

IK2215: Network Design Report

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1 General Information

ASN: 18

NETWORK: 1.118.0.0/20

2 Network overview

The figure shows the network diagram of the project that we are going to for this lab. In the project we are using four routers(r1,r2,r3,r4) and five hosts(three servers that are s1,s2,s3 and two clients i.e c1,c2). The routers r1 and r2 plays the role of eBGP while connected to AS1 and AS21. In this network the routers r1 and r3 are connected with all the routers and the remaining router r2 and r3 are connected with two routers. Three servers are connected with r3 and the two clients are connected with r4. And more detailed ip allocation is mentioned in the ip allocation part.

2.1 Network diagram

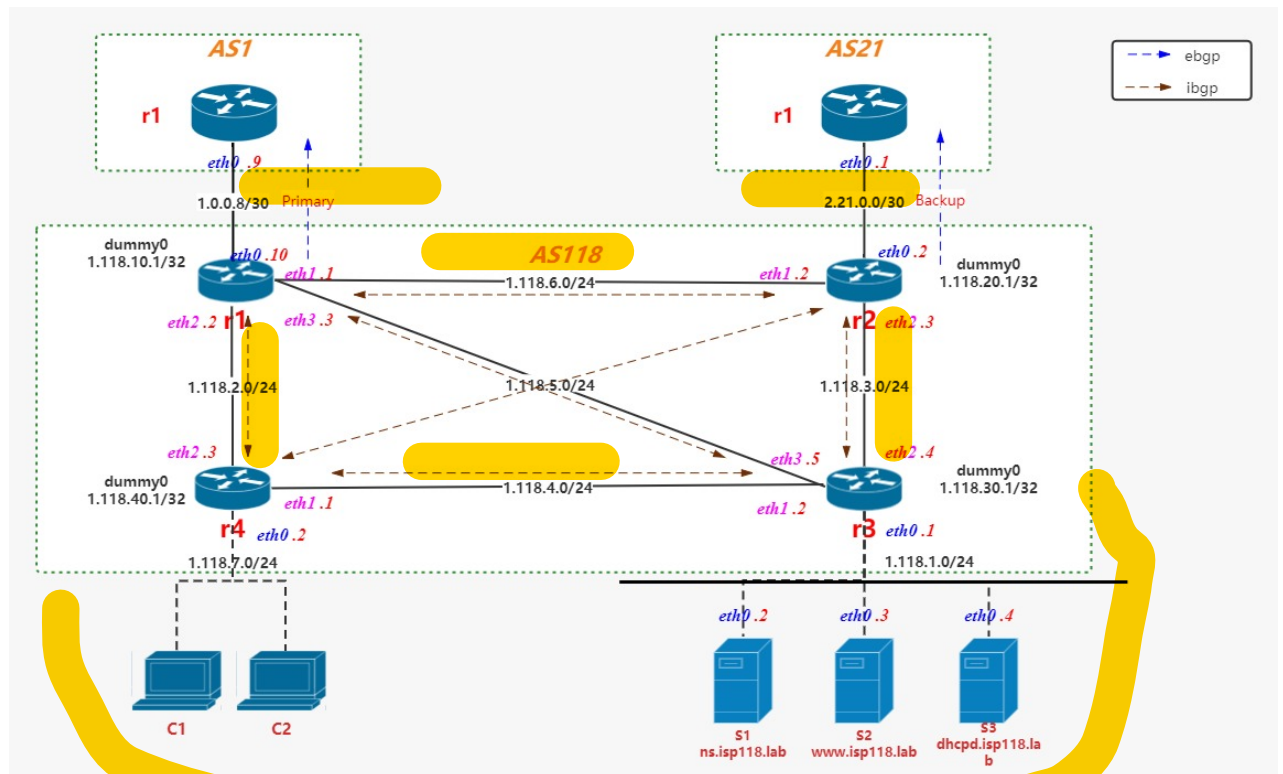


Figure 1: Network Diagram

2.2 IP address allocation

A constructed ip allocation is shown in the table below

Device	Interface	Subnet	IP Address
r1	eth0	1.0.0.8/30	1.0.0.10
r1	eth1	1.118.6.0/24	1.118.6.1
r1	eth2	1.118.2.0/24	1.118.2.2
r1	eth3	1.118.5.0/24	1.118.5.3
r1	dummy0		1.118.10.1/32
r2	eth0	2.21.0.0/30	2.21.0.2
r2	eth1	1.118.6.0/24	1.118.6.2
r2	eth2	1.118.3.0/24	1.118.3.3
r2	dummy0		1.118.20.1/32
r3	eth0	1.118.1.0/24	1.118.1.1
r3	eth1	1.118.4.0/24	1.118.4.2
r3	eth2	1.118.3.0/24	1.118.3.4
r3	eth3	1.118.5.0/24	1.118.5.5
r3	dummy0		1.118.30.1/32
r4	eth0	1.118.7.0/24	1.118.7.2
r4	eth1	1.118.4.0/24	1.118.4.1
r4	eth2	1.118.2.0/24	1.118.2.3
r4	dummy0		1.118.40.1/32
s1	eth0	1.118.1.0/24	1.118.1.2
s2	eth0	1.118.1.0/24	1.118.1.3
s3	eth0	1.118.1.0/24	1.118.1.4
c1	eth0	1.118.7.0/24	
c2	eth0	1.118.7.0/24	

3 Routing and service implementation

This section describes ISP implementation to realize routing and service requirements.

3.1 Routing

This section describe ISP implementation to fulfill routing requirements.

3.1.1 Intra-domain routing

