Applicability of Stateful PCE

draft-zhang-pce-stateful-pce-app-00.txt

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Outline

- Introduction

- General Considerations for Stateful PCE

- Stateful PCE Applicability

- Summary and Next Step

Introduction

What is stateful PCE?

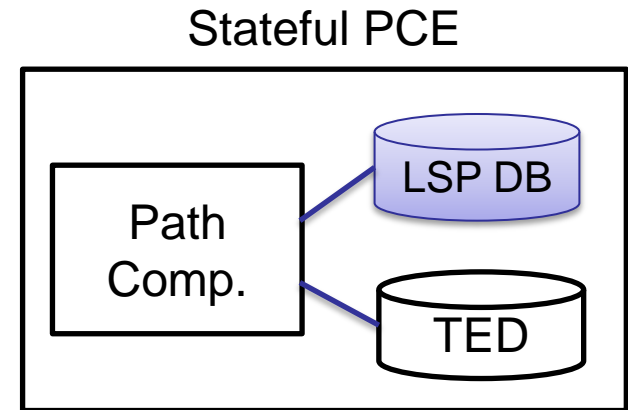- A PCE having the following two databases: (RFC4655)

- **Traffic Engineering DB (TED)**

  - Topology

  - Resource Usage Information

- **LSP DB**

  - The set of computed paths

  - Reserved resources in use in the network
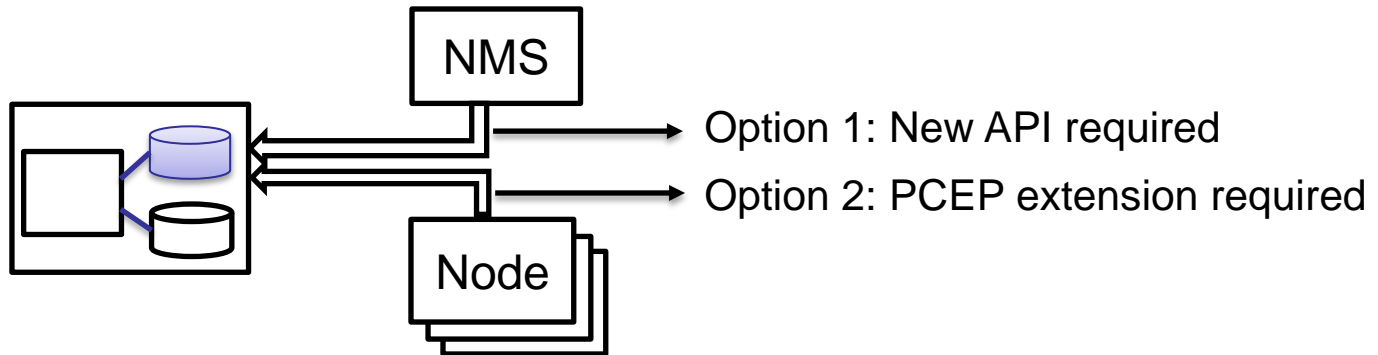
  (i.e. information about existing LSPs)

