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A YANG Data model for Policy based Event Management
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Abstract

[RFC8328] defines a policy-based management framework that allow definition of a data model to be used to represent high-level, possibly network-wide policies. This document defines an YANG data model for the policy based event management [RFC7950]. The policy based Event YANG provides the ability for the network management function (within a controller, an orchestrator, or a network element) to control the configuration and monitor state change on the network element and take simple and instant action when a trigger condition on the system state is met.

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 December 31, 2019.

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1. Introduction

[RFC8328] defines a policy-based management framework that allow definition of a data model to be used to represent high-level, possibly network-wide policies. This document defines an policy based Event Management YANG data model [RFC7950]. The policy based Event management YANG provides the ability for the network management function (within a controller, an orchestrator, or a network element) to control the configurations and monitor state parameters on the network element and take simple and instant action when a trigger condition on the system state is met.

The data model in this document is designed to be compliant with the Network Management Datastore Architecture (NMDA) [RFC8342].

2. Conventions used in this document

2.1. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119]. In this

document, these words will appear with that interpretation only when in ALL CAPS. Lower case uses of these words are not to be interpreted as carrying [RFC2119] significance.

This document uses the following terms:

Error A deviation of a system from normal operation [RFC3877].

Fault Lasting error or warning condition [RFC3877].

Event Something that happens which may be of interest or trigger the invocation of the rule. A fault, an alarm, a change in network state, network security threat, hardware malfunction, buffer untilization crossing a threshold, network connection setup, an external input to the system, for example [RFC3877].

2.2. Tree Diagrams

Tree diagrams used in this document follow the notation defined in [RFC8340].

3. Objectives

This section describes some of the design objectives for the policy based Event management Data Model:

- The policy based Event management YANG should provide the ability for the network management function to control configuration and monitor state changes on a network element using the NETCONF/ RESTCONF, and initiate simple actions whenever a trigger condition is met. For example, a NETCONF subscribed notification can be generated when a system state value exceeds the threshold.

- Clear and precise identification of policy based Event types and managed objects.

- Allow the server to inform the client that a certain Event is related to other Events.

- Allow one event to be able to call another nested event.

- The event data model defined in this document can be implemented on the management system that also implements EVENT-MIB; thus, the mapping between the event data model and ENTITY-MIB should be clear.

4. Relationship to YANG Push

YANG-push mechanism provides a subscription service for updates from a datastore. And it supports two types of subscriptions which are distinguished by how updates are triggered: periodic and on-change.

The On-change Push allow receivers to receive updates whenever changes to target managed objects occur. This document specifies a mechanism that provides three trigger conditions:

- Existence: When a specific managed object appears, the trigger fires, e.g. reserved ports are configured.

- Boolean: The user can set the type of boolean operator (e.g. unequal, equal, less, less-or-equal, greater, greater-or-equal, etc) and preconfigured threshold value (e.g. Pre-configured threshold). If the value of a managed object meet Boolean conditions, the trigger fires, e.g., when the boolean operator type is 'less', the trigger will be fired if the value of managed object is less than the pre-configured Boolean value.

- Variation: The event that may be triggered when a managed object in multiple instances of the data tree is found and the current sampled value is either rising or falling and exceeds the pre-configured threshold, but the value at the last sampling interval does not exceed the pre-configured threshold. It also can be triggered when the current sample value change exceeds the pre-configured delta threshold. For example, when the 'startup' value is set to 'rising', the current sampled value of that managed object is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, then one variation rising event is triggered for that managed object. In another example, if the 'startup' value is set to 'falling' and the system state value of the managed object is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, then one variation falling event is triggered for that managed object.

And the YANG Push mechanism more focuses on the remote mirroring and monitoring of configuration and operational state. For example, for on change method, the subscriber will receive a notification if the change occurs. The model defined in this document provides a method which allow automatic adjusting the value of the corresponding managed object when some event is triggered. It establishes association between network service monitoring and network service provision and can use output generated by network service monitoring as input of network service provision and thereby provide automated

network management. The details of the usage example is described in Appendix A.

