MPLS WG
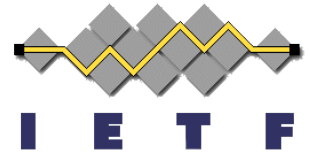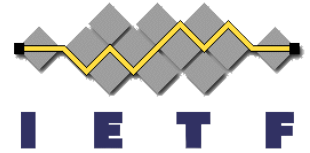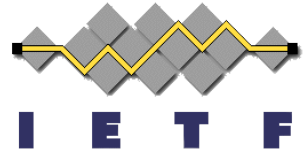
Extensions to RSVP-TE for Bi-directional Label Switched Paths (LSPs)

I E T F

Motivation

- Symmetrical MPLS-TE path application:
  - IEEE-1588 which requires that the Delay_Req message takes the same path as the associated Sync message.

Current State

- MPLS LSPs are Unidirectional - Separate LSPs are required for bi-directional traffic flow

- GMPLS has defined extensions for setting up bi-directional LSPs

- Draft uses the GMPLS extensions and applies those to regular MPLS LSPs and also discusses how bi-directional symmetrical FRR can be achieved

Setting up the RSVP-TE Bi-Directional LSP
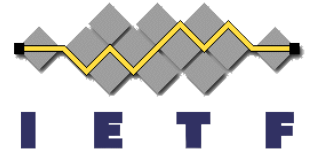
- Use Upstream_Label object in the PATH message.
- When an MPLS node desires label recording, it adds this Upstream Label in the RRO sub-object in PATH message:
  - Thus the initial RRO will now contain the sender's IP address and the Upstream Label advertised by it.
  - Upstream label subobject: type 0x04 and same C-type with label object.

FRR Mechanisms

Head-end A   B   C   D   Tail-end E

Upstream MP   Upstream PLR   Downstream MP   Downstream PLR
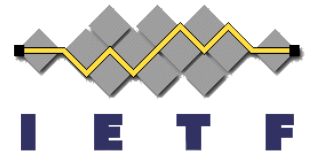
F   G
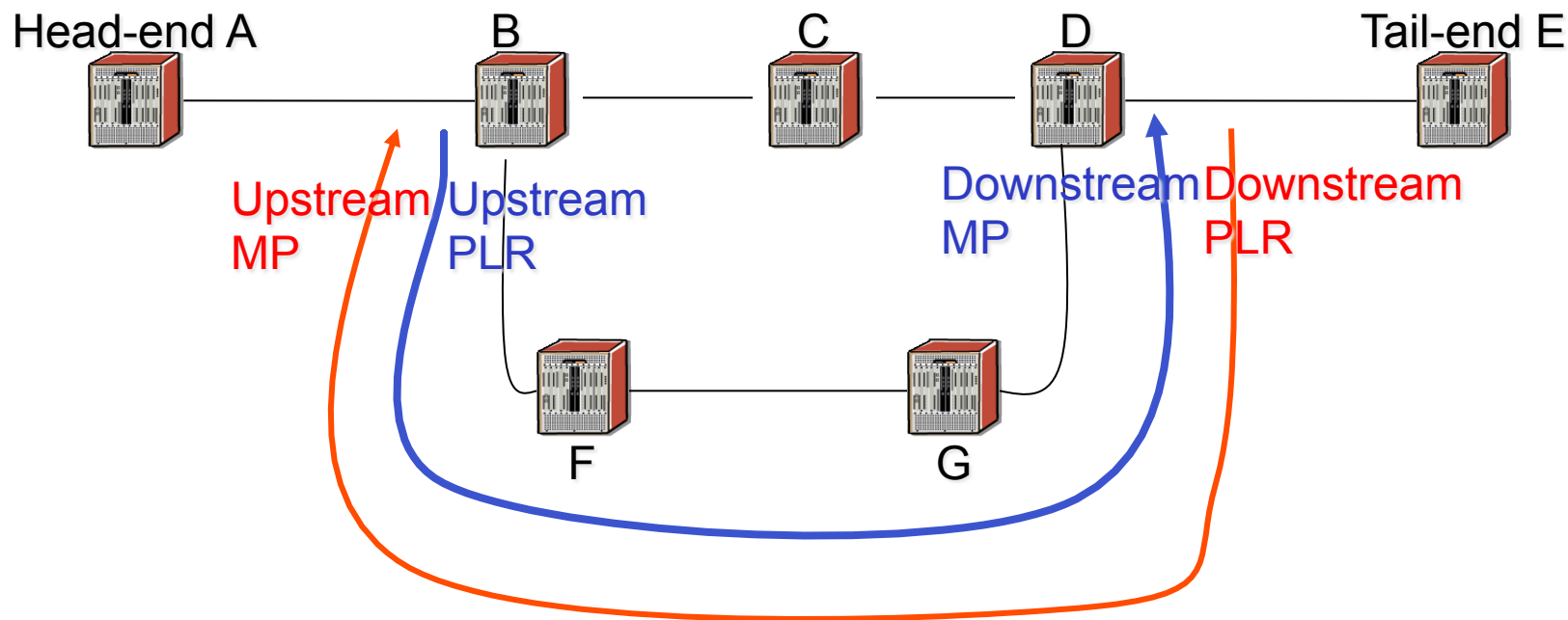
ABCDE - Protected bi-directional LSP

BFGD - Bi-directional bypass tunnel for protecting node C

→ B is the PLR for traffic in one direction

← D is the PLR and B the MP for traffic in reverse direction

Bi-directional By-Pass tunnel

- Protected bi-directional LSP -> bi-directional detour and bypass tunnels.
  - Uses the same Upstream_label mechanism that was used to set up the bi-directional LSP
- Upstream PLR learns the incoming labels expected by its downstream routers by examining the RRO in the RESV messages
- Downstream PLR for the reverse direction, learns the Upstream labels by examining the RRO in the PATH message

Failure Detection between PLR and MP

- Its required that the PLR and MP detect the failure at the same time so that they switch to the bypass or the detour tunnel at the same time
  - We could use BFD, RSVP-TE Hello, or some other mechanism for this.
  - We suggests using BFD - more details in the draft.
- Alternate mechanism is to do protected LSP segment detection between the PLR and the MP.
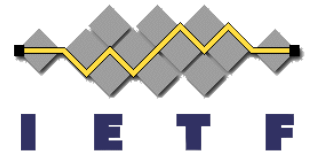
Next steps

- Comments and feedback of the WG?

Thank you!