

Hands-on Activity V

Objectives

Use GNS3

1. To understand Static Routing
2. To understand Open Shortest Path First (OSPF) routing

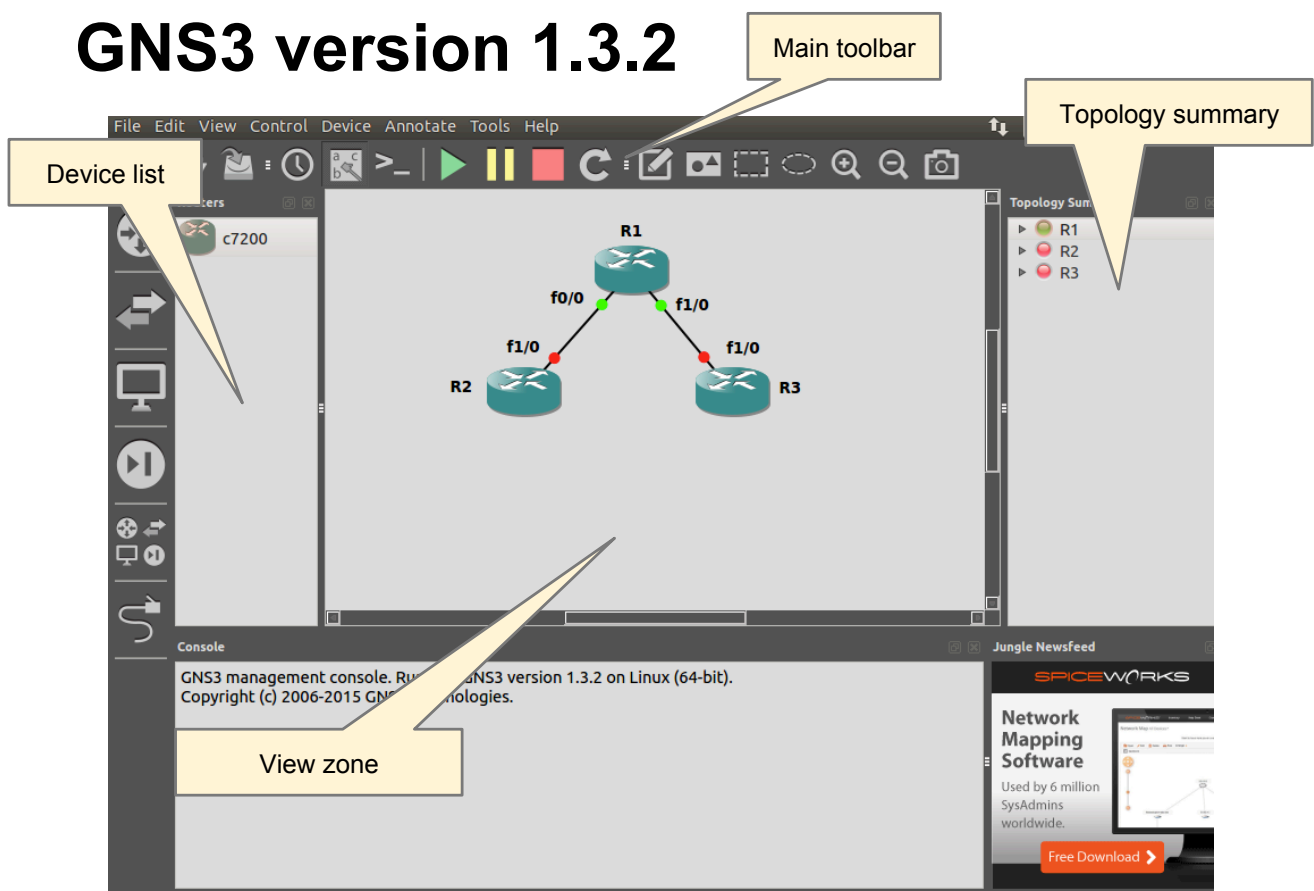
What is GNS3?

