

Post-Lab 4: OSPFv2

Or: How do I know OSPF is actually working??

The main objectives of this postlab are: (a) to become more familiar with NetLab, and (b) to further examine and deepen your understanding of the information available about OSPF using appropriate **show** commands.

What you need to submit and when:

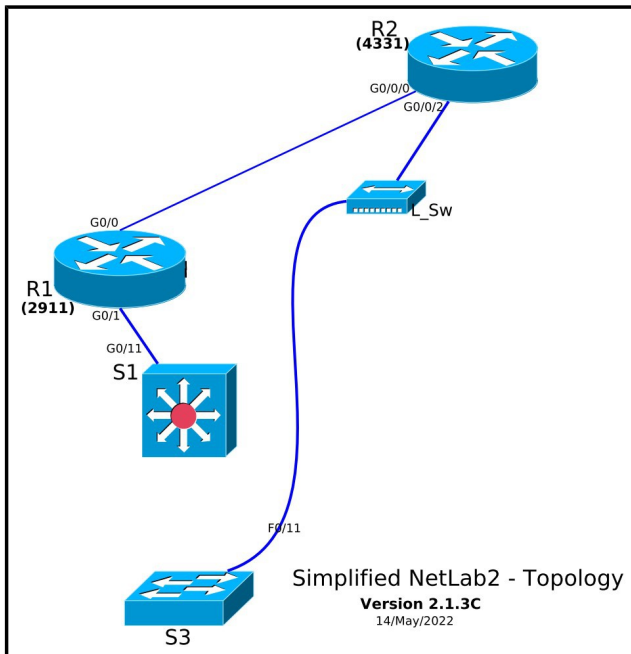
1. Complete the Lab 4 Post-lab quiz on BrightSpace with answers from your work, before your next lab.

References and Resources:

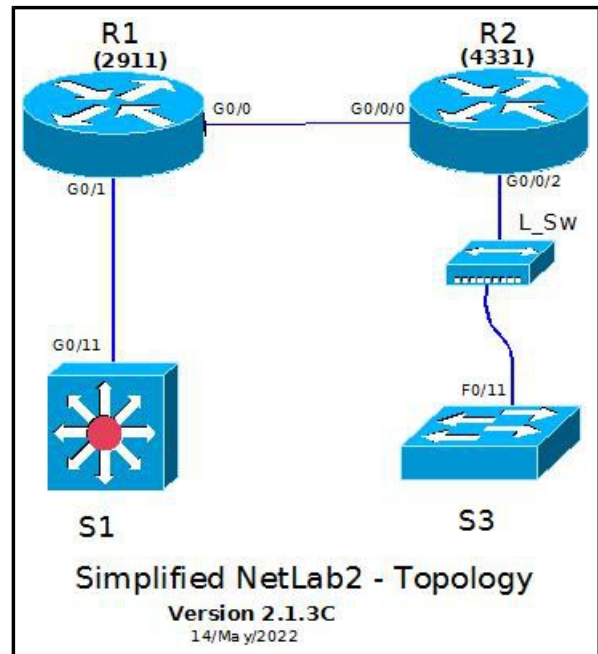
- NET2000 course materials, including ENSA course available from <https://netacad.com>
- Algonquin's NetLab facility – <http://netlab.algonquincollege.com>
all **documentation** is available at – <http://netlab.algonquincollege.com/docs/>
- A booking for NetLab, which should be when you'll have a couple of hours uninterrupted; you only need the *left hand side* of a pod, so it's nice to leave the other half for students in other classes.
- Your own computer

Lab 2 – Topology Diagram and Addressing Table

We'll keep things similar to Lab 4 by configuring only 2 routers, and use 2 switches as hosts. As noted on the first page, you only need the left hand side of a pod, so it's nice to leave the other half for students in other classes.



