PCEP Extensions for
remote-initiated GMPLS LSP Setup

draft-ali-pce-remote-initiated-gmpls-lsp-00.txt

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Outline

- **Scope**
- **Use cases**
- **Requirements**
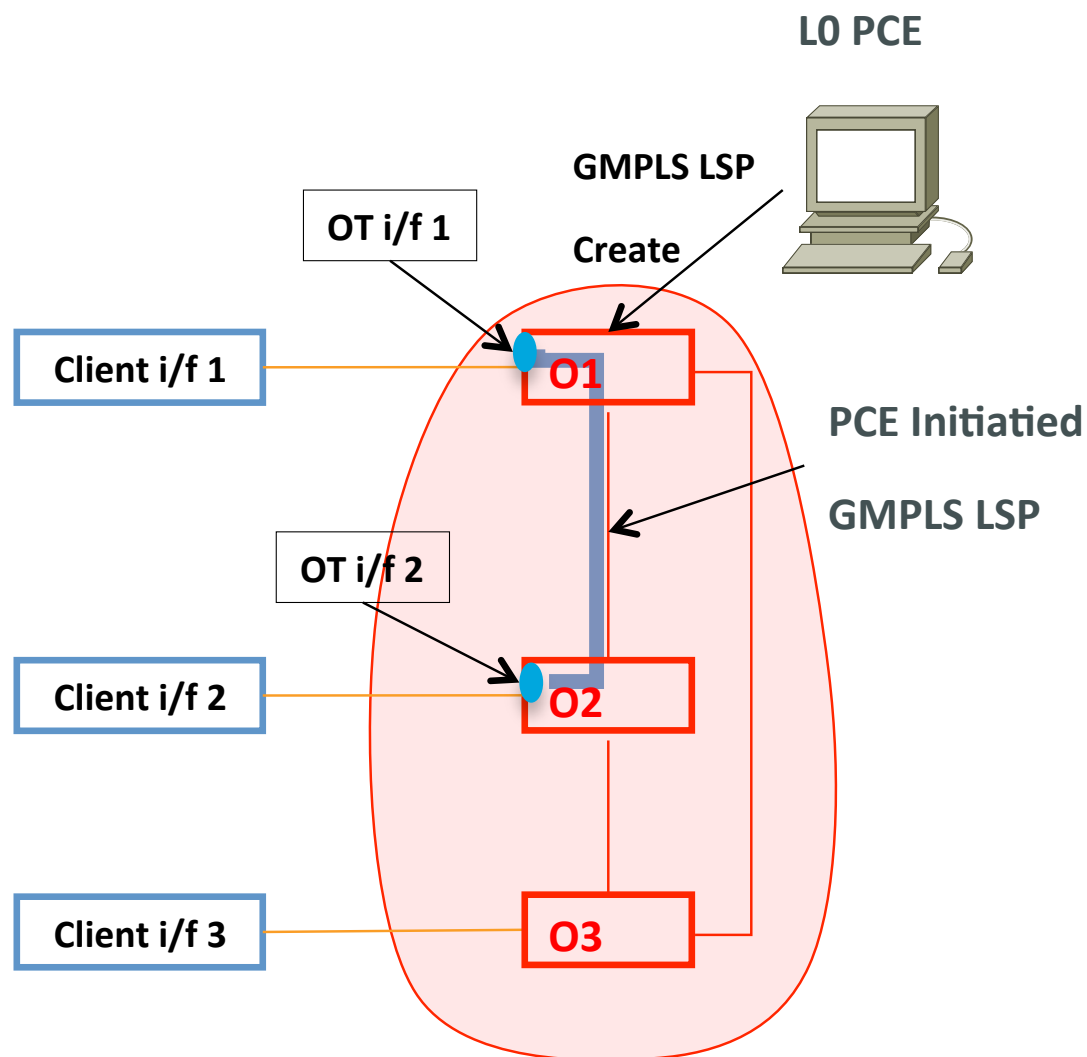- **Solution**
- **Next Steps**

