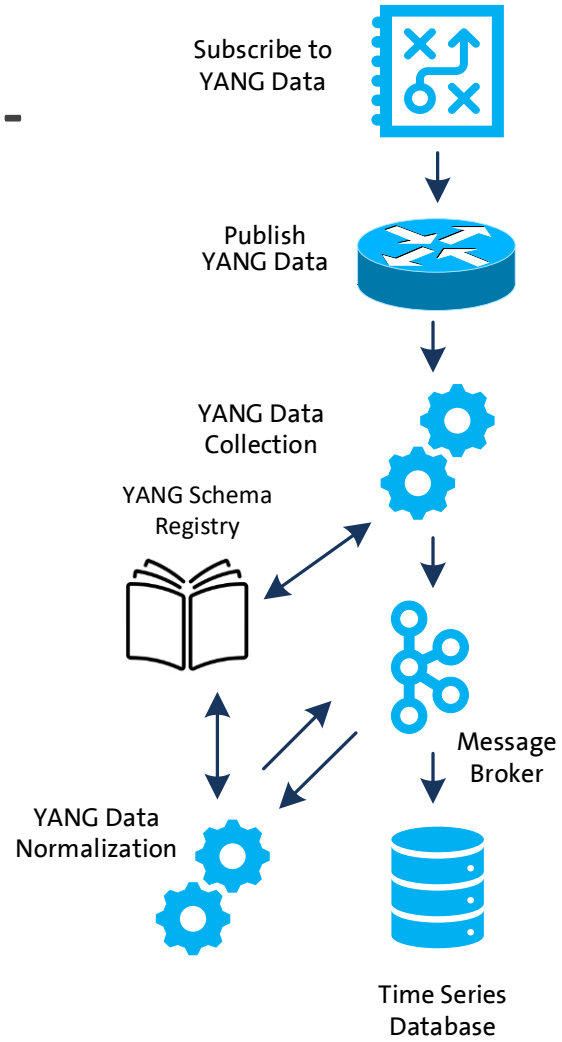
Validate Configured Subscription YANG-Push Publisher Implementations

IETF 123 Hackathon, July 19-20th 2025



Hackathon Plan, Software and Website

Test Plan

- **Subscription automation**
  - Discover YANG-Push systems and notifications capabilities and configure periodical and on-change subscriptions with netconf.
- **Notification integration**
  - Validate subscription state change and push-update and push-change-update notifications against schema with yanglint
  - Validate draft-ietf-nmop-message-broker-telemetry-message for draft-ietf-nmop-yang-message-broker-integration integration

Development Plan

- MVP 1 – Basic Requirements (9)
- MVP 2 – Scale and Secure (3)
- MVP 3 – Optimizations (2)

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

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
- udp-notif dissector - Wireshark

