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Alarm YANG Model
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Abstract

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

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Internet-Draft

Alarm YANG Model

October 2016

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[1.](#) Introduction

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

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

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

[2.](#) Alarm YANG Data Model

Note: The Alarm 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-alarm-types YANG model includes all probable causes as defined in [[X.733](#)] and [[RFC3877](#)].

New network architectures that include controllers, orchestrators, PCE, applications, etc., require new alarm types and probable causes

to be defined. These new alarm types and probable causes will be defined in the next version of the model.

[2.1.](#) YANG Tree

```
module: ietf-alarm
  +--ro alarms
    +--ro alarm* [alarm-id]
      +--ro alarm-id          inet:uri
      +--ro entity-type      string
      +--ro entity-id        inet:uri
      +--ro event-type       identityref
      +--ro alarm-time       yang:date-and-time
      +--ro probable-cause   identityref
      +--ro perceived-severity enumeration
      +--ro trend-indication? enumeration
      +--ro notification-identifier? inet:uri
      +--ro correlated-notifications? string
      +--ro additional-text?  string
      +--ro location?        enumeration
      +--ro service-affecting? boolean
      +--ro direction?      enumeration
  notifications:
    +---n alarm-event
      +--ro alarm-seq?      uint32
      +--ro alarm-id        inet:uri
      +--ro entity-type     string
      +--ro entity-id      inet:uri
      +--ro event-type     identityref
      +--ro alarm-time     yang:date-and-time
      +--ro probable-cause identityref
      +--ro perceived-severity enumeration
      +--ro trend-indication? enumeration
      +--ro notification-identifier? inet:uri
      +--ro correlated-notifications? string
      +--ro additional-text?  string
      +--ro location?      enumeration
      +--ro service-affecting? boolean
      +--ro direction?    enumeration
```

[2.2.](#) Alarm YANG Model

```
<CODE BEGINS> file "ietf-alarm@2016-09-26.yang"
```

```
module ietf-alarm {
  namespace "urn:ietf:params:xml:ns:yang:ietf-alarm";
  prefixflt;

  import ietf-inet-types { prefix "inet"; }
  import ietf-yang-types { prefix "yang"; }
  import ietf-alarm-types { prefix "alm-types"; }
```

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

contact
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         <mailto:zhang.xian@huawei.com>";

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

revision 2016-09-26 {
  description
    "Revision 0.2";
  reference
    "TBD";
}

grouping alarm-info-attributes {
  description
    "Alarm Info attributes.";
```

```

        leaf alarm-id {
            type inet:uri;
            mandatory true;
            description
                "Unique alarm id for the alarm. In most cases this
                will be a combination of entity-type, entity-id,
                probable-cause and severity.";
        }

leaf entity-type {
    type string;
    mandatory true;
    description
        "Type of the entity on which the alarm is raised.";
    reference
        "Managed Object Class in ITU Recommendation X.733";
}

leaf entity-id {

```

```

        type inet:uri;
        mandatory true;
        description
            "An identifier for the entity on which the alarm is
            raised. This entity can be in the device, domain
            controllers, element management systems, or
            northbound orchestrators.";
        reference
            "Managed Object Instance in ITU Recommendation X.733";
    }

leaf event-type {
    type identityref {
        base alm-types:event-type;
    }
    mandatory true;
    description
        "This parameter categorizes the alarm.";
    reference
        "Event Type in ITU Recommendation X.733";
}

```

```

leaf alarm-time {
    type yang:date-and-time;
    mandatory true;
    description
        "Time at which the alarm was raised / reported.";
    reference
        "Event Time in ITU Recommendation X.733";
}

leaf probable-cause {
    type identityref {
        base alm-types:probable-cause-type;
    }
    mandatory true;
    description
        "This parameter defines further qualification as to
        the probable cause of the alarm.";
    reference
        "Probable cause in ITU Recommendation X.733";
}

leaf perceived-severity {
    type enumeration {
        enum Critical;
        enum Major;
        enum Minor;

```