5. Relationship to EVENT MIB

If the device implements the EVENT-MIB [RFC2981], each entry in the "/events/event/trigger" list is mapped to MteTriggerEntry,MteTriggerExistenceEntry,MteTriggerBooleanEntry,MteTriggerThresholdEntry,MteObjectsEntry,MteEventEntry,MteEventSetEntry. respectively.

The following table lists the YANG data nodes with corresponding objects in the EVENT-MIB [RFC2981].

YANG data node in ietf-event.yang	EVENT-MIB Objects (RFC2981)
target	mteObjectsName
event-name	mteEventName
event-description	mteEventComment
value	mteEventSetValue
events/event/trigger/name	mteTriggerName
trigger-description	mteTriggerComment
frequency	mteTriggerFrequency
operator	mteTriggerBooleanComparison
value	mteTriggerBooleanValue
rising-event	mteTriggerThresholdRising
falling-event	mteTriggerThresholdFalling
delta-rising-event	mteTriggerThresholdDeltaRising
variation/startup	mteTriggerThresholdStartup
existence/enable	mteTriggerExistenceStartup
boolean/enable	mteTriggerBooleanStartup

6. Model Overview

The YANG data model for the Event management has been split into two modules:

- The ietf-event-trigger.yang module defines a set of groupings for a generic trigger. It is intended that these groupings will be used by the policy based event management model or other models that require the trigger conditions. In this model, three trigger conditions are defined under the "test" choice node:
  - Existence: When a specific managed object appears, the trigger fires.
  - Boolean: The Boolean trigger condition is used to monitor the value of managed object. It compares the value of the managed object with the pre-configured threshold value and takes action according to the comparison result. The operator types include unequal, equal, less, less-or-equal, greater, and greater-or-equal. For example, if the operator is set to equal, an event is triggered when the value of the managed object equals the pre-configured value. The event will not be triggered again until the value becomes unequal and comes back to equal.
  - Variation: A Variation trigger condition regularly compares the change value of the managed object with the delta threshold value. The Variation trigger condition can be used to monitor the value change of a managed object (when "statup" be set to 'delta-rising' or 'delta-falling'), if the change during the sample interval exceeds the delta threshold, the event is triggered. It can also be used to monitor the value variation of the managed object. In addition, if the value of the monitored object crosses a delta threshold multiple times in succession, the event is triggered only for the first crossing. For example, if the value of a sampled object crosses the rising threshold multiple times, only the first crossing triggers a rising alarm event.
- The ietf-event.yang module defines four lists: trigger, target, event, and action. Triggers define the targets meeting some conditions that lead to events. Events trigger corresponding actions:
  - Each trigger can be seen as a logical test that, if satisfied or evaluated to be true, cause the action to be carried out. The ietf-event.yang module uses groupings defined in ietf-event-trigger.yang to present the trigger attributes.

* The target list defines managed objects that can be added to logging or be set to a new value on the trigger, the trigger test type, or the event that resulted in the actions.

* The event list defines what happens when an event is triggered, i.e., trigger the corresponding action, e.g., addding a logging (i.e. Recording the triggered event), setting a value to the managed object or both. The group-id can be used to group a set of event that can be executed together,e.g., deliver a service or provide service assurance.

* Nested-event are supported by allowing one event's trigger to reference other event's definitions using the call-event configuration. Called events apply their triggers and actions before returning to the calling event's trigger and resuming evaluation. If the called event is triggered, then it returns an effective boolean true value to the calling event. For the calling event, this is equivalent to a condition statement evaluating to a true value and evaluation of the event continues.

* The action list consists of updates or invocations on local managed object attributes and defines a set of actions which will be performed (e.g. logging, set value, etc) when the corresponding event is triggered. The value to be set can use many variations on rule structure.

The following tree diagrams [RFC8340] provide an overview of the data model for "ietf-event-trigger" module and the "ietf-event" module.

