Open for All.
SONiC Management Framework

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Hardened SONiC Implementation?

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

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
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
Unified Management Framework Arch

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

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

#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
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

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)