Scope

- **PCEP Extensions for PCE-initiated GMPLS LSP Setup in a Stateful PCE Model.**

- **Extends draft-crabbe-pce-pce-initiated-lsp for GMPLS LSPs and multilayer networks.**

- **When an active stateful PCE is used for managing remote-initiated LSP, the PCC may not be aware of the intended usage of the remote-initiated LSP.**

  - ➢ **This draft also addresses the requirement to specify on how PCC should use the PCEP initiated MPLS or GMPLS LSPs.**

Outline

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- **Use cases**

- **Requirements**
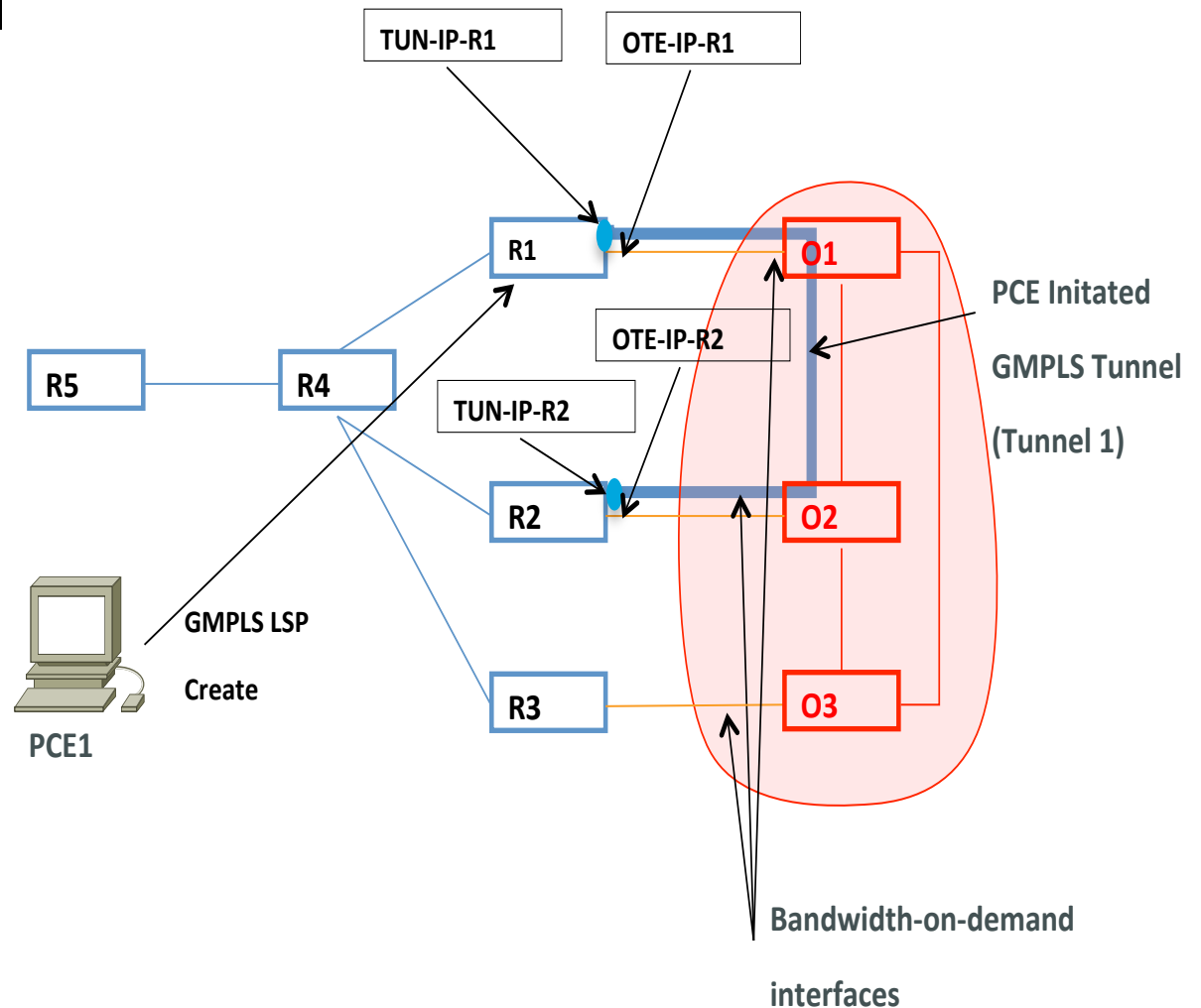
- **Solution**

- **Next Steps**

Single-layer provisioning from active stateful PCE

- **The active PCE can dynamically create or delete L0 services between client interfaces.**

