



Cisco Networking Academy  
Mind Wide Open

# CCNA R&S 6.0

The way to teach!

**Thomas Meuser,**  
based on presentations of Cisco  
product and technical managers

April 2017



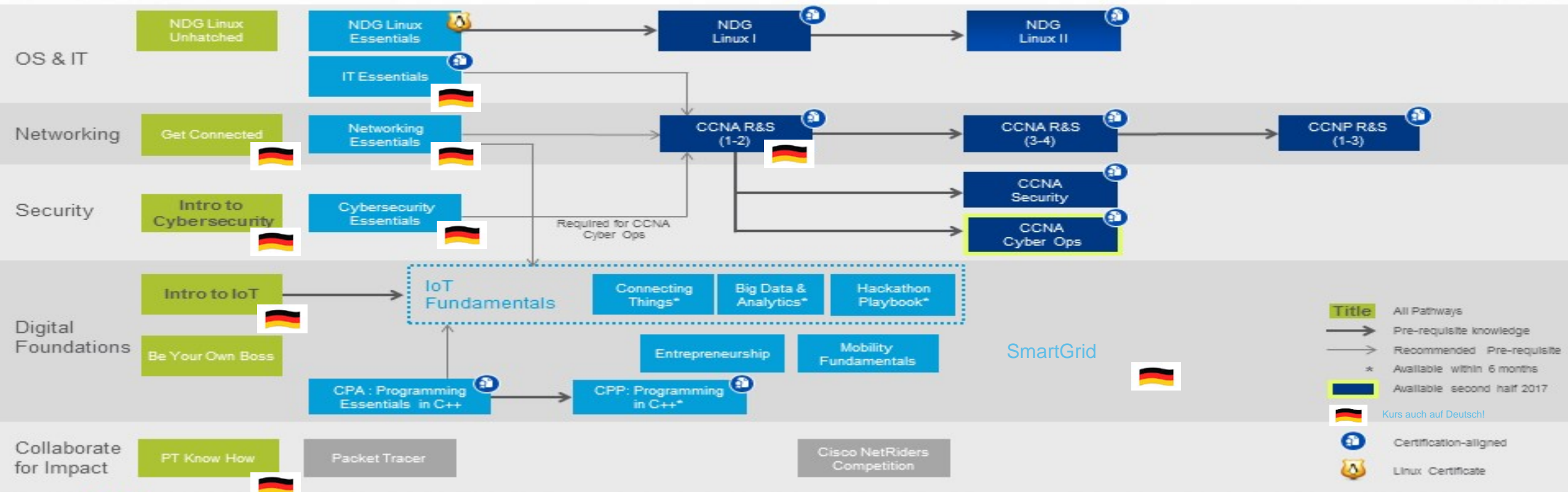
# Übersicht aktuelles NetAcad-Kurs-Portfolio

Exploratory  
Foundational  
Career Ready

October 2016

Sample Job Titles

- Technical Support
- IT Field Service Technician
- Help Desk Technician
- Mobile Application Support
- Network Support Technician
- Network Analyst
- Network Technician
- Support Engineer
- Network Administrator
- Entry-Level Network Engineer
- Linux Administrator
- Cyber Ops Analyst
- Level II Network Engineer
- Network Designer
- Security, Voice or Wireless Engineer



Cisco Networking Academy

© 2016 Cisco and/or its affiliates. All rights reserved. Cisco Confidential 27

Arrows represent assumed prerequisite knowledge in the depicted learning paths. There are actually many learning pathways possible to achieve desired learning outcomes.

# Networking Academy CCNA R&S Curriculum Strategy



# CCNA R&S Curriculum Objectives

NEW Cisco CCNA R&S  
Certifications announced  
May 17, 2016

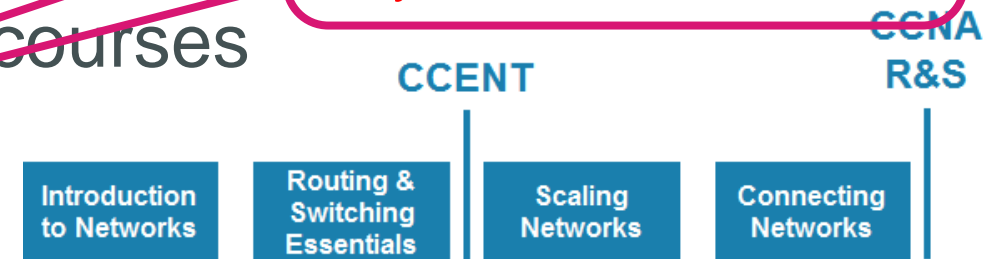
- Develop and release CCNA R&S 6.0 courses based on:

New certification alignment

Latest industry requirements and Cisco digitization strategy

Feedback from NetAcad instructors

- Teach fundamental and essential networking knowledge
- Address certification gap in a timely manner with the CCNA R&S 6.0 Bridging Course



> 101

CCNA R&S Bridging

Edit

AUX

SIM SM2

SVC LTE

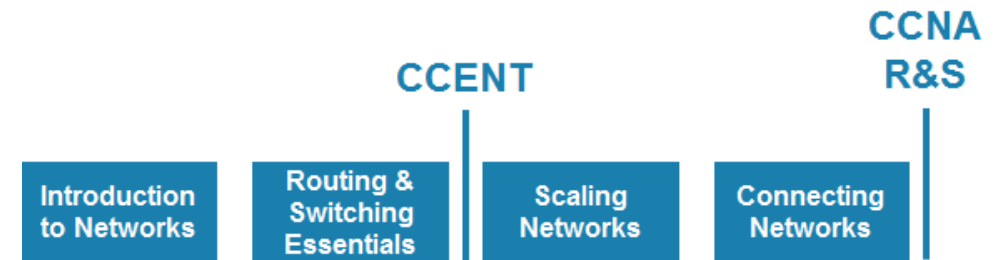
WLAN RSSI

This course is designed to support you as you incorporate new content in the CCNA Routing and Switching courses.

Click [here](#) to get started.

# CCNA R&S 6.0 Curriculum Recommendations

- Continue to teach CCNA R&S 5.X courses
- Leverage the CCNA R&S 6.0 Bridging Course to align to the new CCNA R&S certifications
- Adopt the CCNA R&S 6.0 courses when they become available



This course is designed to support you as you incorporate new content in the CCNA Routing and Switching courses.

