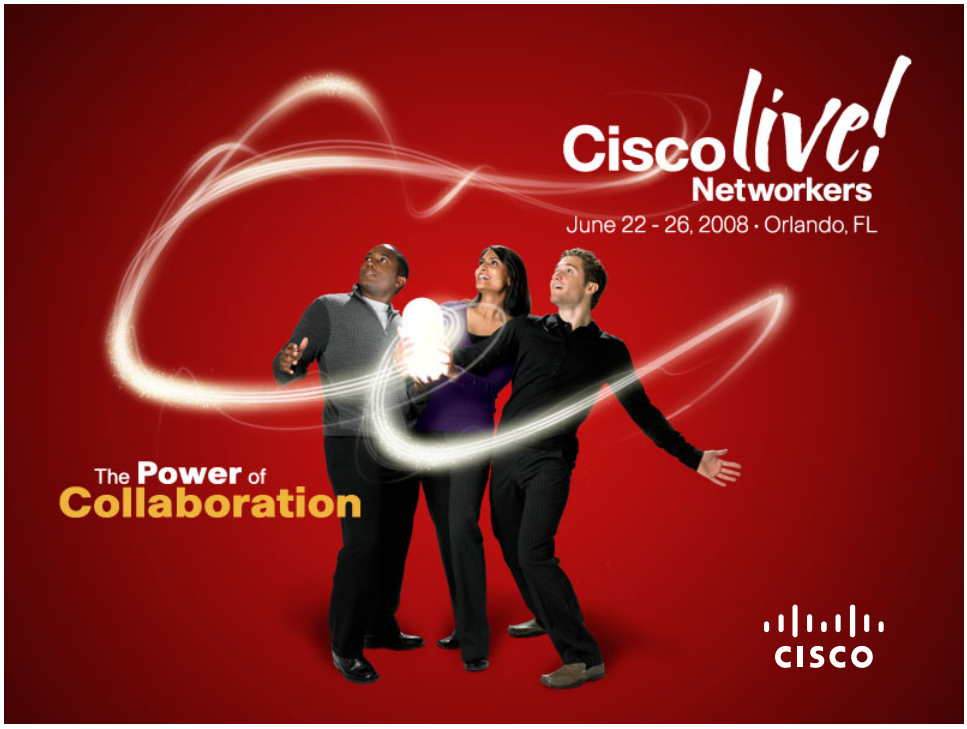
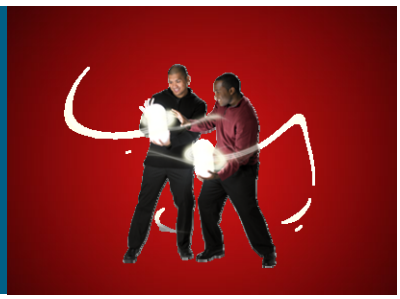


CISCO

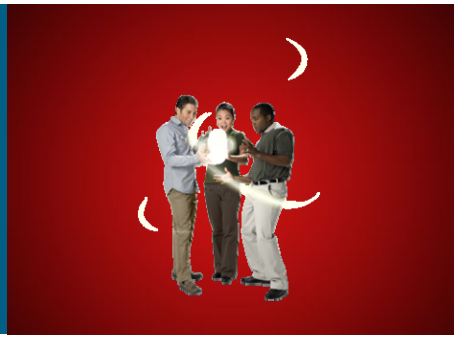
Cisco live! Networkers

CCNA Prep Session: Preparing to Take the CCNA Routing Exam



BRKCRT-1101

Agenda



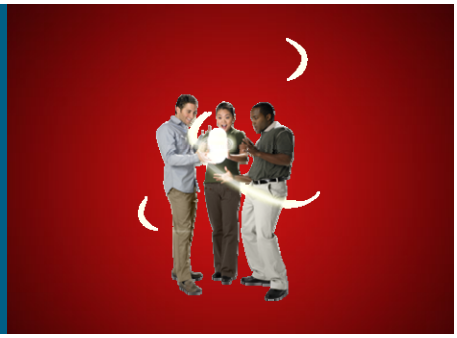
Agenda

- Exam Overview
- Study Resources
- Exam Question Formats
- Tips for Taking the Exams
- Time Budgeting
- ICND1 Practice Questions
- ICND2 Practice Questions
- Q&A

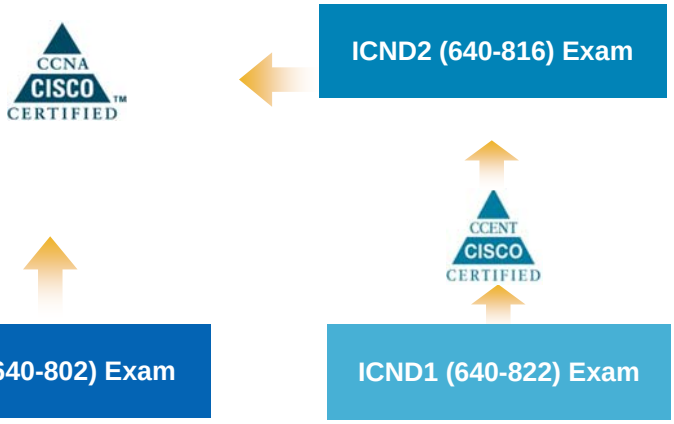
Agenda:
What We Will Cover

- Impossible to cover all topics for CCNA in two-hour session
- Session is about “how to prepare for the CCNA Exam”, not about “cover all CCNA knowledge in two hours”
- We will provide:
  - Suggestions
  - Resources
  - Some sample questions
- We will cover a couple key topics in a little depth:
  - Legends/Truths
  - IP addressing
  - Access lists

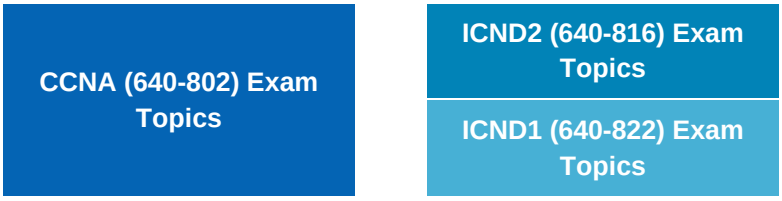
Exam Overview and Options



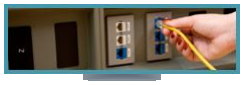
Two Options: 1-Step and 2-Step



CCNA Exam (640-802)



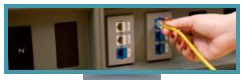
- From an exam day perspective …
  - You may see more ICND2 than ICND1, because some ICND2 skills require ICND1 skills plus more
  - e.g., An ICND2-level question using VLSM may also prove ICND1-level subnetting knowledge and ICND2-level subnetting knowledge



Example ICND1 Exam Topics

For Example, Here Are a Few Paraphrased Exam Topics for the ICND1 Exam:

- **Interpret** network diagrams
- **Determine** the path between two hosts across a network
- **Verify** network status and switch operation using commands
- **Explain** the operation of network of Cisco LAN Switches
- **Create** and **apply** an IP addressing scheme
- **Explain** NAT and **enable** using the SDM GUI
- **Configure** and **troubleshoot** RIP Version 2
- **Manage** IOS configuration files
- **Identify** the components of a Wireless LAN
- **Describe** the functions of common security appliances
- **Describe** and **identify** the function and purpose of WAN networks

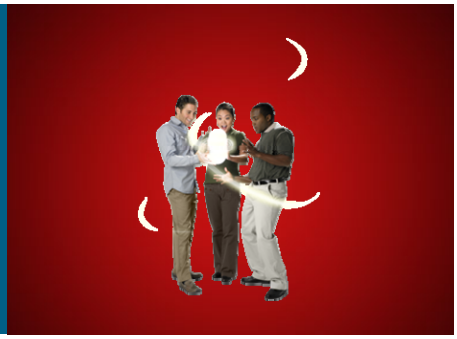


Example ICND2 Exam Topics

For Example, Here Are a Few Paraphrased Exam Topics for the ICND2 Exam:

- **Configure, verify, and troubleshoot** VTP
- **Configure, verify, and troubleshoot** trunking on Cisco switches
- **Calculate and apply** a VLSM IP addressing design to a network **Verify** network status and switch operation using commands
- **Describe** IPv6 addresses
- **Configure, verify, and troubleshoot** EIGRP
- **Troubleshoot** routing implementation issues
- **Configure and apply** an access control list to limit telnet and SSH access to the router
- **Configure and verify** Frame Relay on Cisco routers

Resources



Networkers Live! 2008 Sessions

- CCNA Voice—Covers all things related to CCNA Voice
- CCNA Security—Covers all things related to CCNA Security
- CCNA Wireless—Covers all things related to CCNA Wireless
- Master IP Subnetting Forever—Spends the entire session teaching how to subnet accurately and speedily
- CCNA Routing Lab—hands-on labs related to CCNA Routing
- CCNA Voice Lab—hands-on labs related to CCNA Voice
- CCNA Security Lab—hands-on labs related to CCNA Security