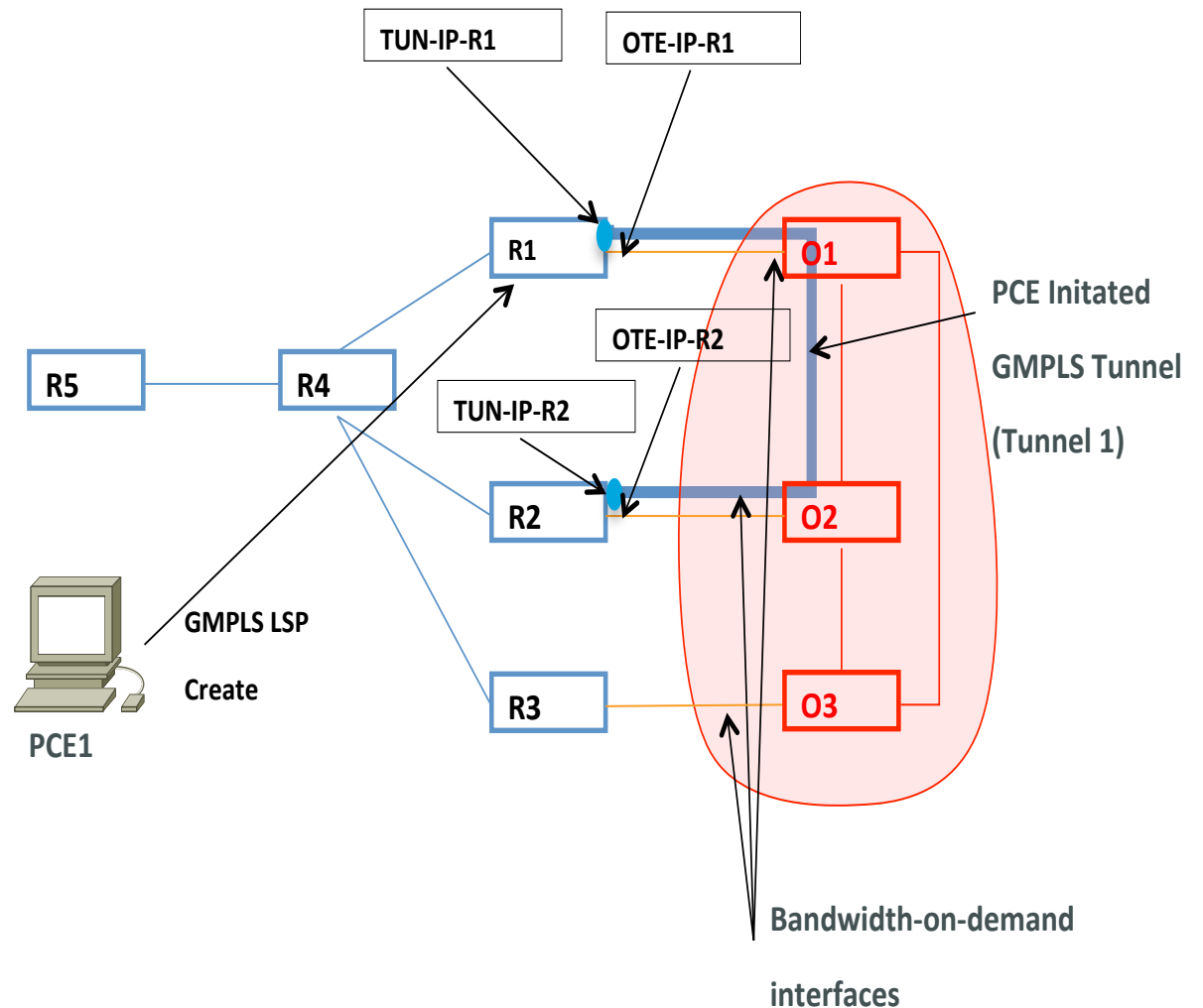- **New connections or reoptimization is controlled by stateful PCE(s).**

