

Experience Today the
Network of Tomorrow.

Cisco Expo
2009

Cisco Certified Design Expert CCDE



Gert De Laet
Business Development
Learning@Cisco

- High Level View
- CCDE Update
- CCDE Written Exam
- CCDE Practical Exam + demo
- Cisco Learning Network (CLN)
- Cisco Press

CCDE Overview



Gert De Laet

Cisco Expo
2009

Welcome to the Human Network.



The Cisco Certified Design Expert

The CCDE certification is a certification that identifies those with expert-level knowledge and skills in Infrastructure Design.

CCDE is parallel to CCIE in terms of difficulty, and expertise.

Emphasizes network design expertise & knowledge to assess network business requirements and can translate them into technical specifications

CCDE

Expert Level Network Designer

Experience: 7+ yrs Networking experience

Prerequisites: NONE

Requirements: (2) exams Qualification and Practical Exam

Roles: Sr. Network Designer & Architect, Network Lead for Enterprise IT Infrastructure Team, Network Contributor for Enterprise Architecture team

CCDP

Description: Professional Level Network Designer

Experience: 5-7 yrs Networking experience

Prerequisites: CCNA, CCDA

Requirements: (3) exams ARCH, BCMSN, BSCI

Roles: Network Design Task Leader, SMB Lead Architect, Journeyman Contributor on Large Infrastructure Design

CCDA

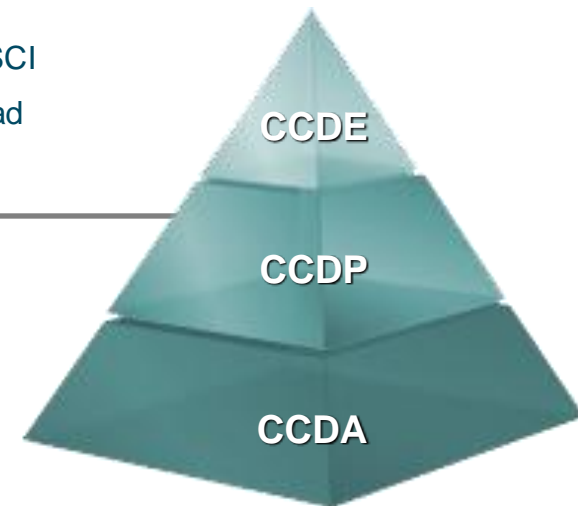
Description: Entry Level Network Designer

Experience: 3-5 yrs Networking experience

Prerequisites: CCNA

Requirements: 1 exam (DESIGN)

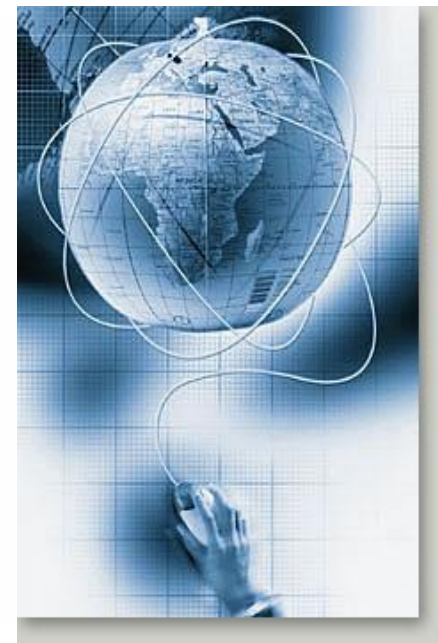
Roles: Network Design Individual Contributor, Network Design Lead in SMB, Operations