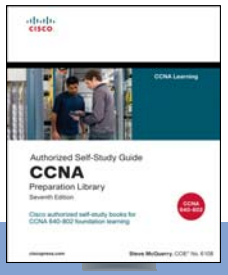
CCNA Exam Recommended Reading

- *CCENT/CCNA ICND1 Official Exam Certification Guide*, Second Edition
- *CCNA ICND2 Official Exam Certification Guide*, Second Edition
- 1 Hour of Video Training

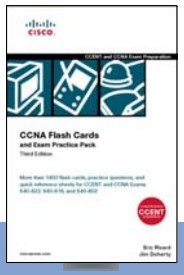
Available Onsite at the Cisco Company Store

CCNA Exam Recommended Reading

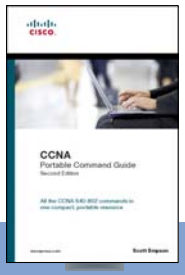
Video Learning and Lab Assistance



Foundation Learning



Test Review and Practice



Hands on Application

Available Onsite at the Cisco Company Store

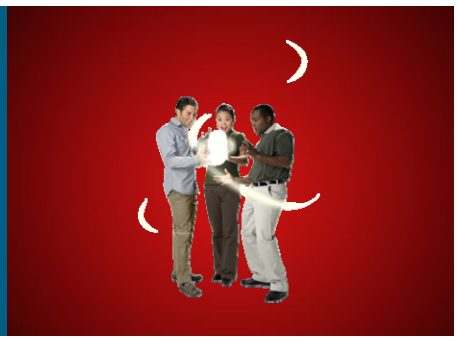
CCNA Prep Center

The CCNA Prep Center is designed to assist those preparing for CCNA Certification. It includes these features to help you reach your goal of obtaining a CCNA certification.

- Practice questions
- Remote labs and simulations
- Discussions forums with peers and CCNA experts
- Live Chat with Customer Service
- Games that will teach you new skills and reinforce CCNA topics
- CCNA TV live broadcast
  (also captured in VOD format for future reference)

www.cisco.com/go/prepcenter

Exam Question Formats



Multiple Choice, Single Answer

- May test simple recall of pertinent facts
- May require analysis and understanding of complex scenarios
- If you click a 2nd answer, it automatically unchecks the previous answer

Which OSI model layer is concerned with routing?

A. Layer 1
B. Layer 3
C. Layer 5
D. Layer 7

Multiple Choice, Multiple Answer

- Question states the number of right answers
- Exam engine reminds about too few, too many answers

Which cable in the campus LAN should be a crossover cable (Choose 2)?

A. SW1 – SW2
B. PC1 – SW2
C. AP1 – SW1
D. R1 – SW2
E. PC2 – PC3

Drag-and-Drop

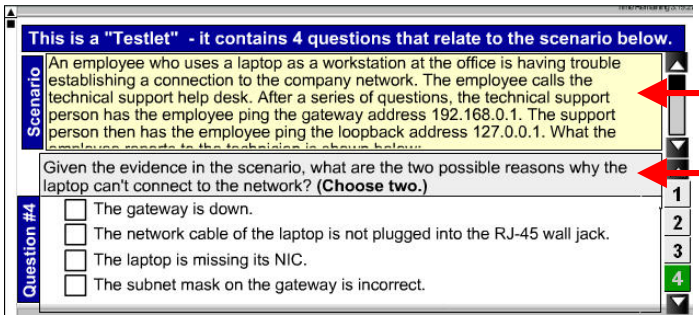
- List of items to be dragged on the left
- Drag to the boxes on the right

Click and drag the unit of information on the left to the OSI Layer to which it best corresponds on the right. Not all apply.

Packet	Layer 1
Frame	Layer 2
Bit	Layer 3
Segment	Layer 4
Record	

Testlet

- One general scenario
- Multiple different mc questions
- Can move around between the questions



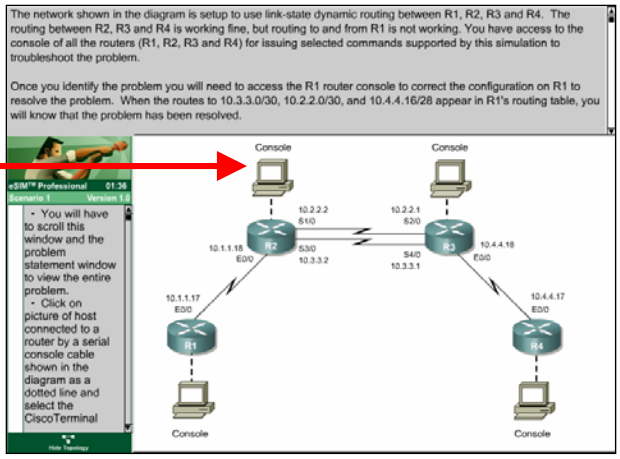
Simulations (Sims)

- Problem Statement, with Goal
- Objective: Complete or Fix the Configuration
- Must Access and Use the CLI
- Click a PC icon to (virtually) Use an Emulator to Connect to Router/Switch
- Sims support:
  - Help (?)
  - Abbreviated commands
  - Tab key to complete commands/keywords

Sim Topology View

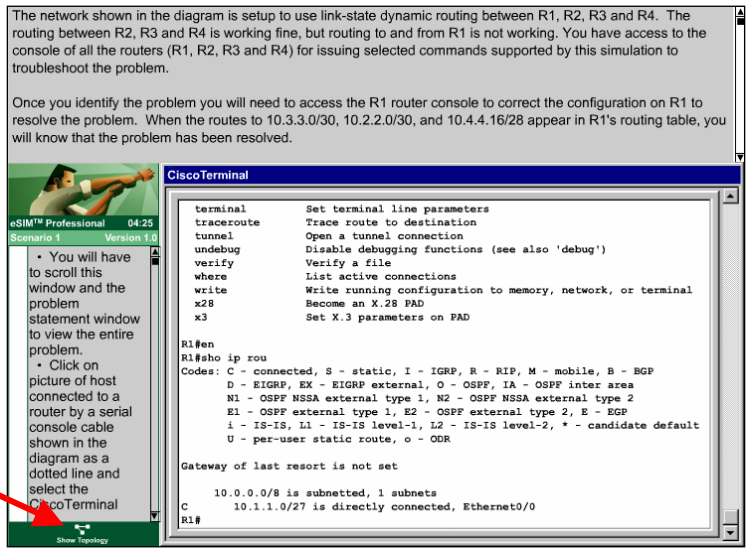
Problem Statement

Dashed Line Implies to Click this PC to reach R2's CLI



Sim With CLI Visible

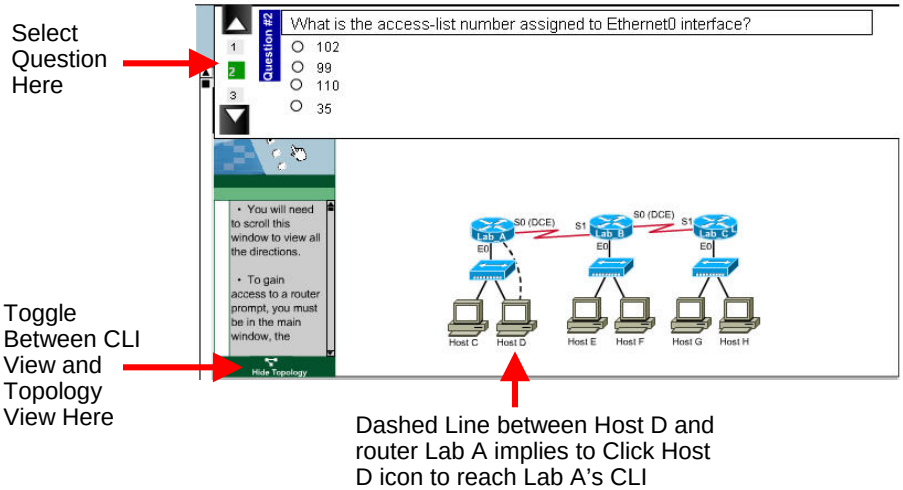
Toggle Between CLI View and Topology View Here



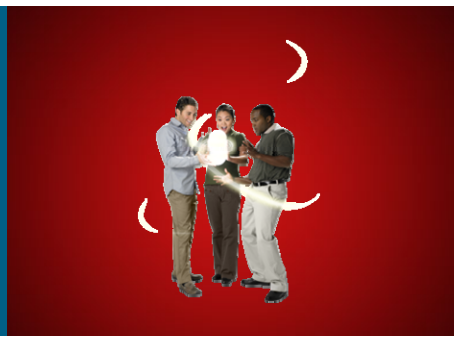
Simlet

- Like testlet, with multiple different MC questions
- Like sim, uses simulator
- Objective is to answer MC questions
- Typically, no configuration required