Hackathon – Repositories

Test Result Repository

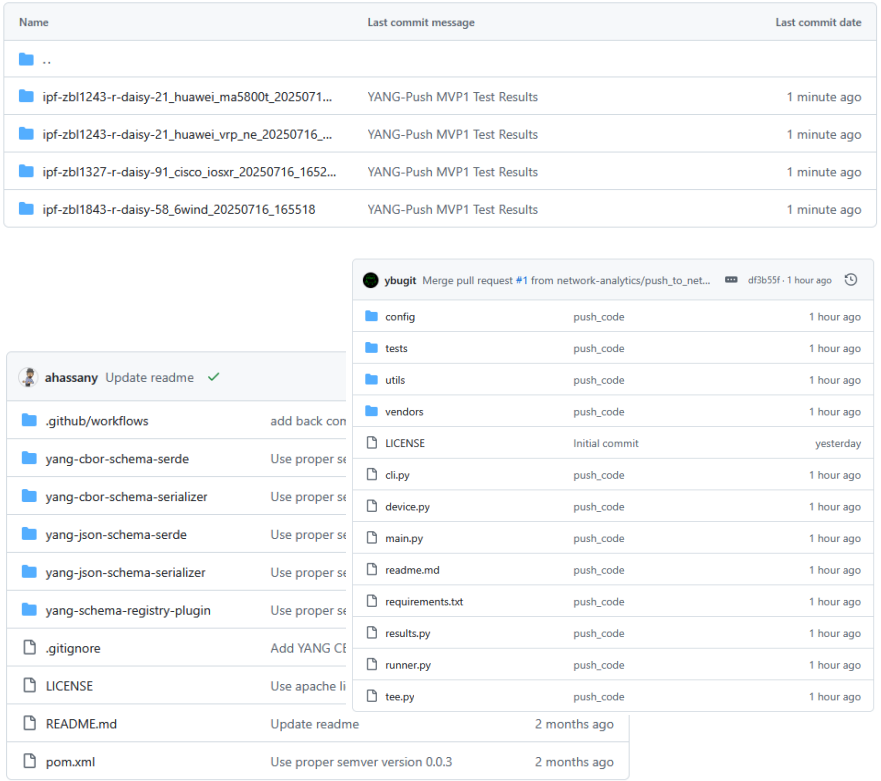
- https://github.com/network-analytics/ietf-network-analytics-document-status/tree/main/123/Hackathon
  - Packet capture on the wire
  - Netconf RPCs and YANG-Push JSON and CBOR encoded messages

Test Tool Repository

- https://github.com/network-analytics/yp_test
  - YANG-Push Test Automation Tool
  - Vendor deviations configuration

Apache Kafka Integration

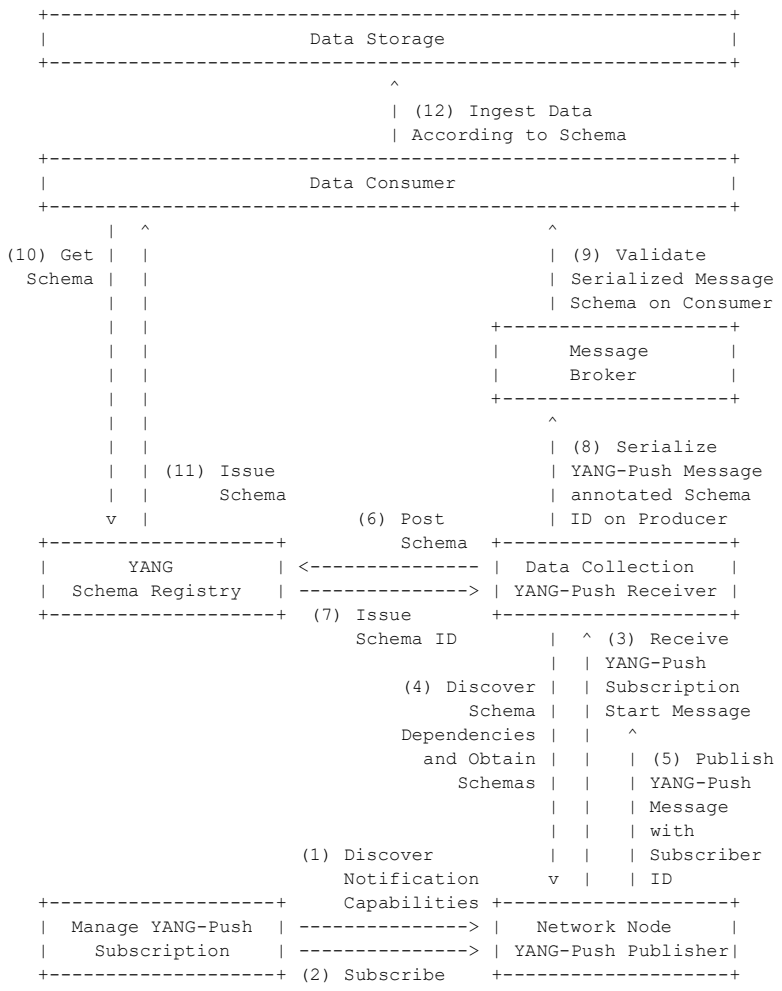
- https://github.com/network-analytics/yang-kafka-integration
  - YANG Serializer
  - YANG Schema Registry Plugin



