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Support of Versioning in YANG Notifications Subscription
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Abstract

This document extends the YANG-Push Subscription mechanism to enforce that particular revisions or semantic versions are used when configuring or establishing a Subscription. It also extends the YANG-Push Subscription state change Notifications with additional context regarding the YANG schema associated with the Subscription.

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1. Introduction

In order to process the YANG-Push Notification messages described in Section 3.7 of [RFC8641] at the YANG-Push Receiver, the Publisher's instance of ietf-yang-library [RFC8525] needs to be queried each time a Subscription state change Notification, as described in Section 2.7 of [RFC8639], is being received to understand whether the YANG module(s) semantic has changed. To notify the Receiver whether the YANG module(s) semantic has changed, a semantic reference to the YANG modules and the XPath or subtree in the Subscription state change Notifications is needed.

This specification is primarily aimed for YANG-Push Configured Subscription, as defined in Section 2.5 of [RFC8639], since the schema of a YANG-Push Publisher datastore could change after a Configured Subscription has been established and the 'subscription-started' Notification has already been sent to the Receiver. Without the mechanism described in Section 2 and Section 3, a subscriber is unable to control the supported YANG module revision or version nor would the YANG-Push Receiver be notified of changes in YANG module revision or version in the YANG-Push Subscription. Although this mechanism is primarily designed for YANG-Push Configured Subscriptions, the extensions defined in Section 3 for 'subscription-started' are also applicable to Dynamic Subscriptions as defined in Section 2.4 of [RFC8639].

This semantic reference is available when the Subscription is established as described in Section 2.4 and 2.5 of [RFC8639] and being streamed from the Publisher to the Receiver with the Subscription state change Notifications, as described in Section 2.7 of [RFC8639]. For each Subscription, a locally unique Subscription ID, as described in Section 4.3.2 of [RFC8641], is issued and streamed as metadata with the Notification message in the YANG-Push message header.

The YANG module version statement is specified in Section 7.1.2 of [RFC7950] and states that the newer revision needs to be backward compatible to the previous revision. Section 3.1 of [I-D.ietf-netmod-yang-module-versioning] specifies that newer semantic versions introduced in [I-D.ietf-netmod-yang-semver] MAY not be backward compatible to the previous version when indicated with non-backwards-compatible keyword.

The YANG Notifications Subscription mechanism defined in [RFC8641] does not include the YANG module revision. Hence, when a network node is upgraded, the subscribed YANG module revision might have changed, and might consequently break the data processing pipeline since the YANG-Push Receiver may not be aware of this change.

This document extends the current YANG Notifications Subscription mechanism to allow Subscriptions to a specific revision or latest YANG module semantic version to which the YANG module version needs to be backward compatible to.

The Subscription state change 'subscription-started' and 'subscription-modified' Notification messages are also extended to include the YANG module revision, version, and YANG library content-id. Changes in the revision and version fields allow a YANG-Push Receiver to detect whenever the subscribed YANG module has changed. Changes in yang-library-content-id indicates that YANG module(s) on the network management Server of the YANG-Push Publisher has or have changed.

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 terms "subscriber", "subscription", "dynamic subscription", "configured subscription", "publisher", "receiver" and "notification message" are used as defined in [RFC8639].

The terms "client", and "server" are used as defined in [RFC8342].

The terms "YANG library" and "YANG library content identifier" are used as defined in [RFC8525].

2. Subscription Policy Extension

The ability to configure or establish a Dynamic Subscription can be constrained to particular module versions or revisions using the following fields that are defined in the 'ietf-yang-push-revision' YANG module:

module: Restricts the Subscription to one or more YANG module names on the Subscription path with revision and version together for the related streamed content.

revision: Restricts the Subscription to a specific YANG module revision. Example: "2014-05-08".

version: Restricts the Subscription to the latest compatible YANG module semantic version referenced to. Example: "2.0.0".

When a NETCONF client creates or modifies a Subscription, either by updating the Subscription configuration or by invoking the 'establish-subscription' or 'modify-subscription' RPCs, and the NETCONF server does not support the specified revision or version in the request, the server MUST return an RPC reply containing an <rpc-error> element as defined in Section 4.3 of [RFC6241], with the error information populated as follows:

- * an "error-type" node of "application".
- * an "error-tag" node whose value is a string that corresponds to an identity associated with the error.

=====	=====
Error identity	Uses "error-tag"
=====	=====
revision-unsupported	invalid-value
+-----	+-----
version-unsupported	invalid-value
+-----	+-----
incompatible-revision-and-version	invalid-value
+-----	+-----

Table 1: General Subscription Error Identities and
Associated "error-tag" Use

Figure 1 provides an example of a Dynamic periodic YANG-Push "establish-subscription" RPC call with YANG revision and datastore-xpath-filter. Figure 2 shows the response when the RPC has been accepted by the NETCONF Server and Figure 3 the error sent by the NETCONF Server when the revision is not supported.

```
<rpc message-id="101"
  xmlns:netconf="urn:ietf:params:xml:ns:netconf:base:1.0">
  <establish-subscription
    xmlns="urn:ietf:params:xml:ns:yang:ietf-subscribed-notifications"
    xmlns:yp="urn:ietf:params:xml:ns:yang:ietf-yang-push"
    xmlns:ypr="urn:ietf:params:xml:ns:yang:ietf-yang-push-revision">
    <yp:datastore
      xmlns:ds="urn:ietf:params:xml:ns:yang:ietf-datastores">
      ds:operational
    </yp:datastore>
    <yp:datastore-xpath-filter
      xmlns:ex="https://example.com/sample-data/1.0">
      /ex:foo
    </yp:datastore-xpath-filter>
    <ypr:module-version>
      <ypr:name>foo</ypr:name>
      <ypr:revision>2023-09-17</ypr:revision>
    </ypr:module-version>
    <yp:periodic>
      <yp:period>500</yp:period>
    </yp:periodic>
    </establish-subscription>
  </rpc>
```