Simlet



Exam Taking Tips



Tips: Multiple Choice Questions

- Look for the “best” answer; some answers may be good, but not “best”, so read all the answers
- Look for subtleties, for example:
  - “Packet” implies layer 3, typically IP packet, routing, etc
  - “RIP Version 2” implies classless routing protocol and implies both VLSM support and 2s formula (instead of 2s – 2 formula) for the number of subnets
- If you need to guess:
  - Rule out as many answers as possible
  - Your first impression is usually the better answer to guess
  - There is no penalty for guessing

Tips: Testlets

- Answer all questions—exam software will remind you before letting you move on
- You can move between questions in a single testlet
  - If confused by testlet question 1, look at question 2
  - When reading question X, go ahead and click answer(s), even if you are unsure, so you’ll remember your first impressions
- Same general suggestions as MC questions

Tips: Sims

- Sim questions are always answered by configuring something!
- The Exam Engine grades the **running config**, not the startup config
- Before exam day …
  - Practice as much as you can (real gear, simulators, sample tests, read every configuration in books, repeat labs while in class, etc.)
  - Use multiple sources for practice/review of configurations
- Exam day …
  - Do what you can—**partial credit**!!!
  - Start with “show running-config”
  - There are no style points!

Tips: Simlets

- Simlet questions—no need to change the config!
- You may not have visibility to the running config!
- Before exam day …
  - Stop and do “show” commands after each step—this emulates the status in Simlet questions
  - Use resources that emphasize and explain show command output
  - Use multiple sources for guidance in your hands-on practice
- Exam day …
  - Guess if you don’t know! (no penalty)
  - If unsure, click your best guess now, to remember your first impressions
  - Read all questions, then use sim (personal preference)

Router Simulation Legends vs. Truth

1. **Legend**: You lose points if you use help "?"

   Truth: No penalty!

2. **Legend**: You have to save your configs even if the simulation does not specifically request saving

   Truth: Grading based on running-config

3. **Legend**: You lose points if you enter too many commands

   Truth: No penalty!

Router Simulation Legends vs. Truth (Cont.)

4. **Legend**: If you miss one little thing, you get 0 points on that Sim question

   Truth: Partial credit is given, so do as much as you can

5. **Legend**: You will fail the exam if you miss even one simulation question

   Truth: You can miss all available points on a sim question and still pass the exam

6. **Legend**: You should spend most of your time working on the simulations

   Truth: Sims do have greater weighting than one MC question, but do not spend most of your time—maybe 5 to 8 minutes

Other Legends and Truths

1. **Legend**: The test is adaptive, e.g., if you miss a RIP question, you'll get more RIP questions

   Truth: The tests are not adaptive

2. **Legend**: My exam covered something not listed in the exam topics

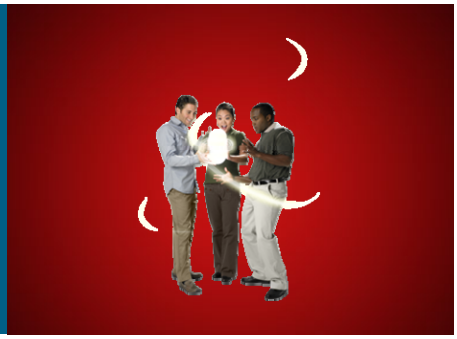
   Truth 1: Exam Topics are "guidelines"; the exams may go beyond the exam topics, so you could see such a question

   Truth 2: More likely: the question was a sample item for possible future tests, and did not affect your score

Cisco Avoids These Questions …

- Those that require the memorization of command syntax or interface/menus
- "Trick questions"
- Version-dependent questions, e.g., configure Cisco IOS vs. Cisco Cat IOS
- Subnetting questions that are ambiguous regarding whether to use the 2s or 2s – 2 formula for the number of subnets

Time Budget



Time and Question Counts on the Exams

- The three exams state the following:

ICND1:	90 minutes	50–60 questions
ICND2:	75 minutes	45–55 questions
CCNA:	90 minutes	50–60 questions

- You learn your exam's question count as you begin the exam
- Look at the clock as you begin Sim and Simlet questions
- Short suggestion on time budget here. For more …
  - Check the softcopy of this presentation, which includes more slides on time budgeting
  - Check Wendell's blog at www.nww.com/odom

Time Budget: Short Version

- You need a way to answer the question:

  Am I using too much time per question so far?

- Time consumers—Sim, Simlet, and Testlet questions—make the obvious math (actual-time/answered-questions vs. time-per-question) much less useful
- Just a suggestion:

  For each simlet/testlet/sim, add 5 to current question count

  Multiple by 1.2

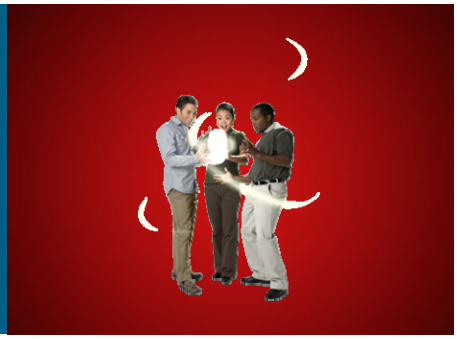
  That's the number of minutes, or less, you should have taken so far

  It's an **estimate**—don't be slaved to it

Time Budget Example

- CCNA Exam
- After question 10, you want to check time
- You've had one Sim question, no Simlets/Testlets
- Multiply 15 * 1.2 = 18 minutes
- If actual time <= 18 minutes, you're doing fine on time

ICND1 Questions: Part 1 Basic Technology



Basic Technology

Practice Item #1

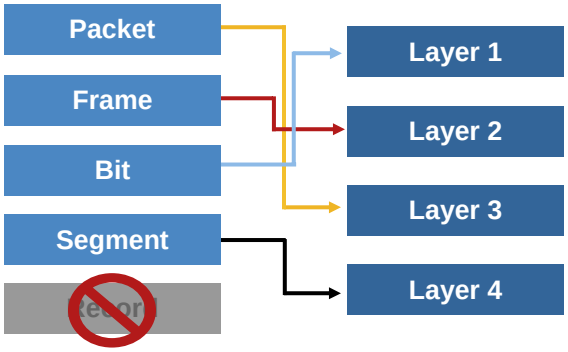
- Click and drag the unit of information on the left to the OSI Layer to which it best corresponds on the right. Not all apply.

Packet	Layer 1
Frame	Layer 2
Bit	Layer 3
Segment	Layer 4
Record	

Basic Technology

Practice Item #1 Solution

- Click and drag the unit of information on the left to the OSI Layer to which it best corresponds on the right. Not all apply.



Basic Technology

Practice Item #2

- An application developer has an application which requires very fast packet delivery. Loss of occasional packets can be tolerated to accommodate the need for speed. Which Layer 4 protocol would be the best choice?

  TCP

  SNMP

  FTP

  UDP

  CDP

Basic Technology

Practice Item #2 Solution

D. UDP

- UDP (User Datagram Protocol) is a communications protocol that offers a limited amount of service when messages are exchanged between computers in a network that uses the Internet Protocol (IP)
- UDP does not provide the service of dividing a message into packets (datagrams) and reassembling it at the other end
- Network applications that want to save processing time will prefer UDP to TCP; the Trivial File Transfer Protocol (TFTP) uses UDP instead of TCP
- In the Open Systems Interconnection (OSI) communication model, UDP, like TCP, is in Layer 4, the Transport Layer

Basic Technology

Practice Item #3

- Click and drag the attribute on the left to the Ethernet collision type that it describes on the right. Not all apply.

Retransmits frame when damaged	**Routine Collisions**
Not normal in a well-design network	
Caused by excessive media latency	
May be normal network operation	
Shared media segment does not allow	**Late Collisions**
Before this, 64 bytes are transmitted	
Found often by full-duplex operation	
Intended jam signal corrupts frame	

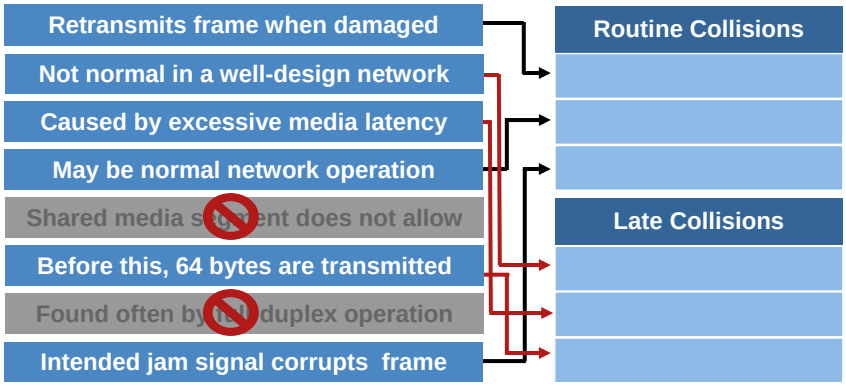
Basic Technology

Practice Item #3 Solution

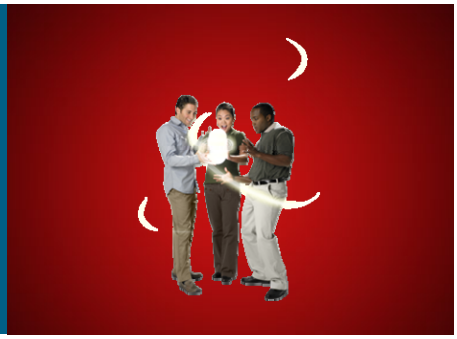
- On shared LAN segments (Hubs, half-duplex links), collisions happen due to CSMA/CD
- On full-duplex links (Two devices only, both using FDX), CSMA/CD is disabled, and collisions should not happen
- On shared segments that meet cabling length requirements, collisions occur within the first 64 bytes of a frame
- Late collisions occur after the first 64 bytes (512 bits)

Basic Technology

Practice Item #3 Solution (Cont.)



