Validate **Validate Network Telemetry Messages Implementations**

IETF 124 Hackathon, November 1-2nd 2025

Subscribe to YANG Data

Publish YANG Data

YANG Data Collection

YANG Schema Registry

YANG Data Normalization

Message Broker

Time Series Database

1
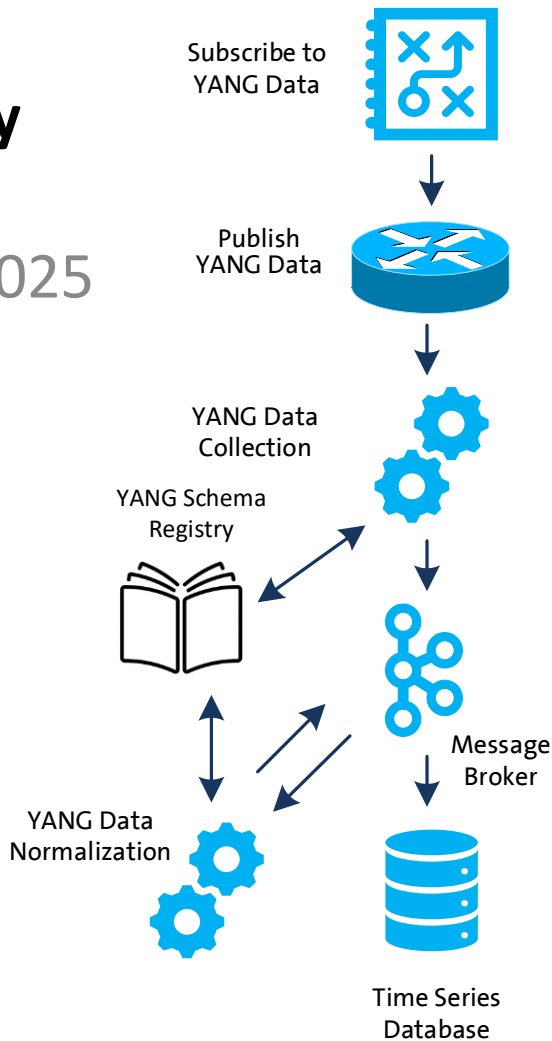
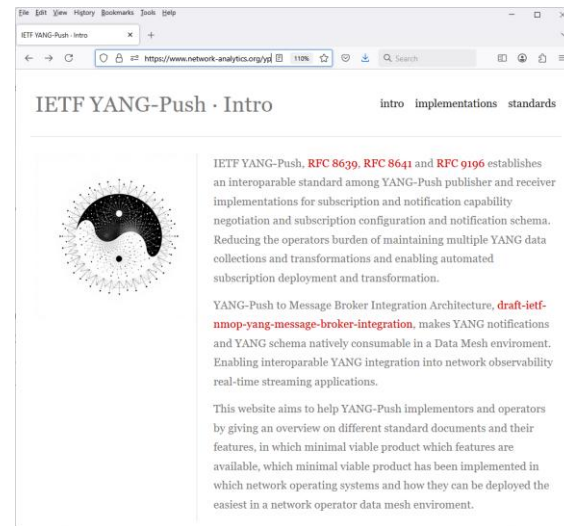# Hackathon Plan, Software and Website

Test Plan

- **Message Broker integration**
  - Validate draft-ietf-nmop-message-broker-telemetry-message for draft-ietf-nmop-yang-message-broker-integration integration against YANG schema with yanglint

Software

- YANG-Push Publisher - Cisco IOS XR
- YANG-Push Publisher - 6WIND VSR
- YANG-Push Publisher - Huawei NE (Router) and MA (OLT)
- YANG-Push Receiver – Netgauze
- YANG-Push Receiver – Pmacct
- udp-notif dissector - Wireshark

https://www.network-analytics.org/yp/how-to-deploy.html

Hackathon – Repositories

YANG-Push Test Result Repository

- https://github.com/network-analytics/ietf-network-analytics-document-status/tree/main/123/Hackathon

