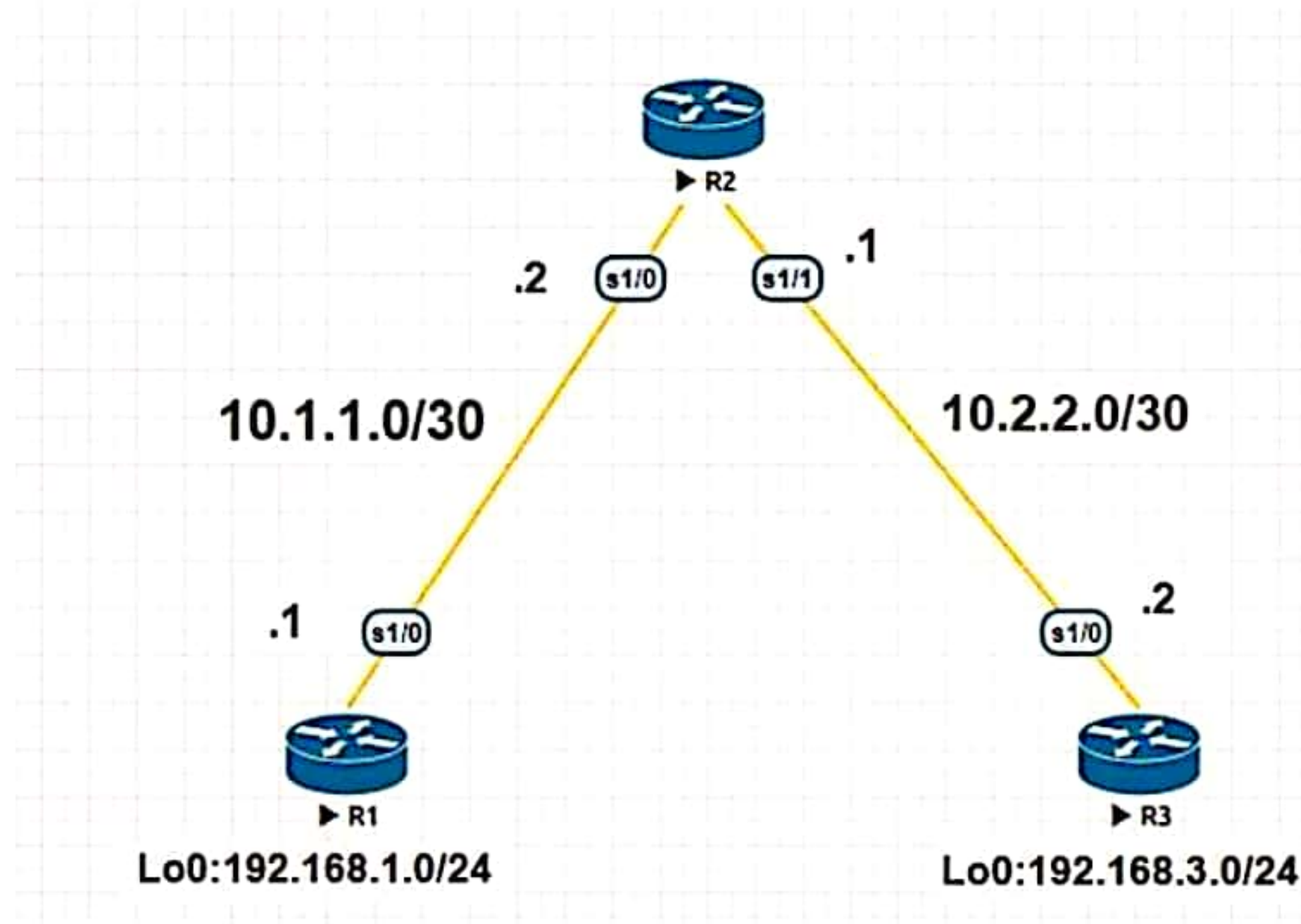## Practical 4

NETWORK TOPOLOGY

R1 Router>en
 Router#conf t
 Enter configuration commands, one per line. End with CNTL/Z.
 Router(config)#hostname R1
R1(config)#interface Loopback 0
*Dec 19 07:53:42.473: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Loopback0, changed state to up
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#exit
 R1(config)#interface s1/0
 R1(config-if)#ip address 10.1.1.1 255.255.255.252
R1(config-if)#no shutdown
 *Dec 19 07:57:21.998: %LINK-3-UPDOWN: Interface Serial1/0, changed state
to up
 *Dec 19 07:57:22.999: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial1/0, changed state to up
 R1(config-if)#exit

 R1(config)#exit Configure static routes a.
 On R1, configure a default static route to ISP.

