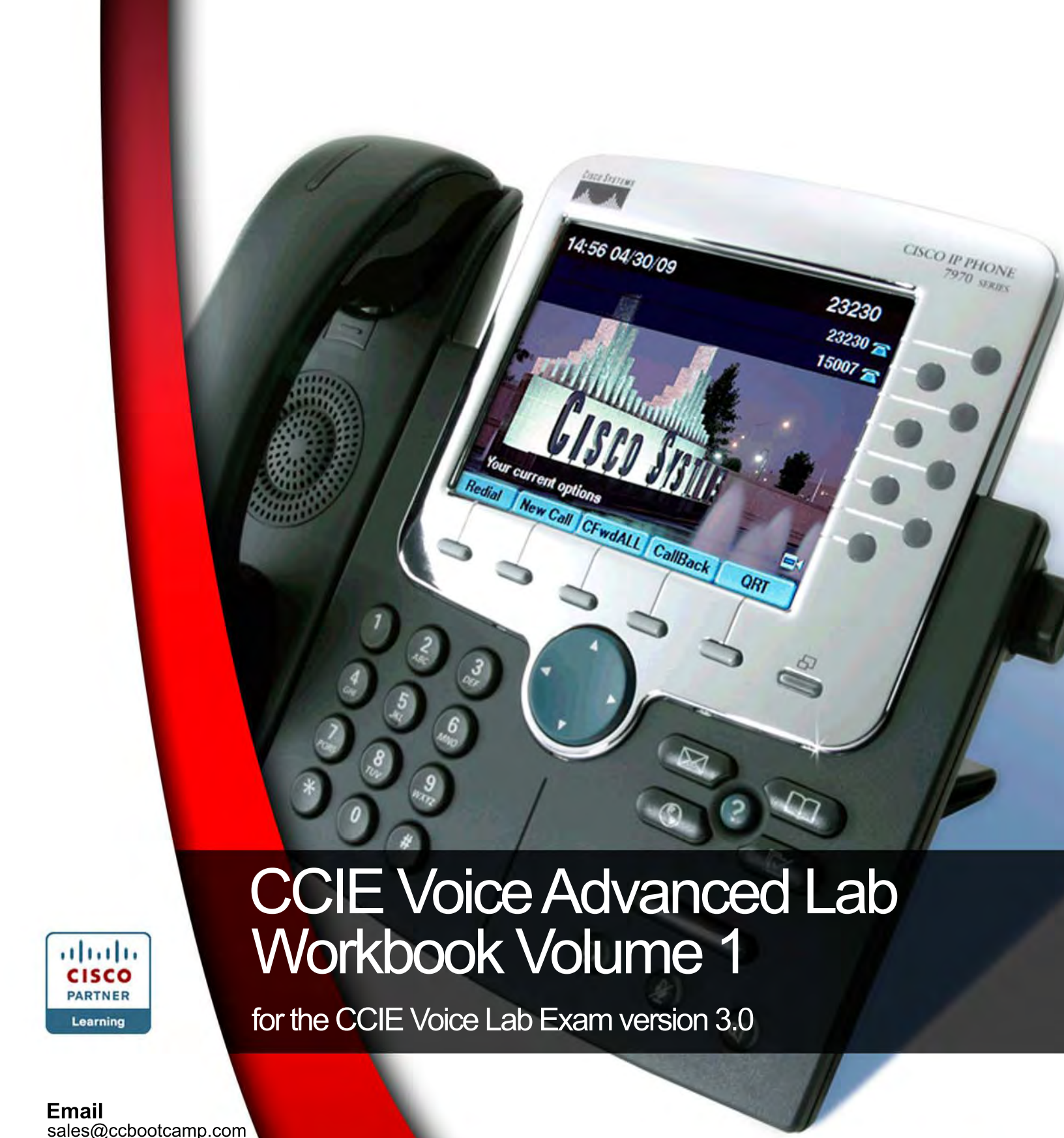

CCIE Voice Advanced Lab Workbook Volume 1

for the CCIE Voice Lab Exam version 3.0

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CCBOOTCAMP™

CCBOOTCAMP's
CCIE Voice Advanced Lab Workbook Volume 1

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CCBOOTCAMP's CCIE Voice
Full Lab Workbook Volume 1

Version 3.0

CCIE Voice 3.0 Blueprint

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Table of Contents:

A note from the Author:

Thank you for choosing CCBOOTCAMP as your partner in your journey to attain your CCIE Voice certification. Before beginning this advanced lab workbook, you should have already completed, or be at the level of, CCBOOTCAMP's CCIE Voice Technology workbook.

