

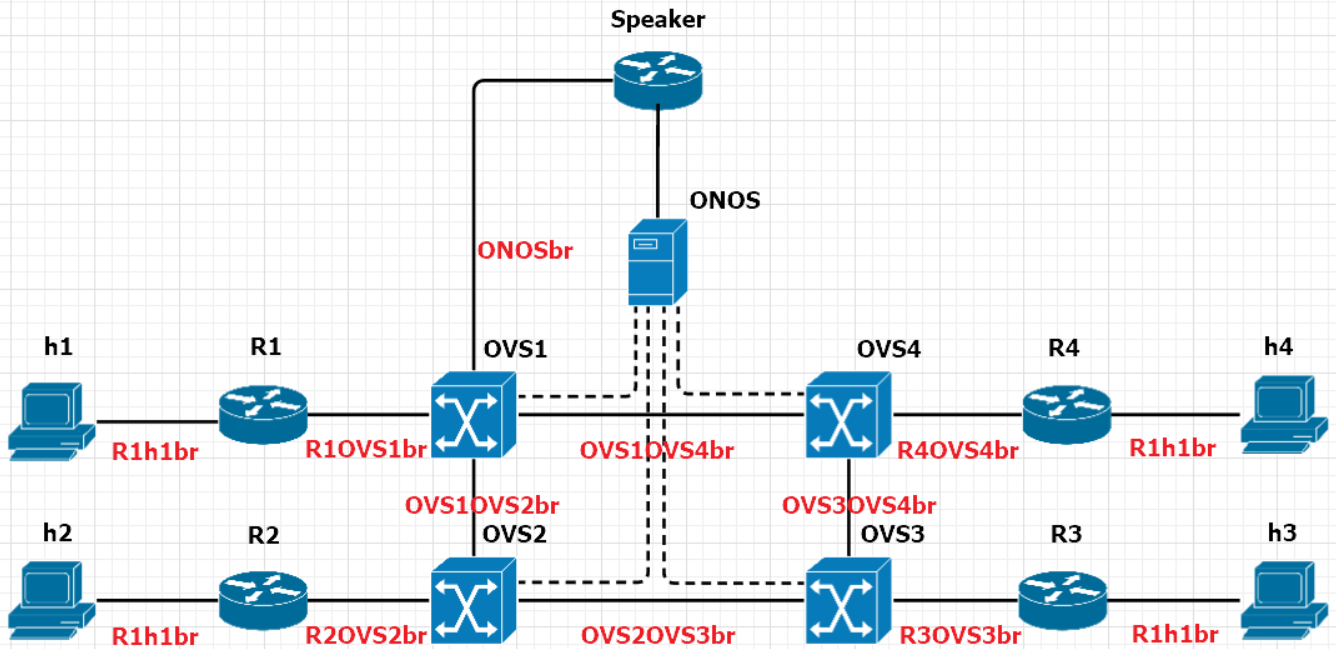
SDN Project3 Answer Sheet

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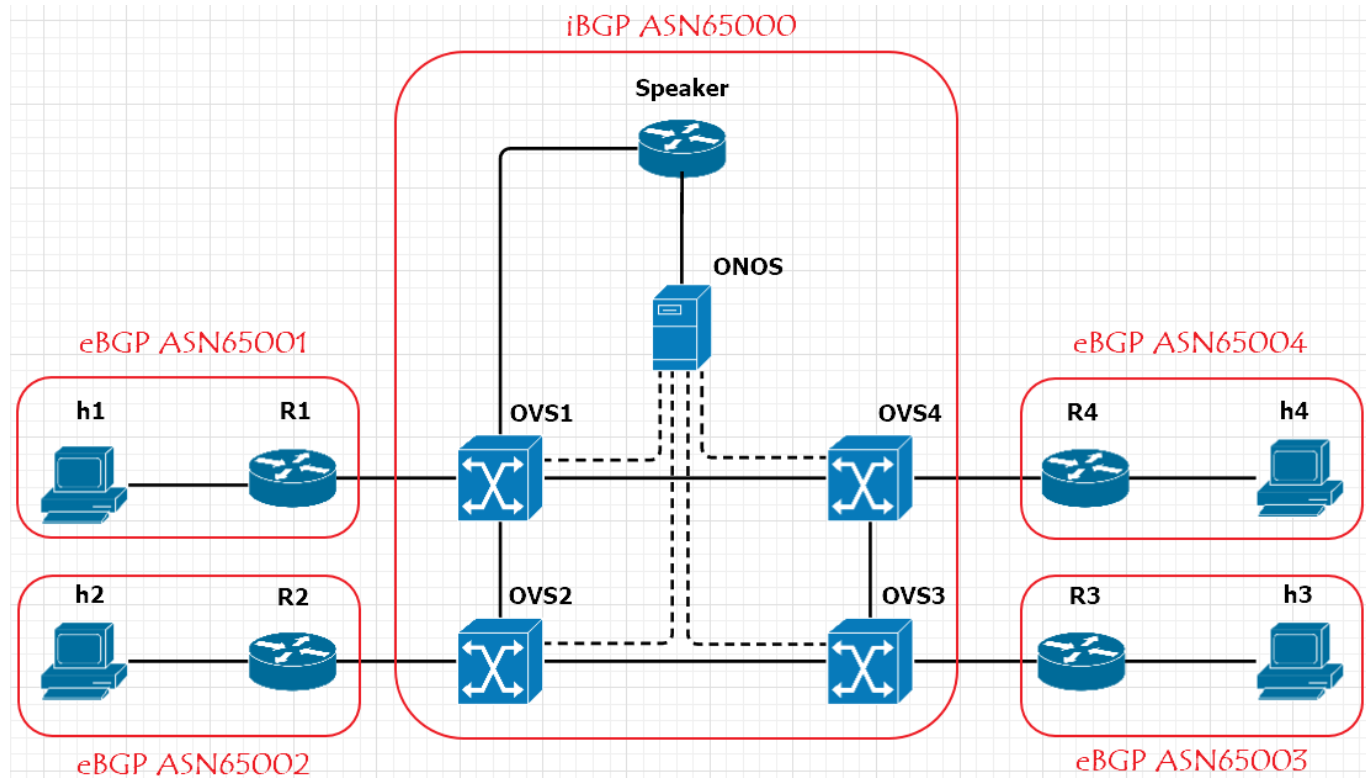
Department: 資訊組

