



# CCIE Routing & Switching Version 5.0

# Instructor Introduction

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- CCIE Routing and Switching - 2002
- CCIE Service Provider - 2006
- CCIE Security - 2007
- CCDE - 2013
- CCIE Data Center - 2013



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# Agenda

- » CCIE RSv4 to RSv5 Changes
- » New CCIE RSv5 Hardware & Software Spec
- » How to prepare for the lab
- » INE's CCIE RSv5 Products
- » These slides available at <http://ine.co/chinog03>

# CCIE RSV4 to RSV5 Changes

## » Big changes from v4 to v5 are...

- New diagnostic section added
- All equipment is virtual
- Topology size is now arbitrarily large
- Legacy topics removed
- New topics added

## » Specifics at...

- [TECCCIE-3000 CCIE Routing and Switching Techtorial](#)
- [My review of the techtorial here](#)

# Topics Added to RSv5 Written

- » Describe basic software architecture differences between IOS and IOS XE
- » Identify Cisco Express Forwarding Concepts
- » Explain General Network Challenges
- » Explain IP, TCP and UDP Operations
- » Describe Chassis Virtualization and Aggregation Technologies

# Topics Added to RSv5 Written (cont.)

- » Explain PIM Snooping
- » Describe WAN Rate-based Ethernet Circuits
- » Describe BGP Fast Convergence Features
- » ISIS (for IPv4 and IPv6)
- » Describe Basic Layer 2 VPN - Wireline
- » Describe Basic L2VPN - LAN Services

# Topics Added to RSv5 Written (cont.)

- » Describe GET VPN
- » Describe IPv6 Network Address Translation
- » Use IOS Troubleshooting Tools
- » Apply Troubleshooting Methodologies
- » Interpret Packet Capture
- » Implement and Troubleshoot Bidirectional Forwarding Detection

# Topics Added to RSv5 Written (cont.)

- » Implement EIGRP (multi-address) Named Mode
- » Implement, Troubleshoot and Optimize EIGRP and OSPF Convergence and Scalability
- » Implement and Troubleshoot DMVPN (single hub)
- » Implement and Troubleshoot IPsec with pre-shared key
- » Implement and Troubleshoot IPv6 First Hop Security



# Topics Added to RSv5 Lab

- » Use IOS Troubleshooting Tools
- » Apply Troubleshooting Methodologies
- » Interpret Packet Capture
- » Implement and Troubleshoot Bidirectional Forwarding Detection
- » Implement EIGRP (multi-address) Named Mode

# Topics Added to RSv5 Lab (cont.)

- » Implement, Troubleshoot and Optimize EIGRP and OSPF Convergence and Scalability
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# Topics Moved from Lab to Written

- » Describe IPv6 Multicast
- » Describe RIPv6 (RIPng)
- » Describe IPv6 Tunneling Techniques
- » Describe Device Security using IOS AAA with TACACS+ and RADIUS
- » Describe 802.1x
- » Describe Layer 2 QoS
- » Identify Performance Routing (PfR)

# Topics Completely Removed

- » Flexlink, ISL, Layer 2 Protocol Tunneling
- » Frame-Relay (LFI, FR Traffic Shaping)
- » WCCP
- » IOS Firewall and IPS
- » RITE, RMON
- » RGMP
- » RSVP QoS, WRR/SRR

# CCIE RSV5 Topology Changes

*...the configuration portion of the exam is now delivered using virtual devices – just like the troubleshooting portion of the exam. Virtual routers and virtual switches will be used throughout the exam, supporting more realistic and bigger network topologies that improve the reliability of the test while focusing on conceptual technologies – rather than testing specific hardware platform peculiarities*

