The Place for Open Source Networking in Enterprise-Grade Networks

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Agenda

- Benefits of Open Source Networking
- SONiC Architecture Overview
- Leveraging Familiar Tooling
- Enterprise-Grade Considerations
- Dell Enterprise SONiC

Benefits of Open Source Networking

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- Cost-effectiveness
- Flexibility and customization
- Rapid innovation and feature development
- Interoperability and open standards
- Transparency and security
- Skill development and knowledge sharing
- Integration with DevOps and automation
- Ecosystem and community support

SONiC Architecture Overview

Software for Open Networking in the Cloud (SONiC)

Open and Extensible Debian Linux-based and standards-based protocols and Northbound interfaces with OpenConfig, REST/JSON and gRPC.
Access to **Linux** tools and 3rd-party apps

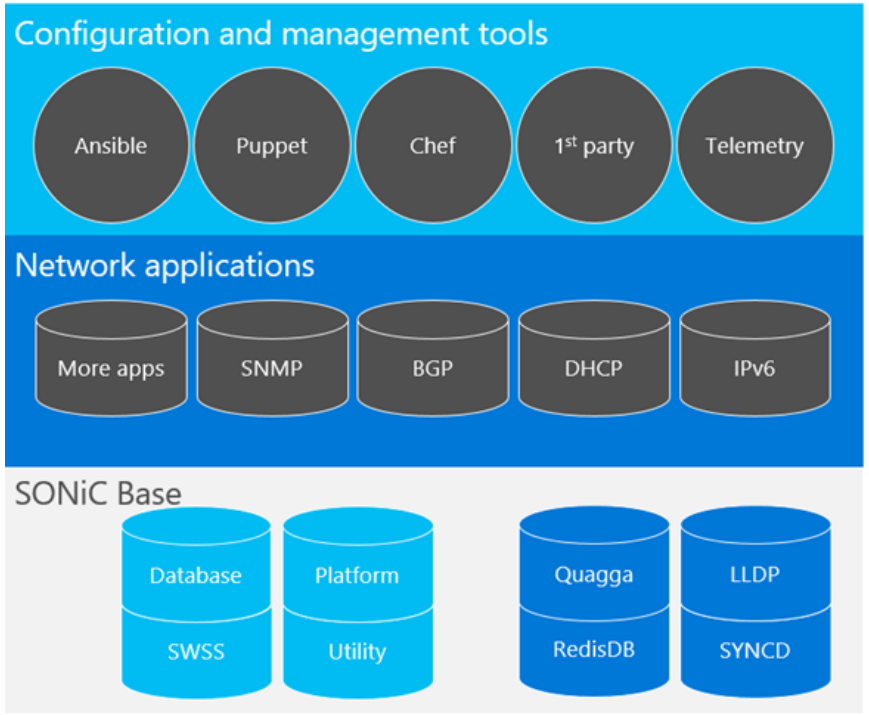
Developer ready through containerization, automation, API centric.
Containers provide sandboxing, security, portability, ease of troubleshooting and granular resource management for apps

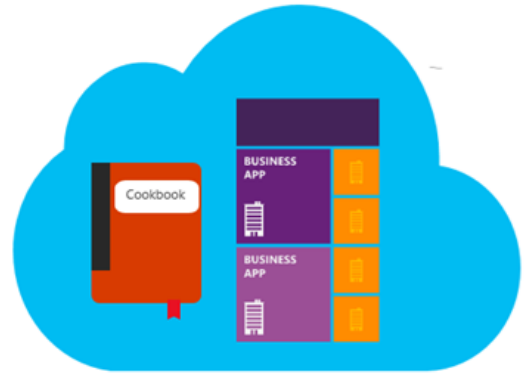
Created for cloud operations at scale.
Real-world tested. Tens of thousands of VM's scale.
Hardened for multi-tenancy.

