
TOMORROW
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CCDE Lab Review

BRKCCDE-3006

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#clmel

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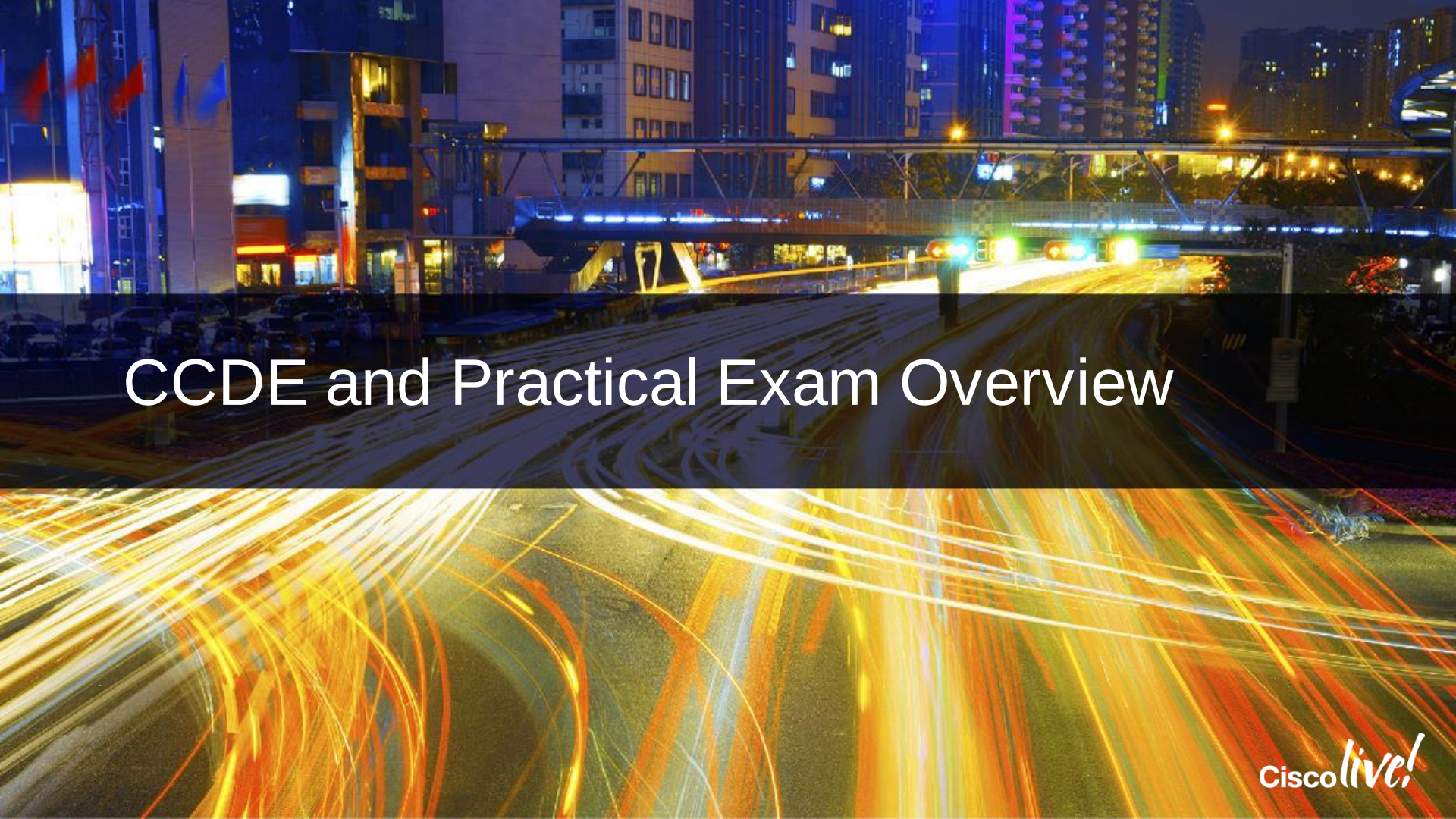
Agenda

- ***** The CCDE Lab portion of this session was run at the WISP Labs *****
- CCDE and Practical Exam Overview
- Critical Question Types
- CCDE Practical Exam Debriefing
- CCDE Practical Study and Exam Tips
- Q&A



CCDE and Practical Exam Overview

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Why CCDE?

- Design is not widely taught or practiced
- Misconceptions: design is easy, it's not new and exciting, it's just plumbing
- Cool, exciting technologies don't work without a solid routing design
- Basic design problems happen every day: a lot of time and money is spent fixing failures caused by poor design
- CCDE assesses design principles to deliver robust network designs
  - Resilient, reliable, redundant, scalable and manageable networks
  - But mainly, network designs which meet the business requirements!

What CCDE Is and What It Is Not

What CCDE "IS"

- Focus on how and where to deploy which technologies, and why
- Vendor-agnostic
- Translates business and technical requirements into technical designs

What CCDE "IS NOT"

- Implementation/configuration, troubleshooting or operations
- Data sheets
- Product specifics
- Software release specifics
- Business test

CCDE Practical Exam

The Scenario

- Context is established through the use of exhibits
  - Business and technical requirements
- Dig for information on each exhibit:
  - Vertical and their unique characteristics: retail, hospital, service provider, etc.
  - Technologies, Topologies and Boundaries: current, proposed (not necessarily ideal but rather best fit), new
  - Speeds and Feeds
  - Locations: divestiture, merge, scaling
  - Constraints: technical, business, regulatory, compliance, policy
  - Problems to be solved
  - Opportunities to be seized
  - Provided vs. missing information/requirements
  - Application characteristics/requirements
  - Risk and risk mitigation
  - OPEX,CAPEX, Lifecycle

This list is not all inclusive

Practical Exam

The Scenario, cont.

- Using this information, you…
  - Decide what information you'll need to finish the challenge
  - Determine what the critical technical and business constraints are
  - Determine which technology fits where
  - Determine how to deploy specific technologies to meet the challenge
  - Respond to customer ideas and queries

CCDE Design Use Cases

Merge/ Divest

Add Technology / Service

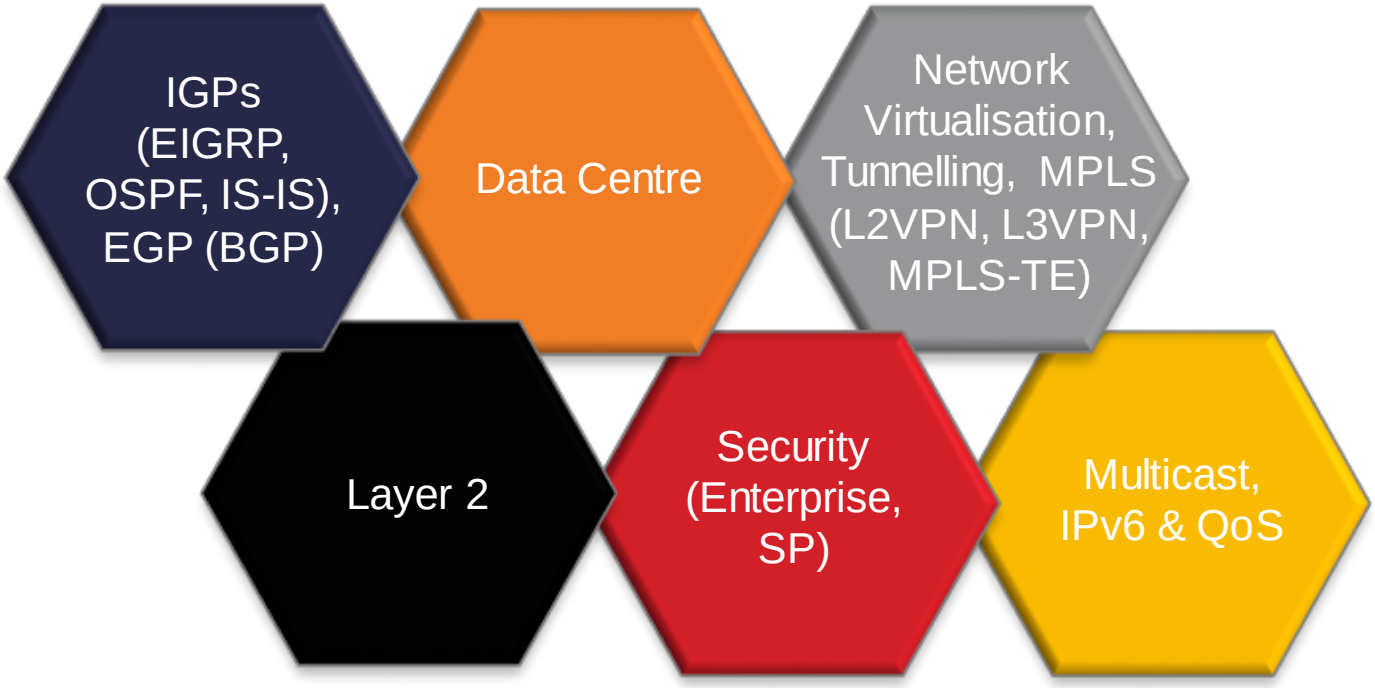
Replace Technology / Service

Scaling

Design Failure

Design Lifecycle

CCDE Technology Domains



Critical Question Types

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Multiple Choice

- Question or instructions that require one or multiple responses
- Can or not have an exhibit
- Options can be exhibits
- Typically worth 1 point