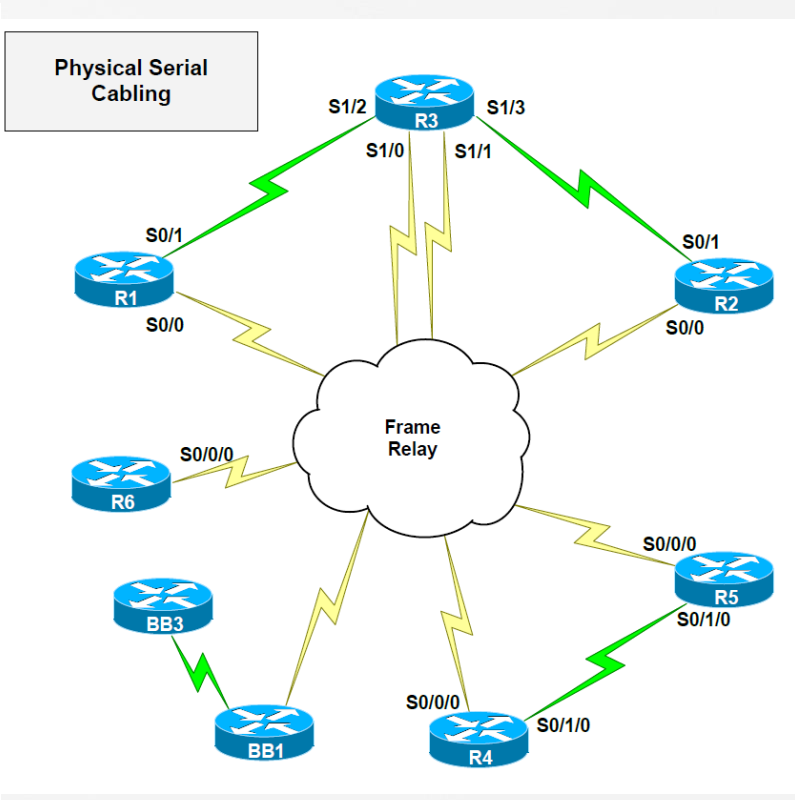
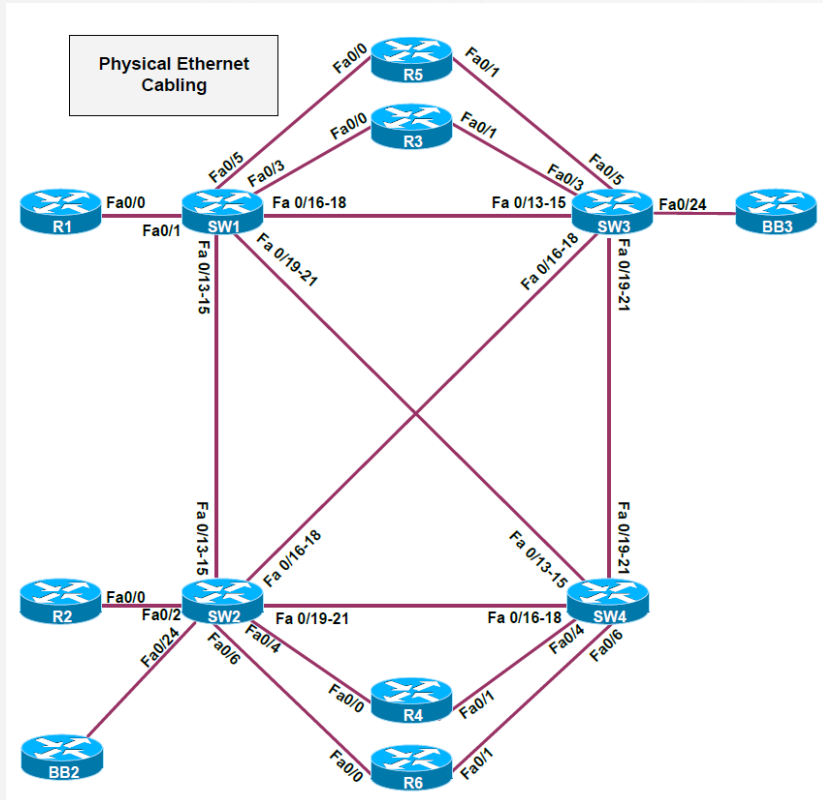
# Cisco's RSV5 Hardware Spec