Click [here](#) to get started.

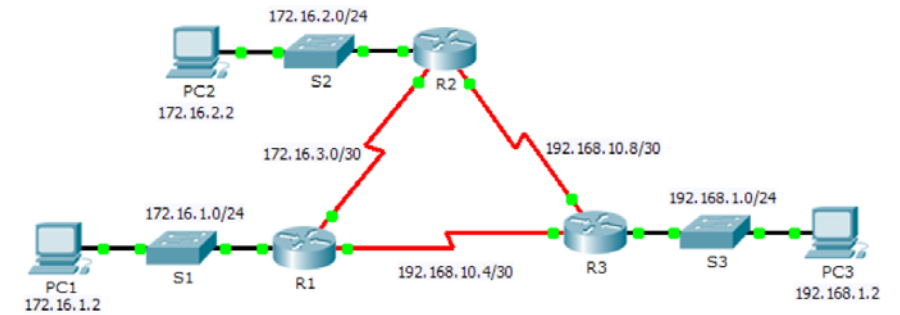
# CCNA R&S 6.0

## Transitional Considerations

- Instructors do not need to be re-accredited to teach CCNA R&S 6.0
- There are no changes to CCNA R&S lab equipment
- Upgrade to Packet Tracer 6.3, better 7.0

### Packet Tracer – Configuring OSPFv2 in a Single Area

#### Topology



Qty.	Product Number
3	CISCO1941/K9
3	WS-C2960+24TC-L

The 2901 and 2911 routers are Out-of-Sale. They will be replaced by 4321 routers soon.

# CCNA R&S 6.0 ITN and RSE Course Release Timeline

Available now!!!

Course	Language	Release Date
Introduction to Networks (ITN) v6.0	English	Nov 2016
Routing and Switching Essentials (RSE) v6.0	English	Nov 2016
Introduction to Networks (ITN) v6.0	French and Spanish	Nov 2016
Introduction to Networks (ITN) v6.0	German	March 1 <sup>st</sup> 2017
Routing and Switching Essentials (RSE) v6.0	German - Validation has started	August 2017 timeframe

# CCNA R&S 6.0

## ScaN & CN Course Release Timeline

Course	Language	Availability
Scaling Networks (ScaN) v6.0	English	July 2017
Connecting Networks (CN) v6.0	English	July 2017
ScaN and CN v6.0	German	None !!



# Cisco Press Projected Availability (English Version)

## CCNA Routing & Switching Curriculum



### Companion Guide

Full-featured textbook for the course.



### Labs & Study Guide

Complete collection of all the course lab exercises, packet tracer labs, and more.



### Course Booklet

Offline reading resource; contains only the narrative from the online course. Includes an index!

Courses	1	<b>Introduction to Networks v6</b>	Book: 9781587133602 <b>NEW</b> eBook: 9780134655635 December 2016	Book: 9781587133619 <b>NEW</b> December 2016	Book: 9781587133596 <b>NEW</b> December 2016
	Print ValuePack - (Companion Guide + Labs & Study Guide) - 9781587135019				
	2	<b>Routing and Switching Essentials v6</b>	Book: 9781587134289 <b>NEW</b> eBook: 9780134669656 December 2016	Book: 9781587134265 <b>NEW</b> December 2016	Book: 9781587134272 <b>NEW</b> December 2016
	Print ValuePack - (Companion Guide + Labs & Study Guide) - 9781587135002				
3	<b>Scaling Networks v6</b>	Book: 9781587134340 <b>NEW</b> eBook: 9780134760896 July 2017	Book: 9781587134333 <b>NEW</b> July 2017	Book: 9781587134302 <b>NEW</b> July 2017	
Print ValuePack - (Companion Guide + Labs & Study Guide) - 9781587134357					
4	<b>Connecting Networks v6</b>	Book: 9781587134326 <b>NEW</b> eBook: 9780134760889 July 2017	Book: 9781587134296 <b>NEW</b> July 2017	Book: 9781587134319 <b>NEW</b> July 2017	
Print ValuePack - (Companion Guide + Labs & Study Guide) - 9781587134364					

**T. Lammle: CCNA Routing and Switching  
 Complete Study Guide: Exams 100-105, 200-105,  
 200-125 , Oktober 2016, ISBN: 1119288282**

Ciscopress.com: <http://www.ciscopress.com/markets/detail.asp?st=44750>

Way to order free copies: [ciscopress.com/irc](http://ciscopress.com/irc)

# CCNA R&S 6.0 Bridging Course



# Bridging Course Information

- All technical content and quizzes are within the course
- Content order is based on the order for CCNA 6.0 courses
- No new equipment needed to teach bridge
- No instructor training required
- Upgrade to Packet Tracer 6.3 (or 7.0)
- Quiz defaults:
  - Published – may choose to unpublish quizzes
  - Quiz grades do not show in the course gradebook

# CCNA R&S 6.0 Bridging Course Overview

- Course Content

4 bridging modules (it's not an online curriculum)

9 hands-on labs & 11 Packet Tracer activities

3 topic quizzes & 4 module quizzes

## 4.4 Quiz BGP

⚠ This is a preview of the published version of the quiz

Started: Apr 30 at 9:44am

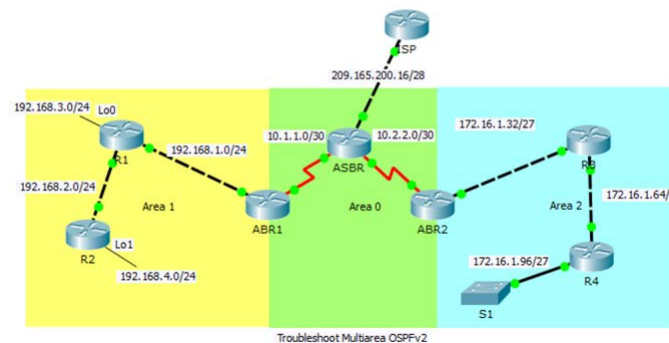
### Quiz Instructions

This quiz covers the content in **CCNA R&S 6.0 CN Bridge Module - BGP**. It is designed to test the skills and knowledge presented in the module. You will be allowed multiple attempts

Form 31104

## Lab – Troubleshoot Multiarea OSPFv2

Topology



### Course Overview

Introduction

Course Completion Overview

Introduction to Networks - Bridge Content

Routing & Switching Essentials - Bridge Content

Scaling Networks - Bridge Content

Connecting Networks - Bridge Content

# CCNA R&S 6.0 Bridging Course Overview

## 1.2.2.1: Duplex Oper Quizlet - Device Discovery with CDP

In data cor  
at a time, t

For best c

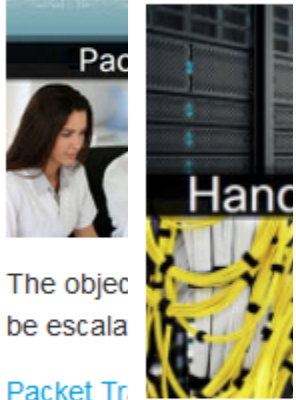
Ethernet a  
capabilities:  
mode.

