Protocol Assisted Protocol (PAP)

draft-li-rtgwg-protocol-assisted-protocol-03

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2020-11-16
Why require east-west assisted protocol function?

- Challenges of North-South methods
  - Large amount of data to be exported: There may be too many devices, protocols and data.
  - High performance requirements on the Controller or NMS to complete all these tasks

- User habits
  - Local configuration and maintenance, more convenient
  - Take time to be adapted to NMS/Controller

- Existing methods is in use.
  - RSVP-TE PathErr/ResvErr, BGP Notification...
Why a common assisted protocol is needed?

- If the protocol is failed by itself, it cannot advertise the possible protocol maintenance information.

- Restricted fault query/notification mechanisms of the existing control protocols. If more protocol maintenance information is introduced, it may have much effect on the existing operations of the control protocols, e.g.
  - BGP extends the Path attribute in Update packets which will have effect on the normal routing options.
  - RSVP extends the cause code for path setup failures. Only two ULONGs are available.

- Protocol extensibility:
  - If a common protocol is used, it is more extensible and convenient to define and advertise related information.
Use Cases

- Troubleshooting Use Cases - BGP route oscillation
  - A Request Message sent: “Are you the oscillation source?”
  - A Reply Message sent: “I’m the oscillation source!”
  - or A Reply Message sent: “I’m not the oscillation source!”, with a further Request Message sent: “Are you the oscillation source?”
  - ...
  - Until someone replies with “I’m the oscillation source!”

- Troubleshooting Use Cases - RSVP-TE set up failure
  - A Notification Message “A link failure happens here!” sent from the failure device to the Ingress device.
PAP (Protocol assisted Protocol)

• A new semi-distributive semi-centralized approach
  • A generic “tunnel” for exchanging troubleshooting data of various protocols

• PAP (Protocol assisted Protocol)
  • designed for devices to exchange protocol related information between each other
  • Separates routing and non-routing data

• Merits
  • Facilitates automatic troubleshooting
  • No impact on existing routing system
  • Adds more network-wide data for individual device
  • Not relying on a centralized server
  • Relieves bandwidth/CPU pressure of centralized data collection/analysis
**Discussion**

- **Discussion 1**: UDP or TCP?
  - Event Driven (On demand)
  - Low resource consumption
  - Low reliability requirements

- **Discussion 2**: There are two possible options to implement PAP
  - Option 1. PAP is developed independently as a protocol
  - Option 2. PAP reuses the existing protocol (GRASP)

<table>
<thead>
<tr>
<th>Vision</th>
<th>Grasp</th>
<th>PAP</th>
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<tbody>
<tr>
<td></td>
<td>The vision is a network that configures, heals, optimizes and protects itself.</td>
<td>Focuses on the exchange of east-west fault information about control-plane protocols. Assists fault locating and self-healing on the control plane.</td>
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<tr>
<td>Message Definition, Interaction Process</td>
<td>Try to reuse the defined messages and procedures of the GRASP protocol.</td>
<td>Defined in the new PAP protocol</td>
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<tr>
<td>Scalability</td>
<td>High resource consumption persistent Connection</td>
<td>Flexible connection, Low resource consumption</td>
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<tr>
<td>Reliability</td>
<td>TCP / UDP (Need extension)</td>
<td>UDP (The application layer need supports)</td>
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<tr>
<td>Security</td>
<td>ACP</td>
<td>MD5</td>
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</tbody>
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Next Steps

• Comments are welcome

• To discuss with ANIMA

Thank You