Silicon vendors drive innovation exposed through extensible SAI layer.
Advanced telemetry and deep analytics visible to apps.
Feature velocity no longer blocked by incumbent NOS constraints

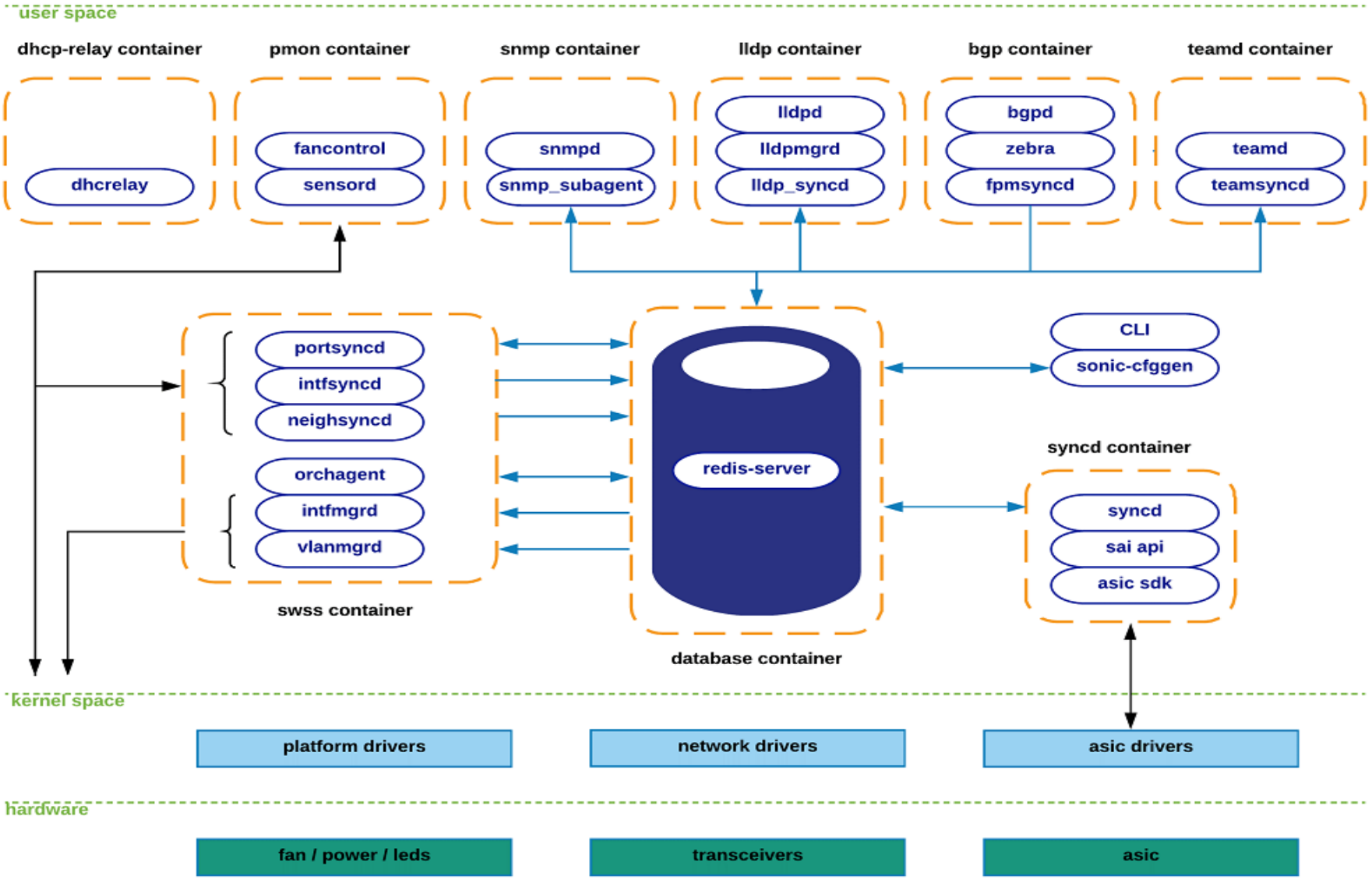
Benefits of Container Architecture – Modular Design