Figure 1:



### 1.2.3.6: Packe

### 1.2.3.5: L



The objec  
be escala

Packet Tr

Packet Tr

In this lab,

- Identify
- Impleme
- Verify F
- Docume

Lab - Troub

an IOS command that displays information about the CDP protocol,  
including its operational status

Restliche 13  
Falsch 0  
Richtig 0

Begriff zuerst anzeigen  
 Audiowiedergabe

Neu starten

Quizlet Dieses Lernset ansehen



















Weiß ich nicht

Antworten

Lernmodus wählen

- Lernmodus wählen
- Zuordnen
- Lernen
- Testen
- Karteikarten
- Schreiben

# New Content provided by Bridging Course

Introduction to Networks	Routing & Switching Essentials	Scaling Networks	Connecting Networks
Extended Traceroute	Host Routes	VTP, Extended VLANs, and DTP  	WAN Topologies DMVPN
Debugging	Device Discovery  	Troubleshoot Multi-VLAN	Implement PPPoE 
Network Troubleshooting  	NTP 	Switch Stacking	Implement eBGP  
	Password Recovery	Implement HSRP (S)  	Common IPv6 ACL Errors 
		Troubleshoot Multi-area OSPF 	LAN Security Best Practices
			SNMPv3 Configuration
			SPAN 
			Quality of Service
			Cloud and Virtualization
 Hands-on Lab	 Packet Tracer Lab		Network Programming
<a href="https://www.netacad.com/group/resources/ccna-rs-bridge/6.0">https://www.netacad.com/group/resources/ccna-rs-bridge/6.0</a>			Using IP SLA 



[Resources](#) / [Course Resources](#)

## Course Resources

[CCNA R&S 6.0: Bridging](#)

2

[CCNA R&S: Intro to Networks 5.1](#) | [older versions 5.0](#)

[CCNA R&S: Routing and Switching Essentials 5.0](#)

[CCNA R&S: Scaling Networks 5.0](#)

[CCNA R&S: Connecting Networks 5.0](#)

[CCNA Security 2.0](#) | [older version 1.2](#)

[CCNP Routing & Switching 7.1](#)

[IT Essentials 6.0](#) | [older versions 5.0](#)

[Introduction to IoT](#)

[Introduction to Cybersecurity 2.0](#) | [older version 1.1](#)

[NDG Linux Essentials](#)

[NDG Linux I & II](#)

[CPA: Programming Essentials in C++](#)

[Be Your Own Boss](#)

[Entrepreneurship](#)

[Get Connected](#)

### INSTRUCTOR RESOURCES

[Course Resources](#)

1

[Assessment Resources](#)

[Additional Resources](#)

[Packet Tracer Resources](#)

[Program Resources](#)

[General Assessment Resources](#)

[Instructor Resources](#)

[FAQs and Answers](#)

[Academy Reports](#)

[Academy Certifications](#)

[Cisco Recognition Program](#)

[Instructor Training Locator](#)

[Latest News](#)

[Translating](#)

[Bridging](#)

[August 1, 2016](#)

[Profess](#)

[März 22, 2016](#)

[New St](#)

[Juli 20, 2016](#)

[Learnin](#)

[Program](#)

[Juli 27, 2016](#)

[Get the](#)

[Juni 23, 2016](#)

### STUDENT RESOURCES

[Course Catalog](#)

[Cisco Certifications and Vouchers](#)

[Find an Academy](#)

[Download Packet Tracer](#)

[All Resources](#)

[Career Resources](#)

[Career Advantage Webinars](#)

# CCNA R&S 6.0 Bridging Course

## Instructor Resources

- Classroom Resources
- Lab Resources
- Instructor Training Resources
- Product Introduction Resources

### Classroom Resources

[Instructor Planning Guide and PPT \(English\)](#)

for all four modules: ITN, RSE, ScaN and CN

[Instructor Resources - Arabic](#)

[Instructor Resources - Chinese](#)

[Instructor Resources - French](#)

[Instructor Resources - Portuguese](#)

[Instructor Resources - Russian](#)

[Instructor Resources - Spanish](#)

### Instructor Training Resources

[Video: Bridging Course Overview](#)

[Video: Importing Bridging Content](#)

[Enroll in the IPD Course to Access the Training Videos and Resources](#)

### Lab Resources

[Student Lab Source Files](#)

[Student Packet Tracer Source Files](#)

[Instructor Lab Manual](#)

[Instructor Lab PDF Files](#)

[Instructor Lab Source Files](#)

[Instructor Packet Tracer Manual](#)

[Instructor Packet Tracer PDF Files](#)

[Instructor Packet Tracer Source Files](#)

[Instructor Packet Tracer PKA Files](#)

### Product Introduction Resources

[Video: Message from NetAcad Executives](#)

[Video: Product Overview from PM](#)

[Product Overview PPT](#)

[FAQ](#)

[Scope and Sequence](#)

<https://www.netacad.com/group/resources/ccna-rs-bridge/6.0>



Resources for New Content

To help assist you in teaching the new CCNA R&S 6.0 Courses and Bridging Content we have provided a number of Instructor Professional (IPD) opportunities around the new technical content.

Join us for sessions on 6 - 10 March, 2017.

Click below to register for live sessions, review recordings and download resources. Click the **Archive** button below to see the sessions from September and December 2016.