ICND1 Questions: Part 2 IP Subnetting



IP Addressing Reference I

- Numeric values allowed in subnet masks, and the number of binary 1's and 0's:

0	00000000
128	10000000
192	11000000
224	11100000
240	11110000
248	11111000
252	11111100
254	11111110
255	11111111

IP Addressing Reference II

- Some masks and prefix lengths

255.255.0.0	/16	255.255.255.0	/24
255.255.128.0	/17	255.255.255.128	/25
255.255.192.0	/18	255.255.255.192	/26
255.255.224.0	/19	255.255.255.224	/27
255.255.240.0	/20	255.255.255.240	/28
255.255.248.0	/21	255.255.255.248	/29
255.255.252.0	/22	255.255.255.252	/30
255.255.254.0	/23		

IP Addressing

Practice Item #4

- A small company has a Class C network address and needs to create 12 subnets, each accommodating 14 hosts
- Which subnet mask should be assigned?
  - A. 255.255.255.128
  - B. 255.255.255.224
  - C. 255.255.255.240
  - D. 255.255.255.248
  - E. 255.255.255.252

IP Addressing
Practice Item #4 Solution

C. 255.255.255.240

- Class C means **24 network bits**
- Mask 11111111.11111111.11111111.1111**0000** means **4 host bits**, leaving **4 subnet bits**
- 4 subnet bits means 2^4 = 16 subnets (including subnet 0)
- 4 host bits means 2^4 - 2 = 14 hosts/subnet

IP Addressing
Practice Item #5

- A network manager wishes to assign static IP addresses to the servers in a network. For network 10.10.10.24/29, the router is assigned the first usable host address while the Gold server is assigned the last usable host address. Which IP configuration values should be assigned to the Gold server?

A. IP address: **10.10.10.14**
Mask: **255.255.255.248**
Default Gateway: **10.10.10.9**

B. IP address: **10.10.10.30**
Subnet Mask: **255.255.255.240**
Default Gateway: **10.10.10.17**

C. IP address: **10.10.10.254**
Mask: **255.255.255.0**
Default Gateway: **10.10.10.1**

D. IP address: **10.10.10.30**
Mask: **255.255.255.248**
Default Gateway: **10.10.10.25**

Practice Item 5 Solution: Binary

	Network + Subnet	Host
Subnet mask =	11111111.11111111.11111111.11111	000
Subnet Number =	00001010.00001010.00001010.00011	000
First Address=	00001010.00001010.00001010.00011	001
Last Address=	00001010.00001010.00001010.00011	110
B'cast Address=	00001010.00001010.00001010.00011	111

IP Addressing

Practice Item #5 Solution

D. IP address: **10.10.10.30**
Mask: **255.255.255.248**
Default Gateway: **10.10.10.25**

Subnetwork address = 10.10.10.24
Broadcast address = 10.10.10.31
Router (Default Gateway) - first usable address = 10.10.10.25
Gold server gets last usable address = 10.10.10.30

Practice Item #5 Solution Decimal

- Mask of /29 is 255.255.255.248
- All subnets with 255.255.255.248 mask are a multiple of 8 (256 – 248) in the 4th octet
- The subnet is 10.10.10.24, so next larger is 10.10.10.32
- Broadcast address of the subnet is 1 less than next larger subnet number, in this case, 10.10.10.24's B'cast is:

  10.10.10.32

  - 1

  10.10.10.31
- First usable is 10.10.10.24 + 1 = 10.10.10.25
- Last usable is 10.10.10.31 – 1 = 10.10.10.30

Practice Item #5 Solution Decimal and Fast

D. IP address: **10.10.10.30**
Mask: **255.255.255.248**
Default Gateway: **10.10.10.25**

- The question listed subnet 10.10.10.24
- The first usable address is 10.10.10.24 + 1 = 10.10.10.25
- The first usable address was to be used by the router
- Only one answer listed 10.10.10.25 as the default gateway, so only 1 answer could have been right!

IP Addressing

Practice Item #6

```
Current configuration
!
Version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password encryption
!
hostname Royal
!
ip subnet zero
!
ip classless
ip route 0.0.0.0 0.0.0.0 Serial0/0
no ip http server
!
<output omitted>
```

The British Navy has a router with a network IP address of 172.27.0.0/19. The graphic reveals a partial configuration.
How many subnets and host addresses will be usable?

A. 7 subnets, 30 host addresses
B. 7 subnets, 2046 host addresses
C. 7 subnets, 8190 host addresses
D. 8 subnets, 30 host addresses
E. 8 subnets, 2046 host addresses
F. 8 subnets, 8190 host addresses

IP Addressing

Practice Item #6 Solution

F. 8 subnets, 8190 host addresses

- The ip subnet-zero global command allows that router to configure an IP address in a subnet zero
- ip subnet zero is the default as of version 12.0, but to avoid version dependent questions, it's explicitly listed
- ip classless has nothing to do with the issue—it's a distracter

```
version 12.0
!
ip subnet zero
!
ip classless
ip route 0.0.0.0 0.0.0.0 Serial0/0
```

IP Addressing

Practice Item #6 Solution (Cont.)

172.27.0.0 is a Class B Network, so 16 Network bits

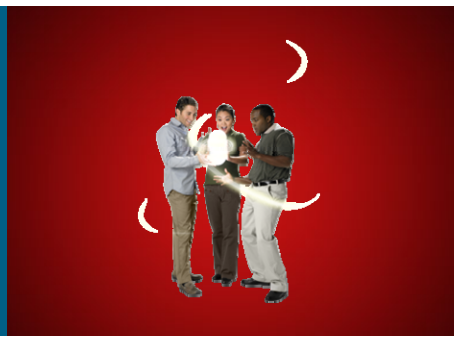
Mask /19 = 11111111.11111111.11100000.00000000

Network Bits | Subnet Bits | Host Bits

3 subnet bits: $2^3 = 8$ subnets

13 host bits: $2^{13} - 2 = 8192 - 2 = 8190$ hosts/subnet

ICND1 Questions: Part 3 Miscellaneous



Routing Protocols

Practice Item #7

- Click and drag the feature on the left to the routing protocol that it uniquely belongs to on the right. Not all apply.

A	Route updates to 255.255.255.255
B	Administrative Distance = 90
C	Uses wildcard mask
D	Administrative Distance = 120
E	Link-state
F	Classful
G	Hybrid
H	Distance Vector

RIPv2

OSPF

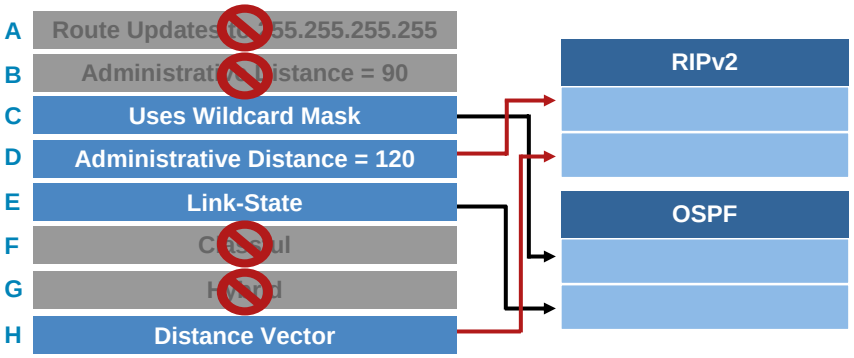
Routing Protocols

Practice Item #7 Solution

	RIPv1	RIPv2	OSPF	EIGRP
less/full	classful	classless	classless	classless
Updates	all 255's	224.0.0.9	224.0.0.5, 6	224.0.0.10
AD	120	120	110	90
Type	DV	DV	LS	Hybrid
Mask	no	no	yes	yes

Routing Protocols

Practice Item #7 Solution



CDP

Practice Item #8

- You have disabled the Cisco Discovery Protocol Version 2 on your new Cisco IOS router. Your supervisor has decided that your router needs to use this protocol. Which command will you use?
  - A. Router(config)**#cdp run**
  - B. Router(config)**#cdp advertise-v2**
  - C. Router(config)**#cdp advertise**
  - D. Router(config-if)**#cdp enable**
  - E. Router(config-if)**#cdp run**

CDP

Practice Item #8 Solution

- You have disabled the Cisco Discovery Protocol on your new Cisco IOS router. Your supervisor has decided that your router needs to use this protocol. Which command will you use?