R1(config)# ip route 0.0.0.0 0.0.0.0 10.1.1.2
R1#show ip route
 Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B – BGP D -
EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA
external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, E2
- OSPF external type 2 i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS
level-2 ia - IS-IS inter area, * - candidate default,U - per-user static route o -
ODR, P - periodic downloaded static route,H - NHRP,l - LISP a - application
route + - replicated route, % - next hop override
Gateway of last resort is 10.1.1.2 to network 0.0.0.0
 S* 0.0.0.0/0 [1/0] via 10.1.1.2 10.0.0.0/8 is variably subnetted, 2 subnets, 2
masks
C 10.1.1.0/30 is directly connected, Serial1/0
L 10.1.1.1/32 is directly connected, Serial1/0 192.168.1.0/24 is variably
subnetted, 2 subnets, 2 masks
 C 192.168.1.0/24 is directly connected, Loopback0
L 192.168.1.1/32 is directly connected, Loopback0 Secure management
access
 R1(config)#security passwords min-length 10
 R1(config)#enable secret class12345
 R1(config)#line console 0
 R1(config-line)#password ciscoconpass
 R1(config-line)#exec-timeout 5 0
 R1(config-line)#login
R1(config-line)#logging synchronous
 R1(config-line)#exit
R1(config)#line vty 0 4
R1(config-line)#password ciscovtypass
 R1(config-line)#exec-timeout 5 0
 R1(config-line)#login
R1(config-line)#exit
R1(config)#line aux 0
 R1(config-line)#no exec

R1(config-line)#end
R1(config)#service password-encryption
 R1(config)#banner motd $Unauthorized access strictly prohibited!$
 R1(config)#exit Configure enhanced username password security
R1(config)#username JR-ADMIN secret class12345
 R1(config)#username ADMIN secret class54321

R1(config)#line console 0
R1(config-line)#login local
R1(config-line)#end
R1(config)#line vty 0 4

R1(config-line)#login local
R1(config-line)#end Enabling AAA RADIUS Authentication with Local User for Backup
R1(config)# aaa new-model
R1(config)# radius server RADIUS-1
R1(config-radius-server)# address ipv4 192.168.1.101
R1(config-radius-server)# key RADIUS-1-pa55w0rd
R1(config-radius-server)# exit
R1(config)# radius server RADIUS-2
R1(config-radius-server)# address ipv4 192.168.1.102
R1(config-radius-server)# key RADIUS-2-pa55w0rd
R1(config-radius-server)# exit
R1(config)# aaa group server radius RADIUS-GROUP
R1(config-sg-radius)# server name RADIUS-1
R1(config-sg-radius)# server name RADIUS-2
R1(config-sg-radius)# exit
R1(config)# aaa authentication login default group RADIUS-GROUP local
R1(config)# aaa authentication login TELNET-LOGIN group RADIUS-GROUP localcase
R1(config)# line vty 0 4
R1(config-line)# login authentication TELNET-LOGIN
R1(config-line)# exit
R2 Router>enable
Router#conf t Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#interface s1/0
R2(config-if)#ip address 10.1.1.2 255.255.255.252
R2(config-if)#no shutdown
*Dec 19 08:01:10.279: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up *Dec 19 08:01:11.279: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up R2(config-if)#exit
R2(config)#interface s1/1
R2(config-if)#ip address 10.2.2.1 255.255.255.252
R2(config-if)#no shutdown

*Dec 19 08:02:33.002: %LINK-3-UPDOWN: Interface Serial1/1, changed state to up

*Dec 19 08:02:34.009: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/1, changed state to up

R2(config-if)#exit

R2(config)#exit Configure static routes a. On R2, configure two static routes.

R2(config)# ip route 192.168.1.0 255.255.255.0 10.1.1.1

R2(config)# ip route 192.168.3.0 255.255.255.0 10.2.2.2

R2#show ip route Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B – BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, E2 - OSPF external type 2 i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2 ia - IS-IS inter area, * - candidate default, U - per-user static route o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP a - application route + - replicated route, % - next hop override

Gateway of last resort is not set 10.0.0.0/8 is variably subnetted, 4 subnets, 2 mask

s C 10.1.1.0/30 is directly connected, Serial1/0 L 10.1.1.2/32 is directly connected, Serial1/0