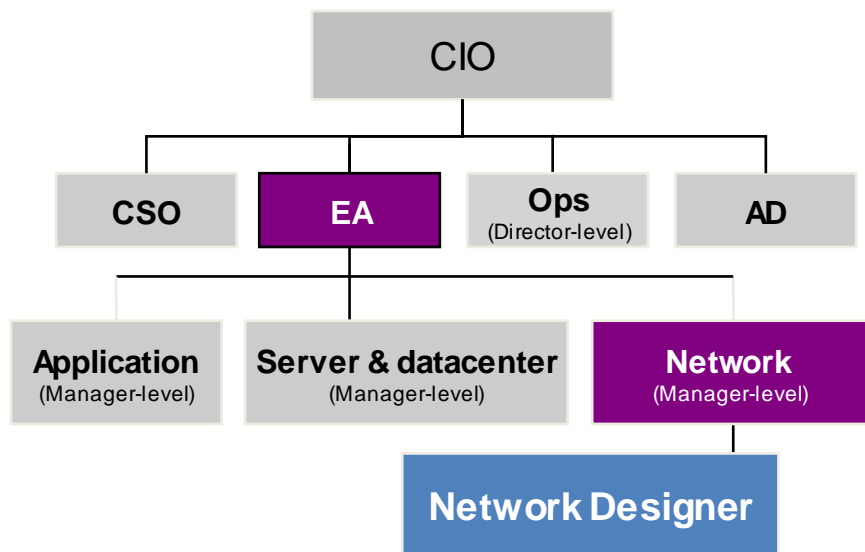
Cisco Certified Design Expert: Expanding the Certification Portfolio

- Cisco recognizes the critical importance of the network infrastructure designer
- The CCDE certification enables these highly experienced Network Infrastructure Designers to be identified in the marketplace

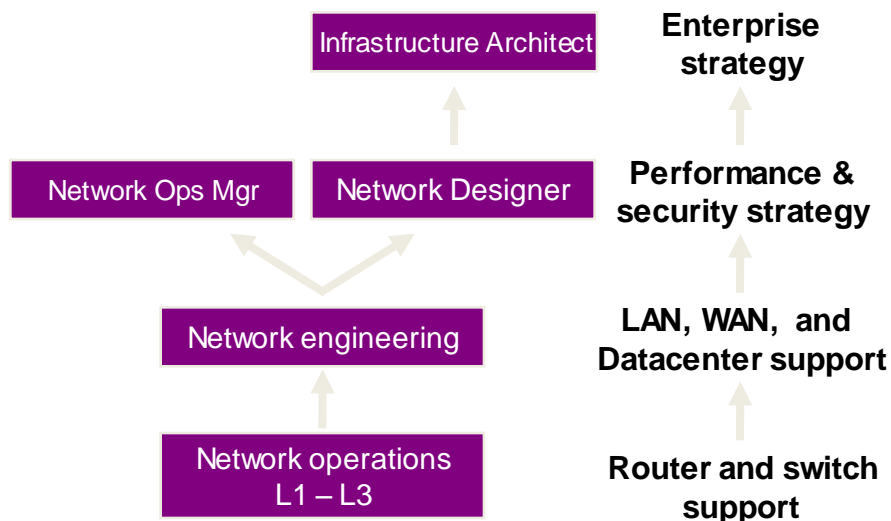
The CCDE certification is a certification that identifies those with expert-level knowledge and skills in Infrastructure Design. CCDE is parallel to CCIE in terms of difficulty, and expertise. It emphasizes network design principles at the routing layer and recognizes expertise of designers that have the knowledge to assess network business requirements and can translate them into technical specifications to be incorporated into successful designs.



Evolving Role: The Network Infrastructure Designer



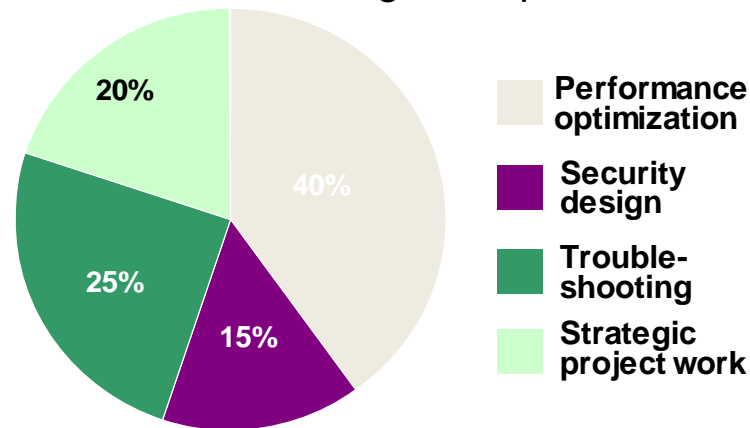
Career path of the network Designer



Key takeaway about the network Designer:

- Predominantly proactive: only 25% reactionary vs. 75% for network ops
- Care about both network performance and security

Where network Designers spend their time



Requirements for obtaining CCDE

CCDE Qualification Exam

- Advanced Network Infrastructure Design Theory and Principles
- Exam # 352-001 ADVDESIGN

- Multiple choice qualification exam
- 120 minute duration
- Available globally via Pearson VUE
- No prerequisite (recommended 7+ years in Networking)
- Meets CCIE Recertification Requirement

CCDE Practical Exam

- Scenario based advanced infrastructure design knowledge assessment

- 8 hour proctored practical exam
- Available at select locations in Fall 2008
- Requires passing score on qualifying exam to schedule
- Passing earns CCDE certification

CCDE is an expert level credential with expert level rules of engagement and benefits.

Where Does the CCDE Fit?

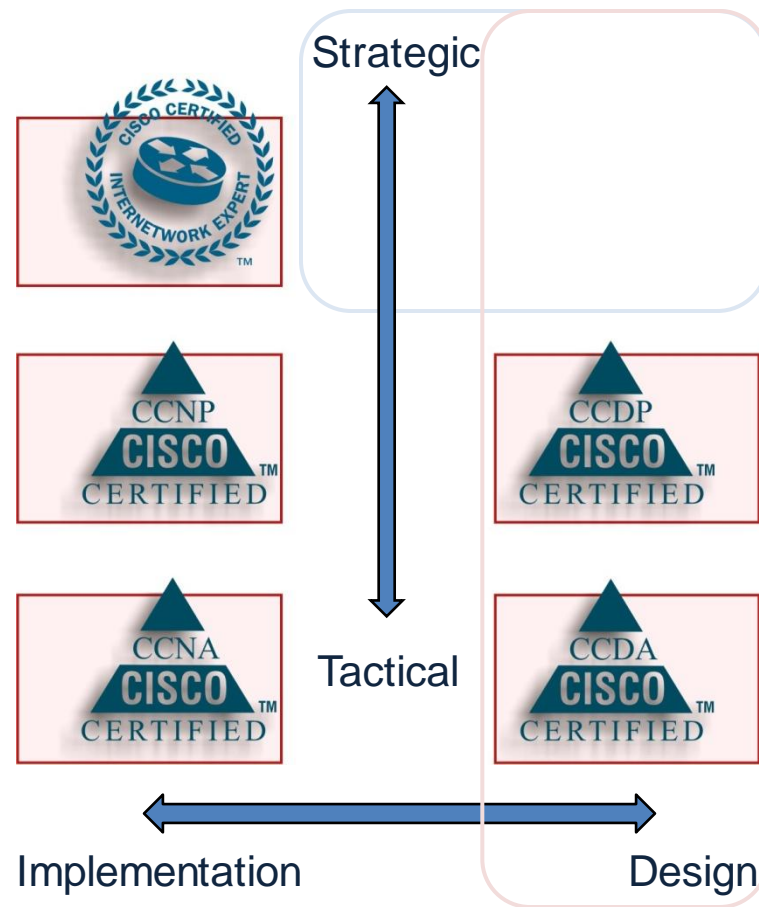
- The CCDE is Design Oriented

—What changes do I need to make to....

- Merge these Networks?
- Implement this Application?
- Provide this Level of Security?
- Prepare this Network for the Next Five Years?