Stem

A. option

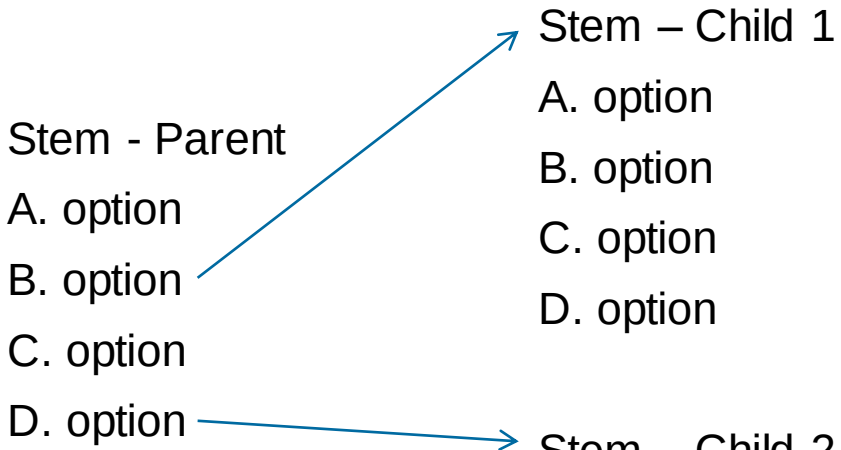
B. option

C. option

D. option

Branch

- Used on decision-making:
  - Make a decision on the parent – use your best judgment
  - Justify your decision on the child/children
  - There may be more than 1 solution, and scoring will account for all optimal (worth more points) and suboptimal solutions (worth less or no points)
- May not be apparent
- Only 1 level deep
- May be worth points on parent and child/children
- Next question level-sets the decision the remaining of the scenario will adopt

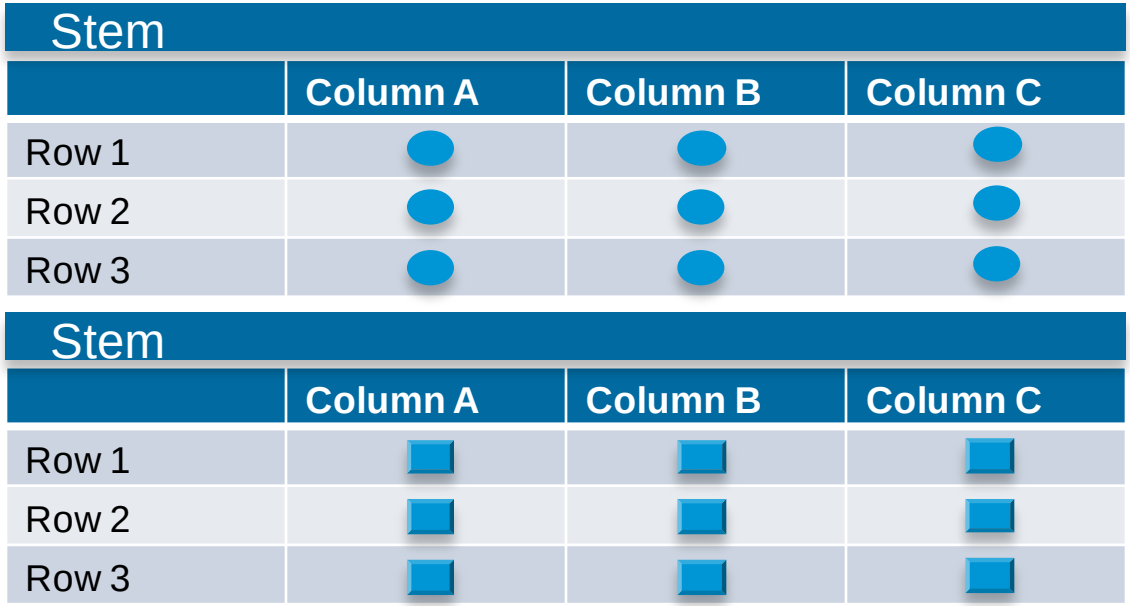


* Options A, C do not branch out

Chart

A task requiring the candidate to select either one option or multiple options per row.

- Used to compare/contrast
- Typically worth multiple points: 1 point per single row|column or groups of rows|columns



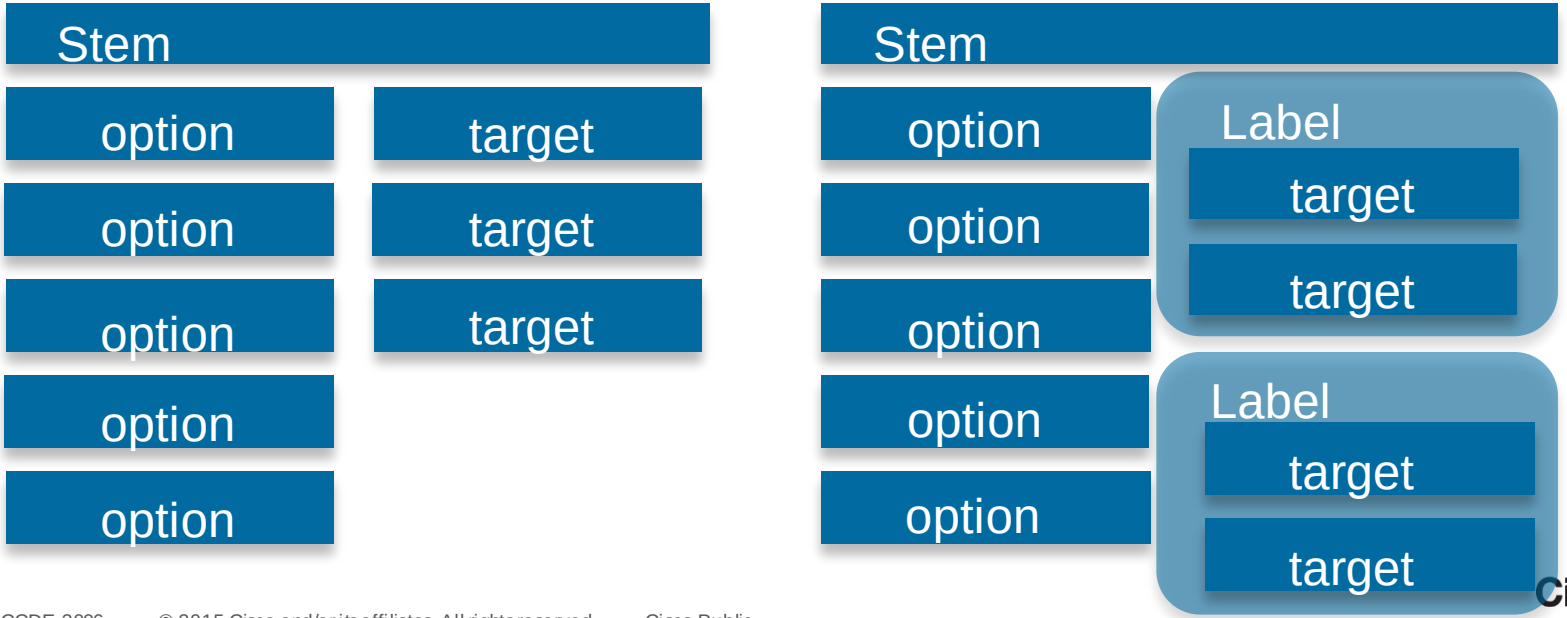
single option per row

multiple options per row

Drag and Drop and Label Drag and Drop

A task requiring the candidate to drag and drop options from one side of the interface to another, by populating or ordering the options.

- Used to select or order multiple options
- Typically worth multiple points: 1 point per group of targets or labels



Hotspot

A task requiring the candidate to click on some part of the presented graphic, select one on a set of figures, or drag icons into a canvas to assemble a meaningful image. May be worth multiple points.