```

        enum Warning;
        enum Cleared;
        enum Indeterminate;
    }
    mandatory true;
    description
        "This parameter indicates the perceived severity
        level of the alarm.";

    reference
        "Perceived Severity in ITU Recommendation X.733";
}

leaf trend-indication {
    type enumeration {

```

```

        enum moreSevere;
        enum noChange;
        enum lessSevere;
    }
    description
        "This parameter, when present, specifies the current
        severity trend of the managed entity.";
    reference
        "Trend Indication in ITU Recommendation X.733";
}

leaf notification-identifier {
    type inet:uri;
    description
        "This parameter provides an identifier for the
        notification, which may be carried in the
        correlated notifications parameter of future
        notifications. Notification identifiers must be
        chosen to be unique across all notifications of
        a particular managed object throughout the time
        that correlation is significant.";
    reference
        "Notification Identifier in ITU Recommendation X.733";
}

leaf correlated-notifications {
    type string;
    description
        "This parameter contains a set of Notification
        identifiers of the correlated alarms.";
    reference
        "Correlated notifications in ITU Recommendation
        X.733";
}

```

```

}

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

```

```

        "Addition Text in ITU Recommendation X.733";
    }

    leaf location {
        type enumeration {
            enum NA;
            enum nearEnd;
            enum farEnd;
        }
        description
            "Location where the alarm is reported.";
    }

    leaf service-affecting {
        type boolean;
        description
            "This parameter indicates if the alarm impacts an
            active service. If the alarm is service affecting
            then the value is true. If the alarm does not
            affect the service then the value is false.";
    }

    leaf direction {
        type enumeration {
            enum NA;
            enum Rx;
            enum Tx;
        }
        description
            "Direction for which alarm is reported.";
    }
}

container alarms {
    config false;
    description
        "Serves as top-level container for list of alarms.";
    list alarm {
        key "alarm-id";
        uses alarm-info-attributes;
    }
}

```



```

        "List of active alarms.";
    reference
        "ITU Recommendation X.733";
    }
}

grouping alarm-sequence {
    description
        "Alarm sequence number used in alarm notification.";
    leaf alarm-seq {
        type uint32;
        description
            "Alarm sequence number that is sent in the alarm
            notification. Northbound clients can use this
            sequence number to check for any missing
            notifications.";
    }
}

notification alarm-event {
    description
        "Alarm Notification.";
    uses alarm-sequence;
    uses alarm-info-attributes;
}
}

```

<CODE ENDS>

[2.3.](#) Alarm Types YANG Model

```

<CODE BEGINS> file "ietf-alarm-types@2016-09-26.yang"

module ietf-alarm-types {
    namespace "urn:ietf:params:xml:ns:yang:ietf-alarm-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>

```

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<mailto:r rao@infinera.com>

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

```
description
  "This module contains Alarm data type definitions.";

revision 2016-09-26 {
  description
    "Revision 0.2";
  reference
    "TBD";
}

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

identity other-event-type {
  base event-type;
  description
    "Alarm type other than the ";
  reference "RFC 3877";
}

identity communication-event-type {
  base event-type;
  description
    "Alarm 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-event-type {
  base event-type;
  description
    "Alarm of this type is principally associated with a
    degradation in the quality of a service.";
```

```
        reference "ITU Recommendation X.733";
    }
```

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

```
identity equipment-event-type {
    base event-type;
    description
        "Alarm of this type is principally associated with an
        equipment alarm.";
    reference "ITU Recommendation X.733";
}
```

```
identity environmental-event-type {
    base event-type;
    description
        "Alarm of this type is principally associated with a
        condition relating to an enclosure in which the
        equipment resides.";
    reference "ITU Recommendation X.733";
}
```

```
identity integrity-violation-event-type {
    base event-type;
    description
        "Integrity Violation Event Type";
    reference "RFC 3877";
}
```

```
identity operation-violation-event-type {
    base event-type;
    description
        "Operation Violation Event Type";
    reference "RFC 3877";
}
```