  - ➤ Packet capture on the wire
  - ➤ Netconf RPCs and YANG-Push JSON and CBOR encoded messages

Telemetry Message Test Result Repository

- https://github.com/network-analytics/ietf-network-analytics-document-status/tree/main/124/Hackathon

  - ➤ Pmtelemetryd configuration and JSON telemetry messages
  - ➤ YANG schemas for validation

Apache Kafka Integration

- https://github.com/network-analytics/yang-kafka-integration

  - ➤ YANG Serializer
  - ➤ YANG Schema Registry Plugin

Name	Last commit message	Last commit date
📁 ..		
📁 ipf-zbl1243-r-daisy-21_huawei_ma5800t_2025071...	YANG-Push MVP1 Test Results	1 minute ago
📁 ipf-zbl1243-r-daisy-21_huawei_vrp_ne_20250716_...	YANG-Push MVP1 Test Results	1 minute ago
📁 ipf-zbl1327-r-daisy-91_cisco_iosxr_20250716_1652...	YANG-Push MVP1 Test Results	1 minute ago
📁 ipf-zbl1843-r-daisy-58_6wind_20250716_165518	YANG-Push MVP1 Test Results	1 minute ago

👤 **graf3net** netgauze and fixes		a00c3d2 · 1 hour ago ⟲

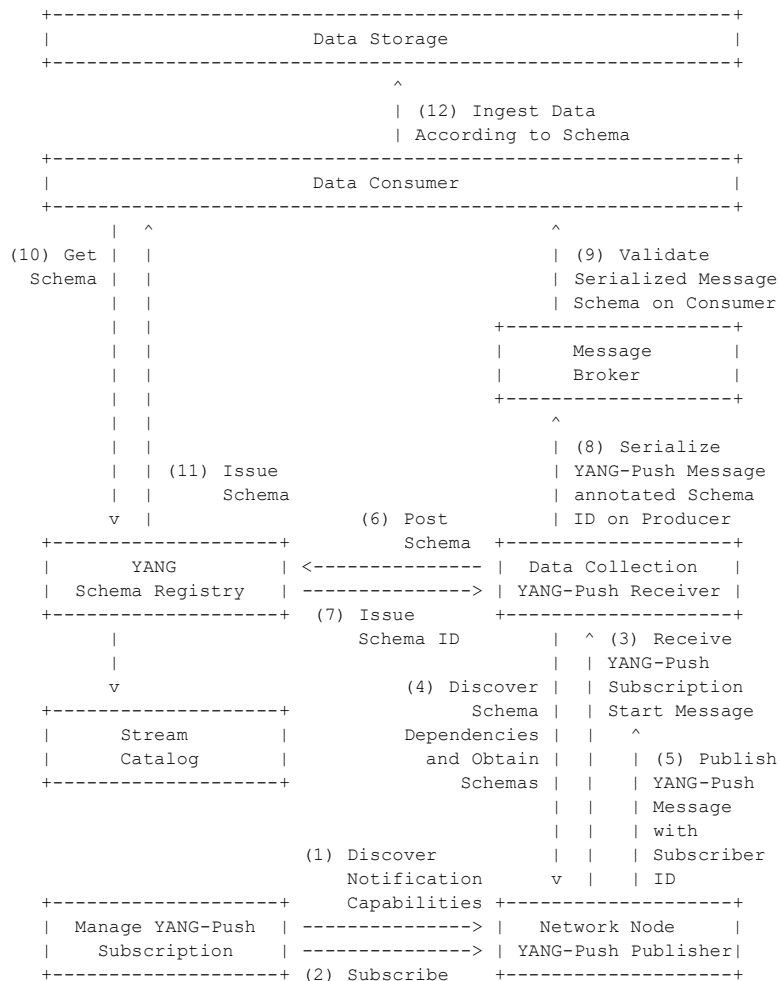| Name	Last commit message	Last commit date
📁 ..		
📁 yang-modules	fixed	1 hour ago
📄 cheat-sheet.txt	fixed	1 hour ago
📄 pmtelemetryd.conf	pmacct config and json output	6 hours ago
📄 pmtelemetryd_log.json	pmacct config and json output	6 hours ago
📄 yp210-push-update.json	json splitted	6 hours ago
📄 yp210-subscription-started.json	Update yp210-subscription-started.json	5 hours ago
📄 yp210-subscription-started2.json	netgauze and fixes	1 hour ago
📄 yp210-subscription-started3.json	netgauze and fixes	1 hour ago
📄 yp210-subscription-started4.json	netgauze and fixes	1 hour ago
📄 yp210-subscription-terminated.json	json splitted	6 hours ago
📄 yp211-push-update.json	json splitted	6 hours ago
📄 yp211-subscription-started.json	json splitted	6 hours ago
📄 yp211-subscription-terminated.json	json splitted	6 hours ago

