# STORDIS
The Open Networking Expert

A Brief Tutorial on SONiC and Overview of the Open-Source AI-Driven Orchestration Framework ORCA

SONiC Linux

- Created by Microsoft for their Azure cloud

- Open-sourced in 2016

- Supports Data Center use cases with increasing availability of campus features

- Hardware-independent

- Containerized architecture

- Free community version, numerous enterprise-grade versions

- Landing page: https://sonicfoundation.dev/
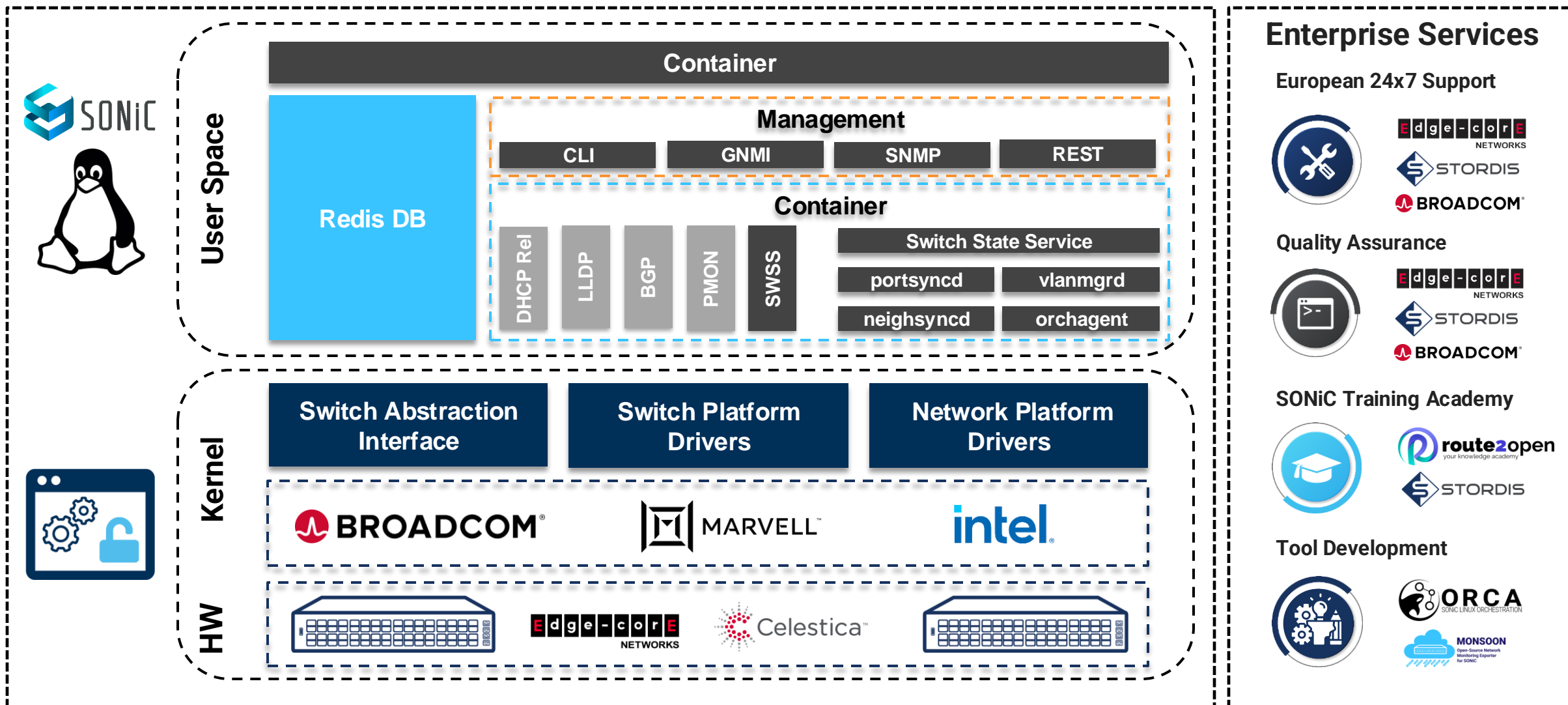
ZTP with SONiC