Figure 1: Dynamic YANG-Push subscription

```
<rpc-reply message-id="101"
  xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <id
    xmlns="urn:ietf:params:xml:ns:yang:ietf-subscribed-notifications">
    52
  </id>
</rpc-reply>
```

Figure 2: RPC Example for a positive establish-subscription response

```

<rpc-reply message-id="101"
  xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"
  xmlns:yp="urn:ietf:params:xml:ns:yang:ietf-subscribed-notifications">
  <rpc-error>
    <error-type>application</error-type>
    <error-tag>operation-failed</error-tag>
    <error-severity>error</error-severity>
    <error-path xmlns:ypr="urn:ietf:params:xml:ns:yang:ietf-yang-push-revision">
      <error-info>
        <yp:establish-subscription-error-datastore>
          <yp:reason xmlns:ypr="urn:ietf:params:xml:ns:yang:ietf-yang-push-revision">
            ypr:revision-unsupported
          </yp:reason>
        </yp:establish-subscription-error-datastore>
      </error-info>
    </rpc-error>
  </rpc-reply>

```

Figure 3: RPC Example for an error establish-subscription response

Figure 4 provides an example of configured periodic YANG-Push Subscription with YANG revision and datastore-xpath-filter.

===== NOTE: '\ ' line wrapping per RFC 8792 =====

```

<rpc message-id="101"
  xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <edit-config>
    <target>
      <running/>
    </target>
    <config>
      <subscriptions
        xmlns="urn:ietf:params:xml:ns:yang:ietf-subscribed-notifications"
        xmlns:yp="urn:ietf:params:xml:ns:yang:ietf-yang-push"
        xmlns:ds="urn:ietf:params:xml:ns:yang:ietf-datastores"
        xmlns:if="urn:ietf:params:xml:ns:yang:ietf-interfaces"
        xmlns:ypr="urn:ietf:params:xml:ns:yang:ietf-yang-push-revision"
        xmlns:unt="urn:ietf:params:xml:ns:yang:ietf-udp-notif-transport"
        xmlns:snr="urn:ietf:params:xml:ns:yang:ietf-subscribed-notif-recei\
vers"
      >
        <subscription>
          <id>53</id>
          <yp:datastore>ds:operational</datastore>
          <yp:datastore-xpath-filter>
            /if:interfaces
          </datastore-xpath-filter>

```

```
<ypr:module-version-subs>
  <name>ietf-interfaces</name>
  <revision>2018-02-20</revision>
</module-version-subs>
<transport>unt:udp-notif</transport>
<encoding>encode-json</encoding>
<receivers>
  <receiver>
    <name>subscription-specific-receiver-def</name>
    <snr:receiver-instance-ref>
      global-udp-notif-receiver-def
    </receiver-instance-ref>
  </receiver>
</receivers>
<yp:periodic>
  <period>6000</period>
</periodic>
</subscription>
<snr:receiver-instances>
  <receiver-instance>
    <name>global-udp-notif-receiver-def</name>
    <unt:udp-notif-receiver>
      <address>192.0.5.1</address>
      <port>12345</port>
      <enable-segmentation>true</enable-segmentation>
      <max-segment-size/>
    </udp-notif-receiver>
  </receiver-instance>
</receiver-instances>
</subscriptions>
</config>
</edit-config>
</rpc>
```

Figure 4: Configured YANG-Push subscription

The YANG-Push Publisher MUST NOT send Notifications if the 'revision' or 'version' of the YANG module name in the Subscription policy configuration does not match with the YANG library [RFC8525].

3. Subscription State Change Notification Extension

Besides the Subscription ID and the xpath or subtree filter reference as described in Section 2.7 of [RFC8639], the following metadata objects are part of a 'subscription-started' or 'subscription-modified' Subscription state change Notifications.

module: Describes the YANG module names from the Subscription path

for the related streamed content.

revision: Describes the YANG module revision as specified in Section 7.1.9 of [RFC7950] for the related streamed content.

version: Describes the YANG module semantic version as specified in [I-D.ietf-netmod-yang-semver] for the related streamed content.

yang-library-content-id: Contains the YANG library content identifier [RFC8525] which is an implementation-specific identifier representing the current information in the YANG library on a specific Server.

Figure 5 provides an example of a 'subscription-modified' Subscription state change Notification message with the YANG module name, revision, version and datastore-xpath-filter for tracking the operational status of a single Ethernet interface (per [RFC8343]). This Subscription state change Notification message is encoded in XML [W3C.REC-xml-20081126] over the Network Configuration Protocol (NETCONF) as per [RFC8640].

```
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
  <eventTime>2023-01-03T10:00:00Z</eventTime>
  <subscription-modified
    xmlns="urn:ietf:params:xml:ns:yang:ietf-subscribed-notifications">
    <id>101</id>
    <stream-xpath-filter
      xmlns:int="urn:ietf:params:xml:ns:yang:ietf-interfaces">
      /int:interfaces
    </stream-xpath-filter>
    <stream>NETCONF</stream>
    <module-version
      xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-push-revision">
      <name>ietf-interfaces</name>
      <revision>2018-02-20</revision>
      <version>2.0.0</version>
    </module-version>
    <yang-library-content-id>1</yang-library-content-id>
  </subscription-modified>
</notification>
```

