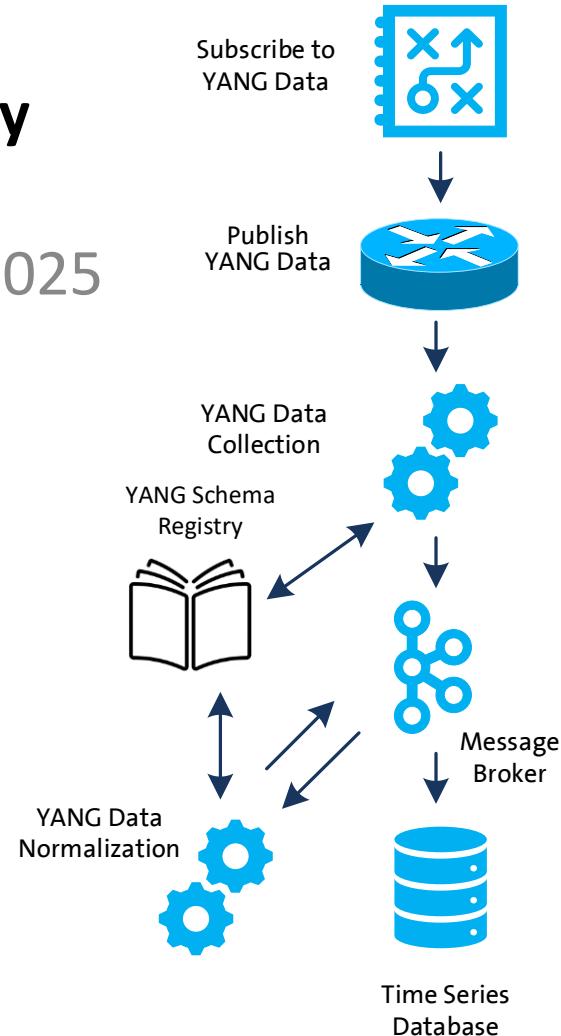


Validate Network Telemetry Messages Implementations

IETF 124 Hackathon, November 1-2nd 2025



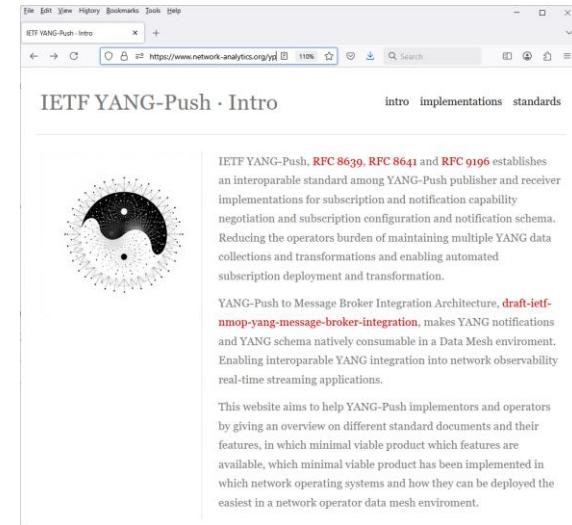
Hackathon Plan, Software and Website

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

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

gra3net netgauze and fixes a00c3d2 · 1 hour ago

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

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

Apache Kafka Integration

- <https://github.com/network-analytics/yang-kafka-integration>
 - YANG Serializer
 - YANG Schema Registry Plugin

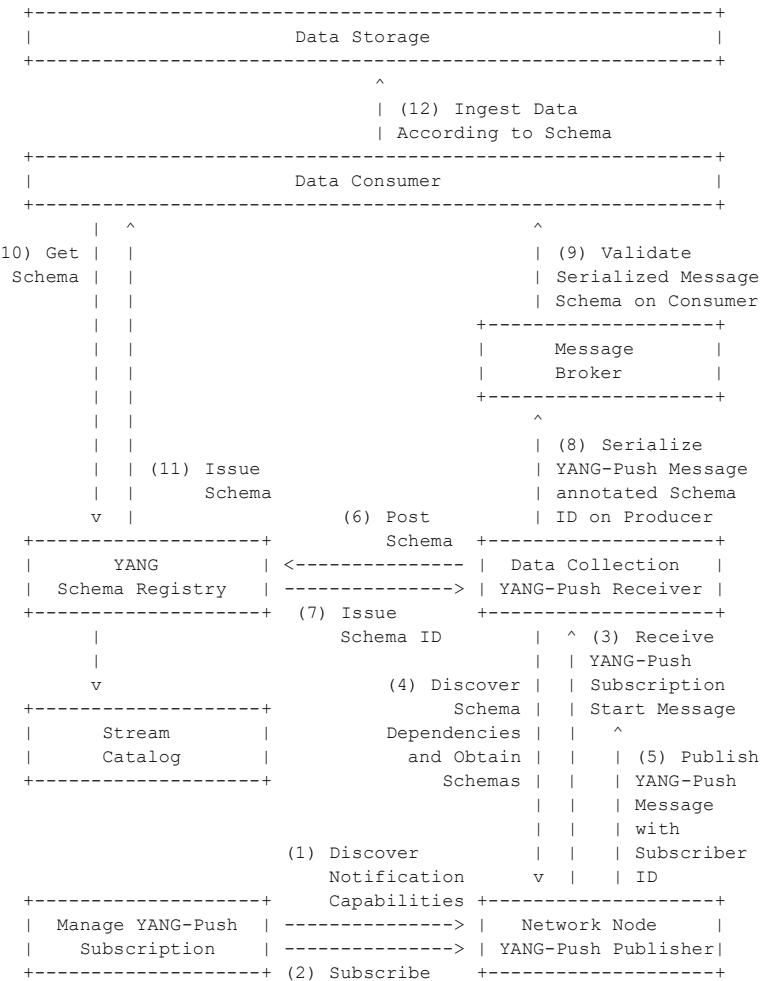
An Architecture for YANG-Push to Message Broker Integration

