"PCE as a Central Controller (PCECC)"

and its relationship to ACTN!

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This is the latest version…

PCECC

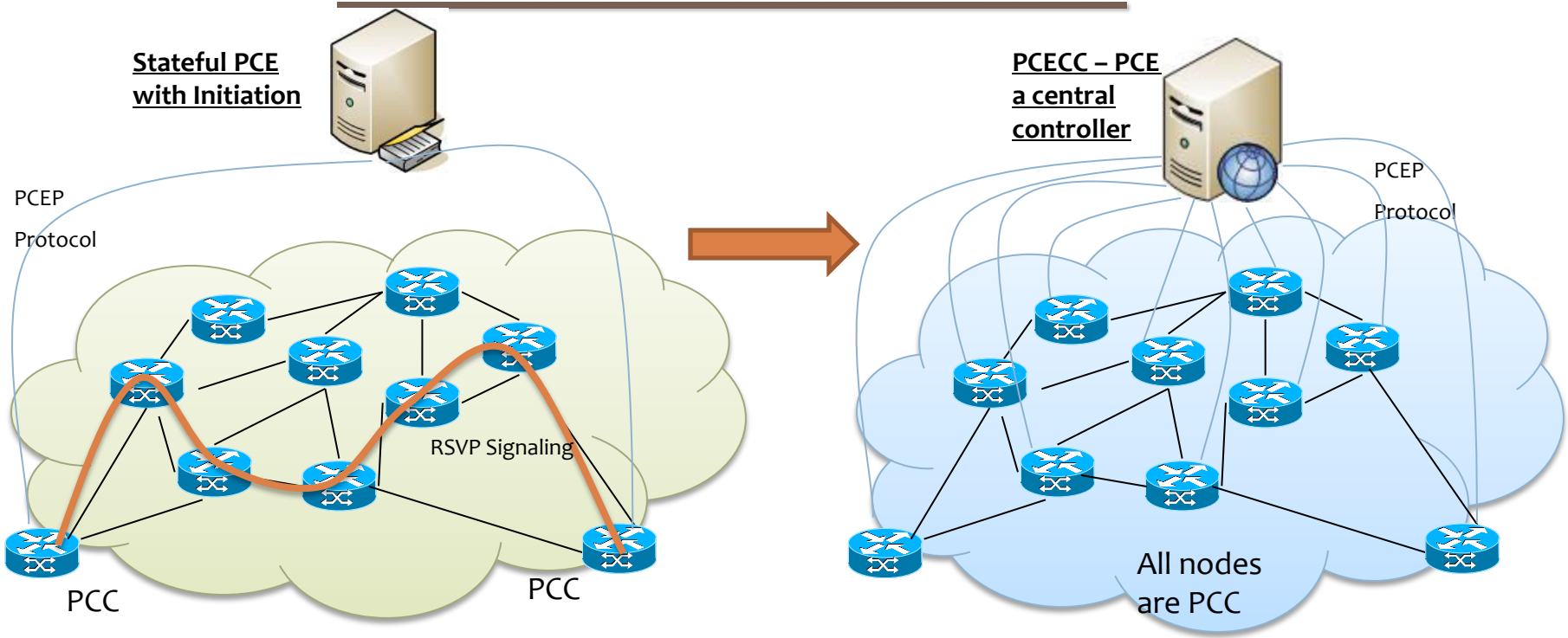
PCECC in PCE WG Agenda

- Adrian presented "Consideration Arising from PCECC Proposals"
- https://www.ietf.org/proceedings/94/slides/slides-94-pce-3.pdf

With this presentation…

- How to progress the architecture/use-case work?
- Relationship to ACTN

Stateful PCE to PCECC!



No signaling protocols or IGP extensions

PCECC communicates to all nodes in the

PCECC responsible for label allocation and FEC mapping (SR)

Central controller (SDN?)

PCEP as a SBI

- Smells like OF/Netconf ☺

PCECC in Action

Aim to keep forwarding similar to RSVP-TE (without RSVP-TE signaling)

Need a mechanism for PCE to download label along the LSP path

- Label local to each node
- But allocated by PCE
- And notified to each node
- Options - A new message or re-use existing message to do this

Rest processing similar to stateful PCE

PCECC in Action?

