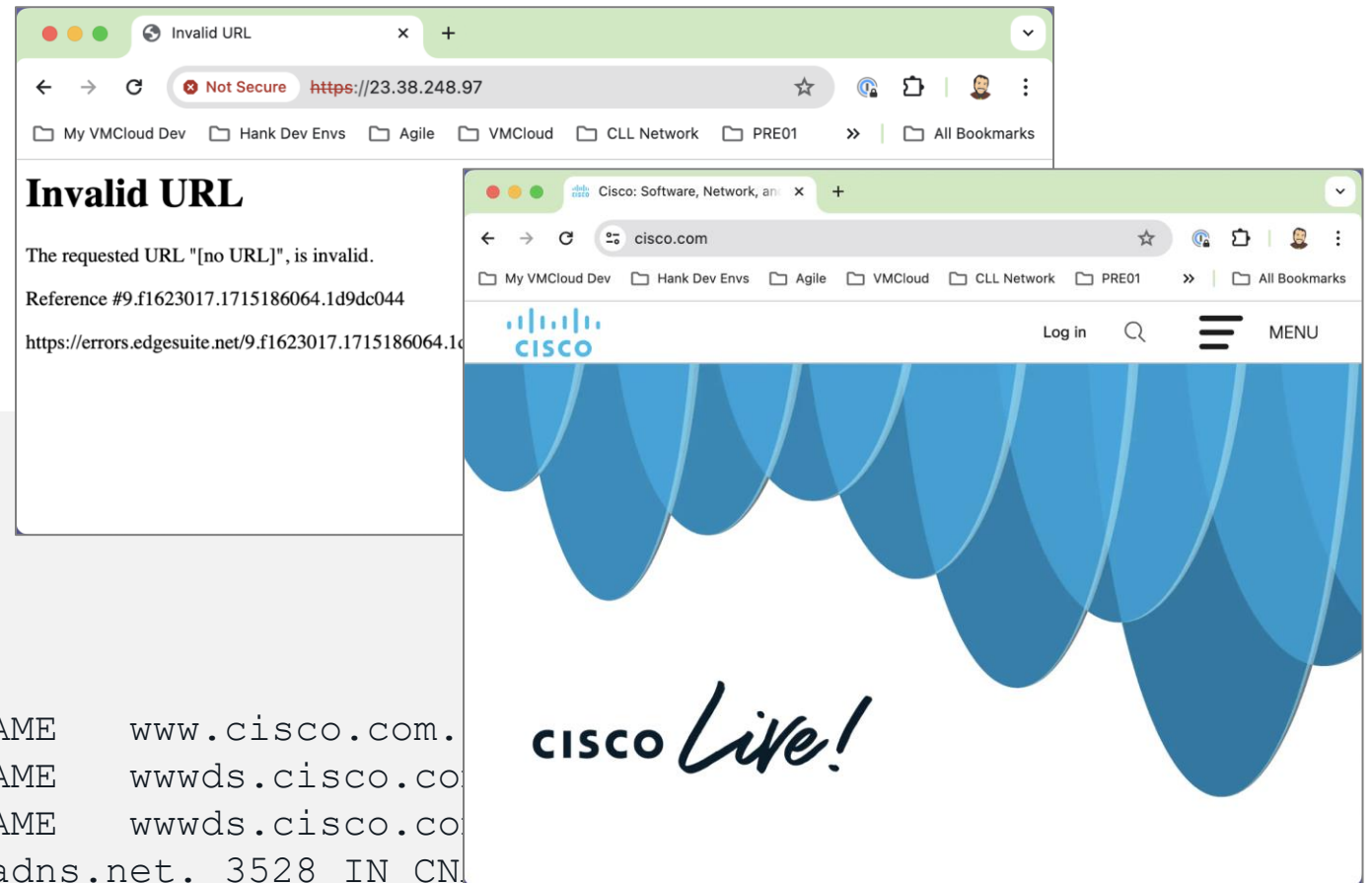
```
dig www.cisco.com
```

```
;; QUESTION SECTION:
```

```
;www.cisco.com.          IN      A
```

```
;; ANSWER SECTION:
```