A. Router(config)**#cdp run**

B. Router(config)**#cdp advertise-v2**

C. Router(config)**#cdp advertise**

D. Router(config-if)**#cdp enable**

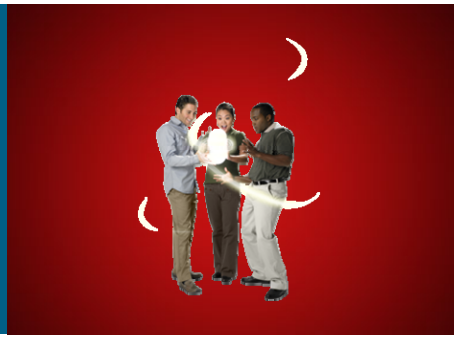
E. Router(config-if)**#cdp run**

CDP

Practice Item #8 Solution (Cont.)

- This question is purposefully a little ambiguous in order to make two points:
  1) Answer D works. cdp enable in interface mode—it enables CDP on the interface.
  2) Answer E also works (cdp run in interface mode)! Global commands issued in non-global modes work.
- Point 1 is a legitimate purposeful case of making you choose the best answer
- Point 2 is an example of am ambiguity that will be avoided for actual exam questions

ICND2 Questions: Part 1 IP Access Lists

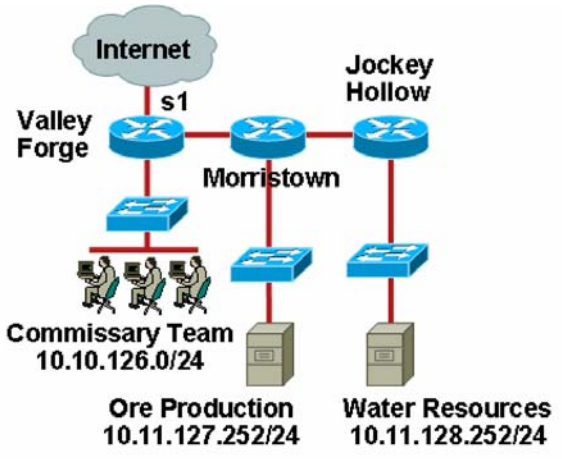


Access Lists

Practice Item #9 Figure

Goals

- Allow HTTP access from the Internet to the Water Resources server
- Allow Telnet from the Internet to the Ore Production server
- All other traffic from the Internet should be blocked



Access Lists

Practice Item #9

- Refer to the figure. Which two access list statements applied to the s1 interface, inbound, of the Valley Forge router are necessary? (Choose two)
  - A. access-list 101 permit tcp any 10.11.128.252 0.0.0.0 eq 80
  - B. access-list 1 permit tcp any 10.11.127.252 0.0.0.0 eq 23
  - C. access-list 101 deny tcp any 10.11.128.252 0.0.0.0 eq 80
  - D. access-list 101 permit tcp 10.11.127.252 0.0.0.0 any eq 23
  - E. access-list 101 deny tcp any 10.11.127.252 0.0.0.0 eq 23
  - F. access-list 101 permit tcp any 10.11.127.252 0.0.0.0 eq 23

Access Lists

Practice Item #9 Solution

A. access-list 101 permit tcp any 10.11.128.252 0.0.0.0 eq 80

(Goal 1)

F. access-list 101 permit tcp any 10.11.127.252 0.0.0.0 eq 23

(Goal 2)

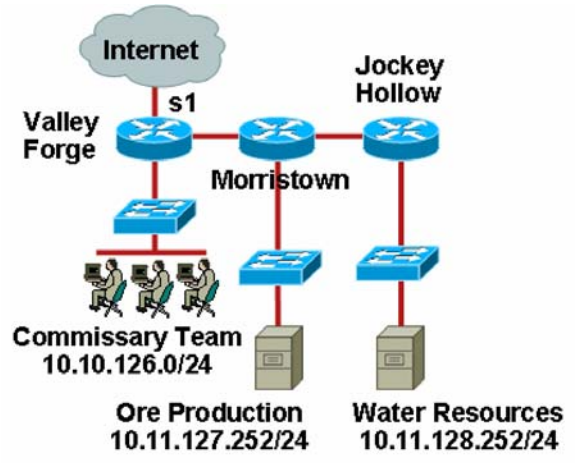
Since there is no other access list statement an implicit Deny All fulfills Goal 3

Access Lists

Practice Item #10

Goals—Same as Previous!

- Allow HTTP access from the Internet to the Water Resources server
- Allow Telnet from the Internet to the Ore Production server
- All other traffic from the Internet should be blocked



Access Lists

Practice Item #10

- Refer to the figure. Which two access list statements applied to the s1 interface, outbound, of the Valley Forge router are necessary? (Choose two)
  - A. access-list 101 permit tcp 10.11.128.252 0.0.0.0 any eq 80
  - B. access-list 101 permit tcp any any eq 23
  - C. access-list 101 permit tcp 10.11.128.252 0.0.0.0 any source-port 80
  - D. access-list 101 permit tcp 10.11.127.252 0.0.0.0 eq 23 any
  - E. access-list 101 permit tcp 10.11.128.252 0.0.0.0 eq 80 any
  - F. access-list 101 permit tcp 10.11.127.252 0.0.0.0 any eq 23

Access Lists

Practice Item #10 Solution

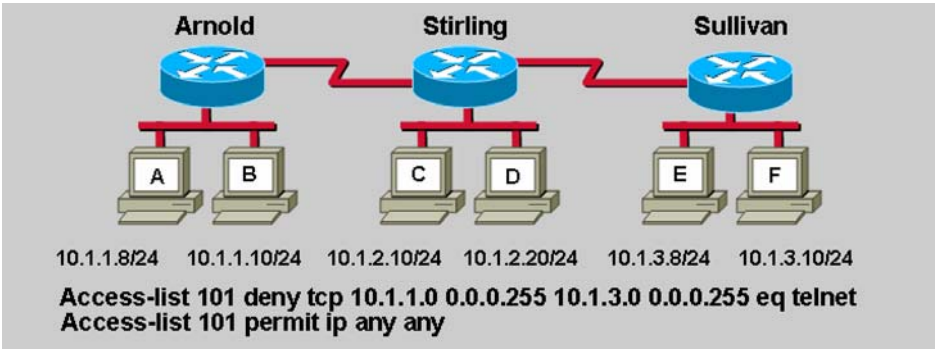
D.	access-list 101 permit tcp 10.11.127.252 0.0.0.0 eq 23 any
E.	access-list 101 permit tcp 10.11.128.252 0.0.0.0 eq 80 any

- Packets going from the servers to the Internet have source ports of the well-known ports for HTTP (80) and Telnet (23)
- To check the source port, the port number operator/operand are after the source IP address, but before the destination IP address—it's positional

Since there is no other access list statement an implicit Deny All fulfills Goal 3

Access Lists

Practice Item #11 Figure



Access Lists

Practice Item #11

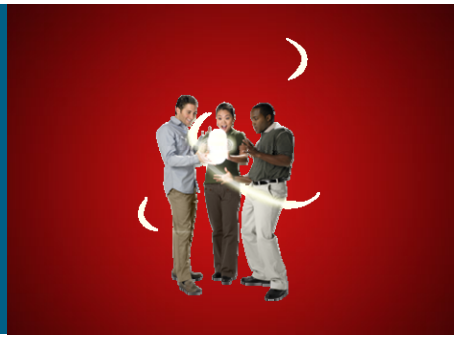
- Refer to the graphic. Access-group 101 is applied to the E0 interface, inbound, of Arnold. Which two telnet sessions are blocked by this ACL? (Choose two)
  - A. From host A to host 10.1.1.10
  - B. From host A to host 10.1.3.10
  - C. From host B to host 10.1.2.10
  - D. From host B to host 10.1.3.8
  - E. From host C to host 10.1.3.10
  - F. From host F to host 10.1.1.10

Access Lists

Practice Item #11 Solution

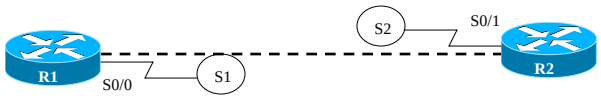
- This ACL only blocks telnet sessions to network 10.1.3.0/24 and only from hosts A and B
  - B. From host A to host 10.1.3.10
  - D. From host B to host 10.1.3.8

ICND1 Questions: Part 2 WAN Protocols



Frame Relay

Practice Item #12



- A network trace shows frames sent by R1 using DLCI 333 as they leave R1 towards Frame Relay switch S1. A network trace shows frames sent by R2 using DLCI 811 as the frames leave R2 towards switch S2. All these frames were sent over the PVC between the two routers. Which of the following are true about the expected output and parameters of the following commands on R1?
  - A. show frame-relay pvc lists DLCI 811
  - B. show frame-relay pvc lists DLCI 333
  - C. The frame-relay map command, if configured, lists DLCI 811
  - D. The frame-relay interface-dlci command, if configured, lists DLCI 333

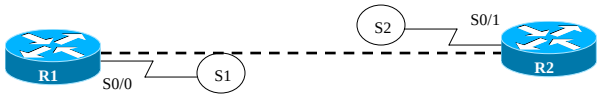
Frame Relay

Practice Item #12 Solution (Cont.)