An Architecture for YANG-Push to Message Broker Integration

draft-ietf-nmop-yang-message-broker-integration
draft-ietf-nmop-message-broker-telemetry-message
draft-netana-nmop-yang-message-broker-message-key

- Subscription to YANG Notifications
  [RFC 8639](#)
- Subscription to YANG Notifications for Datastore Updates
  [RFC 8641](#)
- UDP-based Transport for Configured Subscriptions
  [draft-ietf-netconf-udp-notif](#)
- Subscription to Distributed Notifications
  [draft-ietf-netconf-distributed-notif](#)
- Extensible YANG Model for YANG-Push Notifications
  [draft-ietf-netconf-notif-envelope](#)
- Support of Versioning in YANG Notifications Subscription
  [draft-ietf-netconf-yang-notifications-versioning](#)
- YANG Modules Describing Capabilities for Systems and Datastore Update Notifications
  [RFC 9196](#)
- YANG Notification Transport Capabilities
  [draft-ietf-netconf-yp-transport-capabilities](#)
- YANG Library
  [RFC 8525](#)
- Augmented-by Addition into the IETF-YANG-Library
  [draft-ietf-netconf-yang-library-augmentation](#)
- Validating anydata in YANG Library context
  [draft-netana-nmop-yang-anydata-validation](#)
- Encoding of Data Modeled with YANG in the CBOR
  [RFC 9254](#)

```
+--------------------------------------------------------------+
|                     Data Storage                             |
+--------------------------------------------------------------+
                          ^
                          | (12) Ingest Data
                          | According to Schema
           +--------------------------------------------------+
           |                Data Consumer                     |
           +--------------------------------------------------+
     |   ^                                       ^
(10) Get |   |                                   | (9) Validate
 Schema  |   |                                   | Serialized Message
     |   |                                       | Schema on Consumer
     |   |                               +--------------------+
     |   |                               |    Message         |
     |   |                               |    Broker          |
     |   |                               +--------------------+
     |   |                                       ^
     |   |                                       | (8) Serialize
     |   | (11) Issue                            | YANG-Push Message
     |   |      Schema                           | annotated Schema
     v   |              (6) Post                 | ID on Producer
+--------------------+       Schema    +--------------------+
|       YANG         | <-------------- |  Data Collection   |
|  Schema Registry   | --------------> | YANG-Push Receiver |
+--------------------+   (7) Issue     +--------------------+
     |                   Schema ID       |  ^ (3) Receive
     |                                   |  | YANG-Push
     v                   (4) Discover    |  | Subscription
+--------------------+          Schema   |  | Start Message
|     Stream         |      Dependencies |  |  ^
|     Catalog        |       and Obtain  |  |  | (5) Publish
+--------------------+         Schemas   |  |  | YANG-Push
                                         |  |  | Message
                                         |  |  | with
                      (1) Discover       |  |  | Subscriber
                          Notification   v  |  | ID
                          Capabilities +--------------------+
+--------------------+ --------------> |   Network Node     |
|  Manage YANG-Push  | --------------> | YANG-Push Publisher|
|    Subscription    |                 +--------------------+
+--------------------+ (2) Subscribe
```

