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A YANG Data Model for Client Signal Performance Monitoring
draft-zheng-ccamp-client-pm-yang-00

Abstract

A transport network is a server-layer network to provide connectivity services to its client. Given the client signal is configured, the followup function for performance monitoring, such as latency and bit error rate, would be needed for network operation.

This document describes the data model to support the performance monitoring functionalities. The module carefully maps to relevant performance monitoring standards.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on May 7, 2020.

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1. Introduction

Client-layer network and server-layer network have been respectively modeled to allow the tunnels carrying the client traffic. Server-layers are modeled as tunnels with various switching technologies, such as [I-D.ietf-ccamp-otn-tunnel-model] and [I-D.ietf-ccamp-wson-tunnel-model]. Client-layers are modeled as client signals according to the client-signal identities specified in [I-D.ietf-ccamp-layer1-types].

In the network operation, the operator is interested in monitoring for their instantiated client signal over tunnels. The objective for such monitoring is to complete timely adjustment once there is abnormal statistic which may result in failure of the client signal. The parameters specified in the performance monitoring model can be collected for the operation need.

2. Terminology and Notations

A simplified graphical representation of the data model is used in this document. The meaning of the symbols in the YANG data tree presented later in this document is defined in [RFC8340]. They are provided below for reference.

- Brackets "[" and "]" enclose list keys.
- Abbreviations before data node names: "rw" means configuration (read-write) and "ro" state data (read-only).
- Symbols after data node names: "?" means an optional node, "!" means a presence container, and "*" denotes a list and leaf-list.
- Parentheses enclose choice and case nodes, and case nodes are also marked with a colon (":").
- Ellipsis ("...") stands for contents of subtrees that are not shown.

3. Model Relationship

[I-D.ietf-ccamp-client-signal-yang] has specified the two models for the client signal configuration, module ietf-trans-client-service for transparent client service and module ietf-eth-tran-service for Ethernet service. A common types module, ietf-eth-tran-types, has also been defined for the common use for service configuration. Basically the client signal types in this document is consistent with ietf-eth-tran-types, and focus on different functionality. On the perspective of operator, the modules in [I-D.ietf-ccamp-client-signal-yang] can be used to configure the service given any underlay tunnels, while the operation about monitoring the performance on given service can be achieved by using the model in this document.

Consideration on Key Performance Information (KPI) monitoring for Virtual Network (VN) and tunnels has been specified in [I-D.ietf-teas-actn-pm-telemetry-autonomics]. Usually the monitoring on the tunnels are the VNs should be separately deployed for the network operation, but it is possible to have common parameters that are both needed for the VN/TE and the configured services. Common types are imported in both modules.

VPN-level parameters and their monitoring have been defined in [I-D.www-bess-yang-vpn-service-pm]. This module focus on the performance on the topology at different layer or the overlay topology between VPN sites. On the other hand, this document is

focusing on the performance of the service configured between Customer Ends (CE), as described in [I-D.ietf-ccamp-client-signal-yang].

4. Consideration on Monitoring Parameters

There can be multiple groups of parameters for monitoring, such as latency, bit error rate (BER). Some of these parameters are layer-dependent, for example, packet loss is only applicable in packet networks are won't be neede for layer 1 OTN and layer 0 WSON.

This document starts with the specification of the latency measurement for both Ethernet service and client signal service. In the future version additional parameters would be added into the data model in the same approach as the latency in the current version. A candidate list of parameters to be monitored include: Latency, Packet Loss, Bit Error Rate (BER), Jitter, Bandwidth, Byte/Packet number and so on.