```
identity physical-violation-event-type {
    base event-type;
    description
        "Physical Violation Event Type";
    reference "RFC 3877";
}
```

```
identity security-service-or-mechanism-violation-event-type {
    base event-type;
```

```
    description
        "Security Service or Mechanism Violation Event Type";
    reference "RFC 3877";
}
```

```
identity time-domain-violation-event-type {
    base event-type;
    description
        "Time domain Violation Event Type";
    reference "RFC 3877";
}
```

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

```
/* Probable cause definitions from RFC 3877*/
```

```
identity aIS {
    base probable-cause-type;
    description "aIS";
}
identity callSetUpFailure {
    base probable-cause-type;
    description "callSetUpFailure";
}
identity degradedSignal {
    base probable-cause-type;
    description "degradedSignal";
}
identity farEndReceiverFailure {
```

```
        base probable-cause-type;
        description "farEndReceiverFailure";
    }
    identity framingError {
        base probable-cause-type;
        description "framingError";
    }
    identity lossOfFrame {
        base probable-cause-type;
        description "lossOfFrame";
    }
    identity lossOfPointer {
        base probable-cause-type;
        description "lossOfPointer";
    }
    identity lossOfSignal {
```

```
        base probable-cause-type;
        description "lossOfSignal";
    }
    identity payloadTypeMismatch {
        base probable-cause-type;
        description "payloadTypeMismatch";
    }
    identity transmissionError {
        base probable-cause-type;
        description "transmissionError";
    }
    identity remoteAlarmInterface {
        base probable-cause-type;
        description "remoteAlarmInterface";
    }
    identity excessiveBER {
        base probable-cause-type;
        description "excessiveBER";
    }
    identity pathTraceMismatch {
        base probable-cause-type;
        description "pathTraceMismatch";
    }
    identity unavailable {
        base probable-cause-type;
```

```

        description "unavailable";
    }
    identity signalLabelMismatch {
        base probable-cause-type;
        description "signalLabelMismatch";
    }
    identity lossOfMultiFrame {
        base probable-cause-type;
        description "lossOfMultiFrame";
    }
    identity receiveFailure {
        base probable-cause-type;
        description "receiveFailure";
    }
    identity transmitFailure {
        base probable-cause-type;
        description "transmitFailure";
    }
    identity modulationFailure {
        base probable-cause-type;
        description "modulationFailure";
    }
    identity demodulationFailure {

```

```

        base probable-cause-type;
        description "demodulationFailure";
    }
    identity broadcastChannelFailure {
        base probable-cause-type;
        description "broadcastChannelFailure";
    }
    identity connectionEstablishmentError {
        base probable-cause-type;
        description "connectionEstablishmentError";
    }
    identity invalidMessageReceived {
        base probable-cause-type;
        description "invalidMessageReceived";
    }
    identity localNodeTransmissionError {
        base probable-cause-type;
        description "localNodeTransmissionError";
    }

```

```

}
identity remoteNodeTransmissionError {
    base probable-cause-type;
    description "remoteNodeTransmissionError";
}
identity routingFailure {
    base probable-cause-type;
    description "routingFailure";
}
identity backplaneFailure {
    base probable-cause-type;
    description "backplaneFailure";
}
identity dataSetProblem {
    base probable-cause-type;
    description "dataSetProblem";
}
identity equipmentIdentifierDuplication {
    base probable-cause-type;
    description "equipmentIdentifierDuplication";
}
identity externalIFDeviceProblem {
    base probable-cause-type;
    description "externalIFDeviceProblem";
}
identity lineCardProblem {
    base probable-cause-type;
    description "lineCardProblem";
}
identity multiplexerProblem {

```

```

    base probable-cause-type;
    description "multiplexerProblem";
}
identity nEIdentifierDuplication {
    base probable-cause-type;
    description "nEIdentifierDuplication";
}
identity powerProblem {
    base probable-cause-type;
    description "powerProblem";
}
}

```

