Network Assigned Upstream Label

draft-beeram-ccamp-network-assigned-upstream-label-00

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Motivation

- Requirement: Need a mechanism to let the network assign an upstream-label for a given LSP.
  - A given node may not have sufficient information to assign the correct upstream-label on its own.
  - Picking an incorrect upstream-label may be highly undesirable (use-case discussed later) in certain cases.

- If labels are assumed to be symmetric (as is the case with most practical scenarios), the above requirement gets addressed easily using existing extensions.
  - But "Label Symmetricity" cannot be assumed by default; Need a mechanism to explicitly request "Label Symmetricity".

Label Symmetricity

- Applicable in a label-symmetric Scenario
  - New Flag [Label-Symmetricity-Required] defined in the Attributes Flags TLV (Position TBA).
  - Ingress sets the above flag in the Attributes Flags TLV of the LSP_REQUIRED_ATTRIBUTES object.
  - Label returned in the LABEL object of the RESV is deemed symmetric and is used for both directions.

Upstream ———— **Downstream**
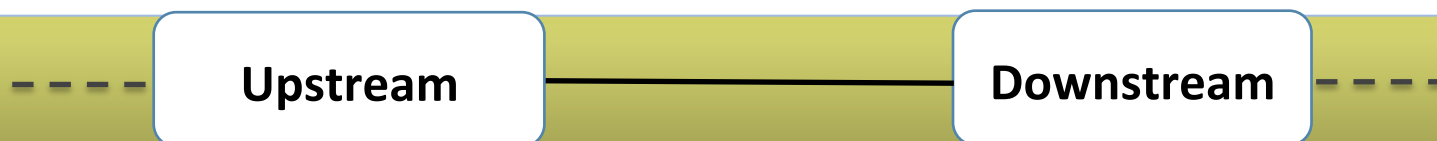
Path LSP Req Attr (Label Symmetricity)
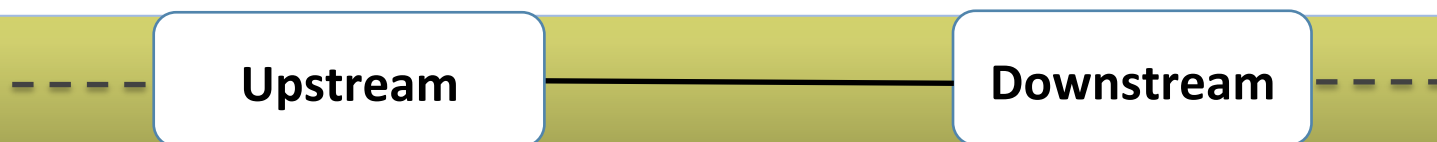Label-Set (L)
→

Resv Label (Assigned – L)
←

Path LSP Req Attr (Label Symmetricity)
Upstream Label (Assigned - L)
→

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Unassigned Upstream Label

- Applicable in a non label-symmetric scenario
  - Special Label Value - "0xFFFFFFFF" - defined to indicate an Unassigned Label
  - Used by a given node when it has no input on what upstream-label needs to get picked; the special value is filled in the UPSTREAM_LABEL object of the PATH that is sent downstream
  - Network responds by filling in a valid label in the UPSTREAM_LABEL object of the corresponding RESV.

| Upstream | ——————— | Downstream |

Path   Upstream Label (Unassigned)

⟶

Resv   Upstream Label (Assigned – L1)
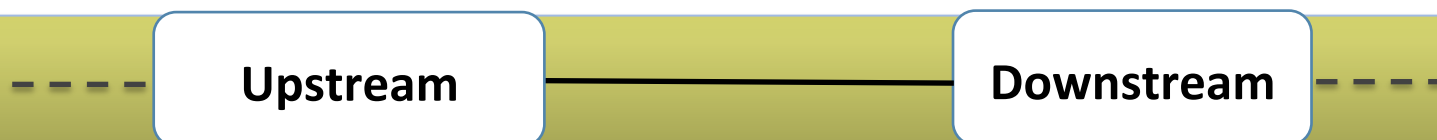Label (Assigned – L2)

⟵

Path   Upstream Label (Assigned – L1)

⟶

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Upstream Label Set

- Applicable in a non label-symmetric scenario
  - UPSTREAM_LABEL_SET is the upstream equivalent of the LABEL_SET
  - Used by a given node when there is a desire to give the network some choices.
  - Network responds by picking a valid label from the given list and signals it back in the UPSTREAM_LABEL object of the corresponding RESV.

Upstream ———— **Downstream**

Path   Upstream Label Set (L1, L2 … Ln)

Resv   Upstream Label (Assigned – L2)
Label (Assigned – Lx)

Path   Upstream Label (Assigned – L2)

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Use-Case : Alien Wavelength Setup

R1   W1   W2   R2

- Optical signal originating on Router R1 tuned to a particular wavelength; It gets multiplexed on WDM-Node W1 with optical signals at other wavelengths via an optical filter.

- It may not be acceptable to have the router send signal into the optical network unless it is at the correct wavelength.
  - Having the router send signal with wrong wavelength may adversely impact existing optical trails.
  - If the clients do not have full visibility into the optical network, they are not in a position to pick the correct wavelength up-front.

Alien Wavelength Setup – Signaling Sequence

R1   **W1**   **W2**   **R2**
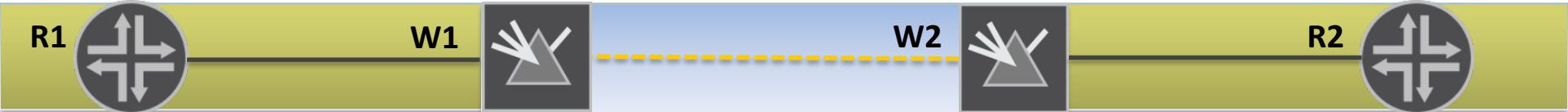
Path Admin Status (Admin down, Reflect)
Upstream Label (Unassigned)

Path Admin Status (Admin down, Reflect)

Resv Admin Status (Admin down)

Resv Admin Status (Admin down)
Upstream Label (Assigned)

Path Admin Status (Reflect)
Upstream Label (Assigned)

Path Admin Status (Reflect)

Resv Admin Status

Resv Admin Status
Upstream Label (Assigned)

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Next Steps

- Initiate discussion.

- Get consensus on solutions for both "label symmetric" and "label non-symmetric" scenarios.