Stateful PCE

General Considerations

◆ Architecture Considerations

   o Composite PCE architecture NOT RECOMMENDED for stateful PCE

   o Not exclude the co-existence of stateful and stateless PCEs

◆ LSP DB Synchronization

   o Between stateful PCE and the network

NMS

Option 1: New API required

Option 2: PCEP extension required

Node

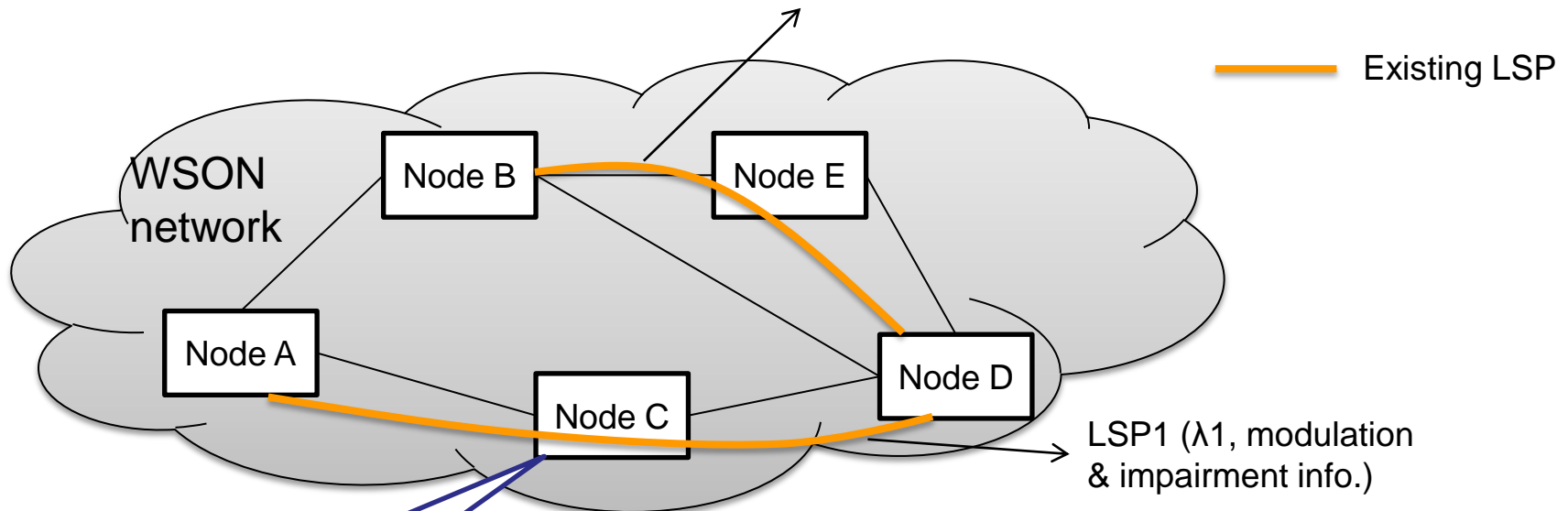   o Among stateful PCEs in single, multiple domain or multiple layer networks

◆ PCE Survivability/Reliability

◆ Delegation and Policy
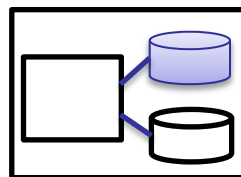
Stateful PCE Applicability(1/4)

◆Impair-aware RWA in WSON networks

LSP2 (λ2, modulation & impairment info.)

Existing LSP

WSON network

Node B

Node E

Node A

Node C

Node D

LSP1 (λ1, modulation & impairment info.)

A NEW request (**C – E**) **Constraint**: do not impact existing traffic (e.g. LSP1, LSP2)
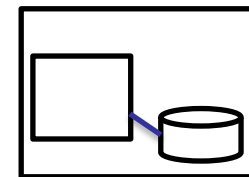
Stateful PCE