- Sandboxing - the apps are developed independent of the platform specific details required to interact with lower-layer abstractions
- Improved Security
- Increased Portability
- Ease of Troubleshooting
- Granular Resource Management for applications
- Simple and fast deployment
- Improved scalability





SONiC Architecture Overview



Switch Abstraction Interface (SAI)

- SAI is a standardized API that abstracts the underlying switch hardware
- Enables SONiC to run on various switch platforms from different vendors
- Promotes code reuse and reduces development effort
- Allows SONiC to leverage hardware-specific features and optimizations

Leveraging Familiar Tooling

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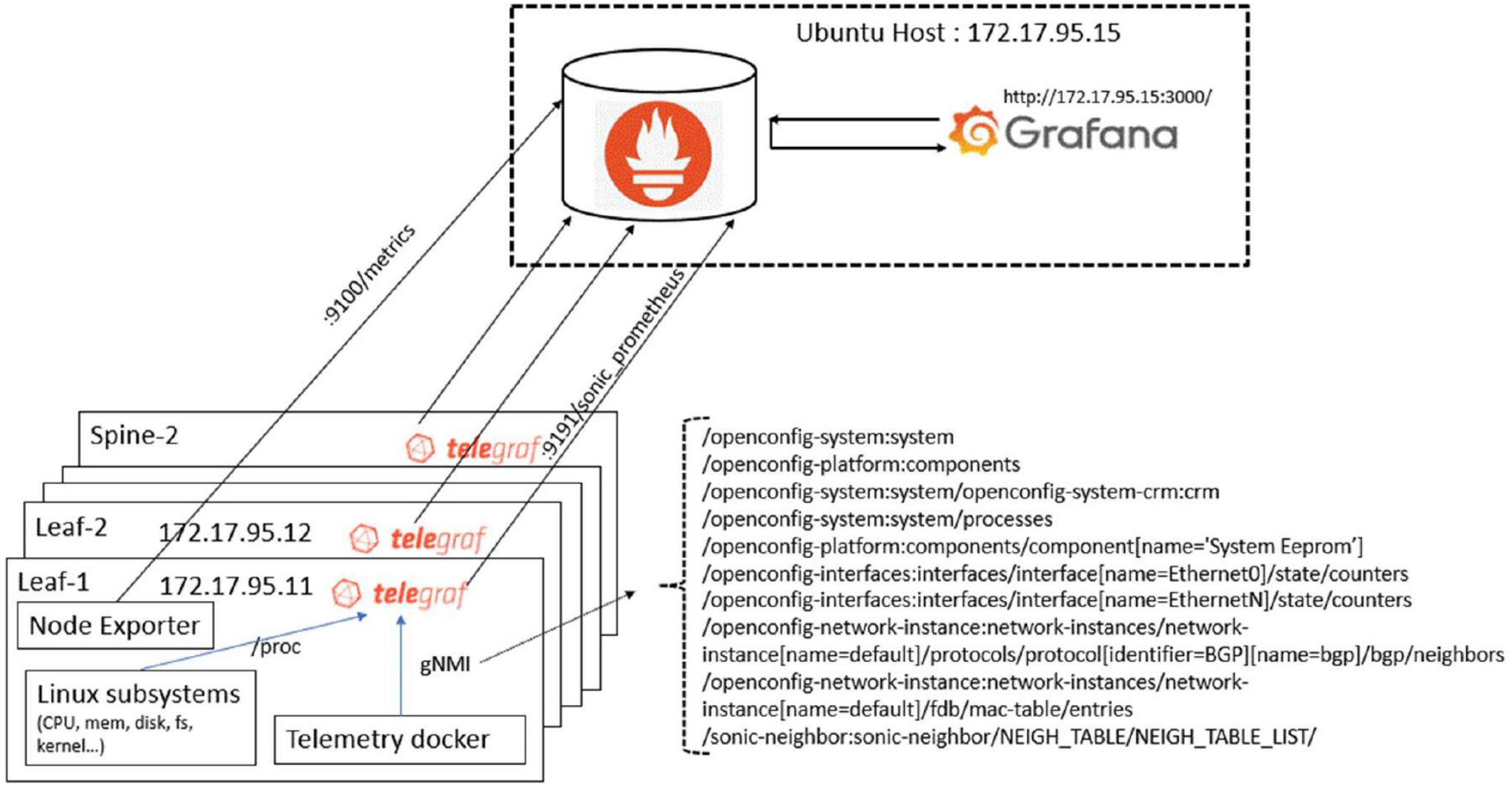
- Automation and CI/CD:
  - Ansible / Jenkins / Drone
- Monitoring and Visibility:
  - Prometheus / Grafana
  - InfluxDB / Telegraf
  - ELK Stack
  - SuzieQ
- Network Simulation and Testing:
  - Vagrant / GNS3 / EVE-NG

