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Support of Versioning in YANG Notifications Subscription
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Abstract

This document extends the YANG notifications subscription mechanism to specify the YANG module semantic version at the subscription. Then, a new extension with the revision and the semantic version of the YANG-Push subscription state change notification is proposed.

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1. Introduction

In order to process the newly received YANG-Push notification messages described in Section 3.7 of [RFC8641] without querying the Publisher IETF-YANG-LIBRARY each time to understand whether the YANG module(s) semantic has changed at the YANG-Push receiver, a semantic reference to the YANG module and the XPath or subtree is needed to determine the data types for each field and which part of the YANG module the metrics are expose from.

This specification applies to the YANG-Push configured subscriptions defined in Section 2.5 of [RFC8639], where a publisher is configured to stream notification out of band, as opposed to dynamic subscriptions defined in Section 2.4 of [RFC8639], where the

subscriber can initiate and modify the subscription dynamically in-band. In the latter case, the subscriber knows already all the subscriber YANG-related information, which it has to know in order to configure the subscription.

This semantic reference is available when the subscription is established as described in Section 3.6 of [RFC8641] and being streamed from the publisher to receiver with the subscription state change notifications described in Section 2.7 of [RFC8639] where for each subscription a locally unique subscription ID described in Section 4.3.2 of [RFC8641] is being issued and streamed as metadata with the notification message in the YANG-Push message header.

The semantics can change between different YANG module revisions. The YANG module version statement is specified in Section 7.1.2 of [RFC6020] 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 allow to specify the YANG module revision. When a network node is upgraded, the subscribed YANG module revision MAY have updated and might, consequently, break the data processing pipeline since the YANG-Push receiver may not be aware of this change.

This documents extends the current YANG notifications subscription mechanism to allow to subscribe 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, revision-label, and YANG library content-id. Changes in the revision and revision-label fields allow a YANG-Push receiver to detect whenever the subscribed YANG module has changed. Changes in the yang-library-content-id that YANG module(s) on the network management server of the YANG-Push publisher has/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 "YANG library" and "YANG library content identifier" are used as defined in [RFC8525].

2. Extend the Datastore Selection

The YANG notifications subscription **OPTIONALLY** can be restricted to the following YANG module revision for future capabilities:

module: Restricts the subscription to one or more YANG module names with revision and revision-label together for the related streamed content.

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

revision-label: Restricts the subscription to the latest compatible YANG module semantic version referenced to. Example: "2.0.0".

When the NETCONF client creates or modifies the subscription using the RPCs establish-subscription and modify-subscription and the NETCONF server does not support the revision, the revision-label or the combination of revision and revision-label specified in the RPC request, the NETCONF server **MUST** return an RPC reply including 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
revision-label-unsupported	invalid-value
incompatible-revision-and-revision-label	invalid-value

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

Figure 1 provides an example of a "establish-subscription" RPC call with YANG revision and datastore-xpath-filter for periodical subscription. 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.

```
<netconf: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:module-name>ex:foo</ypr:module-name>
      <ypr:revision>2023-09-17</ypr:revision>
    </ypr:module-version>
    <yp:periodic>
      <yp:period>500</yp:period>
    </yp:periodic>
  </establish-subscription>
</netconf:rpc>
```

Figure 1: RPC Example for an establish-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

3. Extend the Subscription State Change Notifications

Besides the Subscription ID and the xpath or sub-tree 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 notification.

module: Describes the YANG module names for the related streamed content.

revision: Describes the YANG module revision as specified in Section 7.1.9 of [RFC6020] for the related streamed content.