5. YANG Model for Client Signal Performance Monitoring

5.1. YANG Tree for Ethernet Performance Monitoring

```
module: ietf-eth-service-pm
  +--rw performance-monitoring
     +--rw service-pm* [service-name]
        +--rw service-name          leafref
        +--rw pm-enable?            boolean
        +--rw latency-monitoring
        |  +--rw latency-measure-enable?   boolean
        +--ro service-pm-state
           +--ro start-time?            yang:date-and-time
           +--ro last-update-time?      yang:date-and-time
           +--ro latency?               uint32
           +--ro error-message?         string
           +--ro service-oper-status?   identityref
```

5.2. YANG Tree for Transparent Client Signal Performance Monitoring

```
   module: ietf-trans-client-svc-pm
     +--rw performance-monitoring
        +--rw service-pm* [service-name]
           +--rw service-name          leafref
           +--rw pm-enable?            boolean
           +--rw latency-monitoring
           |  +--rw latency-measure-enable?   boolean
           +--ro service-pm-state
              +--ro start-time?            yang:date-and-time
              +--ro last-update-time?      yang:date-and-time
              +--ro latency?               uint32
              +--ro error-message?         string
              +--ro service-oper-status?   identityref
```

6. YANG Code for Performance Monitoring

6.1. The ETH Service Performance Monitoring YANG Code

```
<CODE BEGINS> file "ietf-eth-service-pm@2019-11-04.yang"
module ietf-eth-service-pm {
  /* TODO: FIXME */
  yang-version 1.1;

  namespace "urn:ietf:params:xml:ns:yang:ietf-eth-service-pm";
  prefix "ethsvc-pm";

  import ietf-eth-tran-service {
    prefix "ethtsvc";
  }

  import ietf-eth-tran-types {
    prefix "etht-types";
  }

  import ietf-yang-types {
    prefix "yang";
  }

  import ietf-te-types {
    prefix "te-types";
  }

  organization
    "Internet Engineering Task Force (IETF) CCAMP WG";
```

```
  contact
    "
      WG List: <mailto:ccamp@ietf.org>

      ID-draft editor:
        Haomian Zheng (zhenghaomian@huawei.com);
        Italo Busi (italo.busi@huawei.com);
        Yanlei Zheng (zhengyanlei@chinaunicom.cn);
    ";

  description
    "This module defines the performance monitoring for Ethernet
     services. The model fully conforms to the Network Management
     Datastore Architecture (NMDA).

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     Relating to IETF Documents
     (https://trustee.ietf.org/license-info).
     This version of this YANG module is part of RFC XXXX; see
     the RFC itself for full legal notices.";

  revision 2019-11-04 {
    description
      "Initial version";
    reference
      "ADD REFERENCE HERE";
  }

  container performance-monitoring {
    description
      "This part is for performance monitoring. ";
    list service-pm {
      key "service-name";
      description
        "The list of service to be monitored.";
      leaf service-name {
        type leafref {
          path "/ethtsvc:etht-svc/ethtsvc:etht-svc-instances/ethtsvc:etht-svc-
name";
        }
        description "The name of service.";
      }
```

```
      leaf pm-enable {
        type boolean;
        description
          "Indicate whether the performance monitoring
          is enable or not.";
      }

      container latency-monitoring {
        description
          "To monitor the latency of service.";
        leaf latency-measure-enable {
          type boolean;
          description
            "Indicate whether the latency measurement
            is enable or not.";
        }
      }

      container service-pm-state {
        config false;
        description
          "The state of service performance monitoring.";
        leaf start-time {
          type yang:date-and-time;
          description
            "The time stamp when the service is started.";
        }

        leaf last-update-time {
          type yang:date-and-time;
          description
            "The time stamp when the service is last updated.";
        }

        leaf latency {
          type uint32;
          units microsecond;
          description
            "The latency of service.";
        }

        leaf error-message {
          type string;
          description
            "The message of error.";
        }

        leaf service-oper-status {
```

```
          type identityref {
            base te-types:tunnel-state-type;
          }
          description
            "The operational status of the services.";
        }
      }
    }
  }
}

<CODE ENDS>
```