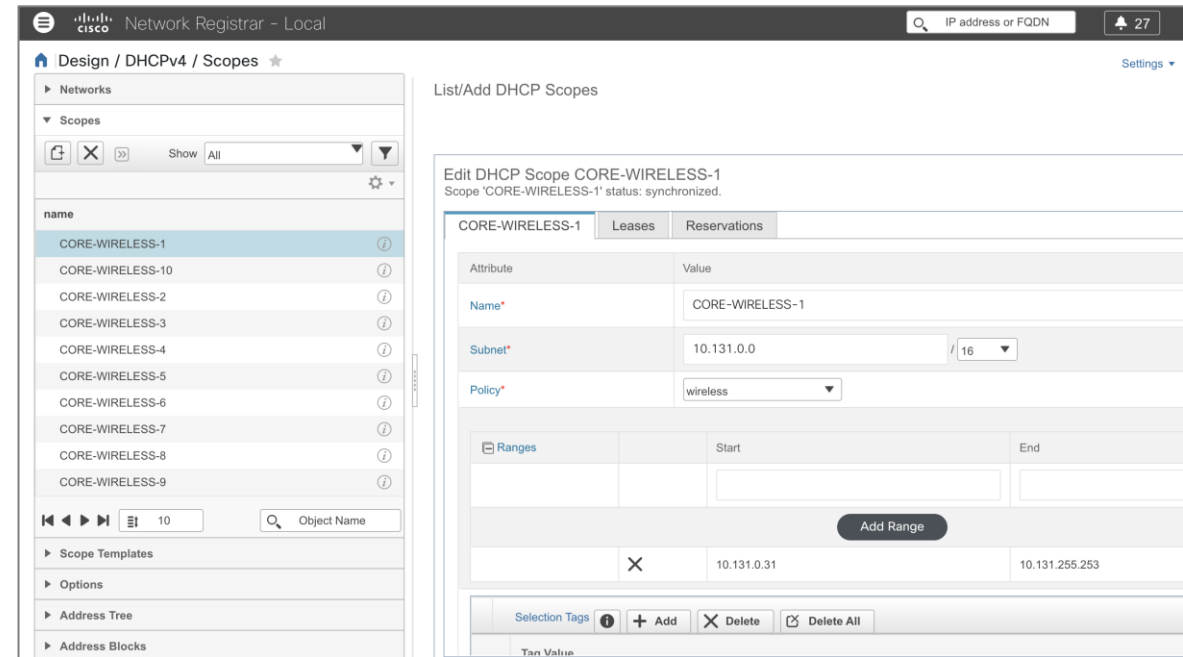
```
www.cisco.com.          2568.  IN      CNAME    www.cisco.com.
www.cisco.com.akadns.net. 224    IN      CNAME    wwds.cisco.co
wwds.cisco.com.edgekey.net.20468 IN      CNAME    wwds.cisco.co
wwds.cisco.com.edgekey.net.globalredir.akadns.net. 3528 IN CN
e2867.dsca.akamaiedge.net. 1        IN      CNAME    user-att-162-233-32-0.e2867.dsca.akamaiedge.net.
user-att-162-233-32-0.e2867.dsca.akamaiedge.net.    20     IN      A      23.38.248.97
```



DHCP

Dynamic Host Configuration Protocol

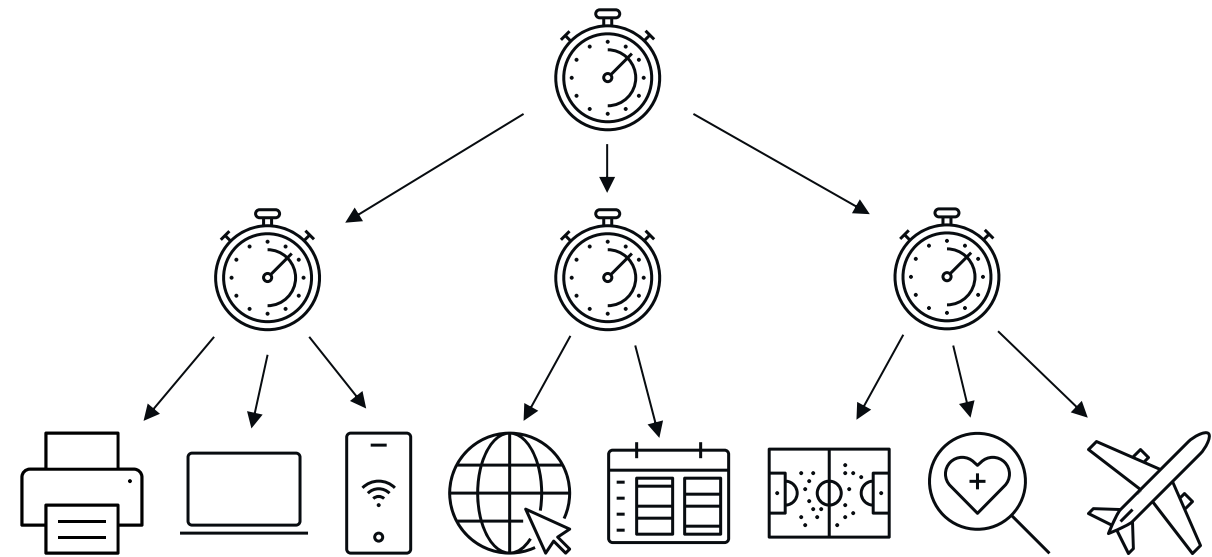
The reason you don't have to manually change the IP address on your phone, table, PC, dozens of times a day.