Day 1  
Tues 7<sup>th</sup> March, 2017

Day 2  
Wed 8<sup>th</sup> March, 2016

Day 3  
Thurs 9<sup>th</sup> March, 2017

Program Updates  
[Check the Agenda]

Technical Sessions  
[Check the Agenda]

Instructor Forums  
[Check the Agenda]

Localizations

- العربية
- Português
- Русский
- 中文
- Italian

CCNA R&S 6.0 & Bridging Course Resources

Sept. & Dec. 2016 Global IPD Week Archives



Earn a Certificate of Attendance



Learn

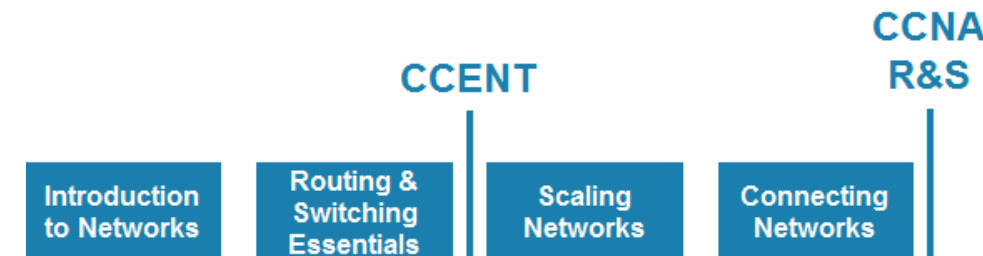
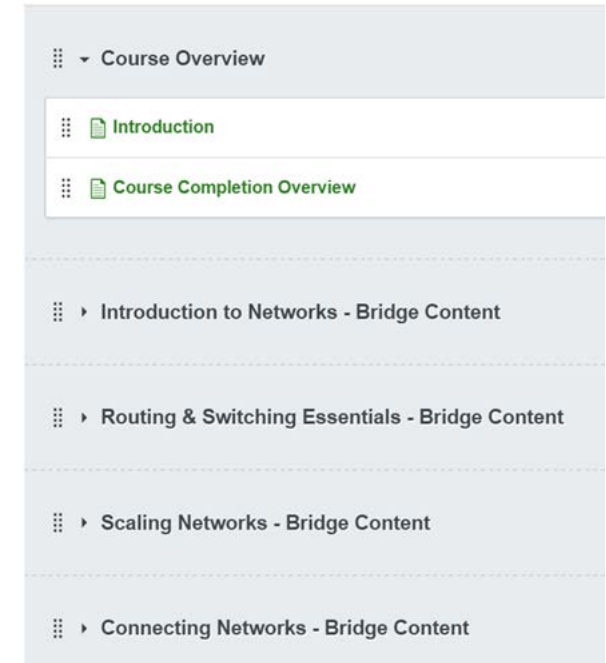


Introduction to Networks	Routing & Switching Essentials	Scaling Networks	Connecting Networks
Network Troubleshooting <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>	Host Routes <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>	VTP and DTP <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>	DMVPN <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>
Includes Extended Traceroute and Debugging	Device Discovery <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>	Troubleshoot Multi-area OSPF <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>	Implement PPPoE <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>
	NTP <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>	Switch Stacking <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>	Common IPv6 ACL Errors <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>
	Password Recovery <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>	Implement HSRP <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>	LAN Security Best Practices Coming Soon
		Extended VLANs <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>	eBGP <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>
			SPAN <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>
			Quality of Service <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>
			QoS Using IPSLA <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>
			Cloud and Virtualization <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>
			Network Programming <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>
			SNMPv3 Configuration <a href="#">(Recording)</a> / <a href="#">PowerPoint</a>

# CCNA R&S 6.0 Bridging Course

## Four Options for Instructors

1. Create a Bridge Course with all four modules and enroll students
2. Integrate the new content at the end of Routing and Switching Essentials and Connecting Networks
3. Integrate the new content at the end of each course
4. Integrate the new content into existing CCNA R&S 5.X chapter



# CCNA R&S 6.0 Bridging Course Option for Students

- A Self-paced CCNA R&S 6.0 Bridging Course will be offered to NetAcad student alumni
- Available on NetSpace since May 2016

CCNA R&S 6.0: Bridging

Prepare for the latest Cisco CCENT and CCNA Routing and Switching Certification exams. Recommended for current and recent CCNA students.

Enroll Now

■ ■ ■ Intermediate Duration: 20 hours

Instructor-led/Self-paced

### Course Summary

The most sought after networking career certifications are getting better. Cisco CCENT and CCNA Routing and Switching Certifications have been updated to meet the new demands of today's networking careers. Cisco Networking Academy instructors who teach CCNA will be incorporating the new skills into current courses. Students who have completed courses in the [CCNA Routing and Switching](#) curriculum can enroll in the self-paced CCNA R&S 6.0: Bridging course to prepare for the updated certification exams.

- CCNA R&S: Introduction to Networks now includes extended traceroute activities and more practice in debugging and network troubleshooting.
- CCNA R&S: Routing and Switching Essentials has added material related to host routes, device discovery, NTP, and password recovery.
- CCNA R&S: Scaling Networks has added VTP, extended VLANs, and DTP. You will also learn more about troubleshooting multi-VLAN and multi-area OSPF, switch stacking, and how to implement HSRP.
- CCNA R&S: Connecting Networks has the most updates with new content in the areas of: WAN topologies, IP errors, security best practices, quality of service, cloud and virtualization, and network programming.

Languages:

---

### Career Pathways

CCNA R&S 6.0: Bridging prepares CCNA students for certification exams. Students who enroll in the course can choose the material they need to review based on the courses they have taken and their intended certification.

Certification: [Cisco CCENT](#) or [CCNA Routing and Switching](#)

Enroll Now

# Access Learning Materials CCNA R&S, v6



Cisco Networking Academy



My NetAcad | News and Events | Support | **Resources** | Thomas

Teach | **Manage** | Learn

## Access the Courses You Are Teaching

[CCNA1\\_Instruktor\\_2017](#)

CCNA R&S: Introduction to Networks  
Hochschule Niederrhein



[Bridge\\_6\\_0](#)

CCNA R&S 6.0 Bridging  
Hochschule Niederrhein



[Instruktorenkurs ITE 6.01 awo  
Hambu...](#)



### Actions

- Create a Course
- Manage Instructor
- Access Academy
- View Academy
- Show Condu...

### INSTRUCTOR RESOURCES

**Course Resources**

Assessment Resources

Packet Tracer Resources

Marketing and Program Resources

Academy Reports

Cisco Recognition Program

Instructor Training Locator

ASC Locator

### STUDENT RESOURCES

Course Catalog

Try New Version!