1. Show topology with IP addresses, interfaces and ASNs



Interface	Device1 IP	Device2 IP	Device3 IP	ASNs
ONOSbr	ONOS: 172.23.0.2	Speaker: 172.23.0.3	OVS1: 172.23.0.4	Speaker: 65000
R1h1br	R1: 172.18.0.2	h1: 172.18.0.3	-	R1: 65001
R2h2br	R2: 172.19.0.2	h2: 172.19.0.3	-	R2: 65002
R3h3br	R3: 172.24.0.2	h3: 172.24.0.3	-	R3: 65003
R4h4br	R4: 172.25.0.2	h4: 172.25.0.3	-	R4: 65004
R1OVS1br	R1: 172.20.0.2	OVS1: 172.20.0.3	-	-
R2OVS2br	R2: 172.21.0.2	OVS2: 172.21.0.3	-	-
R3OVS3br	R3: 172.29.0.2	OVS3: 172.29.0.3	-	-
R4OVS4br	R4: 172.30.0.2	OVS4: 172.30.0.3	-	-
OVS1OVS2br	OVS1: 172.22.0.2	OVS2: 172.22.0.3	-	-
OVS1OVS4br	OVS1: 172.27.0.2	OVS4: 172.27.0.3	-	-
OVS2OVS3br	OVS2: 172.28.0.2	OVS3: 172.28.0.3	-	-
OVS3OVS4br	OVS3: 172.26.0.2	OVS4: 172.26.0.3	-	-

2. Mark the path eBGP and iBGP in topology



3. Capture BGP packets (send/receive) in speaker path

***br-fc80f562c848**

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/> Expression...

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	02:eb:9f:67:c9:42	Broadcast	0x8942	136	Ethernet II
2	0.227554295	172.20.0.2	172.20.0.100	BGP	85	KEEPALIVE Message
3	0.227580711	172.20.0.100	172.20.0.2	TCP	66	179 → 41788 [ACK] Seq=1 Ack=20 Win=509 Len=0
4	0.784824114	172.30.0.2	172.30.0.100	BGP	85	KEEPALIVE Message
5	0.784850356	172.30.0.100	172.30.0.2	TCP	66	179 → 34972 [ACK] Seq=1 Ack=20 Win=509 Len=0
6	1.003637189	172.29.0.100	172.29.0.2	TCP	74	57020 → 179 [SYN] Seq=0 Win=64240 Len=0 MSS=1
7	1.487458965	172.20.0.100	172.20.0.2	BGP	85	KEEPALIVE Message
8	1.487508604	172.20.0.2	172.20.0.100	TCP	66	41788 → 179 [ACK] Seq=20 Ack=20 Win=502 Len=0
9	1.487528877	172.30.0.100	172.30.0.2	BGP	85	KEEPALIVE Message
10	1.487560337	172.30.0.2	172.30.0.100	TCP	66	34972 → 179 [ACK] Seq=20 Ack=20 Win=502 Len=0
11	1.487620710	172.21.0.100	172.21.0.2	BGP	85	KEEPALIVE Message
12	1.487662768	172.21.0.2	172.21.0.100	TCP	66	46376 → 179 [ACK] Seq=1 Ack=20 Win=502 Len=0
13	1.851458499	172.21.0.2	172.21.0.100	BGP	85	KEEPALIVE Message
14	1.851486393	172.21.0.100	172.21.0.2	TCP	66	179 → 46376 [ACK] Seq=20 Ack=20 Win=509 Len=0
15	2.961895234	172.29.0.100	172.29.0.2	TCP	74	57034 → 179 [SYN] Seq=0 Win=64240 Len=0 MSS=1
16	3.102502526	02:eb:9f:67:c9:42	Broadcast	0x8942	136	Ethernet II
17	3.227887453	172.20.0.2	172.20.0.100	BGP	85	KEEPALIVE Message
18	3.227914273	172.20.0.100	172.20.0.2	TCP	66	179 → 41788 [ACK] Seq=20 Ack=39 Win=509 Len=0
19	3.786395260	172.30.0.2	172.30.0.100	BGP	85	KEEPALIVE Message
20	3.786439403	172.30.0.100	172.30.0.2	TCP	66	179 → 34972 [ACK] Seq=20 Ack=39 Win=509 Len=0