X

Hotspot

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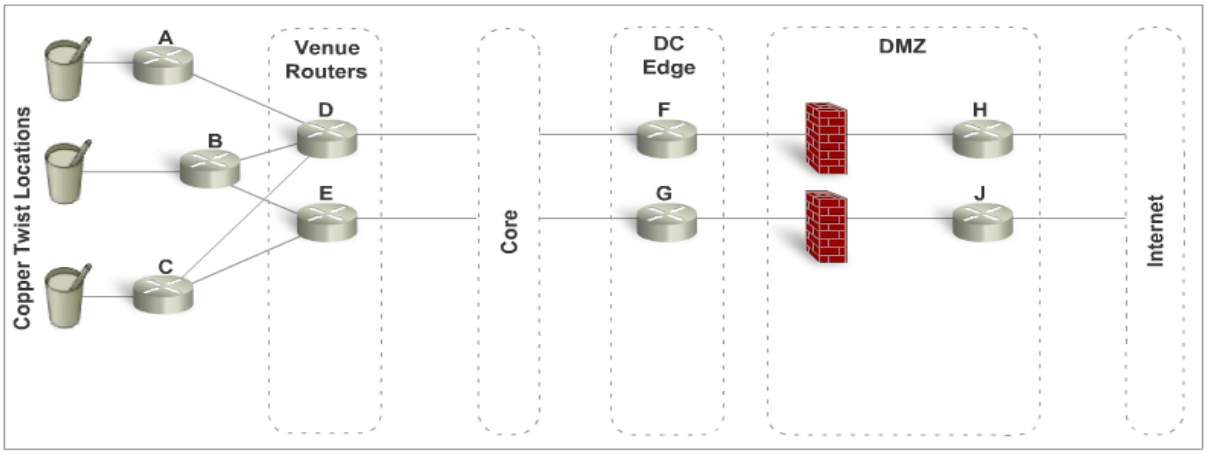
Simulation

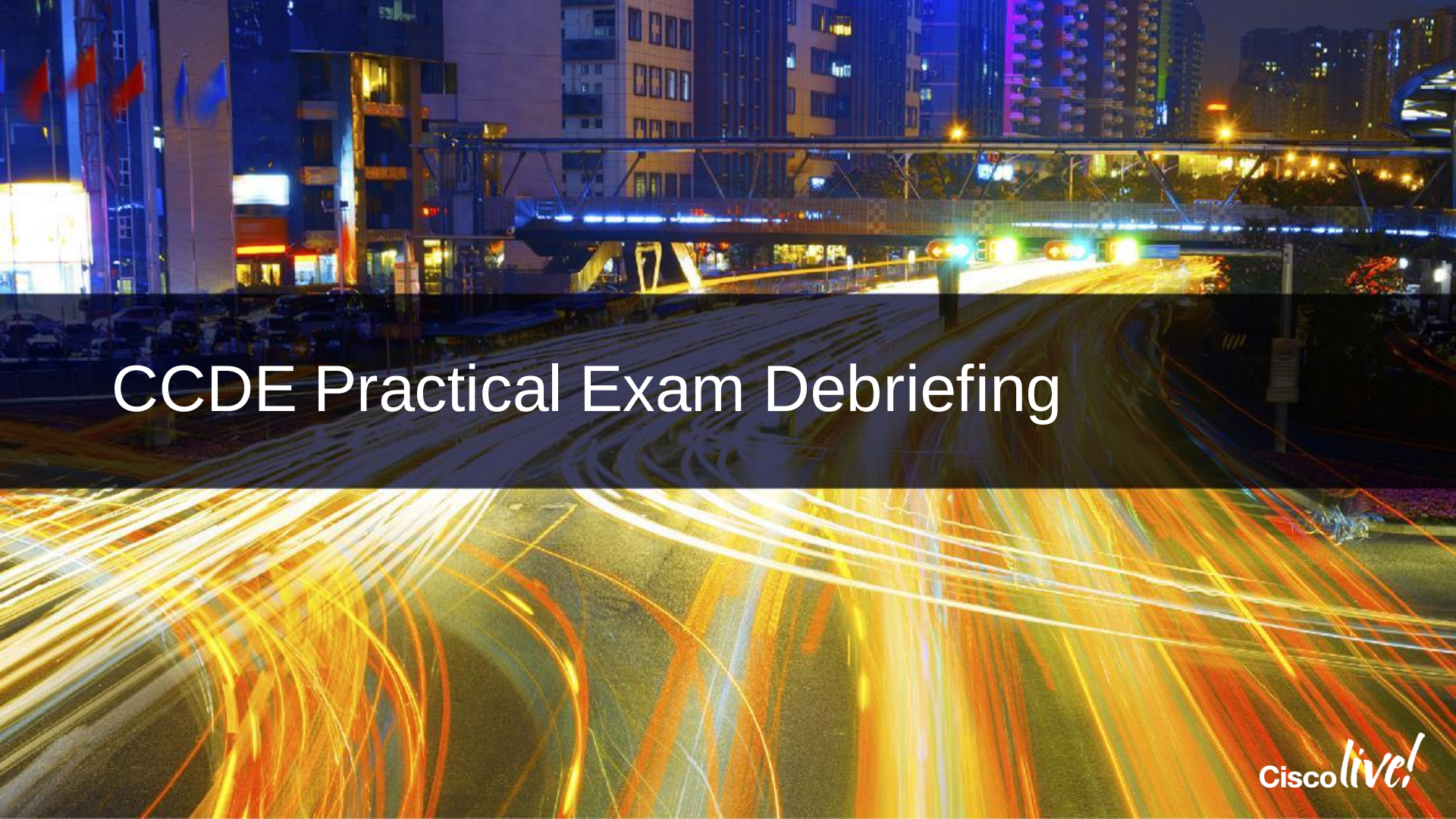
- A simulation approximate live systems (subset) and applications without actually using real methods. Detailed instructions are provided on how to interact with it.
- Complex scoring, typically is worth multiple points.
- Used to place, remove and connect devices on a topology, and to select design features on devices and links on a topology



CCDE Practical Exam

Scoring

- Exam is auto-scored
  - Multiple valid solutions are taken into consideration for scoring
    - Optimal and suboptimal
  - Some items are worth multiple points, with partial scoring
  - Some items are unscored
  - Must achieve minimum score to pass
    - Employs statistical analysis to assure all exams are in the same difficulty level
    - Cutscore varies to guarantee exams are balanced
- Candidates receive score report at the end of the exam, which indicates broad areas where additional preparation may be useful; score report mapped to exam blueprint



CCDE Practical Exam Debriefing

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Actual CCDE Practical Exam Score Report

- If you pass the CCDE Practical exam, the score report will only show the Pass status
- If you fail the CCDE Practical exam, the score report will show the Fail status along with the percentages per blueprint domain, as follows:
  - Analyse design requirements x%
  - Develop network designs x%
  - Implement network design x%
  - Validate and optimise network design x%

- Disclaimer
  - Please observe this CCDE Labtorial is not intended with the purpose of certification.
  - This CCDE Labtorial mimics the same difficulty level of 1 of the 4 sections on the actual CCDE Practical exam. However, having a good performance on this CCDE Labtorial does not imply that you will pass the certification exam.
  - The CCDE Lab scenario takes longer than the regular CCDE Practical exam scenario
  - Some items on the actual exam are not scored: items are evaluated using statistical analysis before they are actually scored on the exam

CCDE Exams Blueprint

CCDE Written Exam List of Topics	
1.0 Layer 2 Control Plane	26%
2.0 Layer 3 Control Plane	37%
3.0 Network Virtualisation	17%
4.0 Design Considerations	20%

CCDE Practical Exam List of Topics	
1.0 Analyse Design Requirements	36%
2.0 Develop Network Designs	39%
3.0 Implement Network Design	13%
4.0 Validate and Optimise Network Design	12%

Scenario Recap - 1

- Best Buddy Pet Store Chain overview
  - Best Buddy is trying to overcome their lack of technical expertise, grow to new markets, and deploy new applications
- What does growing into new markets sound like to you?

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- What does growing into new markets sound like to you? Scaling!
  - Which are “Scaling” considerations for Retail Stores?
    - What is the cause of the growth –organic or planned?
    - What problems are being experienced because of this growth?
    - What solutions do you need to implement – more modularisation, move network components to better places, or… ?

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    - What solutions do you need to implement – more modularisation, move network components to better places, or… ?
- What does deploy new applications sound like to you? Add Technology/Service!
  - Which are “Add technology/Service” considerations for Retail Stores?
    - What is the impact on the existing network? Bandwidth, delay, jitter, convergence times, traffic flow, current technologies in use – are these still the right decisions to make?
    - What is the impact on existing applications? Will the quality of any existing services be impacted by adding this new application?

Scenario Recap - 2

- Best Buddy Pet Store Chain overview
  - After creating new areas, Best Buddy's partner GoodNutrit lost connectivity.
  - Best Buddy is looking into replacing their legacy frame relay circuits.
- What does losing connectivity sound like to you?

Scenario Recap - 2

- Best Buddy Pet Store Chain overview
  - After creating new areas, Best Buddy's partner GoodNutrit lost connectivity.
  - Best Buddy is looking into replacing their legacy frame relay circuits.
- What does losing connectivity sound like to you? Design Failure!
  - Which are "Design Failure" considerations?
    - Address root causes?
    - What solutions do you need to implement –more modularisation, move network components to better places, or… ?