## New C Programming Course

Collaboration with C++ Institute,  
C Programming in C teaches  
C programming skills.

[Details](#)



## Try It! You'll Like It!

Learn about the new instructor  
face features, then try it out for  
yourself.

[Learn more](#)



## Learning Portfolio is Growing



## News and Events

Students, Learn C Programming!  
März 16, 2017

[Product Portfolio PPT & Translations Updated](#)



# Course Resources



## Course Resources

- [CCNA R&S 2.0: Bridging](#)
- [CCNA R&S: Intro to Networks 6.0 | older versions 5.1, 5.0](#)
- [CCNA R&S: Routing and Switching Essentials 6.0 | older versions 5.0](#)
- [CCNA R&S: Scaling Networks 5.0](#)
- [CCNA R&S: Connecting Networks 5.0](#)
- [CCNA Security 2.0 | older version 1.2](#)
- [CCNP Routing & Switching 7.1](#)
- [IT Essentials 6.0 | older versions 5.0](#)

- [Introduction to IoT](#)
- [Introduction to Cybersecurity 2.0 | older version 1.1](#)
- [Cybersecurity Essentials](#)
- [Networking Essentials](#)
- [NDG Linux Unhatched](#)
- [NDG Linux Essentials](#)
- [NDG Linux I & II](#)
- [CPA: Programming Essentials in C++](#)
- [CLA: Programming Essentials in C](#)

## Additional Instructor Resources

- [Packet Tracer Resources](#)
- [General Assessment Resources](#)
- [Instructor Professional Development](#)
- [FAQs and Tutorials for Instructors](#)
- [Academy Orientation course](#)

---

## Latest News

[Teach New C Programming Course](#)  
Februar 23, 2017

[Product Portfolio PPT & Translations Updated](#)  
März 15, 2017

[Webinar Replay: SDN Applications in Cisco](#)

# Learning Materials

■ ■ ■ Intermediate Duration: 70 Hours Classroom/Lab Networking Instructor-led

Select your course language ▼

## CCNA R&S: Introduction to Networks

CCNA Routing & Switching Curriculum

Version 6.0 | Released November 2016 [Release Notes & Versions](#)

### Course Overview

CCNA R&S: Introduction to Networks (ITN) covers networking architecture, structure, and functions. The course introduces the principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations to provide a foundation for the curriculum.

By the end of the course, students will be able to:

- Explain network technologies.
- Explain how devices access local and remote network resources.

[Read More](#)

### Quick links

[CCNA R&S FAQ](#)  
[Release Notes](#)  
[Scope and Sequence](#)  
[CCNA R&S 6.0 Bridging Course](#)  
[CCNA R&S: Routing and Switching Essentials Resources](#)  
[Translated Instructor Resources](#)  
[Packet Tracer Resources](#)  
[General Assessment Resources](#)  
[Best Practices for Teaching CCNA R&S](#)  
[Errata](#)

### Latest News

[French and Spanish CCNA R&S RSE 6.0](#)  
März 01, 2017

[German CCNA R&S ITN 6.0 Now Available](#)  
März 01, 2017

[Webinar Replay: SDN Applications in Cisco](#)  
Februar 13, 2017

[More Languages for CCNA R&S ITN](#)  
Februar 01, 2017

[NetRiders Competitions 2017](#)  
Februar 08, 2017

[go to news & events](#)

### Classroom Resources

[Instructor PPT](#)  
[Dynamic Tracer](#)  
[Icon Glossary](#)

[Translated Instructor Resources](#)

### Assessment Resources

[Skills Assessment](#)  
[Exam Design Document](#)  
[Packet Tracer Skills Assessment Design](#)

### Lab Resources

[Student Lab Source Files](#)  
[Student Packet Tracer Source Files](#)  
[Instructor Lab Manual](#)  
[Instructor Lab Source Files](#)  
[Instructor Lab PDF Files](#)  
[Instructor Packet Tracer Manual](#)  
[Instructor Packet Tracer PDF Files](#)  
[Instructor Packet Tracer Source Files](#)  
[Packet Tracer Activity Source Files](#)

### Marketing Resources

[Release Notes](#)  
[Scope and Sequence](#)  
[CCNA R&S FAQ](#)  
[Curriculum Overview PPT](#)  
[Curriculum At-A-Glance](#)

Home

Modules

Announcements

Assignments

Discussions

Grades

People

Pages

Files

Syllabus

Outcomes

Quizzes

Collaborations

Assessment Center

Settings

Instructor Home

1

# CCNA1\_Instruktor\_2017

## CCNA Routing and Switching: Introduction to Networks



Launch Course



Student Resources

# Instructor Home

Resource Link	Description
<a href="#">Working with IOS 15 Universal Image Licenses</a> ↗	View information regarding IOS 15.
<a href="#">Instructor Resources</a>	View informative resources for the CCNA R&S curriculum: <ul style="list-style-type: none"> <li>• Curricula informational materials (ex. Scope &amp; Sequence)</li> <li>• Assessment resources (ex. Design Documents)</li> <li>• Instructor and student lab and PT resources</li> <li>• Source materials</li> <li>• Instructor Planning Guide and PPT</li> </ul>
<a href="#">Assessment Resources</a>	Tutorials on NetAcad assessments, including new activation and assessment viewer features, managing assessments, using Canvas quizzes and item banks, etc.
<a href="#">Packet Tracer Resources</a>	Cisco Packet Tracer provides simulation, visualization, authoring, assessment, and collaboration capabilities, and facilitates the teaching and learning of complex technology concepts.
<a href="#">Course Downloadable</a>	For academies that have a need to deliver the course from a local server, a downloadable option is provided for instructors. The downloadable file is to be downloaded by instructors only and used for instructional purposes. It should not be made available directly to students or other instructors.
<a href="#">Equipment Information</a>	View the Equipment list for this course. For general equipment information, go to Program>Equipment Information on netacad.com.