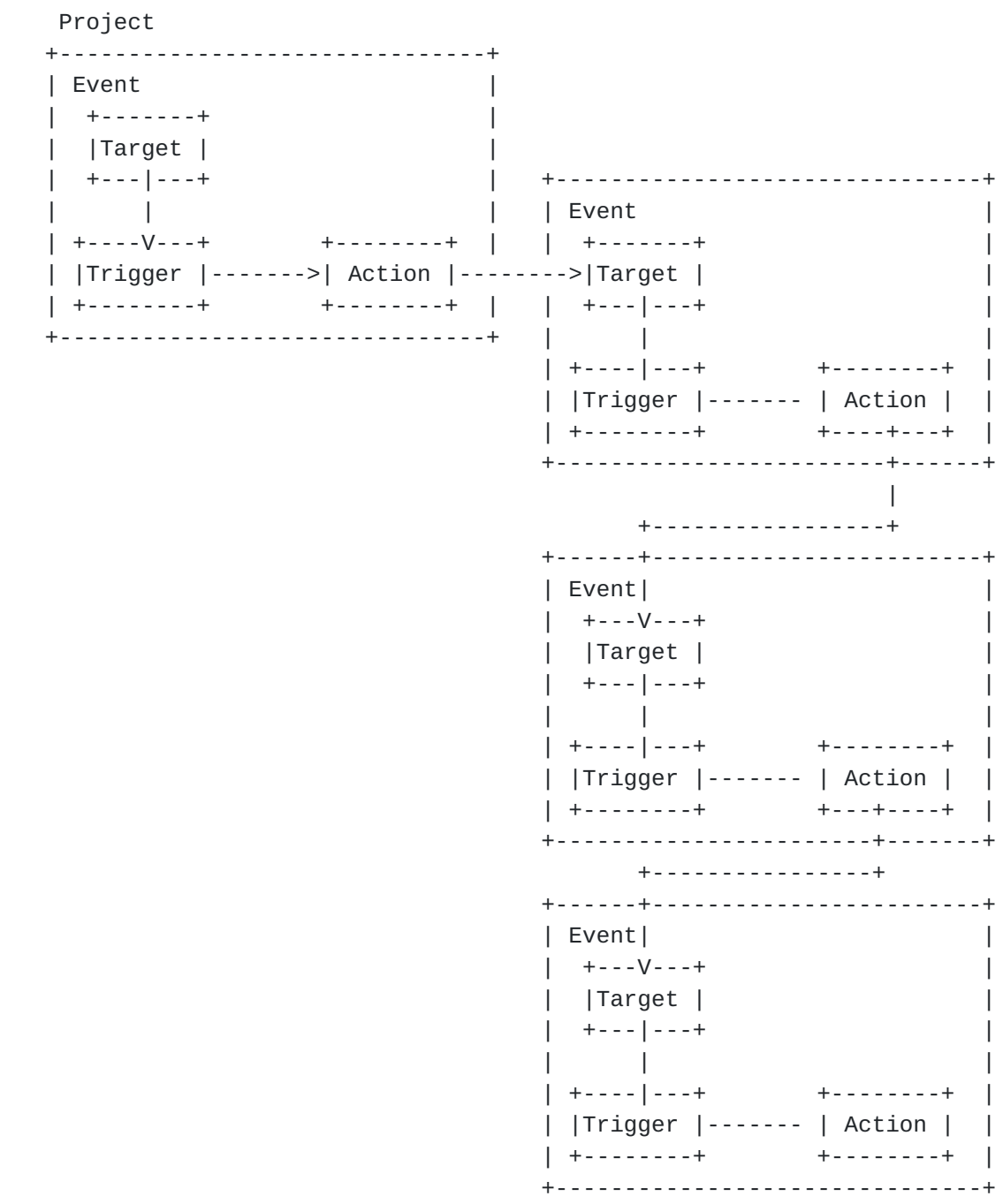
```
module: ietf-event-trigger
  grouping existences-trigger
    +-- existences
       +-- target*   target
  grouping boolean-trigger
    +-- boolean
       +-- operator?   operator
       +-- value?      match-value
       +-- target*     target
  grouping variation-trigger
    +-- variation
       +-- rising-value?           match-value
       +-- rising-target*          target
       +-- falling-value?          match-value
       +-- falling-target*         target
       +-- delta-rising-value?     match-value
       +-- delta-rising-target*    target
       +-- delta-falling-value?    match-value
```

```
         +-- delta-falling-target*   target
         +-- startup?                enumeration
     grouping trigger-grouping
       +-- (test)?
          +--:(existences)
          |  +-- existences
          |     +-- target*   target
          +--:(boolean)
          |  +-- boolean
          |     +-- operator?   operator
          |     +-- value?      match-value
          |     +-- target*     target
          +--:(variation)
             +-- variation
                +-- rising-value?           match-value
                +-- rising-target*          target
                +-- falling-value?          match-value
                +-- falling-target*         target
                +-- delta-rising-value?     match-value
                +-- delta-rising-target*    target
                +-- delta-falling-value?    match-value
                +-- delta-falling-target*   target
                +-- startup?                enumeration

   module: ietf-event
     +--rw events
        +--rw event* [event-name type]
           +--rw event-name           string
           +--rw type                 identityref
           +--rw event-description?   string
           +--rw group-id?            group-type