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  - Which are "Design Failure" considerations?
    - Address root causes?
    - What solutions do you need to implement –more modularisation, move network components to better places, or… ?
- What does replacing legacy circuits sound like to you? Replace Technology/Service!
  - Which are "Replace Technology/Service" considerations?
    - What is the impact on the existing design?
    - What is the impact on the existing applications and services?
    - Are there any scaling issues that will arise with the replacement?

If Best Buddy was an actual customer…

- What information would you ask for?
- Do you typically get exactly what you asked for?
  - More, less or simply different?
- When you get something, do you frequently notice something is missing and you need to ask for more?
- Does it happen that you don't have at your disposal the best possible options to choose from?

Claim 1: Analyse Design Requirements

Claim 1.1: Analyse business requirements, conflicts, and constraints

Drag the top three business challenges Best Buddy is facing today from the left, and drop them into the three Challenge spaces on the right in no particular order.

- Increased OPEX & CAPEX
- Budget issues
- Business Model Innovation
- Rapid Growth
- Mergers & Acquisitions Integration
- Industry Compliance

Business Challenge

Business Challenge

Business Challenge

Relevant Documentation: Company Overview

…Currently it is a chain of 331 stores in all southwest American states: California, Nevada, Utah, Colorado, Oklahoma, Arizona, New Mexico, and Texas. Best Buddy has retail locations in the major cities of each state and in many rural areas. Through acquisitions Best Buddy also expanded to 75 international locations: Finland, England, France, and Italy in Europe, and Japan in Asia.

…. The majority of Best Buddy's revenue is from the brick and mortar locations but there is pressure to expand the online retail presence from both the business partners and stockholders. Due to the success of the Best Buddy brand and the breadth of their partner relationships, many of Best Buddy suppliers and partners have offered to enter into exclusive agreements with Best Buddy managing all online e-commerce.

…. This has encouraged Best Buddy to expand their business with plans to open 115 new stores across the United States this year and 80 new stores in Europe and Asia. With the rapid expansion of the pet product and services business, Best Buddy is also expecting a rapid increase in the number of companies in their ecosystems.

…. They have experienced recent attrition of some of their key network engineers and have recently failed a PCI-DSS credit card compliance audit due to insufficient protection of customer credit card information.

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Claim 2: Develop Network Designs

Claim 2.3: Incorporate best practices within the network design

Mark the QoS mechanism that should be enabled on the CE routers in the US retail stores to implement the QoS design and to preserve end-to-end DSCP markings by checking all checkboxes that apply.

Network Location	Traffic Shaping	Policing	Classification/ Marking	CBWFQ
Outbound traffic to SP1				
Inbound traffic from SP1				
Outbound traffic to SP2				
Inbound traffic from SP2				

Supporting Documentation: Email 4

…We have secured a great deal from two MPLS service providers that will provide us with international coverage for MPLS Layer 3 VPN service. Each store, in the US, EMEA, and Japan will have a 100 Mb/s Ethernet connection with a 1.5 Mb/s committed rate to service provider 1 and a T1 to service provider 2. The data centres in the US, EMEA, and Japan will also connect to both MPLS provider clouds on line-rate gigabit Ethernet connections.

….

Supporting Documentation: Email 6

…In order to make the VoIP seamless to the users, we want to maintain as close to toll quality as possible. We are also going to add a standard definition video application so that training and 1:1 meetings can occur between headquarters and the remote sites.

….

We have confirmed with both service providers that they can offer QoS on our Layer 3 VPN service. These applications, when active, would take priority over the data traffic. Since the only critical data traffic at the stores is the Point of Sale system, we would like to protect that from other data traffic by reserving 250 Kb/s for that traffic flow.

….

Supporting Documentation: Email 7

….

- The video system requires 384k/s of bandwidth. 64 Kb/s for the audio and 320 Kb/s video. The vendor recommends adding 10% buffer for the bandwidth allocation on the video stream for small bursts and layer 2 overhead.
- We will be using G.711 for the on-network VoIP application

….Based on feedback from the vendors, we are using the following DSCP values:

Application	DSCP
VoIP Bearer	EF
VoIP Signalling	CS3
Video Bearer	CS4
Video Signalling	CS3
Point of Sale	AF21
All Other	BE

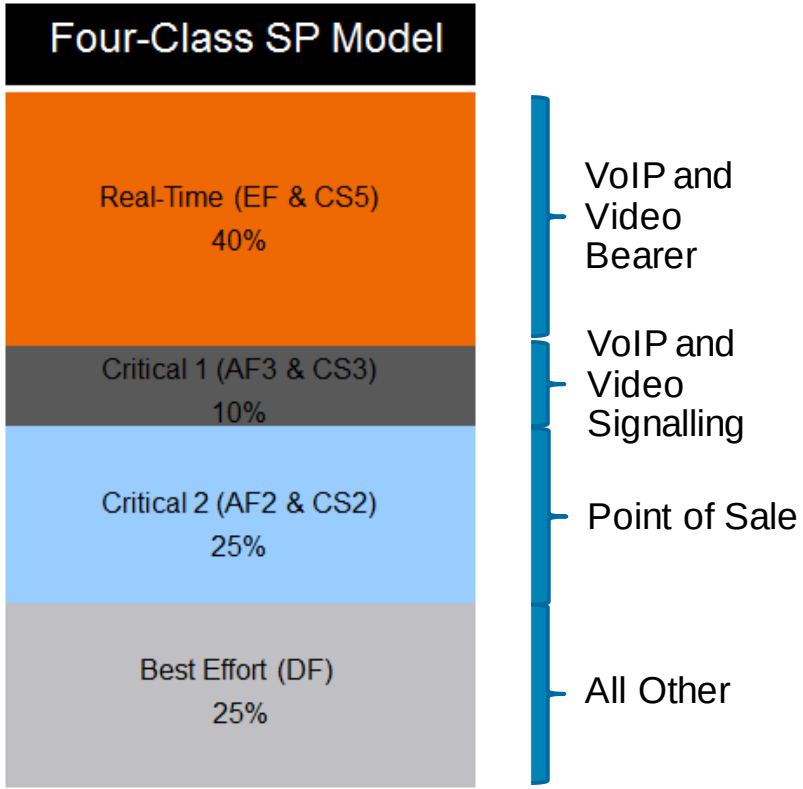
Supporting Documentation: Email 7

…. SP1 has responded back that they use pipe tunnel mode and SP2 has confirmed that they use uniform tunnel mode. I have attached the QoS profiles each service provider has available for us. Both providers confirmed that they are not performing traffic shaping in the core of their network but they do engineer dedicated bandwidth for routing protocols.

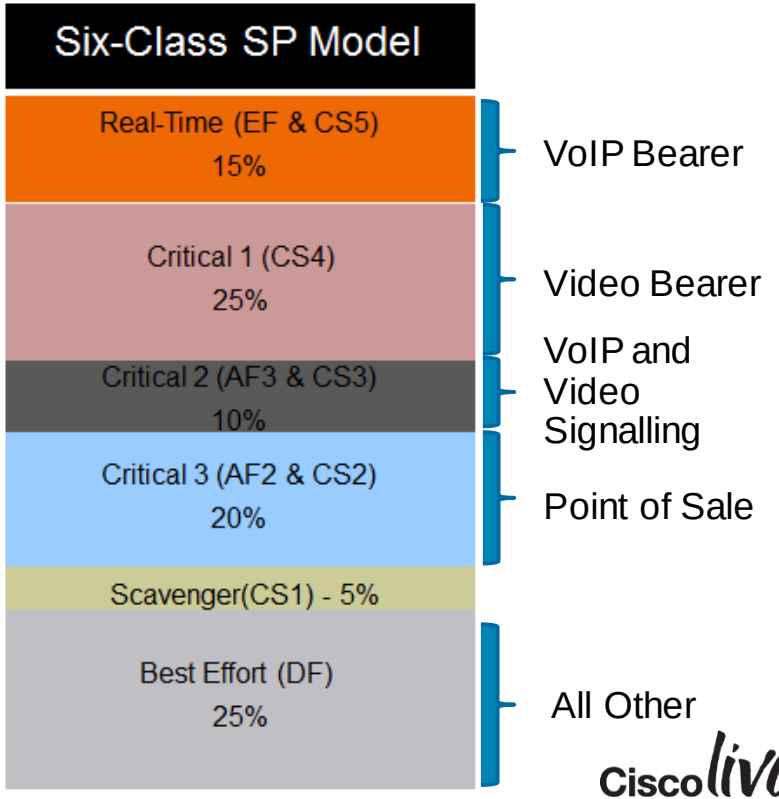
…. The video conferencing equipment has the capability to mark the voice and video independently. For the best experience, the vendor recommends using LLQ for the VoIP traffic. The video media should also be in a LLQ whenever possible and if unavailable, a dedicated data queue.