**Curriculum can be down-loaded from the materials of an open class only**



# Enroll to IPD Opportunities

The screenshot displays the Cisco Networking Academy user interface. At the top, the Cisco logo and 'Cisco Networking Academy' text are visible, along with a search icon. A navigation bar contains 'My NetAcad', 'News and Events', 'Support', 'Resources', and 'Thomas'. Below this, a blue header bar features 'Teach' (circled in red with a purple '1' badge), 'Learn', and 'Teach More Courses'. The 'Teach' section lists courses like 'IT-Schülerlabor' and 'CCNA1\_Instruktor\_2017' with 'Edit' buttons. An 'Actions' sidebar includes 'Create a Course', 'Manage Instructor Accreditation', 'Access Academy Reports', 'View Academy Information', and 'Show Concluded Courses'. On the right, a green 'Try New Version!' button is present. Below are three promotional cards: 'Scavenger Hunt!' with a 'Start now' button, 'Learning Portfolio is Growing!' with a photo of students, and 'New C++ Programming Course' with a 'C++' graphic. At the bottom, a 'News and Events' section lists articles, and a 'Professional Development' card features a 'IPD Opportunities' button (circled in red with a purple '2' badge) and a photo of a woman.

# Enroll to IPD Opportunities

## Professional Development Opportunities

February 23, 2017

### Global Instructor Professional Development (IPD) Week

6 to 10 March 2017

#NetAcadIPD

To enroll in the Global IPD Week course and register for sessions go to: <http://cs.co/GIPD17>

Already enrolled?

1. enter the course from your **Learn** tab
2. register for the live sessions you want to join

The **Program Update** sessions are packed with information. Here are some of the topics:

- IoT Fundamentals new courses
- My NetAcad Updates
- CCP: Programming in C++
- Certification Price Changes and Updated Voucher Information
- NetRiders Skills Competition

Join the **Instructor Forum** sessions focused on what is an IoT Hackathon and best practices from experienced instructors around the globe.

**Technical Sessions** will include:

- Digitize your Classroom with Cisco DevNet
- Understanding and Troubleshooting BGP Neighborships
- Packet Tracer 7 and the Real World
- IoT and Digitization: The 360 view with Arduino and Raspberry Pi
- An Introduction to Cisco Meraki
- Data Center Evolution

We are offering sessions in ten languages: English, Arabic, Chinese, French, German, Italian, Russian, Spanish, Portuguese and Turkish.

## Academy Orientation course

This self-paced course provides new Networking Academy instructors, administrators and other partners a broad overview of Cisco Networking Academy and the services and resources available as part of the program. The orientation course will also help instructors and administrators understand how to use these resources and the Cisco Networking Academy platform in support of the program and its students.

Enroll in the [Academy Orientation](#) course.

If you are already enrolled, enter the [Academy Orientation](#) course.

## Global Instructor Resources

Access [Global Instructor Resources](#) to expand your technical knowledge and supplement classroom instruction. If you are already enrolled, enter the [Global Instructor Resources](#) course.

3

## Preview Networking Academy Courses

Enroll in the [Networking Academy Course Previews for Instructors](#). The Course Previews contain all the available Networking Academy courses arranged by curriculum, course, and language.

# Enroll to IPD Opportunities

Home

Assignments

Discussions

Modules

Collaborations

Chat

4

## Global Instructor Resources



English

[Upcoming Academy events](#)

[CCNA R&S 6.0 Bridging Course Resources](#)

[Register for Global IPD Week](#)

Português

[Próximos eventos da Academia](#)

[Registrar para semana Global IPD](#)

Español

[Próximos eventos del programa Academy](#)

[Regístrese para la Semana Global IPD](#)

Français

[Prochains événements de NetAcad](#)

[Inscrivez-vous à la semaine mondiale IPD](#) [报名参加全球IPD周](#)

中文

[即将举行的亲临现场的网院活动](#)

Русский

[Ближайшие очные события Академии](#)

[Зарегистрироваться на Глобальную неделю IPD](#)

# CCNA R&S 6.0 Objectives



# Magnitude of Changes New Content

Page
Topic
Section
Chapter

Introduction to Networks	Routing & Switching Essentials	Scaling Networks	Connecting Networks
	Host Routes		WAN Topologies DMVPN
	Password Recovery		Common IPv6 ACL Errors
Extended Traceroute	NTP	Switch Stacking	LAN Security Best Practices
Debugging	Device Discovery	Implement HSRP	SNMPv3 Configuration
Network Troubleshooting		Troubleshoot Multi-area OSPF	Implement PPPoE & eBGP
		VTP, Extended VLANs, and DTP	SPAN
		Troubleshoot Multi-VLAN	Cloud and Virtualization
			Network Programming
			Quality of Service

# Magnitude of Changes Moved Content

- Page
- Topic
- Section
- Chapter

Introduction to Networks	Routing & Switching Essentials	Scaling Networks	Connecting Networks
<b>None</b>	Dynamic Routing (additional depth)	→	
	Single-Area OSPF		
	DTP	→	
	SVI Inter-VLAN Routing		
	Inter-VLAN Routing Troubleshoot		
	LAN Security	→	
	Extended IPv4 ACLs		
	All IPv6 ACLs		

# Magnitude of Changes Removed Content

- Page
- Topic
- Section
- Chapter

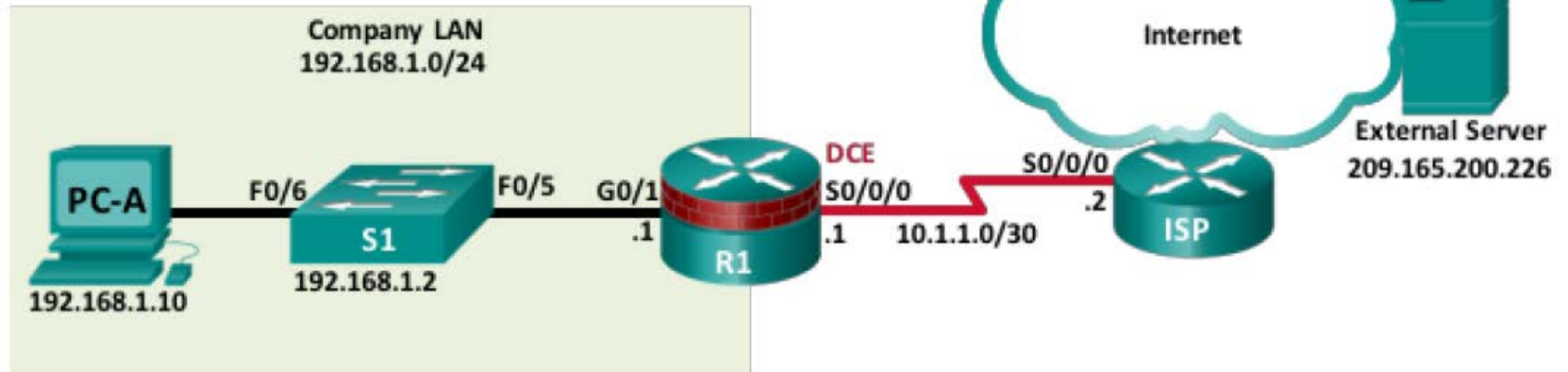
Introduction to Networks	Routing & Switching Essentials	Scaling Networks	Connecting Networks
<h1>None</h1>	CIDR and VLSM Review	EIGRP Summarization	Remote Access
	RIPng, Summary Routes	Secure EIGRP	IPsec
		OSPF Summarization	NetFlow
	Wireless LANs	Secure OSPF	Frame Relay
		Wireless LANs	