Figure 5: XML Push Example for a subscription-modified Notification message

Figure 6 provides an example of a JSON encoded, [RFC8259], Subscription state change Notification message over HTTPS-based [I-D.ietf-netconf-https-notif] or UDP-based [I-D.ietf-netconf-udp-notif] transport for the same Subscription.

```
{
  "ietf-restconf:notification" : {
    "eventTime": "2023-01-03T10:00:00Z",
    "ietf-subscribed-notifications:subscription-modified": {
      "id": 101,
      "stream-xpath-filter": "/ietf-interfaces:interfaces",
      "stream": "NETCONF",
      "ietf-yang-push-revision:module-version": [
        {
          "name": "ietf-interfaces",
          "revision": "2018-02-20",
          "version": "2.0.0",
        }
      ],
      "ietf-yang-push-revision:yang-library-content-id": "1",
    }
  }
}
```

Figure 6: JSON Push Example for a subscription-modified Notification message

4. Discovering "ietf-yang-push-revision" Support

A Client can discover whether the Server supports the 'ietf-yang-push-revision' model through the capabilities model defined in [RFC9196]. This document extends the 'ietf-notification-capabilities' model [RFC9196] with:

- * A leaf 'yang-push-module-revision-supported', stating that the YANG-Push Subscription state change Notifications are extended with 'revision', 'version' and 'yang-library-content-id' extensions.

The YANG models defined in Section 5.2 augments the 'ietf-notification-capabilities' model with the leaf listed above.

```

module: ietf-system-capabilities
  +--ro system-capabilities
    +--ro datastore-capabilities* [datastore]
      +--ro datastore
      |   -> /yanglib:yang-library/datastore/name
      +--ro per-node-capabilities* []
        +--ro (node-selection)?
        |   +--:(node-selector)
        |   |   +--ro node-selector?
        |   |   |   nacm:node-instance-identifier
        +--ro notc:subscription-capabilities
          +--ro notc:max-nodes-per-update?                uint32
          +--ro notc:periodic-notifications-supported?
          |   notification-support
          +--ro (notc:update-period)?
          |   +--:(notc:minimum-update-period)
          |   |   +--ro notc:minimum-update-period?        uint32
          |   |   +--:(notc:supported-update-period)
          |   |   |   +--ro notc:supported-update-period*    uint32
          +--ro notc:on-change-supported?
          |   notification-support {yp:on-change}?
          +--ro notc:minimum-dampening-period?            uint32
          |   {yp:on-change}?
          +--ro notc:supported-excluded-change-type*      union
          |   {yp:on-change}?
    +--ro notc:subscription-capabilities
      +--ro notc:max-nodes-per-update?                uint32
      +--ro notc:periodic-notifications-supported?
      |   notification-support
      +--ro (notc:update-period)?
      |   +--:(notc:minimum-update-period)
      |   |   +--ro notc:minimum-update-period?            uint32
      |   |   +--:(notc:supported-update-period)
      |   |   |   +--ro notc:supported-update-period*      uint32
      +--ro notc:on-change-supported?
      |   notification-support {yp:on-change}?
      +--ro notc:minimum-dampening-period?            uint32
      |   {yp:on-change}?
      +--ro notc:supported-excluded-change-type*      union
      |   {yp:on-change}?
      +--ro ypr:yang-push-module-revision-supported?    boolean

```

This model can be retrieved via a NETCONF <get> RPC.

5. The "ietf-yang-push-revision" Module

5.1. Data Model Overview

This 'ietf-yang-push-revision' YANG module augments the 'ietf-subscribed-notifications' module with the 'name', 'revision', 'version' and 'yang-library-content-id' in the 'subscription-started' and 'subscription-modified' Subscription state change Notifications and the ability to define the 'revision' and 'version' in the 'establish-subscription' and 'modify-subscription' RPCs in the datastore push Subscription.

5.1.1. Tree View

The following is the YANG tree diagram [RFC8340] for the 'ietf-yang-push-revision' YANG module

```
module: ietf-yang-push-revision
```

```
augment /sn:establish-subscription/sn:input:
  +---w module-version-subs* [name]
    +---w name                yang:yang-identifier
    +---w (revision-version)?
      +--:(revision)
      | +---w revision?      rev:revision-date
      +--:(version)
        +---w version?      ysver:version
augment /sn:modify-subscription/sn:input:
  +---w module-version-subs* [name]
    +---w name                yang:yang-identifier
    +---w (revision-version)?
      +--:(revision)
      | +---w revision?      rev:revision-date
      +--:(version)
        +---w version?      ysver:version
augment /sn:subscription-started:
  +--ro module-version* [name]
  | +--ro name                yang:yang-identifier
  | +--ro revision            rev:revision-date
  | +--ro version?           ysver:version
  +--ro yang-library-content-id?
    -> /yanglib:yang-library/content-id
augment /sn:subscription-modified:
  +--ro module-version* [name]
  | +--ro name                yang:yang-identifier
  | +--ro revision            rev:revision-date
  | +--ro version?           ysver:version
  +--ro yang-library-content-id?
    -> /yanglib:yang-library/content-id
augment /sn:subscriptions/sn:subscription:
  +--rw module-version-subs* [name]
    +--rw name                yang:yang-identifier
    +--rw (revision-version)?
      +--:(revision)
      | +--rw revision?      rev:revision-date
      +--:(version)
        +--rw version?      ysver:version
augment /sysc:system-capabilities/notc:subscription-capabilities:
  +--ro yang-push-module-revision-supported?  boolean
```

