

Lab 5: CSPF (+ prep for LDP-over-RSVP)

Or: Hop selection via TE; Inter-area RSVP

What you will do:

1. Configure RSVP throughout a single-area OSPF region
2. Enable TE extensions to OSPF to generate opaque LSAs (type 10)
3. Configure link colouring
4. Create and test a CSPF LSP, constrained by link colours.
5. Prepare to create T-LDP tunnels across an RSVP region

Things that you will need to know or learn:

1. CLI commands for configuring OSPF, RSVP, and MPLS
2. CLI commands for configuring LDP, T-LDP
3. CLI commands for enabling LDP tunnels, and ldp-over-rsvp
4. Ability to understand and interpret MPLS terminology as given in the lab manual

What you need to submit and when:

1. There is no pre-lab for Lab 5.
2. Complete the in-lab part of the exercise (see below), **before** the end of your lab period.
3. Complete the “Lab 5 Post-lab” exercise and submit to BrightSpace, by **11:59pm** your lab section's assigned due date (Mon group = Sun, Fri group = Thu)

Required Equipment:

- USB memory stick to save results for post-lab questions
- Hard-cover lab notebook, for reference during SBA at the end of the course.
- PC with internet access, a browser, Java, and terminal program (Provided in T108)

In-Lab Marks:

First, if you didn't complete the **RSVP LSP** from **Lab 4**, use the config from **slide 17, Module 4** and verify successful operation to ensure you know what a working LSP looks like!

Afterwards, each of the items listed below is worth a single mark towards your in-lab score.

- [Lab 5.1] Demo the LSP, which includes green and excludes red, going clockwise
- [Lab 5.1] Demo the LSP going counter clockwise, including green and excluding red
- [Lab 5.1] Demo the LSP running CSPF but failing to find an acceptable path

The in-lab score is worth 35% of the mark for this lab.

The post-lab score is worth 65% of the mark for this lab.

10% of your final mark is for labs done during the course of the semester.

References and Resources:

- MPLS lab guide; specifically labs 5.1 (pages 26-29) and 5.3 (pages 32-34)
- Command reference (beginning of Lab 5 section, and command reference next page)
- MySRLab: remote-access lab facility hosted at the Nokia Kanata campus

Addressing & Login Table

	Edu Lab 1	Edu Lab 2	Edu Lab 3
R1	.164	.196	.228
R2	.165	.197	.229
R3	.166	.198	.230
R4	.167	.199	.231
R5	.168	.200	.232
R6	.169	.201	.233
R7	.170	.202	.234
R8	.171	.203	.235

(R9-R12 are not needed or used in this lab.)

	My specific login information
EDU Lab # (1, 2, or 3)	
Individual login ID	
Corresponding password	

See BrightSpace for a list of login IDs and passwords; write **yours** in the space above.

Base IP address is: **192.168.206.0/24**

Command Reference

```
configure • router • if-attribute • admin-group <grp-name> value <bit-flag> # define group
show • router • if-attribute • admin-group # show groups
configure • router • ospf • traffic-engineering # Turns on generating of type 10 opaque LSAs
configure • router • mpls • interface <interface-name> • admin-group <group-name>
configure • router • mpls • lsp <lsp-name> • cspf # activates CSPF determination of path
configure • router • mpls • lsp <lsp-name> • primary <path-name> • include <group-name>
configure • router • mpls • lsp <lsp-name> • primary <path-name> • exclude <group-name>
```

Task 1: Configure infrastructure for Lab 5.1

Follow the lab instructions for setting up the infrastructure. Main items are:

(1) **No** CE routers; (2) single-area OSPF; (3) MPLS enabled on all interfaces; (4) RSVP enabled.

Task 2: Complete all steps in Lab 5.1

Follow all steps in the lab. **Ask** for help if you get stuck. *Wait* a few moments for reconvergence.

NB: Students on PE routers should complete all activities using an LSP to the clockwise P router.

CHECK POINT #1, #2, #3: Show the output of the lsp path detail command to confirm results.

Help any of your classmates who haven't yet succeeded in getting all the tasks completed.

Task 3: Prepare in-lab infrastructure for Lab 5.3

Delete the existing MPLS/RSVP configuration. Shutdown OSPF, then add the extra OSPF areas as indicated in the topology diagram for Lab 5.3. Re-configure MPLS/RSVP as per the lab.

Task 4: Start work on Lab 5.3 (time permitting)

Follow all steps in the lab. Any new commands are given in the lab. **Ask** for help if you get stuck.