# CCNA R&S ITN – New Objectives

- Network Testing and Verification
  - How to use the extended traceroute (like extended ping)
  - How to use the tracert options on a Windows PC
  - How to use debugging commands
    - Warning to use unspecified debug in real networks (e.g. debug ip packets)
    - Stop data capturing (undebug all – u al)
    - Re-direct log messages on a Telnet or SSH using ‘terminal monitor’
- Network Troubleshooting
  - Basic Troubleshooting Approaches
  - Describe how to use the **show**, **debug**, **ping**, and **traceroute** commands for network troubleshooting.



# Troubleshooting – Best Practice



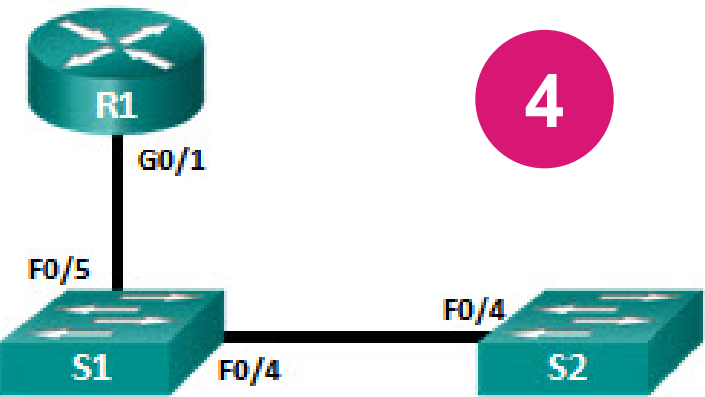
1. ping default gateway from PC;  
in case of failure check using 'ipconfig' on PC-A and 'sh ip int brief' on R1
2. ping serial interface of R1 from PC; see step 1.
3. ping serial interface of ISP;  
in case of failure check using 'sh ip int brief' and 'sh ip route' on R1
4. ping external server;  
of failure check 'ipconfig' on server or 'sh ip route' 'sh ip protocols' on ISP in case
5. if necessary check all routers in the same way

# CCNA R&S RSE – New Objectives (part 1)

- Create a Host Route (subnet mask equal /32)
  - Automatically listed as **L**ocal interface in the routing table when an IP address is configured on the router
  - It can be configured as a static host route
  - Host route automatically obtained through a routing protocol like OSPF
- Device Discovery using CDP and LLDP
  - Link discovery protocol that is used to gather information about devices which share the same data link
  - Each device sends periodic CDP advertisements to connected devices. Advertisements share information about the type of device, the name of the devices, and the number and type of the interfaces.
  - CDP is Cisco proprietary Layer 2 protocol whereas LLDP is an open, vendor neutral protocol also for non-Cisco devices

Us

S



2

```
R1# show cdp neighbors detail
-----
Device ID: S1
Entry address(es):
  IP address: 192.168.1.2
Platform: cisco WS-C2960-24TT-L, Capabilities: Switch IGMP
Interface: GigabitEthernet0/1, Port ID (outgoing port):
FastEthernet0/5
Holdtime : 136 sec

Version :
Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M),
Version 15.0(2)SE7, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2014 by Cisco Systems, Inc.
Compiled Thu 23-Oct-14 14:49 by prod_rel_team
```

1

```
R1# show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source
                  S - Switch, H - Host, I - IGMP, r - Repea
                  D - Remote, C - CVTA, M - Two-port Mac Re

Device ID      Local Intrfce   Holdtme    Capability   P
S1             Gig 0/1         122        S I W
```

3

### telnet auf Switch S1 und erneut cdp

```
S1# show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone,
                  D - Remote, C - CVTA, M - Two-port Mac Relay

Device ID      Local Intrfce   Holdtme    Capability   Platform  Port ID
S2             Fas 0/4         158        S I          WS-C2960- Fas 0/4
R1             Fas 0/5         136        R B S I      CISCO1941 Gig 0/1
```

221FF000000000000000002291210380FF0000

# CCNA R&S RSE – New Objectives (part 2)

- Configure and verify NTP – Network Time Protocol
  - NTP enables routers to synchronize time settings with an NTP server (local master clock or publicly available NTP server on the Internet)
  - NTP networks use a hierarchical system of time sources with each level called a stratum (0 = is the authoritative time source)

```
R1# show clock detail
20:55:10.207 UTC Fri Dec 11 2015
Time source is user configuration
```

```
R1(config)# ntp server 209.165.200.225
R1(config)# end
```

```
R1# show clock detail
21:01:34.563 UTC Fri Dec 11 2015
Time source is NTP
```

```
R1# show ntp associations

address          ref clock      st   when  poll reach  delay  offset  disp
*~209.165.200.225 .GPS.          1    61    64   377  0.481  7.480  4.261
* sys.peer, # selected, + candidate, - outlyer, x falseticker, ~ configured
```

```
R1# show ntp status
Clock is synchronized, stratum 2, reference is 209.165.200.225
```

# CCNA R&S RSE – New Objectives (part 3)

## Password Discovery

- If any password is lost or unknown, then password recovery must be performed to access a network device
- This procedure cannot be done remotely as you must have physical access and console access to the device
- Steps are slightly different for different Cisco devices
  - Step 1: Enter the ROMMON mode - break power on sequence or remove flash
  - Step 2: Change config-register to 0x2142 to ignore the startup config file
  - Step 3: Reset / reboot the device – it should look like an un-configured device
  - Step 4: Enter enable mode and load the start-up configuration
  - Step 5: Make necessary password changes and save configuration
  - Step 6: Set back the config-register to 0x2102 and reload the device