4

Libyang – Anydata Validation Support

```
root@daisy-playground-rh8 [ /tmp/hackathon ] () # yanglint-devel -i -t ext yang-modules/ietf-subscribed-
notifications.yang yang-modules/ietf-yang-push-revision.yang yang-modules/ietf-yang-push.yang yang-
modules/ietf-datastores.yang  yang-modules/ietf-udp-notif-transport.yang  yang-modules/ietf-yang-push-
telemetry-message.yang yang-modules/ietf-telemetry-message.yang yang-modules/ietf-yang-types.yang yang-
modules/ietf-yang-revisions.yang yang-modules/ietf-yang-semver.yang yang-modules/ietf-yang-structure-ext.yang
yang-modules/ietf-yp-notification.yang yang-modules/ietf-inet-types.yang yang-modules/ietf-yang-types.yang
yp210-subscription-started.json -f json -k ietf-telemetry-message:structure:message
libyang err : Expecting JSON name/object but anydata "anydata-values" is represented in input data as
name/number. (/ietf-telemetry-message:message/network-operator-metadata/labels[name='seq']) (line 41)
YANGLINT[E]: Parsing of extension data failed.
YANGLINT[E]: Failed to parse input data file "yp210-subscription-started.json".
```

- Section 7.10 of RFC 7950 describes anydata but doesn't specify how content can be validated against YANG schema. draft-netana-nmop-yang-anydata-validation describes how YANG validation can be performed.

- Libyang is currently missing anydata validation support. Section 6 of draft-netana-nmop-yang-anydata-validation describes in libyang implementation.

Pmacct – Telemetry Message Support

```
yanglint -devel -i -t ext yang-modules/ietf-subscribed-notifications.yang yang-modules/ietf-yang-push-revision.yang yang-modules/ietf-yang-push.yang yang-modules/ietf-datastores.yang  yang-modules/ietf-udp-notif-transport.yang
yang-modules/ietf-yang-push-telemetry-message.yang yang-modules/ietf-telemetry-message.yang yang-modules/ietf-yang-types.yang yang-modules/ietf-yang-revisions.yang yang-modules/ietf-yang-semver.yang yang-modules/ietf-yang-
structure-ext.yang yang-modules/ietf-yp-notification.yang yang-modules/ietf-inet-types.yang yang-modules/ietf-yang-types.yang yp210-subscription-started2.json -f json -k ietf-telemetry-message:structure:message
{
  "ietf-telemetry-message:message": {
    "telemetry-message-metadata": {
      "collection-timestamp": "2025-01-01T01:00:30+01:00",
      "notification-event": "log",
      "session-protocol": "yang-push",
      "export-address": "71.19.157.107",
      "export-port": 31513
    },
    "data-collection-manifest": {
      "name": "default",
      "vendor": "pmacct",
      "software-version": "1.7.10-git",
      "software-flavor": "20251029-0 (7c22e2cf)"
    },
    "network-operator-metadata": {
      "labels": [
        {
          "name": "seq",
          "string-value": "1"
        },
        {
          "name": "serialization",
          "string-value": "json"
        }
      ]
    },
    "payload": {
      "ietf-yp-notification:envelope": {
        "event-time": "2025-07-18T09:50:49.505Z",
        "hostname": "ipf-zbl1327-r-daisy-91",
        "sequence-number": 0,
        "contents": {
          "ietf-subscribed-notifications:subscription-started": {
            "id": 210,
            "ietf-yang-push:datastore": "ietf-datastores:operational",
            "ietf-yang-push:datastore-xpath-filter": "openconfig-interfaces:interfaces/interface/state/counters",
            "transport": "ietf-udp-notif-transport:udp-notif",
            "ietf-yang-push-revision:module-version": [
              {
                "module-name": "openconfig-interfaces",
                "revision": "2022-10-25"
              }
            ],
            "ietf-yang-push-revision:yang-library-content-id": "6d13bafd8fd1dc21aa8932d1199b369794881393",
            "encoding": "encode-json",
            "ietf-yang-push:periodic": {
              "period": 3000,
              "anchor-time": "2025-01-01T00:00:30+00:00"
            }
          }
        }
      }
    }
  }
}
```