6.2. The Transparent Client Signals Performance Monitoring YANG Code

```
<CODE BEGINS> file "ietf-trans-client-svc-pm@2019-11-04.yang"
module ietf-trans-client-svc-pm {
  /* TODO: FIXME */
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-trans-client-svc-pm";
  prefix "clntsvc-pm";

  import ietf-trans-client-service {
    prefix "clntsvc";
  }

  import ietf-yang-types {
    prefix "yang";
  }

  import ietf-te-types {
    prefix "te-types";
  }

  organization
    "Internet Engineering Task Force (IETF) CCAMP WG";
  contact
    "
      WG List: <mailto:ccamp@ietf.org>

      ID-draft editor:
        Haomian Zheng (zhenghaomian@huawei.com);
        Italo Busi (italo.busi@huawei.com);
        Yanlei Zheng (zhengyanlei@chinaunicom.cn);
    ";
```

```
  description
    "This module defines the performance monitoring for transparent
     client signals. The model fully conforms to the Network Management
     Datastore Architecture (NMDA).

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     Relating to IETF Documents
     (https://trustee.ietf.org/license-info).
     This version of this YANG module is part of RFC XXXX; see
     the RFC itself for full legal notices.";

  revision 2019-11-04 {
    description
      "Initial version";
    reference
      "ADD REFERENCE HERE";
  }

  container performance-monitoring {
    description
      "This part is for performance monitoring. ";
    list service-pm {
      key "service-name";
      description
        "The list of service to be monitored.";
      leaf service-name {
        type leafref {
          path "/clntsvc:client-svc/clntsvc:client-svc-instances/clntsvc:client-
svc-name";
        }
        description "The name of service.";
      }

      leaf pm-enable {
        type boolean;
        description
          "Indicate whether the performance monitoring
          is enable or not.";
      }

      container latency-monitoring {
        description
          "To monitor the latency of service.";
```

```
        leaf latency-measure-enable {
          type boolean;
          description
            "Indicate whether the latency measurement
            is enable or not.";
        }

      }

      container service-pm-state {
        config false;
        description
          "The state of service performance monitoring.";

        leaf start-time {
          type yang:date-and-time;
          description
            "The time stamp when the service is started.";
        }

        leaf last-update-time {
          type yang:date-and-time;
          description
            "The time stamp when the service is last updated.";

        }

        leaf latency {
          type uint32;
          units microsecond;
          description
            "The latency of service.";
        }

        leaf error-message {
          type string;
          description
            "The message of error.";
        }

        leaf service-oper-status {
          type identityref {
            base te-types:tunnel-state-type;

          }
          description
            "The operational status of the services.";
        }
```

```
      }
    }
  }
}
```

<CODE ENDS>

7. IANA Considerations

It is proposed that IANA should assign new URIs from the "IETF XML Registry" [RFC3688] as follows:

```
URI: urn:ietf:params:xml:ns:yang:ietf-eth-service-pm
Registrant Contact: The IESG
XML: N/A; the requested URI is an XML namespace.
```

```
URI: urn:ietf:params:xml:ns:yang:ietf-trans-client-svc-pm
Registrant Contact: The IESG
XML: N/A; the requested URI is an XML namespace.
```

This document registers following YANG modules in the YANG Module Names registry [RFC7950].

```
name:         ietf-eth-service-pm
namespace:    urn:ietf:params:xml:ns:yang:ietf-eth-service-pm
prefix:       ethsvc-pm
reference:    RFC XXXX (This document)
```

```
name:         ietf-trans-client-svc-pm
namespace:    urn:ietf:params:xml:ns:yang:ietf-trans-client-svc-pm
prefix:       clntsvc-pm
reference:    RFC XXXX (This document)
```

8. Manageability Considerations

TBD.

9. Security Considerations

The data following the model defined in this document is exchanged via, for example, the interface between an orchestrator and a transport network controller. The security concerns mentioned in [I-D.ietf-ccamp-client-signal-yang] also applies to this document.

The YANG module defined in this document can be accessed via the RESTCONF protocol defined in [RFC8040], or maybe via the NETCONF protocol [RFC6241].

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11. References

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[RFC8040] Bierman, A., Bjorklund, M., and K. Watsen, "RESTCONF Protocol", RFC 8040, DOI 10.17487/RFC8040, January 2017, <https://www.rfc-editor.org/info/rfc8040>.

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[I-D.ietf-ccamp-wson-tunnel-model]
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