- Frame Relay DLCIs are local
- A router does not have knowledge of the DLCI used on the other end of the PVC
- All show and configuration commands will reference the local DLCI
- The Frame Relay network swaps the DLCIs as frames traverse the network

Frame Relay

Practice Item #12 Solution



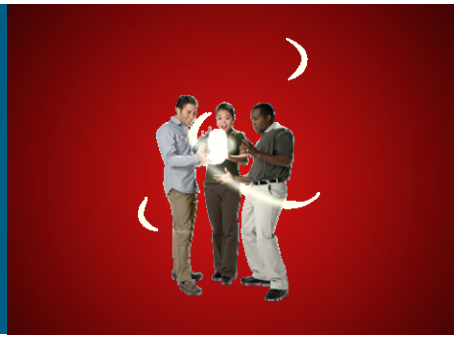
A. show frame-relay pvc lists DLCI 811

B. show frame-relay pvc lists DLCI 333

C. The frame-relay map command, if configured, lists DLCI 811

D. The frame-relay interface-dlci command, if configured, lists DLCI 333

ICND1 Questions: Part 3 IP and Routing



IP Addressing

Practice Item #13

- A router has been configured for IPv6 on interface Fa0/0 as shown below. If the engineer issued a show ipv6 interface command, which of the following IPv6 addresses will be listed?

```
ipv6 unicast-routing
!
interface fa0/0
 mac-address 0400.0003.0003
 ipv6 address 2345:1:2:3::/64 eui-64
```

A. 2345:1:2:3:400:FF:FE03:3
B. 2345:1:2:3:600:FF:FE03:3
C. 2345:1:2:3:600:3:FFFE:3
D. FE80::400:FF:FE03:3
E. FE80::600:FF:FE03:3
F. FE80::600:3:FFFE:3

IPv6 Addressing

Forming the 2nd Half with EUI-64

EUI-64 Format

1st ½ of MAC	FFFE	2nd ½ of MAC

Flip 7th bit (reading left-to-right) in first byte to a binary 1

IP Addressing

Practice Item #13

MAC Address:
0040.0003.0003

0400 00	FFFE	03 0003

0000 0100

7th bit

0000 0110

0600 00	FFFE	03 0003

0600:00FF:FE03:0003

600:FF:FE03:3

IP Addressing
Practice Item #13

- The global unicast IP address will start with 2345:1:2:3 (per config)
- The Link Local begins FE80:: (octets 2, 3, 4 are 0's)
- Both end with the 4 quartets of EUI as seen on the previous pages

```
ipv6 unicast-routing
!
interface fa0/0
 mac-address 0400.0003.0003
 ipv6 address 2345:1:2:3::/64
```

A. 2345:1:2:3:400:FF:FE03:3
B. 2345:1:2:3:600:FF:FE03:3
C. 2345:1:2:3:600:3:FFFE:3
D. FE80::400:FF:FE03:3
E. FE80::600:FF:FE03:3
F. FE80::600:3:FFFE:3

IP Addressing
Practice Item #14

- The output shown below lists all subnets in an internetwork. The engineer needs to add two subnets—one with a /30 mask, and one with a /23 mask. Which answers show the lowest subnet numbers that could be used without causing overlapping subnets?

172.16.1.0/24
172.16.2.0/24
172.16.3.0/24
172.16.4.0/22
172.16.9.0/25
172.16.10.8/30
172.16.10.0/30

A. 172.16.0.0/23
B. 172.16.8.0/23
C. 172.16.12.0/23
D. 172.16.0.0/30
E. 172.16.8.0/30
F. 172.16.10.4/30

IP Addressing
Practice Item #14

- Find the biggest (/23) subnet first!
- Calculate all subnets and ranges of addresses
- Compare to the current list of subnets, find the smallest that doesn't overlap

IP Addressing
Practice Item #14

- 172.16.0.0/23
- 172.16.2.0/23
- 172.16.4.0/23
- 172.16.6.0/23
- 172.16.8.0/23
- 172.16.10.0/23
- 172.16.12.0/23

- With /23 (mask 255.255.254.0), subnets will be increments of 2 (256 – 254) in the 3rd octet
- The range of addresses in each subnet begins with the subnet number, and ends 1 number less than the next subnet number
  - e.g., 172.16.0.0 – 172.16.1.255
  - e.g., 172.16.2.0 – 172.16.3.255

IP Addressing

Practice Item #14

- 172.16.0.0 – 172.16.1.255 → **172.16.1.0/24**
- 172.16.2.0 – 172.16.3.255 → **172.16.2.0/24**
- 172.16.4.0 – 172.16.5.255 → **172.16.3.0/24**
- 172.16.6.0 – 172.16.7.255 → **172.16.4.0/22**
- 172.16.8.0 – 172.16.9.255 → **172.16.9.0/25**
- 172.16.10.0 – 172.16.11.255 → **172.16.10.8/30**
- 172.16.12.0 – 172.16.13.255 → **172.16.10.0/30**

IP Addressing

Practice Item #14

- The output shown below lists all subnets in an internetwork. The engineer needs to add two subnets—one with a /30 mask, and one with a /23 mask. Which answers show the lowest subnet numbers that could be used without causing overlapping subnets?

172.16.1.0/24
172.16.2.0/24
172.16.3.0/24
172.16.4.0/22
172.16.9.0/25
172.16.10.8/30
172.16.10.0/30

A. 172.16.0.0/23
B. 172.16.8.0/23
C. 172.16.12.0/23
D. 172.16.0.0/30
E. 172.16.8.0/30
F. 172.16.10.4/30

Summary

Prepare

Use the Many Resources

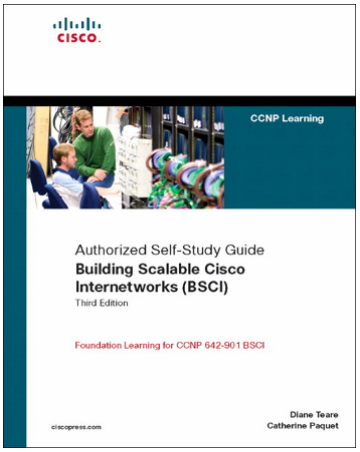
Practice on Routers and Switches or Simulators

Time Budget on Questions—Answer All of Them

Don't Be Intimidated by the Simulations
Give Yourself a Time Budget When You Hit a Simulation
Shows and Question Marks work
Answer as Much as You Can

Recommended Reading

- Continue your Cisco Live learning experience with further reading from Cisco Press
- Check the Recommended Reading flyer for suggested books



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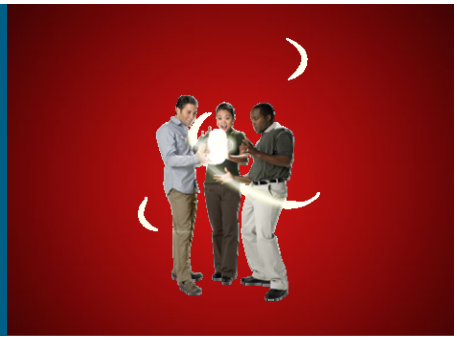
A



Extra Slides—More Detail on the Time Budget

Time and Question Counts on the Exams

- The three exams state the following:

ICND1:	90 minutes	50-60 questions
ICND2:	75 minutes	45-55 questions
CCNA:	90 minutes	50-60 questions

- You learn your exam's question count as you begin the exam
- A Sim question counts as 1
- A Testlet question counts as 1—regardless of number of actual questions inside the testlet
- A Simlet counts as 1—regardless of number of actual questions inside the Simlet