- » Candidates who want to prepare using hardware based labs can use the following equipment and Cisco IOS Software releases:
  - Cisco ISR 2900 Series routers running IOS version 15.3T Universal Software release
  - Catalyst 3560X Series switches running IOS version 15.0SE Universal (IP Services) Software release
- » Any other hardware platform that can run equivalent Cisco IOS Software version 15 may be used as well.
- » Note that older equipment platforms and Cisco IOS Software Releases may be used to learn and practice a significant portion of the exam curriculum. Refer to the Cisco Feature Navigator ([www.cisco.com/go/fn](http://www.cisco.com/go/fn)) to compare Cisco IOS Software Releases.

# INE's CCIE RSV4 Topology

- » 6 IOS Routers w/ 12.4T
- » 4 Catalyst IOS Switches w/ 12.2SE
- » 3 Backbone Routers
- » 1 Frame Relay Switch

# INE's CCIE RIPv4 Topology

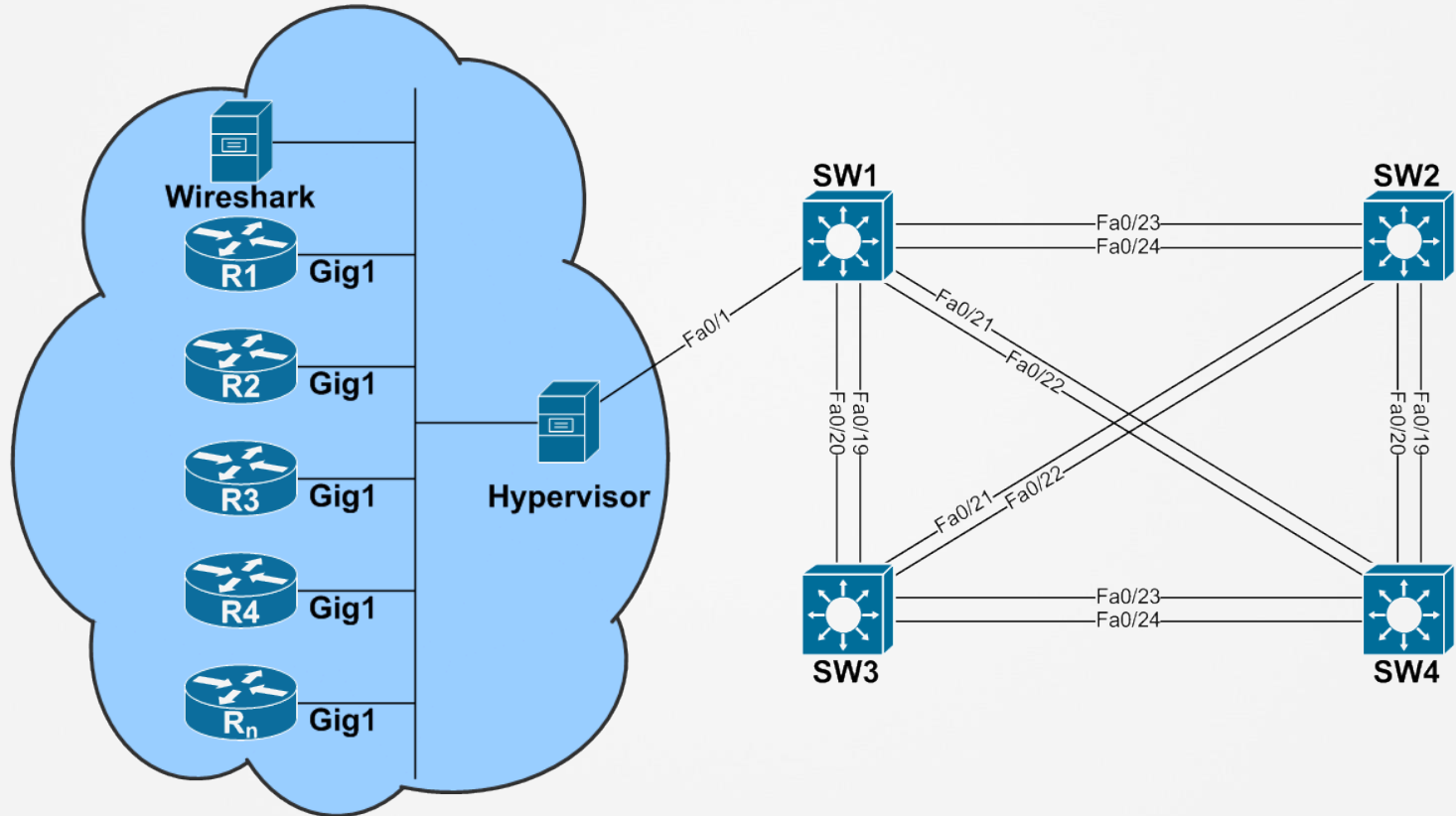