The advanced practice labs contained in this workbook are designed to test your speed and knowledge in voice technology and help you identify the areas where self study is needed most. This approach will help you attain the knowledge needed to not only pass the CCIE Voice lab exam, but also to become an expert in applying voice technology.

In this first advanced lab workbook volume you will be tested in areas of dial plan, digit manipulation, SIP, IP-to-IP gateway, and more. Also included, is a lab designed specifically to test speed and help you gauge if you're ready for the actual lab.

You will need to have a complete and in-depth understanding of the topics contained in this workbook in order to pass the lab exam.

I wish you the best!

Chris Fortner - CCIE #18065
CCIE Voice Program Manager

General Information:

You may notice that some of the sections within the lab repeat. This is done on purpose as it is meant to make you practice the basics over and over again. This will help your speed and accuracy when taking the lab.

CCIE Voice Blueprint 3.0:

Listed below is the current published 3.0 hardware and software blueprint from Cisco Systems. The CCBOOTCAMP remote racks features a hardware, where relevant, and software match based on the published blueprint.

Lab Equipment:

- Cisco MCS-7845 Media Convergence Servers
- Cisco 3825 Series Integrated Services Routers (ISR)
- Cisco 2821 Series Integrated Services Routers (ISR)
- ISR Modules and Interface Cards
  - VWIC2-1MFT-T1/E1
  - PVDM2
  - HWIC-4ESW-POE
  - NME-CUE
- Cisco Catalyst 3750 Series Switches
- IP Phones and Soft Clients

Software Versions:

Any major software release which has been generally available for six months is eligible for testing in the CCIE Voice Lab Exam.

- Cisco Unified Communications Manager 7.0
- Cisco Unified Communications Manager Express 7.0
- Cisco Unified Contact Center Express 7.0
- Cisco Unified Presence 7.0
- Cisco Unity Connection 7.0
- All routers use IOS version 12.4T Train.
- Cisco Catalyst 3750 Series Switches uses 12.2 Main Train
- Network Interfaces
  - Fast Ethernet
  - Frame Relay
- Telephony Interfaces
  - T1
  - E1

Pre Configuration:

The pre configuration files for the voice racks at CCBOOTCAMP can be downloaded from the link provided below and will contain the base information for the start of all labs.

http://www.ccbootcamp.com/download/!Voice/Files-For-NLIs-CCIE-Voice-Tech-Workbook/V3/configs.zip

VPN Access Information:

In order to access the voice racks at CCBOOTCAMP you will first need to download the Cisco VPN client from www.cisco.com. Once installed you can then download the appropriate VPN profile from the link provided below for the rack you have scheduled.

http://www.ccbootcamp.com/download/!Voice/voice-rack-vpn-profiles/

Tips for the initial setup:

- Define under the console (line con 0) the command “no exec-timeout” in order to avoid inactivity logout.
- Define some useful shortcuts that may save precious time with aliases. Some common commands: “show call active voice brief”, “show gatekeeper call status” and any command you feel might be used heavily throughout your lab.
- Think ahead and try not to touch any page more than once or twice.

Cisco's Non-Disclosure Agreement:

This book was written in high respect for the CCIE certification and is not intended to violate Cisco's Non-Disclosure Agreement. We will not answer questions regarding things that relate to the actual LAB exam and will not take part in any activities that stand against the CCIE NDA in any regards. Please visit the link below for the complete NDA specification.