We will use the OSPF protocol in the intra-domain routing. OSPF uses the shortest path algorithm to determine the transmission route. It converges faster and doesn't need to send update messages regularly. We will configure the cost of every path to make sure that router will choose the certain path we want and there are no equal-cost paths between two end-to-end points. Since AS1 is the top- tier provider of AS118 and it is directly connected to the r1, we manage our routers' cost in a certain way to make the packets all traverse through r1 in normal operations.

- r1 to client network and vice versa
- r1 to server network and vice versa
- r2 to client network and vice versa
- r2 to server network and vice versa
- Routers have at least two disjoint paths and the network stays operational when one of the internal links fails. The primary and second path a certain traffic will traverse are as below:

Path	r1	r2	servers	clients
r1	X	-	r1 r3	r1 r4
r2	-	X	r2 r3	r2 r1
servers	r3 r1	r3 r2	X	r3 r4
clients	r4 r1	r1 r2	r4 r3	X

Table 1: Primary Path

Path	r1	r2	servers	clients
r1	X	-	r1 r2 r3	r1 r3 r4
r2	-	X	r2 r1 r3	r2 r1 r3 r4
servers	r3 r2 r1	r3 r1 r2	X	r3 r1 r4
clients	r4 r3 r1	r4 r3 r1 r2	r4 r1 r3	X

Table 2: Secondary Path

3.1.2 Inter-domain routing

The primary link is used for all traffic (incoming and outgoing) during normal operation. However, the traffic connecting neighboring AS21 will take a direct path over the backup link. The backup link also provides Internet connectivity in case the primary link fails. We will set up a iBGP connection which contains r1-r4 in AS118. To differ the primary and the secondary path, we will set the local-preference and use some commands to make sure that those packets whose destination is other autonomous systems will go over the primary link in normal operations and go over the backup links if a certain link breaks down.

3.2 Internet service

This section describe ISP implementation to fulfill service requirements.

3.2.1 DNS

According to this project s1 is used as DNS and it's ip address is 1.118.1.2 and it is named as ns.isp118.lab

3.2.2 Web

s2 is used as web server in this project. The ip address that assigned to it is 1.118.1.3 and it is named as www.isp118.lab

3.2.3 DHCP

s3 is used as DHCP server and r4 is the DHCP relay agency. The ip address allocated to the DHCP is 1.118.1.4 and named as dhcp.isp118.lab