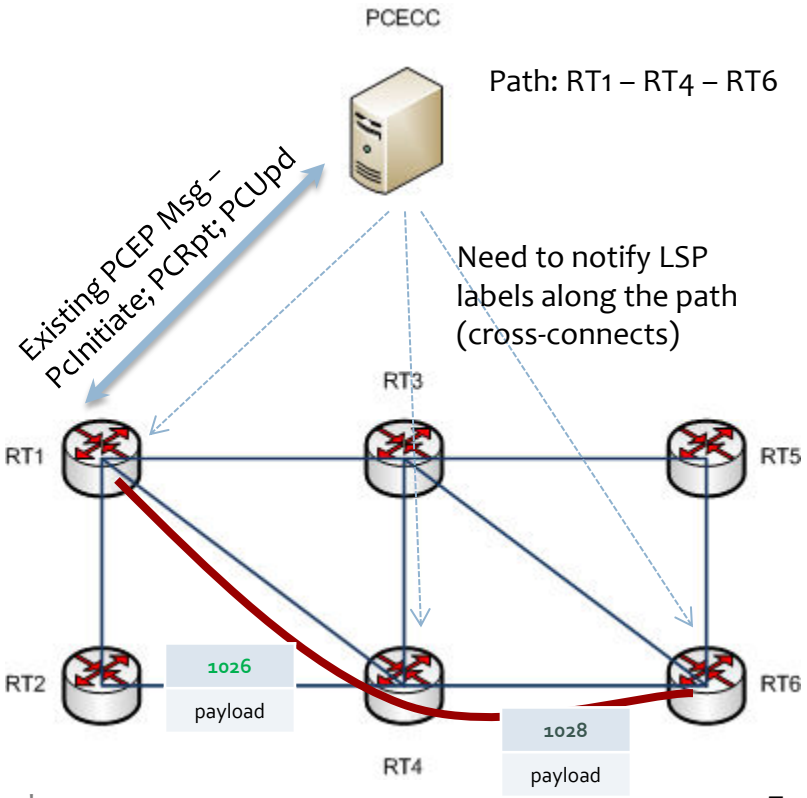
PCEP session to all nodes

Need a mechanism to notify each node about the LSP

All other operations same as stateful PCE!

Use existing mechanism and create 1-hop LSP

Or a new message



ACTN

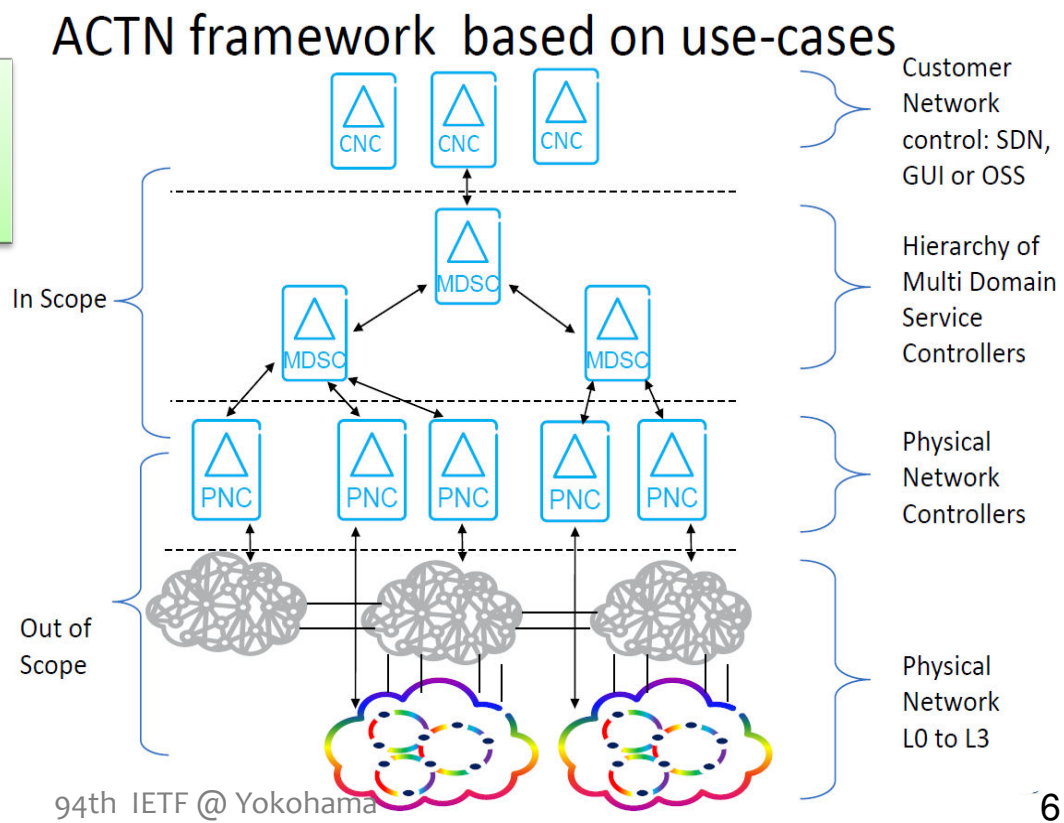
ACTN is agnostic to the physical network characteristics