GNS3 is a Graphic Network Simulator

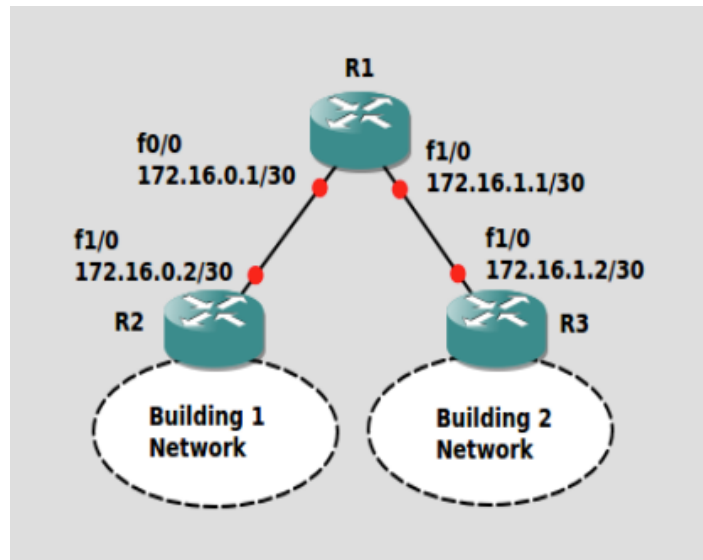
- can emulate a realistic network environment
- a very good learning tool for network admins/engineers



GNS3 version 1.3.2



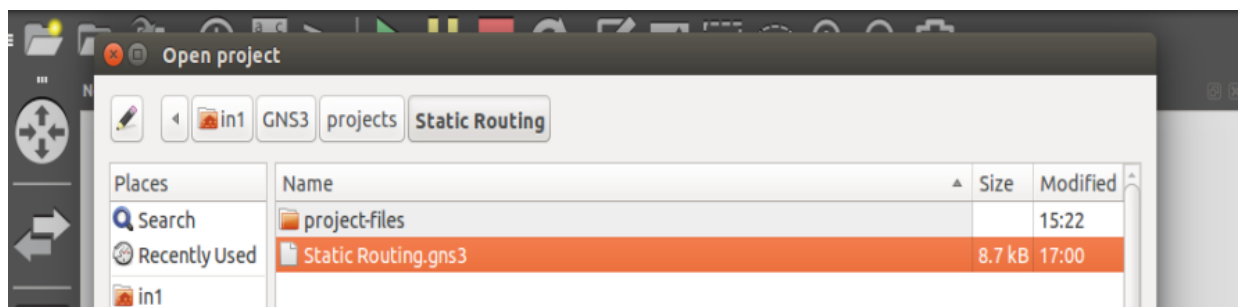
Let's Create a Simple Network



Goal: Enable all routers to ping each other

R1 and R2 were partially configured

Load the saved project **Static Routing**:



Check Router Configuration using the “show run” command

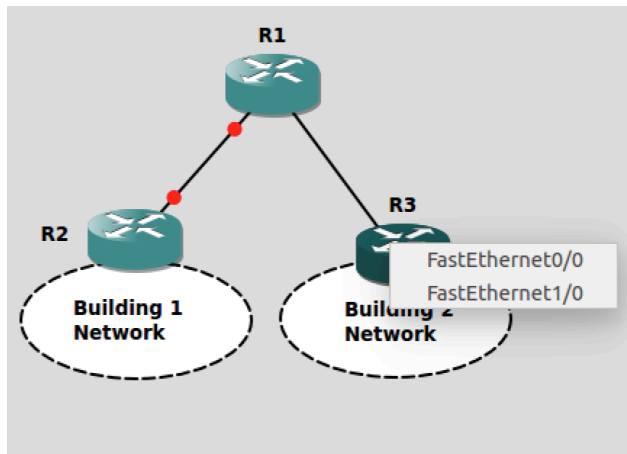
- 1) start all routers
- 2) open Console by right clicking on the router
- 3) execute `$show run`

Let's try to ping from R1 to R2!

```
$ping 172.16.0.2
```

Let's add and configure R3 through its console

- 1) add a router
- 2) add a link between R1 (FastEthernet1/0) and R3 (FastEthernet0/0)
- 3) configure R3 via Console



```
R3
SETUP: new interface FastEthernet0/0 placed in "shutdown" state
SETUP: new interface FastEthernet1/0 placed in "shutdown" state

Press RETURN to get started!

00:00:01: read snmpBoots failed
00:00:02: %DEC21140-1-INITFAIL: Unsupported PHY brand timed out, csr5=0x0
00:00:02: %DEC21140-1-INITFAIL: Unsupported PHY brand timed out, csr5=0x0
00:00:04: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
00:00:04: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to up
*May 12 11:38:44.247: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to down
*May 12 11:38:44.299: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to down
*May 12 11:38:45.583: %LINK-5-CHANGED: Interface FastEthernet0/0, changed state to administratively down
*May 12 11:38:45.591: %LINK-5-CHANGED: Interface FastEthernet1/0, changed state to administratively down
R3#
R3#
R3#
R3#
```