NTP

Network Time Protocol

From log correlation to certificate validation and authentication requirements, accurate time across the network relies on NTP.



Documents		Field statistics		
Columns		1 field sorted		
@timestamp		HOST_FROM	PRIORITY	MESSAGE
☐	May 8, 2024 @ 16:49:40.000		info	
☐	May 8, 2024 @ 16:49:40.000		notice	
☐	May 8, 2024 @ 16:49:40.000		notice	
☐	May 8, 2024 @ 16:49:40.000		info	
☐	May 8, 2024 @ 16:49:40.000		notice	
☐	May 8, 2024 @ 16:49:40.000		notice	
☐	May 8, 2024 @ 16:49:40.000		notice	

Internet Architecture

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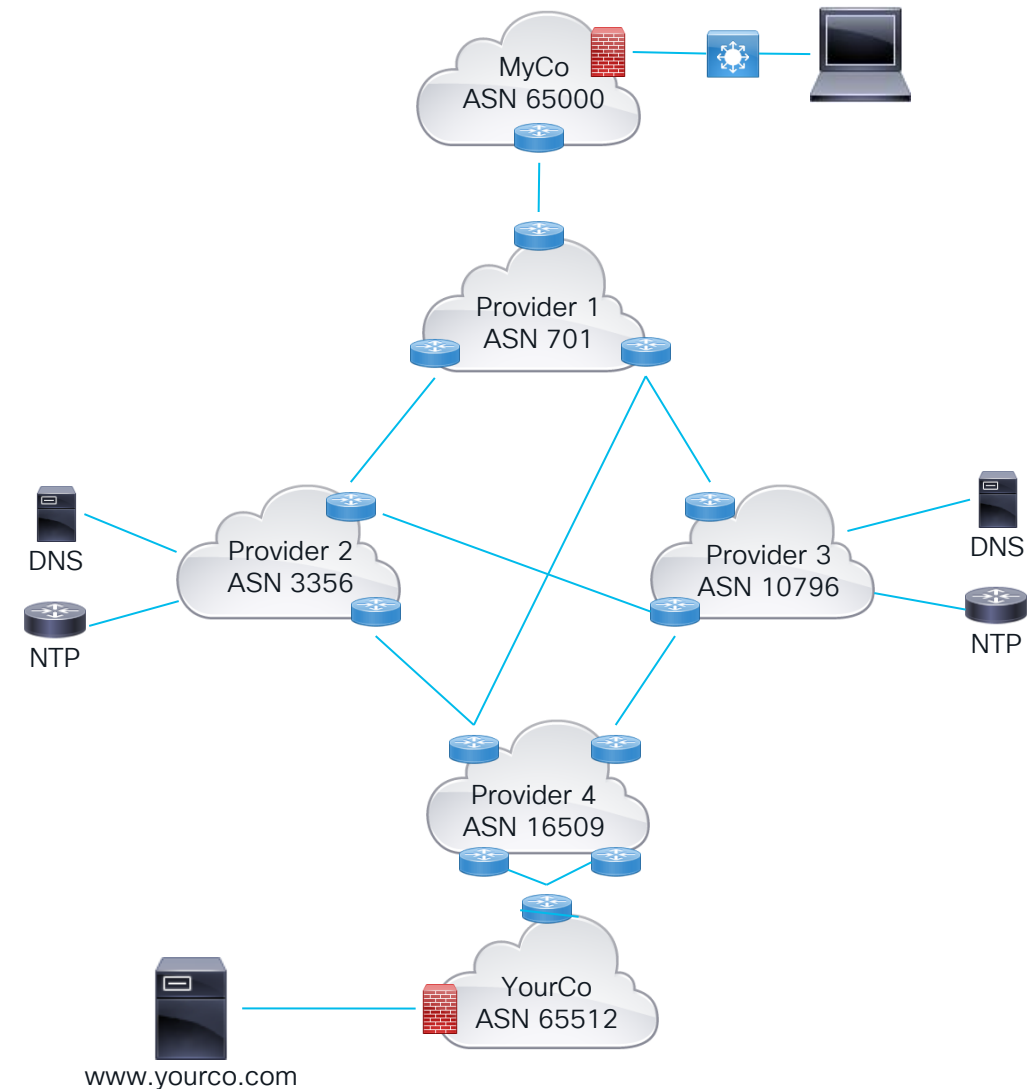
The Internet... it's
kind of a big deal...



