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Base Notifications for NMDA  
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## Abstract

The Network Configuration Protocol (NETCONF) provides mechanisms to manipulate configuration datastores. NMDA introduces additional datastores for systems that support more advanced processing chains converting configuration to operational state. However, client applications are not able to be aware of common events pertaining to additional datastores, such as a data validation state change in NETCONF server, that may impact management applications. This document updates [RFC6470] to allow a NETCONF client to receive additional notifications for some common system events pertaining to the Network Management Datastore Architecture (NMDA) defined in [RFC8342].

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## [1.](#) Introduction

The Network Configuration Protocol (NETCONF) [[RFC6470](#)] provides mechanisms to manipulate configuration datastores. NMDA introduces additional datastores (e.g., <intended>, <operational>) for systems that support more advanced processing chains converting configuration to operational state. However, client applications are not able to be aware of common events pertaining to additional datastores, e.g., there are many background activities that happen during the time that configuration is committed to <running> to the time that the configuration is actually applied to <operational>. It is possible that some configuration could not be applied to <operational> due to either validation issues, or missing resource etc. There is a need for user to know the validation result of <intended> data-store and the reason why the configuration were not applied.

This document updates [[RFC6470](#)] to allows a NETCONF client to receive additional notifications for some common system events pertaining to the Network Management Datastore Architecture (NMDA) defined in [[RFC8342](#)]. These notification are not specific to any network management protocols such as NETCONF and RESTCONF.

The solution presented in this document is backwards compatible with [\[RFC6470\]](#).

### [1.1.](#) Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [BCP 14](#) [\[RFC2119\]](#) [\[RFC8174\]](#) when, and only when, they appear in all capitals, as shown here.

The following terms are defined in [\[RFC8342\]](#) and are not redefined here:

- o operational state datastore
- o running configuration datastore
- o intended configuration datastore

## [2.](#) Summary of Updates to [RFC 6470](#)

This document is intended to provide an extension of notifications initially defined within [\[RFC6470\]](#), with the development of NMDA architecture and data model. Key relationships between these two documents include:

- o The existing notifications defined in [\[RFC6470\]](#) are remain unchanged, no additional information is added.
- o A new event notification is defined in this document to overcome the shortcoming of [\[RFC6470\]](#) for supporting NMDA.

## [3.](#) NETCONF Base Notifications YANG Model extension for NMDA

### [3.1.](#) Overview

The YANG module in NETCONF Base Notifications [\[RFC6470\]](#) specifies the following 5 event notifications for the 'NETCONF' stream to notify a

client application that the NETCONF server state has changed:

- o netconf-config-change
- o netconf-capability-change
- o netconf-session-start
- o netconf-session-end
- o netconf-confirmed-commit

These event notifications used within the 'NETCONF' stream are accessible to clients via the subscription mechanism described in [\[RFC5277\]](#).

This document extends the YANG module defined in [\[RFC6470\]](#) to include NMDA specific extension which allows a NETCONF client to receive notifications for additional common system event as follows:

nmda-data-validate: Generated when a server with network management protocol support detects that a data validation event has occurred from the time that configuration is committed to <running> to the time that the configuration is actually applied to <operational> during management session. Indicates the event and the current state of the data validation. A server MAY report events for non-NETCONF management sessions (such as RESTCONF,gPRC), using the 'session-id' value of zero.

These notification messages are accessible to clients via either the subscription mechanism described in [\[RFC5277\]](#) or dynamic subscription mechanism and configured subscription mechanism described in [I-D.ietf-netconf-netconf-event-notifications].

The following are examples of a nmda-data-validation notification message:

```
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
  <eventTime>2017-06-16T16:30:59.137045+09:00</eventTime>
  <nmda-data-validate xmlns="urn:ietf:params:xml:ns:yang:ietf-nmda-notifications"
    <username>admin</username>
```

```

<session-id>0</session-id>
<source-host>10.251.93.83</source-host>
<validate-event>start</validate-event>
<validate-result>partial-fail</validate-result>
<validate-fail-target>
  <datastore>intended</datastore>
  <target> /ietf-interfaces:interfaces-state </target>
</validate-fail-target>
<validate-fail-target>
  <datastore>intended</datastore>
  <target> /ietf-system:system </target>
</validate-fail-target>
</nmda-data-validate>
</notification>

```

### [3.2.](#) Definitions

This section presents the YANG module defined in this document. This module imports data types from the 'ietf-netconf' module defined in [\[RFC6241\]](#) and 'ietf-inet-types' module defined in [\[RFC6021\]](#).

```

<CODE BEGINS> file "ietf-nmda-notifications@2018-04-01.yang"
module ietf-nmda-notifications {
  namespace "urn:ietf:params:xml:ns:yang:ietf-nmda-notifications";
  prefix nmdan;

  import ietf-datastores {
    prefix ds;
  }
  import ietf-inet-types { prefix inet; }
  organization
    "IETF NETCONF (Network Configuration Protocol) Working Group";
  contact
    "WG Web:  <http://tools.ietf.org/wg/netconf/>
     WG List: <mailto:netconf@ietf.org>
     WG Chair: Kent Watsen
               <mailto:kwatsen@juniper.net>

