PCEP Extensions for MPLS-TE LSP Automatic Bandwidth Adjustment with Stateful PCE.

draft-dhody-pce-stateful-pce-auto-bandwidth-02

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Motivation

Auto-Bandwidth

- Automatically adjust the bandwidth allocation for TE tunnels based on their measured traffic load.
- The traffic load must be measured for these TE tunnels and adjusted based on the largest sample periodically.
- Already supported by most vendors and handled at the ingress (for stateless or passive stateful PCE).

Auto-Bandwidth with Stateful PCE

- Support for 'delegated' TE LSP (active stateful PCE)
- Stateful PCE can make **better adjustments** as it is aware of all the LSPs and there bandwidth demand.

Motivation

But 'active 'stateful PCE can simply update the bandwidth?

- Extensions are needed for -
  - Knobs to adjust Bandwidth range, thresholds, disable etc.
    - Must for PCC initiated LSP
  - Reporting of real traffic to stateful PCE.

Other Mechanisms

- PCE can 'also' get the above information from some other means
- But easier if it is part of PCEP

Questions & Comments?

Thanks!

Backup Slides

Introduction

Term	Explanation
Maximum Average Bandwidth (MaxAvgBw)	The unit to measure the traffic demand in a time interval. (the max value of the averaged traffic pattern in a particular time interval)
Sample-Interval	The time interval in which the traffic rate (MaxAvgBw) is collected as a sample.
Adjustment-Interval	The time interval in which the bandwidth adjustment should be made based on the MaxAvgBw.
Minimum Bandwidth	The minimum bandwidth that should be reserved for the LSP.
Maximum Bandwidth	The maximum bandwidth that can be reserved for the LSP.
Report-Threshold (%)	This value indicates when the MaxAvgBw must be reported to stateful PCE via PCRpt message. Only if the % difference between the current MaxAvgBw and the last MaxAvgBw is greater than or equal to the threshold percentage the LSP bandwidth is reported to PCE.
Adjust-Threshold(%)	This value indicates when the bandwidth must be adjusted. Only if the percentage difference between the current MaxAvgBw and the current bandwidth allocation is greater than or equal to the threshold percentage the LSP bandwidth is adjusted to the current bandwidth demand.

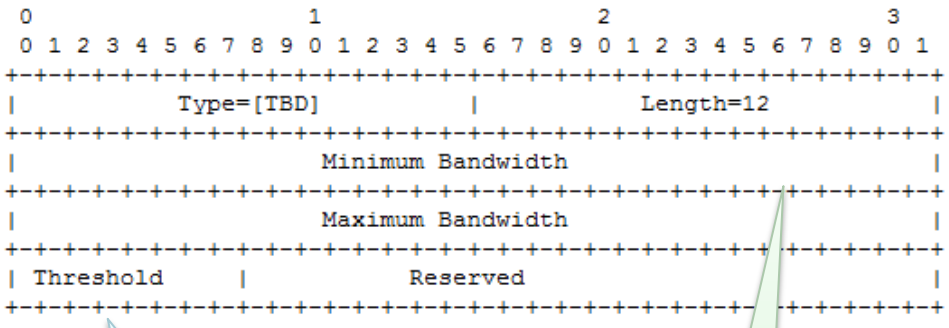
To avoid sending multiple Reports

To avoid making frequent adjustments

Extension to PCEP

AUTO-BANDWIDTH-ATTRIBUTE TLV

- **To carry the Auto-Bandwidth configured parameters**
- Carried in the LSP object defined in draft-ietf-pce-stateful-pce
- MUST with the PCRpt message when delegated and Auto-Bandwidth enabled (presence of this TLV indicated the Auto-Bandwidth feature has been enabled.



AUTO-BANDWIDTH-ATTRIBUTE TLV format

Adjust-Threshold(%) : To avoid making frequent adjustments to Bandwidth

Min & Max Bandwidth allowed.

A new BANDWIDTH type

- **To report the current traffic load**
- A new BANDWIDTH object type 3 [TBD] is used to specify the MaxAvgBw determined from the existing TE LSP Traffic flow at every sample-interval.
- The Report-Threshold percentage is used to determine if there is a need to report.

The PCRpt Message

```
The format of the PCRpt message is as follows:

      <PCRpt Message> ::= <Common Header>
                          <state-report-list>
   Where:

      <state-report-list> ::= <state-report>[<state-report-list>]

      <state-report> ::= <SRP>
                         <LSP>
                         <path>

      <path>::= <ERO><attribute-list>

      where:

      <attribute-list>::=[<LSPA>]
                         [<BANDWIDTH>]
                         [<metric-list>]
                         [<IRO>]

      <metric-list>::=<METRIC>[<metric-list>]
```

The Auto-Bandwidth enabled and configured parameters (TLV inside LSP Object)

No change to PCEP message encoding / RBNF.

The new BANDWIDTH object of type 3 is used to report the traffic flow information.