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Fault YANG Model
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Abstract

This document describes the Fault YANG data model for modeling and reporting standing alarm conditions.

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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1. Introduction

Network devices, controllers, orchestrators, and applications generate faults indicating active alarm state on entities. These faults are reported to the northbound systems, which can diagnose and take corrective actions to fix these faults.

Faults raised by various entities in the system are present in the fault model in the operational datastore. New faults are reported to the clients using notifications. On system re-start, faults are rediscovered, and the fault model is re-populated in the operational datastore. In some systems, faults once cleared, may get moved to historical fault log, which is outside the scope of this document.

The fault definition is based on existing standards [X.733] [RFC3877] and is widely adopted for alarm reporting. This document provides the YANG model for Faults described in the existing standards [X.733] [RFC3877].

2. Fault YANG Data Model

Note: The Fault YANG Data Model contains the most widely used attributes from [X.733]. It is being discussed if this YANG model should contain all attributes as defined in [X.733] and [RFC3877].

The ietf-fault-types YANG model does not currently include all probable causes as defined in X.733. The full list of probable causes will be added in the next version of the document.

New network architectures that include controllers, orchestrators, PCE, applications, etc., require new fault types and probable causes to be defined. These new fault types and probable causes will be defined in the next version of the model.

2.1. YANG Tree

```
module: ietf-fault
   +--ro faults
      +--ro fault* [fault-id]
         +--ro fault-id             inet:uri
         +--ro (entity-type)?
         |  +--:(id)
         |  |  +--ro entity-id           inet:uri
         |  +--:(name)
         |     +--ro entity-name         string
         +--ro fault-type           identityref
         +--ro probable-cause       identityref
         +--ro fault-time           yang:date-and-time
         +--ro fault-severity       enumeration
         +--ro service-affecting?   boolean
         +--ro additional-text?     string
notifications:
   +---n fault-event
      +--ro fault-id             inet:uri
      +--ro (entity-type)?
      |  +--:(id)
      |  |  +--ro entity-id           inet:uri
      |  +--:(name)
      |     +--ro entity-name         string
      +--ro fault-type           identityref
      +--ro probable-cause       identityref
      +--ro fault-time           yang:date-and-time
      +--ro fault-severity       enumeration
      +--ro service-affecting?   boolean
      +--ro additional-text?     string
```

2.2. Fault YANG Model

```
<CODE BEGINS> file "ietf-fault@2016-06-22.yang"

module ietf-fault {
    namespace "urn:ietf:params:xml:ns:yang:ietf-fault";
    prefix flt;

    import ietf-inet-types { prefix "inet"; }
    import ietf-yang-types { prefix "yang"; }
    import ietf-fault-types { prefix "flt-types"; }

    organization
        "IETF NETMOD (NETCONF Data Modeling Language) Working Group";

    contact
```

```
            "WG Web: <http://tools.ietf.org/wg/netmod/>
            WG List: <mailto:netmod@ietf.org>

            Editor: Anurag Sharma
                    <mailto:AnSharma@infinera.com>

            Editor: Rajan Rao
                    <mailto:rrao@infinera.com>

            Editor: Xian Zhang
                    <mailto:zhang.xian@huawei.com>";

        description
            "Fault YANG Data Model for Network Topology and Services.";

        revision 2016-06-22 {
            description
                    "Initial revision.";
            reference
                    "TBD";
        }

        grouping fault-entity {
            description
            "Reference to the entity for which the fault is reported.";
            choice entity-type {
                description
                "Entity reference type.";
                case id {
                    leaf entity-id {
                        type inet:uri;
                        mandatory true;
                        description
                        "An identifier for the entity on which the fault
                        is raised. This entity can be in the device,
                        domain controllers, element management systems,
                        or northbound orchestrators. ";
                    }
                }
                case name {
                    leaf entity-name {
                        type string;
                        mandatory true;
                        description
                        "Name for the entity on which the fault is
                        raised. This entity can be in the device,
                        domain controllers, element management systems,
                        or northbound orchestrators. ";
```

```
                }
            }
        }
    }

    grouping fault-info-attributes {
        description
                "Fault Info attributes.";
        leaf fault-id {
            type inet:uri;
            mandatory true;
            description
            "An identifier for the fault. This identifier should be
            chosen such that same fault will always be identified
            using the same identifier.";
        }

        uses fault-entity;

        leaf fault-type {
            type identityref {
                base flt-types:fault-type;
            }
            mandatory true;
            description
            "This parameter categorizes the fault.";
        }

        leaf probable-cause {
            type identityref {
                base flt-types:probable-cause-type;
            }
            mandatory true;
            description
            "This parameter defines further qualification as to the
            probable cause of the alarm.";
        }

        leaf fault-time {
            type yang:date-and-time;
            mandatory true;
            description
            "Time that the fault was raised / reported.";
        }

        leaf fault-severity {
            type enumeration {
                enum Critical {
```

```
                    description
                    "The Critical severity level indicates that a
                    service affecting condition has occurred and an
                    immediate corrective action is required.";
                }
                enum Major {
                        description
                        "The Major severity level indicates that a
                        service affecting condition has developed and
                        an urgent corrective action is required.";
                }
                enum Minor {
                        description
                        "The Minor severity level indicates the
                        existence of a non-service affecting fault
                        condition and that corrective action should
                        be taken in order to prevent a more serious
                        (for example, service affecting) fault.";
                }
                enum Warning {
                        description
                        "The Warning severity level indicates the
                        detection of a potential or impending service
                        affecting fault, before any significant
                        effects have been felt.";
                }
                enum Cleared {
                        description
                        "The Cleared severity level indicates the
                        clearing of one or more previously reported
                        alarms.";
                }
                enum Indeterminate {
                        description
                        "The Indeterminate severity level indicates
                        that the severity level cannot be
                        determined.";
                }
            }
            mandatory true;
            description
            "This parameter indicates the perceived severity level of
            the fault.";
        }

        leaf service-affecting {
            type boolean;
            description
```

```
                "This parameter indicates if the fault impacts an active
                service. If the fault is service affecting then the value
                is true. If the fault does not affect the service then
                the value is false.";
            }

            leaf additional-text {
                type string;
                description
                "This parameter, when present, allows a free form text
                description to be reported.";
            }
        }

        container faults {
            description
            "Serves as top-level container for list of faults.";
            config "false";
            list fault {
                key "fault-id";
                uses fault-info-attributes;
                description
                    "Describes a fault.";
                reference
                            "ITU Recommendation X.733";
            }
        }

        notification fault-event {
            description
            "Fault Notification.";
            uses fault-info-attributes;
        }
    }


    <CODE ENDS>
```

