

Open for All.



OCP
GLOBAL
SUMMIT

SONiC Management Framework

Jose Gonzalez, PLM, Dell Technologies

Senthil Ganesan, Architect, Dell Technologies



OPEN
COMMUNITY®



Hardened SONiC Implementation?

1. Supportable
2. Maintainable and Extendable
3. Include Unified Management Infrastructure



NETWORKING



SONiC Management infrastructure



NETWORKING



Management interfaces

- Linux shell
- SONiC CLI (Python based – Click)
- FRR CLI
- Config_db.json
- Minigraph.xml (deprecated)

User feedback

- Not centralized
- Configuration backup and restore is cumbersome
- Various formats
- Prone to misconfiguration
- Root privileges



SONiC Management Framework

Implementation considerations

- Backwards compatible
- Modern programmatic northbound interfaces:
REST, gNMI/gNOI
- Intuitive CLI
- Standards-based: OpenConfig, IETF
- Containerized
- Management Workgroup sub-group
- First pull request in 201911



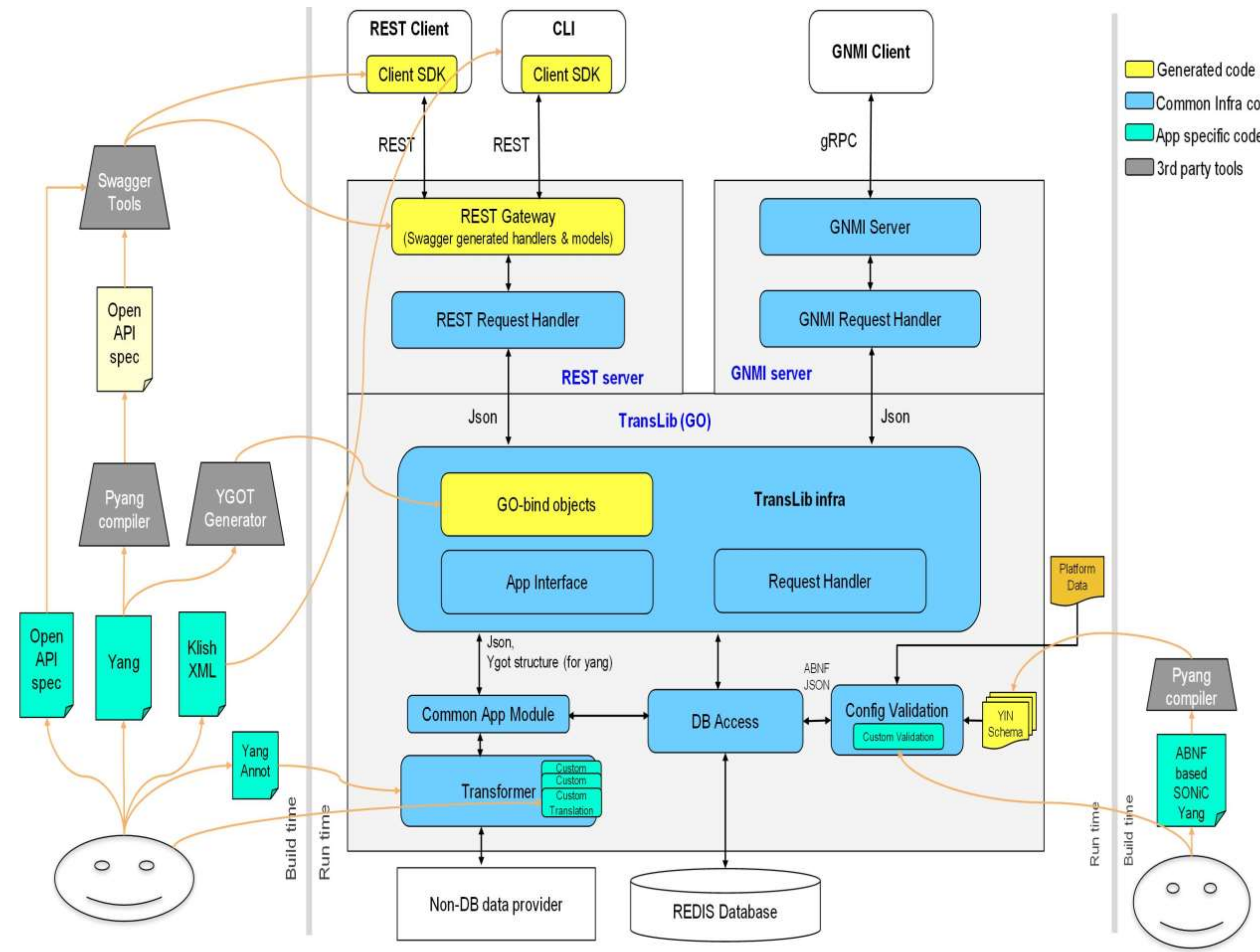
NETWORKING



Unified Management Framework Arch



- Simplify and Standardize SONiC management
- Make SONiC management DevOps friendly
- Intuitive CLI for SONiC config validations and error feedback



NETWORKING



CLI

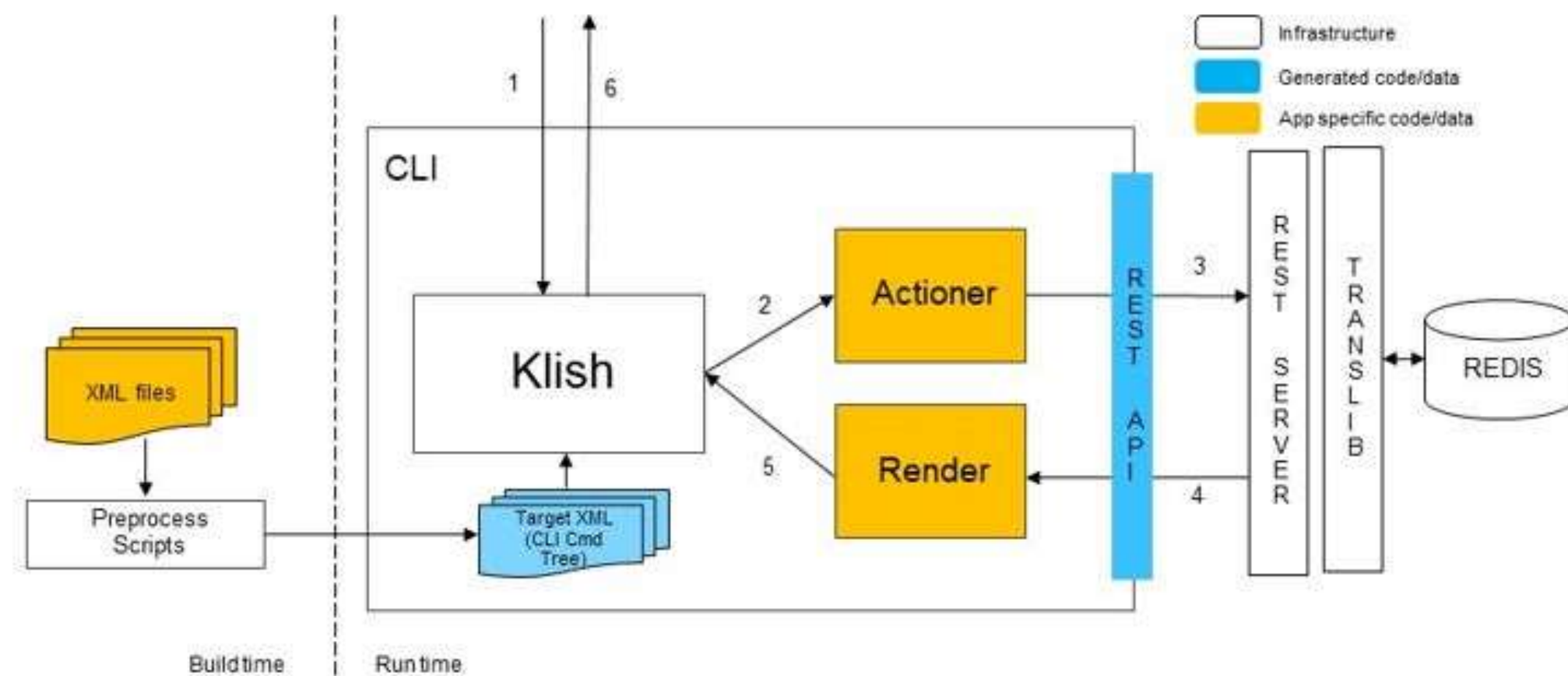
- Intuitive CLI
- Uses Open Source Klish Framework
- Integrates FRR BGP into the Mgmt Framework