L0 PCE

GMPLS LSP

Create

OT i/f 1

Client i/f 1

O1

PCE Initiatied

GMPLS LSP

OT i/f 2

Client i/f 2

O2

Client i/f 3

O3

5

Bandwidth-on-demand for multi-layer networks

- **A multilayer stateful PCE(s) establishes L0 circuits based on L3 demands.**

- **PCE computes the L0 Paths and triggers L0 circuit creation.**

- **Bandwidth on demand and spare bandwidth is shared.**

TUN-IP-R1   OTE-IP-R1

R1

OTE-IP-R2

R5   R4

TUN-IP-R2

R2

GMPLS LSP

Create

PCE1

R3

O1

O2

O3

PCE Initated

GMPLS Tunnel

(Tunnel 1)
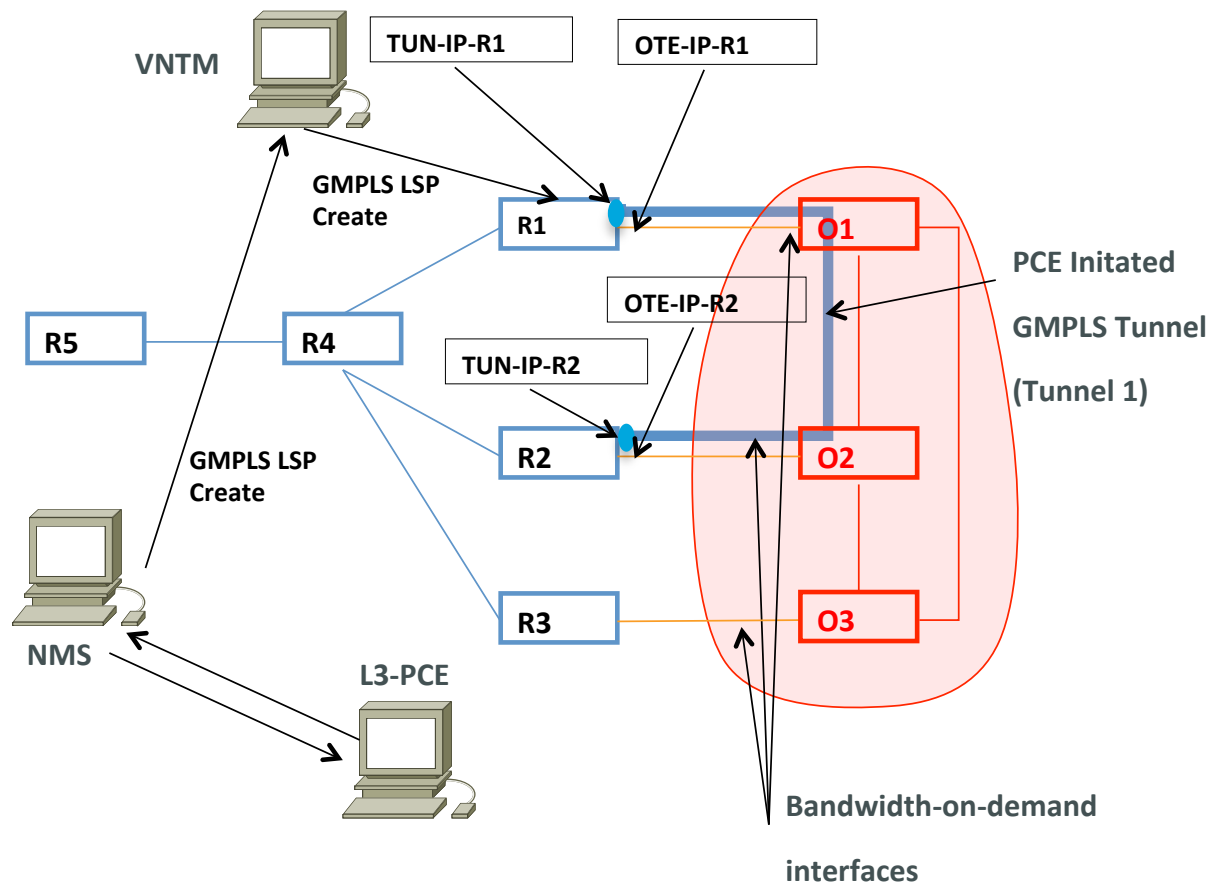
Bandwidth-on-demand

interfaces

Higher Layer Signaling Trigger

- **Similar to the previous use case but in this scenario a L3 PCE is used.**

- **PCE triggers L0 circuit creation but GMPLS signaling takes care of path computation and establishment of the LSP.**

TUN-IP-R1

OTE-IP-R1

R1

O1

PCE Initated

GMPLS Tunnel

(Tunnel 1)

OTE-IP-R2

R5

R4

TUN-IP-R2

R2

O2

GMPLS LSP

Create

R3

O3

PCE1

Bandwidth-on-demand

interfaces

NMS-VNTM cooperation model

- **NMS does not have information about all network information, so it consults L3 PCE.**