Automated installation of SONiC (or other OS) with ONIE ZTP

- ONIE = Open Networking Install Enviroment (https://www.opencompute.org/wiki/Networking/ONIE)

- Provide ONIE installer URL via DHCP option 14 (`default-url`)

Automated provisioning of SONiC

- ZTP JSON file URL via DHCP option 67 (`bootfile-name`)

- Download files, provide config, update firmware, execute script, set up SNMP, …

Configuring SONiC

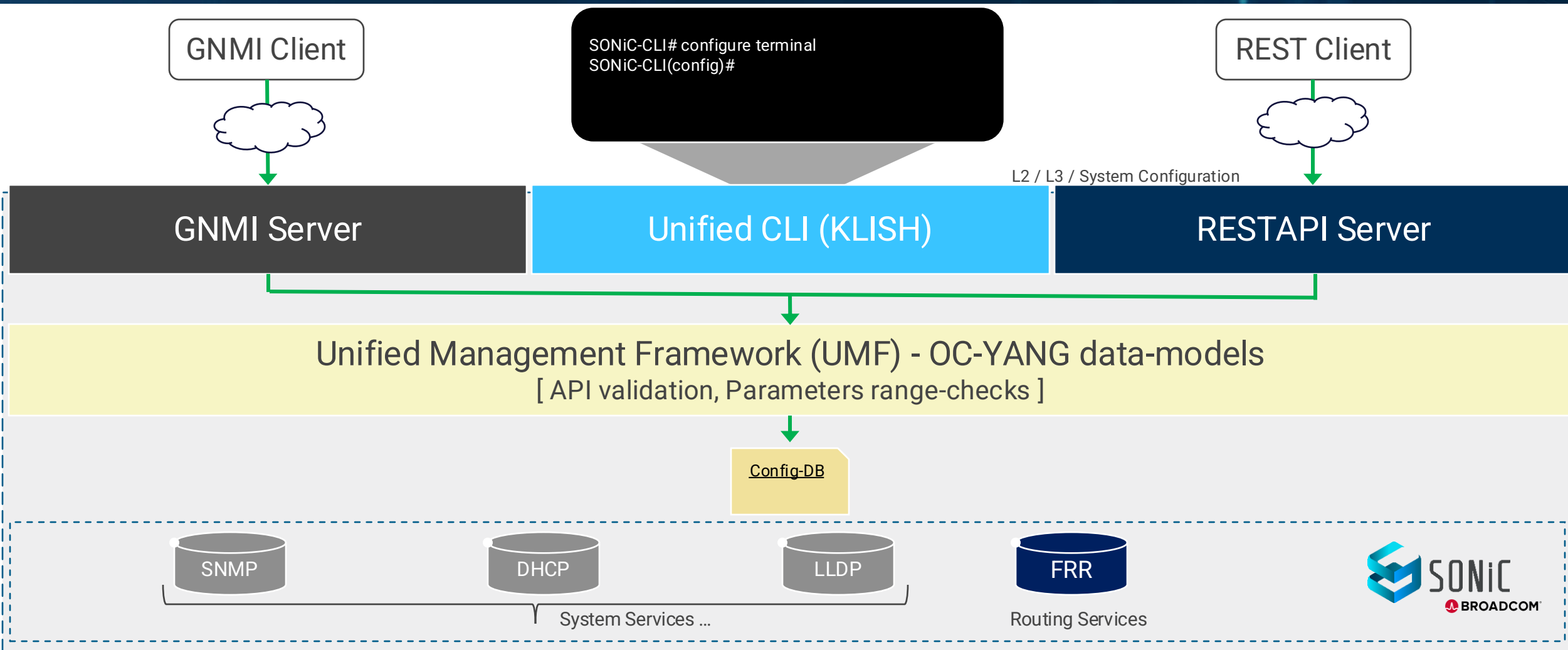SONiC software can be configured using the following three methods:

- Command Line Interface (CLI)