NETWORKING



CLI modules



#sonic-cli

```
sonic# configure terminal
```

```
sonic(config)# router bgp 200
```

```
sonic(config-router-bgp)# neighbor 45.0.0.1
```

```
sonic(config-router-bgp-neighbor)# remote-as 200
```

```
sonic(config-router-bgp-neighbor)# address-family ipv4 unicast
```

```
sonic(config-router-bgp-neighbor-af)# activate
```

```
sonic(config-router-bgp-neighbor-af)#
```



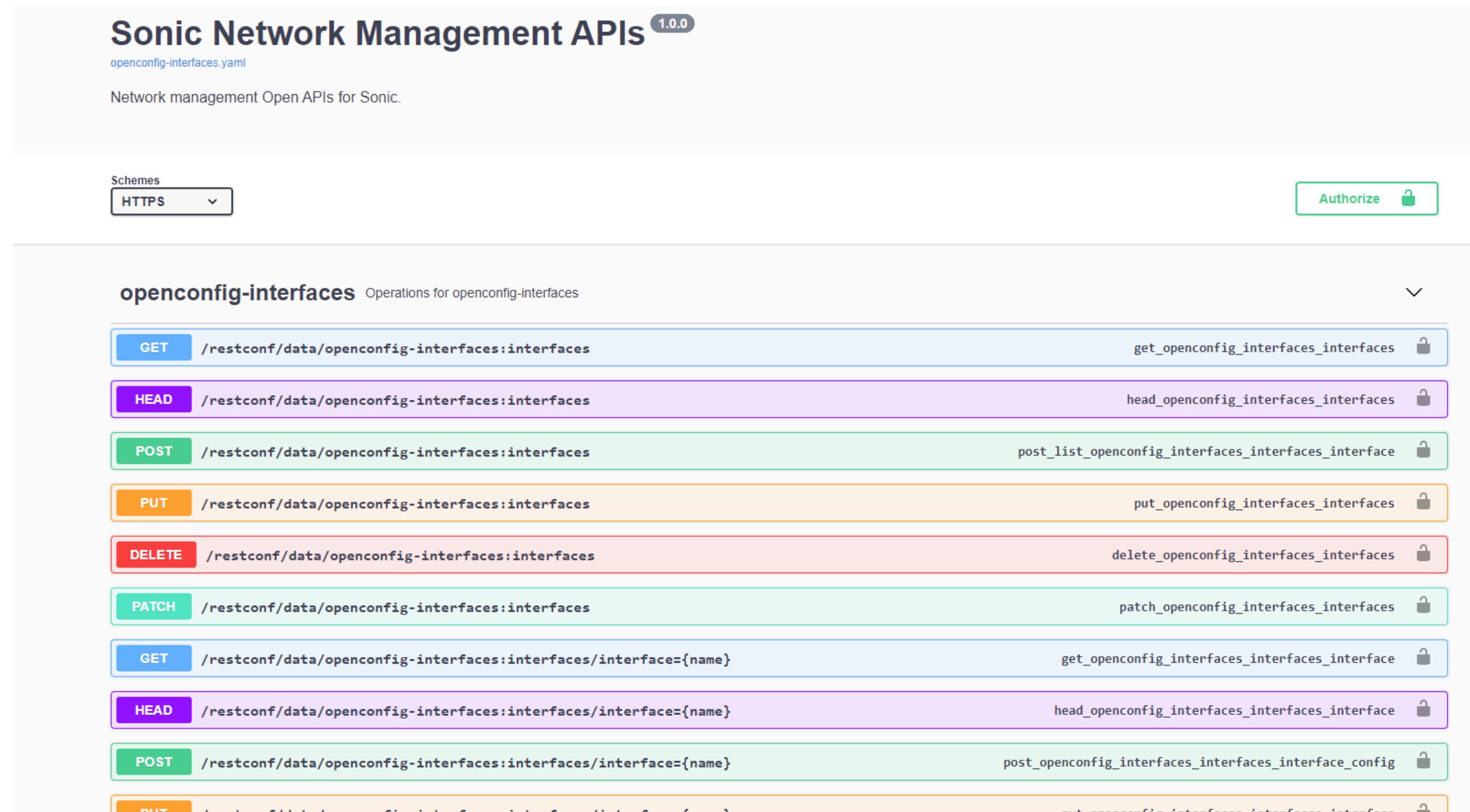
REST

- Follows Open API Specification
- Uses Swagger Server
- Autogenerated from YANG
- <https://<mgmt-ip>/ui>

SONiC REST API explorer

Please click on any of the links below to explore its corresponding REST APIs

Model	Description
ietf-ptp	REST APIs for ietf-ptp
ietf-snmp	REST APIs for ietf-snmp
ietf-yang-library	REST APIs for ietf-yang-library
openconfig-acl	REST APIs for openconfig-acl
openconfig-bfd	REST APIs for openconfig-bfd
openconfig-interfaces	REST APIs for openconfig-interfaces
openconfig-lacp	REST APIs for openconfig-lacp
openconfig-lldp	REST APIs for openconfig-lldp
openconfig-mclag	REST APIs for openconfig-mclag
openconfig-nat	REST APIs for openconfig-nat
openconfig-network-instance	REST APIs for openconfig-network-instance