R3 Configuration

Configure IP address

```
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface FastEthernet 0/0
R3(config-if)#ip address 172.16.1.2 255.255.255.252
R3(config-if)#no shutdown
```

Configure static route

```
R3(config)#ip route 172.16.0.0 255.255.255.0 172.16.1.1
```

Confirm the configuration

```
R3#show ip interface brief
Interface              IP-Address      OK? Method Status    Prot
ocol
FastEthernet0/0        172.16.1.2      YES manual  up        up

R3#show ip route
172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks
S    172.16.0.0/24 [1/0] via 172.16.1.1
C    172.16.1.0/30 is directly connected, FastEthernet0/0
```

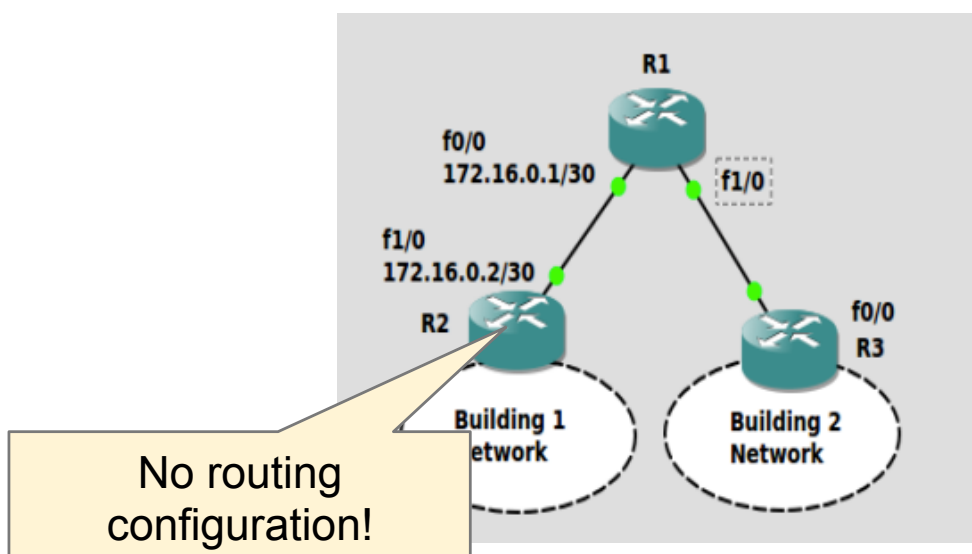
Save the configuration

```
R3#copy running-config startup-config
Destination filename [startup-config]?
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
```

Let's try to ping from R3 to R2!

```
$ping 172.16.0.2
```

What is the problem?



Use “show ip interface brief” and “show IP route” commands to check IP and routing configuration

Update R2 Configuration

Configure static route

```
$ip route 172.16.1.0 255.255.255.0 172.16.0.1
```

Save the configuration

```
$copy running-config startup-config
```

Ping R3 to confirm success

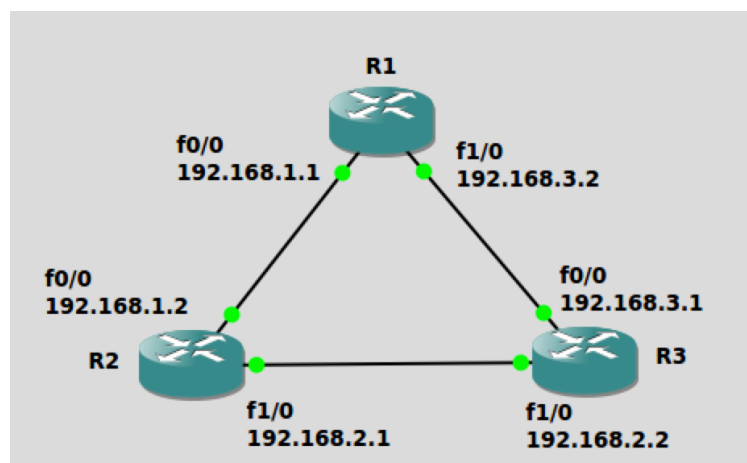
```
$ping 172.16.1.2
```

Experimenting with RIP

Open the premade **RIP** project.

Objectives: Analyze/Change the configuration.