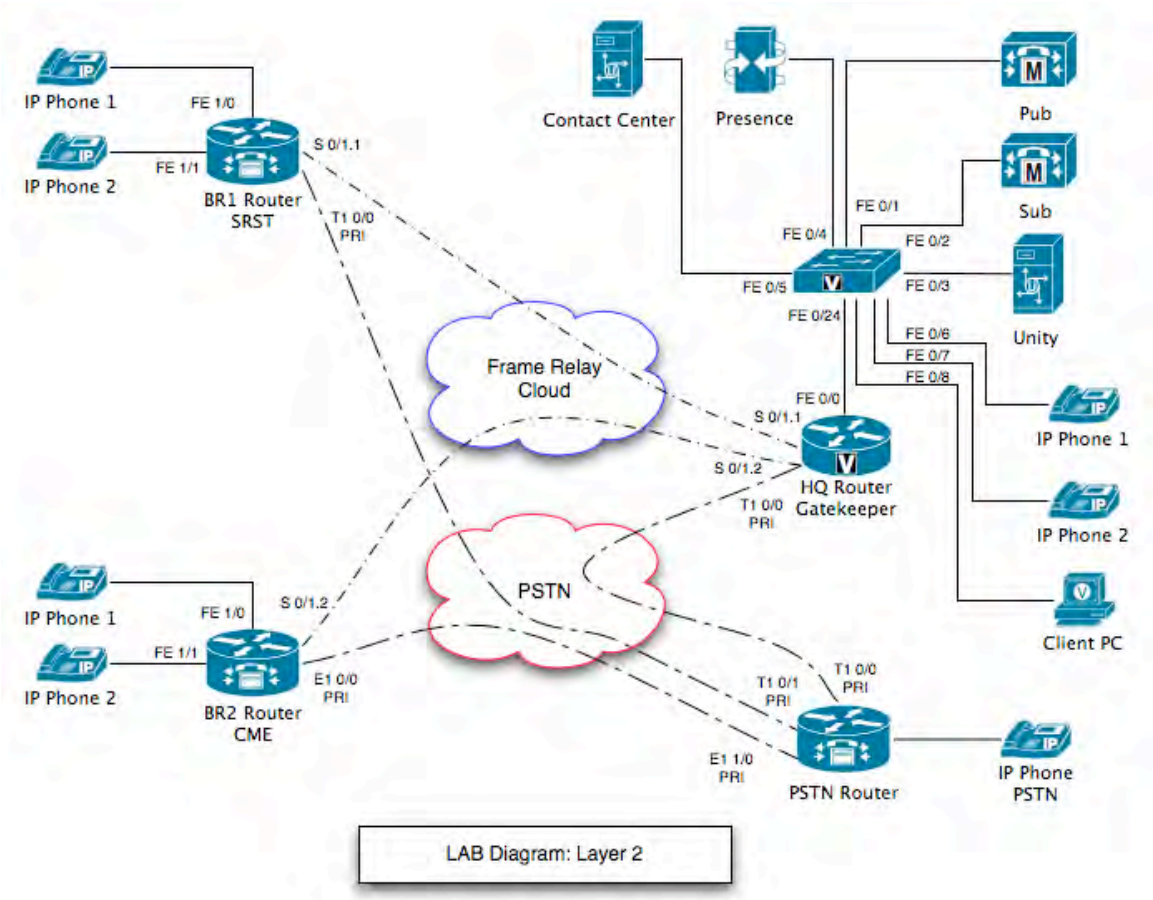
http://www.cisco.com/web/learning/le3/ccie/exam/violation_rules.html

Read Before Start:

Here are some simple rules to follow during your lab which should be taken into consideration before you configure any devices.

1. All devices should register to the subscriber and then the publisher.
2. All usernames and passwords for devices are “admin” and “cisco5796” unless specified in your lab.
3. Where you see “YY” that is your rack number.
4. All devices should pull NTP from the HQ1 router and should be set to the appropriate time zone.
5. Credit in the real lab will only be given for working solutions. This should be taken into consideration throughout your lab.

Lab Topology :



Note: Please note that ports may vary on different racks so please check your connections with “show cdp neighbors”.

Lab Dial Plan and Addressing:

Phone	Number	Protocol	Class of Service
HQ Phone 1	1001	SCCP/SIP	International
HQ Phone 2	1002	SCCP/SIP	Long Distance
BR1 Phone 1	2001	SCCP/SIP	International
BR1 Phone 2	2002	SCCP/SIP	Internal
BR2 Phone 1	3001	SCCP/SIP	International
BR2 Phone 2	3002	SCCP/SIP	Local

Site	PSTN E.164 Address	PSTN Number
HQ	7029461...	7029465000
BR1	7023332...	7023335000
BR2	442076303...	442076305000
ALL	911	911

Server	IP Address	Login
Publisher	10.1.200.21	admin:cisco5796
Subscriber	10.1.200.25	admin:cisco5796
Unity Connections	10.1.200.22	admin:cisco5796
Presence	10.1.200.23	admin:cisco5796
Contact Center	10.1.200.24	administrator:enableme

Chapter 1 - Lab 1

Brief Lab Overview:

This lab is designed to test your dial plan knowledge. The focus is dial plan redundancy and digit manipulation.

Basic Campus Design:

1. Configure VLANS and IP networks in all three sites according to the following two tables:

VLAN	HQ	BR1	BR2
Servers	1	N/A	N/A
Data	20	120	220
Voice	30	130	230

Network	HQ	BR1	BR2
Servers	10.1.200.0/24	N/A	N/A
Data	10.YY.20.0/24	10.YY.120.0/24	10.YY.220.0/24
Voice	10.YY.30.0/24	10.YY.130.0/24	10.YY.230.0/24

2. Make sure you set all voice traffic to use the voice VLAN for all sites.
3. Configure phones on HQ site to have IP addresses 120-130. Use IOS DHCP on the HQ router to accomplish this task.