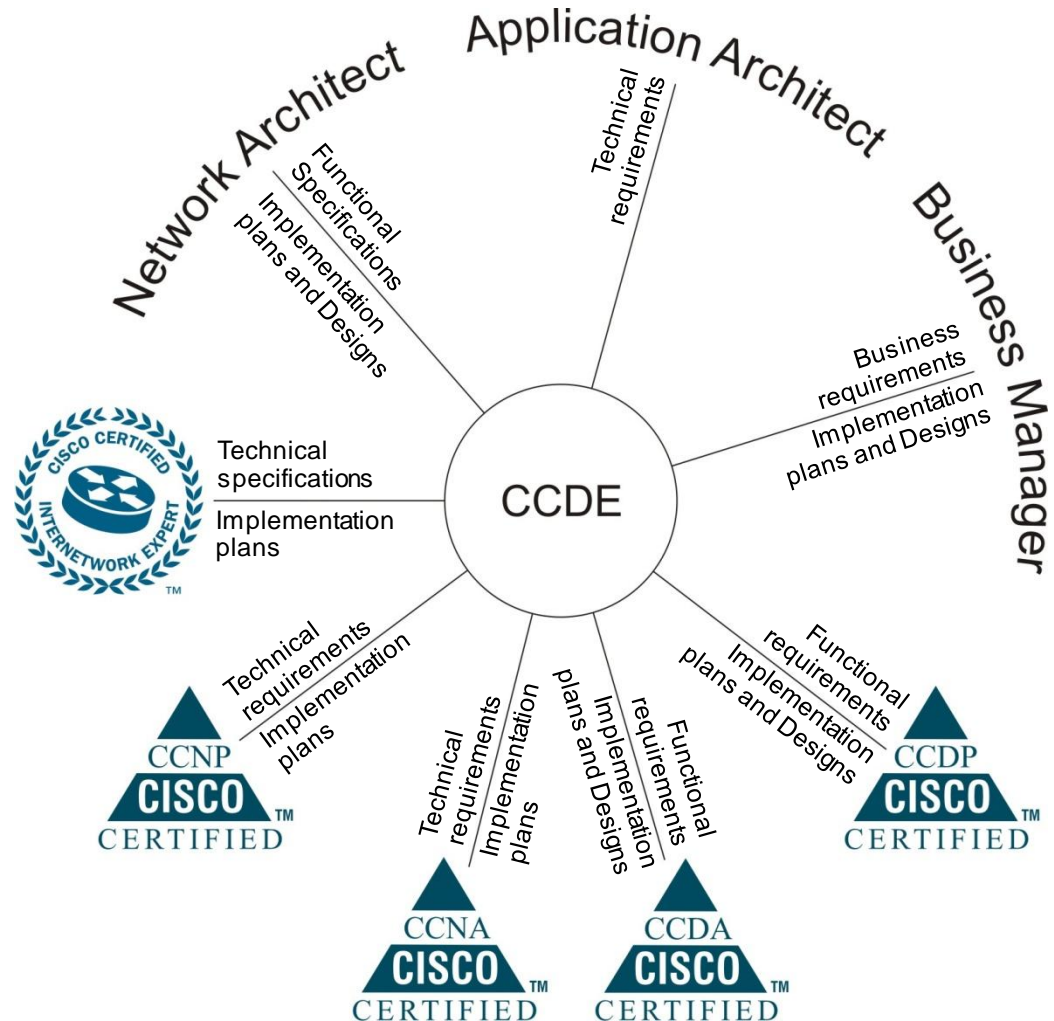
—How do I transition the network?

- Business hurdles?
- Technical hurdles?
- People hurdles?



Where Does the CCDE Fit?

- The CCDE is more horizontal to the business
 - Interacts with the business, rather than following the business



What the CCDE is Not

- You do not “go forth and configure”
 - This is higher level than the “?”
- This is not about choosing the right equipment in the right place
 - Hardware limitations only come in at a high level
 - Hardware changes occur on a daily basis
- The skills you demonstrate for this certification should be timeless

CCDE Witten Exam



Gert De Laet

Cisco Expo
2009

Welcome to the Human Network.



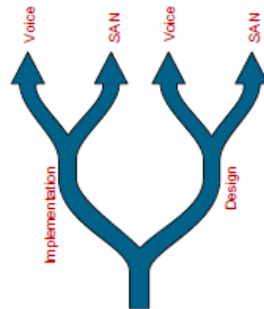
Why Are We Doing This?

- The network engineering field has split into many pieces
- Implementation and design are almost completely different career paths

Operations and design are not normally both outsourced

Design is almost always global, while operations might be global or regional

Most people seem to move from operations to design work over time



Why Are We Doing This?

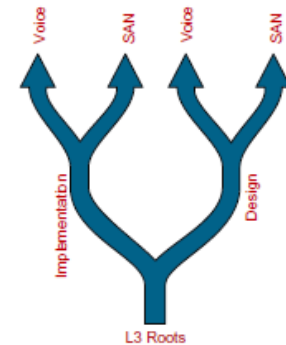
- We seem to have lost our "roots"

We focus on specific technologies

Voice
WAN Acceleration
Security
....

