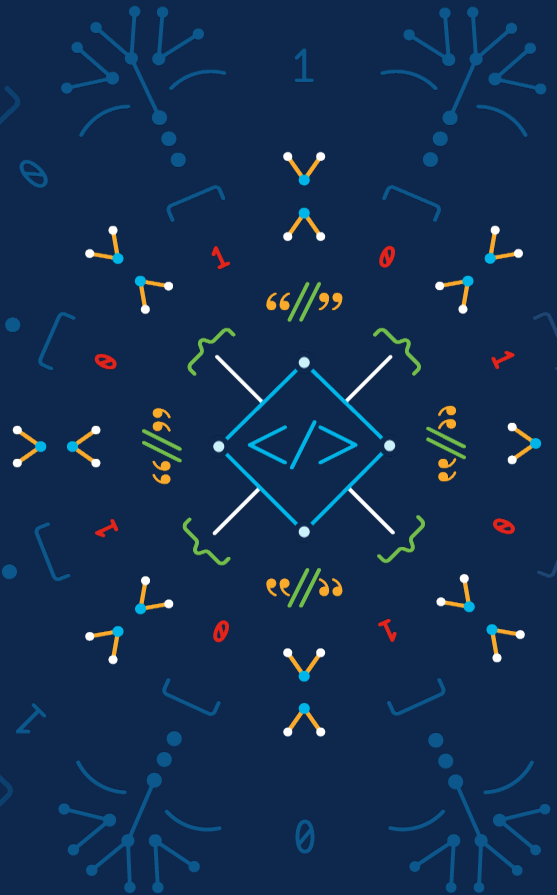
Developer Days
Automation

cisco
The bridge to possible

gNMI Telemetry Interoperability Testing



Wai Tai
Solutions Architect
May 11, 2023

Agenda

- gNMI Streaming Telemetry
- Why Interop Testing?
- gNMI Telemetry Interop Test Tool
- Demo
- What’s next
- Q&A

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

gNMI Streaming Telemetry

Streaming Telemetry

- Push vs. Poll
- Big Data Analytics
- Closed-loop automation

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

gNMI Overview

- gRPC based protocol for Network Management
  - Get/Set/Capabilities/Subscribe
- Model-Driven gNMI streaming telemetry is a good use case
  - RFC 9232 – Network Telemetry Framework
- Configuration is better handled with NETCONF

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

Vendor Neutral Model-Driven Telemetry

- OpenConfig YANG models
- SNMP MIB-II

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

Why Interop Testing?

gNMI Specifications

- Defined by OpenConfig Working Group
- Not all requirements are as well specified as IETF RFCs

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

NYAT (NETCONF & YANG Automation Testing) *

- Interoperability testing of configuration management with NETCONF & YANG
- Compliance testing against Service Automation Criteria
- Avoids custom error coding when developing automation software

* https://developer.cisco.com/nyat/

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

gNMI Telemetry Interoperability Testing

- Enables multi-vendor support of telemetry
- Avoids custom coding
- Normalize gNMI telemetry server implementations

