Considerations Arising from PCE-CC Proposals

Adrian Farrel (adrian@olddog.co.uk)

IETF-94 : Yokohama : November 2015
PCE Centralised Controller (PCE-CC)

- A couple of I-Ds over the last year
  - The Use Cases for Using PCE as the Central Controller (PCECC) of LSPs
    - draft-zhao-pce-central-controller-user-cases
  - PCEP Procedures and Protocol Extensions for Using PCE as a Central Controller (PCECC) of LSPs
    - draft-zhao-pce-pcep-extension-for-pce-controller

- Examining the role of a PCE as a centralised control in an SDN-like architecture
Two “New” Functions Emerge

1. Using PCE to compute a path and then using PCEP to touch each node in the network to establish the end-to-end LSP. The underlying forwarding might be MPLS swapping or MPLS pop-and-go (segment routing), and PCEP is essentially being used as an equivalent to OpenFlow or Netconf.

2. Using PCEP to install a packet classification rule for LSPs. This seems to be a big missing component in the case of delegated/initiated LSPs where the PCC/LER has no idea what it is supposed to use the LSP for.
SBI : What Can We Do Already?

• A TE-LSP is a series of “cross connects” and “resource reservations”
  – Each is a mapping from \{input interface, input label\} to \{output interface, output label\}

• PCEP allows an active PCE to install a TE-LSP in the network
  – The “cross-connects” are indicated by the ERO
  – An ERO can include label information (GMPLS)

• LSPs can be short
  – A single hop LSP can be just one “cross-connect”
SBI : Work Might We Do?

• The ERO approach is a little ugly
  – It might trigger the signalling component to attempt to do work
  – We haven’t worked much on “upstream interface for head-end LER” in GMPLS or PCEP

• We could add to PCEP specifically for this function
  – Not a lot of work
SBI: How Excited Should We Be?

• There seem to be a number of existing SBIs
  – NETCONF
  – OpenFlow
  – ...

• Why develop a new one?
  – Arguments include:
    • We already have to implement PCEP
    • We already have a PCE
    • It doesn’t necessitate any changes to PCE or PCEP

• Other applications might include
  – DetNet
  – 6tisch
Traffic Classification for LSPs

• When a TE-LSP is set up, the head end needs to know how to use it
  – What traffic to send on the LSP
  – Whether it is a virtual link
  – Whether to advertise it in the IGP
  – What bits of this information to signal to the tail end

• PCEP allows an Active PCE to set up or modify LSPs
  – But we have no way to tell the head end how to use the LSP
  – This is because of history
    • It used to be the LER that made the request of the PCE, so it knew why it wanted the LSP

• This function is presumably necessary
  – But it is missing
TC : How Do We Handle It Today?

• There are several possibilities
  – No-one uses Active PCE
    • The problem doesn’t arise
  – Active PCE is used only in controlled environments
    • Head end always knows what the LSP is for
  – Active PCE is used in conjunction with config
    • The LSP is set up using PCEP
    • Some other mechanism tells the head end what to do
  – Active PCE is used in conjunction with BGP Flowspec
    • Possibly not what BGP Flowspec was designed for
      – But it works

• Note that the last two of these seem a waste
  – Why separate the functions?
  – Could use one protocol for everything
TC: What Might We Do?

• It would not be hard to add some Objects and TLVs to PCEP
• Describe:
  – How to use the LSP
  – How to advertise the LSP
  – Extra signaling information
• We already have ways of describing flowspecs
  – Can re-use encodings (e.g., from BGP Flowspec)
Suggestions for the WG

• Decide whether either case is related to ACTN
  – Some suggestions made at IETF-93
  – Doesn’t seem related to me
  – Maybe both functions could be applied in ACTN

• Keep the two functions separate
  – They seem to have different motivations
  – The solution work is quite different

• Determine implementer/deployer support for each function

• Do not develop standards unless there is support

• Work SBI as an Applicability Statement
  – Develop protocol extensions only to fill gaps

• Work TC as extensions to Stateful PCEP
  – Doesn’t seem to be relevant for Stateless PCE