revision-label: 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 4 provides an example of a "subscription-modified" subscription state change notification message with the YANG module name, revision, revision label and datastore-xpath-filter for tracking the operational status of a single Ethernet interface (per [RFC8343]). This subscription state change notification message is encoded 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">
      <module-name>ietf-interfaces</module-name>
      <revision>2018-02-20</revision>
      <revision-label>2.0.0</revision-label>
    <yang-library-content-id>1</yang-library-content-id>
    </module-version>
  </subscription-modified>
</notification>
```

Figure 4: XML Push Example for a subscription-modified notification message

Figure 5 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": [
        {
          "module-name": "ietf-interfaces"
          "revision": "2018-02-20",
          "revision-label": "2.0.0",
        }
      ],
      "ietf-yang-push-revision:yang-library-content-id": "1",
    }
  }
}
```

Figure 5: JSON Push Example for a subscription-modified notification message

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

A client can discover the support of 'ietf-yang-push-revision' model through the capabilities model defined in [RFC9196]. This documents extends the 'ietf-notification-capabilities' model with:

- * A leaf 'yang-push-module-revision-supported', stating that the YANG-Push subscription state change notifications are extended with 'revision', 'revision-label' 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
          |   {yang-push-revision-supported}?

```

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

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

5.1. Data Model Overview

This YANG module augments the "ietf-yang-push" module with the 'module-name', 'revision', 'revision-label' and 'yang-library-content-id' in the 'subscription-started' and 'subscription-modified' subscription state change notifications and the ability to define the 'revision' and 'revision-label' 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-config* [module-name]
    {yang-push-revision-supported}?
  +---w module-name          yang:yang-identifier
  +---w revision?            rev:revision-date
  +---w revision-label?      ysver:version
augment /sn:modify-subscription/sn:input:
  +---w module-version-config* [module-name]
    {yang-push-revision-supported}?
  +---w module-name          yang:yang-identifier
  +---w revision?            rev:revision-date
  +---w revision-label?      ysver:version
augment /sn:subscription-started:
  +--ro module-version* [module-name]
  |   {yang-push-revision-supported}?
  |   +--ro module-name          yang:yang-identifier
  |   +--ro revision             rev:revision-date
  |   +--ro revision-label?      ysver:version
  +--ro yang-library-content-id? -> /yanglib:yang-library/content-id
    {yang-push-revision-supported}?
augment /sn:subscription-modified:
  +--ro module-version* [module-name]
  |   {yang-push-revision-supported}?
  |   +--ro module-name          yang:yang-identifier
  |   +--ro revision             rev:revision-date
  |   +--ro revision-label?      ysver:version
  +--ro yang-library-content-id? -> /yanglib:yang-library/content-id
    {yang-push-revision-supported}?
augment /sn:subscriptions/sn:subscription:
  +--rw module-version-config* [module-name]
    {yang-push-revision-supported}?
  +--rw module-name          yang:yang-identifier
  +--rw revision?            rev:revision-date
  +--rw revision-label?      ysver:version
augment /sysc:system-capabilities/notc:subscription-capabilities:
  +--ro yang-push-module-revision-supported? boolean
    {yang-push-revision-supported}?
```

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-yang-push
```

```
rpcs:
```

```
  +---x resync-subscription {on-change}?
    +---w input
      +---w id      sn:subscription-id
```

```
notifications:
```

```
  +---n push-update
    | +--ro id?          sn:subscription-id
    | +--ro datastore-contents? <anydata>
    | +--ro incomplete-update? empty
  +---n push-change-update {on-change}?
    +--ro id?          sn:subscription-id
    +--ro datastore-changes
      | +--ro yang-patch
      |   +--ro patch-id      string
      |   +--ro comment?     string
      |   +--ro edit* [edit-id]
      |     +--ro edit-id      string
      |     +--ro operation    enumeration
      |     +--ro target       target-resource-offset
      |     +--ro point?       target-resource-offset
      |     +--ro where?       enumeration
      |     +--ro value?       <anydata>
    +--ro incomplete-update? empty
```

```
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 ypr:module-version-config* [module-name]
|   {yang-push-revision-supported}?
|   +--rw ypr:module-name        yang:yang-identifier
|   +--rw ypr:revision?          rev:revision-date
|   +--rw ypr:revision-label?    ysver:version
+--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

```