- **In case of there is no path in L3; NMS sends a message to the VNTM to create a GMPLS LSP at the lower layer.**

VNTM

TUN-IP-R1   OTE-IP-R1

GMPLS LSP Create

R1   O1

PCE Initated

GMPLS Tunnel

(Tunnel 1)

R5   R4   OTE-IP-R2

TUN-IP-R2

GMPLS LSP Create

R2   O2

NMS   L3-PCE

R3   O3

Bandwidth-on-demand

interfaces

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GMPLS Requirements for Remote-Initiated LSPs

- Support for multiple switching capabilities.

- Support for encoding type to be used by the LSP.

- Support for G-PID to be carried by the LSP.

- Technology specific Traffic Parameters.

- Support for Asymmetric Bandwidth.

- Support for unnumbered interfaces [RFC3477].

- Explicit label control.

- GMPLS protection and restoration [RFC4872], [RFC4873], etc.

Remote Initiated LSP Usage Requirement

- **The target IGP instance for the Remote-initiated LSP.**

- **In the target IGP instance, should the PCE-initiated LSP be advertised as a forwarding adjacency and/ or routing adjacency and/ or to be used locally by the PCC?**

- **If Remote-initiated LSP is to be advertised an IPv4 FA/ RA, IPv6 FA/ RA, what is the local and remote IP address is to be used for the advertisement**