           +--rw target*              trig:target
           +--rw clear?               boolean
           +--rw trigger* [name]
           |  +--rw name                    string
           |  +--rw call-event?             -> ../../event-name
           |  +--rw frequency
           |  |  +--rw type?          identityref
           |  |  +--rw periodic
           |  |  |  +--rw interval    uint32
           |  |  |  +--rw start?      yang:date-and-time
           |  |  |  +--rw end?        yang:date-and-time
           |  |  +--rw scheduling
           |  |     +--rw month*           string
           |  |     +--rw day-of-month*    uint8
           |  |     +--rw day-of-week*     uint8
           |  |     +--rw hour*            uint8
           |  |     +--rw minute*          uint8
```

```
|  |     +--rw second*         uint8
|  |     +--rw start?          yang:date-and-time
|  |     +--rw end?            yang:date-and-time
|  +--rw (test)?
|     +--:(existences)
|     |  +--rw existences
|     |     +--rw target*     target
|     +--:(boolean)
|     |  +--rw boolean
|     |     +--rw operator?   operator
|     |     +--rw value?      match-value
|     |     +--rw target*     target
|     +--:(variation)
|        +--rw variation
|           +--rw rising-value?           match-value
|           +--rw rising-target*          target
|           +--rw falling-value?          match-value
|           +--rw falling-target*         target
|           +--rw delta-rising-value?     match-value
|           +--rw delta-rising-target*    target
|           +--rw delta-falling-value?    match-value
|           +--rw delta-falling-target*   target
|           +--rw startup?                enumeration
+--rw actions
   +--rw target?    trig:target
   +--rw value?     <anydata>
   +--rw logging?   logging-type
```