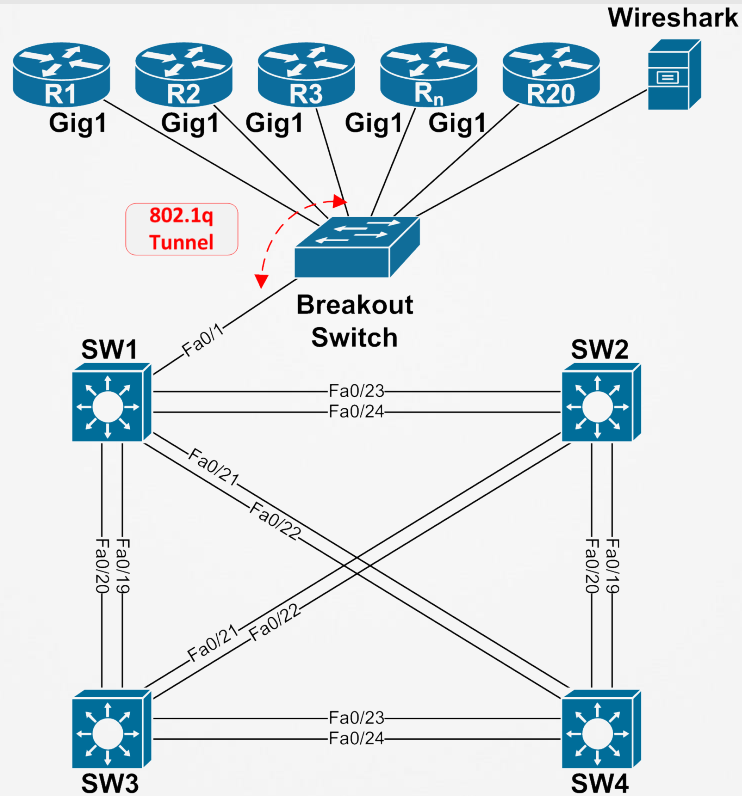
# INE's CCIE RSV5 Topology

- » 20 IOS Routers w/ 15.4S or 15.3T
  - Virtual or Physical
- » 4 Catalyst IOS w/ 15.0SE

# INE's CCIE RSV5 Topology w/ Hypervisor



# INE's CCIE RSV5 Topology w/ Physical



# Hypervisor Router Platforms

## » CSR1000v

- Runs IOS XE 3.11S (15.4S)
- Only lacking feature is Serial links
- Ideally on baremetal Hypervisor
  - E.g. not CSR on Virtualbox on Windows

## » GNS3

- 7200s with 15.2S
- IOU or IOL
- CSR1000v inside GNS3 probably bad
- Not all features are stable, and not all are supported

# Physical Router Platforms

## » ISR G2 or higher

- 1900/2900/3900
- Runs IOS 15.3T Universal
- IP Base, Data, & Security Feature Sets needed

## » ISR G1 still viable

- 1800/2800/3800
- Runs IOS 15.1T Advanced Enterprise Services
- Super secret squirrel IOS 15.3 is out there 😊
- Not all features supported, but a good start

