Routing & Switching

Hardware Specification

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This publication, *Routing & Switching Hardware Specification*, is designed to assist candidates in their preparation for the Cisco Systems Routing & Switching Certification Exam.

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Routing & Switching (R&S) Lab Rack Hardware Specifications

The INE Lab Racks are built to support all the features and technologies used in the actual CCIE lab exam.

For Routing & Switching Lab Racks, the major hardware components are: six routers with Ethernet and Serial interfaces, running IOS 12.4/12.4T images; and two Catalyst 3550 and two Catalyst 3560 series switches, all switches running IOS 12.2 images with the enhanced multilayer software image (EMI).

In accordance with the actual CCIE lab hardware specification, the Lab Racks also include various external components that are not within the control of the candidate: a Frame Relay switch, and three backbone routers to inject routes and facilitate your testing and verification of configurations.

The physical topology of the Routing & Switching Lab Rack remains the same throughout the entire INE workbook series. Therefore, after your Lab Rack has been physically cabled to meet this specification, there is no need to change the cabling to complete each lab in the R&S workbooks.

The specific devices used in the design of the INE Lab Racks are:

Device	Platform	DRAM	Flash	NVRAM	Installed WICs / Modules
R1	2610XM	128 MB	32 MB	32 KB	two WIC-1T
R2	2610XM	128 MB	32 MB	32 KB	two WIC-1T
R3	2611XM	128 MB	32 MB	32 KB	one NM-4A/S
R4	1841	256 MB	64 MB	191 KB	two WIC-1T
R5	1841	256 MB	64 MB	191 KB	two WIC-1T
R6	1841	256 MB	64 MB	191 KB	two WIC-1T
SW1	3560-24TS-S	Default	Default	Default	—
SW2	3560-24TS-S	Default	Default	Default	—
SW3	3550-24-EMI	Default	Default	Default	—
SW4	3550-24-EMI	Default	Default	Default	—

The generic devices used in the R&S Lab Racks include the following:

Device	Software Version	Software Feature Set	Interfaces
R1	12.4(10)A	Advanced Enterprise Services	1 – FastEthernet 2 – Serial
R2	12.4(10)A	Advanced Enterprise Services	1 – FastEthernet 2 – Serial
R3	12.4(10)A	Advanced Enterprise Services	2 – FastEthernet 4 – Serial
R4	12.4(24)T	Advanced Enterprise Services	2 – FastEthernet 2 – Serial
R5	12.4(24)T	Advanced Enterprise Services	2 – FastEthernet 2 – Serial
R6	12.4(24)T	Advanced Enterprise Services	2 – FastEthernet 1 – Serial
SW1	12.2(25)SEE2	EMI	24 – FastEthernet 2 – GigabitEthernet
SW2	12.2(25)SEE2	EMI	24 – FastEthernet 2 – GigabitEthernet
SW3	12.2(25)SEC2	EMI	24 – FastEthernet 2 – GigabitEthernet
SW4	12.2(25)SEC2	EMI	24 – FastEthernet 2 – GigabitEthernet

The external core devices used in the R&S Lab Racks include:

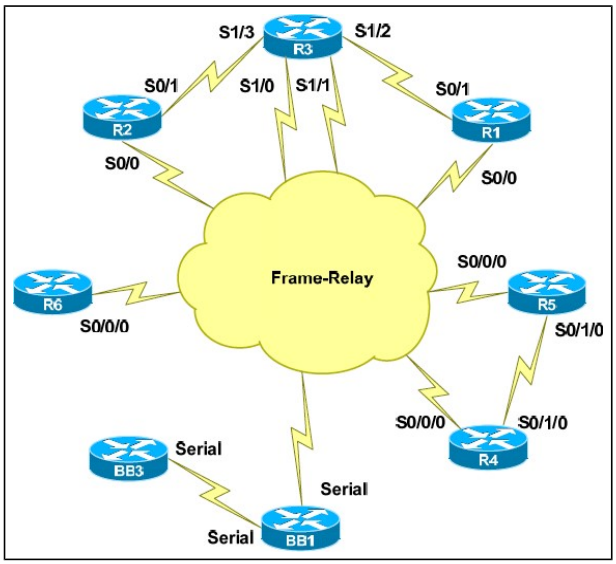
Device	Software Version	Software Feature Set	Interfaces
BB1*	12.2(15)T17	IP Plus	1 – Ethernet
BB2	12.2(15)T17	IP Plus	1 – Ethernet
BB3*	12.2(15)T17	IP Plus	1 – Ethernet
Frame Relay Switch†	—	—	8 – Serial

* BB1 and BB3 will need to peer via iBGP with each other.
† The Frame Relay switch is implemented in the BB1 router.

