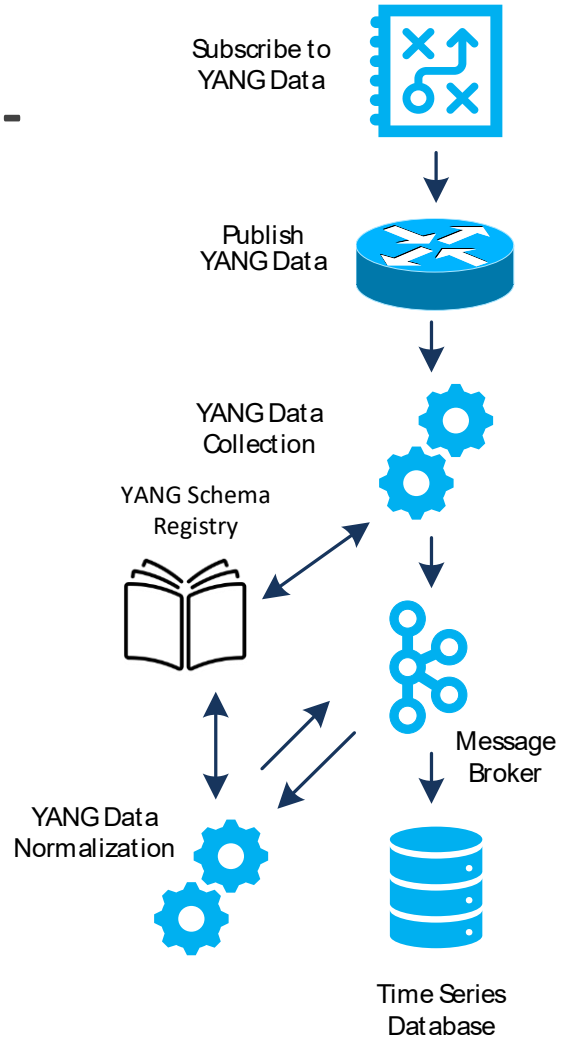
Validate Configured Subscription YANG-Push Publisher Implementations