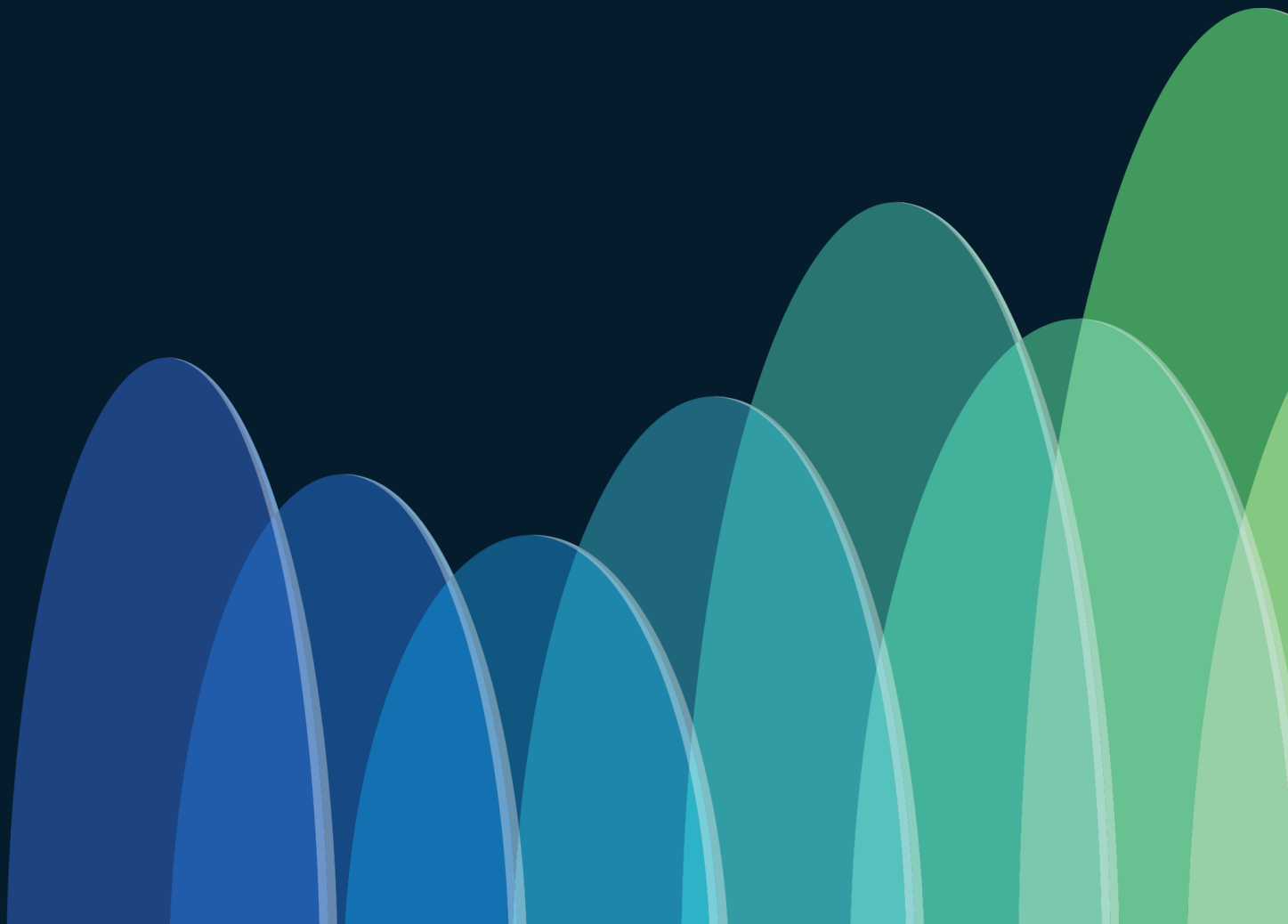
Internet architecture

The network of networks

- The Internet is HUGE which necessitates a unique architecture
- Built for resiliency and stability
- A series of “Autonomous Systems” (AS) operated independently using BGP as the shared rule set for passing data
- Data is forwarded and each AS is responsible for delivery to the other side



All about the CCNA!



How to become a CCNA!!!!



How to become a CCNA!!!!

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200-301: Cisco Certified Network AssociateX

Go

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200-301: Cisco Certified Network Associate

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 **OnVUE** Online with OnVUE

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What do I need to know?



Find the exam topics / blueprint

The Cisco Learning Network

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The Cisco Learning Network

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CCNA Certification and Training

Achieving CCNA certification is the first step in preparing for a career in IT technologies. To earn CCNA certification, you pass one exam that covers a broad range of fundamentals for IT careers, based on the latest networking technologies, security, and automation and programmability skills and job roles. CCNA gives you the foundation you need to take your career in any direction.

[Download At-a-glance](#)

Now Available: CCNA 1.1 Exam

ⓘ The 200-301 CCNA 1.1 exam is now available. New topics on the exam include Generative AI, Cloud Network Management, and Machine Learning. These updates account for less than 10% of the total exam content. To see the latest minor updates to CCNA v1.1, review the exam topics. To take the exam, register now through Pearson VUE.

[Register now](#)

Exam | Discussions | Webinars & Videos | Additional Resources

Exam

Now Available

200-301 CCNA v1.1 Exam: Cisco Certified Network Associate