- draft-ietf-nmop-message-broker-telemetry-message support has been implemented in Pmacct for IETF 124 hackathon.
- Libyang supports YANG data structures as of RFC 8791 as of version 4.0.14. This came as improvement from the IETF 123 YANG-Push validation activities.
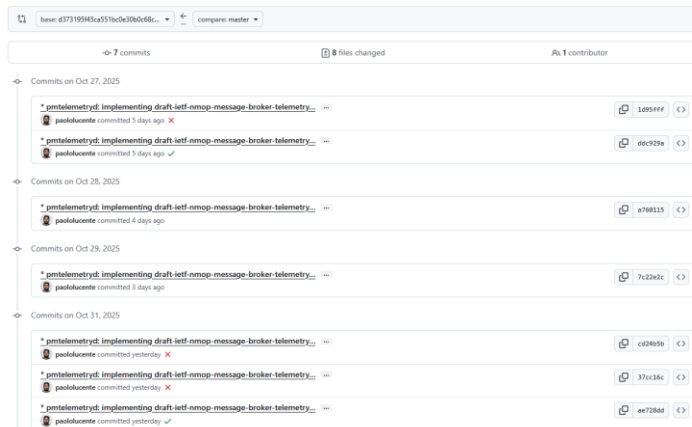
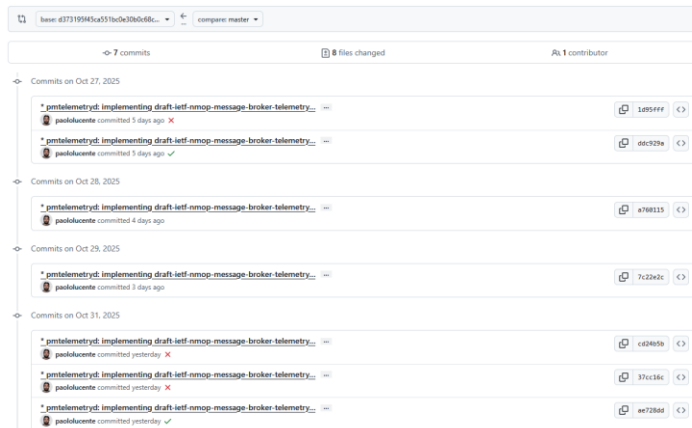# NetGauze – Telemetry Message Support