```

```

WG Chair: Mahesh Jethanandani
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Editor:   Qin Wu
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description
  "This module defines a YANG data model for use with the
  NETCONF protocol that allows the NETCONF client to
  receive additional common NETCONF base event notifications
  related to NMDA.
  Copyright (c) 2012 IETF Trust and the persons identified as
  the document authors. All rights reserved.
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  without modification, is permitted pursuant to, and subject
  to the license terms contained in, the Simplified BSD License
  set forth in Section 4.c of the IETF Trust's Legal Provisions
  Relating to IETF Documents
  (http://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 2018-04-01 {
  description
    "Initial version.";
  reference "RFC xxx: NETCONF Base Notifications for NMDA";

```

```

}
typedef session-id-or-zero-type {
  type uint32;
  description
    "NETCONF Session Id or Zero to indicate none";
}

grouping common-session-parms {
  description
    "Common session parameters to identify a
    management session.";

  leaf username {
    type string;
    mandatory true;

```

```

        description
            "Name of the user for the session.";
    }

    leaf session-id {
        type session-id-or-zero-type;
        mandatory true;
        description
            "Identifier of the session.
            A NETCONF session MUST be identified by a non-zero value.
            A non-NETCONF session MAY be identified by the value zero.";
    }

    leaf source-host {
        type inet:ip-address;
        description
            "Address of the remote host for the session.";
    }
}

notification nmda-data-validate {
    description
        "Generated when a NETCONF server detects that a
        Data validation event has occurred. Indicates the event
        and the current state of the data validation procedure
        in progress.";
    reference "RFC 8342, Section 5";
    uses common-session-parms;
    leaf validate-event {
        type enumeration {
            enum "start" {
                description
                    "The data validate procedure has started.";
            }
        }
    }
}

```

```

        enum "complete" {
            description
                "The data validation procedure has been completed.";
        }
    }
    mandatory true;
    description
        "Indicates the event that caused the notification.";
}

```

```

}
leaf validate-result {
  when "../validate-event = 'complete'";
  type enumeration {
    enum "fail" {
      description
        "The <intended> configuration fails to be validated
        before being applied to <operational>, e.g., resources
        are not available or otherwise not physically present
        leads to the whole set of <intended>are not applied.";
    }
    enum "partial-fail" {
      description
        "The <intended> configuration partially fails to be
        validated before being applied to <operational>,e.g.,
        resources are not available or otherwise not physically
        present leads to parts of <intended>are not applied";
    }
    enum "success" {
      description
        "The <intended> configuration is successfully validated
        before being applied to <operational>.";
    }
  }
  description
    "Result of validate";
}
list fail-validate-target {
  leaf datastore {
    type identityref {
      base ds:datastore;
    }
    default "ds:operational";
    description
      "Indicates which datastore has changed or which datastore is
      target of edit-data operation.";
  }
  leaf target {
    type instance-identifier;
    description

```

"Topmost node associated with the configuration change.



```

        A server SHOULD set this object to the node within
        the datastore that is being altered. A server MAY
        set this object to one of the ancestors of the actual
        node that was changed, or omit this object, if the
        exact node is not known.";
    }
    description
        "List for fail validate targets";
}
}
}
}
<CODE ENDS>

```

#### 4. Security Considerations

The YANG module defined in this memo is designed to be accessed via the NETCONF protocol [[RFC6241](#)]. The lowest NETCONF layer is the secure transport layer and the mandatory-to-implement secure transport is SSH, defined in [[RFC6242](#)].

Some of the readable data nodes in this YANG module may be considered sensitive or vulnerable in some network environments. It is thus important to control read access (e.g., via get, get-config, or notification) to these data nodes. These are the subtrees and data nodes and their sensitivity/vulnerability:

/nmda-data-validate/validate-event:

Indicates the specific validate-event state change that occurred. A value of 'complete' probably indicates that data validation procedure has completed.

#### 5. IANA Considerations

This document registers one XML namespace URN in the 'IETF XML registry', following the format defined in [[RFC3688](#)]:

URI: urn:ietf:params:xml:ns:yang:ietf-nmda-notifications

Registrant Contact: The IESG.

XML: N/A, the requested URI is an XML namespace.

This document registers one module name in the 'YANG Module Names' registry, defined in [[RFC7950](#)]:

name: ietf-nmda-notifications

prefix: ncdn

namespace: urn:ietf:params:xml:ns:yang:ietf-nmda-notifications

RFC: xxxx

## 6. Acknowledgements

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