# Physical Switch Platforms

## » Catalyst 3560/3750 E or X

- Runs Catalyst IOS 15.0SE
- IP Services Feature Set Needed

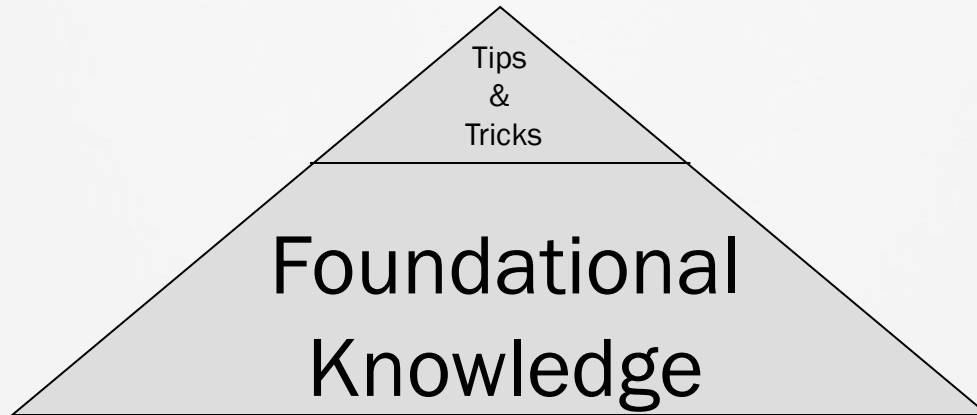
## » Catalyst Non E/X still viable

- 3560, 3560G, 3750, 3750G, etc.
- Boxes with 32MB Flash can run 15.0SE
- Not all features supported, but a good start

# How to Prepare for the CCIE Lab

## » Learning the Technologies

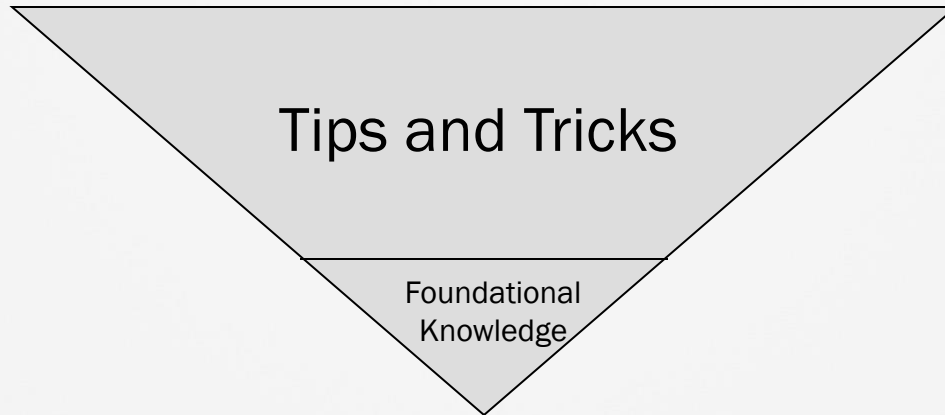
- Passing as a byproduct of being an expert
- Results in becoming a true Internetwork Expert



# How *NOT* to Prepare for the CCIE Lab

## » Learning by Lab

- Results in knowledge gaps - “Gotchas”
- Passing by “brute force”





# Structured CCIE Preparation Approach

## » Step 1

- Gain a basic understanding

## » Step 2

- Gain basic hands-on experience to reinforce and expand your understanding

## » Step 3

- Gain an expert level of understanding

## » Step 4

- Gain an expert level of hands-on experience

# CCIE Preparation Resources

- » Books, Books, & more Books
- » Cisco's Technology Documentation
- » Cisco's Product Documentation

# Recommended Readings

## » Safari Books Online

- Allows searching of content, not just titles

## » Vendor Independent First

- Interconnections: Bridges & Routers, Second Edition
- Internetworking with TCP/IP, Volume I
- TCP/IP Illustrated: Volume 1
- Routing and Switching: Time of Convergence?
- IPv6 Theory, Protocol, and Practice
- MPLS Enabled Applications