```

identity processorProblem {
    base probable-cause-type;
    description "processorProblem";
}
identity protectionPathFailure {
    base probable-cause-type;
    description "protectionPathFailure";
}
identity receiverFailure {
    base probable-cause-type;
    description "receiverFailure";
}
identity replaceableUnitMissing {
    base probable-cause-type;
    description "replaceableUnitMissing";
}
identity replaceableUnitTypeMismatch {
    base probable-cause-type;
    description "replaceableUnitTypeMismatch";
}
identity synchronizationSourceMismatch {
    base probable-cause-type;
    description "synchronizationSourceMismatch";
}
identity terminalProblem {
    base probable-cause-type;
    description "terminalProblem";
}
identity timingProblem {
    base probable-cause-type;
    description "timingProblem";
}
identity transmitterFailure {
    base probable-cause-type;
    description "transmitterFailure";
}
identity trunkCardProblem {

```

```

    base probable-cause-type;
    description "trunkCardProblem";
}
identity replaceableUnitProblem {

```



```

        base probable-cause-type;
        description "replaceableUnitProblem";
    }
    identity realTimeClockFailure {
        base probable-cause-type;
        description "realTimeClockFailure";
    }
    identity antennaFailure {
        base probable-cause-type;
        description "antennaFailure";
    }
    identity batteryChargingFailure {
        base probable-cause-type;
        description "batteryChargingFailure";
    }
    identity diskFailure {
        base probable-cause-type;
        description "diskFailure";
    }
    identity frequencyHoppingFailure {
        base probable-cause-type;
        description "frequencyHoppingFailure";
    }
    identity iODeviceError {
        base probable-cause-type;
        description "iODeviceError";
    }
    identity lossOfSynchronisation {
        base probable-cause-type;
        description "lossOfSynchronisation";
    }
    identity lossOfRedundancy {
        base probable-cause-type;
        description "lossOfRedundancy";
    }
    identity powerSupplyFailure {
        base probable-cause-type;
        description "powerSupplyFailure";
    }
    identity signalQualityEvaluationFailure {
        base probable-cause-type;
        description "signalQualityEvaluationFailure";
    }
    identity tranceiverFailure {

```

```
        base probable-cause-type;
        description "tranceiverFailure";
    }
    identity protectionMechanismFailure {
        base probable-cause-type;
        description "protectionMechanismFailure";
    }
    identity protectingResourceFailure {
        base probable-cause-type;
        description "protectingResourceFailure";
    }
    identity airConditioningFailure {
        base probable-cause-type;
        description "airConditioningFailure";
    }
    identity airDryerFailure {
        base probable-cause-type;
        description "airDryerFailure";
    }
    identity batteryDischarging {
        base probable-cause-type;
        description "batteryDischarging";
    }
    identity batteryFailure {
        base probable-cause-type;
        description "batteryFailure";
    }
    identity commercialPowerFailure {
        base probable-cause-type;
        description "commercialPowerFailure";
    }
    identity coolingFanFailure {
        base probable-cause-type;
        description "coolingFanFailure";
    }
    identity engineFailure {
        base probable-cause-type;
        description "engineFailure";
    }
    identity fireDetectorFailure {
        base probable-cause-type;
        description "fireDetectorFailure";
    }
    identity fuseFailure {
        base probable-cause-type;
        description "fuseFailure";
    }
}
```

```
identity generatorFailure {
```

```
    base probable-cause-type;
    description "generatorFailure";
}
identity lowBatteryThreshold {
    base probable-cause-type;
    description "lowBatteryThreshold";
}
identity pumpFailure {
    base probable-cause-type;
    description "pumpFailure";
}
identity rectifierFailure {
    base probable-cause-type;
    description "rectifierFailure";
}
identity rectifierHighVoltage {
    base probable-cause-type;
    description "rectifierHighVoltage";
}
identity rectifierLowFVoltage {
    base probable-cause-type;
    description "rectifierLowFVoltage";
}
identity ventilationsSystemFailure {
    base probable-cause-type;
    description "ventilationsSystemFailure";
}
identity enclosureDoorOpen {
    base probable-cause-type;
    description "enclosureDoorOpen";
}
identity explosiveGas {
    base probable-cause-type;
    description "explosiveGas";
}
identity fire {
    base probable-cause-type;
    description "fire";
}
identity flood {
```