5.1.2. Full Tree View

The following is the YANG tree diagram [RFC8340] for the 'ietf-yang-push-revision' augmentation within the 'ietf-subscribed-notifications', including the RPCs and Notifications.

```

module: ietf-subscribed-notifications
+--ro streams
|   +--ro stream* [name]
|   |   +--ro name                string
|   |   +--ro description?        string
|   |   +--ro replay-support?     empty {replay}?
|   |   +--ro replay-log-creation-time yang:date-and-time
|   |   |   {replay}?
|   |   +--ro replay-log-aged-time? yang:date-and-time
|   |   |   {replay}?
+--rw filters
|   +--rw stream-filter* [name]
|   |   +--rw name                string
|   |   +--rw (filter-spec)?
|   |   |   +--:(stream-subtree-filter)
|   |   |   |   +--rw stream-subtree-filter? <anydata> {subtree}?
|   |   |   +--:(stream-xpath-filter)
|   |   |   |   +--rw stream-xpath-filter? yang:xpath1.0 {xpath}?
+--rw yp:selection-filter* [filter-id]
|   +--rw yp:filter-id            string
|   +--rw (yp:filter-spec)?
|   |   +--:(yp:datastore-subtree-filter)
|   |   |   +--rw yp:datastore-subtree-filter? <anydata>
|   |   |   |   {sn:subtree}?
|   |   +--:(yp:datastore-xpath-filter)
|   |   |   +--rw yp:datastore-xpath-filter? yang:xpath1.0
|   |   |   |   {sn:xpath}?
+--rw subscriptions
|   +--rw subscription* [id]
|   |   +--rw id
|   |   |   subscription-id
|   |   +--rw (target)
|   |   |   +--:(stream)
|   |   |   |   +--rw (stream-filter)?
|   |   |   |   |   +--:(by-reference)
|   |   |   |   |   |   +--rw stream-filter-name
|   |   |   |   |   |   |   stream-filter-ref
|   |   |   |   +--:(within-subscription)
|   |   |   |   |   +--rw (filter-spec)?
|   |   |   |   |   |   +--:(stream-subtree-filter)
|   |   |   |   |   |   |   +--rw stream-subtree-filter?
|   |   |   |   |   |   |   |   <anydata> {subtree}?
|   |   |   |   +--:(stream-xpath-filter)
|   |   |   |   |   +--rw stream-xpath-filter?
|   |   |   |   |   |   yang:xpath1.0 {xpath}?
|   |   |   +--rw stream
|   |   |   |   stream-ref
|   |   +--ro replay-start-time?

```

```

| | | yang:date-and-time {replay}?
| | +--rw configured-replay? empty
| | {configured,replay}?
| +--:(yp:datastore)
| | +--rw yp:datastore
| | | identityref
| | +--rw (yp:selection-filter)?
| | | +--:(yp:by-reference)
| | | | +--rw yp:selection-filter-ref
| | | | selection-filter-ref
| | | +--:(yp:within-subscription)
| | | | +--rw (yp:filter-spec)?
| | | | | +--:(yp:datastore-subtree-filter)
| | | | | | +--rw yp:datastore-subtree-filter?
| | | | | | <anydata> {sn:subtree}?
| | | | +--:(yp:datastore-xpath-filter)
| | | | | +--rw yp:datastore-xpath-filter?
| | | | | yang:xpath1.0 {sn:xpath}?
| +--rw stop-time?
| | yang:date-and-time
| +--rw dscp?
| | | inet:dscp {dscp}?
| +--rw weighting? uint8
| | {qos}?
| +--rw dependency?
| | | subscription-id {qos}?
| +--rw transport?
| | | transport {configured}?
| +--rw encoding?
| | | encoding
| +--rw purpose? string
| | {configured}?
| +--rw (notification-message-origin)? {configured}?
| | +--:(interface-originated)
| | | +--rw source-interface?
| | | | if:interface-ref {interface-designation}?
| | | +--:(address-originated)
| | | | +--rw source-vrf?
| | | | | -> /ni:network-instances/network-instance/name
| | | | | {supports-vrf}?
| | | | +--rw source-address?
| | | | | inet:ip-address-no-zone
| +--ro configured-subscription-state?
| | enumeration {configured}?
| +--rw receivers
| | +--rw receiver* [name]
| | | +--rw name string
| | | +--ro sent-event-records?

```

```

|         |         yang:zero-based-counter64
|         +---ro excluded-event-records?
|         |         yang:zero-based-counter64
|         +---ro state enumeration
|         +---x reset {configured}?
|         |         +---ro output
|         |         +---ro time yang:date-and-time
+---rw (yp:update-trigger)?
|   +---:(yp:periodic)
|   |   +---rw yp:periodic!
|   |   |   +---rw yp:period centiseconds
|   |   |   +---rw yp:anchor-time? yang:date-and-time
+---:(yp:on-change) {on-change}?
|   +---rw yp:on-change!
|   |   +---rw yp:dampening-period? centiseconds
|   |   +---rw yp:sync-on-start? boolean
|   |   +---rw yp:excluded-change* change-type
+---rw ypr:module-version-subs* [name]
|   +---rw ypr:name yang:yang-identifier
+---rw (ypr:revision-version)?
|   +---:(ypr:revision)
|   |   +---rw ypr:revision? rev:revision-date
+---:(ypr:version)
|   +---rw ypr:version? ysver:version

rpcs:
+---x establish-subscription
|   +---w input
|   |   +---w (target)
|   |   |   +---:(stream)
|   |   |   |   +---w (stream-filter)?
|   |   |   |   |   +---:(by-reference)
|   |   |   |   |   |   +---w stream-filter-name
|   |   |   |   |   |   |   stream-filter-ref
|   |   |   |   +---:(within-subscription)
|   |   |   |   |   +---w (filter-spec)?
|   |   |   |   |   |   +---:(stream-subtree-filter)
|   |   |   |   |   |   |   +---w stream-subtree-filter?
|   |   |   |   |   |   |   |   <anydata> {subtree}?
|   |   |   |   |   +---:(stream-xpath-filter)
|   |   |   |   |   |   +---w stream-xpath-filter?
|   |   |   |   |   |   |   yang:xpath1.0 {xpath}?
|   |   |   +---w stream
|   |   |   |   stream-ref
|   |   +---w replay-start-time?
|   |   |   yang:date-and-time {replay}?
+---:(yp:datastore)
|   +---w yp:datastore