4. Configure BR1 phones to have IP addresses of 130–140 using the IOS DHCP on the BR1 Router.
5. Configure BR2 phones to have IP addresses 210–220 using the IOS DHCP on the BR2 router.
6. Configure HQ router as an NTP master clock with stratum 2 for local time zone in Los Angeles and configure BR1 and BR2 to synchronize their clocks to HQ. BR1 is in New York time zone and BR2 is in India.

CallManager and CallManager Express:

1. Register all HQ and BR1 phones according to the dial plan table using SCCP loads. BR2 phones should use SIP loads and register accordingly. Make sure the phones will display calling names in every scenario presented (internal and PSTN):

2. Configure directory number 3003 as a second line on both phones in BR2. When a call comes into 3003 it should ring on both phones and be answered by the first user to respond.

3. Make sure you that when the initiator of a conference call within the BR2 site drops that the conference call drops.

4. Make sure all phones display the same general information aside from the line specific configuration; this refers to HQ and BR1.

5. Allow BR2 phone 1 to pickup calls, ringing and on hold, on BR2 phone 2 and vice versa. This should work for internal and external calls.

6. Both BR2 phone 1 and BR2 phone 2 are members of VIP sales group and are required to take calls dialed to 442076303111. The calls are expected to ring the phones in sequential order. Both phones should ring for 5 seconds and if the call is not answered it should be forwarded to DN 3000.

Voice Gateways and Signaling:

1. Configure the HQ router as a IOS MGCP gateway using T1 PRI and NI as the line parameters.

2. Configure BR1 router as a IOS H.323 gateway using T1 PRI and NI as the line parameters.

3. Configure BR2 as E1 PRI and make sure all BR2 numbers are reachable.

4. Configure HQ router as a gatekeeper with the following details:
   Local zone name: voiceie

Domain name: ccbootcamp.com

Register CallManager and CME to the gatekeeper. Register the CallManager with a tech-prefix of "1#" and a zone called "CM". Register CME with a tech-prefix of "1#" and to a zone called "CME".

Call Routing:

1. In every site, phone 1 should be allowed to dial international and below numbers, phone 2 should only be allowed to call long distance and below.

2. Configure the following dialing options for users in HQ:

7+4 digits	Calls to BR2
911 and 9911	Emergency
9+7 digits The first is in the range of 2 to 9	Local
9+1+10 digits The first and the forth are in the range of 2 to 9.	Long Distance
9+011+any number of digits Please allow users to dial the hash sign at the end of the number in order to have faster response	International

- Local calls from HQ should use local HQ gateway and BR1 gateway as backup.
- Long distance calls from HQ should use local HQ gateway as first choice and then BR1 gateway.
- Calls to BR1 PSTN numbers should be routed out BR1 gateway (Toll Bypass), with fallback to local HQ gateway.
- International calls to BR2 numbers, using the 7+4 digits pattern, should be routed via the gatekeeper as VoIP and use the local HQ gateway as backup.
- International calls to BR2 local numbers should be routed via the gatekeeper and then via the local HQ gateway.
- All other International calls should route out the HQ gateway.

3. Configure the following dialing options for users in BR1:

7+4 digits	Calls to BR2
911 and 9911	Emergency
9+7 digits The first is in the range of 2 to 9	Local
9+1+10 digits The first and the forth are in the range of 2 to 9.	Long Distance

9+011+any number of digits Please allow users to dial the hash sign at the end of the number in order to have faster response	International

- Local calls from BR1 should use the local BR1 IOS gateway and then the HQ gateway as a backup.
- Long distance calls from BR1 should use the BR1 gateway as a first choice and then the HQ gateway as a backup.
- Calls to HQ PSTN numbers (Area Code+Prefix) should be routed out the HQ gateway (Toll Bypass) with fallback to the local BR1 gateway.
- International calls to BR2 numbers, using the 7+4 digits pattern, should be routed via the gatekeeper as VoIP and use the BR1 gateway as backup.
- International calls to BR2 local numbers should be routed via the gatekeeper and then via the local HQ gateway.
- All other International calls should route out the BR1 gateway.

4. Configure the following dialing options for users in BR2:

7+4 digits	Calls to HQ and BR1
999	Emergency
9+7 digits	Local
9+0+8 digits	Long Distance