2.3. Fault Types YANG Model

```
<CODE BEGINS> file "ietf-fault-types@2016-06-22.yang"

module ietf-fault-types {
    yang-version 1;
    namespace "urn:ietf:params:xml:ns:yang:ietf-fault-types";
    prefix flt-types;

    organization
```

```
        "IETF NETMOD (NETCONF Data Modeling Language) Working Group";

    contact
        "WG Web: <http://tools.ietf.org/wg/netmod/>
        WG List: <mailto:netmod@ietf.org>

        Editor: Anurag Sharma
                <mailto:AnSharma@infinera.com>

        Editor: Rajan Rao
                <mailto:rrao@infinera.com>

        Editor: Xian Zhang
                <mailto:zhang.xian@huawei.com>";

    description
        "This module contains Fault data type definitions.";

    revision 2016-06-22 {
        description
                "Initial revision.";
        reference
                "TBD";
    }

    identity probable-cause-type {
        description
                "Base identity from which specific probable cause types
                are derived.";
    }

    identity LOS {
        base probable-cause-type;
        description
                "Loss of Signal.";
    }

    identity LOF {
        base probable-cause-type;
        description
                "Loss of Frame.";
    }

    identity framing-error {
        base probable-cause-type;
        description
                "Framing error probable fault cause.";
    }
```

```
    identity fault-type {
        description
                "Base identity from which specific fault types are
                derived.";
    }

    identity communication-fault-type {
        base fault-type;
        description
                "A fault of this type is principally associated with the
                procedures and/or processes required to convey
                information from one point to another.";
        reference "ITU Recommendation X.733";
    }

    identity QoS-fault-type {
        base fault-type;
        description
                "A fault of this type is principally associated with a
                degradation in the quality of a service.";
        reference "ITU Recommendation X.733";
    }

    identity processing-fault-type {
        base fault-type;
        description
                "A fault of this type is principally associated with a
                software or processing fault.";
        reference "ITU Recommendation X.733";
    }

    identity equipment-fault-type {
        base fault-type;
        description
                "A fault of this type is principally associated with an
                equipment fault.";
    }

    identity environmental-fault-type {
        base fault-type;
        description
                "A fault of this type is principally associated with a
                condition relating to an enclosure in which the
                equipment resides.";
    }
}

<CODE ENDS>
```

3. Security Considerations

TBD

4. IANA Considerations

TBD

5. Acknowledgements

6. Normative References

[RFC3877] Chisholm, S. and D. Romascanu, "Alarm Management Information Base (MIB)", RFC 3877, DOI 10.17487/RFC3877, September 2004, <http://www.rfc-editor.org/info/rfc3877>.

[RFC6020] Bjorklund, M., Ed., "YANG - A Data Modeling Language for the Network Configuration Protocol (NETCONF)", RFC 6020, DOI 10.17487/RFC6020, October 2010, <http://www.rfc-editor.org/info/rfc6020>.

[X.733] ITU, ""ITU Recommendation X.733, Information Technology - Open Systems Interconnection - System Management: Alarm Reporting Function"", 1992.

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