```
        base probable-cause-type;
        description "flood";
    }
    identity highHumidity {
        base probable-cause-type;
        description "highHumidity";
    }
    identity highTemperature {
```

```
        base probable-cause-type;
        description "highTemperature";
    }
    identity highWind {
        base probable-cause-type;
        description "highWind";
    }
    identity iceBuildUp {
        base probable-cause-type;
        description "iceBuildUp";
    }
    identity intrusionDetection {
        base probable-cause-type;
        description "intrusionDetection";
    }
    identity lowFuel {
        base probable-cause-type;
        description "lowFuel";
    }
    identity lowHumidity {
        base probable-cause-type;
        description "lowHumidity";
    }
    identity lowCablePressure {
        base probable-cause-type;
        description "lowCablePressure";
    }
    identity lowTemperatue {
        base probable-cause-type;
        description "lowTemperatue";
    }
    identity lowWater {
        base probable-cause-type;
```

```
        description "lowWater";
    }
    identity smoke {
        base probable-cause-type;
        description "smoke";
    }
    identity toxicGas {
        base probable-cause-type;
        description "toxicGas";
    }
    identity coolingSystemFailure {
        base probable-cause-type;
        description "coolingSystemFailure";
    }
    identity externalEquipmentFailure {
```

```
        base probable-cause-type;
        description "externalEquipmentFailure";
    }
    identity externalPointFailure {
        base probable-cause-type;
        description "externalPointFailure";
    }
    identity storageCapacityProblem {
        base probable-cause-type;
        description "storageCapacityProblem";
    }
    identity memoryMismatch {
        base probable-cause-type;
        description "memoryMismatch";
    }
    identity corruptData {
        base probable-cause-type;
        description "corruptData";
    }
    identity outOfCPUCycles {
        base probable-cause-type;
        description "outOfCPUCycles";
    }
    identity sfwrEnvironmentProblem {
        base probable-cause-type;
        description "sfwrEnvironmentProblem";
```

```

}
identity sfwrDownloadFailure {
    base probable-cause-type;
    description "sfwrDownloadFailure";
}
identity lossOfRealTime1 {
    base probable-cause-type;
    description "lossOfRealTime1";
}
identity applicationSubsystemFailure {
    base probable-cause-type;
    description "applicationSubsystemFailure";
}
identity configurationOrCustomisationError {
    base probable-cause-type;
    description "configurationOrCustomisationError";
}
identity databaseInconsistency {
    base probable-cause-type;
    description "databaseInconsistency";
}
identity fileError {

```

```

    base probable-cause-type;
    description "fileError";
}
identity outOfMemory {
    base probable-cause-type;
    description "outOfMemory";
}
identity softwareError {
    base probable-cause-type;
    description "softwareError";
}
identity timeoutExpired {
    base probable-cause-type;
    description "timeoutExpired";
}
identity underlyingResourceUnavailable {
    base probable-cause-type;
    description "underlyingResourceUnavailable";
}

```

```

identity versionMismatch {
    base probable-cause-type;
    description "versionMismatch";
}
identity bandwidthReduced {
    base probable-cause-type;
    description "bandwidthReduced";
}
identity congestion {
    base probable-cause-type;
    description "congestion";
}
identity excessiveErrorRate {
    base probable-cause-type;
    description "excessiveErrorRate";
}
identity excessiveResponseTime {
    base probable-cause-type;
    description "excessiveResponseTime";
}
identity excessiveRetransmissionRate {
    base probable-cause-type;
    description "excessiveRetransmissionRate";
}
identity reducedLoggingCapability {
    base probable-cause-type;
    description "reducedLoggingCapability";
}
identity systemResourcesOverload {

```