The physical network can be GMPLS, OpenFlow based, SR based, NMS based..

ACTN focusing on controller-controller interaction

The provisioning interface for creating forwarding state in the physical network, requested via the Physical Network Controller – Out of Scope of ACTN interface!

But PCECC is an attractive option in the controller based ACTN framework!



PCECC & ACTN

PCECC	ACTN	ACTN with PCECC
• A SDN controller in single domain using PCEP as an SBI • Controller to device	• ACTN proposes multi-controller interactions for heterogeneous multi-domain networks. • Controller to Controller	• PCECC can be one type of PNC and thus complements the work being done in ACTN

PCECC Interface primitives and ACTN Interface primitives are quite different!

PCECC and ACTN should be worked on separately!

PCECC & ACTN

PCECC current focus is primarily in a single domain.

For multi-domain scenario, it should be the "domain PCE" that would allocate labels and notify the nodes.

In case of hierarchy of PCE / ACTN would the PCECC primitives be applicable

- in CMI – probably not!
- in MPI – does the primitives work on an abstract topology? i.e. allocate "an abstract label" for the abstract topology!!
  - But what is the use-case for this?
  - Since one of the goal for ACTN is to be heterogeneous when it comes to PNC, how to apply these to other PNC and SBI?

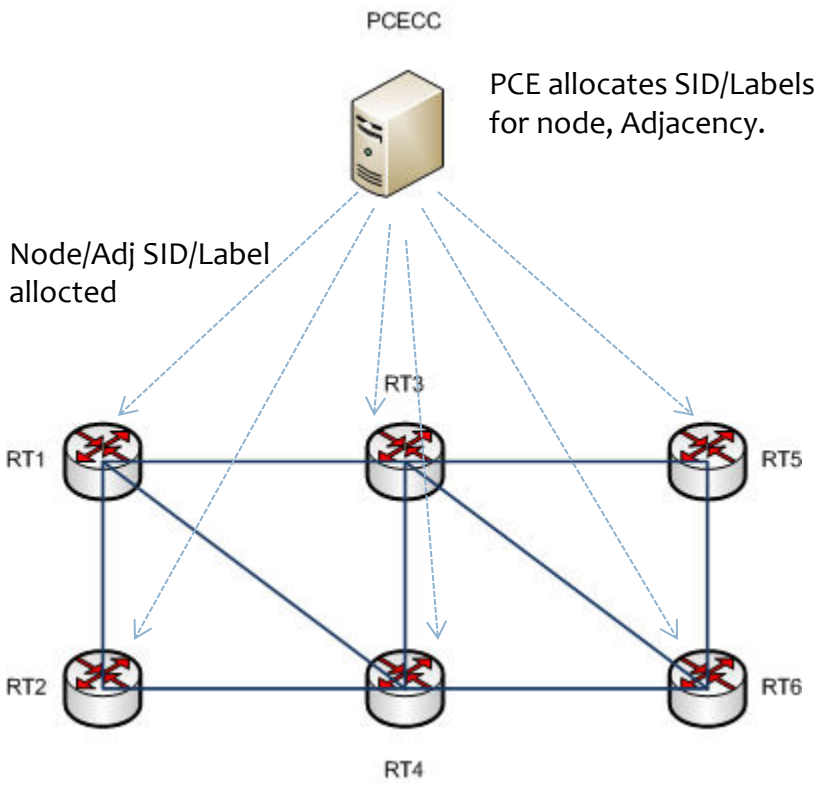
Applicability of PCECC

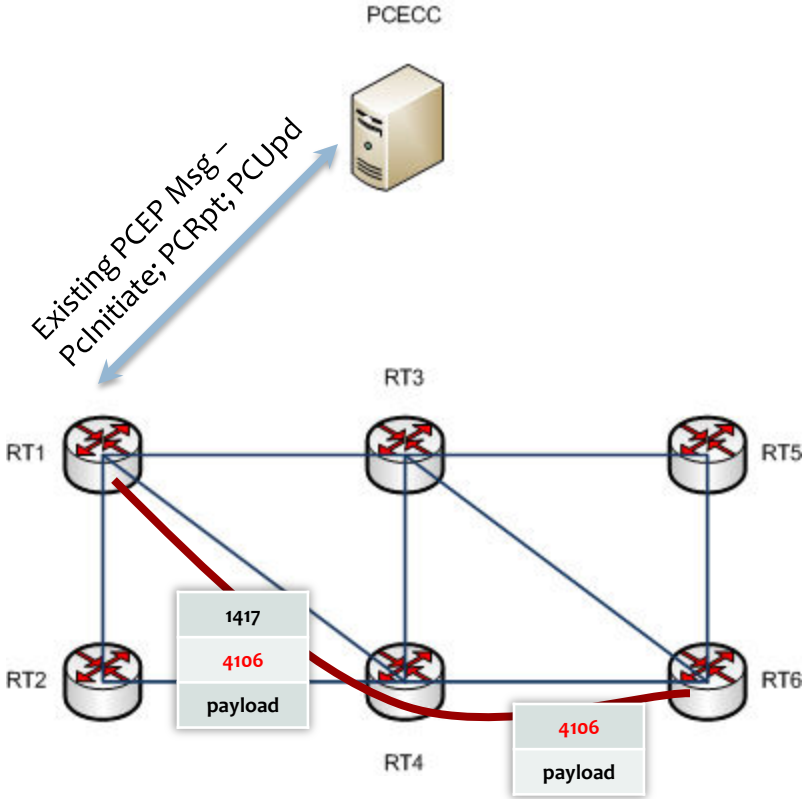
PCE based SDN controller	• With PCEP as SBI and talking to all nodes
PCECC as PNC in ACTN architecture	• But PCECC primitives usually not applicable in ACTN controller to controller interfaces