```

```

|         identityref
+---w (yp:selection-filter)?
|   +---:(yp:by-reference)
|     +---w yp:selection-filter-ref
|       selection-filter-ref
+---:(yp:within-subscription)
|   +---w (yp:filter-spec)?
|     +---:(yp:datastore-subtree-filter)
|       +---w yp:datastore-subtree-filter?
|         <anydata> {sn:subtree}?
+---:(yp:datastore-xpath-filter)
|   +---w yp:datastore-xpath-filter?
|     yang:xpath1.0 {sn:xpath}?
+---w stop-time?
|   yang:date-and-time
+---w dscp?
|   inet:dscp {dscp}?
+---w weighting?
|   uint8 {qos}?
+---w dependency?
|   subscription-id {qos}?
+---w encoding?
|   encoding
+---w (yp:update-trigger)?
|   +---:(yp:periodic)
|     +---w yp:periodic!
|       +---w yp:period          centiseconds
|       +---w yp:anchor-time?    yang:date-and-time
+---:(yp:on-change) {on-change}?
|   +---w yp:on-change!
|     +---w yp:dampening-period?  centiseconds
|     +---w yp:sync-on-start?     boolean
|     +---w yp:excluded-change*   change-type
+---w ypr:module-version-subs* [name]
|   +---w ypr:name                yang:yang-identifier
+---w (ypr:revision-version)?
|   +---:(ypr:revision)
|     +---w ypr:revision?         rev:revision-date
+---:(ypr:version)
|   +---w ypr:version?           ysver:version
+--ro output
|   +--ro id                      subscription-id
|   +--ro replay-start-time-revision? yang:date-and-time
|     {replay}?
+---x modify-subscription
|   +---w input
|     +---w id
|       subscription-id

```

```

+---w (target)
|   +---:(stream)
|   |   +---w (stream-filter)?
|   |   |   +---:(by-reference)
|   |   |   |   +---w stream-filter-name
|   |   |   |   stream-filter-ref
|   |   +---:(within-subscription)
|   |   |   +---w (filter-spec)?
|   |   |   |   +---:(stream-subtree-filter)
|   |   |   |   |   +---w stream-subtree-filter?
|   |   |   |   |   <anydata> {subtree}?
|   |   |   +---:(stream-xpath-filter)
|   |   |   |   +---w stream-xpath-filter?
|   |   |   |   yang:xpath1.0 {xpath}?
|   +---:(yp:datastore)
|   |   +---w yp:datastore
|   |   |   identityref
|   |   +---w (yp:selection-filter)?
|   |   |   +---:(yp:by-reference)
|   |   |   |   +---w yp:selection-filter-ref
|   |   |   |   selection-filter-ref
|   |   +---:(yp:within-subscription)
|   |   |   +---w (yp:filter-spec)?
|   |   |   |   +---:(yp:datastore-subtree-filter)
|   |   |   |   |   +---w yp:datastore-subtree-filter?
|   |   |   |   |   <anydata> {sn:subtree}?
|   |   |   +---:(yp:datastore-xpath-filter)
|   |   |   |   +---w yp:datastore-xpath-filter?
|   |   |   |   yang:xpath1.0 {sn:xpath}?
|   +---w stop-time?
|   |   yang:date-and-time
|   +---w (yp:update-trigger)?
|   |   +---:(yp:periodic)
|   |   |   +---w yp:periodic!
|   |   |   |   +---w yp:period          centiseconds
|   |   |   |   +---w yp:anchor-time?  yang:date-and-time
|   |   +---:(yp:on-change) {on-change}?
|   |   |   +---w yp:on-change!
|   |   |   |   +---w yp:dampening-period?  centiseconds
|   +---w ypr:module-version-subs* [name]
|   |   +---w ypr:name          yang:yang-identifier
|   |   +---w (ypr:revision-version)?
|   |   |   +---:(ypr:revision)
|   |   |   |   +---w ypr:revision?  rev:revision-date
|   |   +---:(ypr:version)
|   |   |   +---w ypr:version?      ysver:version
+---x delete-subscription
|   +---w input

```

```

|      +---w id      subscription-id
+---x kill-subscription
|      +---w input
|      +---w id      subscription-id

notifications:
+---n replay-completed {replay}?
|  +---ro id      subscription-id
+---n subscription-completed {configured}?
|  +---ro id      subscription-id
+---n subscription-modified
|  +---ro id
|  |      subscription-id
+---ro (target)
|  +---:(stream)
|  |      +---ro (stream-filter)?
|  |      |      +---:(by-reference)
|  |      |      |      +---ro stream-filter-name
|  |      |      |      stream-filter-ref
|  |      |      +---:(within-subscription)
|  |      |      +---ro (filter-spec)?
|  |      |      |      +---:(stream-subtree-filter)
|  |      |      |      |      +---ro stream-subtree-filter?
|  |      |      |      |      <anydata> {subtree}?
|  |      |      |      +---:(stream-xpath-filter)
|  |      |      |      +---ro stream-xpath-filter?
|  |      |      |      yang:xpath1.0 {xpath}?
|  |      +---ro stream
|  |      |      stream-ref
|  |      +---ro replay-start-time?
|  |      |      yang:date-and-time {replay}?
+---:(yp:datastore)
|  +---ro yp:datastore
|  |      identityref
+---ro (yp:selection-filter)?
|  +---:(yp:by-reference)
|  |      +---ro yp:selection-filter-ref
|  |      |      selection-filter-ref
+---:(yp:within-subscription)
|  +---ro (yp:filter-spec)?
|  |      +---:(yp:datastore-subtree-filter)
|  |      |      +---ro yp:datastore-subtree-filter?
|  |      |      |      <anydata> {sn:subtree}?
+---:(yp:datastore-xpath-filter)
|  +---ro yp:datastore-xpath-filter?
|  |      yang:xpath1.0 {sn:xpath}?
+---ro stop-time?
|  yang:date-and-time