Time Budget

- You need a way to answer the question:
  - Am I using too much time per question so far?
- Time consumers—Sim, Simlet, and Testlet questions—make the obvious math (actual-time/answered-questions versus time per question) much less useful
- An exam that happens to front-load time consumers can discourage and can be hard to estimate time
- To budget time during the actual exam …
  - Normalize the question count to adjust for the three types of time consumers
  - Use a process that takes just a few seconds to check your time budget
  - Based on some discussion on Wendell Odom's blog at www.nww.com/subnets/cisco

Calculating the Time Budget

- Suggestion: Count time consumers as 6 questions (by adding 5), and expect 1.2 minutes per adjusted "Question Equivalent" (QE):
  - 1) Count the number of time consumers (Sim, Simlet, Testlet) you have already answered
  - 2) To check time budget versus actual time, calculate the QE as follows:
    - QE = questions-answered + 5 per time consumer
  - e.g., after 20 questions, 2 of which were Sims:
    - QE = 20 answered + 5 * 2 Sims = 30
  - 3) Calculate time budget with either of the following:
    - Time budget = 6 minutes for each 5 QE's,
    - Time budget = 1.2 * QE
    - e.g.,
      - Time budget = 30 * 1.2 = 36 minutes

Checking Your Time Suggestions

- After calculating the QE and Time Budget (previous slide), compare budget to actual time:
  - If actual time taken is less, you're ahead of the game
  - If actual time taken is more, you're slow
- Don't slave yourself to the number, and don't psych yourself out if you're slower—this is an **estimate**!
- One admitted problem with this process:
  - It does provide a little too much time for each testlet/simlet
- Math is easiest after the number of questions is a multiple of 5:
  - Even easier after multiples of 10 questions answered

Time Budget Example 1

- CCNA Exam
- After question 10, you want to check time
- You've had 1 time consumer, so QE = 10 + 5 = 15
- 15 QE's at 6 minutes / 5 QE is 18 minutes
- Actual time is 16 minutes – you're 2 minutes ahead per your estimate!

Time Budget Example 1

- CCNA Exam—55 questions, 90 minutes
- After question 10, you want an early read of time taken
- The exam timer's on 19 minutes, and you're starting to panic—seems like you're way slow
- You've had 1 time consumer so far, so:

  QE = 10 + 1*5 = 15

  6 minutes per 5 QE's (or 15 * 1.2)—time budget is 18 minutes
- You're only 1 minute behind of the time budget:

  Probably no need to speed up yet

  Check again in 10 questions, and if the gap widens, then pick up the pace

Time Budget Example 2

- ICND1 Exam—48 questions, 75 minutes
- After question 25, you're panicking—the timer's on 47 minutes—23 questions left, and only 28 minutes!
- You've had 3 time consumers, so:

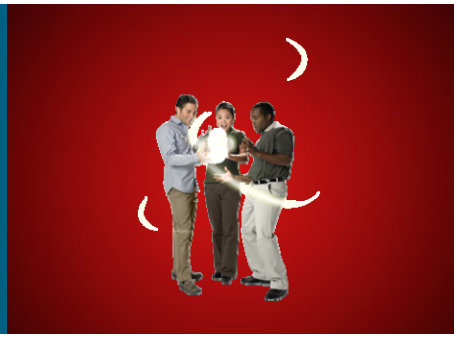
  QE = 25 + 3*5 = 40

  6 minutes per 5 QE's (or 40 * 1.2)—time budget is now 48 minutes
- You're actually 1 minute ahead of the time budget!!

Reverse Engineering the Time Estimate

- Assume your CCNA exam tells you, before the start:
  - 55 questions (it'll be between 50-60)
  - 90 minutes (standard set time)
- You'll probably see 3-4 time consumers at most, so assume worst case of 4 for now
- For the whole exam, QE = 55 questions + 4*5 = 75
- 90 minutes / 75 QE's = 1.2 minutes/QE = 1:12 per QE
- 1.2 minutes per QE with this process means:
  - 1:12 per MC or D&D
  - 6 * 1:12 = 7:12 minutes per Sim/Simlet/Testlet

B



Extra Slides—Extra ICND1 Practice Questions

Basic Technology

Practice Item #1

- Click and Drag the item on the left to the layer 4 feature description that it belongs to on the right

Port	Breaking large data into smaller pieces that are of an appropriate size for sending the through the network
Segmentation	Initiates communication by establishing an initial sequence number and window size
Window	The amount of data that can be sent before an acknowledgement is required
Three-Way Handshake	Allows multiple communications to the same host

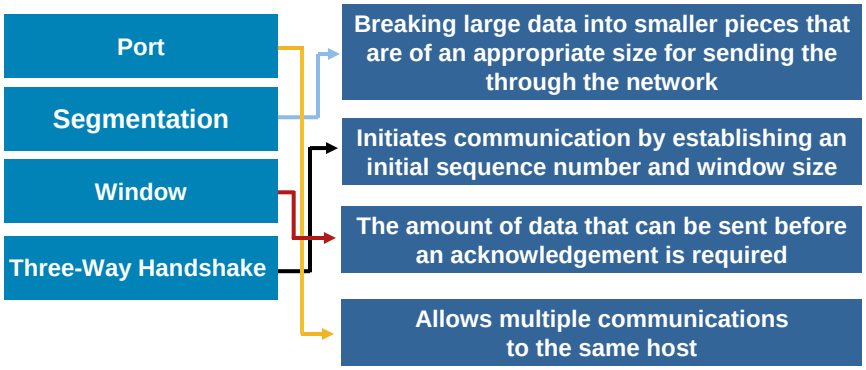
Basic Technology

Practice Item #1 Solution

Segmentation	Sending application asks TCP "send this 2 MB file" TCP segments data into multiple segments, for example, 1460 bytes to fit into a 1500 byte IP packet
Three-Way Handshake	TCP endpoints send 3 TCP segments Process identifies port numbers and initializes the sequence number and window size
Window	The receiving host states the window size (bytes) The sending host limits itself to that many sent bytes before getting an ACK
Port	Identifies the specific software process on one host EG, two web browsers use two different ports (maybe more)

Basic Technology

Practice Item #1 Solution (Cont.)



Cisco IOS Commands

Practice Item #2

- Network users at Plum Currants are not able to access LAN resources that are connected to interface E0/1 on the PlumSpecial router. Which three commands will provide both the IP address being used by that router interface, as well as the Layer 1 and Layer 2 status of E0/1? (Choose three)
  - A. PlumSpecial# **show eigrp version**
  - B. PlumSpecial# **show protocols**
  - C. PlumSpecial# **show interfaces**
  - D. PlumSpecial# **show controllers**
  - E. PlumSpecial# **show ip interface**
  - F. PlumSpecial# **show startup-config**

Cisco IOS Commands

Practice Item #2 Solution

- Network users at Plum Currants are not able to access LAN resources that are connected to interface E01 on the PlumSpecial router. Which three commands will provide both the IP address being used as well as the Layer 1 and Layer 2 status of E01? (Choose three)

A. PlumSpecial# **show eigrp version**

B. PlumSpecial# **show protocols**

C. PlumSpecial# **show interfaces**

D. PlumSpecial# **show controllers**

E. PlumSpecial# **show ip interface**

F. PlumSpecial# **show startup-config**

Cisco IOS Commands

Practice Item #2 Solution (Cont.)

```
PlumSpecial# show protocols
 <output omitted>
Ethernet 0 is up, line protocol is up
  Internet address is 192.168.1.1, subnet mask is 255.255.255.0
<output omitted>
  XNS address is 2001.AA00.0400.06CC
  <output omitted>
```

Cisco IOS Commands

Practice Item #2 Solution (Cont.)

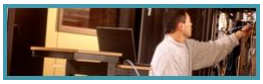
```
PlumSpecial# show interfaces serial 0
Serial1 is up, line protocol is up
<output omitted>
Internet address is 5.0.2.1/24
<output omitted>
```

```
PlumSpecial# show ip interface
Ethernet 0 is up, line protocol is up
IP address is 10.210.93.51 /16
MTU 1500 bytes, BW 0 Mbps
```

Note: Some show controllers arguments will show ip addresses, but the command by itself does not.

Security

Practice Item #3



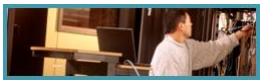
- Click and drag the security concern on the left to the organizational category that it belongs to on the right

Competitors
DoS
Insider
Distribution
Intelligence
Disgruntled Employees

Adversaries
Hacker Motivations
Classes of Attack

Security

Practice Item #3 Solution



- Click and drag the security concern on the left to the organizational category that it belongs to on the right

Adversaries

Competitors

Disgruntled Employees

Hacker Motivations

DoS

Intelligence

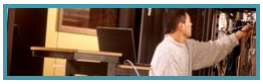
Classes of Attack

Insider

Distribution

Security

Practice Item #3 Solution (Cont.)