Supporting Documentation: QoS Profiles

SP1 QoS Profile



SP2 QoS Profile



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Network Location	Traffic Shaping	Policing	Classification/Marking	CBWFQ
Outbound traffic to SP1	X	don't care		
Inbound traffic from SP1				
Outbound traffic to SP2		don't care		
Inbound traffic from SP2				

1 pt.

Claim 2: Develop Network Designs

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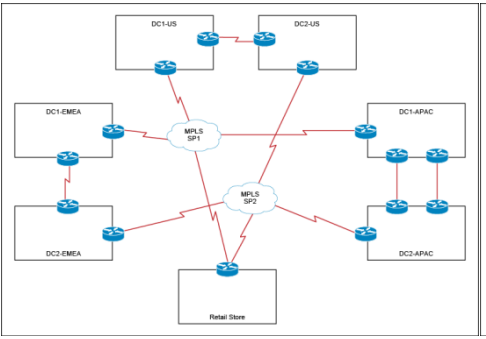
Network Location	Traffic Shaping	Policing	Classification/Marking	CBWFQ
Outbound traffic to SP1	X	don't care	X	X
Inbound traffic from SP1			X	don't care
Outbound traffic to SP2		don't care		X
Inbound traffic from SP2			X	don't care

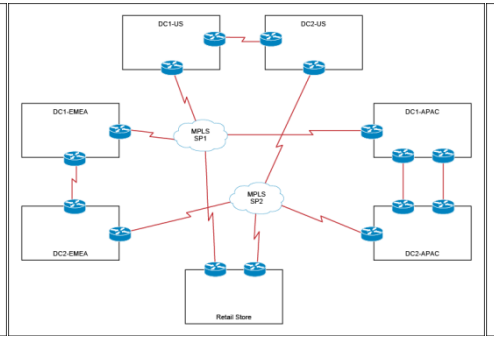
1 pt. 1 pt.

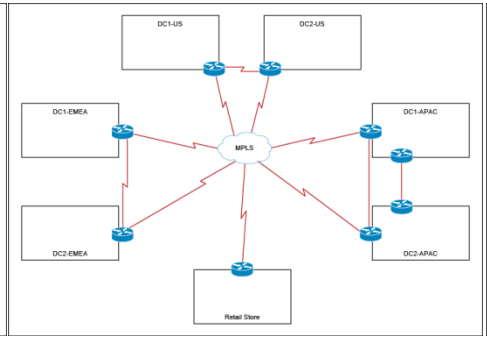
Claim 3: Implement Network Designs

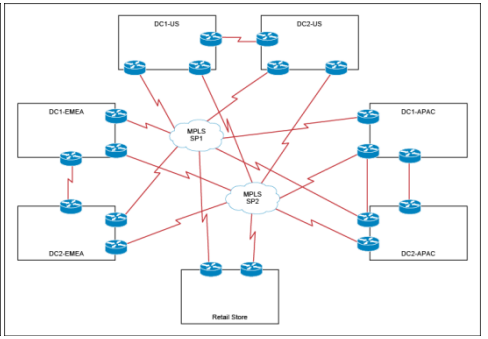
Claim 3.1: Analyse implementation options

Best Buddy decided to move forward with a MPLS Layer 3 VPN network to replace frame relay in the US and the leased lines in EMEA and Japan. There will be a point-to-point Ethernet connection between the two US data centres, and the international data centres will keep their current interconnects. Which design option is the cheapest solution that meets the stated requirements?









Supporting Documentation: Network Overview

…Best Buddy has a hub and spoke frame relay network with two different service providers that connects the main data centre to all US-based stores. US-based stores have a T1 connection to each service provider with a 512 Kb/s PVC to the data centre.

…. The main data centre hosts multiple applications that are used across the company including the e-commerce web site and supporting systems, a database of all Best Buddy products, back office point of sale systems, workforce management systems, and a customer database containing customer purchase histories, frequent shopper IDs, and billing information.

…. The store cash registers use the Point of Sale system at headquarters to process credit card transactions. If there is an outage of the main system, the stores have one cash register that can process credit cards over the local POTS connections and all other credit card transactions must be processed manually.

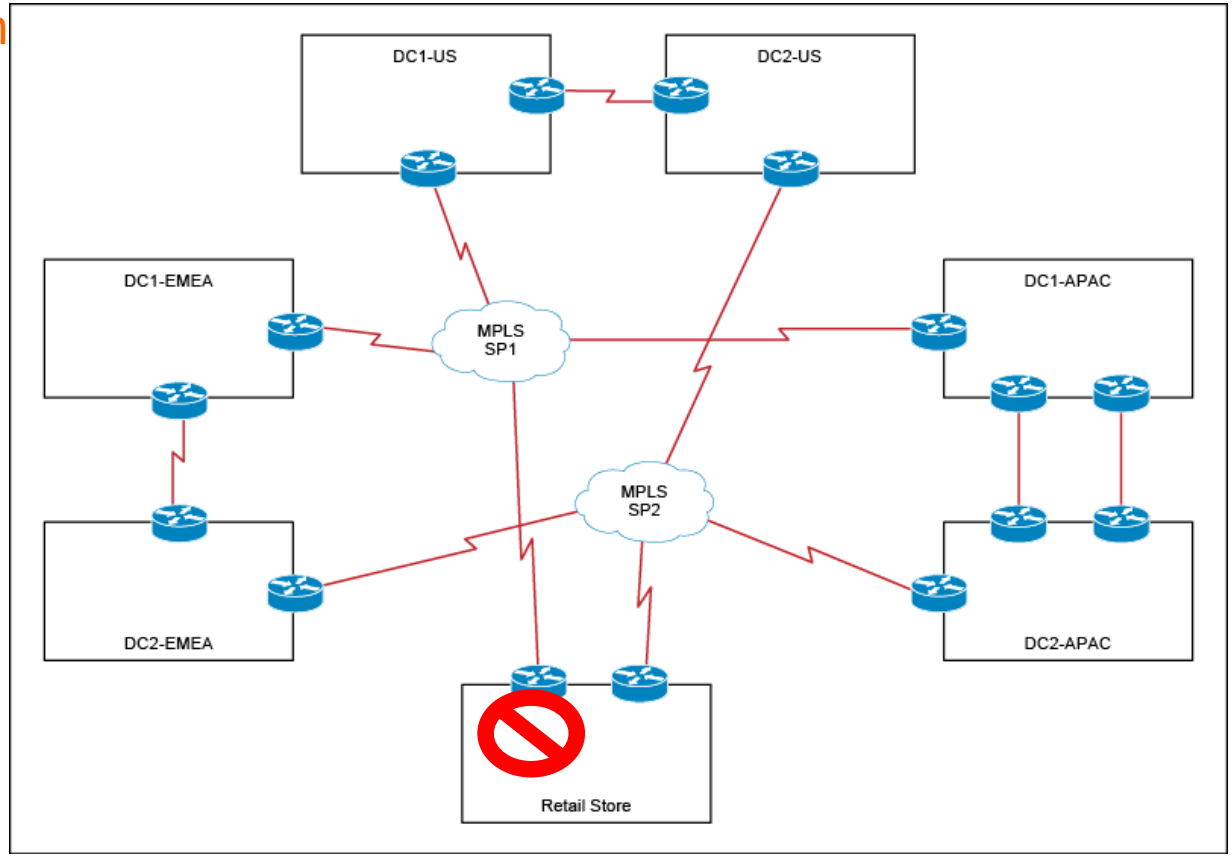
Supporting Documentation: Email 3

…Our management team has decided to address the resiliency of the network design by adding a data centre and upgrading our US network from the current frame relay network to a newer technology. They would like to realise operational cost savings with this migration but that is secondary to making sure the business requirements are met.

…. Recently we have had issues in the data centre that caused the stores to lose connectivity with the Point of Sale systems. Although the stores can run credit cards locally, the limitations of the local system is causing long wait times at the store. Store managers are pointing to these outages as key reasons for poor sales numbers. It is acceptable for us to have some stores go offline occasionally but these widespread outages that affect a large number or all of the stores is a major problem. Management is requiring the new design create high availability for all of the core systems in the US data centre. ….