The relation between Event, Trigger, Target and Action is described as follows:



One event may trigger another event,i.e., the action output in the first event can be input to target in the second event and a set of events can be grouped together and executed in a coordinated manner, but if it does not trigger another event, the relation between two events should be ignored.

7. EVENT TRIGGER YANG Module

```
<CODE BEGINS> file "ietf-event-trigger@2019-06-24.yang"
module ietf-event-trigger {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-event-trigger";
  prefix trig;

  import ietf-yang-types {
    prefix yang;
  }

  organization
    "IETF xxx Working Group";
  contact
    "Zitao Wang: wangzitao@huawei.com
     Qin Wu: bill.wu@huawei.com";
  description
    "This module defines a reusable grouping for event trigger.";

  revision 2019-06-24 {
    description
      "Initial revision.";
    reference
      "foo";
  }

  typedef match-value {
    type union {
      type yang:xpath1.0;
      type yang:object-identifier;
      type string;
    }
    description
      "This type is used to match resources of type 'target'.
       Since the type 'target' is a union of different types,
       the 'match-value' type is also a union of corresponding
       types.";
  }

  typedef target {
    type union {
      type instance-identifier;
      type yang:object-identifier;
      type yang:uuid;
      type string;
    }
    description
```

```
        "If the target is modelled in YANG, this type will
         be an instance-identifier.
         If the target is an SNMP object, the type will be an
         object-identifier.
         If the target is anything else, for example a distinguished
         name or a CIM path, this type will be a string.
         If the target is identified by a UUID use the uuid
         type.
         If the server supports several models, the presedence should
         be in the order as given in the union definition.";
    }

    typedef operator {
      type enumeration {
        enum unequal {
          description
            "Indicates that the comparision type is unequal to.";
        }
        enum equal {
          description
            "Indicates that the comparision type is equal to.";
        }
        enum less {
          description
            "Indicates that the comparision type is less than.";
        }
        enum less-or-equal {
          description
            "Indicates that the comparision type is less than
             or equal to.";
        }
        enum greater {
          description
            "Indicates that the comparision type is greater than.";
        }
        enum greater-or-equal {
          description
            "Indicates that the comparision type is greater than
             or equal to.";
        }
      }
      description
        "definition of the operator";
    }

    grouping existences-trigger {
      description
        "A grouping that provides existence trigger";
```

```
      container existences {
        leaf-list target {
          type target;
          description
            "List for target objects";
        }
        description
          "Container for existence";
      }
    }

    grouping boolean-trigger {
      description
        "A grouping that provides boolean trigger";
      container boolean {
        leaf operator {
          type operator;
          description
            "Comparison type.";
        }
        leaf value {
          type match-value;
          description
            "Compartion value which is static threshold value.";
        }
        leaf-list target {
          type target;
          description
            "List for target management objects.";
        }
        description
          "Container for boolean test.";
      }
    }

    grouping variation-trigger {
      description
        "A grouping that provides variation trigger";
      container variation {
        leaf rising-value {
          type match-value;
          description
            "Sets the rising variation to the specified value,
             when the current sampled value is greater than or equal to
             this threshold, and the value at the last sampling interval
             was less than this threshold, the event is triggered. ";
        }
        leaf-list rising-target {
```

```
          type target;
          description
            "List for target objects.";
        }
        leaf falling-value {
          type match-value;
          description
            "Sets the falling threshold to the specified value.";
        }
        leaf-list falling-target {
          type target;
          description
            "List for target objects.";
        }
        leaf delta-rising-value {
          type match-value;
          description
            "Sets the delta rising threshold to the specified value.";
        }
        leaf-list delta-rising-target {
          type target;
          description
            "List for target objects.";
        }
        leaf delta-falling-value {
          type match-value;
          description
            "Sets the delta falling threshold to the specified value.";
        }
        leaf-list delta-falling-target {
          type target;
          description
            "List for target objects.";
        }
        leaf startup {
          type enumeration {
            enum rising {
              description
                "If the first sample after this
                 managed object becomes active is greater than or equal
                  to 'rising-value' and the 'startup' is equal to
                  'rising' then one threshold rising event is

                  triggered for that managed object.";
            }
            enum falling {
              description
                "If the first sample after this managed object becomes
```

```
                active is less than or equal to 'falling-value' and
                the 'startup' is equal to 'falling' then one
                threshold falling event is triggered for that managed
                object.";
            }
            enum rising-or-falling {
              description
                "That event may be triggered when the
                 'startup' is equal to 'rising-or-falling'.
                 'rising-or-falling' indicate the state value of the
                  managed object may less than or greater than the
                 specified thrshold value.";
            }
          }
          description
            "Startup setting.";
        }
        description
          "Container for the threshold trigger condition.
           Note that the threshold here  may change over time
           or the state value changes in either ascend order
           or descend order.";
      }
    }

    grouping trigger-grouping {
      description
        "A grouping that provides event trigger.";
      choice test {
        description
          "Choice test";
        case existences {
          uses existences-trigger;
        }
        case boolean {
          uses boolean-trigger;
        }
        case variation {
          uses variation-trigger;
        }
      }
    }
  }
  <CODE ENDS>
```