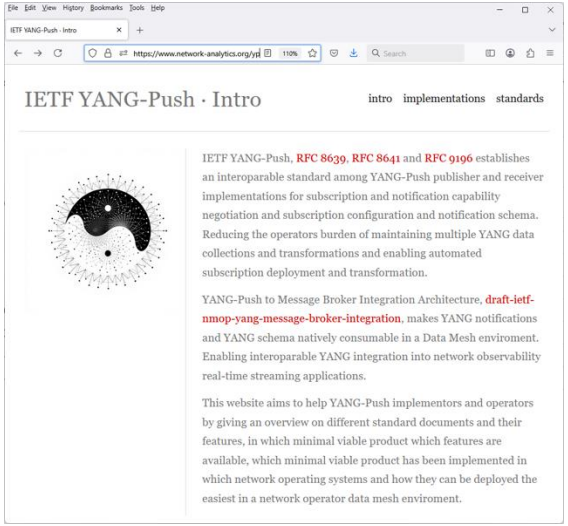
IETF 123 Hackathon, July 19-20th 2025



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



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

Development Plan

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

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

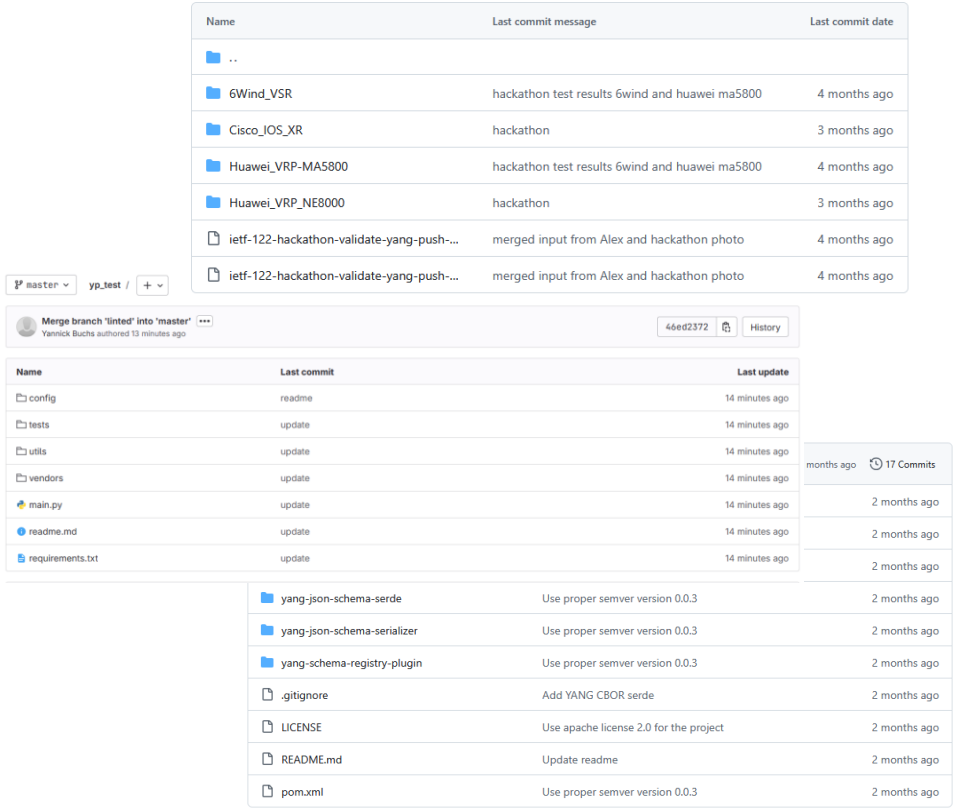
- https://github.com/network-analytics/ietf-network-analytics-document-status/tree/main/123/Hackathon
  - Packet capture on the wire
  - Netconf RPCs and YANG-Push JSON and CBOR encoded messages

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



Name	Last commit message	Last commit date
..		
6Wind_VSR	hackathon test results 6wind and huawei ma5800	4 months ago
Cisco_IOS_XR	hackathon	3 months ago
Huawei_VRP-MA5800	hackathon test results 6wind and huawei ma5800	4 months ago
Huawei_VRP_NE8000	hackathon	3 months ago
ietf-122-hackathon-validate-yang-push-...	merged input from Alex and hackathon photo	4 months ago
ietf-122-hackathon-validate-yang-push-...	merged input from Alex and hackathon photo	4 months ago

master · yp_test /

Merge branch 'linted' into 'master'
Yannick Buchs authored 13 minutes ago

46ed2372 · History

Name	Last commit	Last update
config	readme	14 minutes ago
tests	update	14 minutes ago
utils	update	14 minutes ago
vendors	update	14 minutes ago
main.py	update	14 minutes ago
readme.md	update	14 minutes ago
requirements.txt	update	14 minutes ago