Having LSP info. ☺

Stateless PCE
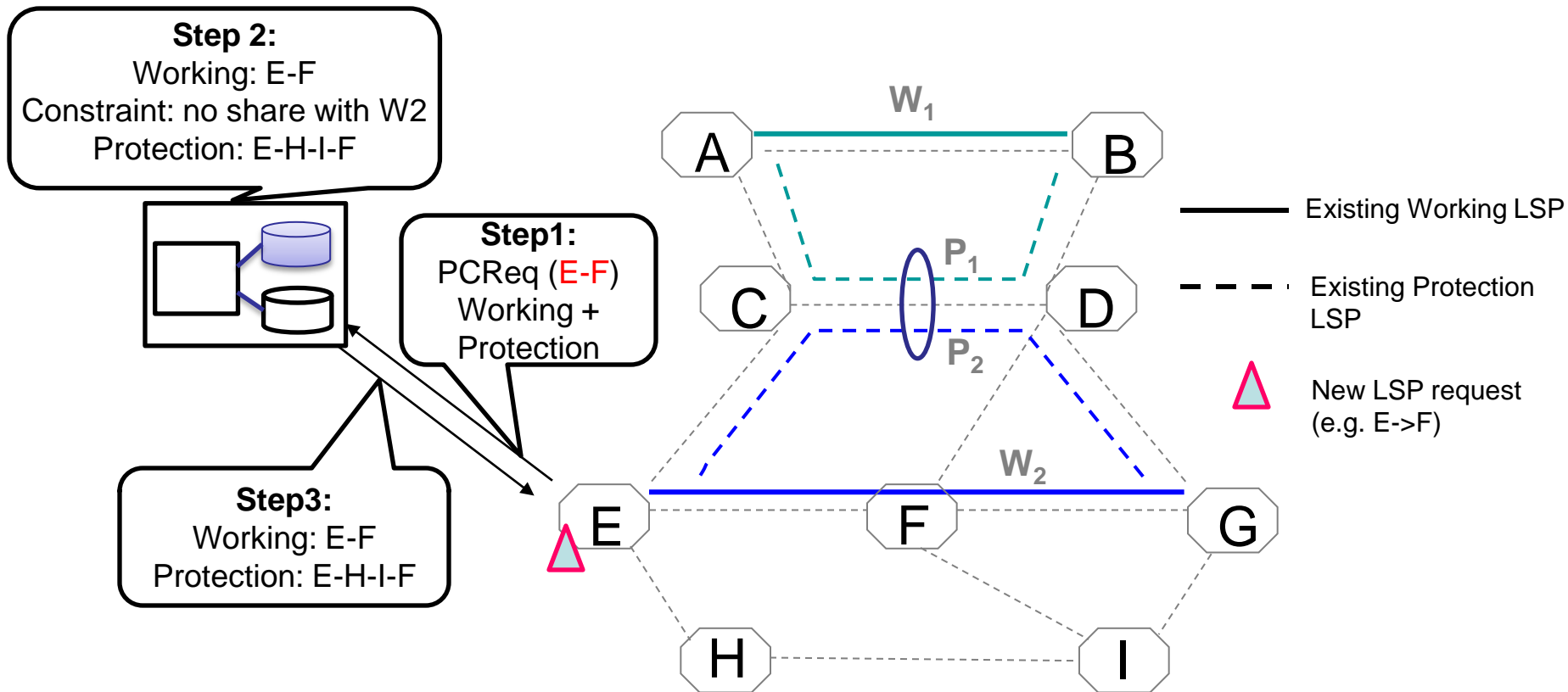
No LSP Info. ☹

Stateful PCE Applicability(2/4)

◆ Recovery

    ○ Protection – Objective: shared protection, against single link failure

Step 2:
Working: E-F
Constraint: no share with W2
Protection: E-H-I-F

Step1:
PCReq (E-F)
Working +
Protection

Step3:
Working: E-F
Protection: E-H-I-F

W_1

P_1

P_2

W_2

A   B   C   D   E   F   G   H   I

Existing Working LSP

Existing Protection LSP

New LSP request (e.g. E->F)

Stateful PCE Applicability(3/4)

◆ Recovery

    o Restoration – multiple rerouting requests (not necessarily the same time)

Step 2:
1) Any other affected LSPs? Yes
2) Reroute all affected LSPs

Step1:
PCReq (E-F)
C-D failed

Step3:
Reroute Replies
(LSP1, LSP2)

A   B

C   D

E   F   G

LSP1

LSP2

Reroute Request

*assuming one PCReq arrives at PCE first (e.g. PCReq(E-F))
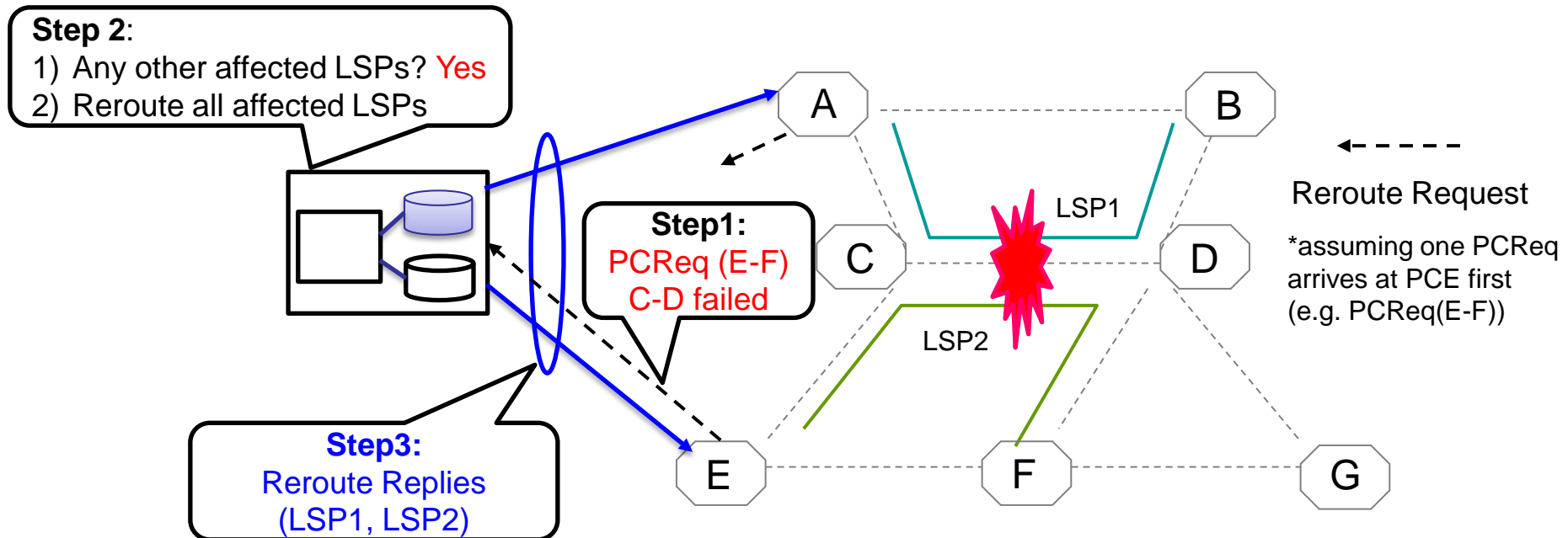
Stateful PCE Applicability(4/4)