The Cisco Certified Network Associate v1.1 (CCNA 200-301) is a 120-minute exam associated with the CCNA certification. This exam tests candidates' knowledge and skills related to network fundamentals, network access, IP connectivity, IP services, security fundamentals, automation, and programmability. Additionally, new topics such as generative AI, cloud network management, and machine learning are included in the CCNA 1.1 exam.

[Exam Topics](#)

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The blueprint to your certification

Exam Description

CCNA Exam v1.1 (CCNA 200-301) is a 120-minute exam associated with the CCNA certification. This exam tests a candidate's knowledge and skills related to network fundamentals, network access, IP connectivity, IP services, security fundamentals, and automation and programmability. The course, Implementing and Administering Cisco Solutions (CCNA), helps candidates prepare for this exam.



Network Fundamentals



Network Access



IP Connectivity



IP Services



Security Fundamentals



Automation and Programmability

Expand each item below to view related exam topics.

1.0 Network Fundamentals	20%	▼
2.0 Network Access	20%	▼
3.0 IP Connectivity	25%	▼
4.0 IP Services	10%	▼
5.0 Security Fundamentals	15%	▼
6.0 Automation and Programmability	10%	▼

The above topics are likely to be included on the **200-301 CCNA v1.1** exam. The topics are subject to change at any time to reflect the latest technologies aligned to Cisco's products.



Cisco Cert Prep Tip:

Create and keep track of learning milestones by downloading exam topics.

[Download Complete List of CCNA v1.1 Exam Topics in PDF Format](#)

Deciphering the blueprint:

Cisco Certified Network Associate (200-301)

20% 1.0 Network fundamentals

Weight

Domain

1.1 Explain the role and function of network components

Task

1.1.a Routers

Subtasks

1.1.b Layer 2 and Layer 3 switches

Verb

Scope

1.2 Describe characteristics of network topology architectures

1.3 Compare physical interface and cabling types

1.4 Identify interface and cable issues (collisions, errors, mismatch duplex, and/or speed)

1.5 Compare TCP to UDP

1.6 Configure and verify IPv4 addressing and subnetting

1.7 Describe private IPv4 addressing

How to prepare?