[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](#)

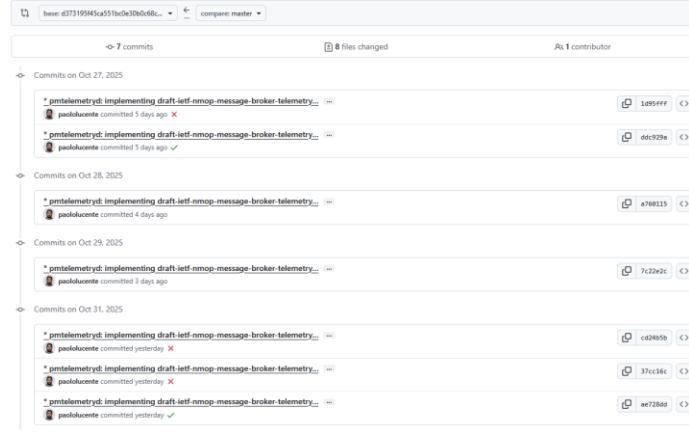


Pmacct – Telemetry Message Support

```
yanglint -d dev1 -i -t ext yang-modulesietf-subscribed-notifications.yang yang-modulesietf-yang-push-revision.yang yang-modulesietf-yang-push.yang yang-modulesietf-datastores.yang yang-modulesietf-udp-notif-transport.yang
yang-modulesietf-yang-push-telemetry-message.yang yang-modulesietf-telemetry-message.yang yang-modulesietf-yang-types.yang yang-modulesietf-yang-revisions.yang yang-modulesietf-yang-server.yang yang-modulesietf-yang-
structure-ext.yang yang-modulesietf-yp-notification.yang yang-modulesietf-inet-types.yang yang-modulesietf-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": "7.19.157.107",
      "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:datasstore": "ietf-datastores:operational",
            "ietf-yang-push:datasstore-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": "6d13baf8fd1dc21aa8932d1199b369794881393",
            "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.



Pmacct – Anydata to be valid I-JSON

```
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".
```

```
"network-operator-metadata": {  
    "labels": [  
        {  
            "name": "seq",  
            "anydata-values": 3  
        },
```

- [Section 5.5 of RFC 7951](#) describes that an anydata YANG data node needs to be a valid I-JSON.
- Since anydata-values andydata node contains the value "3" instead, yanglint is failing YANG validation.

Pmacct – Typedef date-and-time Compliance

```
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-started1.json -f json -k ietf-telemetry-message:structure:message
libyang err : Invalid date-and-time timezone hour "",
  "export-address": "71.19.157.107",
  "export-port": 31513
}
}
".
libyang err : Invalid date-and-time timezone hour "",
  "export-address": "71.19.157.107",
  "export-port": 31513
}
}
".
(/ietf-telemetry-message:message/telemetry-message-metadata/collection-timestamp) (line 51)
YANGLINT[E]: Parsing of extension data failed.
YANGLINT[E]: Failed to parse input data file "yp210-subscription-started1.json".
```

- With [Section 2.2 of RFC 9557](#) IETF updated RFC 3339 on timestamping semantics. [draft-ietf-netmod-rfc6991-bis](#) mirrors this in typedef date-and-time.
- Pmacct needs to update collection-timestamp value to match typedef date-and-time schema.

Pmacct – Encoding value Namespace missing

