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 YANG model for NETCONF Event Notifications

Abstract

This document defines the YANG model for NETCONF Event Notifications. The definition of this YANG model allows the encoding of NETCONF Event Notifications in YANG compatible encodings such as YANG-JSON and YANG-CBOR.

Requirements Language

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.

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1. Introduction

This document defines a YANG [[RFC7950](#)] data model for NETCONF Event Notifications [[RFC5277](#)]. The notification structure defined in [[RFC5277](#)] uses a XML Schema [[W3C.REC-xml-20001006](#)] allowing to encode and validate the message in XML. Nevertheless, when the notification message is encoded using other encodings such as YANG-JSON [[RFC7951](#)] or YANG-CBOR [[RFC9254](#)], a YANG model to validate or encode the message is necessary. This document extends [[RFC5277](#)], defining the NETCONF Event Notification structure in a YANG module.

2. Differences to draft-ietf-netconf-notification-messages

[[I-D.ietf-netconf-notification-messages](#)] proposes a structure to send multiple notifications in a single message. Unlike

[[I-D.ietf-netconf-notification-messages](#)], this document defines a YANG module to encode NETCONF Notifications with encodings other than XML, which is currently not existing. The structure for NETCONF notifications is defined in [[RFC5277](#)] using a XSD, but there is no YANG module defining the structure of the notification message sent by a server when the message is encoded in YANG-JSON [[RFC7951](#)] or YANG-CBOR [[RFC9254](#)].

3. YANG Module

3.1. YANG Tree Diagram

This YANG module adds a structure with one leaf for the datetime as defined in section 2.2.1 of [[RFC5277](#)]. The name of the leaf matches the definition of the XSD element name defined in Section 4 of [[RFC5277](#)].

```
module: ietf-notification
```

```
  structure notification:
```

```
    +-- eventTime      yang:date-and-time
```

3.2. YANG Module

The YANG module uses the same namespace from the XML Schema defined in Section 4 of [[RFC5277](#)] allowing to use this YANG module to also validate already implemented XML encoded NETCONF Event Notifications.

<CODE BEGINS> file "ietf-notification@2024-01-22.yang"

```
module ietf-notification {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:netconf:notification:1.0";
  prefix inotif;
  import ietf-yang-types {
    prefix yang;
    reference
      "RFC 6991: Common YANG Data Types";
  }
  import ietf-yang-structure-ext {
    prefix sx;
    reference
      "RFC 8791: YANG Data Structure Extensions";
  }

  organization "IETF NETCONF (Network Configuration) Working Group";
  contact
    "WG Web:  <https://datatracker.ietf.org/group/netconf/>
    WG List:  <mailto:netconf@ietf.org>

    Authors:  Alex Huang Feng
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              Thomas Graf
              <mailto:thomas.graf@swisscom.com>
              Benoit Claise
              <mailto:benoit.claise@huawei.com>";

  description
    "Defines NETCONF Event Notification structure as defined in RFC5277.
    This YANG module uses the same namespace from the XML schema defined
    in Section 4 of RFC5277 to be able to validate already implemented
    XML encoded messages.

    Copyright (c) 2023 IETF Trust and the persons identified as
    authors of the code.  All rights reserved.

    Redistribution and use in source and binary forms, with or without
    modification, is permitted pursuant to, and subject to the license
    terms contained in, the Revised BSD License set forth in Section
    4.c of the IETF Trust's Legal Provisions Relating to IETF Documents
    (https://trustee.ietf.org/license-info).

    This version of this YANG module is part of RFC XXXX; see the RFC
    itself for full legal notices.";

  revision 2024-01-22 {
```

```

    description
        "First revision";
    reference
        "RFC XXXX: NETCONF Event Notification YANG";
}

sx:structure notification {
    leaf eventTime {
        type yang:date-and-time;
        mandatory true;
        description
            "The date and time the event was generated by the event source.
            This parameter is of type dateTime and compliant to [RFC3339].
            Implementations must support time zones.
            The leaf name in camel case matches the name of the XSD element
            defined in Section 4 of RFC5277.";
    }
}
}

```

<CODE ENDS>

4. Security Considerations

The security considerations for the NETCONF Event notifications are described in [[RFC5277](#)]. This documents adds no additional security considerations.

5. IANA Considerations

This document describes the URI used for the IETF XML Registry and registers a new YANG module name.

5.1. URI

IANA is requested to add this document as a reference in the following URI in the [IETF XML Registry](#) [[RFC3688](#)].

URI: urn:ietf:params:xml:ns:netconf:notification:1.0

Registrant Contact: The IESG.

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

Reference: RFC5277; RFC-to-be

5.2. YANG module name

This document registers the following YANG module in the [YANG Module Names Registry](#) [[RFC6020](#)], within the "YANG Parameters" registry:

name: ietf-notification

namespace: urn:ietf:params:xml:ns:netconf:notification:1.0

prefix: inotif

reference: RFC-to-be

5.3. YANG SID-file

IANA is requested to register a new ".sid" file in the ["IETF YANG SID Registry"](#) [[I-D.ietf-core-sid](#)]:

SID range entry point: TBD

SID range size: 50

YANG module name: ietf-notification

reference: RFC-to-be

A ".sid" file is proposed in [Appendix B](#).

6. Acknowledgements

The authors would like to thank Andy Bierman, Carsten Bormann, Tom Petch and Jason Sterne for their review and valuable comments.