Frame 19: 85 bytes on wire (680 bits), 85 bytes captured (680 bits) on interface 0
 Ethernet II, Src: 02:42:ac:1e:00:02 (02:42:ac:1e:00:02), Dst: 02:42:ac:17:00:03 (02:42:ac:17:00:03)
 Internet Protocol Version 4, Src: 172.30.0.2, Dst: 172.30.0.100
 Transmission Control Protocol, Src Port: 34972, Dst Port: 179, Seq: 20, Ack: 20, Len: 19
 Border Gateway Protocol - KEEPALIVE Message

4. Telnet bgpd daemons of Speaker and show summary screenshots

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Speakerbgp> show ip bgp summary
BGP router identifier 172.17.0.100, local AS number 65000
RIB entries 5, using 560 bytes of memory
Peers 5, using 22 KiB of memory

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Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/P
fxRcd									
172.17.0.2	4	65000	6208	6419	0	0	0	05:20:52	0
172.20.0.2	4	65001	6411	6417	0	0	0	05:20:46	1
172.21.0.2	4	65002	6117	6123	0	0	0	05:06:05	1
172.29.0.2	4	65003	0	0	0	0	0	never	Connect
172.30.0.2	4	65004	5701	5712	0	0	0	01:19:47	1

5. Screenshots topology and intents on the ONOS Web GUI

Lab [執行中] - Oracle VM VirtualBox

ONOS - Mozilla Firefox

172.17.0.2:8181/onos/ui/#/topo2

Lab [執行中] - Oracle VM VirtualBox

ONOS - Mozilla Firefox

172.17.0.2:8181/onos/ui/#/intent

Intents (27 total)

APPLICATION ID	KEY	TYPE	PRIORITY	STATE
122 : org.onosproject.sdnip	172.18.0.0/16	MultiPointToSinglePointIntent	180	Installed
122 : org.onosproject.sdnip	172.19.0.0/16	MultiPointToSinglePointIntent	180	Installed
122 : org.onosproject.sdnip	172.20.0.100-172.20.0.2-dst	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.20.0.100-172.20.0.2-icmp	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.20.0.100-172.20.0.2-src	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.20.0.2-172.20.0.100-dst	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.20.0.2-172.20.0.100-icmp	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.20.0.2-172.20.0.100-src	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.21.0.100-172.21.0.2-dst	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.21.0.100-172.21.0.2-icmp	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.21.0.100-172.21.0.2-src	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.21.0.2-172.21.0.100-dst	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.21.0.2-172.21.0.100-icmp	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.21.0.2-172.21.0.100-src	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.25.0.0/16	MultiPointToSinglePointIntent	180	Installed
122 : org.onosproject.sdnip	172.29.0.100-172.29.0.2-dst	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.29.0.100-172.29.0.2-icmp	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.29.0.100-172.29.0.2-src	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.29.0.2-172.29.0.100-dst	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.29.0.2-172.29.0.100-icmp	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.29.0.2-172.29.0.100-src	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.30.0.100-172.30.0.2-dst	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.30.0.100-172.30.0.2-icmp	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.30.0.100-172.30.0.2-src	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.30.0.2-172.30.0.100-dst	PointToPointIntent	1000	Installed
122 : org.onosproject.sdnip	172.30.0.2-172.30.0.100-icmp	PointToPointIntent	1000	Installed

6. Write down what you have learned or solved

- A. 如前面幾題可知，有一個 ebgp 沒有被實作出來，想分享一下 debug 的過程
 - I. 檢查了 Speaker, R3/ebgp 及 ovs3 /ovs-vsctl 的設定
 - II. 刪除及重建(ovs2ovs3br, ovs3ovs4br)
 - III. 重新連 ovs port
 - IV. Update switch port into the json file
 - V. 檢查 R3 bgp 與其他的 router 設定，也並無發現異常
 - VI. 看討論區很同學是選擇整個網路刪掉重建，但作業繳交時間即將截止沒能完成，後續會再嘗試重新建一次新網路看是否有盲點沒注意到
- B. 學習 SDN + vSwitch & vRouter，建立虛擬化網路
- C. 學習 iBGP & eBGP 網路架構及設定