- REST or gNMI calls to API

- Edit configuration files (manually or scripted)

Types of CLIs:

- CLICK

- FRR shell (VTYSH)

- Management Framework CLI "Klish" (`sonic-cli`) - not implemented everywhere
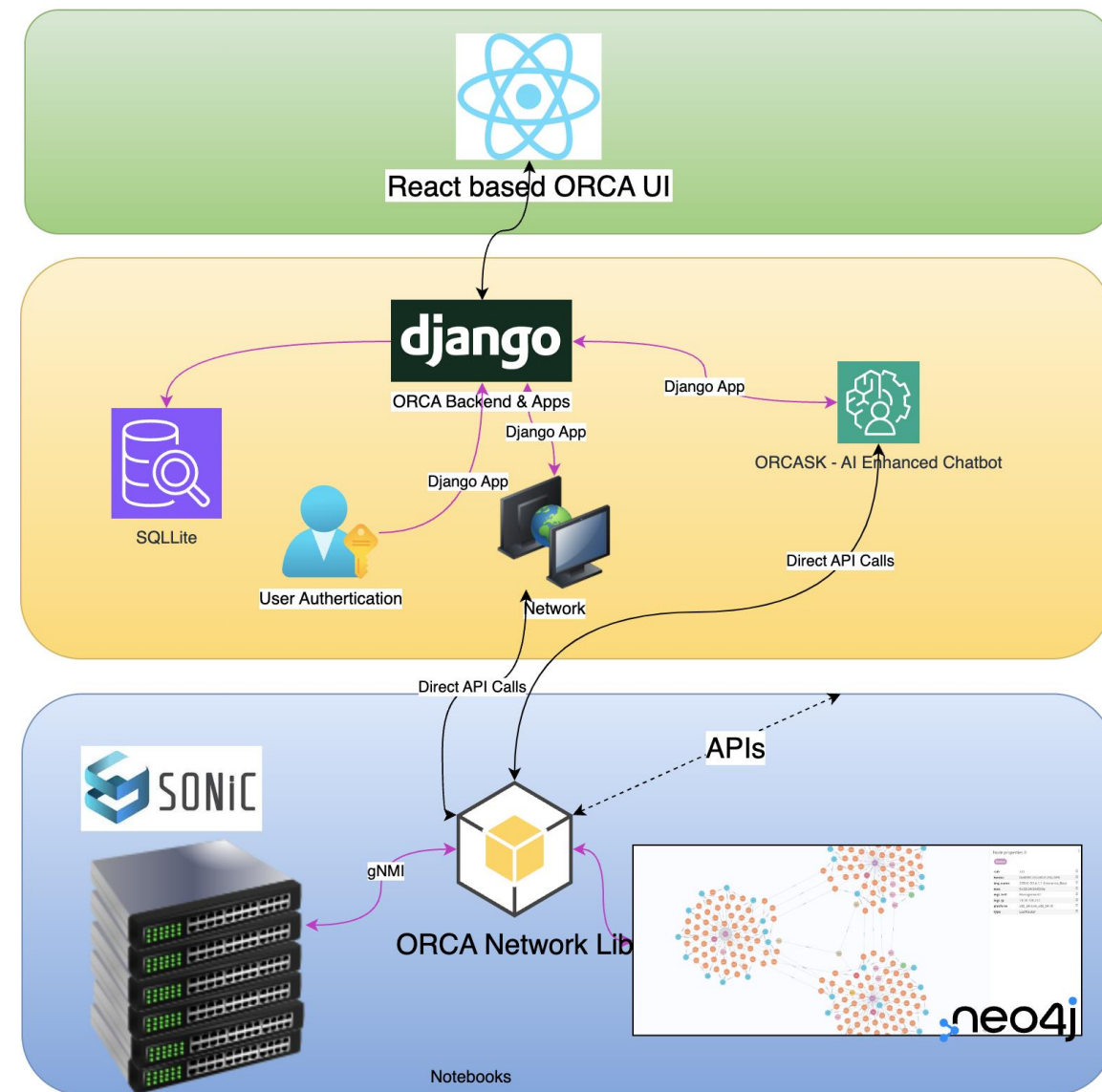
Unified Management Framework

It´s so simple to manage SONiC

- An Open Source Orchestration Solution For SONiC

- 3 Major components-
  - ORCA Network Library
  - ORCA Backend
  - ORCA UI

- Network Topology maintained Neo4j graph database.