7. References

7.1. Normative References

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[RFC7951] Lhotka, L., "JSON Encoding of Data Modeled with YANG", RFC 7951, DOI 10.17487/RFC7951, August 2016, <<https://www.rfc-editor.org/info/rfc7951>>.

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[RFC8791] Bierman, A., Björklund, M., and K. Watsen, "YANG Data Structure Extensions", RFC 8791, DOI 10.17487/RFC8791, June 2020, <<https://www.rfc-editor.org/info/rfc8791>>.

[W3C.REC-xml-20001006] Bray, T., Paoli, J., Sperberg-McQueen, M., and E. Maler, "Extensible Markup Language (XML) 1.0 (Second Edition)", W3C, October 2000, <<https://www.w3.org/TR/2000/REC-xml-20001006>>.

7.2. Informative References

[I-D.ietf-netconf-notification-messages]

Voit, E., Jenkins, T., Birkholz, H., Bierman, A., and A. Clemm, "Notification Message Headers and Bundles", Work in Progress, Internet-Draft, draft-ietf-netconf-notification-messages-08, 17 November 2019, <<https://datatracker.ietf.org/doc/html/draft-ietf-netconf-notification-messages-08>>.

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[RFC9254] Veillette, M., Ed., Petrov, I., Ed., Pelov, A., Bormann, C., and M. Richardson, "Encoding of Data Modeled with YANG in the Concise Binary Object Representation (CBOR)", RFC 9254, DOI 10.17487/RFC9254, July 2022, <<https://www.rfc-editor.org/info/rfc9254>>.

Appendix A. Examples

This non-normative section shows examples of how XML, YANG-JSON and YANG-CBOR are encoded.

A.1. XML encoded message

This is an example of a XML-encoded notification as defined in [[RFC5277](#)].

```
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
  <eventTime>2022-09-02T10:59:55.32Z</eventTime>
  <push-update xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-push">
    <id>1011</id>
    <datastore-contents>
      <interfaces xmlns="urn:ietf:params:xml:ns:yang:ietf-interfaces">
        <interface>
          <name>eth0</name>
          <oper-status>up</oper-status>
        </interface>
      </interfaces>
    </datastore-contents>
  </push-update>
</notification>
```

Figure 1: XML-encoded notification

A.2. YANG-JSON encoded message

This is an example of a YANG-JSON encoded notification.

```

{
  "ietf-notification:notification": {
    "eventTime": "2023-02-10T08:00:11.22Z",
    "ietf-yang-push:push-update": {
      "id": 1011,
      "datastore-contents": {
        "ietf-interfaces:interfaces": [
          {
            "interface": {
              "name": "eth0",
              "oper-status": "up"
            }
          }
        ]
      }
    }
  }
}

```

Figure 2: JSON-encoded notification

A.3. YANG-CBOR encoded message

This is an example of YANG-CBOR encoded notification. The figure [Figure 3](#) shows the message using the CBOR diagnostic notation as defined in section 3.1 of [\[RFC9254\]](#).

```

{
  "ietf-notification:notification": {
    "eventTime": "2023-02-10T08:00:11.22Z",
    "ietf-yang-push:push-update": {
      "id": 1011,
      "datastore-contents": {
        "ietf-interfaces:interfaces": [
          {
            "interface": {
              "name": "eth0",
              "oper-status": "up"
            }
          }
        ]
      }
    }
  }
}

```

Figure 3: CBOR-encoded notification using diagnostic notation

A.4. YANG-CBOR encoded message using SIDs

This is an example of YANG-CBOR encoded notification using YANG SIDs [[I-D.ietf-core-sid](#)]. The figure [Figure 4](#) shows the message using the CBOR diagnostic notation as defined in section 3.1 of [[RFC9254](#)].

```
{
  2551: {
    1: "2023-02-10T08:00:11.22Z",
    "ietf-yang-push:push-update": {
      "id": 1011,
      "datastore-contents": {
        "ietf-interfaces:interfaces": [
          {
            "interface": {
              "name": "eth0",
              "oper-status": "up"
            }
          }
        ]
      }
    }
  }
}
```

Figure 4: CBOR-encoded notification using YANG SIDs in CBOR diagnostic notation

Appendix B. .sid file

Note to the RFC-Editor: Please remove this section before publishing.

For CBOR encoding using YANG-SIDs identifiers, a ".sid" file is requested to IANA in [Section 5.3](#).

```

<CODE BEGINS> file "ietf-notification@2024-01-22.sid"

{
  "ietf-sid-file:sid-file": {
    "module-name": "ietf-notification",
    "module-revision": "2024-01-22",
    "description": "NETCONF Event Notification structure",
    "dependency-revision": [
      {
        "module-name": "ietf-yang-types",
        "module-revision": "2013-07-15"
      },
      {
        "module-name": "ietf-yang-structure-ext",
        "module-revision": "2020-06-17"
      }
    ],
    "assignment-range": [
      {
        "entry-point": "2550",
        "size": "50"
      }
    ],
    "item": [
      {
        "namespace": "module",
        "identifier": "ietf-notification",
        "sid": "2550"
      },
      {
        "namespace": "data",
        "identifier": "/ietf-notification:notification",
        "sid": "2551"
      },
      {
        "namespace": "data",
        "identifier": "/ietf-notification:notification/eventTime",
        "sid": "2552"
      }
    ]
  }
}

<CODE ENDS>

```

Figure 5: .sid file for "ietf-notification" module

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