```

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?
            |
            {qos}?
          +---w dependency?
            |
            subscription-id {qos}?
          +---w encoding?
            |
            encoding
          +---w ypr:module-version-config* [module-name]
            |
            {yang-push-revision-supported}?

```

uint8

```

| | | +---w ypr:module-name          yang:yang-identifier
| | | +---w ypr:revision?           rev:revision-date
| | | +---w ypr:revision-label?     ysver:version
| | +---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
| +--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 ypr:module-version-config* [module-name]
|         |         {yang-push-revision-supported}?
|         |         +---w ypr:module-name         yang:yang-identifier
|         |         +---w ypr:revision?           rev:revision-date
|         |         +---w ypr:revision-label?     ysver:version
+---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
+---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 ypr:module-version* [module-name]
| | {yang-push-revision-supported}?
| | +--ro ypr:module-name      yang:yang-identifier
| | +--ro ypr:revision         rev:revision-date
| | +--ro ypr:revision-label?  ysver:version
+--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
+---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?

```

uint8

encoding

```

|   +--ro purpose?                               string
|   |   {configured}?
|   +--ro ypr:module-version* [module-name]
|   |   {yang-push-revision-supported}?
|   |   +--ro ypr:module-name          yang:yang-identifier
|   |   +--ro ypr:revision             rev:revision-date
|   |   +--ro ypr:revision-label?     ysver:version
|   +--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
+---n subscription-suspended
|   +--ro id          subscription-id
|   +--ro reason      identityref
+---n subscription-terminated
|   +--ro id          subscription-id
|   +--ro reason      identityref

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
    {yang-push-revision-supported}?

```

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@2025-04-05.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-11,
      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-15, 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 revision-label. Adds the support of the revision and
  revision-label selection in the YANG-Push subscription RPCs.

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  identified as authors of the code. All rights reserved.

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  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>).

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.";

```
revision 2025-04-05 {
  description
    "First revision";
  reference
    "RFC XXXX: Support of Versioning in YANG Notifications
    Subscription";
}

feature yang-push-revision-supported {
  description
    "This feature indicates the YANG Subscription Notifications
    supports specifying the list of modules, revisions and
    revision-label in the YANG 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 revision-label-unsupported {
  base sn:establish-subscription-error;
  base sn:modify-subscription-error;
  description
    "Revision-label not supported. This failure can be due to
    subscribing to a specific revision-label not supported by the
    publisher.";
}

identity incompatible-revision-and-revision-label {
  base sn:establish-subscription-error;
  base sn:modify-subscription-error;
  description
    "The combination of revision and the revision-label are
    incompatible. This failure happens when the revision and the
```

```
    revision-label are both specified in the RPC and the YANG
    module supported by the publisher does not support one of the
    revision or the revision-label.";
}

grouping yang-push-module-version-config {
  description
    "This grouping combines the module name, the revision and
    revision-label leaves. This grouping is to be used for
    configuration and the leaves are not mandatory.";
  leaf module-name {
    type yang:yang-identifier;
    description
      "This references the YANG module name.";
  }
  leaf revision {
    type rev:revision-date;
    description
      "This references the YANG module revision to be sent in the
      subscription.";
  }
  leaf revision-label {
    type ysver:version;
    description
      "This references the YANG module semantic version to be sent in
      the subscription.";
  }
}

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

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

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

// Subscription parameters
```

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

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

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

// Event capabilities
augment "/sysc:system-capabilities/notc:subscription-capabilities" {
  description
```

```
    "Add system level capabilities";
  leaf yang-push-module-revision-supported {
    type boolean;
    description
      "Specifies whether the publisher supports exporting
       revision and revision-label in YANG-Push subscription state
       change notifications.";
    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

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 'revision-label' 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

The security considerations for the YANG notifications subscription mechanism are described in [RFC8641]. This documents adds no additional security considerations.

10. Acknowledgements

The authors would like to thank Qiufang Ma, Robert Wilton and Jian Ping Zhang for their review and valuable comments.

11. References

11.1. Normative References

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