Complete CCNA training with Hands On Labs

The image displays the Cisco U. website interface for CCNA training. The main header includes navigation links: Cisco U., For You, Explore, Certifications, Community, and View Plans. A search bar and a shopping cart icon are also present.

The central content area is titled "Implementing and Administering Cisco Solutions | CCNA". It describes the learning path: "Learn to install, operate, configure, and verify basic networks, and prepare to take the 200-301 CCNA exam." Below this, there are icons representing various learning components: Beginner, 34h 15m, 33 Courses, 32 Labs, 14 Assessments, 30 Credits, and v2.0.

The "DESCRIPTION" section states: "The Implementing and Administering Cisco Solutions learning path offers comprehensive associate-level training focused on the technologies you need to implement and administer networking and IT infrastructure. Completing this learning path will help you prepare for the Cisco Certified Network Associate (200-301 CCNA) exam and earn your CCNA certification."

The "SKILLS YOU'LL LEARN" section lists four key skills:

1. To install, operate, configure, and verify basic IPv4 and IPv6 networks
2. To configure network components such as switches, routers, and wireless LAN controllers
3. To manage network devices and identify basic security threats
4. How to describe and define network programmability, automation, and software-defined networking

The "ABOUT" section shows the path was created on Jun 1, 2022, and updated on Mar 13, 2024.

On the right side, there is a sidebar titled "Implementing and Administering Cisco Solutions" showing the "Learning Path Curriculum" with a progress bar at 0.3%. The curriculum includes:

- 1. Network Fundamentals (6h 20m)
- 2. Network Switching (3h 30m)
- 3. Network Routing (9h 40m)
- 4. Network Security Fundamentals
- 5. WAN and Network Services
- 6. Network Management
- 7. Wireless

Below the curriculum, there is a "Lab | Configure VLANs and Trunks" section. It features a video player titled "Configure VLANs and Trunks" with a play button and a link to "Open Transcript".

