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# MPLS in NS-2

**Choe, Hyun Jung (Stella)**  
Spring 2008

High Performance Networks  
Department of Computer Science and Engineering  
The University of Texas at Arlington

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## MPLS Modules in NS-2

- MNS-v2.0 Patch
  - Chungnam National University, South Korea (1998)

→ included in Default NS-2 package

- modified MPLS commands
- Implementation Scope
  - MPLS Packet Switching
  - CR-LDP

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## Structure of a MPLS node

The diagram illustrates the internal structure of an MPLS node. It features an **MPLS Classifier** at the center, which receives input from the left. Above it is the **PFT Table (Outgoing Label and Outgoing Interface)**, and below it is the **LIB Table (Outgoing Label and Outgoing Interface)**. Dashed arrows indicate that if an *unlabeled packet*, the node looks up the PFT Table, and if a *labeled packet*, it looks up the LIB Table. The output of the MPLS Classifier goes to an **Addr Classifier**, which then feeds into a **Port Classifier**. The Port Classifier directs traffic to two agents: **Agent (source/null)** and **Agent (CR-LDP)**. Two main output paths are shown: **L3 Forwarding** and **Label Switching**.

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3

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## Example commands

- mns\_v2.0
- set node0 [\$ns node]
- set LSR1 [\$ns mpls-node]
- set LSR2 [\$ns mpls-node]
- ...
- set LSR8 [\$ns mpls-node]
- set node9 [\$ns node]
- ...
- \$ns at 0.1 "LSR4 setup-erlsp 7 3\_4\_5 1000"

- ns2.30
- set node0 [\$ns node]
- \$ns node-config -MPLS ON
- set LSR1 [\$ns node]
- \$ns node-config -MPLS ON
- ...
- set LSR8 [\$ns node]
- \$ns node-config -MPLS OFF
- set node12 [\$ns node]
- ...
- \$ns at 0.1 ["\$LSR4 get-module MPLS] make-explicit-route 7 3\_4\_5 1000 -1"

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4


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**~/ns-2.xx/mpls**

**~/ns-2.xx/mns-2.0/**

- int MPLSAddressClassifier::convertL3toL2
- int MPLSAddressClassifier::convertL2toL2
- int MPLSAddressClassifier::processIP()
  - code to manipulate PHB
  - return convertL3toL2;
- int MPLSAddressClassifier::processLabelIP()


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5

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## NS Interface

- make-explicit-route {fec er lspid rc}
- configure-ldp-on-all-mpls-nodes : make initialization in links, bandwidths and topology tables and will also make necessary initialization in QOSPF module
- configure-cbq-on-all-mpls-nodes : install cbq classes on all MPLS node.
- use-QOSPF-for-cbr : ensures that integrated module works and MNS use OSPF with QoS extensions for routing.
- constraint-based-routing {dest bw} : a route with given bandwidth for the given destination using route computed by QOSPF agent.
- setup-crlsp {dest route lspID bw bSize pSize sPrio hPri} : the actual reservation and set up CR-LSP along the given route and make preemption and take care of route failures and simultaneously communicate the same to QOSPF module

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6