We focus on "Places in the Network"

The data center
The WAN
The campus
....



The Purpose of the Written

- Test Knowledge of Design Concepts
 - Theoretical Knowledge of Network Design Principles
- Test Technology Knowledge
 - No "Bit Level" Questions
 - No Configurations
 - Focused on Design Implications
- Show Qualification for the Practical
 - If you don't know this stuff, you don't have any hope of passing the practical....

The Written Exam

- The Purpose of the Written
- Written Outline
 - Design
 - Routing
 - Tunneling
 - QoS
 - Management
 - Security

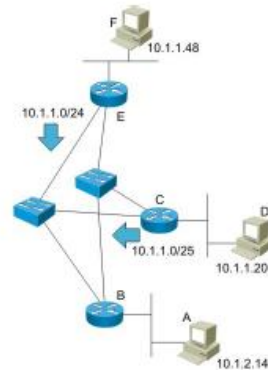


Routing

Aggregation

- If Host A sends a packet to Host F, what will happen?

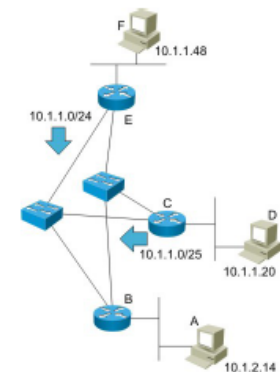
The packet will be discarded at B
The packet will be discarded at C
The packet will be received by D
The packet will be discarded at E
The packet will be received by F



Routing

Aggregation

- The packet is discarded at C
 - The destination address is 10.1.1.48
 - This falls within 10.1.1.0/25
 - So the traffic is routed to C
 - But C doesn't have an ARP entry for this destination
 - So it ARPs and drops the packet
- Why do we care?
 - Overlapping destinations are a fact of life when you aggregate
 - You need to understand how they interact

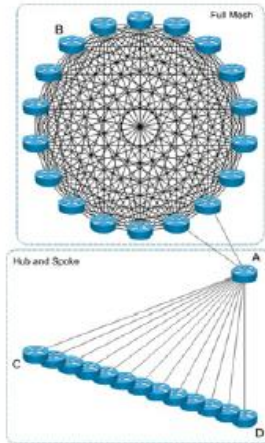


Routing

Aggregation

- What justification would you give for configuring Router A as an ABR, with the Hub and Spoke area as an OSPF stub area, without route summarization?

- To reduce the routing table size at Router B
- To reduce the complexity of the full mesh in OSPF
- To reduce the impact of Router B failing at Router C
- To reduce SPF run time at Router A



Routing

Aggregation

- To reduce the impact of Router B failing at Router C

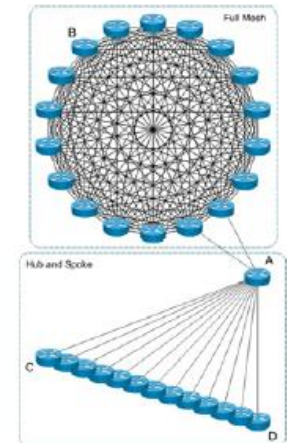
Router B failing would normally cause a full SPF run on all routers

If the Hub and Spoke area is a stub, routers within the area would not run SPF for a failure at B

- Why do we care?

Failure domains are intrinsically related to flooding domains in link state protocols

Failure domains are important in network design



Tunneling

Scalability

- What tunneling mechanism would you consider for connecting 1000 remote sites which need to be fully meshed, have layer 3 transport requirements only, and use OSPF routing?

VPLS

IPsec using AH

L3VPNs

GRE tunnels

Tunneling

Scalability

- L3VPNs

VPLS would require a full mesh of 1000 OSPF adjacencies

IPsec would require a full mesh of 1000 tunnels, and wouldn't support OSPF (no multicast support)

GRE would require a full mesh of 1000 tunnels and OSPF adjacencies

L3VPNs allow you to carry routing information through the tunnel infrastructure without forming adjacencies through the tunnels

- Why do we care?