Claim 3: Implement Network Designs

Incorrect Option



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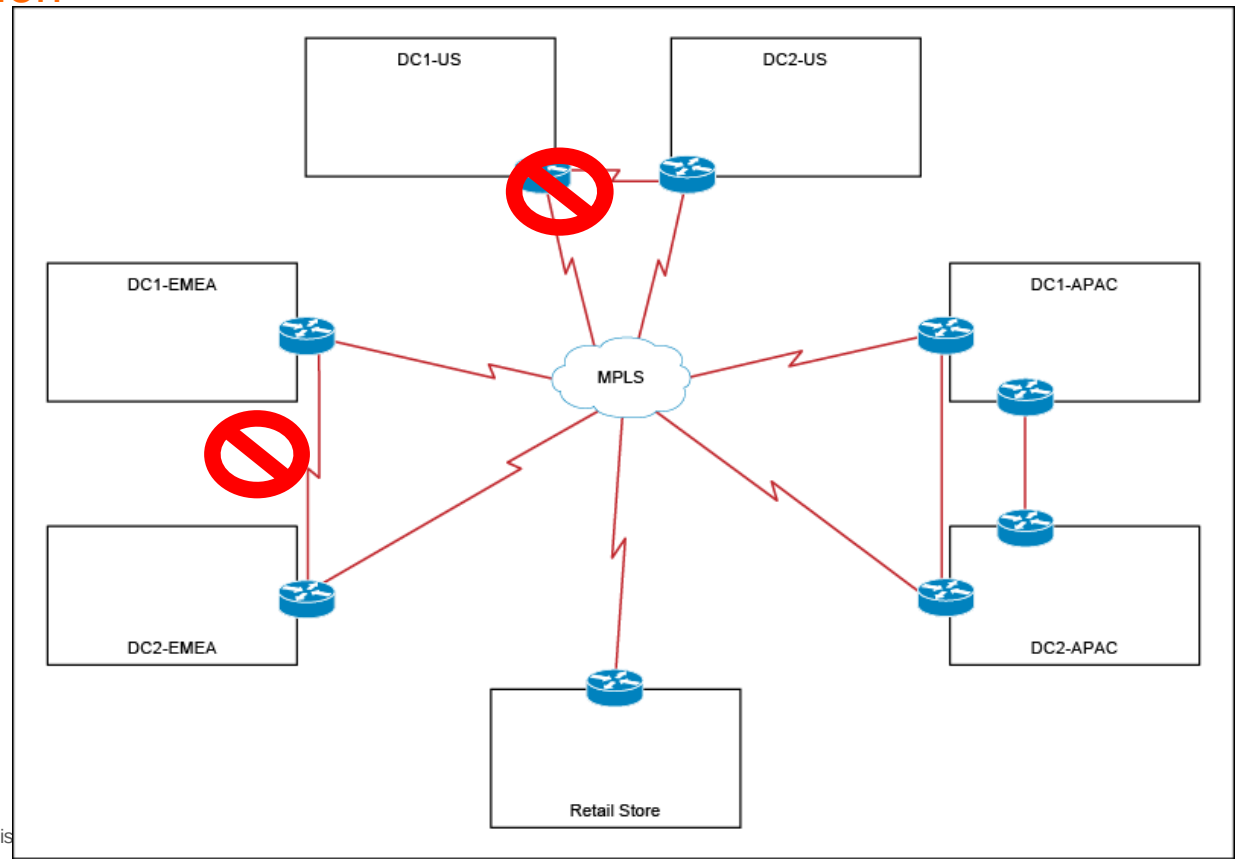

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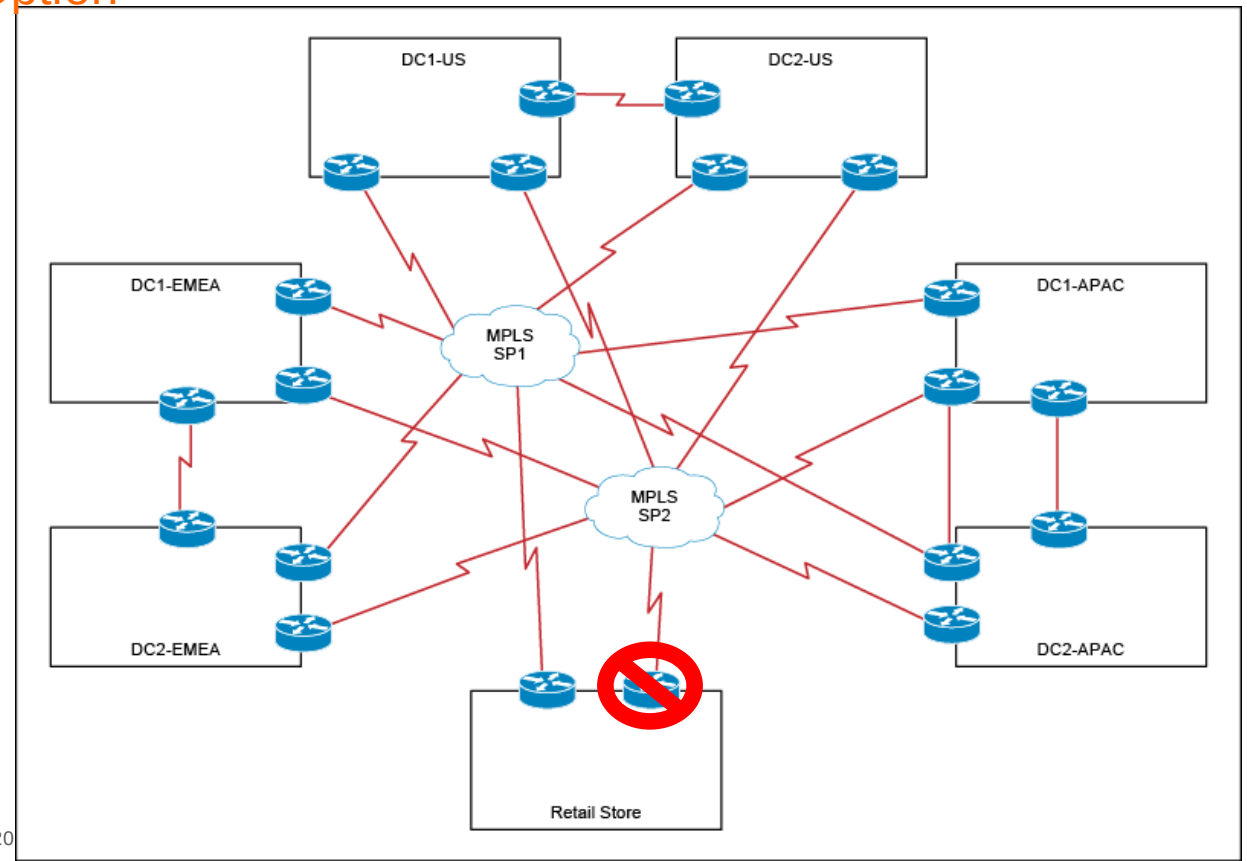

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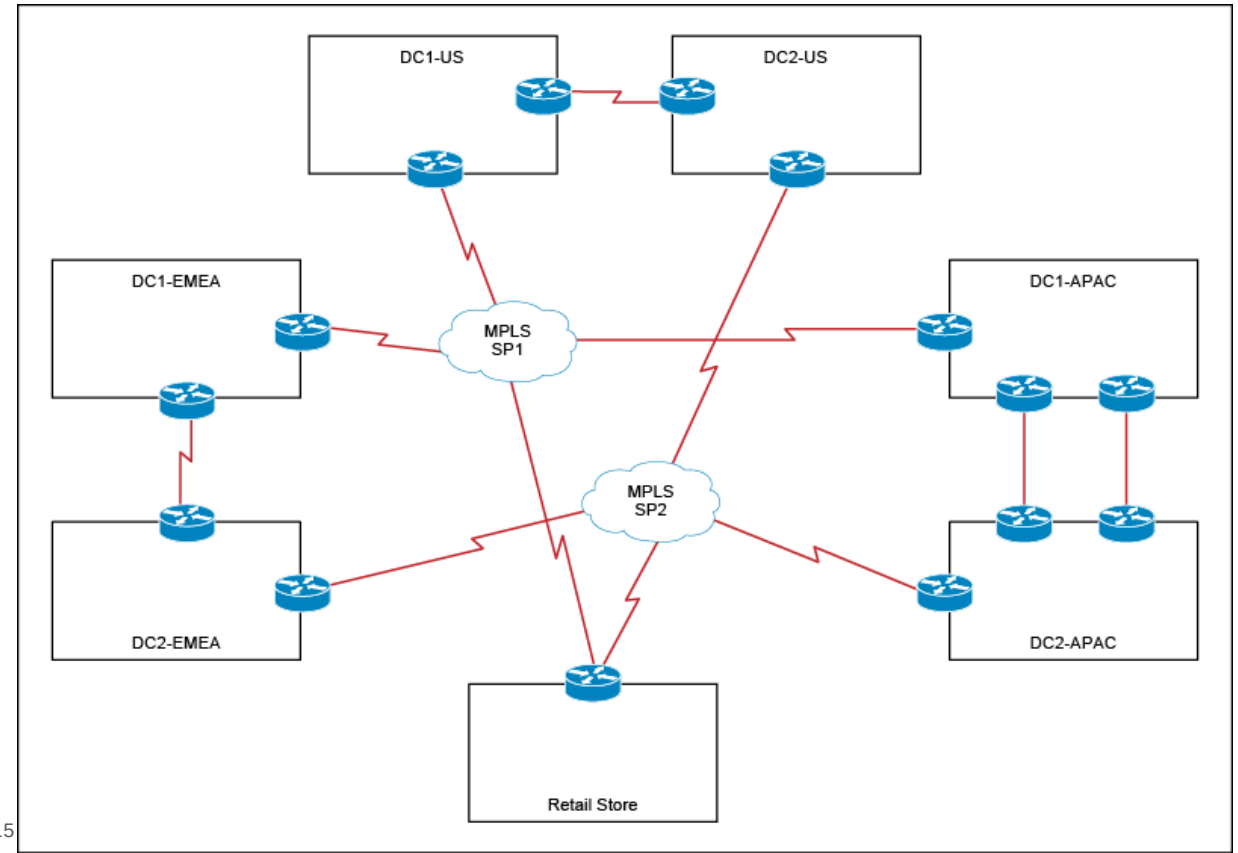
Correct Option