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

gNMI Telemetry Interop Test Tool

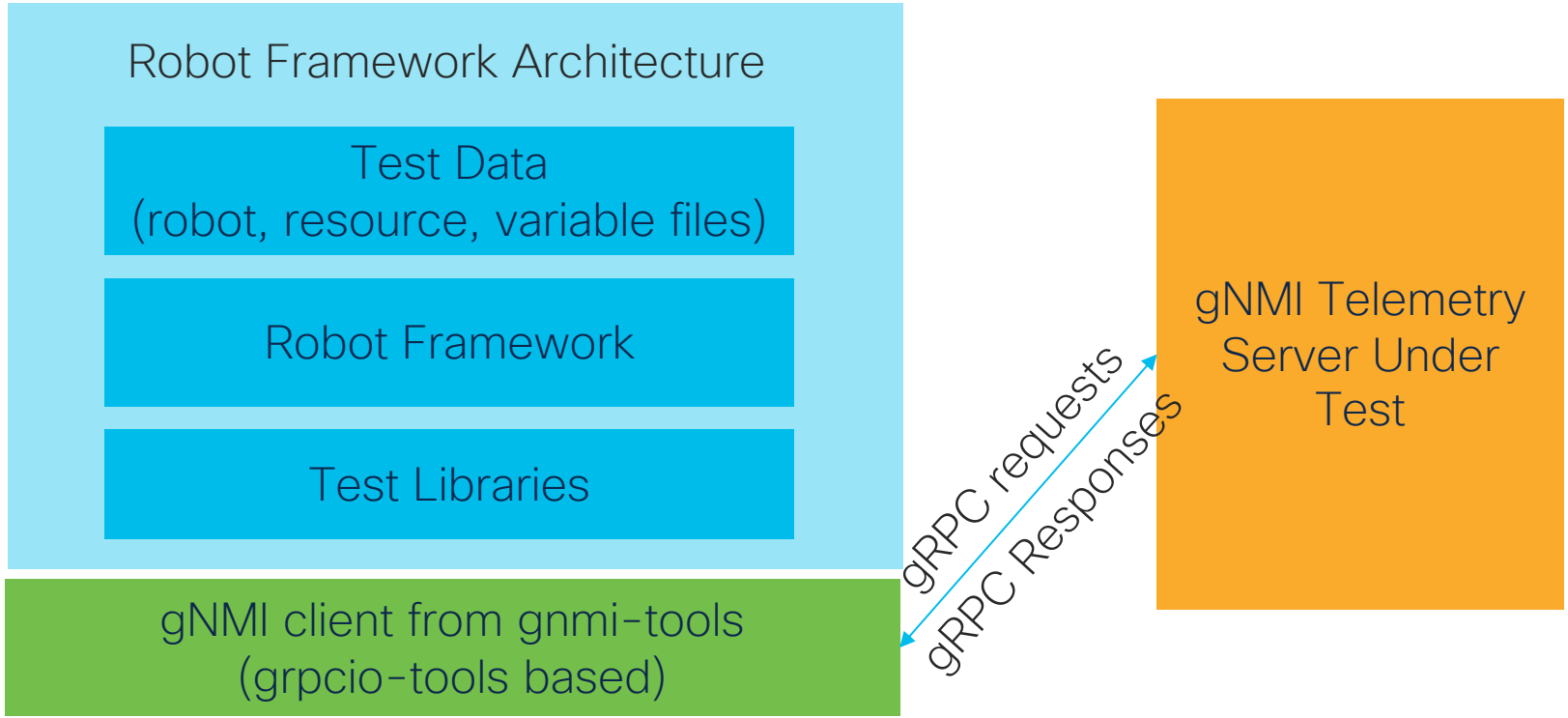
gNMI Telemetry Interop Test Tool

- Beta version of the test tool is available through GitHub *
- Automated testing using the Robot Framework
  - Compliance testing of gNMI Capabilities, Get and Subscribe methods
  - OpenConfig Interfaces model testing
  - Vendor-specific model testing
- The Robot Framework test generates a test report and log files
- Testing has been done against several Cisco and 3rd party gNMI telemetry servers

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

* https://github.com/ConfD-Developer/gnmi-tests

gNMI Telemetry Interop Testing



© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

gNMI Adapter for ConfD & NSO

- PoC on northbound support of gNMI for ConfD & NSO *
  - ConfD & NSO shares the same MAAPI interface
  - Not needed when testing against your own gNMI telemetry server
- Limitations of the PoC are listed in the User Documentation
- Handy during the development of the gNMI Telemetry test cases

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

* https://github.com/ConfD-Developer/gnmi-tools

gNMI Server Implementation Variations

- Only proprietary instead of OpenConfig models
- Root path for Get requests
- Differences in interpretation of origin, prefix, and path fields
- JSON_IETF instead of the mandatory JSON encoding
- Paths can only be specified through Subscribe but not Get

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

gNMI Server Implementation Variations Cont'd

- Capabilities advertises incorrect supported encodings
- Missing sync_response in subscription responses
- Multiple updates for the same leaf within the initial set of updates
- Update messages are being aggregated when not permitted
- Operational data type isn't usually supported

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

Demo

What's next

- Cleanup remaining known issues
- Add support of more OpenConfig paths
  - platform, if-ip, and more
- Test against devices with telemetry data that's changing
- Let us know if you are interested in this tool
  - Welcome discussions, bug reports, and pull requests

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

Resources

- gNMI test client & server tools: https://github.com/ConfD-Developer/gnmi-tools
- Automated gNMI Telemetry Interop Test Tool: https://github.com/ConfD-Developer/gnmi-tests
- grpcio-tools: https://pypi.org/project/grpcio-tools/
- ConfD Basic: https://developer.cisco.com/site/confD/
- Robot Framework: https://robotframework.org

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

Q&A

The bridge to possible