8. EVENT YANG Module

```
<CODE BEGINS> file "ietf-event@2019-06-24.yang"

module ietf-event {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-event";
  prefix evt;

  import ietf-yang-types {
    prefix yang;
  }
  import ietf-event-trigger {
    prefix trig;
  }

  organization
    "IETF xxx Working Group";
  contact
    "Zitao Wang: wangzitao@huawei.com
     Qin Wu: bill.wu@huawei.com";
  description
    "This module defines a model for the service topology.";

  revision 2019-06-24 {
    description
      "Initial revision.";
    reference
      "foo";
  }

  identity event-type {
    description
      "Base identity for event type";
  }

  identity frequency {
    description
      "Base identity for frequency";
  }

  identity periodic {
    base frequency;
    description
      "Identity for periodic trigger";
  }

  identity scheduling {
```

```
      base frequency;
      description
        "Identity for scheduling trigger";
    }

    identity logging {
      description
        "Base identity for logging action";
    }

    identity logging-notification {
      base logging;
      description
        "Logging for event notification";
    }

    identity logging-set {
      base logging;
      description
        "Logging for reset values";
    }

    typedef logging-type {
      type identityref {
        base logging;
      }
      description
        "Logging types";
    }

    typedef group-type {
      type string;
      description
        "Group type";
    }

    grouping start-end-grouping {
      description
        "A grouping that provides start and end times for
         Event objects.";
      leaf start {
        type yang:date-and-time;
        description
          "The date and time when the Event object
           starts to create triggers.";
      }
      leaf end {
        type yang:date-and-time;
```

```
        description
          "The date and time when the Event object
           stops to create triggers.
           It is generally a good idea to always configure
           an end time and to refresh the end time as needed
           to ensure that agents that lose connectivity to
           their Controller do not continue executing Schedules
           forever.";
      }
    }

    container events {
      list event {
        key "event-name type";
        leaf event-name {
          type string;
          description
            "Event name";
        }
        leaf type {
          type identityref {
            base event-type;
          }
          description
            "Type of event";
        }
        leaf event-description {
          type string;
          description
            "Event description";
        }
        leaf group-id {
          type group-type;
          description
            "Group Identifier";
        }
        leaf-list target {
          type trig:target;
          description
            "targeted objects";
        }
        leaf clear {
          type boolean;
          default "false";
          description
            "A flag indicate whether the event be closed";
        }
        list trigger {
```

```
            key "name";
            leaf name {
              type string;
              description
                "Trigger name";
            }
            leaf trigger-description {
              type string;
              description
                "Trigger description";
            }
            leaf call-event {
              type leafref {
                path "../../event-name";
              }
              description
                "This leaf call sub-event.";
            }
            container frequency {
              leaf type {
                type identityref {
                  base frequency;
                }
                description
                  "Type of trigger frequency";
              }
              container periodic {
                when "derived-from-or-self(../type, 'periodic')";
                description
                  "A periodic timing object triggers periodically
                   according to a regular interval.";
                leaf interval {
                  type uint32 {
                    range "1..max";
                  }
                  units "seconds";
                  mandatory true;
                  description
                    "The number of seconds between two triggers
                     generated by this periodic timing object.";
                }
                uses start-end-grouping;
              }
              container scheduling {
                when "derived-from-or-self(../type, 'scheduling')";
                description
                  "A scheduling timing object triggers.";
                leaf-list month {
```

```
        type string;
        description
          "A set of months at which this scheduling timing
           will trigger.";
      }
      leaf-list day-of-month {
        type uint8 {
          range "0..59";
        }
        description
          "A set of days of the month at which this
           scheduling timing will trigger.";
      }
      leaf-list day-of-week {
        type uint8 {
          range "0..59";
        }
        description
          "A set of weekdays at which this scheduling timing
           will trigger.";
      }
      leaf-list hour {
        type uint8 {
          range "0..59";
        }
        description
          "A set of hours at which the scheduling timing will
           trigger.";
      }
      leaf-list minute {
        type uint8 {
          range "0..59";
        }
        description
          "A set of minutes at which this scheduling timing
           will trigger.";
      }
      leaf-list second {
        type uint8 {
          range "0..59";
        }
        description
          "A set of seconds at which this calendar timing
           will trigger.";
      }
      uses start-end-grouping;
    }
    description
```

```
            "Container for frequency";
          }
          uses trig:trigger-grouping;
          description
            "List for trigger";
        }
        container actions {
          leaf target {
            type trig:target;
            description
              "Report the target objects";
          }
          anydata value {
            description
              "Inline set content.";
          }
          leaf logging {
            type logging-type;
            description
              "Specifies the log action";
          }
          description
            "Container for Actions";
        }
        description
          "List for Events";
      }
      description
        "YANG data module for defining event triggers and actions for
         network management purposes";
    }
  }
```