```

    base probable-cause-type;
    description "systemResourcesOverload";
}
identity adapterError {
    base probable-cause-type;
    description "adapterError";
}
identity applicationSubsystemFailure {
    base probable-cause-type;
    description "applicationSubsystemFailure";
}
identity bandwidthReducedX733 {

```

```

        base probable-cause-type;
        description "bandwidthReducedX733";
    }
    identity callEstablishmentError {
        base probable-cause-type;
        description "callEstablishmentError";
    }
    identity communicationsProtocolError {
        base probable-cause-type;
        description "communicationsProtocolError";
    }
    identity communicationsSubsystemFailure {
        base probable-cause-type;
        description "communicationsSubsystemFailure";
    }
    identity configurationOrCustomizationError {
        base probable-cause-type;
        description "configurationOrCustomizationError";
    }
    identity congestionX733 {
        base probable-cause-type;
        description "congestionX733";
    }
    identity corruptData {
        base probable-cause-type;
        description "corruptData";
    }
    identity cpuCyclesLimitExceeded {
        base probable-cause-type;
        description "cpuCyclesLimitExceeded";
    }
    identity dataSetOrModemError {
        base probable-cause-type;
        description "dataSetOrModemError";
    }
    identity degradedSignalX733 {

```

```

        base probable-cause-type;
        description "degradedSignalX733";
    }
    identity dteDceInterfaceError {
        base probable-cause-type;

```



```

        description "dteDceInterfaceError";
    }
    identity enclosureDoorOpenX733 {
        base probable-cause-type;
        description "enclosureDoorOpenX733";
    }
    identity equipmentMalfunction {
        base probable-cause-type;
        description "equipmentMalfunction";
    }
    identity excessiveVibration {
        base probable-cause-type;
        description "excessiveVibration";
    }
    identity fileErrorX733 {
        base probable-cause-type;
        description "fileErrorX733";
    }
    identity fireDetected {
        base probable-cause-type;
        description "fireDetected";
    }
    identity framingErrorX733 {
        base probable-cause-type;
        description "framingErrorX733";
    }
    identity heatingVentCoolingSystemProblem {
        base probable-cause-type;
        description "heatingVentCoolingSystemProblem";
    }
    identity humidityUnacceptable {
        base probable-cause-type;
        description "humidityUnacceptable";
    }
    identity inputOutputDeviceError {
        base probable-cause-type;
        description "inputOutputDeviceError";
    }
    identity inputDeviceError {
        base probable-cause-type;
        description "inputDeviceError";
    }
    identity lanError {

```

