Support of Versioning in YANG Notifications Subscription
## draft-tgraf-netconf-yang-notifications-versioning-00

Adds semantics to the subscription process and notification
message to enable automated data mesh integration

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YANG push with semantics reference and versioning
Enabling automated data processing and data mesh integration
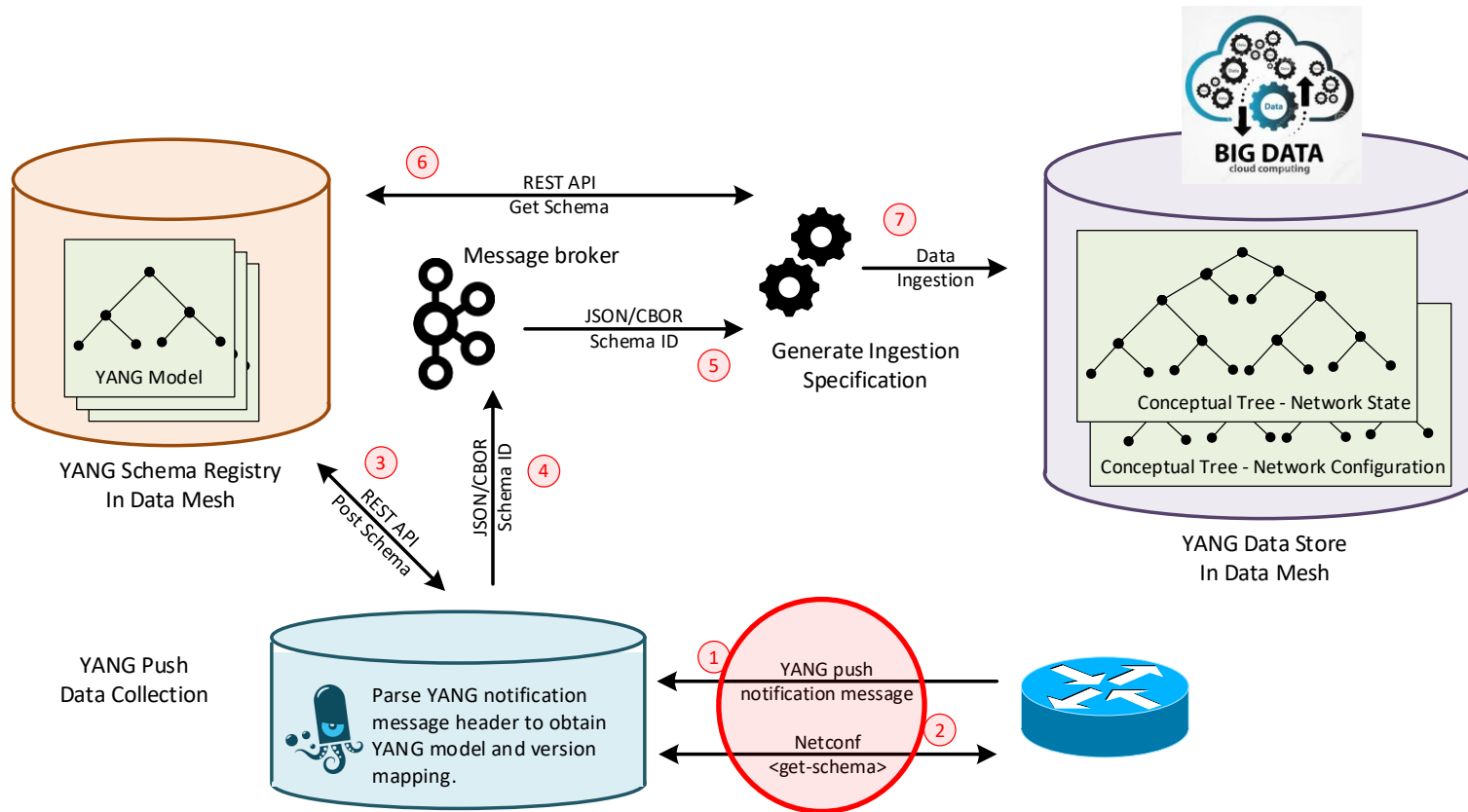
- **Data Mesh** is a big data architecture where different domains can exchange data with a bounded context. **Same principle as in networks.**

- **Bounded context relies that data always has semantics and versioning.**

- Semantics are needed to describe the data. **A gauge32 is not the same as counter32.** Values can increase or decrease. Needs monotonic increasing counter normalization or not.

- **Versioning is needed to** not only understand that the semantic has changed, but also wherever the new semantic is backward compatible or not. **Preventing to break the data processing pipeline.**

- YANG push as defined in RFC8641 is **missing semantics and versioning. draft-tgraf-netconf-yang-notifications-versioning addresses both.**