New areas	• DetNet / 6tish

Can PCECC work with SR?

The same mechanism that notify label along the LSP path can also be used for Node/Adj SID index/Label allocation?		
Use Node label for Best Effort SR-BE LSP	Use Label Stack of Node and Adjacency for Traffic Engineered SR-TE LSP	PCE used for SID (Label) management – an SDN function?

PCECC – SR – How would that look?





Next Steps

PCECC should be worked on outside of ACTN.

- ACTN can call out PCECC as one of the possible PNC

Determine the right home for PCECC architecture, use-cases – I guess that's TEAS!

PCE WG to determine if extension is needed and define them!

Thanks!

PCECC Modes Comparison

Basic

- Forwarding similar to RSVP-TE without RSVP-TE signaling
- Use of local label along the LSP path
- PCECC allocates local label and downloads to LSR
- Rest processing similar to stateful PCE

SR-BE

- Forwarding similar to LDP without LDP/IGP-SR signaling
- Use of SR Node label (global) or SID to distribute label map
- PCECC allocates global label or SID and distribute them
- Each LSR rely on local IGP for the next hop

SR-TE

- Forwarding similar to IGP-SR-TE
- Use of SR node and Adj label allocated and distributed by PCECC
- Rest processing similar to stateful PCE with SR

Related Drafts

Experimental I-D. - PCEP Procedures and Protocol Extensions for Using PCE as a Central Controller (PCECC) of LSPs
http://www.ietf.org/id/draft-zhao-pce-pcep-extension-for-pce-controller-01.txt

I-D. - The Use Cases for Using PCE as the Central Controller(PCECC) of LSPs.
https://tools.ietf.org/id/draft-zhao-pce-central-controller-user-cases-01.txt