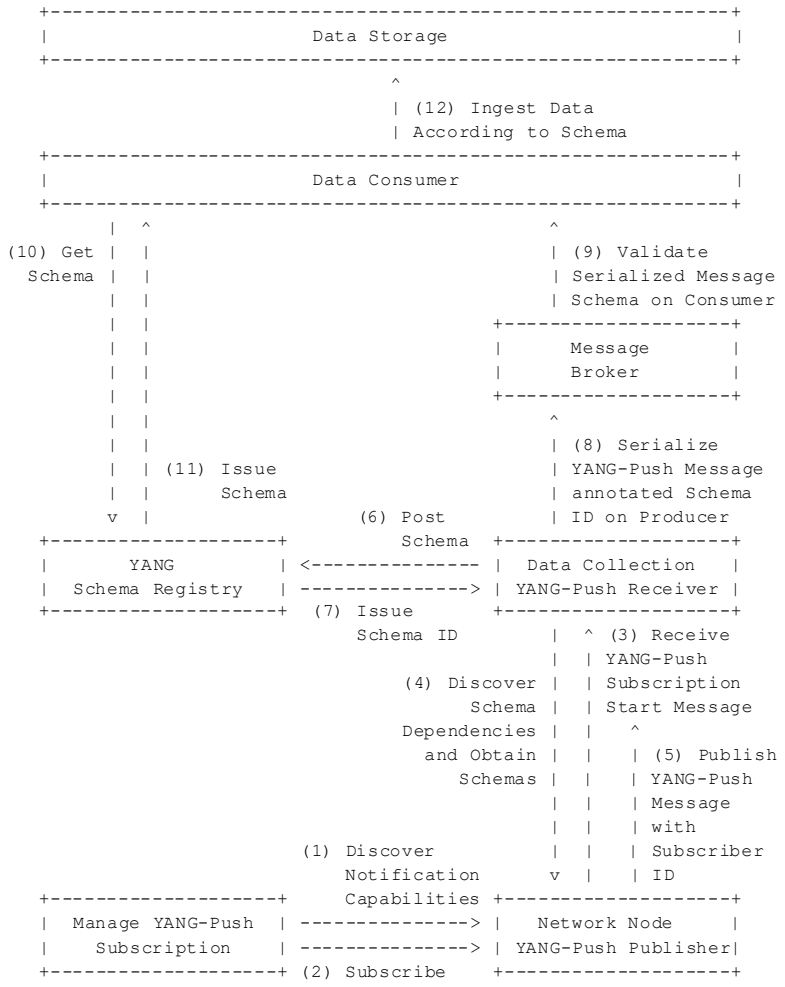
months ago · 17 Commits

yang-json-schema-serde	Use proper semver version 0.0.3	2 months ago
yang-json-schema-serializer	Use proper semver version 0.0.3	2 months ago
yang-schema-registry-plugin	Use proper semver version 0.0.3	2 months ago
.gitignore	Add YANG CBOR serde	2 months ago
LICENSE	Use apache license 2.0 for the project	2 months ago
README.md	Update readme	2 months ago
pom.xml	Use proper semver version 0.0.3	2 months ago

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



Registering new yang schema - Payload

We use the same message format to register new YANG schema as other formats: AVRO, JSON, and ProtoBuf.

```
{
 "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
```

Retrieving 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 on wire format

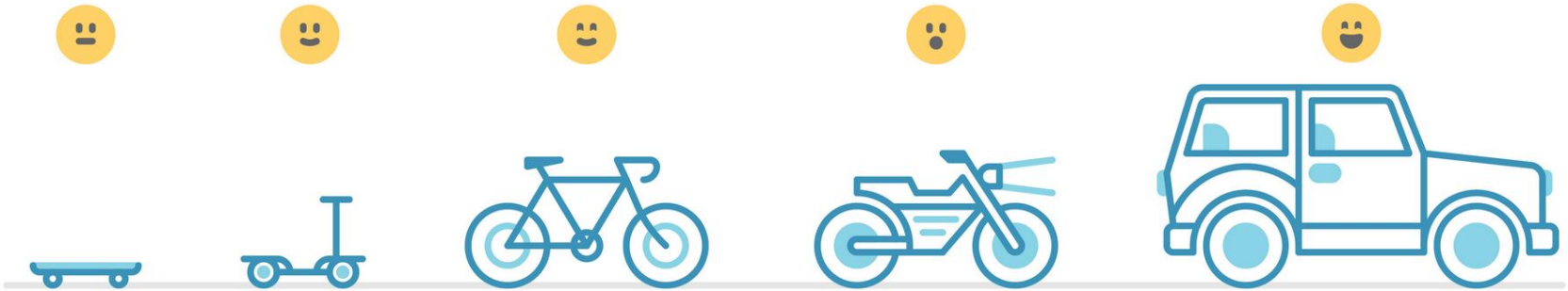
- Data is encoded in native YANG format (json, cbor, xml).
- Schema ID is included in the header.
- Content type is encoded in the header using the standard allocated in IANA (RFC8040 and RFC9254)

```
{
 ”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…

- Rob Wilton – Cisco
- Nick Corran – Cisco (remote)
- Emma Rankin – Cisco (remote)
- Mathew Green – Cisco (remote)
- Samuel Gauthier – 6WIND (remote)
- Jérémie Leska – 6WIND (remote)
- Liu Bin – Huawei (remote)
- Benoit Claise – Huawei
- Zhuoyao Lin – Huawei (remote)
- Jiale Li – Huawei (remote)
- Jian Ping– Huawei (remote)
- Xiao Chen– Huawei (remote)
- Paolo Lucente – Pmacct
- Holger Keller – DT
- Nils Warnke - DT
- Alex Huang-Feng – INSA Lyon
- Yannick Buchs – Swisscom (remote)
- 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