```
yanglint-devel -i -t ext yang-modules/ietf-yang-push.yang yang-modules/ietf-yp-observation.yang yang-
modules/openconfig-interfaces.yang yang-modules/Cisco-IOS-XR-openconfig-interfaces-stats-ext.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 yang-modules/ietf-udp-notif-transport.yang yp210-push-update1.json -f json -k ietf-telemetry-
message:structure:message
libyang err : Invalid identityref "encode-json" value - identity not found in module "ietf-yang-push-
telemetry-message". (/ietf-telemetry-message:message/telemetry-message-metadata/ietf-yang-push-telemetry-
message:yang-push-subscription/encoding) (line 1333)
YANGLINT[E]: Parsing of extension data failed.
YANGLINT[E]: Failed to parse input data file "yp210-push-update1.json".
```

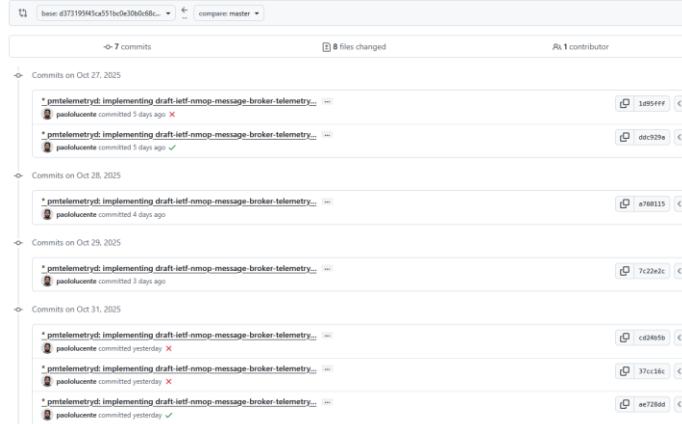
```
"telemetry-message-metadata": {
    "ietf-yang-push-telemetry-message:yang-push-subscription":
{
    "id": 210,
    "transport": "ietf-udp-notif-transport:udp-notif",
    "encoding": "encode-json",
}
}
```

NetGauze – Telemetry Message Support

```
yanglint-devel -i -e ext yang-modulesietf-subscribed-notifications.yang yang-modulesietf-yang-push-revision.yang yang-modulesietf-yang-push.yang yang-modulesietf-datastores.yang yang-modulesietf-udp-notif-transport.yang yang-modulesietf-yang-push-telemetry-message.yang
yang-modulesietf-telemetry-message.yang yang-modulesietf-yang-types.yang yang-modulesietf-yang-revisions.yang yang-modulesietf-yang-semver.yang yang-modulesietf-yang-structure-ext.yang yang-modulesietf-yp-notification.yang yang-modulesietf-inet-types.yang
modulesietf-yang-types.yang ypx2l0+subscription-started4.json -f json -k ietf-telemetry-message:structure:message
```

```
{
  "ietf-telemetry:telemetry": {
    "message": {
      "ietf-telemetry:telemetry": {
        "node-extracted-timestamp": "2025-07-18T11:50:49.505020Z",
        "collection-timestamp": "2025-07-18T11:50:49.503566119Z",
        "notification-event": "loop",
        "session-protocol": "yang-push",
        "export-address": "203.0.113.91",
        "export-port": 31513,
        "ietf-yang-push-telemetry:telemetry": {
          "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",
          "period": 3000,
          "periodic": true,
          "anchor-time": "2025-01-01T00:00:00Z",
          "yang-library-content-id": "6d13bafdf8fd1dc21as8932d1199b369794881393"
        }
      },
      "data-collection-manifest": {
        "name": "netgauze-yang-push#ietf-col-left01",
        "version": "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": "mkey",
            "string-value": "unknown"
          },
          {
            "name": "mkey",
            "string-value": "unknown"
          }
        ]
      },
      "payload": {
        "ietf-yp-notification:envelope": {
          "contents": {
            "ietf-subscribed-notifications:subscription-started": {
              "id": "210",
              "ietf-yang-push-revision:module-version": [
                {
                  "module-name": "openconfig-interfaces",
                  "revision": "2022-10-25"
                }
              ],
              "ietf-yang-push-revision:library-content-id": "6d13bafdf8fd1dc21as8932d1199b369794881393",
              "ietf-yang-push:datasource": "ietf-datastores:operational",
              "ietf-yang-push:datasource:xpath-filter": "openconfig-interfaces:interfaces/interface/state/counters",
              "ietf-yp-notification: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": "ipzb11327r-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.

Next Steps for IETF 125 Hackathon...

- [Yanglint](#), misses anydata validation support within YANG structures 
- [Pmacct](#) corrects collection-timestamp to be typedef date-and-time compliant. 
- [Pmacct](#) corrects encoding value to include ietf-subscribed-notifications namespace in JSON encoding. 
- [Pmacct](#) corrects network-operator-metadata/labels/anydata-values anydata statement to be valid I-JSON. 
- [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
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- 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 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.