An Architecture for YANG-Push to Message Broker Integration

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

- 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
- Encoding of Data Modeled with YANG in the CBOR
  RFC 9254



Register new YANG schema - Payload

The same rest API as other formats such as AVRO, JSON, and ProtoBuf is used to register new YANG schemas.

```
{
 "schemaType": "YANG",
 "references": [
  {
   "name": "other-module-name",
   "subject": "registered subject name",
   "version": "registered version",
  }
 ],
 "schema": "... yang schema text"
}
```

my-module-request.json

```
curl -X POST \
        -H "Content-Type: application/vnd.schemaregistry.v1+json"
        -d @my-module-request.json  \
        http://localhost:8081/subjects/my-module/versions
```

Retrieve new YANG schema

- Retrieve all registered schemas

  curl http://localhost:8081/subjects/
- Retrieve all registered version of a given subject

  curl http://localhost:8081/subjects/my-module
- Retrieve a specific version of a schema registry

  curl http://localhost:8081/subjects/my-module/versions/1
- Retrieve a schema by ID

  http://localhost:8081/schemas/ids/1

```
{
 "schemaType": "YANG",
 ”subject": "my-module",
 "version": 1,
 ”id": 1,
 "references": [
  {
   "name": "other-module-name",
   "subject": "registered subject name",
   "version": "registered version",
  }
 ],
 "schema": "... yang schema text"
}
```

Result of getting schema from schema registry

Apache Kafka wire format

- Data is encoded in native YANG format (json, cbor).
- Schema ID is included in the header.
- Content type is encoded in the header using the standard allocated in IANA (RFC 8040 and RFC 9254)

```
{
 ”headers": [
   "schema-id": 1, // schema id registered
   "content-type": "application/yang-data+json"
 ]
 "paylod": ..json encoded YANG,
}
```

Apache Kafka message value and headers

Thanks to…

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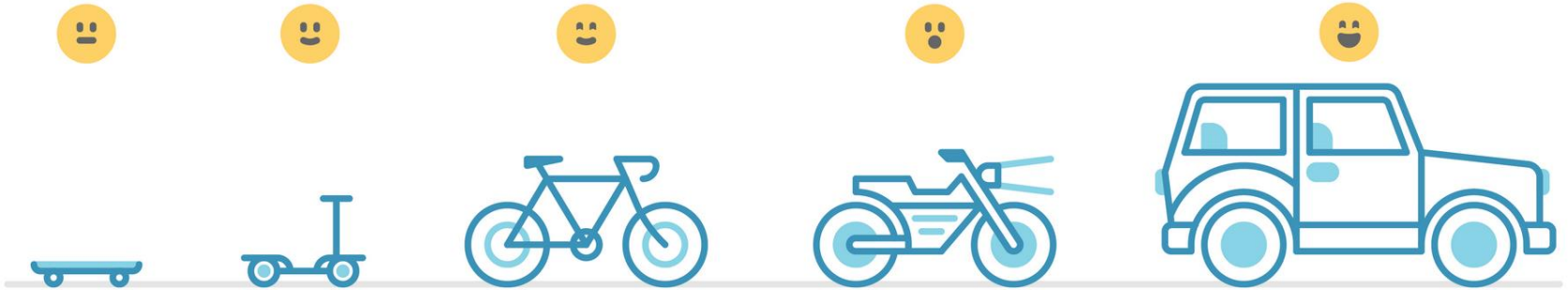
- Ahmed Elhassany - Swisscom
- Thomas Graf – Swisscom



Today, subscribing to a YANG datastore, publishing a YANG modeled notifications message from the network and viewing the data in a time series database, **manual labor is needed to perform data transformation** to make a message broker and its data processing components with YANG notifications interoperable.

State of the Union

From data mess to data mesh