The tunnel infrastructure directly impacts the layer 3 and routing scalability

We need to choose the tunnel mechanisms we use with this in mind

Quality of Service

Performance Metrics

- Which of the following would you deploy to control delay along the path from A to B?

Head of queue dropping
Traffic policing
Tail of queue dropping
Traffic shaping



Quality of Service

Performance Metrics

- Traffic policing

Head of queue and tail of queue drops will drop random packets, so the delay will be random

Traffic shaping will try to keep the traffic in line, but will really tail drop in this case

Traffic policing will drop traffic which is out of policy, keeping the delay consistent

- Why do we care?

This is an interaction between layer 3 and transport behavior required by specific applications



Network Management

Management Tools

- If you wanted to determine the servers which transmit the most traffic to an external destination, which tool would be the most appropriate?

Packet level debugs filtered through an access list

SNMP traps set for traffic flows

Buffered Syslog based on packet event information

Netflow traffic flow statistics

Network Management

Management Tools

- Netflow traffic flow statistics

Packet level debugs? Right!

SNMP wouldn't be able to keep up with traffic flow information

Syslog would depend on debugs or some other information

- What other options are there here?

IP Accounting?

ACLs with logging?

- Why do we care?

A network design engineer must know when to specify and use the various management tools available

A network design engineer must know what sorts of information to expect from each tool when looking at a design or problem

Security

Control Plane Protection

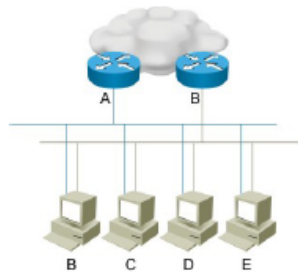
- What attacks would configuring unicast RPF at A and B prevent?

False routing protocol adjacencies from B, C, D, and E

DoS attacks against A and B from B, C, D, and E

Attacks from spoofed sources originating from B, C, D, and E

Layer 2 based attacks against A and B sourced from B, C, D and E



Security

Control Plane Protection

- Attacks from spoofed sources originating from B, C, D, and E

uRPF would prevent spoofed packets from entering the network

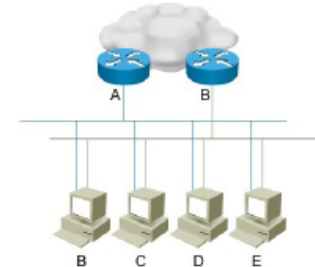
uRPF does not manage routing adjacencies

uRPF does not block DoS attacks

uRPF does not operate at layer 2

- Why do we care?

A design engineer must be able to plan in mitigations against various attacks



CCDE Practical Exam



Gert De Laet

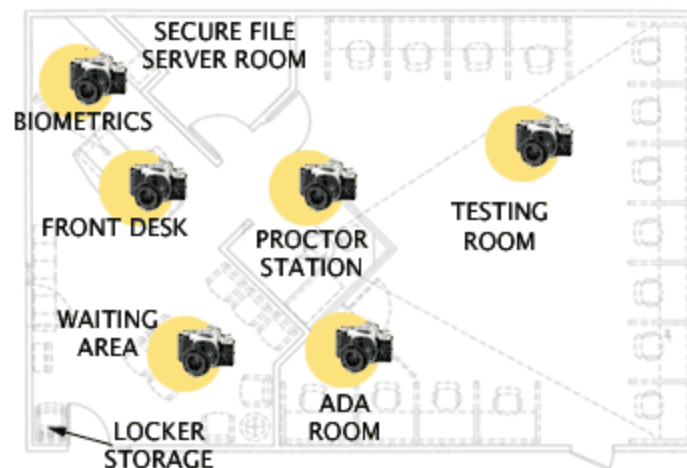
Cisco Expo
2009

Welcome to the Human Network.



Secure Professional Testing

- Testing will be administered only in certified secure professional testing centers
- Testing will be available at specific dates and locations



Exam Calendar						
M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Enhanced security,
comfort and value

CCDE Practical Exam

- **Content:** The CCDE practical exam is a performance-based, design-scenario exam that tests design analysis, design requirements, and implementation based on best practices.
Methodology: The CCDE practical exam does not require configuration or manipulation of networking devices. The exam includes reference materials for the design scenarios, which are displayed on a standard personal computer.
- **Delivery:** The delivery of the CCDE practical exam takes place on specific dates and at predetermined locations.
- **Exam topics:** The practical exam measures the ability of the individual to interpret design scenarios by gathering and reviewing technical and business documentation and communications.