◆ Time-based Scheduling

LSP scheduling Table

LSP ID	Time	Resource
1	T1-T2	E-C-D-G
2	T2-T4	E-C-D-F
3	T3-T4	E-F
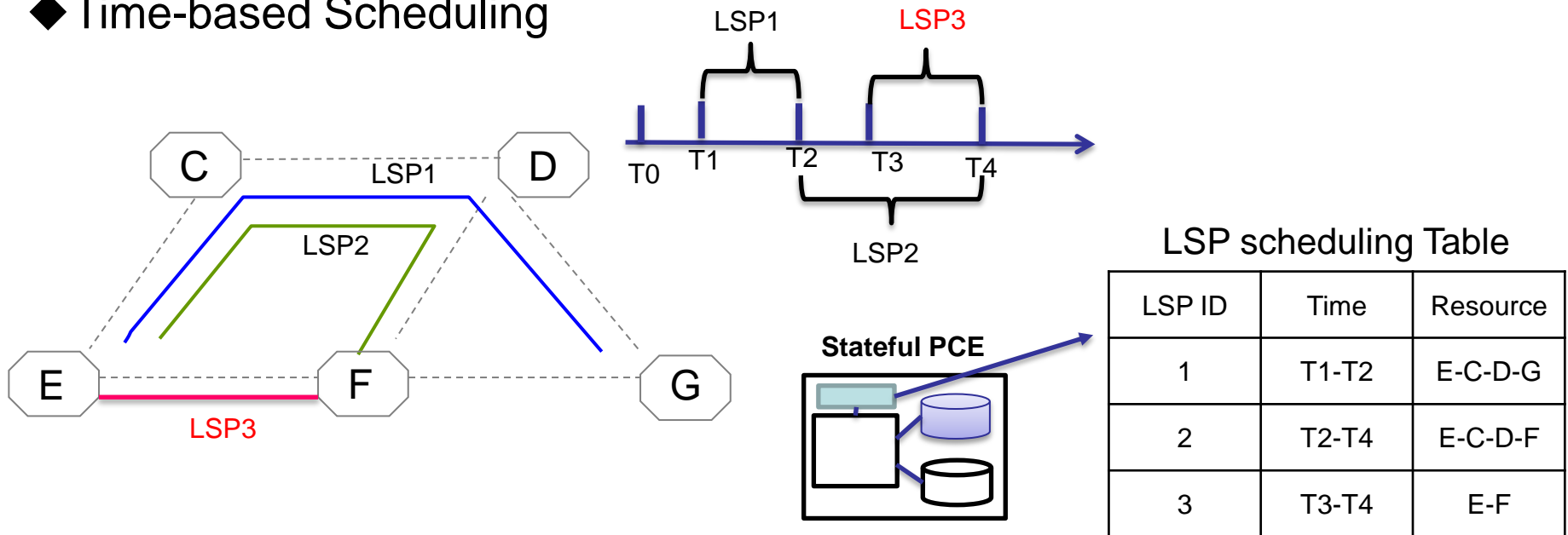
◆ SRLG Diversity

◆ Defragmentation in flexible grid networks

◆ Maintenance of Virtual Network Topology

◆ GCO (Incremental)

◆ P2MP Application

Summary & Next Step

- Stateful PCE work should be driven by the general applicability and use cases. This document addresses these needs.

- Welcome feedback from the meeting or mailing list and further revision