Claim 4: Validate and Optimise Network Designs

Claim 4.3: Optimise design

The utilisation on the connection between the call centre and Best Buddy during reported issues is 90-100% and the LLQ bandwidth is set to 35%. Peak call volume has been measured at 45 calls and average call volume during the product launch is between 35-40 simultaneous calls.

Which design change can be made to solve this call quality issue and maximise cost savings?

A. Change the CODEC for calls across the MLPPP bundle to G.729.

B. Order three additional T1s for the MLPPP bundle.

C. Adjust the VoIP payload size for calls across the MLPPP bundle to 240 bytes.

D. Install a 10 mbps MPLS connection and remove the existing MLPPP bundle.

E. Enable cRTP header compression on the link between the call centre and US DC 1.

Claim 4: Validate and Optimise Network Designs

Claim 4.3: Optimise design

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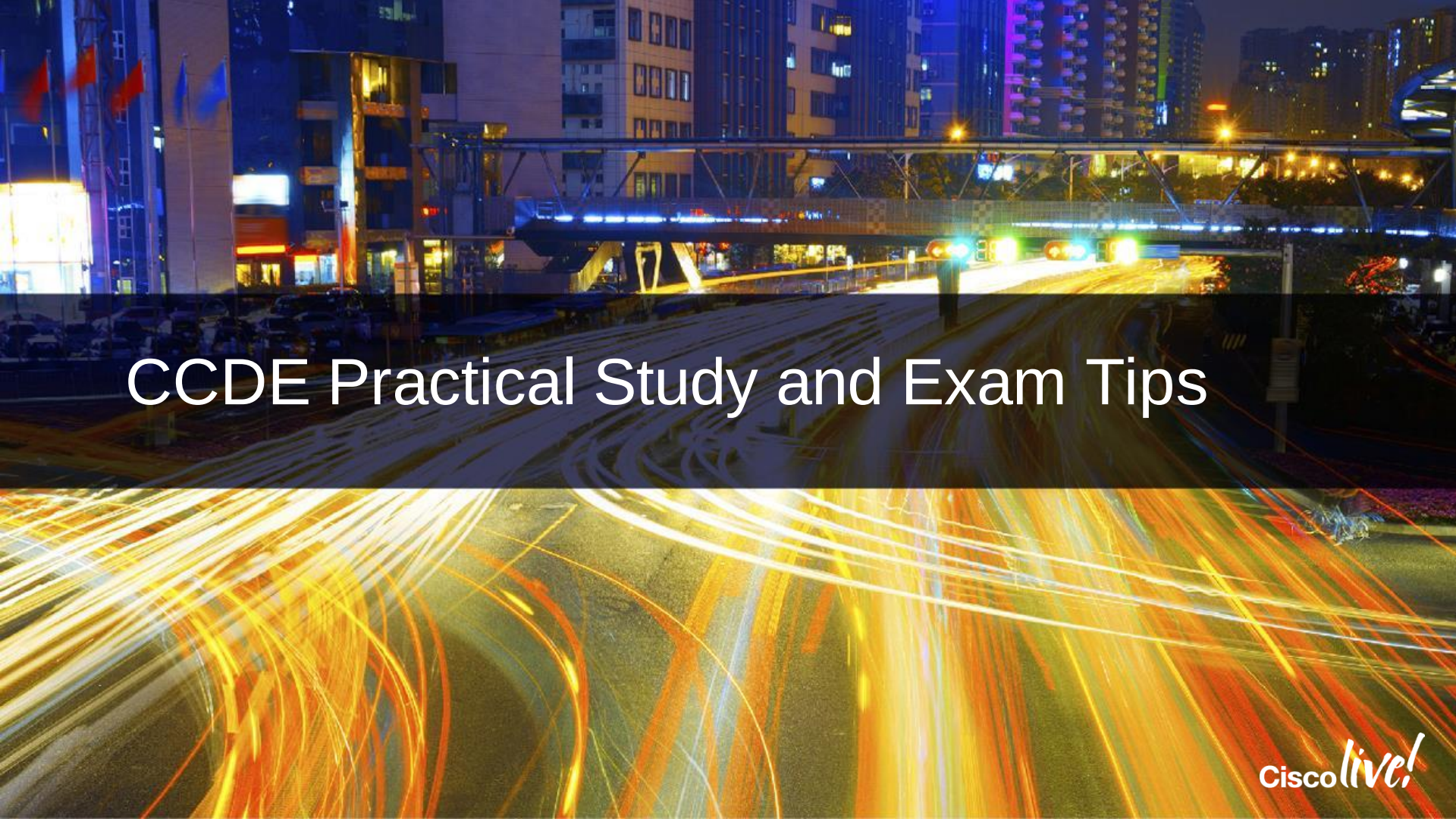

CCDE Practical Study and Exam Tips

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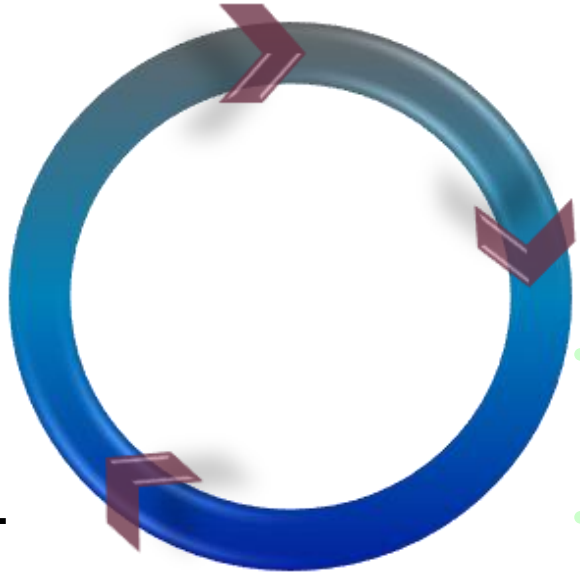
CCDE Study Tips

- Honestly assess your strengths in all technologies and blueprint domains
- Prioritise your studies based on weaknesses
- Design experience is key
  - Evaluate past work projects
  - Read as many case studies and design reviews as possible
  - Join a study group that shares real world design challenges
- It is a design test
  - Focus on design chapters of recommended books
  - Don't worry about configuration unless it helps solidify your understanding of the technology
- Take the time to read!
  - During studies, practice speed reading while taking notes.
  - Very helpful during the exam

Interacting With the CCDE Practical Exam

Understand

- Take time to comprehend and absorb the question
- Don’t make false assumptions
- Real-life: will have to work around constraints and bad decisions



Connect

- Check what information is already provided in the background documents
- Connect the question with previous questions and scenario information
- Look at the bigger picture

Take action

- Apply the best design strategy to answer the questions
- Consolidate the information to support your answer

CCDE Practical Exam Tips

- Don’t be so fast in your decision
- There are no answers other than the listed ones, so LOOK again and you will find it
- Don’t assume something if not mentioned, read to find important information
- Verify other points to support your answers
- Always consider the customer's business requirements while answering
- If a sub-optimal design/decision is picked by the customer, just proceed
- No compromise on time allocation, allocate 2 hours per scenario
- Take full 1 hour lunch break
- Take Notes but don’t take a lot of notes
- Use the rough pad & ask for more pads if needed
- Highlight with one colour as you are not attending an art exam

Preparation Resources

- Cisco Learning Network (CLN)
  - CCDE written exam study/learn: https://learningnetwork.cisco.com/community/certifications/ccde/written_exam?tab=2
  - CCDE practical exam study/learn: https://learningnetwork.cisco.com/community/certifications/ccde/practical_exam

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* SME= Subject Matter Expert

