

Extensible YANG Model for YANG-Push Notifications

I-D: draft-ietf-netconf-notif-envelope-03

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Extensible YANG model for YANG-Push Notifications

Status of the draft

- Draft under WGLC since **28th August** [1]
 - Extended WGLC to facilitate early reviews by OPSDIR and YANGDOCTORS
 - YANGDOCTOR review by Jürgen Schönwälder: “**Almost Ready**”
 - OPSDIR review by Joe Clarke: “**Has Issues**” (more of a “*discuss*”)
- WGLC forwarded to CORE WG for review
 - No feedback received from CORE WG
- Received reviews from Andy Bierman, Paul Aitken, Qin Wu, Rob Wilton, Reshad Rahman, Jürgen Schönwälder and Joe Clark
 - Thanks a lot for the reviews!
- 2 last-minute “open discussions”

[1] https://mailarchive.ietf.org/arch/msg/netconf/V0awk3huXZg7V_DIQn5fFNn5kvo/

Extensible YANG model for YANG-Push Notifications

Changes since -02

- Editorial changes fixing ambiguity
- Fixed XML/JSON/CBOR examples
- Removed “**The 'contents' element MUST be located at the end of the notification envelope structure.**”
- Removed references
 - RFC3339 (Timestamps) → Rely on [ietf-yang-types@2025-06-23.yang](#) for the compliance with RFC3339 and RFC9557 (Timestamps with Additional Information)
 - RFC1213 (MIB, for the definition of sysName) → Rely on [ietf-yang-types@2025-06-23.yang](#) for the newly defined “type inet:host-name”
- Changed “type inet:hostname” to “type inet:host-name” for the definition of a hostname
- New text: “The hostname MUST be configured before by the administrator to identify the node uniquely.”
- Made .sid file normative
- New YANG features:
 - “feature notification-envelope”: Support of the notif-envelope
 - “feature hostname-sequence-number”: Support of the hostname and sequence number

Extensible YANG model for YANG-Push Notifications

Last minute discussion (1)

- Reshad suggested changing “timestamp” to “observed-timestamp”

```
[{"ietf-yp-notification:envelope": {  
    "event-time": "2025-03-25T08:30:11.22Z",  
    "hostname": "example-router.example.com",  
    "sequence-number": 1,  
    "contents": {  
        "ietf-yang-push:push-update": {  
            "id": 6666,  
            "ietf-yp-observation:timestamp": "2025-03-25T08:29:30.22Z",  
            "ietf-yp-observation:point-in-time": "initial-state",  
            "datastore-contents": {  
                "ietf-interfaces:interfaces": {  
                    "interface": [  
                        {"name": "GigabitEthernet0/0", "state": "up"},  
                        {"name": "GigabitEthernet0/0.1", "state": "up"}  
                    ]  
                }  
            }  
        }  
    }  
}
```

(Current version & position from the authors)

```
{  
    "ietf-yp-notification:envelope": {  
        "event-time": "2025-03-25T08:30:11.22Z",  
        "hostname": "example-router.example.com",  
        "sequence-number": 1,  
        "contents": {  
            "ietf-yang-push:push-update": {  
                "id": 6666,  
                "ietf-yp-observation:observed-timestamp": "2025-03-25T08:29:30.22Z",  
                "ietf-yp-observation:point-in-time": "initial-state",  
                "datastore-contents": {  
                    "ietf-interfaces:interfaces": {  
                        "interface": [  
                            {"name": "GigabitEthernet0/0", "state": "up"},  
                            {"name": "GigabitEthernet0/0.1", "state": "up"}  
                        ]  
                    }  
                }  
            }  
        }  
    }  
}
```

Proposal from Reshad

Reasons in favor of “observed-timestamp”:

- XML readability

Arguments against “observed-timestamp”:

- [draft-ietf-netmod-rfc8407bis-28#section-4.3.1](https://datatracker.ietf.org/doc/draft-ietf-netmod-rfc8407bis-28#section-4.3.1) states that the name should not be repeated within a container

NETCONF WG:

→ We request feedback from the WG to close this discussion

Extensible YANG model for YANG-Push Notifications

Last minute discussion (2)