The reference configurations for BB1, BB2, BB3, and the Frame Relay switch are located at:

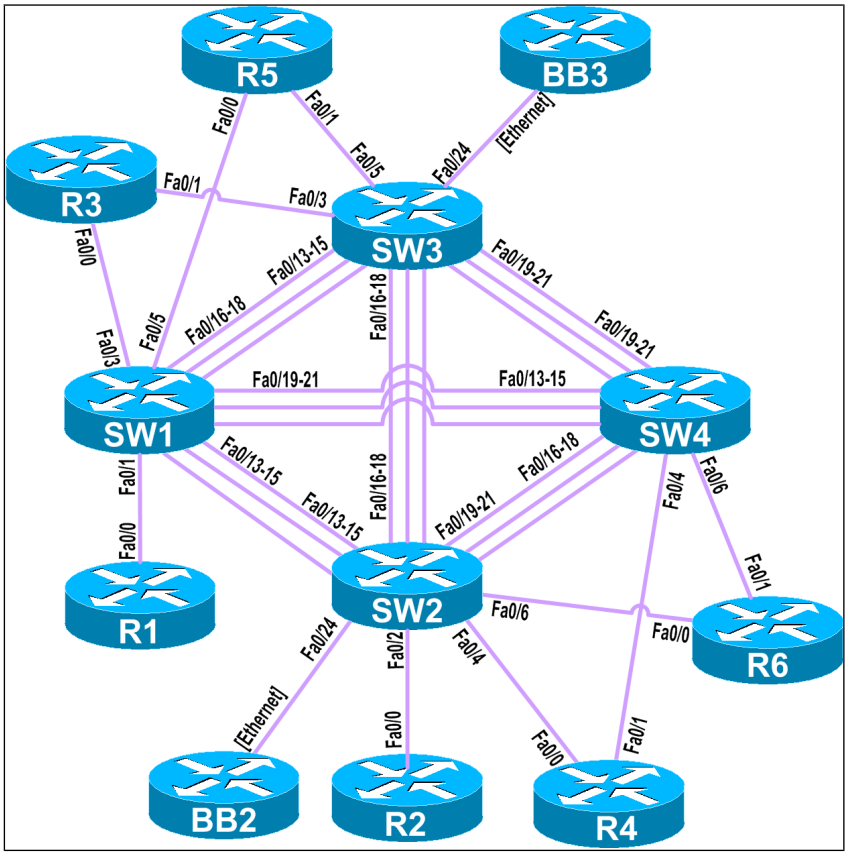
```
http://www.ine.com/downloads/bb1.txt
http://www.ine.com/downloads/bb2.txt
http://www.ine.com/downloads/bb3.txt
```


R&S Lab Rack Physical WAN Cabling



(See BB1 reference configuration for serial port assignments on the FRS definition on BB1.)

R&S Lab Rack Physical LAN Cabling



Frame Relay Interface Connections

Local Router	Local Interface	Local DLCI	Remote Router	Remote Interface	Remote DLCI
R1	S0/0	102	R2	S0/0	201
R1	S0/0	103	R3	S1/0	301
R1	S0/0	113	R3	S1/1	311
R1	S0/0	104	R4	S0/0/0	401
R1	S0/0	105	R5	S0/0/0	501
R2	S0/0	201	R1	S0/0	102
R2	S0/0	203	R3	S1/0	302
R2	S0/0	213	R3	S1/1	312
R2	S0/0	204	R4	S0/0/0	402
R2	S0/0	205	R5	S0/0/0	502
R3	S1/0	301	R1	S0/0	103
R3	S1/0	302	R2	S0/0	203
R3	S1/0	304	R4	S0/0/0	403
R3	S1/0	305	R5	S0/0/0	503
R3	S1/1	311	R1	S0/0	113
R3	S1/1	312	R2	S0/0	213
R3	S1/1	314	R4	S0/0/0	413
R3	S1/1	315	R5	S0/0/0	513
R4	S0/0/0	401	R1	S0/0	104
R4	S0/0/0	402	R2	S0/0	204
R4	S0/0/0	403	R3	S1/0	304
R4	S0/0/0	413	R3	S1/1	314
R4	S0/0/0	405	R5	S0/0/0	504
R5	S0/0/0	501	R1	S0/0	105
R5	S0/0/0	502	R2	S0/0	205
R5	S0/0/0	503	R3	S1/0	305
R5	S0/0/0	513	R3	S1/1	315
R5	S0/0/0	504	R4	S0/0/0	405
R6	S0/0/0	51	BB1	(Note 1)	51
R6	S0/0/0	100	BB1	(Note 1)	100
R6	S0/0/0	101	BB1	(Note 1)	101
R6	S0/0/0	201	BB1	(Note 1)	201
R6	S0/0/0	301	BB1	(Note 1)	301
R6	S0/0/0	401	BB1	(Note 1)	401

