Echo Request/Reply for DetNet Capability Discovery

draft-tan-detnet-cap-discovery-01

Li Zhang, Tianran Zhou, Hongyi Huang @HUAWEI
Background

• As per RFC8655, DetNet provides a capability to deliver data flows with extremely low packet loss rates and bounded latency.

• As per RFC 9551:
  • DetNet OAM MUST support the discovery of DetNet relay nodes.
  • DetNet OAM MUST support the discovery of Packet Replication, Elimination, and Order preservation sub-functions locations in the domain.
  • DetNet OAM MUST support the collection of the DetNet service sub-layer specific (e.g., configuration/operation/status) information from DetNet relay nodes.

• I.D.varga-detnet-service-sub-layer-oam introduces “DetNet PING” mechanism, used to collect the service sub-layer specific information(configuration and status).

• This document extended DetNet Ping to discovery the enabled DetNet capabilities.
DetNet Echo Request/Reply Extension

- This draft introduces **DetNet Capabilities Discovery Objects** to deliver DetNet capabilities of relay nodes.

- The object consists of a **DetNet Capability Metadata** and an **abstract object Header**
  - The abstract object header has the corresponding format depending on the specific type of DetNet data plane (e.g., MPLS/IP).
  - The **DetNet Capabilities Discovery Metadata** includes the detail information of DetNet capabilities, with varied length and format depending on the DetNet capability type.
DetNet Capability Object

- **In Echo-Request**: indicating which capabilities the DetNet Ping initiator are requested;
- **In Echo-Reply**: indicating which capabilities the relay node are enabled.

Flags (4 bytes): DetNet Capability Flags
- S: Service sub-layer capability
- F: Forwarding sub-layer capability
- I: Incoming flow configuration
- O: Outgoing flow configuration
DetNet Relay Node ID Object

- Node ID: DetNet node id (MPLS)
- IPv4 addr: DetNet node id (IPv4)
- IPv6 addr: DetNet node id (IPv6)
- OP: Service operation on node
  - 0x00: No operation of service
  - 0x01: Initiation of service
  - 0x02: Termination of service
  - 0x03: Relay (Swap) of service
DetNet Service Protection Function Objects

- **Service Protection Object**
  - Used in the echo-reply packet to indicated the supported Service Protection Function.
  - **Flags (4 bytes):** service protection flags.
    - **SL (2 bits):** Sequence number length.
      - 0b00/01/10: 0/16/28 bits
    - **OP (3 bits):** Service protection functions.
      - 0b001/010/100: Replication/Elimination/Ordering

- **Replication/Elimination/Ordering Capability Sub-Object**
  - **Flags (4 bytes):** unused
DetNet Service Flow Information Object (MPLS)

- DetNet Service Flow Information Object (MPLS)

  ![DetNet Capabilities Discovery Header](image)

  Flags (4 bytes):
  - I: Incoming flow
  - O: Outgoing flow
  - P: platform-label-space

- Service Label Sub-Object
DetNet Service Flow Information Objects (IPv4)

- DetNet Service Flow Information Object (IPv4)

- Flags (4 bytes):
  - I: Incoming flow
  - O: Outgoing flow
  - A: IPv4 header identifier (6-tuple)
  - S: IPsec Security Parameters Index (IPSec-SPI)

- IPv4 Header Identifier Sub-Object

- IPSec-SPI Sub-Object
DetNet Service Flow Information Objects (IPv6)

- **DetNet Service Flow Information Object (IPv6)**

  - Flags (4 bytes):
    - I: Incoming flow
    - O: Outgoing flow
    - A: IPv6 header identifier (6-tuple)
    - S: IPsec Security Parameters Index (IPSEC-spi)
    - L: IPv6 flow label

- **IPv6 Header Identifier Sub-Object**

- **IPv6 Flow Label Sub-Object**
Next Steps

• Collecting comments and improving the draft.
Thank you