- Current:
 - Toggling “enable-notification-envelope” kills all the active subscriptions (both dynamic and configured)
- Joe Clarke (OPSDIR review) proposes to
 - Enable *toggling* “enable-notification-envelope” **only** if all active subscriptions are terminated (less disruptive)

When active subscriptions exist, the 'enable-notification-envelope' node MUST NOT be modified until all such subscriptions have been terminated. The publisher MUST reject any attempt to change the 'enable-notification-envelope' node while active subscriptions are actively sending notifications. Any new subscription after the change uses the header defined by the node 'enable-notification-envelope', i.e. encoded as Section 3.3.1 when enabled and as defined in [RFC5277] if disabled.

Proposal from the authors

NETCONF WG:

→ We request feedback from the WG to close this discussion. Any objections?

Extensible YANG model for YANG-Push Notifications

Next steps

- Submit -04 iteration integrating OPSDIR review and last changes
- Send to the IESG for publication

BACKUP

Extensible YANG model for YANG-Push Notifications

Proposal of this I-D

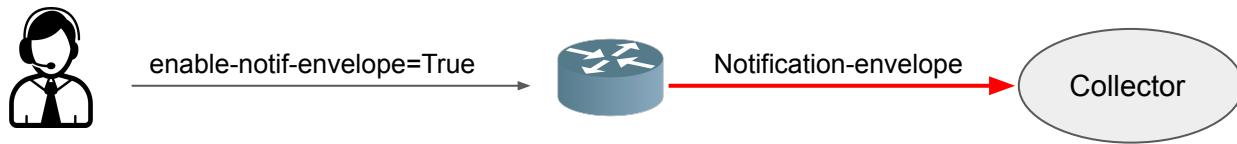
- Structure defined as a notification containing
 - event-time
 - metadata(s)
 - contents

```
structure envelope:  
  +-+ event-time          yang:date-and-time  
  +-+ hostname?           inet:host  
  +-+ sequence-number?    yang:counter32  
  +-+ contents?           <anydata>
```

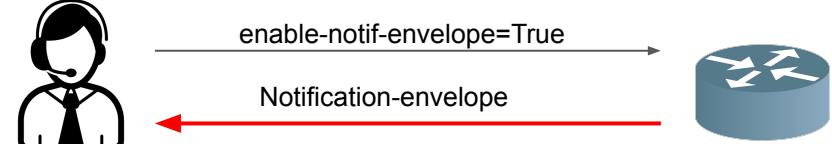
```
{  
  "ietf-yp-notification:envelope": {  
    "event-time": "2024-10-10T08:00:11.22Z",  
    "contents": {  
      "ietf-yang-push:push-update": {  
        "id": 1011,  
        "datastore-contents": {  
          "ietf-interfaces:interfaces": [  
            {  
              "interface": {  
                "name": "eth0",  
                "oper-status": "up"  
              }  
            }  
          ]  
        }  
      }  
    }  
  }  
}
```

JSON example without metadata

Configured Subscriptions



Dynamic Subscriptions



Extensible YANG model for YANG-Push Notifications

Proposal of this I-D

- YANG Notification structure for **YANG-Push Notifications** [RFC 8639/8641]
 - (1) Option to “opt-in” to this notification envelope
 - (2) Able to discover the capability of this new header through “ietf-notification-capabilities”
 - (3) Extensible header defined in YANG 1.1
 - (4) Definition of each encoding (XML, JSON, CBOR)
 - (5) Defines the first base extensions (I-D.tgraf-netconf-notif-sequencing; I-D.tgraf-netconf-yang-push-observation-time)

Extensible YANG model for YANG-Push Notifications

Reminder on current proposal

- Initial proposal was centralizing requests via an RPC call
 - Feedback: complex to manage
- Current proposal:
 - Switch headers using “/sn:subscriptions/inotenv:enable-notification-envelope”

```
module: ietf-yp-notification

augment /sn:subscriptions:
  +-rw enable-notification-envelope?  boolean
  +-rw metadata
```

- When switching this node, existing Subscriptions are torn down:

When there are existing subscriptions and a client changes the node 'enable-notification-envelope', all existing subscriptions MUST be terminated. The publisher MUST send a 'subscription-terminated' notification to all the existing subscriptions using the header configured prior to the change. Any new subscription after the change use the header defined by the node 'enable-notification-envelope', i.e. encoded as Section 3.3.1 when enabled and as defined in [RFC5277] if disabled.