The video player shows a terminal window with the following output:

```
Press RETURN to get started!

*Apr 24 18:55:13.855: %LINK-7-NO_IFINDEX_FILE: Unable to open nvram:/ifindex-table. No such file or directory
*Apr 24 18:55:16.111: %LINEPROTO-5-UPDOWN: Line protocol on Interface VdiP-Hall0, changed state to up
*Apr 24 18:55:16.111: %LINK-3-UPDOWN: Interface Ethernet0/0, changed state to up
*Apr 24 18:55:16.112: %LINK-3-UPDOWN: Interface Ethernet0/1, changed state to up
*Apr 24 18:55:16.112: %LINK-3-UPDOWN: Interface Ethernet0/2, changed state to up
*Apr 24 18:55:16.112: %LINK-3-UPDOWN: Interface Ethernet0/3, changed state to up
*Apr 24 18:55:16.342: %SYS-5-CONFIG_I: Configured from memory by console
*Apr 24 18:55:16.375: %SYS-5-RESTART: System restarted --
Cisco IOS Software, Linux Software (I8681_LINUX-ADVENTERPRISEK9-M), Version 15.2(4)M3, DEVELOPMENT TEST SOFTWARE
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2013 by Cisco Systems, Inc.
Compiled Tue 26-Feb-13 19:06 by prod_rel_team

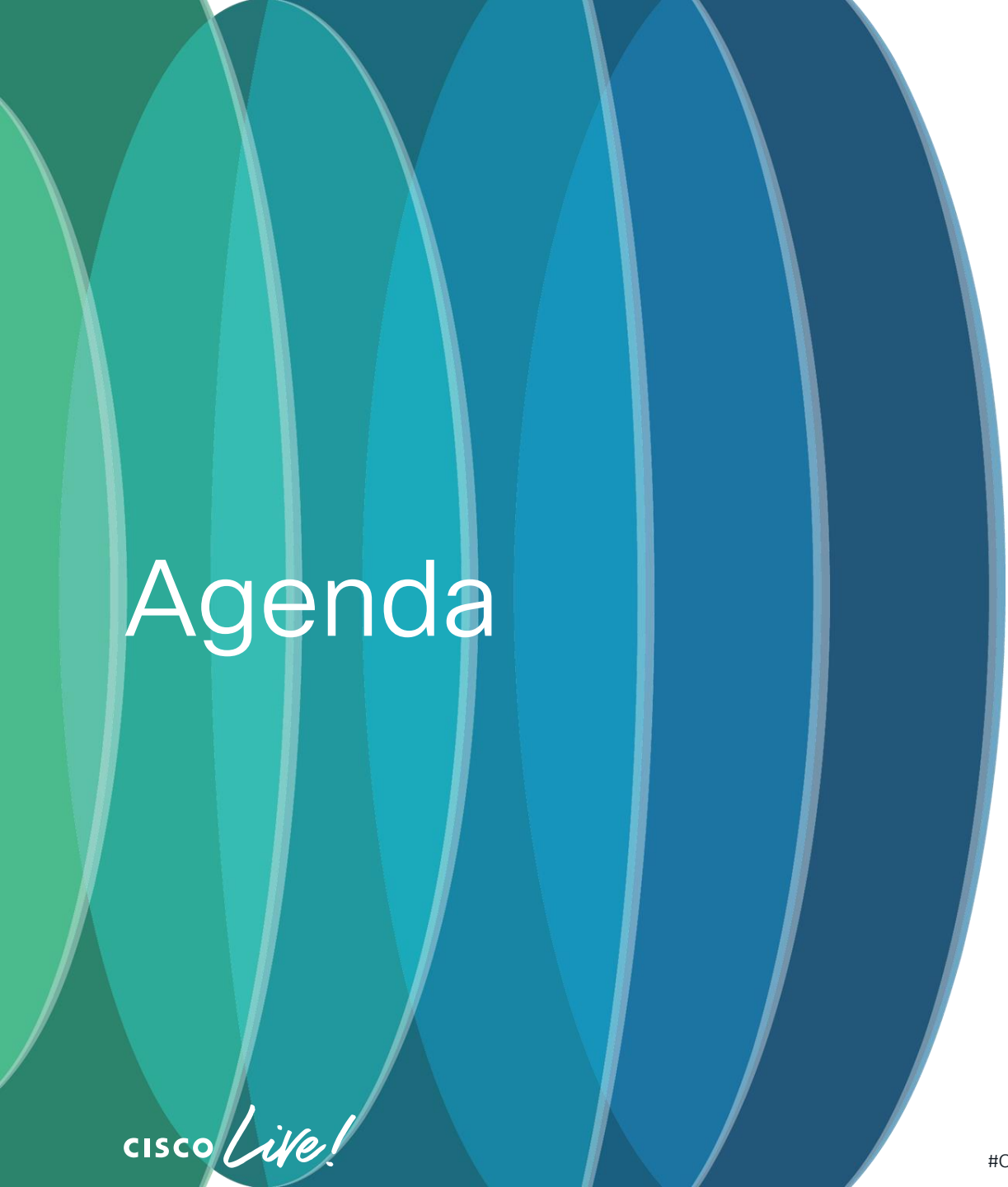
*Apr 24 18:55:16.375: %SNMP-5-COLDSTART: SNMP agent on host PC1 is undergoing a cold start
*Apr 24 18:55:16.392: %CRYPTO-6-ISAAMP_ON_OFF: ISAAMP is OFF
*Apr 24 18:55:16.392: %CRYPTO-6-GDOI_ON_OFF: GDOI is OFF
*Apr 24 18:55:17.113: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to up
*Apr 24 18:55:17.113: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/1, changed state to down
*Apr 24 18:55:17.113: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/2, changed state to down
*Apr 24 18:55:17.113: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/3, changed state to down
*Apr 24 18:55:18.206: %LINK-5-CHANGED: Interface Ethernet0/1, changed state to administratively down
*Apr 24 18:55:18.311: %LINK-5-CHANGED: Interface Ethernet0/2, changed state to administratively down
*Apr 24 18:55:18.319: %LINK-5-CHANGED: Interface Ethernet0/3, changed state to administratively down
PC1#
PC1#ping 10.10.1.20
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.10.1.20, timeout is 2 seconds:
!!!!
Success rate is 88 percent (4/5), round-trip min/avg/max = 1/1/1 ms
PC1#ping 10.10.1.30
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.10.1.30, timeout is 2 seconds:
```

Cisco U.