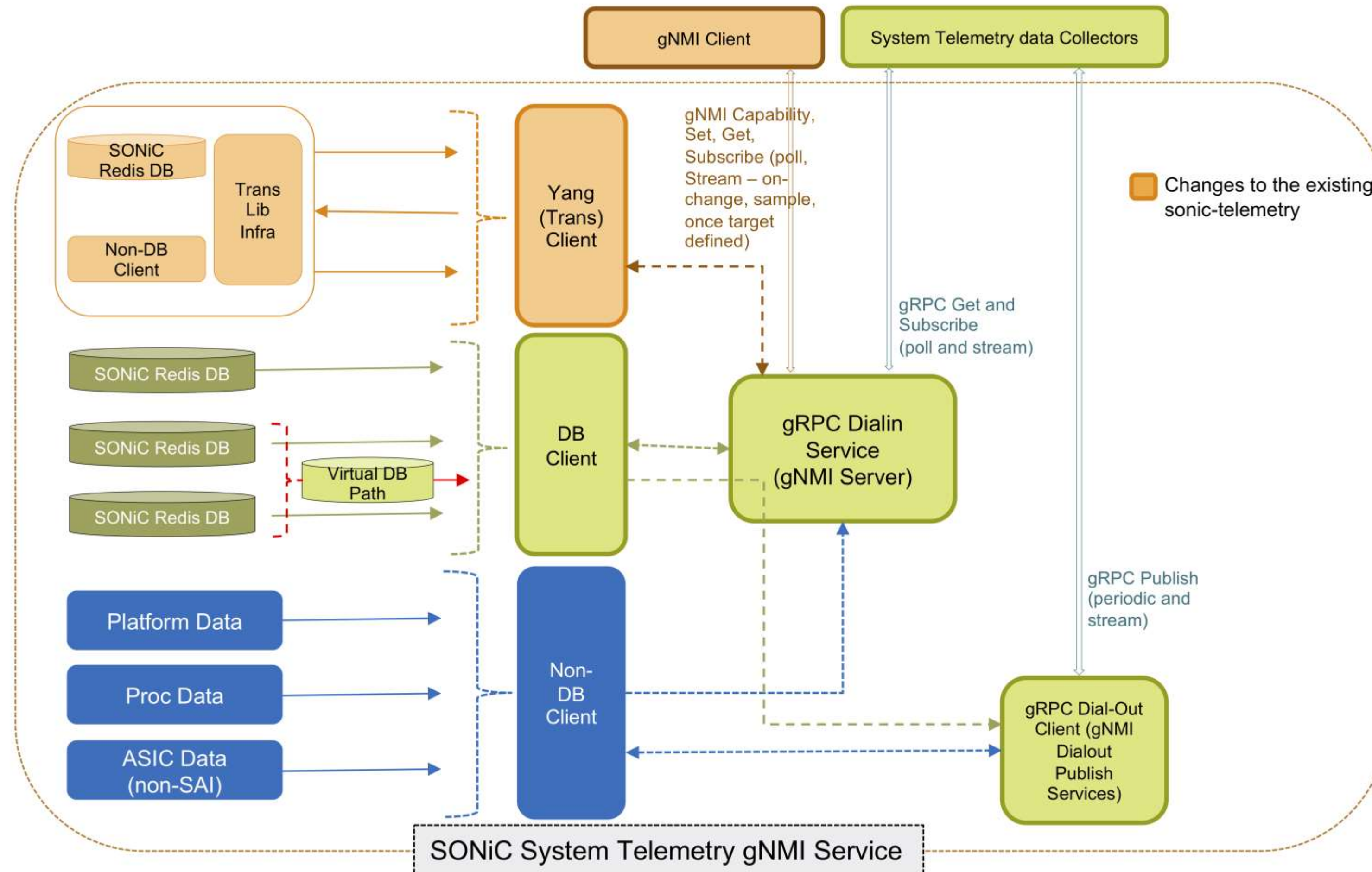
Authentication

- Current implementation supports three modes of authentication:
 - Username/Password: Sent in the message metadata, similar to http Basic Auth.
 - Java Web Token(JWT): After initial authentication via gNOI RPC (with user/pass) or cert based authentication you are issued a token that can be passed in subsequent requests in the metadata. Token contains user, roles and expiry time.
 - Client Certificate: Certificate can specify user in the CN field of the client certificate for authentication and authorization.

gNMI



NETWORKING



gNMI

A programmatic northbound interface for configuration and telemetry using binary protocol buffers

- Get: Retrieve configuration.
- Set: Update, Replace or Delete configuration.
- Subscribe: Subscribe to updates to system state and telemetry.
- Capabilities: Get lists of supported models and encodings as well as gNMI version.

Subscription Modes

- Polling: The client sends polling requests periodically and target responds leaving the RPC open.
- Once: The target creates the relevant update messages, transmits them, and subsequently closes the RPC.
- Stream: Pushed updates sent from the target.
 - On Change: The target watches for updates to the specified fields and sends updates to the client immediately. Only a limited set of fields support this mode.
 - Sampled: Similar to polling, but the target polls the field at a client specified period and sends updates.
 - Target Defined: The target decides what is the appropriate mode to use for the given fields (On Change or Sampled)

gRPC Network Operations Interface (gNOI)

- Defines a set of gRPC-based microservices for executing operational commands on network devices.
- GNOI framework as been defined.
- Sample RPCs supported.
 - Image Management
 - Show Tech Support
 - Copy Config
 - System Time

Call to Action

- Join the mailing list **sonic-mgmt-workgroup@googlegroups.com**
- When adding new features, add it via the new **mgmt framework**
- Provide your feedback on the management framework.
- Phase I is already Merged (Framework, Sample Features)
- Phase II prepared for PR (Additional Features, GNOI Framework, RBAC Framework)

Open for All.



OCP
GLOBAL
SUMMIT

MARCH 4 & 5, 2020 | SAN JOSE, CA