YANG model for NETCONF Event Notifications

Interim 2024-09-19 – draft-ahuang-netconf-notif-yang

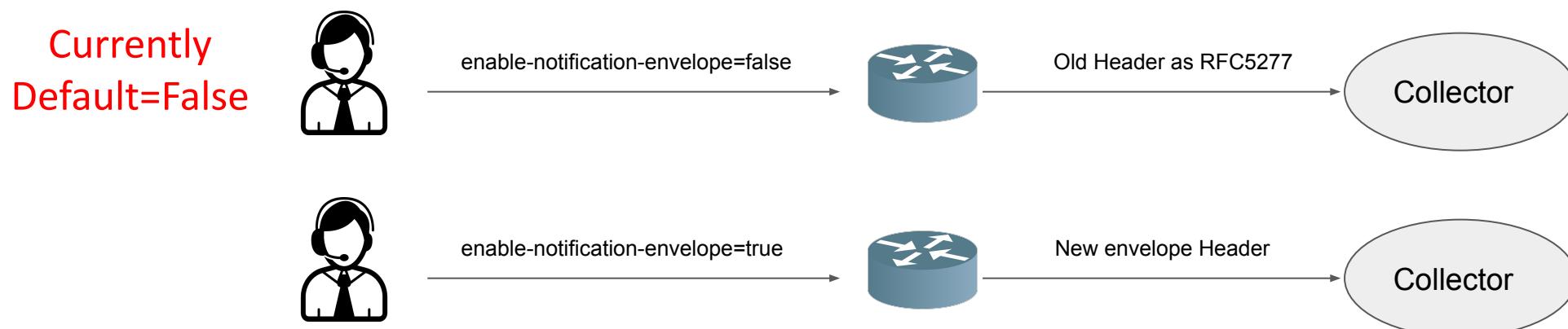
- <https://datatracker.ietf.org/doc/minutes-interim-2024-netconf-02-202409191300/>
- Thorough review of draft-ahuang-netconf-notif-yang/YANG-Push/NETCONF Event Notifications
- Conclusion
 - draft-ahuang-netconf-notif-yang fixes a **gap** for YANG-Push but might be worth putting the effort on a brand new header
 - We need:
 - Bypass RFC5277, thus use YANG-Push only
 - Extensible header
 - be able to add new metadata (sequencing, versioning, others...)
 - A client should be able to “opt-in”
 - Clients that don’t support this new header should continue working seamlessly
 - The notification should be a YANG-based solution
 - Fix JSON and CBOR underspecification
 - including CBOR-SID allocation

Extensible YANG model for YANG-Push Notifications

(1) Option to “opt-in” through a YANG-Push Subscription

- Configuration on Globally on the server via the RPC “enable-notif-envelope”

```
rpcs:  
  +---x enable-notif-envelope  
    +---w input  
      +---w enable-notification-envelope? boolean  
      +---w metadata
```



Extensible YANG model for YANG-Push Notifications

(2) Able to discover the capability of this new header

- Augmentation on notification capabilities (RFC9196)

module: ietf-yp-notification

```
augment /sn:subscriptions:  
  +-ro enable-notification-envelope?  boolean  
  +-ro metadata  
augment /sysc:system-capabilities/notc:subscription-capabilities:  
  +-ro notification-metadata  
  +-ro notification-envelope?  boolean  
  +-ro metadata  
  +-ro hostname-sequence-number?  boolean
```

module: ietf-yp-observation

```
augment /yp:push-update:  
  +-ro timestamp?          yang:date-and-time  
  +-ro point-in-time?      enumeration  
augment /yp:push-change-update:  
  +-ro timestamp?          yang:date-and-time  
  +-ro point-in-time?      enumeration  
augment /sysc:system-capabilities/notc:subscription-capabilities:  
  +-ro yang-push-observation-supported?  
    inotifseq:notification-support  
    {yang-push-observation-timestamp}?
```