- Realtime updates in DB using gNMI subscriptions.
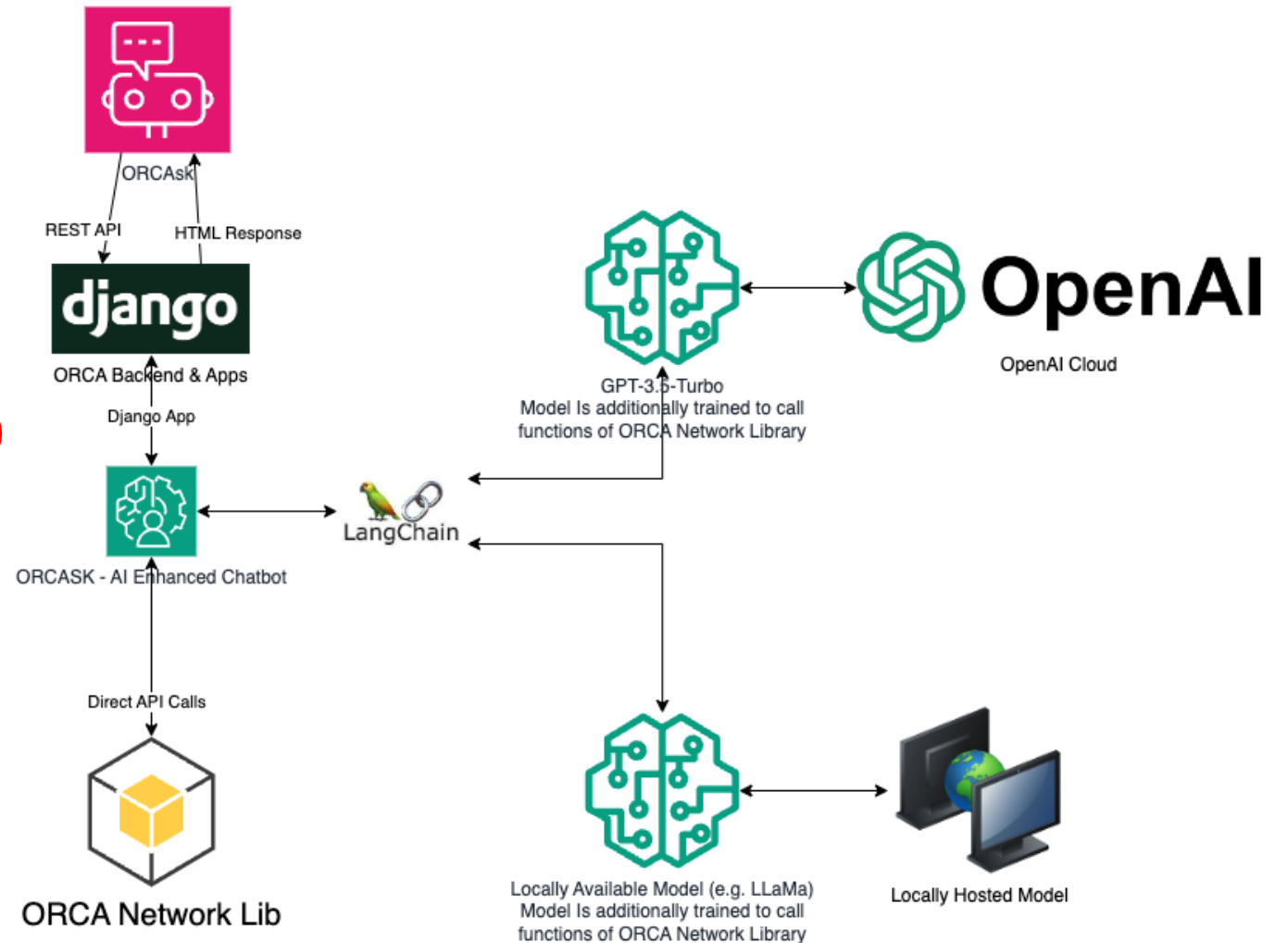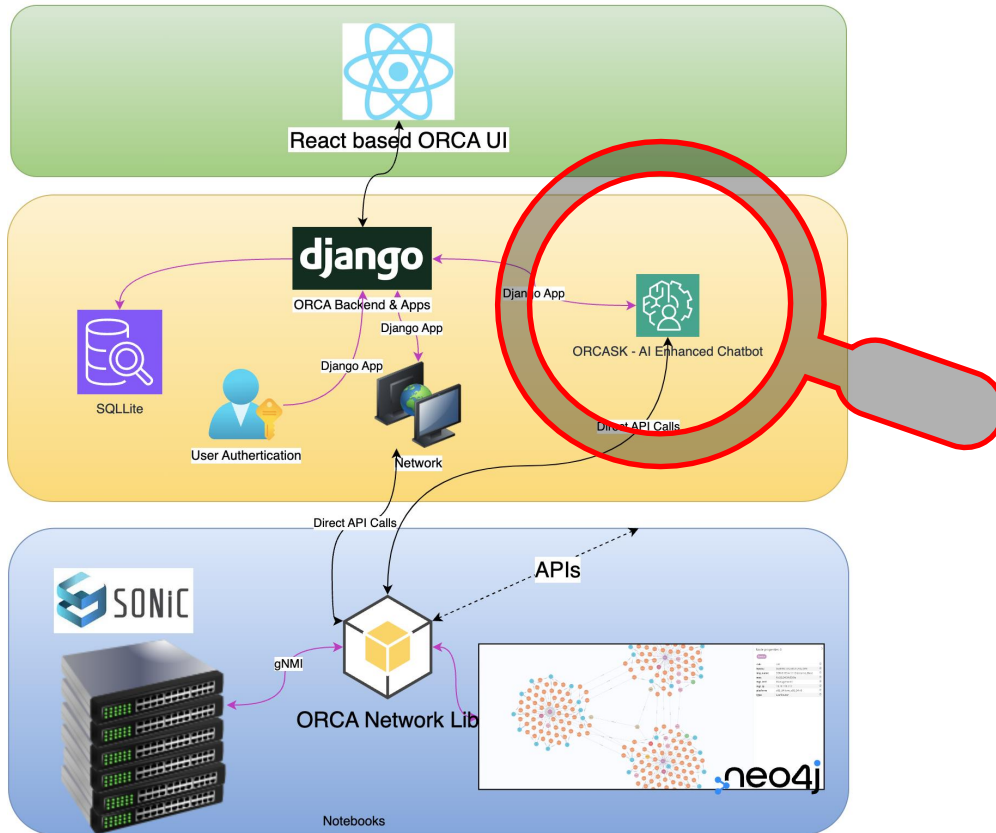
- **Discovery & Config –**
  - Interfaces,
  - LLDP Neighbour Links
  - Port Groups
  - Port Channels
  - MCLAGs & Peer links
  - BGP & neighbor links
  - VLANs.
  - STP
