YANG-based Time Series Telemetry

Nov 2023, IETF 118
Kristian Larsson <kll@dev.terastrm.net>
Jan Lindblad <jlinbl@csco.com>
YANG-based Time Series Telemetry
YANG-based Time Series Telemetry

Really Nice Graphs

- What is included?
- Traceability?
- Measurement Units?
- Precision?

Compare numbers and graphs? Between systems? Vendors?

Use as input for decisions?
Philatelist Framework

**PROVIDER**
- Let's not implement Yet-Another-
- Scattered Sensors already abundant
- Pointers and Metadata

**COLLECTOR**
- Collect from all kinds of sources
- Add YANG + Metadata as needed

**AGGREGATOR**
- Transform and aggregate data flows
- Deliver TSDB buckets with traceable, vendor agnostic, well defined data
Collectors

Input:
• YANG-modeled data
• Non-YANG data

Output:
• YANG-modeled data

Transport format:
• Whatever (gNMI, Redfish, YANG Push, RESTCONF, SNMP, ...)
Aggregators

Input:
- YANG-modeled data
Output:
- YANG-modeled data
Transport format:
- TSDB tagged (see next slide)
YANG to Time Series Database Mapping

Original YANG Instance-Identifier:

```
/interfaces/interface[name='eth0']/statistics/in-unicast-pkts
```

- Metric: `interfaces_interface_statistics_in_unicast_pkts`
- Value: 5432100
- Labels:
  - `host = router-01`
  - `interfaces_interface_name = eth0`
YANG to Time Series Database Mapping

• A mapping of YANG-modelled data into label-set centric Time Series Databases
  • Convert NETCONF XML or RESTCONF JSON payload to store in TSDB
• All data automatically has a valid & deterministic TSDB representation
  • Otherwise, very common with custom, ad-hoc schemas written by hand
• Self-describing, so no strict reliance on YANG for visualizations
  • But extra metadata can be retrieved using YANG model
  • Dashboards and navigation can be built / organized with metadata from YANG model
    • Like show all temperature sensors on one dashboard, grouped by geography
Queries

• SP scale order of magnitude
  • Thousands large PE routers
  • Hundreds of thousands / millions CPE
  • Billions of metrics

• Programmatic queries of TSDB data

To retrieve incoming unicast packets for the interface eth0:
  *InfluxQL: SELECT * FROM interfaces_interface_statistics_in_unicast_pkts WHERE interfaces_interface_name = 'eth0'
  *PromQL: interfaces_interface_statistics_in_unicast_pkts{interfaces_interface_name="eth0"}

• Use YANG model as rich index to get overview of data
Thank you