C 10.2.2.0/30 is directly connected, Serial1/1

L 10.2.2.1/32 is directly connected, Serial1/1

S 192.168.1.0/24 [1/0] via 10.1.1.1

S 192.168.3.0/24 [1/0] via 10.2.2.2 Secure management access

R2(config)#security passwords min-length 10

R2(config)#enable secret class12345

R2(config)#line console 0 R2(config-line)#password ciscoconpass

R2(config-line)#exec-timeout 5 0

R2(config-line)#login

R2(config-line)#logging synchronous

R2(config-line)#exit

R2(config)#line vty 0 4

R2(config-line)#password ciscovtypass

R2(config-line)#exec-timeout 5 0

R2(config-line)#login

R2(config-line)#exit

R2(config)#line aux 0

R2(config-line)#no exec

R2(config-line)#end

R2(config)#service password-encryption

R2(config)#banner motd $Unauthorized access strictly prohibited!$

```
R2(config)#exit Configure enhanced username password security
R2(config)#username JR-ADMIN secret class12345
R2(config)#username ADMIN secret class54321
R2(config)#line console 0
R2(config-line)#login local
R2(config-line)#end
R2(config)#line vty 0 4
R2(config-line)#login local
R2(config-line)#end Enabling AAA RADIUS Authentication with Local User for
Backup
R2(config)# aaa new-model
R2(config)# radius server RADIUS-1
R2(config-radius-server)# address ipv4 192.168.1.101
R2(config-radius-server)# key RADIUS-1-pa55w0rd
R2(config-radius-server)# exit
R2(config)# radius server RADIUS-2
R2(config-radius-server)# address ipv4 192.168.1.102
R2(config-radius-server)# key RADIUS-2-pa55w0rd
R2(config-radius-server)# exit R2(config)# aaa group server radius RADIUS-
GROUP
R2(config-sg-radius)# server name RADIUS-1
R2(config-sg-radius)# server name RADIUS-2
R2(config-sg-radius)# exit
R2(config)# aaa authentication login default group RADIUS-GROUP local
R2(config)# aaa authentication login TELNET-LOGIN group RADIUS-GROUP
localcase
R2(config)# line vty 0 4
R2(config-line)# login authentication TELNET-LOGIN
R2(config-line)# exit
R3 Router>enable
Router#conf t Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#interface loopback 0
*Dec 19 08:07:50.079: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Loopback0, changed state to up
R3(config-if)#ip address 192.168.3.1 255.255.255.0
R3(config-if)#exit
R3(config)#interface s1/0
R3(config-if)#ip address 10.2.2.2 255.255.255.252
R3(config-if)#no shutdown
```

R3(config-if)#exit

*Dec 19 08:09:26.986: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up

*Dec 19 08:09:27.996: %LINEPROTO-5-UPDOWN: Line protocol on interface Serial1/0, changed state to up

R3(config)#end Configure static routes a. On R3, configure a default static route to ISP.

R3(config)# ip route 0.0.0.0 0.0.0.0 10.2.2.1

R3#show ip route Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B – BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, E2 - OSPF external type 2 i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2 ia - IS-IS inter area, * - candidate default, U - per-user static route o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP a - application route + - replicated route, % - next hop override

Gateway of last resort is 10.2.2.1 to network 0.0.0.0

S* 0.0.0.0/0 [1/0] via 10.2.2.1 10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 10.2.2.0/30 is directly connected, Serial1/0

L 10.2.2.2/32 is directly connected, Serial1/0 192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.3.0/24 is directly connected, Loopback0

L 192.168.3.1/32 is directly connected, Loopback0 Secure management access

R3(config)#security passwords min-length 10

R3(config)#enable secret class12345

R3(config)#line console 0

R3(config-line)#password ciscoconpass

R3(config-line)#exec-timeout 5 0

R3(config-line)#login

R3(config-line)#logging synchronous

R3(config-line)#exit

R3(config)#line vty 0 4

R3(config-line)#password ciscovtypass

R3(config-line)#exec-timeout 5 0

R3(config-line)#login R3(config-line)#exit

R3(config)#line aux 0

R3(config-line)#no exec

R3(config-line)#end

R3(config)#service password-encryption

```
R3(config)#banner motd $Unauthorized access strictly prohibited!$
Configure enhanced username password security
R3(config)#username JR-ADMIN secret class12345
R3(config)#username ADMIN secret class54321
R3(config)#line console 0
R3(config-line)#login local
R3(config-line)#exit
R3(config)#line vty 0 4
R3(config-line)#login local
R3(config-line)#exit
Enabling AAA RADIUS Authentication with Local User for Backup
R3(config)# aaa new-model
R3(config)# radius server RADIUS-1
R3(config-radius-server)# address ipv4 192.168.1.101
R3(config-radius-server)# key RADIUS-1-pa55w0rd
R3(config-radius-server)# exit
R3(config)# radius server RADIUS-2
R3(config-radius-server)# address ipv4 192.168.1.102
R3(config-radius-server)# key RADIUS-2-pa55w0rd
R3(config-radius-server)# exit
R3(config)# aaa group server radius RADIUS-GROUP
R3(config-sg-radius)# server name RADIUS-1
R3(config-sg-radius)# server name RADIUS-2 R3(config-sg-radius)# exit
R3(config)# aaa authentication login default group RADIUS-GROUP loca
l R3(config)# aaa authentication login TELNET-LOGIN group RADIUS-GROUP
localcase
R3(config)# line vty 0 4
R3(config-line)# login authentication TELNET-LOGIN
R3(config-line)# exit
```