Call to Action

- Visit the World of Solutions for
  - Cisco Campus
  - Walk in Labs
  - Technical Solution Clinics
- Meet the Engineer
- Lunch time Table Topics
- DevNet zone related labs and sessions
- Recommended Reading: for reading material and further resources for this session, please visit www.pearson-books.com/CLMilan2015


Q&A
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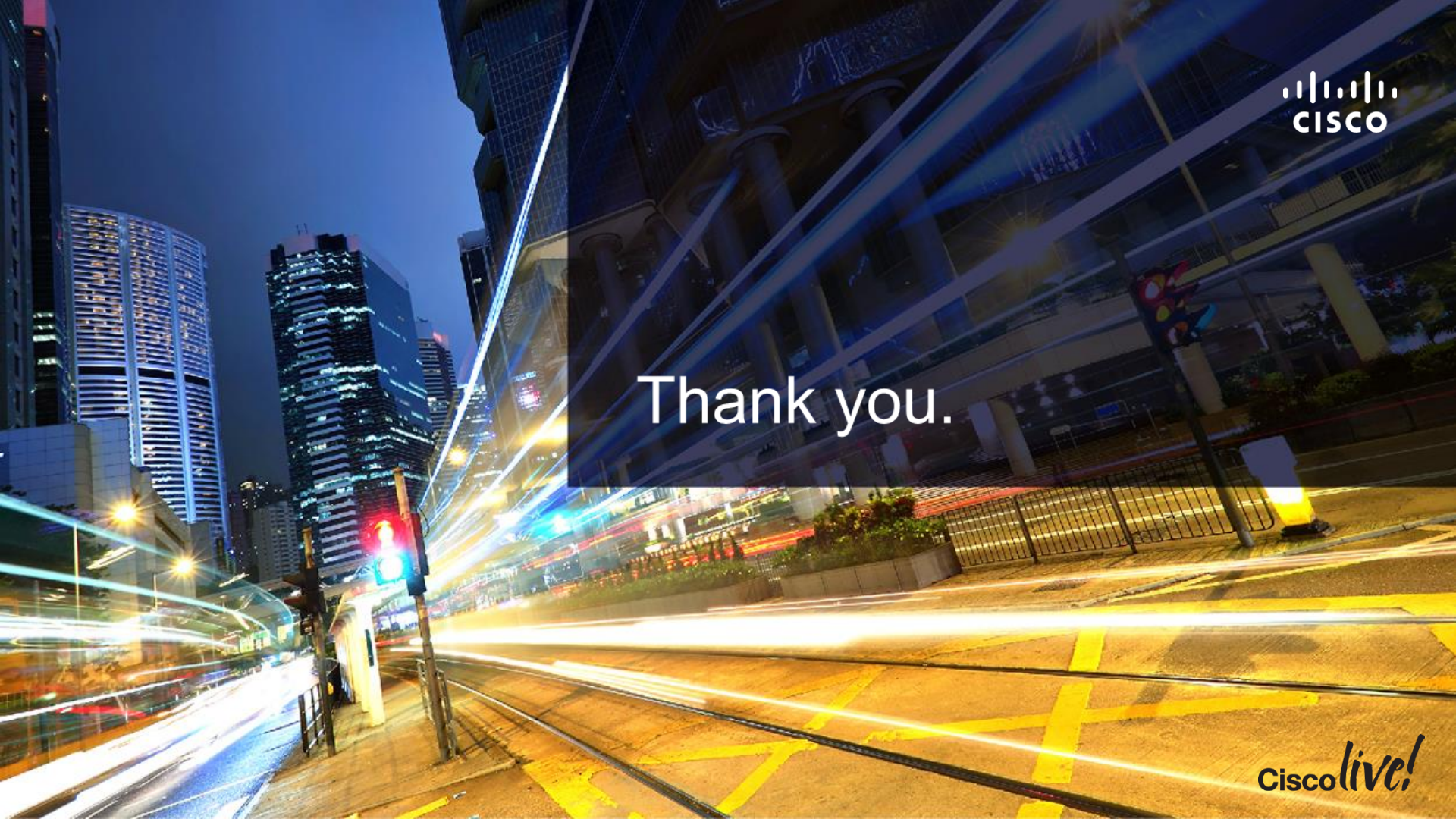
Thank you.

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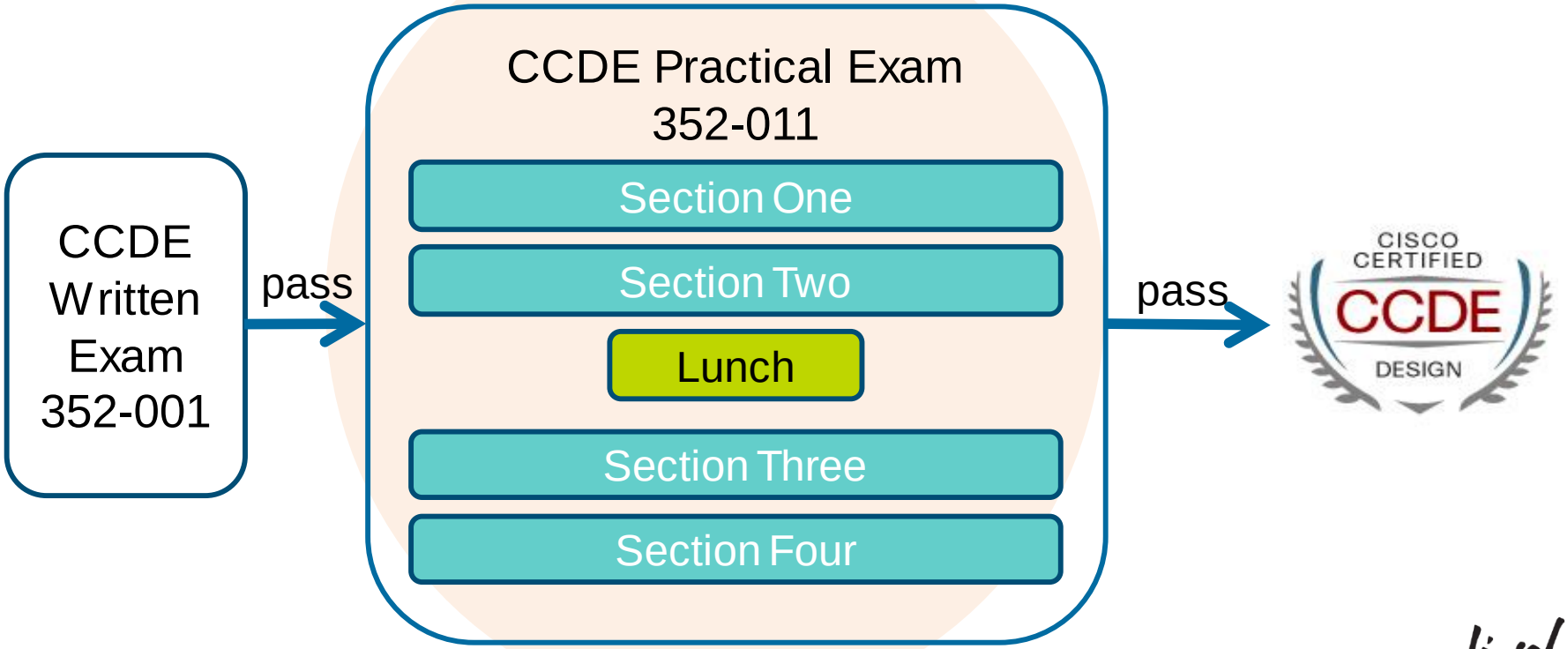
What's in it for me?

- CCDE is a certification relevant to network design job roles
  - Assesses expert level network design skills for Layer 2 and Layer 3 infrastructure
- Encourages end-to-end, big picture design thinking
  - Why do I care as a network designer?
- Preparing for CCDE helps close the gaps on technologies from a proactive design perspective
  - Gain overwhelming design knowledge
- Professional development path to CCAr

Certification Process

Overview



CCDE Practical Exam

352-011 Exam Information

- **Location**: Pearson VUE Professional Test Centres; event based (only offered on specific dates and now available WW)
- **Duration**: 9 hours (8 hour exam plus 1 hour lunch break *)
- **Scenario section**: Uses a hypothetical story as a basis to thinking through a complex design test that is credible, real-life, and covers multiple steps

* Lunch is not provided

- **Format**:
  - 4 distinct scenario-based sections
  - Approximately 20-35 items per scenario
  - Scored & non-scored items
  - NO “skip question”, NO “go back”
  - A 24 inch monitor
  - Auto-scored
- **Pre-requisite**: CCDE Written
- **Upcoming Dates:**
  - February 5, 2015
  - May 19, 2015
  - August 19, 2015
  - November 19, 2015

CCDE Practical Exam - Expanded Footprint 2014

- Registration closes 1 day before the event date vs. 1 month before, although we encourage candidates to register at least 45 days in advance

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