Extensible YANG model for YANG-Push Notifications

(3) Extensible header defined in YANG

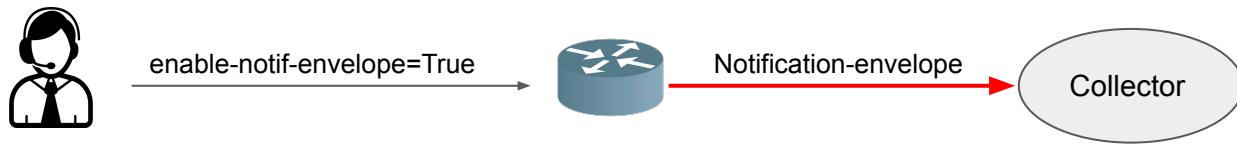
- Structure defined as a notification containing
 - event-time
 - metadata(s)
 - notification-contents

```
structure envelope:  
  +-- event-time          yang:date-and-time  
  +-- hostname?           inet:host  
  +-- sequence-number?    yang:counter32  
  +-- notification-contents? <anydata>
```

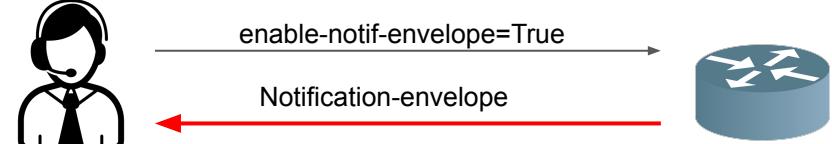
```
{  
  "ietf-yp-notification:envelope": {  
    "event-time": "2024-10-10T08:00:11.22Z",  
    "notification-contents": {  
      "ietf-yang-push:push-update": {  
        "id": 1011,  
        "datastore-contents": {  
          "ietf-interfaces:interfaces": [  
            {  
              "interface": {  
                "name": "eth0",  
                "oper-status": "up"  
              }  
            }  
          ]  
        }  
      }  
    }  
  }  
}
```

JSON example without metadata

Configured Subscriptions



Dynamic Subscriptions



Extensible YANG model for YANG-Push Notifications

(4) Definition of each encoding (XML, JSON, CBOR)

- Explicit definition of the content of the “envelope” (solving gap for JSON and CBOR)
 - Definition of the namespace (urn:ietf:params:xml:ns:netconf:notification:2.0)
 - Mandatory event-time node
 - Mandatory notification-contents node
 - Metadata present when configured

A YANG notification encoded in XML is structured as a root "envelope" container. The namespace of this container is the namespace defined in the YANG module "ietf-yp-notification":

urn:ietf:params:xml:ns:netconf:notification:2.0

Two mandatory child nodes within the "envelope" container are expected, representing the event time and the notification payload. The "event-time" node is defined within the same XML namespace as the "envelope" container. The "event-time" node MUST be compliant with [RFC3339]. Other metadata defined within the YANG module defined in [Section 5](#) MUST use the same XML namespace. See [Section 3.4](#) for more details.

Extensible YANG model for YANG-Push Notifications

(5) Extensions for hostname and sequence-number

- Definition of hostname and sequence-number extensions (draft-tgraf-netconf-notif-sequencing)
 - Present by default when the envelope is enabled
 - Discovery of support of this header through RFC9196

```
structure envelope:  
  +-+ event-time          yang:date-and-time  
  +-+ hostname?           inet:host  
  +-+ sequence-number?    yang:counter32  
  +-+ notification-contents? <anydata>
```

```
{  
  "ietf-yp-notification:envelope": {  
    "event-time": "2023-03-25T08:30:11.22Z",  
    "hostname": "example-router",  
    "sequence-number": 1,  
    "notification-contents": {  
      "ietf-yang-push:push-update": {  
        "id": 6666,  
        "datastore-contents": {  
          "ietf-interfaces:interfaces": [  
            {  
              "interface": {  
                "name": "eth0",  
                "type": "iana-if-type:ethernetCsmacd",  
                "oper-status": "up",  
                "mtu": 1500  
              }  
            }  
          ]  
        }  
      }  
    }  
  }  
}
```