Ver A: Exact sub-set of original



Ver B: Sub-set after tidying up

Addressing Table

Device	Interface	IP Address	Subnet Mask	Gateway
R1	G0/0	10.1.2.1	255.255.255.0	–
	G0/1	10.1.1. 254	255.255.255.0	–
	Loopback1	1.1.1.1	255.255.255.0	–
S1	VLAN 1	10.1.1. 253	255.255.255.0	?
R2	G0/0/0	10.1.2.2	255.255.255.0	–
	G0/0/2	10.2.3. 254	255.255.255.0	–
	Loopback1	2.2.2.2	255.255.255.0	–
S2	VLAN 1	10.2.3. 253	255.255.255.0	?

USEFUL Tip: If you're in the middle of typing a command and you get interrupted by some (asynchronous) output, you can press CTRL+R to **R**ewrite the current command line.

Task 1: Plan for your session

Make sure you're prepared before you start your session.

- Look over the addressing table carefully and make sure you understand it
tip: 1st octet = 10/8 private IP; 2nd octet = lower numbered device (R1);
3rd octet = higher numbered device (R2); 4th octet = device number(R1)
- Determine the appropriate default gateway values for the switches;

Question: If 10 random students from NET2000 all happen to working on the same post-lab on NetLab at the exact same time, is there any danger or problem from everyone using the exact same IP addresses? Why or why not?

Task 2: Connect to NetLab

The [Intro To NetLab](#) document is available on the course site. Follow it if you need help to:

- make a booking for a NetLab session;
remember to use your Algonquin Network ID and not your student number
- check that you receive your login credentials sent to your Algonquin email;
- at the appropriate time, connect to your session; the easiest is using the NetLab2.bat script
- don't forget that for S3 (and S4) you need start the normal boot process by: **y** then **boot**
- don't forget to **disable** all switch interfaces immediately after you connect:
R1 = **interface range G0/1/0-3** followed by **shutdown**
S1 = **interface range G0/1-24** followed by **shutdown**
S3 = **interface range F0/1-24** followed by **shutdown**

Remember: the login account name has the pod number embedded within it, and it ends in the two letters "nl" (for **Net Lab**)

Task 3: Configure helpful settings – ALL devices

Some config settings are basics that should always be done just because they're really *helpful*. Configure your two routers and switches with the four essential categories of basic config. This is a repeat from previous labs (Lab 2 - Postlab, Lab 4). Other than modifying loopback addresses (next task), this should be a 1-2 min cut-and-paste operation.

(Don't forget to use "terminal monitor" as the first command of all SSH/Telnet sessions.)

Task 4: Re-enable required interfaces and Configure basic addressing

Hey, all the switch interfaces are down! Don't forget to re-enable them (S1 = G0/11, S3 = F0/11). Check the IP addressing and other interfaces, including loopbacks on the routers and interface VLAN 1 on the switches; troubleshoot any interfaces that aren't up/up.

Take note that the interfaces on R1 have two digits (0/0) while those on R2 have three (0/0/0). (Ignore the "L-Sw" switch; it's a cheapo \$10 switch that's just there for connectivity.)

Self-check: Ensure you can ping between directly connected devices (R1-S1, R1-R2, R2-S3). (You won't be able to ping the loopbacks from other devices yet.)

Task 5: Configure simple, single-area OSPF

OSPF needs to be configured, so these steps are a repeat of Lab 4, Task 4 except that you need to examine the output more carefully in order to answer the questions below.

- Step 1. On each router, show what (dynamic) protocols are running: **(do) show ip protocol**
Record what output, if any, is produced by the command at this stage.
- Step 2. On R1 (left side) **only**: enter the OSPF process config context: **router ospf 10**
and then exit the context.
Repeat step 1 for *both* routers (show protocols) and record the results.
- Step 3. On each router, enter the interface configuration context for G0/0 or G0/0/0 and
configure it as participating in OSPF: **ip ospf 10 area 0**
Then *quickly* repeat step 1; record the results.
- Step 4. After at least 30 secs has passed, note any console messages that appeared.
- Step 5. Repeat step 1 and **record** the results.
- Step 6. Examine all the output and generate some conclusions: two similar, but not
identical configuration sequences were completed. Was the end result the same?
What is the absolute, bare-bones, minimum number of different commands that
are needed for OSPF?