Telemetry with Telegraf & Grafana



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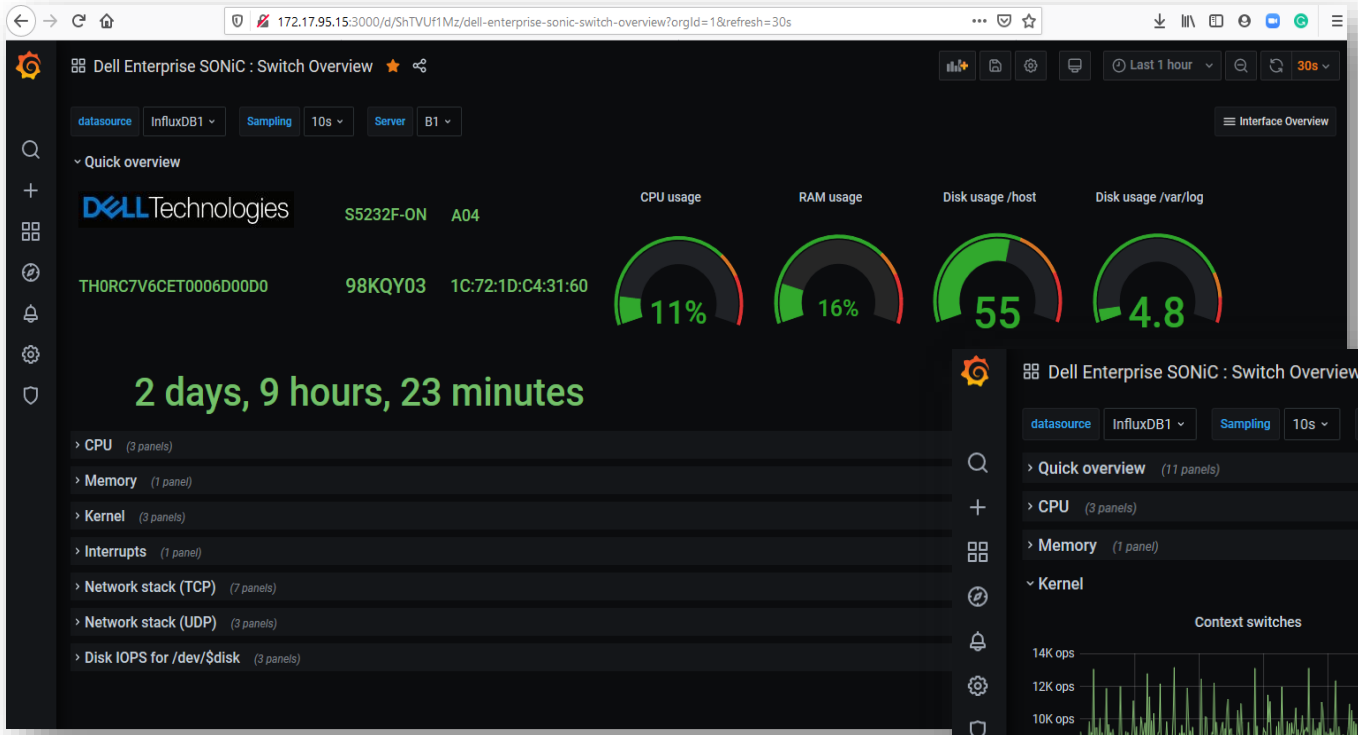