```

```

|  +--ro dscp?
|  |   inet:dscp {dscp}?
|  +--ro weighting?                               uint8
|  |   {qos}?
|  +--ro dependency?
|  |   subscription-id {qos}?
|  +--ro transport?
|  |   transport {configured}?
|  +--ro encoding?
|  |   encoding
|  +--ro purpose?                                   string
|  |   {configured}?
|  +--ro (yp:update-trigger)?
|  |   +--:(yp:periodic)
|  |   |   +--ro yp:periodic!
|  |   |   |   +--ro yp:period            centiseconds
|  |   |   |   +--ro yp:anchor-time?      yang:date-and-time
|  |   +--:(yp:on-change) {on-change}?
|  |   |   +--ro yp:on-change!
|  |   |   |   +--ro yp:dampening-period?  centiseconds
|  |   |   |   +--ro yp:sync-on-start?     boolean
|  |   |   |   +--ro yp:excluded-change*   change-type
|  +--ro ypr:module-version* [name]
|  |   +--ro ypr:name                yang:yang-identifier
|  |   +--ro ypr:revision            rev:revision-date
|  |   +--ro ypr:version?            ysver:version
|  +--ro ypr:yang-library-content-id?
|  |   -> /yanglib:yang-library/content-id
+---n subscription-resumed
|  +--ro id      subscription-id
+---n subscription-started {configured}?
|  +--ro id
|  |   subscription-id
|  +--ro (target)
|  |   +--:(stream)
|  |   |   +--ro (stream-filter)?
|  |   |   |   +--:(by-reference)
|  |   |   |   |   +--ro stream-filter-name
|  |   |   |   |   |   stream-filter-ref
|  |   |   +--:(within-subscription)
|  |   |   |   +--ro (filter-spec)?
|  |   |   |   |   +--:(stream-subtree-filter)
|  |   |   |   |   |   +--ro stream-subtree-filter?
|  |   |   |   |   |   |   <anydata> {subtree}?
|  |   |   +--:(stream-xpath-filter)
|  |   |   |   +--ro stream-xpath-filter?
|  |   |   |   |   yang:xpath1.0 {xpath}?
|  +--ro stream

```

```

|   |   |   |   stream-ref
|   |   |   |   +--ro replay-start-time?
|   |   |   |   |   yang:date-and-time {replay}?
|   |   |   |   +--ro replay-previous-event-time?
|   |   |   |   |   yang:date-and-time {replay}?
|   |   |   +--:(yp:datastore)
|   |   |   |   +--ro yp:datastore
|   |   |   |   |   identityref
|   |   |   |   +--ro (yp:selection-filter)?
|   |   |   |   |   +--:(yp:by-reference)
|   |   |   |   |   |   +--ro yp:selection-filter-ref
|   |   |   |   |   |   |   selection-filter-ref
|   |   |   |   +--:(yp:within-subscription)
|   |   |   |   |   +--ro (yp:filter-spec)?
|   |   |   |   |   |   +--:(yp:datastore-subtree-filter)
|   |   |   |   |   |   |   +--ro yp:datastore-subtree-filter?
|   |   |   |   |   |   |   |   <anydata> {sn:subtree}?
|   |   |   |   |   |   +--:(yp:datastore-xpath-filter)
|   |   |   |   |   |   |   +--ro yp:datastore-xpath-filter?
|   |   |   |   |   |   |   |   yang:xpath1.0 {sn:xpath}?
|   |   |   +--ro stop-time?
|   |   |   |   yang:date-and-time
|   |   |   +--ro dscp?
|   |   |   |   inet:dscp {dscp}?
|   |   |   +--ro weighting?
|   |   |   |   {qos}?
|   |   |   +--ro dependency?
|   |   |   |   subscription-id {qos}?
|   |   |   +--ro transport?
|   |   |   |   transport {configured}?
|   |   |   +--ro encoding?
|   |   |   |   encoding
|   |   |   +--ro purpose?
|   |   |   |   {configured}?
|   |   |   +--ro (yp:update-trigger)?
|   |   |   |   +--:(yp:periodic)
|   |   |   |   |   +--ro yp:periodic!
|   |   |   |   |   |   +--ro yp:period
|   |   |   |   |   |   |   centiseconds
|   |   |   |   |   |   +--ro yp:anchor-time?
|   |   |   |   |   |   |   yang:date-and-time
|   |   |   |   +--:(yp:on-change) {on-change}?
|   |   |   |   |   +--ro yp:on-change!
|   |   |   |   |   |   +--ro yp:dampening-period?
|   |   |   |   |   |   |   centiseconds
|   |   |   |   |   |   +--ro yp:sync-on-start?
|   |   |   |   |   |   |   boolean
|   |   |   |   |   |   +--ro yp:excluded-change*
|   |   |   |   |   |   |   change-type
|   |   |   +--ro ypr:module-version* [name]
|   |   |   |   +--ro ypr:name
|   |   |   |   |   yang:yang-identifier
|   |   |   |   +--ro ypr:revision
|   |   |   |   |   rev:revision-date
|   |   |   |   +--ro ypr:version?
|   |   |   |   |   ysver:version

```

uint8

string

```
|  +--ro ypr:yang-library-content-id?
|  -> /yanglib:yang-library/content-id
+---n subscription-suspended
|  +--ro id          subscription-id
|  +--ro reason      identityref
+---n subscription-terminated
|  +--ro id          subscription-id
|  +--ro reason      identityref
```