An Overview

- What about multiple good solutions?
Aren't there bound to be a bunch of good solutions for any given problem?
- Two Solutions
The scenarios are tightly scripted
Business and technical requirements strongly bound the solution set
In some places, there are multiple right answers
When the requirements leave multiple solutions open, provisions are made to account for all right solutions
Some right solutions might be worth more points than other right solutions, however

Analysis

- Determine Network Expectations
Examine and understand business goals
Examine and understand application requirements
Examine and understand the implications of network failures
- Gather and Validate Information
Determine missing information
Determine additional required tests

Design

- Focus on Technology
Understand technical/functional tradeoffs between solutions
- Reduce or Eliminate the Impact on Existing Services
- Focus on Scalability
- Common Cases verses the Worst Case
Determine what is likely, and plan for that, rather than for the worse case
- Focus on Elegance and Supportability
Know what's necessary and what's unnecessary
Consider operational expenses (OPEX)
- Minimize Impact of Network Failures

Implementation

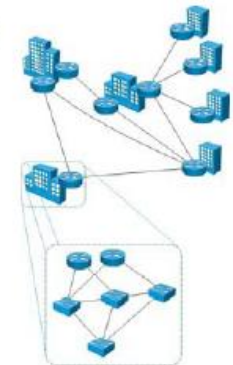
- Develop an Implementation Plan
Consider interactions between the phases of implementation
Minimize impact on services during implementation
- Develop a Contingency Plan

Justification

- Justify Technologies Chosen
- Justify Changes in the Design
 - Based on functional requirements
 - Based on technical requirements
- Consider Alternate Options
 - Justify moving or not moving to an alternate

Abstraction

- Underlies Many of the Concepts
 - Analysis, Scalability, Elegance, Supportability, Resiliency, etc.
- Deploy a New Data Center
 - The Data Center as a Network
 - Capacity, Addressing, etc.
 - The Data Center as an Object
 - Placement, Capacity, etc.



The Practical Format

- You Begin with a Set of Documents
 - Background documents
 - Network diagrams
 - Email threads
- You then get a Set of Questions
 - Network diagram drag and drop/modify attributes
 - Multiple choice
 - Ordering a list
 - Match two lists

The Practical Format

- As You Complete Questions You Gain Access to More Information
 - Decisions made in the design process
 - New information about the network
 - Changes in the network state

Computer Based Exam Environment - Demo

The screenshot displays a computer-based exam interface. At the top, a static menu bar contains four tabs: "Introduction", "Launch Section", "Documents", and "Notes". A red box with an arrow points to this menu bar, stating: "A static menu bar will always be present to navigate the exam and its contents."

Below the menu bar, the main area is titled "Question 1". The question text asks: "What additional information do you need to collect from CiscoLand Theme Parks and what additional information do you need to collect from Copper Twist before you develop a network design?" It further instructs: "To answer the question, drag the Additional Information that you need to collect and drop it next to the organization from which you would collect the information. You may use all or some of the Additional Information, and you may drag the same Additional Information to both organizations."

On the left, a light blue box labeled "Additional Information" contains five yellow boxes: "Security Policy", "Bandwidth Requirements", "QoS Policy", "SLA Information", and "Amount of free Ethernet ports in the DMZ". Red arrows indicate that "Security Policy" and "Bandwidth Requirements" are being dragged to the "Copper Twist" and "Cisco Land Theme Parks" boxes on the right. These boxes are blue and each contains three empty orange slots for dropping information.

At the bottom center, a "Documents" window is open, showing a list of documents under the heading "Base Network Information": "First email from CiscoLand Theme Parks" and "CiscoLand Theme Parks Network Diagram". A red box with an arrow points to this window, stating: "The exam includes all necessary material to answer the questions in this simple documents area."

At the bottom right, there is a "Next Question" button. A red box with an arrow points to the "Documents" window, stating: "The rich media environment enables a much more interactive testing experience."

Cisco Learning Network (CLN)



Gert De Laet

Cisco Expo
2009

Welcome to the Human Network.