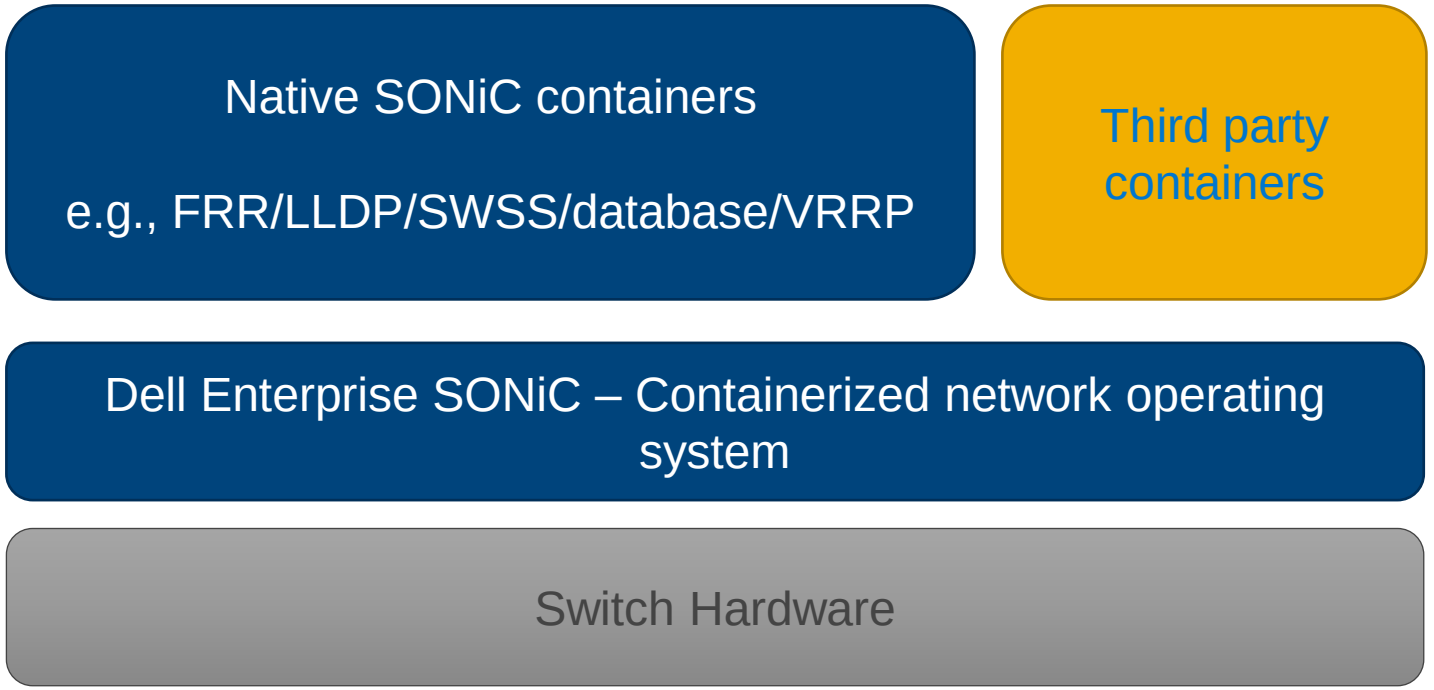
Logs with ELK

Enterprise-Grade Considerations

Enterprise-Grade Considerations

- Zero Touch Provisioning and Management
- Scalability and Performance
- High Availability and Redundancy
- Security and Access Control
- Programmatic Access and Automation
- Monitoring and (Advanced) Telemetry
- Optics Compatibility and Testing
- Ecosystem and Interoperability
- Support and Maintenance
- Training and Enablement
- Professional Services and Consulting

Third Party Container Management (TPCM)