Extending the Datastore Selection and Notification Message Metadata
Draft Introduction

```
module: ietf-yang-push-metadata

augment /yp:push-update:
  +--ro module?                    string
  +--ro namespace?                 string
  +--ro revision?                  rev:revision-date-or-label
  +--ro revision-label?            ysver:version
  +--ro datastore-xpath-filter?    yang:xpath1.0 {sn:xpath}?
  +--ro datastore-subtree-filter?  <anydata> {sn:subtree}?
augment /yp:push-change-update:
  +--ro module?                    string
  +--ro namespace?                 string
  +--ro revision?                  rev:revision-date-or-label
  +--ro revision-label?            ysver:version
  +--ro datastore-xpath-filter?    yang:xpath1.0 {sn:xpath}?
  +--ro datastore-subtree-filter?  <anydata> {sn:subtree}?
augment /sn:establish-subscription/sn:input/sn:target:
  +-- revision?        rev:revision-date-or-label
  +-- revision-label?  ysver:version
augment /sn:modify-subscription/sn:input/sn:target:
  +-- revision?        rev:revision-date-or-label
  +-- revision-label?  ysver:version
augment /sn:subscription-started/sn:target:
  +-- revision?        rev:revision-date-or-label
  +-- revision-label?  ysver:version
augment /sn:subscription-modified/sn:target:
  +-- revision?        rev:revision-date-or-label
  +-- revision-label?  ysver:version
augment /sn:subscriptions/sn:subscription/sn:target:
  +--rw revision?        rev:revision-date-or-label
  +--rw revision-label?  ysver:version
```

- **Network operators need to control semantics in its data processing pipeline. That includes YANG push.**

- This is today only possible during YANG push subscription but not when nodes are being upgraded or messages are being published.

- draft-tgraf-netconf-yang-notifications-versioning extends the YANG push subscription and publishing mechanism defined in RFC8641:

  - **By extending the YANG push header** so that the YANG push receiver learns the semantic reference in the notification message directly.

  - **By adding the ability to subscribe to a specific revision** or latest-compatible-semversion.

Example Notification Message
In JSON and XML encoding

```
{
    "ietf-notification:notification": {
        "eventTime": "2022-09-02T10:59:55.32Z",
        "ietf-yang-push:push-update": {
            "id": 101,{
            "module": "ietf-interfaces",{
            "namespace": "urn:ietf:params:xml:ns:yang:ietf-interfaces",{
            "revision": "2014-05-08",{
            "revision-label": "1.0.0",{
            "datastore-xpath-filter": "ietf-interfaces:interfaces",
            "datastore-contents": {
                "ietf-interfaces:interface": {
                    "name": {
                        "eth0": {
                            "oper-status": "up",
                        }
                    }
                }
            }
        }
    }
}
```

```
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
 <eventTime>2022-09-02T10:59:55.32Z</eventTime>
 <push-update xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-push">
   <id>101</id>
   <module>ietf-interfaces</module>
   <namespace>urn:ietf:params:xml:ns:yang:ietf-interfaces</namespace>
   <revision>2014-05-08</revision>
   <revision-label>1.0.0</revision-label>
   <datastore-xpath-filter>ietf-interfaces:interfaces</datastore-xpath-filter>
   <datastore-contents>
     <interfaces xmlns="urn:ietf:params:xml:ns:yang:ietf-interfaces">
      <interface>
        <name>eth0</name>
        <oper-status>up</oper-status>
      </interface>
     </interfaces>
   </datastore-contents>
 </push-update>
</notification>
```

Versioning in YANG Notifications Subscription
Next steps

- **Do you recognize the problem statement?**

- **Network operators need to control semantics** in its data processing pipeline and therefore want to
  - Persist the revision or semantic-version also on upgrade.
  - Have a semantic reference in the notification message.

- A sample open-source and a vendor implementation will be shown at the IETF 116 hackathon.

- **-> Requesting feedback and comments.**
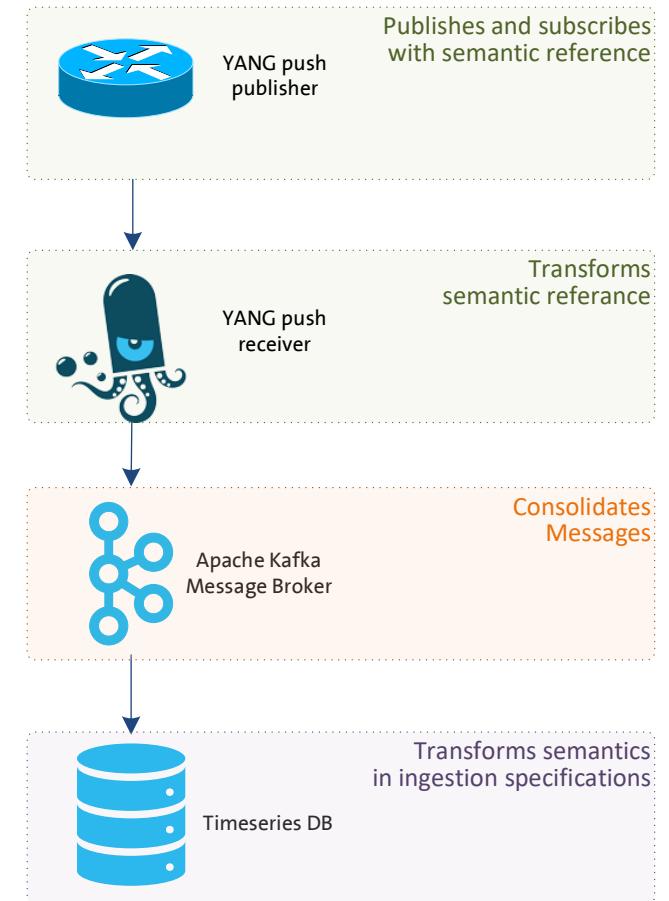
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