Note 1: Connection to BB1 via FRS (Frame Relay switch)

Router Ethernet Interface Connections

Local Router	Local Interface	Remote Router	Remote Interface
R1	Fa0/0	SW1	Fa0/1
R2	Fa0/0	SW2	Fa0/2
R3	Fa0/0	SW1	Fa0/3
R3	Fa0/1	SW3	Fa0/3
R4	Fa0/0	SW2	Fa0/4
R4	Fa0/1	SW4	Fa0/4
R5	Fa0/0	SW1	Fa0/5
R5	Fa0/1	SW3	Fa0/5
R6	Fa0/0	SW2	Fa0/6
R6	Fa0/1	SW4	Fa0/6
SW1	Fa0/1	R1	Fa0/0
SW1	Fa0/3	R3	Fa0/0
SW1	Fa0/5	R5	Fa0/0
SW2	Fa0/2	R2	Fa0/0
SW2	Fa0/4	R4	Fa0/0
SW2	Fa0/6	R6	Fa0/0
SW2	Fa0/24	BB2	Ethernet
SW3	Fa0/3	R3	Fa0/1
SW3	Fa0/5	R5	Fa0/1
SW3	Fa0/24	BB3	Ethernet
SW4	Fa0/4	R4	Fa0/1
SW4	Fa0/6	R6	Fa0/1

Serial Connections[2]

Local Router	Local Interface		Remote Router	Remote Interface	
R1	S0/1	—	R3	S1/2	DCE
R2	S0/1	—	R3	S1/3	DCE
R3	S1/2	DCE	R1	S0/1	—
R3	S1/3	DCE	R2	S0/1	—
R4	S0/1/0	DCE	R5	S0/1/0	—
R5	S0/1/0	—	R4	S0/1/0	DCE
BB1	S9	DCE	BB3	S0	—

[2]Does not include Frame Relay links.

Switch to Switch Ethernet Connections

Local Switch	Local Interface	Remote Switch	Remote Interface
SW1	Fa0/13	SW2	Fa0/13
SW1	Fa0/14	SW2	Fa0/14
SW1	Fa0/15	SW2	Fa0/15
SW1	Fa0/16	SW3	Fa0/13
SW1	Fa0/17	SW3	Fa0/14
SW1	Fa0/18	SW3	Fa0/15
SW1	Fa0/19	SW4	Fa0/13
SW1	Fa0/20	SW4	Fa0/14
SW1	Fa0/21	SW4	Fa0/15
Local Switch	**Local Interface**	**Remote Switch**	**Remote Interface**
SW2	Fa0/13	SW1	Fa0/13
SW2	Fa0/14	SW1	Fa0/14
SW2	Fa0/15	SW1	Fa0/15
SW2	Fa0/16	SW3	Fa0/16
SW2	Fa0/17	SW3	Fa0/17
SW2	Fa0/18	SW3	Fa0/18
SW2	Fa0/19	SW4	Fa0/16
SW2	Fa0/20	SW4	Fa0/17
SW2	Fa0/21	SW4	Fa0/18
Local Switch	**Local Interface**	**Remote Switch**	**Remote Interface**
SW3	Fa0/13	SW1	Fa0/16
SW3	Fa0/14	SW1	Fa0/17
SW3	Fa0/15	SW1	Fa0/18
SW3	Fa0/16	SW2	Fa0/16
SW3	Fa0/17	SW2	Fa0/17
SW3	Fa0/18	SW2	Fa0/18
SW3	Fa0/19	SW4	Fa0/19
SW3	Fa0/20	SW4	Fa0/20
SW3	Fa0/21	SW4	Fa0/21
Local Switch	**Local Interface**	**Remote Switch**	**Remote Interface**
SW4	Fa0/13	SW1	Fa0/19
SW4	Fa0/14	SW1	Fa0/20
SW4	Fa0/15	SW1	Fa0/21
SW4	Fa0/16	SW2	Fa0/19
SW4	Fa0/17	SW2	Fa0/20
SW4	Fa0/18	SW2	Fa0/21
SW4	Fa0/19	SW3	Fa0/19
SW4	Fa0/20	SW3	Fa0/20
SW4	Fa0/21	SW3	Fa0/21