Questions:

1. What output is produced in step 1? What mention is there, if any, of OSPF?
2. After step 2, what's the difference in the output (if any)? Any mention of OSPF?
3. After step 3, look for changes in the "Number of areas in this router" in comparison with the
value for step 2.
4. For step 4, what is the exact message identifier (i.e. starts with "%")?
5. For step 4, the last 6 words in the message identify the change in state. What is the prior
and successive states identified? (Ref: Module 1.3)
6. After step 5, is there any difference in the OSPF status?
7. After step 6: even with variations in the config, was the end results the same or not?
What is the absolute minimum number of commands to get OSPF running?
8. The **show ip proto** command identifies the specific interfaces that are participating in
OSPF i.e. exchanges OSPF messages. What is the exact 'title' of that small subsection of
the output?

Task 6: Confirm OSPF operation

Verifying OSPF (e.g. for troubleshooting purposes) can be done by showing three aspects: the
participating interfaces, valid neighbours, and LSAs appearing in the OSPF topology database.

- Step 1. Examine your output from Task 5 to confirm what interfaces are active in OSPF.
- Step 2. On each router, verify the status of G0/0 in OSPF: **show ip ospf interface g0/0**
- Step 3. On each router, prove that you have an OSPF neighbour: **show ip ospf neighbor**
- Step 4. On each router, prove that OSPF is sharing topology info: **show ip ospf database**
- Step 5. Quick check: are any OSPF appearing in the routing table yet? **show ip route**
(*Both routers!*) You'll want to compare this with the results after the next Task!

Questions:

1. The output from Task 5, step 5 should list interface G0/0 or G0/0/0. What is the exact 'title'
of the sub-section mentioning the interface? Hint: 5 words long, then it mentions Area 0.
2. In step 2, what is the Network Type for G0/0(/0)? Tip: not buried too deeply.

3. In step 3, which device is the DR? (Ref: 1.3.5)
4. In step 4, Cisco calls Type 1 LSAs 'Router Link States'. How many Type 1 LSAs are there? How many routers are participating in OSPF? Notice any correlation?
5. In step 4, Cisco calls Type 2 LSAs 'Net Link States'. How many Type 2 LSAs are there?
6. In step 5, how many OSPF routes appear in the routing table so far?

Task 7: Extend and verify full end-end connectivity

In the previous Task, OSPF didn't have a lot of info: just the single interface that connected the two routers. To make OSPF's benefits a little more obvious, we'll add more information — more interfaces.

- Step 1. Just as you did in Task 5, step 3, configure OSPF on Lo1 and {G0/1 or G0/0/2}: enter the interface configuration context and do: **ip ospf 10 area 0**
It never hurts to wait at least 5-10 secs for the router to do it's thing!
- Step 2. Assuming you've correctly configured the default gateway for S1, S3, then you should be able to ping end-to-end: between S1 – S3 or to either loopback from either switch. Test it all! If it doesn't work, verify that you've correctly completed all the previous Tasks and steps.
- Step 3. Print the routing table and check for OSPF routes: **show ip route**
To gain real insight, compare line for line against the output from the last step of Task 6. Again, do it for both routers.

Questions:

1. How do you identify which route(s) are from OSPF? (Hint: check the legend that's printed just before the actual routing table!)
2. How many routes do you have from OSPF? (Assuming all the config is correct!)

Task 8: Finishing the NetLab session

NetLab is a "shared environment", so it's important to clear any saved config from the equipment before you disconnect. PLEASE do this when you get the 15 min warning before the end of your session: **erase startup-config** and for good measure on the switches: **delete vlan.dat**

After you've done that, you can just close all the terminal windows and walk away. NetLab takes care of automatically power-cycling the equipment to make sure the running config is wiped out.

Though it may seem at the beginning that NetLab 'takes more time', please consider that it takes zero (0) minutes to do all the cabling and de-cabling of the equipment at the beginning and end of the lab. That's gotta be worth at least ~10+ minutes! There's no need to verify the cabling in NetLab (e.g. plugging in the network cabling to one device, and accidentally plugging the console cable in a different device ... so things just don't work). Another time saver.

Finally, NetLab doesn't 'run out of steam' as you get more and more advanced. It's perfectly capable of serving the needs of courses all the way to the highest-level CCNP course.

Happy labbing!