```
        base probable-cause-type;
        description "lanError";
    }
    identity leakDetected {
        base probable-cause-type;
        description "leakDetected";
    }
    identity localNodeTransmissionErrorX733 {
        base probable-cause-type;
        description "localNodeTransmissionErrorX733";
    }
    identity lossOfFrameX733 {
        base probable-cause-type;
        description "lossOfFrameX733";
    }
    identity lossOfSignalX733 {
        base probable-cause-type;
        description "lossOfSignalX733";
    }
    identity materialSupplyExhausted {
        base probable-cause-type;
        description "materialSupplyExhausted";
    }
    identity multiplexerProblemX733 {
        base probable-cause-type;
        description "multiplexerProblemX733";
    }
    identity outOfMemoryX733 {
        base probable-cause-type;
        description "outOfMemoryX733";
    }
    identity ouputDeviceError {
        base probable-cause-type;
        description "ouputDeviceError";
    }
    identity performanceDegraded {
        base probable-cause-type;
        description "performanceDegraded";
    }
    identity powerProblems {
        base probable-cause-type;
        description "powerProblems";
    }
    identity pressureUnacceptable {
        base probable-cause-type;
        description "pressureUnacceptable";
    }
    identity processorProblems {
```

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```
        base probable-cause-type;
        description "processorProblems";
    }
    identity pumpFailureX733 {
        base probable-cause-type;
        description "pumpFailureX733";
    }
    identity queueSizeExceeded {
        base probable-cause-type;
        description "queueSizeExceeded";
    }
    identity receiveFailureX733 {
        base probable-cause-type;
        description "receiveFailureX733";
    }
    identity receiverFailureX733 {
        base probable-cause-type;
        description "receiverFailureX733";
    }
    identity remoteNodeTransmissionErrorX733 {
        base probable-cause-type;
        description "remoteNodeTransmissionErrorX733";
    }
    identity resourceAtOrNearingCapacity {
        base probable-cause-type;
        description "resourceAtOrNearingCapacity";
    }
    identity responseTimeExcessive {
        base probable-cause-type;
        description "responseTimeExcessive";
    }
    identity retransmissionRateExcessive {
        base probable-cause-type;
        description "retransmissionRateExcessive";
    }
    identity softwareErrorX733 {
        base probable-cause-type;
        description "softwareErrorX733";
    }
    identity softwareProgramAbnormallyTerminated {
        base probable-cause-type;
        description "softwareProgramAbnormallyTerminated";
```

```
}
identity softwareProgramError {
    base probable-cause-type;
    description "softwareProgramError";
}
identity storageCapacityProblemX733 {
```

```
    base probable-cause-type;
    description "storageCapacityProblemX733";
}
identity temperatureUnacceptable {
    base probable-cause-type;
    description "temperatureUnacceptable";
}
identity thresholdCrossed {
    base probable-cause-type;
    description "thresholdCrossed";
}
identity timingProblemX733 {
    base probable-cause-type;
    description "timingProblemX733";
}
identity toxicLeakDetected {
    base probable-cause-type;
    description "toxicLeakDetected";
}
identity transmitFailureX733 {
    base probable-cause-type;
    description "transmitFailureX733";
}
identity transmitterFailure {
    base probable-cause-type;
    description "transmitterFailure";
}
identity underlyingResourceUnavailable {
    base probable-cause-type;
    description "underlyingResourceUnavailable";
}
identity versionMismatchX733 {
    base probable-cause-type;
    description "versionMismatchX733";
}
}
```

```
identity authenticationFailure {
    base probable-cause-type;
    description "authenticationFailure";
}
identity breachOfConfidentiality {
    base probable-cause-type;
    description "breachOfConfidentiality";
}
identity cableTamper {
    base probable-cause-type;
    description "cableTamper";
}
identity delayedInformation {
```

```
    base probable-cause-type;
    description "delayedInformation";
}
identity denialOfService {
    base probable-cause-type;
    description "denialOfService";
}
identity duplicateInformation {
    base probable-cause-type;
    description "duplicateInformation";
}
identity informationMissing {
    base probable-cause-type;
    description "informationMissing";
}
identity informationModificationDetected {
    base probable-cause-type;
    description "informationModificationDetected";
}
identity informationOutOfSequence {
    base probable-cause-type;
    description "informationOutOfSequence";
}
identity keyExpired {
    base probable-cause-type;
    description "keyExpired";
}
identity nonRepudiationFailure {
```

```
        base probable-cause-type;
        description "nonRepudiationFailure";
    }
    identity outOfHoursActivity {
        base probable-cause-type;
        description "outOfHoursActivity";
    }
    identity outOfService {
        base probable-cause-type;
        description "outOfService";
    }
    identity proceduralError {
        base probable-cause-type;
        description "proceduralError";
    }
    identity unauthorizedAccessAttempt {
        base probable-cause-type;
        description "unauthorizedAccessAttempt";
    }
    identity unexpectedInformation {
```

```
        base probable-cause-type;
        description "unexpectedInformation";
    }
    identity other {
        base probable-cause-type;
        description "other";
    }
}
```

<CODE ENDS>

[3.](#) Security Considerations

TBD

[4.](#) IANA Considerations

TBD

[5.](#) Acknowledgements

6. Normative References

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