5.2. YANG Module

The YANG module has two leaves augmenting the model of Subscription to YANG Notifications [RFC8639].

```
<CODE BEGINS> file "ietf-yang-push-revision@2025-12-07.yang"
module ietf-yang-push-revision {
  yang-version 1.1;
  namespace
    "urn:ietf:params:xml:ns:yang:ietf-yang-push-revision";
  prefix ypr;
  import ietf-subscribed-notifications {
    prefix sn;
    reference
      "RFC 8639: Subscription to YANG Notifications";
  }
  import ietf-yang-revisions {
    prefix rev;
    reference
      "RFC YYYY: draft-ietf-netmod-yang-module-versioning-13,
      Updated YANG Module Revision Handling";
  }
  import ietf-yang-types {
    prefix yang;
    rev:recommended-min-date "2013-07-15";
    reference
      "RFC 6991: Common YANG Data Types.";
  }
  import ietf-yang-semver {
    prefix ysver;
    reference
      "RFC ZZZZ: draft-ietf-netmod-yang-semver-23, YANG Semantic
      Versioning";
  }
  import ietf-yang-library {
    prefix yanglib;
    reference
      "RFC 8525: YANG Library";
  }
}
```

```
import ietf-system-capabilities {
  prefix sysc;
  reference
    "RFC 9196: YANG Modules Describing Capabilities for
    Systems and Datastore Update Notifications";
}
import ietf-notification-capabilities {
  prefix notc;
  reference
    "RFC 9196: YANG Modules Describing Capabilities for
    Systems and Datastore Update Notifications";
}

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

  Authors:    Thomas Graf
               <mailto:thomas.graf@swisscom.com>
               Benoit Claise
               <mailto:benoit.claise@huawei.com>
               Alex Huang Feng
               <mailto:alex.huang-feng@insa-lyon.fr>";

description
  "Defines YANG-Push event notification header with the revision
  and the version. Adds the support of the revision and
  version selection in the YANG-Push subscription RPCs.

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  identified as authors of the code. All rights reserved.

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  Relating to IETF Documents
  (https://trustee.ietf.org/license-info).

  All revisions of IETF and IANA published modules can be found
  at the YANG Parameters registry
  (https://www.iana.org/assignments/yang-parameters).

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

  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 (RFC 2119) (RFC 8174) when, and only when, they appear in all capitals, as shown here.";

```
revision 2025-12-07 {
  description
    "First revision";
  reference
    "RFC XXXX: Support of Versioning in YANG Notifications
    Subscription";
}

// Identities
identity revision-unsupported {
  base sn:establish-subscription-error;
  base sn:modify-subscription-error;
  description
    "Revision not supported. This failure can be due to
    subscribing to a specific revision not supported by the
    publisher.";
}

identity version-unsupported {
  base sn:establish-subscription-error;
  base sn:modify-subscription-error;
  description
    "Specific version not supported. This failure can be due to
    subscribing to a specific version not supported by the
    publisher.";
}

identity incompatible-revision-and-version {
  base sn:establish-subscription-error;
  base sn:modify-subscription-error;
  description
    "The combination of revision and version are
    incompatible. This failure happens when the revision and the
    version are both specified in the RPC and the YANG
    module supported by the publisher does not support one of them.";
}

grouping yang-push-module-version-subs {
  description
    "This grouping combines the module name, the revision and
    version leaves. This grouping is to be used for
    configuration and the leaves are not mandatory.";
  leaf name {
```

```
    type yang:yang-identifier;
    description
      "This references the YANG module name.";
  }
  choice revision-version {
    description
      "Specifies the revision or version of the YANG module sent
      in the subscription.";
    case revision {
      leaf revision {
        type rev:revision-date;
        description
          "This references the YANG module revision to be sent in the
          subscription.";
      }
    }
    case version {
      leaf version {
        type ysver:version;
        description
          "This references the YANG module semantic version to be sent
          in the subscription.";
      }
    }
  }
}

grouping yang-push-module-version-notif {
  description
    "This grouping combines the module name, the revision and
    version leaves. This grouping is to be used for
    read-only cases such as the content of YANG-Push Notifications.
    The name and revision are mandatory and MUST be present
    in the data.";
  leaf name {
    type yang:yang-identifier;
    config false;
    mandatory true;
    description
      "This references the YANG module name.";
  }
  leaf revision {
    type rev:revision-date;
    config false;
    mandatory true;
    description
      "This references the YANG module revision of the sent
      notification message.";
```

```
    }
    leaf version {
      type ysver:version;
      description
        "This references the YANG module semantic version of the
        sent notification message.";
    }
  }

  grouping yang-push-module-version-notif-list {
    description
      "This grouping defines a list of yang-push-module-version-notif
      grouping.";
    list module-version {
      key "name";
      config false;
      description
        "List of yang-push-module-version grouping. The revision is
        not configurable.";
      uses ypr:yang-push-module-version-notif;
    }
    leaf yang-library-content-id {
      type leafref {
        path "/yanglib:yang-library/yanglib:content-id";
      }
      config false;
      description
        "Contains the YANG library content identifier RFC 8525
        information.";
    }
  }

  grouping yang-push-module-version-subs-list {
    description
      "This grouping defines a list of yang-push-module-version-subs
      grouping.";
    list module-version-subs {
      key "name";
      description
        "List of yang-push-module-version-subs grouping. The
        revision is configurable.";
      uses ypr:yang-push-module-version-subs;
    }
  }

  // Subscription parameters
  augment "/sn:establish-subscription/sn:input" {
    description
```

```
    "Augment the establish-subscription RPC from the
    ietf-subscribed-notifications YANG module with the
    yang-push-module-version-subs-list grouping.";
    uses ypr:yang-push-module-version-subs-list;
}
augment "/sn:modify-subscription/sn:input" {
    description
        "Augment the modify-subscription RPC from the
        ietf-subscribed-notifications YANG module with the
        yang-push-module-version-subs-list grouping.";
    uses ypr:yang-push-module-version-subs-list;
}

