Stateful PCE Inter-domain Considerations

draft-dhody-pce-stateful-pce-interdomain-00

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Motivation

General considerations for stateful PCE(s) deployment in multi-domain scenarios

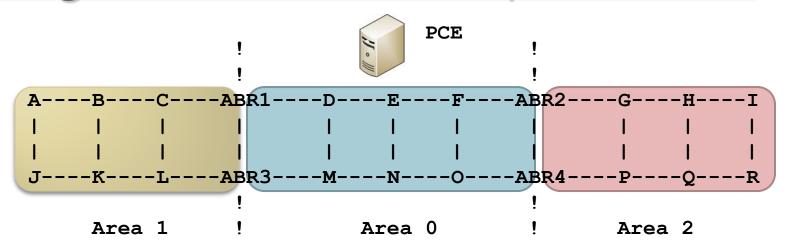| Interaction with inter-domain path computation mechanism	LSP State synchronization	Analysis of various PCE deployments
• Per Domain • BRPC • HPCE	• State is synchronized to the ingress-PCE from the ingress LSR (PCC); • **but this ingress PCC cannot synchronize to other PCEs (in transit or egress domains);**	• A single PCE; • Multiple PCEs; • With or without inter-PCE communication

Single Stateful PCE, Multiple Domains

PCE

```
A----B----C----ABR1----D----E----F----ABR2----G----H----I
|    |    |     |       |    |    |     |       |    |    |
|    |    |     |       |    |    |     |       |    |    |
J----K----L----ABR3----M----N----O----ABR4----P----Q----R
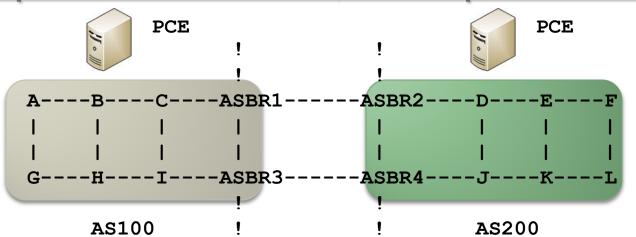```

Area 1            Area 0            Area 2

| a single stateful PCE with topology visibility into all domains. | Ingress (PCC) synchronize the LSP state to this PCE. | Ingress may also delegate control to the PCE. | *This model is similar to a single domain in all aspects.* |

# Multiple Stateful PCE, Multiple Domains

PCE

PCE

```
       A----B----C----ASBR1------ASBR2----D----E----F
       |    |    |      |           |      |    |    |
       |    |    |      |           |      |    |    |
       G----H----I----ASBR3------ASBR4----J----K----L
```

AS100

AS200

One PCE per domain, and each has topology visibility restricted to its own domain.

Ingress (PCC) synchronizes the LSP state to the Ingress PCE.

Ingress may not be able to synchronize to other PCEs (in transit or egress domains).

Ingress may also delegate control to the Ingress PCE, which may trigger end to end path (re-)computation

Inter-domain Path Computation

		Per-Domain	BRPC	H-PCE	
				Domain-Sequence	E2E Path
State Sync to Ingress PCE		Ingress LSR would synchronies the state to the ingress PCE			
State Sync to Transit/ Egress PCE(s)	Entry BN	Entry Boundary Node can synchronize the state of inter-domain LSPs to transit/egress PCEs			
	PCE *(alternative approach)*	-	Each PCE to synchronize LSP state to the next PCE(s) in the domain-sequence		Ingress PCE synchronizes state to parent PCE, which synchronizes to other child PCEs along the domain-sequence
Passive		Ingress and each entry BN would perform path computation via PCReq, thus passive is well suited	Using PCReq and PCRep messages among passive stateful PCE(s)		
Active (Delegation)		Ingress PCE (active) would be capable of loose path computation, and update to PCC accordingly	Ingress PCE (active) trigger E2E path computation using PCReq/PCRep (passive)		

Delegation

Inter-domain LSP is delegated to the ingress PCE and only the ingress PCE can issue updates to the inter-domain LSP.

- The ingress PCE is responsible to trigger E2E path re-optimization.

Ingress PCE can recommend update for all aspects of the inter-domain LSP including the segment of path in another domain

- which may have computed with the help of other cooperating PCEs.
- Interaction between PCEs using PCReq/PCRep messages (i.e., in a passive mode).

The transit/egress PCE cannot update any attribute of the inter-domain LSP on its own.

- Transit/egress PCE may inform the ingress PCE to trigger E2E re-optimization via a new mechanism

Questions
&
Comments?

Thanks!