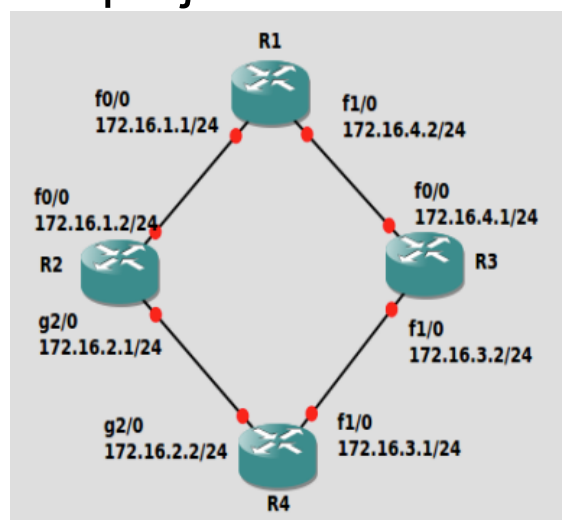
Try to observe the count to infinity problem.





Let's Create a Simple Network using OSPF

Load the saved project **OSPF:**



Goal: Enable OSPF on all routers. Observe the shortest path and link state behaviour

Configure OSPF on R4

R4 configuration

- enable OSPF

```
R4(config)#router ospf 1
R4(config-router)#router-id 4.4.4.4
R4(config-router)#network 172.16.0.0 0.0.255.255 area 0
R4(config-router)#exit
```

- set higher cost for interface f1/0

```
R4(config)#int f1/0
R4(config-if)#ip ospf cost 10
```

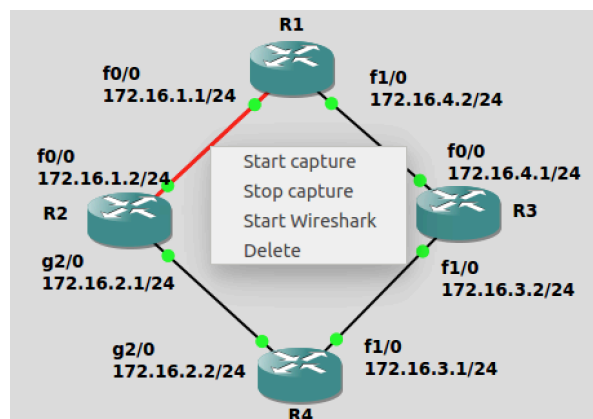
- confirm configuration

```
R4#sh ip ospf int brief
```

Interface	PID	Area	IP Address/Mask	Cost	State	Nbrs	F/C
Gi2/0	1	0	172.16.2.2/24	1	BDR	1/1	
Fa1/0	1	0	172.16.3.1/24	10	BDR	1/1	

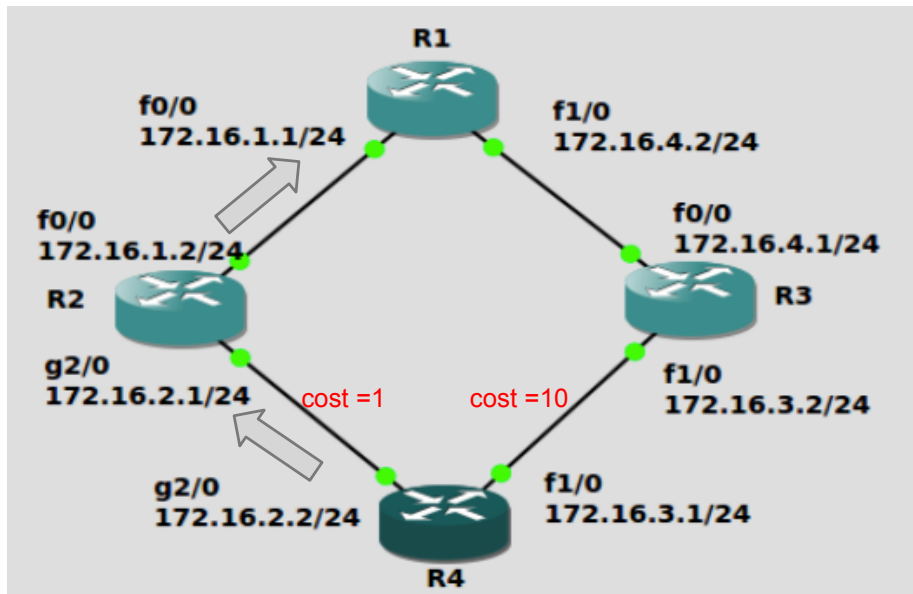
Let's capture the traffic between R4 - R2

Right click the link and choose "Start capture" to start wireshark



Let's traceroute from R4 to R1!

```
$traceroute 172.16.4.2
```



Let's stop R2 and traceroute again

```
$traceroute 172.16.4.2
```