yanglint-devel -i -t ext yang-modules/ietf-subscribed-notifications.yang yang-modules/ietf-yang-push-revision.yang yang-modules/ietf-yang-push.yang yang-modules/ietf-datastores.yang yang-modules/ietf-udp-notif-transport.yang yang-modules/ietf-yang-push-telemetry-message.yang
yang-modules/ietf-telemetry-message.yang yang-modules/ietf-yang-types.yang yang-modules/ietf-yang-revisions.yang yang-modules/ietf-yang-semver.yang yang-modules/ietf-yang-structure-ext.yang yang-modules/ietf-yp-notification.yang yang-modules/ietf-inet-types.yang yang-
modules/ietf-yang-types.yang yp210-subscription-started4.json -f json -k ietf-telemetry-message:structure:message
{
  "ietf-telemetry-message:message": {
    "telemetry-message-metadata": {
      "node-export-timestamp": "2025-07-18T11:50:49.505+02:00",
      "collection-timestamp": "2025-07-18T11:50:49.503566119+02:00",
      "notification-event": "log",
      "session-protocol": "yang-push",
      "export-address": "203.0.113.91",
      "export-port": 31513,
      "ietf-yang-push-telemetry-message:yang-push-subscription": {
        "id": 210,
        "xpath-filter": "openconfig-interfaces:interfaces/interface/state/counters",
        "datastore": "ietf-datastores:operational",
        "transport": "ietf-udp-notif-transport:udp-notif",
        "encoding": "ietf-subscribed-notifications:encode-json",
        "periodic": {
          "period": 3000,
          "anchor-time": "2025-01-01T01:00:30+01:00"
        },
        "yang-library-content-id": "6d13bafd8fd1dc21aa8932d1199b369794881393"
      }
    },
    "data-collection-manifest": {
      "name": "netgauze-yang-push@ietf-col-left01",
      "vendor": "NetGauze",
      "software-version": "0.7.0 (cba5eb90)",
      "software-flavor": "release",
      "os-version": "8.10",
      "os-type": "Red Hat Enterprise Linux"
    },
    "network-operator-metadata": {
      "labels": [
        {
          "name": "nkey",
          "string-value": "unknown"
        },
        {
          "name": "pkey",
          "string-value": "unknown"
        }
      ]
    },
    "payload": {
      "ietf-yp-notification:envelope": {
        "contents": {
          "ietf-subscribed-notifications:subscription-started": {
            "encoding": "ietf-subscribed-notifications:encode-json",
            "id": 210,
            "ietf-yang-push-revision:module-version": [
              {
                "module-name": "openconfig-interfaces",
                "revision": "2022-10-25"
              }
            ],
            "ietf-yang-push-revision:yang-library-content-id": "6d13bafd8fd1dc21aa8932d1199b369794881393",
            "ietf-yang-push:datastore": "ietf-datastores:operational",
            "ietf-yang-push:datastore-xpath-filter": "openconfig-interfaces:interfaces/interface/state/counters",
            "ietf-yang-push:periodic": {
              "anchor-time": "2025-01-01T00:00:30Z",
              "period": 3000
            },
            "transport": "ietf-udp-notif-transport:udp-notif"
          }
        },
        "event-time": "2025-07-18T09:50:49.505Z",
        "hostname": "ipf-zbl1327-r-daisy-91",
        "sequence-number": 0
      }
    }
  }
}

- draft-ietf-nmop-message-broker-telemetry-message support has been implemented in Netgauze for IETF 123 hackathon.
- Libyang supports YANG data structures as of RFC 8791 as of version 4.0.14. This came as improvement from the IETF 123 YANG-Push validation activities.

Next Steps from IETF 123 Hackathon…

- Yanglint, fix YANG extension's structure support ✔

- Pmacct supporting Network Telemetry Message ✔

- YANG schema registry supporting YANG features

- NetGauze supporting
    - netconf <get> to obtain YANG library content,
    - YANG validation for YANG-Push notifications,
    - YANG schema registration.

Thanks to…

- Paolo Lucente – Pmacct
- Maxence Younsi – INSA Lyon
- Reshad Rahman - Equinix
- Rob Wilton – Cisco
- Dan Voyer – Cisco
- Holger Keller – DT
- Nils Warnke – DT
- Benoit Claise - Everything OPS SRL
- Yannick Buchs – Swisscom
- Ahmed Elhassany – Swisscom
- Thomas Graf – Swisscom

Want to to know more than join us at…

- NMOP on **Monday** 14:30-16:30 at Viger for Message Broker, Telemetry Message and Message Key.
- NMOP on **Wednesday 14:30 – 15:30** at Agora for more on Telemetry Message integration and validation.
- NETMOD on **Friday 09:30 – 11:00** at Van Horne for more on YANG anydata validation.