

# RSVP Traffic Engineering (Part 1)

## Essentials: Opaque LSAs, Admin groups, CSPF

### Agenda

- Field trip to Nokia: **Fri Feb 9**; leaving immediately after lab @ 10am
  - Address for drivers: 600 March Rd; watch for sign ~150 m before turn!!
- Course outline now available on course site; please read it!
- Complete RSVP: Module 4, section 1 (Intro, protocol basics, control plane)
- Lab Prep: Traffic Engineering in RSVP
- Start RSVP & Traffic Engineering in Module 5:
  - CSPF: what is it and how does it work? (Mod 5.46-50)
- Coming next: complete RSVP (Mod 4); continue TE

### Assignments and Lab work

- Read: complete MPLS Module 4: RSVP (entire; by next Wed)
- Start studying for test #1:
  - re-read: NRS-II book: Chapter 11
- Lab 4 post-lab: due by 11:59pm on your lab section's assigned due date.
- Lab #5: MPLS Lab Guide, Lab 5.1 and prep for Lab 5.3
- Exercise #1 (on BB): MPLS LSPs and Labels, due next **Wed @3:00pm**

### RSVP Traffic Engineering Essentials

- OSPF Type 10 (intra-area) LSAs (ref: Mod 5.18-20)
- Enabling the OSPF Traffic Engineering extension (ref: Mod 5.21)
- Admin Groups aka Link Colouring (ref: Mod5.60)
  - defining groups
  - characterizing links by assigning Admin Group parameters
- CSPF: activating Constrained Shortest Path First (ref: Mod 5.46-50)
- Specifying Constraints on an LSP (ref: Mod 5.64-65)

**NB:** The NRS II textbook was published in 2011 and used SR OS ~ver 8; we are using ver 13. Some of the commands have changed format and now reside in a different command context.

SR OS ver 12 supported both old & new formats; ver 13 **only** supports the new format.

In short: the **courseware slidedecks** have the **correct** command syntax and context; the **NRS II** textbook is now only **mostly correct**.

## Lab Prep

Setting up the infrastructure for Traffic Engineering is split across three contexts:

OSPF	Admin Group Def'n	TED configuration
(See Mod5 slide 21) config>router> <b>ospf#</b> ----- <b>traffic-engineering</b> exit	(See Mod 5 slide 60) config> <b>router#</b> ----- <b>if-attribute</b> <b>admin-group red value 1</b> <b>admin-group blue value 2</b> exit interface system exit interface toR2 exit interface toR3 exit interface toR4 exit	(See Mod 5 slide 60) config>router> <b>mpls# info</b> ----- interface system exit interface toR2 <b>admin-group "blue"</b> exit interface toR3 <b>admin-group "red"</b> exit interface toR4 <b>admin-group "blue"</b> <b>admin-group "red"</b> exit <b>no shutdown</b>

Once the pre-requisites for TE have been configured, defining an RSVP LSP with link colouring requires two more steps:

(The first types of TE are <i>not</i> specified within the path definition, so not even a single change here)	A:R1>config>router>mpls# ----- <b>path "empty_list_aka_loose"</b> <b>no shutdown</b> exit
<ol style="list-style-type: none"> <li>1. Activate the TE algorithm (CSPF)</li> <li>2. specify the admin groups which must be followed or avoided</li> </ol> <p>If either is missing, the LSP is <i>not</i> following the intended TE specification!</p>	A:R1>config>router>mpls# ----- lsp "to_R6" <b>cspf</b> to 10.10.10.6 primary "empty_list_aka_loose" <b>include "blue" #(i.e. "MUST...")</b> # and/or <b>exclude "red" #(MUST NOT...)</b> exit <b>no shutdown</b> exit

The lab guide provides several "show" commands which provide insight into the TE and LSP operation.