# Recommended Readings

## » Vendor Specific Second

- Cisco LAN Switching
- Routing TCP/IP Volumes I & 2
- Internet Routing Architectures
- MPLS Fundamentals
- Developing IP Multicast Networks
- Implementing Cisco IPv6 Networks
- Cisco QoS Exam Certification Guide

## » Recommended book list located at

- <http://www.ine.com/resources/>

# Using the Technology Documentation

» [www.cisco.com](http://www.cisco.com) > Support > Configure

- Technology
  - FAQs
  - Standards
  - White Papers
  - Design Guides
  - Config Examples

» **Not accessible during the Lab Exam**

- Good preparation resource though

# Using the Product Documentation

## » [www.cisco.com](http://www.cisco.com) > Support > Configure

- Products
  - Cisco IOS
    - IOS
      - » 15M&T
  - Switches
    - LAN Switches – Access
      - » 3560

## » **Search is disabled during the Lab Exam**

- Learn the navigation paths for all topics

# Using the IOS Documentation

## » Configuration Guides

## » Reference Guides

- Command References

## » Release and General Information

- Master Index
- Release Notes
  - New Feature Descriptions

# Using the Catalyst IOS Documentation

## » Configuration Guides

## » Reference Guides

- Command References

## » All docs are available in PDF format

- Don't count on this for the exam
- Good for eReaders



# Shameless Plugs – INE's RSv5 Products

- » CCIE RSv5 Lab Workbook
- » CCIE RSv5 Advanced Technologies Class
- » CCIE RSv5 Bootcamps
- » CCIE RSv5 Mock Labs
- » INE's All Access Pass

# About INE's CCIE RSV5 Workbook

## » CCIE Routing & Switching v5 Workbook

- Instant access
- Delivered online in HTML and PDF format
- Access, bookmark, and add notations from your PC, Mac, iOS, or Android device
- No restrictions on access, printing, or time limits
- Continual development cycle ensures that you always have the latest updates

# INE's CCIE RSV5 Workbook Details

- » Subdivided into four parts
  - Similar to previous “Volumes” but now it’s all one product
- » Advanced Technology Labs
  - Labs that walk you through each and every technology
- » Advanced Foundation Labs
  - Refines configuration skills on the core technologies
- » Advanced Troubleshooting Labs
  - Pre-built topologies where you fix problems that have been introduced.
- » Full-Scale Practice Labs
  - Designed to simulate the CCIE Routing & Switching Lab Exam

# INE's CCIE RSV5 Advanced Technologies Class

» Objective is to learn a structured approach for...

- Configuration
- Verification
- Troubleshooting

» Class is a mix of...

- Technology explanations
- Hands-on live examples
  - Not pre-scripted

# Current RSv5 ATC Class Schedule

## » Week 1

- Completed and available in streaming & download format

## » Week 2

- This Monday
- June 16 - June 20, 2014

## » Week 3

- June 23 - June 27, 2014

## » Week n

- More dates will likely be added based on class flow

# INE's CCIE RSV5 Bootcamps

## » CCIE RSV5 10-Day Bootcamp

- Ideally towards the end of your preparation
- [Specifics and dates can be found here](#)

## » CCIE RSV5 5-Day Troubleshooting

- Specifically targeted at the Troubleshooting section
- Topology is 28 ISR routers and 4 Catalyst switches
- [Specifics and dates can be found here](#)

# CCIE RSV5 Mock Labs

- » Simulation of the exam
  - Final stage of preparation
- » Includes all three RSV5 exam sections
  - Troubleshooting
  - Diagnostic
  - Configuration
- » Available late summer / early fall 2014

# INE's All Access Pass

- » Subscription to our entire streaming video library
  - Literally thousands of hours of videos
- » All technology tracks
  - Routing & Switching
  - Data Center
  - Security
  - Service Provider
  - Voice / Collaboration
- » [More information on AAP here](#)



# AAP Promo for CHI-NOG

- » 60 days of free access to AAP for CHI-NOG
- » Create an account at <http://members.ine.com>
- » Email me offline and I'll assign access
  - [bmcgahan@ine.com](mailto:bmcgahan@ine.com)

# Q&A