Developing a World of Talent Through Collaboration

Scale
Reach

Online
Mentoring



The Cisco Learning Network

Cisco Learning Home | Careers | Connections | Certifications | Learning Center

Welcome, Guest
Connect with the Cisco Learning Network
[Register](#) | [Login](#) | [Contact Us](#) | [Help](#)

Search the Learning Network

Join the Community

Participate in exciting discussions about advancing your career and discover more about the future of networking.



Jeannette
General Manager
Cisco Certification Group

Master a Language
that Connects the World.

Join other IT professionals in this social learning network to enhance and advance your IT career. Browse technical content and connect and share insights, opinions, and knowledge with the community. Register now and jump in!

[Discussions](#)

[Documents](#)

[Blog Posts](#)

[Community](#)

Certification Spotlight

Check out these great technical resources and online events to help you prepare for your certification exam. You'll find lots of other useful preparation materials—even games—in the [Certification Center](#).

Missed CCNP TV today? VoD in 5 days!
[New CCNAs: Security, Voice, Wireless](#)

Technology Spotlight

Drill down on the latest technologies from Cisco and beyond. Hear from technologists that make it all work and the analysts and writers that make it work for you. Visit the [Learning Center](#) for more.

Basic IP Routing Concepts
Quick Learning Module: QOS for Security
Cisco IP Communicator Tutorial

Top Contributors

[Cert Guy](#)

[Ann - Community Mgr.](#)

[Adrie Finch](#)

[Cert Gal](#)

Recent

[CISCO871W, any good for CCNA...](#)

by [hmspresident](#) 4 hours ago

[Re: CDDP self study](#)

by [Doug Ingersoll](#)

[Re: July 24 - CCNP](#)

by [Cisco Moderator](#)

ago

[Re: Definition of X...](#)

by [Pablo Barriga](#) 14 hours ago

[Re: How many categories of...](#)

ago

Social
Learning

Online
Assessments

First Site for Learning, Starting, and Growing a Networking Career



CISCO The Cisco Learning Network

Connect with the Cisco Learning Network
Contact Us / Help / Log out

New = My Account = History = Browse =

Cisco Learning Home | Careers | Connections | Certifications | Learning Center

Search the Learning Center Go

Careers
Get Informed

CAREERS

Think you deserve the job of the future?
Get proof.

While demand is growing for IT professionals at all levels, whether you're beginning, advancing your career, get empowered now. Your journey begins here.

Chart Your Professional Path

Are you just beginning? Perhaps you're at a crossroads in your career and trying to decide which certification leads to the types of job responsibilities suited for you. Our sample job role paths can help point you in the right direction.

[Read about job paths](#)

Salaries Jump for IT Professionals in 2008

Wondering if an IT career will increase your overall value? NetworkWorld.com reports

Women in the IT Workforce

Women represent a growing percentage of the global IT workforce. Read their stories and

Top Content

Verita
Raphael
Anthony

Recent

Jo
H
te
es
W
U

Recent

An
Ma
Ire

Roadshow Photo Album 2008:
[Across the U.S. and Back!](#)

Welcome to the Human Network.

Cisco Learning Network

- The Cisco Social Learning Network for Networking Professionals Across the Globe
- www.cisco.com/go/learnnetspace



Cisco Press



Gert De Laet

Cisco Expo
2009

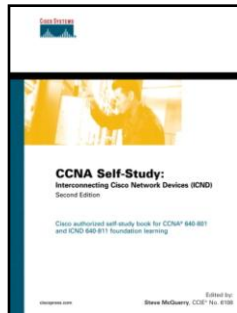
Welcome to the Human Network.



Cisco Press Resources

Enhances Classroom or Web-Based Training

Cisco Press Learning Path



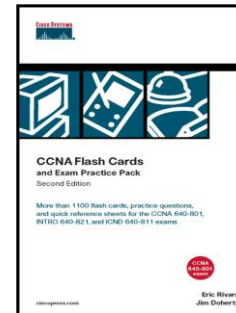
Learn



Experience



Prepare



Practice



Expert-Level

www.ciscopress.com

Q & A



Gert De Laet

Cisco Expo
2009

Welcome to the Human Network.