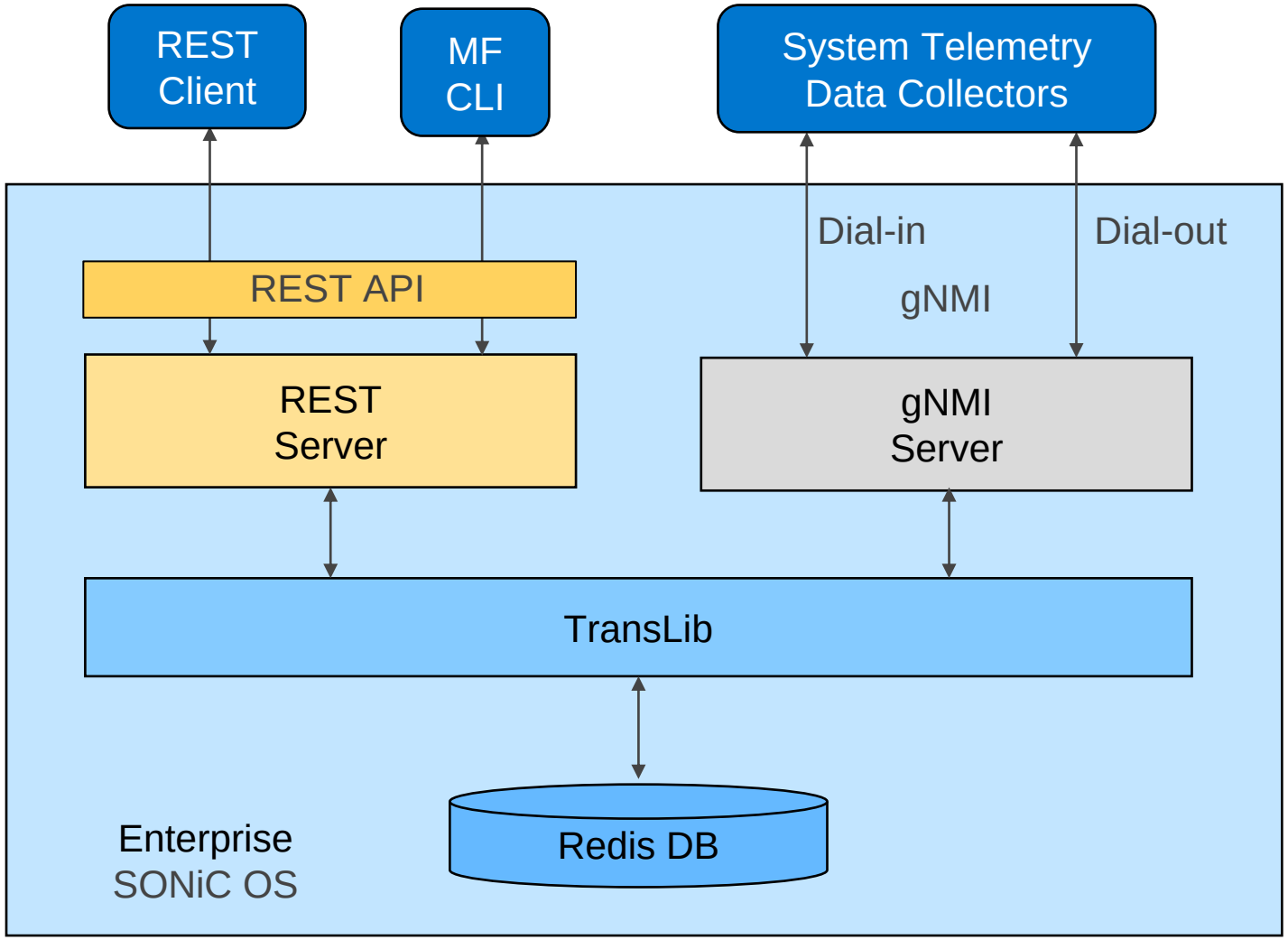


- Provide TPC interface for install/ uninstall/ upgrade
- Preserve/Restore TPC during SONiC image upgrade
- Automatically start during reboot