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CCNA resources cheat sheet

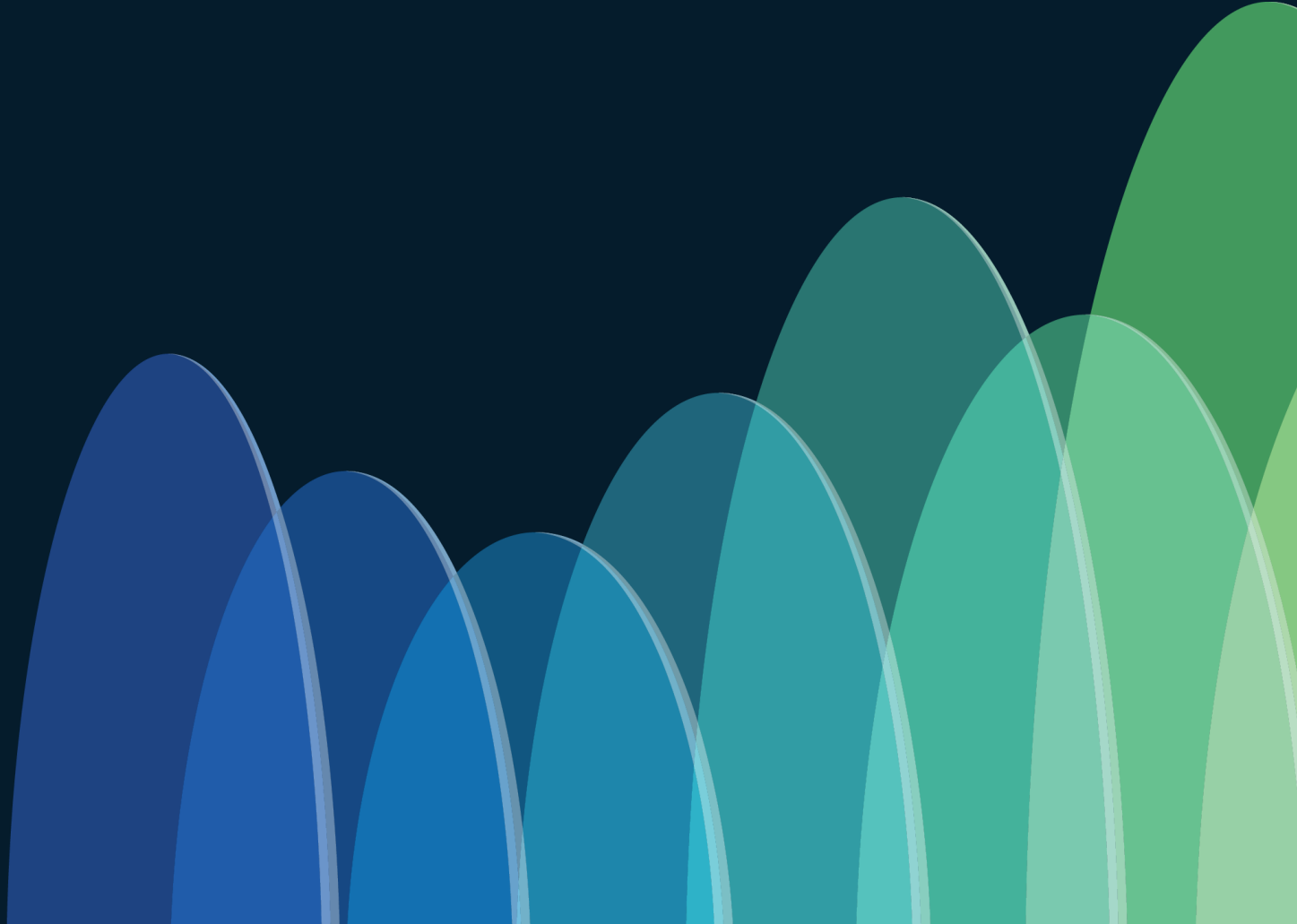
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Agenda

- ✓ A Tour of IT Jobs Today
- ✓ Fundamental Networking Skills from the CCNA
- ✓ Everything you wanted to know about the CCNA but were afraid to ask!

Questions?



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Contact me at: hapresto@cisco.com



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