Outline

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- **Solution**

- **Next Steps**

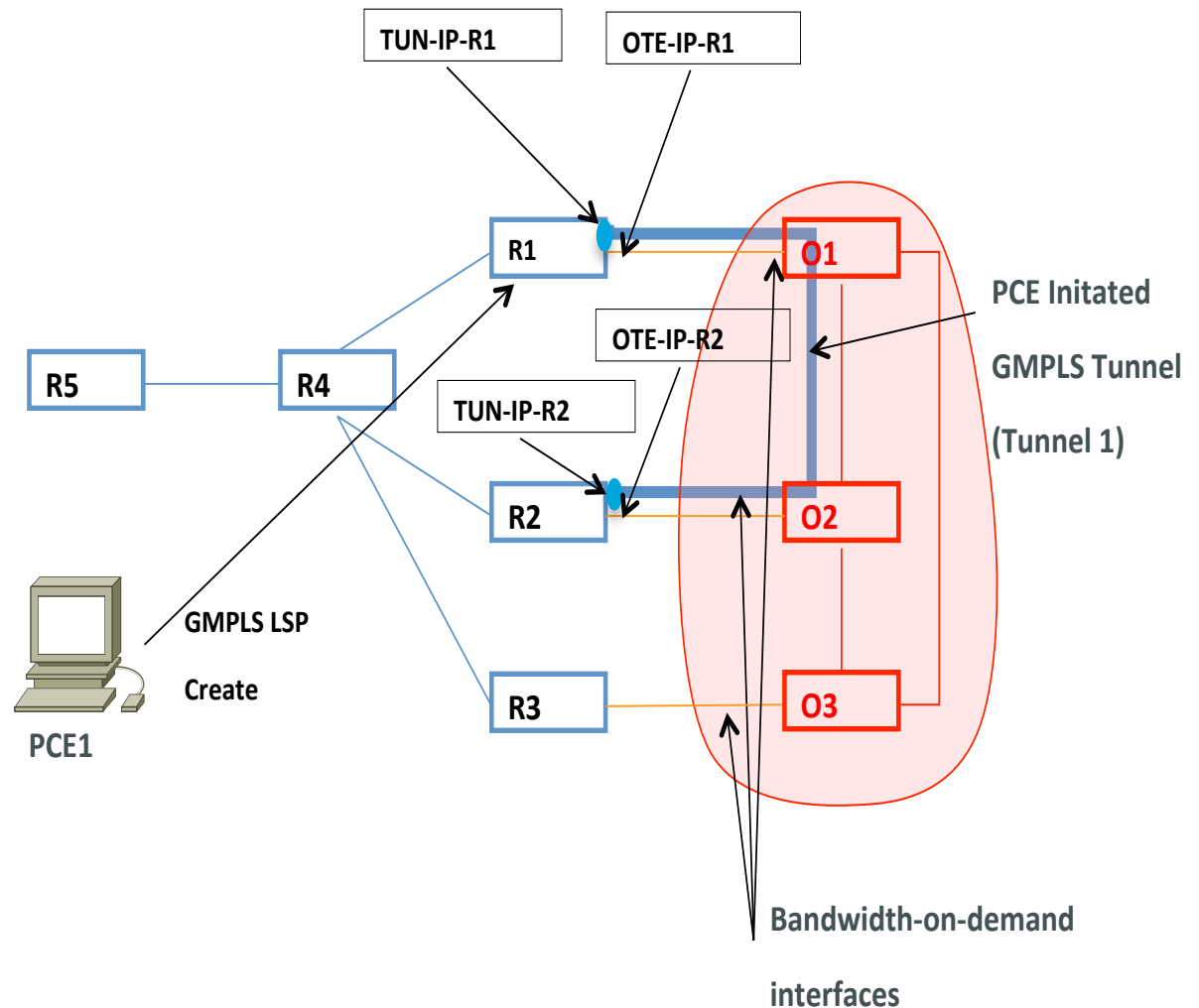# PCEP Extensions for Remote-Initiated GMPLS LSPs

- **LSP create message defined in [I-D. draft-crabbe-pce-pce-initiated-lsp] is extended to include GMPLS specific PCEP objects.**

- **Minor misc. changes to support GMPLS initiated LSPs.**

PCEP extension for PCE Initiated LSP Usage Specification

- **[RFC6107] defines LSP_TUNNEL_INTERFACE_ID Object for communicating usage of the forwarding or routing adjacency from the ingress node to the egress node.**

- **This document extends the LSP Create Message to include LSP_TUNNEL_INTERFACE_ID object defined in [RFC6107].**

Communicating LSP usage to Egress node

- **PCE does not need to send LSP Create message to egress node to communicate LSP usage information.**

- **Instead PCC uses RSVP-TE signaling mechanism specified in [RFC6107] to send the LSP usage to Egress node.**

TUN-IP-R1   OTE-IP-R1

R1   O1

OTE-IP-R2

R5   R4   TUN-IP-R2

PCE Initated

GMPLS Tunnel

(Tunnel 1)

R2   O2

GMPLS LSP

Create

PCE1   R3   O3

Bandwidth-on-demand

interfaces

Outline

- **Requirements and Scope**

- **Problem Statement**

- **Solution**

- **Next Steps**

Next Steps

- **We would like to request PCE WG Charter to include this work.**

Thank You.