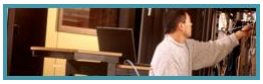


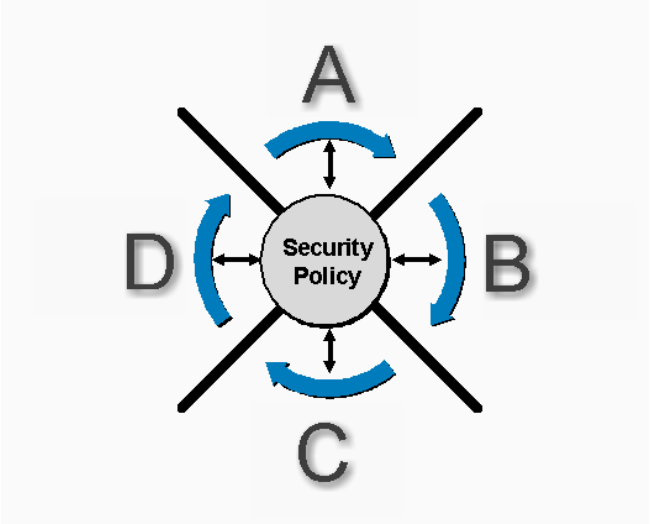
- To defend against attacks on information systems, organizations must define the threat in these three terms:

Adversaries, Hacker Motivations, and Classes of Attack

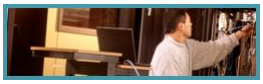
Adversaries	Motivations	Classes of Attack
• Nation states • Terrorists • Criminals • Hackers • Crackers • Competitors • "Script Kiddies" • Disgruntled Employees • Government	• Intelligence • Theft • DoS • Embarrassment • Challenge	• Passive • Active • Close-in • Insider • Distribution

Security
Practice Item #4 Figure





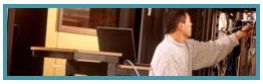
Security
Practice Item #4



- Refer to the figure. Which option correctly describes the design steps that an organization will continuously cycle through to verify the security of the network
  - A. Secure, Monitor, Test, Improve
  - B. Monitor, Test, Secure, Improve
  - C. Detect, Audit, Validate, Implement
  - D. Audit, Detect, Implement, Validate
  - E. Firewall, Encrypt, Authenticate, Patch
  - F. Authenticate, Encrypt, Firewall, Patch

Security

Practice Item #4 Solution

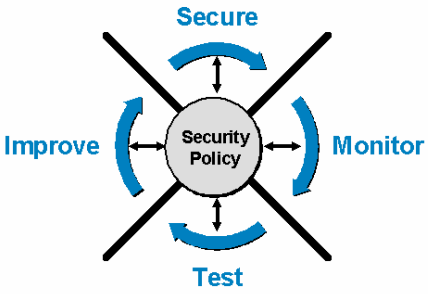


A. Secure, Monitor, Test, Improve

Network Security Design Factors

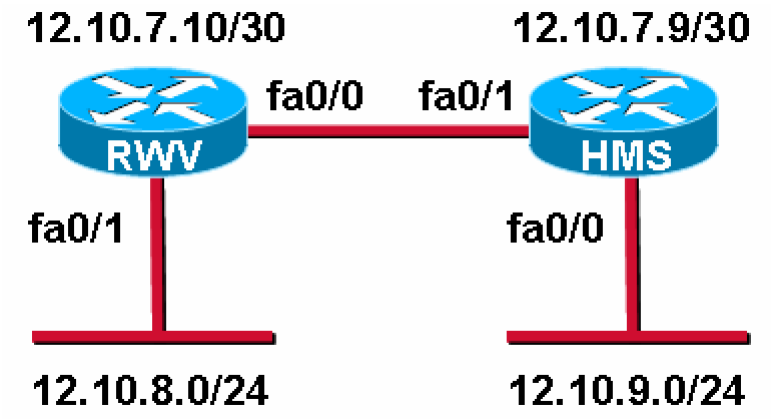
Network security is a continuous process built around a security policy:

- **Step 1: Secure**
- **Step 2: Monitor**
- **Step 3: Test**
- **Step 4: Improve**



Cisco IOS Commands

Practice Item #5 Figure



Cisco IOS Commands

Practice Item #5

- Refer to the exhibit. The router RWV needs a static route to the 12.10.9.0/24 network. The network manager wants RWV to see this static route as the most reliable route. Which command will achieve this result?

  A. RWV(config)# ip route 12.10.9.0 0.0.0.255 fa0/0

  B. RWV(config)# ip route 12.10.9.0 0.0.0.255 12.10.7.9

  C. RWV(config)# ip route 12.10.9.0 255.255.255.0 fa0/0

  D. RWV(config)# ip route 12.10.9.0 255.255.255.0 12.10.9.11

  E. RWV(config)# ip route 12.10.7.9 0.0.0.255 12.10.9.0

  F. RWV(config)# ip route 12.10.7.9 255.255.255.0 12.10.9.0

Cisco IOS Commands

Practice Item #5 Solution

C. RWV(config)# ip route 12.10.9.0 255.255.255.0 fa0/0

- A static route's administrative distance can be set with a parameter on the end of the command—for example,

  ip route 12.10.9.0 255.255.255.0 12.10.9.10 23

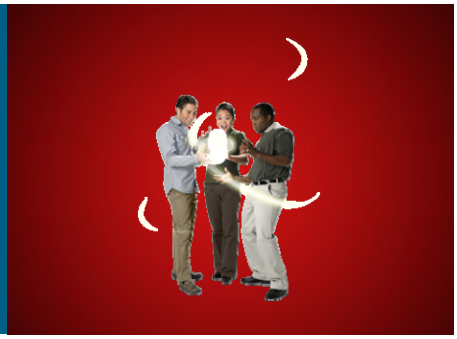
- By default, the AD is:

  0 for Static routes with an outgoing interface

  1 for Static routes with a next-hop IP address

- A lower AD might be described as "reliable", "believable", "better", or other words

C



Extra Slides—Extra ICND2 Practice Questions

Spanning Tree

Practice Item #6

- What is the default method of determining Spanning Tree cost?
  - A. Total hop count
  - B. Sum of the costs
  - C. Dynamically determined based on load
  - D. Individual link cost based on latency

Spanning Tree

Practice Item #6 Solution

- What is the default method of determining Spanning Tree cost?

A. Total hop count

B. Sum of the costs based on bandwidth

C. Dynamically determined based on load

D. Individual link cost based on latency

Spanning Tree

Practice Item #6 Solution (Cont.)

- In Spanning Tree a cost value is given to each port; according to the original specification, port cost is calculated based on a bandwidth of 1000 Mbps; the port cost is 1000 Mbps divided by the link bandwidth
- To compensate for the speed of networks faster than gigabit, the standard cost has been modified as the table shows

Bandwidth	STP Cost Value
4 Mbps	250
10 Mbps	100
16 Mbps	62
45 Mbps	39
100 Mbps	19
155 Mbps	14
622 Mbps	6
1 Gbps	4
10 Gbps	2

Note: The Path Cost Can Be an Arbitrary Value Assigned by the Network Administrator, Instead of One of the Standard Cost Values

Spanning Tree
Practice Item #7

- Which switch will be the Spanning Tree Root Bridge for a network which contains only these four devices?

A.
```
Princeton#show spanning-tree
Spanning tree 1 is executing the IEEE compatible Spanning Tree
Protocol Bridge Identifier has priority 4096, address f176.dec4.bf13
Configured hello time 2, max age 20, forward delay 15
```

B.
```
Brandywine#show spanning-tree
Spanning tree 1 is executing the IEEE compatible Spanning Tree
Protocol Bridge Identifier has priority 32678, address f176.dec4.cc13
Configured hello time 2, max age 20, forward delay 15
```

C.
```
Germantown#show spanning-tree
Spanning tree 1 is executing the IEEE compatible Spanning Tree
Protocol Bridge Identifier has priority 16384 address f176.dec4.cc04
Configured hello time 2, max age 20, forward delay 15
```

D.
```
Trenton#show spanning-tree
Spanning tree 1 is executing the IEEE compatible Spanning Tree
Protocol Bridge Identifier has priority 4096, address f176.dec4.bf50
Configured hello time 2, max age 20, forward delay 15
```


Spanning Tree
Practice Item #7 Solution

- The first step in the Spanning Tree process is for all nodes on the network to elect a Root Bridge.
- Bridge/switch with the lowest Bridge-ID wins
- Bridge-ID formed by combining Priority with a MAC address
- Answer A's switch has slightly lower value

A.
```
Princeton#show spanning-tree
Spanning tree 1 is executing the IEEE compatible Spanning Tree
Protocol Bridge Identifier has priority 4096, address f176.dec4.bf13
Configured hello time 2, max age 20, forward delay 15
```

D.
```
Trenton#show spanning-tree
Spanning tree 1 is executing the IEEE compatible Spanning Tree
Protocol Bridge Identifier has priority 4096, address f176.dec4.bf50
Configured hello time 2, max age 20, forward delay 15
```