// Subscription notifications
augment "/sn:subscription-started" {
    description
        "Augment the subscription-started notification from the
        ietf-subscribed-notifications YANG module with the
        yang-push-module-version-notif-list grouping.";
    uses ypr:yang-push-module-version-notif-list;
}
augment "/sn:subscription-modified" {
    description
        "Augment the subscription-modified notification from the
        ietf-subscribed-notifications YANG module with the
        yang-push-module-version-notif-list grouping.";
    uses ypr:yang-push-module-version-notif-list;
}

// Subscription container
augment "/sn:subscriptions/sn:subscription" {
    description
        "Augment the subscriptions RPC container from the
        ietf-subscribed-notifications YANG module with the
        yang-push-module-version-subs-list grouping.";
    uses ypr:yang-push-module-version-subs-list;
}

// Subscription capabilities
augment "/sysc:system-capabilities/notc:subscription-capabilities" {
    description
        "Add system level capabilities";
    leaf yang-push-module-revision-supported {
        type boolean;
        default true;
        description
            "Specifies whether the publisher supports exporting
            revision and version in YANG-Push subscription state change
```

```
        notifications. If set to true, publisher supports. If set to
        false, publisher does not support.";
    reference
        "RFC XXXX: Support of Versioning in YANG Notifications
        Subscription";
    }
}
}
<CODE ENDS>
```

6. IANA Considerations

6.1. IETF XML Registry

This document registers the following URIs in the "IETF XML Registry" [RFC3688]:

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

6.2. YANG Module Name

This document registers the following YANG modules in the 'YANG Module Names' registry [RFC6020]:

```
name: ietf-yang-push-revision
namespace: urn:ietf:params:xml:ns:yang:ietf-yang-push-revision
prefix: ypr
reference: RFC-to-be
```

7. Operational Considerations

The solution described in this document allows Subscription policies to be constrained to a particular module revisions/versions that are used by the Publisher before a Subscription is initiated. The augmentations to the Subscription state change Notifications also gives the Receiver additional context and confidence of the current schema associated with a Subscription.

Section 2.5.1 of [RFC8639] describes the Subscription state machine for Configured YANG-Push Subscriptions. It states that 'subscription-modified' condition is triggered when the Subscription policy is being changed. Since this document proposes YANG version and revision extensions in Subscription configuration and state change notifications, it is expected that changes in YANG version and revision of a Subscription during Subscription lifecycle accounts for changes in Subscription policy and therefore MUST trigger 'subscription-modified' Subscription state change Notifications.

Note, that not all modules used or referenced under a Subscription path are included in the Subscription state change Notification, and hence, it is possible that the schema associated with a Subscription MAY change without any corresponding change to the advertise module revisions or versions. Therefore, the YANG Library content-id that is also included in the Subscription state change Notifications allows the Receiver to detect if there were changes to the device schema. This includes changes not related to the Subscription path as well. Take Figure 6 as example. The Subscription path is '/ietf-interfaces:interfaces' and the listed YANG module name is 'ietf-interfaces' with revision '2018-02-20' and version '2.0.0'. The 'ietf-interfaces' YANG module defined in Section 5 of [RFC8343] and imports 'ietf-yang-types' YANG module. If 'ietf-interfaces' YANG module version or revision would change during the Subscription lifecycle, a YANG-Push Receiver would recognize the change since the revision or version in the module-version and the YANG library content-id has changed. However, if 'ietf-yang-types' YANG module version or revision would change, a YANG-Push Receiver would only be able to recognize the change using the YANG library content-id.

A YANG package [I-D.ietf-netmod-yang-packages], specifies a versioned organizational structure used to manage a set of YANG modules that collectively defines a package schema. For example, a YANG package could contain a set of YANG modules required to implement a L3VPN service on a network node. It offers therefore a complementary information to the solution in this draft by describing how one specific YANG module revision is part of a set of YANG modules.

8. Implementation Status

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

8.1. Huawei VRP

Huawei implemented in Notification the 'module', 'revision' and 'version' extension as described in Section 3 for a YANG-Push Publisher on UDP-based Transport for Configured Subscriptions [I-D.ietf-netconf-udp-notif] in their VRP platform.

8.2. 6WIND VSR

6WIND implemented in Notification 'module', 'revision' and 'library-content-id' extension as described in Section 3 for a YANG-Push Publisher on UDP-based Transport for Configured Subscriptions [I-D.ietf-netconf-udp-notif] in their VSR platform.

8.3. Cisco IOS XR

Cisco implemented in Notification 'module', 'revision' and 'library-content-id' extension as described in Section 3 and 'module' and 'revision' in Subscription as described in Section 2 for a YANG-Push Publisher on UDP-based Transport for Configured Subscriptions [I-D.ietf-netconf-udp-notif] in their IOS XR platform.

9. Security Considerations

This section uses the template described in Section 3.7 of [I-D.ietf-netmod-rfc8407bis].

The "ietf-yang-push-revision" YANG module defines a data model that is designed to be accessed via YANG-based management protocols, such as NETCONF [RFC6241] and RESTCONF [RFC8040]. These YANG-based management protocols (1) have to use a secure transport layer (e.g., SSH [RFC6242], TLS [RFC8446], and QUIC [RFC9000]) and (2) have to use mutual authentication.

The Network Configuration Access Control Model (NACM) [RFC8341] 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). All writable data nodes are likely to be reasonably sensitive or vulnerable in some network environments. Write operations (e.g., edit-config) and delete operations to these data nodes without proper protection or authentication can have a negative effect on network operations. The following subtrees and data nodes have particular sensitivities/vulnerabilities:

- * /sn:establish-subscription/sn:input/ypr:module-version-subs
- * /sn:modify-subscription/sn:input/ypr:module-version-subs
- * /sn:subscriptions/sn:subscription/ypr:module-version-subs

The entries in the list above allow in a YANG-Push Subscription to define the revision or version of a YANG module name. Access control MUST be set so that only someone with proper access permissions has the ability to access and modify this resource.

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