# CCNA R&S SN – New Objectives (part 1)

- VTP, Extended VLANs, and DTP
  - Implement VTP
  - Explain how to delete a VLAN and troubleshoot DTP and VTP configurations
  - Topics have been part of CCNA, version 4.x. Now there are back again 😊
- Implement HSRP (Hot Standby Routing Protocol)
  - HSRP operation – more detailed view as in version 5.x
  - Configure, verify, and troubleshoot HSRP; in version 5.x included in a hand-on lab, now extended as section of the curriculum

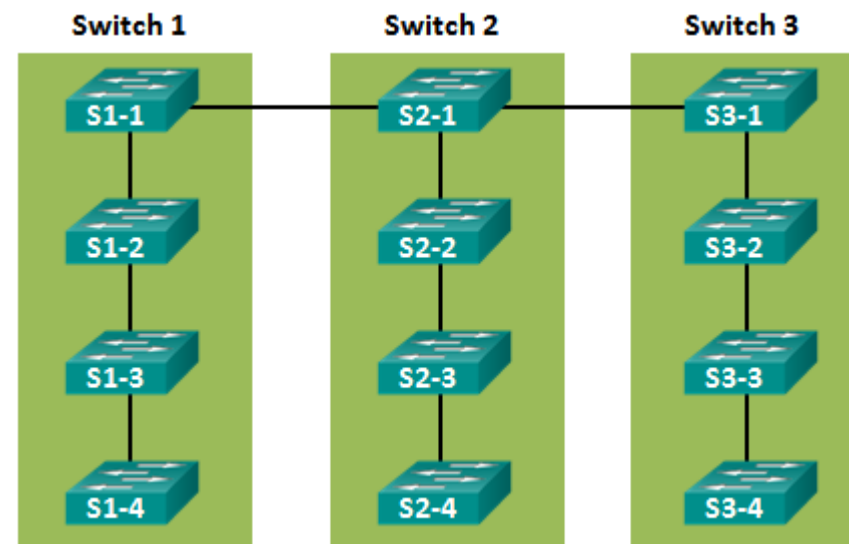
# CCNA R&S SN – New Objectives (part 2)

- Explain how switch stacking improves STP deployment
  - Up to 9 connected switches, the stack master controls all stack members
  - The master contains the configuration files for the stack
  - each member has a current copy for backup and is an eligible master
  - Layer 2 and Layer 3 protocols present the entire switch stack as a single entity to the network.
  - Switch stacks are managed using a single IP address



# CCNA R&S SN – New Objectives (part 3)

- Switch stacks help to reduce the impact of diameter on STP reconvergence deployment; IEEE recommends a maximum of 7 switches
  - Switch stacking also has the ability to add more switches to a single STP instance without increasing the STP diameter.
  - In a switch stack, all switches use the same bridge ID for a given spanning-tree instance.





# CCNA R&S SN – New Objectives (part 4)

- Troubleshooting Multiarea OSPF – understand operation and data flows

Data Structure	Description
<b>Interface table</b> sh ip ospf interface	<ul style="list-style-type: none"><li>• Table includes a list of all active OSPF enabled interfaces.</li><li>• Type 1 LSAs include the subnets associated with each active interface.</li></ul>
<b>Neighbor table</b> sh ip ospf neighbor	<ul style="list-style-type: none"><li>• Table is used to manage neighbor adjacencies using hello timers and dead timers.</li><li>• Neighbor entries are added and refreshed when a hello is received.</li><li>• Neighbors are removed when the dead timer expires.</li></ul>
<b>Link-state database</b> sh ip ospf database	<ul style="list-style-type: none"><li>• This is the primary data structure used by OSPF to store network topology information.</li><li>• It includes full topological information about each area that the OSPF router is connected to, as well as any paths that are available to reach other networks or AS.</li></ul>
<b>Routing table</b> sh ip route	<ul style="list-style-type: none"><li>• After the SPF algorithm is calculated, the best routes to each network are offered to the routing table.</li></ul>

# CCNA R&S CN – New Objectives (part 1)

- WAN Technologies Overview - Explanation of a **WAN topologies** only.
- Describe Dynamic Multipoint VPN (**DMVPN**) - Cisco software solution for building multiple VPNs in an easy, dynamic, and scalable manner.
- Implement a Cisco router with **PPPoE** (PPP over Ethernet).  
A customer's router is connected to the ISP router using DSL. Both routers have been configured for PPPoE.  
Curriculum only include troubleshooting of PPPoE using show and debug
- **eBGP** (external Border Gateway Protocol) is an Exterior Gateway Protocol used to route between networks administered by two different organizations  
Overview, basic configuration and verification.  
Configure eBGP in a single-homed remote access network.

# CCNA R&S CN – New Objectives (part 2)

- Troubleshoot common **IPv6 ACL errors** using CLI commands in 3 scenarios
- LAN Security - Explain how to mitigate common LAN security attacks
  - Use **DHCP snooping** to mitigate DHCP spoofing attacks
  - AAA with **RADIUS** and **TACACS+**
  - **IEEE 802.1X** as a port-based access control and authentication protocol
- Configure **SNMPv3** to monitor network operations in a small to medium-sized business network.
- Troubleshoot a network problem using Cisco Switch Port Analyzer (**SPAN**).

# CCNA R&S CN – New Objectives (part 3)

- **QoS Overview** on purpose and characteristics of QoS.
  - Improve network transmission quality by prioritizing traffic
  - Transmission quality is based on bandwidth, congestion, delay, and jitter
  - Voice, video, and data have different traffic characteristics
  - Explanation of different queuing algorithms
- **QoS Mechanisms** - how networking devices implement QoS
  - Three QoS policy models: Best Effort, Integrated Services, and Differentiated Services
  - Three QoS tool classes:



# CCNA R&S CN – New Objectives (part 4)

- Explain why **cloud computing** and **virtualization** are necessary for evolving networks. Introduction to:
  - Cloud Services, Cloud Models and Cloud Computing
  - Virtualization, Abstract layers, and Hypervisor
- Explain why network programmability is necessary for evolving networks. Introduction to **Software Defined Networking (SDN)**
- **IP Service Level Agreements (IP SLAs)** are a feature of the Cisco IOS that allows the analysis of IP service levels.

IP SLAs use generated **ICMP** echo-based traffic to measure network performance between two networking devices, multiple network locations, or across multiple network paths.

IP SLA configuration is shown