<CODE ENDS>

9. Security Considerations

The YANG modules defined in this document MAY be accessed via the RESTCONF protocol [RFC8040] or NETCONF protocol ([RFC6241]). The lowest RESTCONF or NETCONF layer requires that the transport-layer protocol provides both data integrity and confidentiality, see Section 2 in [RFC8040] and [RFC6241]. The lowest NETCONF layer is the secure transport layer, and the mandatory-to-implement secure transport is Secure Shell (SSH)[RFC6242] . The lowest RESTCONF layer is HTTPS, and the mandatory-to-implement secure transport is TLS [RFC5246].

The NETCONF access control model [RFC6536] provides the means to restrict access for particular NETCONF or RESTCONF users to a preconfigured subset of all available NETCONF or RESTCONF protocol operations and content.

There are a number of data nodes defined in this YANG module that are writable/creatable/deletable (i.e., config true, which is the default). These data nodes may be considered sensitive or vulnerable in some network environments. Write operations (e.g., edit-config) to these data nodes without proper protection can have a negative effect on network operations. These are the subtrees and data nodes and their sensitivity/vulnerability:

- /events/event/event-name
- /events/event/target
- /events/actions/target
- /events/event/trigger/name

10. IANA Considerations

This document registers two URIs in the IETF XML registry [RFC3688]. Following the format in [RFC3688], the following registrations are requested to be made:

```
---------------------------------------------------------------------
   URI: urn:ietf:params:xml:ns:yang:ietf-event-trigger
   Registrant Contact: The IESG.
   XML: N/A, the requested URI is an XML namespace.

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

This document registers two YANG modules in the YANG Module Names registry [RFC6020].

```
------------------------------------------------------------------
   Name:         ietf-event-trigger
   Namespace:    urn:ietf:params:xml:ns:yang:ietf-event-trigger
   Prefix:       trig
   Reference:    RFC xxxx

   Name:         ietf-event
   Namespace:    urn:ietf:params:xml:ns:yang:ietf-event
   Prefix:       evt
   Reference:    RFC xxxx
------------------------------------------------------------------
```

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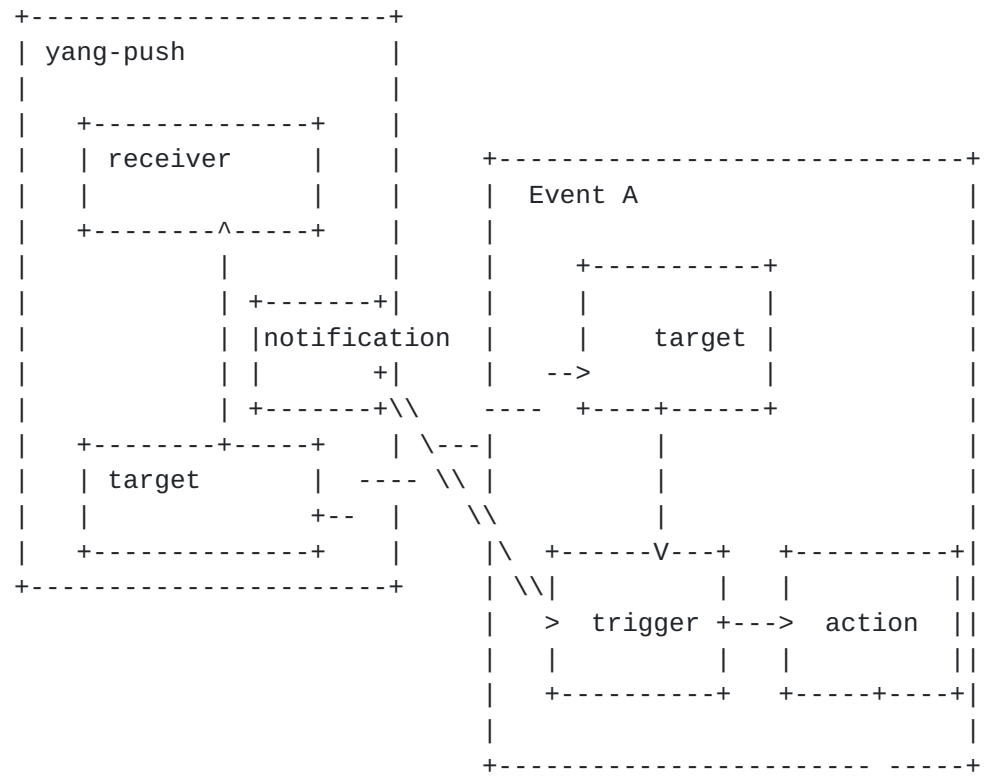
Appendix A. Usage Example of ECA model working with YANG PUSH

The relation between Event and YANG PUSH is described as follow: YANG Push Notification may trigger one event, i.e. one trigger conditions of the Event A can be set to "receiver received a yang push notification", and it can associates with other conditions of the Event A. When these conditions are met, the event A is triggered.



For Example:

The receiver received a push-change-update notification and learned that the "oper-status" of interface[name='eth0'] changed.

The target of Event "interface-state-monitoring" is set to "/if:interfaces/if:interface[if:name='eth0']", the trigger list contains two conditions: 1)receiver received a push-change-update notification; 2) the value of "in-errors" of interface[name='eth0'] exceeded the pre-configured threshold. When these conditions are met, corresponding action will be performed, i.e. disable interface[name='eth0']. The XML examples are shown as below:

```
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
 <eventTime>2017-10-25T08:22:33.44Z</eventTime>
 <push-change-update
      xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-push">
   <id>89</id>
   <datastore-changes>
     <yang-patch>
       <patch-id>0</patch-id>
       <edit>
         <edit-id>edit1</edit-id>
         <operation>replace</operation>
         <target>/ietf-interfaces:interfaces</target>
         <value>
           <interfaces
                xmlns="urn:ietf:params:xml:ns:yang:ietf-interfaces">
             <interface>
               <name>eth0</name>
               <oper-status>up</oper-status>
             </interface>
           </interfaces>
         </value>
       </edit>
     </yang-patch>
   </datastore-changes>
 </push-change-update>
</notification>

  <event>
   <event-name>interface-state-monitoring</event-name>
   <type>interface-exception</type>
   <target>/if:interfaces/if:interface[if:name='eth0']</target>
   <trigger>
    <name>state-push-change</name>
```

```
      <trigger-description>received yang push
\changed notification</trigger-description>
      <test>
       <existence>/yp:notification/yp:push-change-update/yp:id[id=89]\
/yp:datastore-changes/.../yp:target="/ietf-interfaces:interfaces='eth0'\
"</existence>
      </test>
     </trigger>
     <trigger>
      <name>evaluate-in-errors</name>
      <call-event>interface-state-chang</call-event>
      <trigger-description>evaluate the number of
       the packets that contained errors
       </trigger-description>
      <frequency>10m</frequency>
      <test>
       <boolean>
        <operator>greater-or-equal</operator>
        <value>100</value>
        <target>/if:interfaces/if:interface[if:name='eth0']\
/if:statistic/if:in-errors</target>
       </boolean>
      </test>
     </trigger>
     <action>
       <target>/if:interfaces/if:interface[if:name='eth0']</target>
       <value>
        <interfaces>
         <interface>
          <name>eth0</name>
          <enable>false</enable>
         </interface>
        </interfaces>
       </value>
     </action>
    </event>

   </events>
```

Appendix B. Changes between revisions

v01 - v02

- Introduce the group-id which allow group a set of events that can be executed together

- Change threshold trigger condition into variation trigger condition to further clarify the difference between boolean trigger condition and variation trigger condition.

- Module structure optimization.

- Usage Example Update.

v00 - v01

- Separate ietf-event-trigger.yang from Event management modeland ietf-event.yang and make it reusable in other YANG models.

- Clarify the difference between boolean trigger condition and threshold trigger condition.

- Change evt-smp-min and evt-smp-max into min-data-object and max-data-object in the data model.

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