Management Framework (MF)

Management Framework includes:

- Management Framework CLI
  - User interface
- REST Server
  - Supports CLI and REST clients
  - Utilizes JSON over HTTP
- gNMI Server
  - Supports gNMI clients (collectors)



Dell Enterprise SONiC

Shipping: Dell Enterprise SONiC 4.4.0

Enterprise SONiC Key Features and Supported Platforms

Protocols and Certifications (in alphabetical order)

- Anycast Gateway
- BFD
- BGP Unnumbered
- BGPv4/v6
- COPP
- Cut-through switching
- Datacenter Interconnect (DCI) Multi-Site
- DHCP with Relay Support
- Dynamic Load Balancing
- ECMP
- EVPN with Multihoming Support
- FIPS 140-2 Certification
- GNS3 image
- IEEE 802.1x
- IP SLA
- Integrated Routing and Bridging (IRB) A/Symmetric
- LAG, MCLAG, LACP Fallback
- LLDP, LLDP-MED
- Multicast (L2 & L3), IGMP, PIM-SSM, IGMP Snooping
- NTP
- OSPFv2
- PFC, ECN
- Policy Based Routing
- Priority Group Mapping
- PVST, RPVST+, MSTP
- QinQ
- QoS, WRED
- RoCEv2
- Routed sub-interfaces
- Secure boot
- Static routing
- Storm Control
- UDF Hashing
- Unidirectional Link Detection (UDLD)
- USGv6-R1 Certification
- VRF
- VRRPv4/v6
- VXLAN (L2 & L3)

Platforms

- **Z9664F-ON**
  Tomahawk4, 64x400G + 2x 10G
- **Z9432F-ON**
  Trident4.x11, 32x400G + 2x10G
- **Z9332F-ON**
  Tomahawk3, 32x400G + 2x10G
- **Z9264F-ON**
  Tomahawk2, 64x100G + 2x10G
- **S5448F-ON**
  Trident4.x9, 48x100G + 8x400G + 2x10G
- **S5232F-ON**
  Trident3.x7, 32x100G + 2x10G
- **S5296F-ON**
  Trident3.x7, 96x25G + 8x100G
- **S5248F-ON**
  Trident3.x7, 48x25G + 4x100G + 2x100G
- **S5224F-ON**
  Trident3.x5, 24x25G + 4x100G
- **S5212F-ON**
  Trident3.x5, 12x25G + 3x100G
- **E3248PXE-ON**
  48x10G POE
- **E3248P-ON**
  48x1G POE
- **N3248TE-ON**
  Trident3.x3, 48x1G + 4x10G + 2x100G
- Accton AS5835-54T
  Trident3.x5; 48x10G + 6x100G
- Accton AS4630-54PE
  Trident3.x3, 48x1G + 4x25G + 2x100G
- Accton AS7326-56X
  Trident3.x7, 48x25G + 8x100G
- Accton AS7712-32X (32x100G)
- Accton AS9716-32D (32x400G)
- AS7726-32X (32x100GbE)
- AS7816-64X (64x100GbE)

System

- Debian GNU/Linux 11 (Bullseye)
- Linux Kernel 5.10
- SAI ver: 10.0.0.6 (4.2.0)
- FRR 8.2.2

Infrastructure

- L2 & L3 ACL
- TACACS, RADIUS, RBAC
- Dynamic port breakout
- Standard interface naming
- SNMPv2/v3
- Syslog
- NAT
- NTP
- PoE, PoE+, UPoE

Management and Monitoring

- ZTP
- gNMI, REST, MF-CLI, OpenConfig models
- Silicon telemetry (IFA, MOD)
- Silicon Analytics: In-band Flow Analyzer 2.0, Drop Monitor, Tail-stamping
- sFlow
- RSPAN, ERSPAN/Everflow

Ecosystem

- Ansible collection
- Fabric Design Center
- Telegraf
- Prometheus
- Open Stack
- Augtera
- Dorado
- Beyond Edge
- Metalsoft
- Racksnet

Dell Platforms