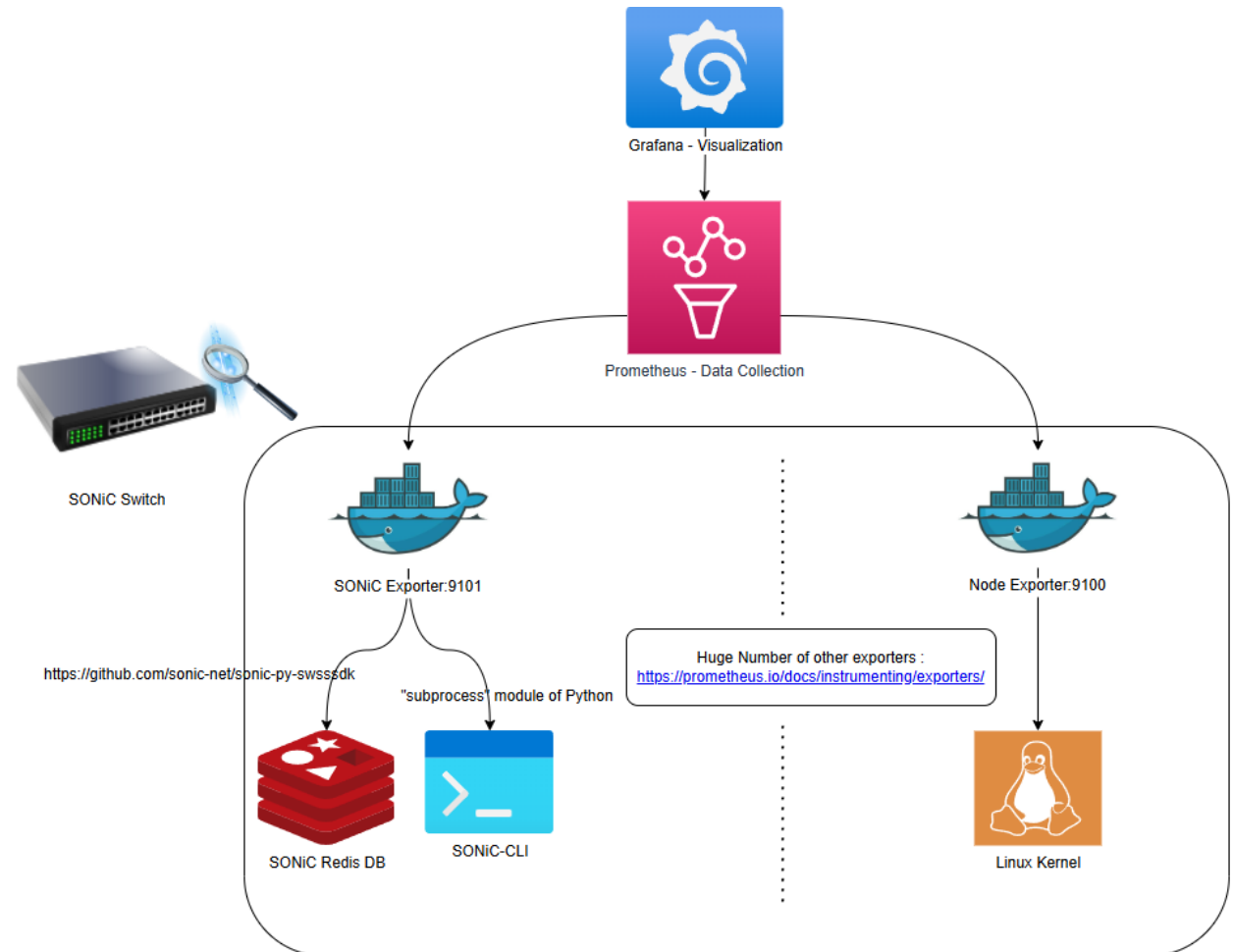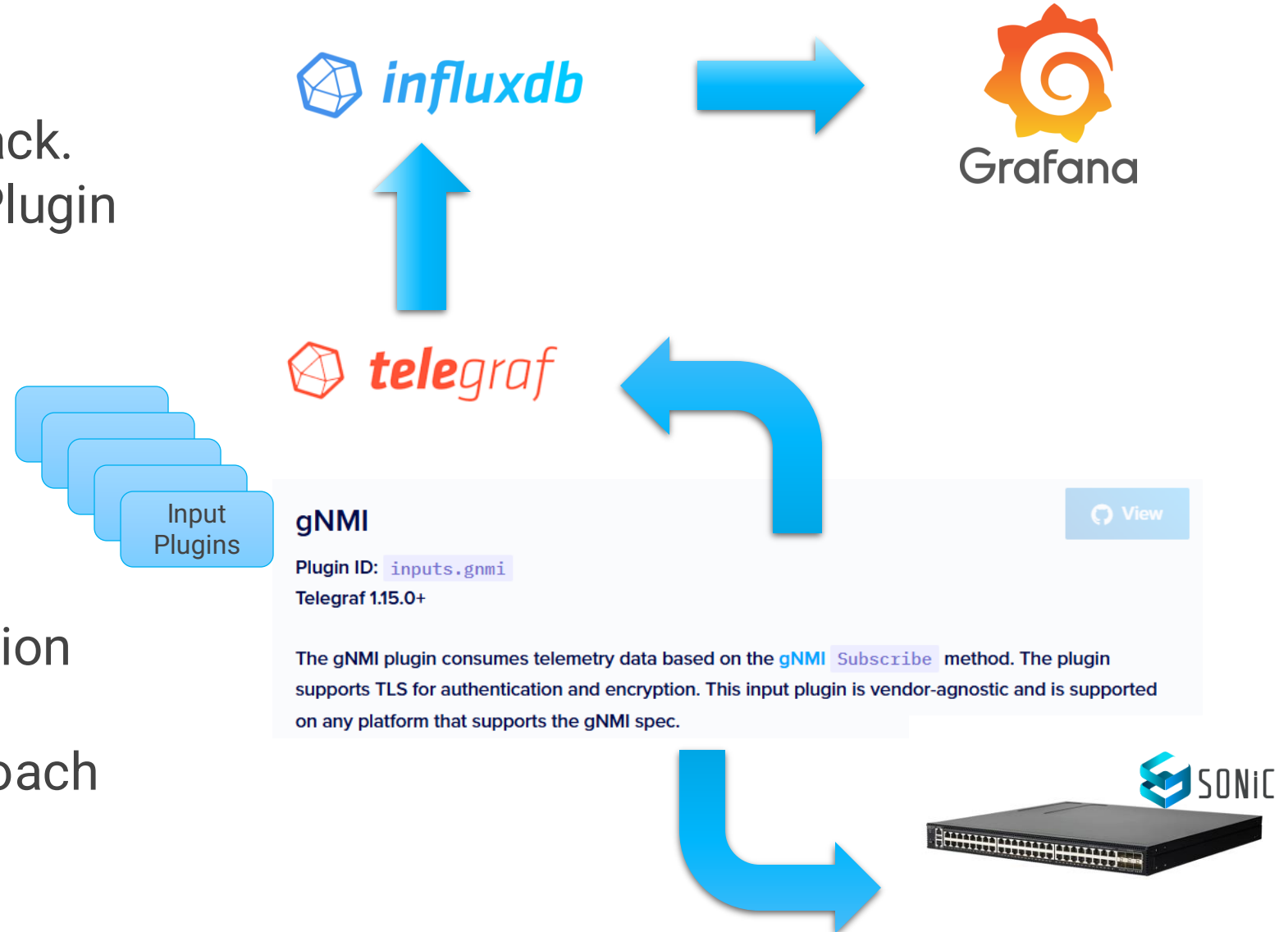 - SONiC Release Management
- Modular Design
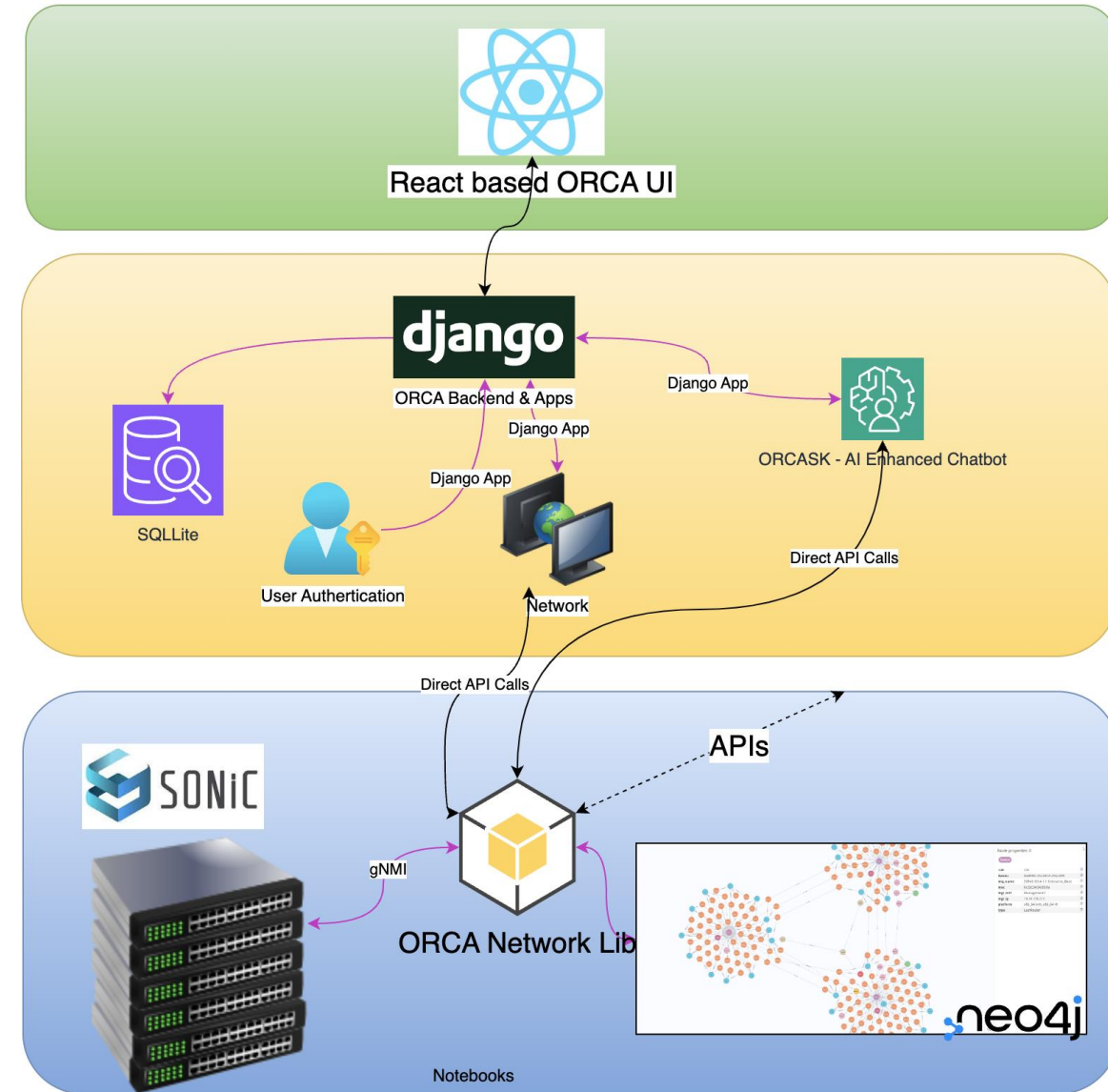
ORCASK

Monsoon1

- **Grafana** − A data visualization tool.
- **Prometheus** − A time series database.
- **Prometheus Exporters** − Data collection agent, https://prometheus.io/docs/instrumenting/exporters/
- **SONiC Exporter** − Agent sitting on the switch, supplying network specific data. https://github.com/STORDIS/monsoon
- Areas of Improvement

Options Available

- Influx DB & Telegraf Stack.
- Telegraf's gNMI Input Plugin

- Caveat –Only Subscription supported.
- Needed a tailored approach

influxdb

Grafana

telegraf

Input Plugins

gNMI

Plugin ID: `inputs.gnmi`

Telegraf 1.15.0+

The gNMI plugin consumes telemetry data based on the gNMI `Subscribe` method. The plugin supports TLS for authentication and encryption. This input plugin is vendor-agnostic and is supported on any platform that supports the gNMI spec.

View

SONiC

Monsoon2 Architecture

- Agent-less Solution.
- No Telegraf, Only Time Series Database is used.
- Using orca_nw_lib.
- Topology Data.
- Easy Maintenance.
- Single docker compose command sets up every thing in one step.

Monsoon2

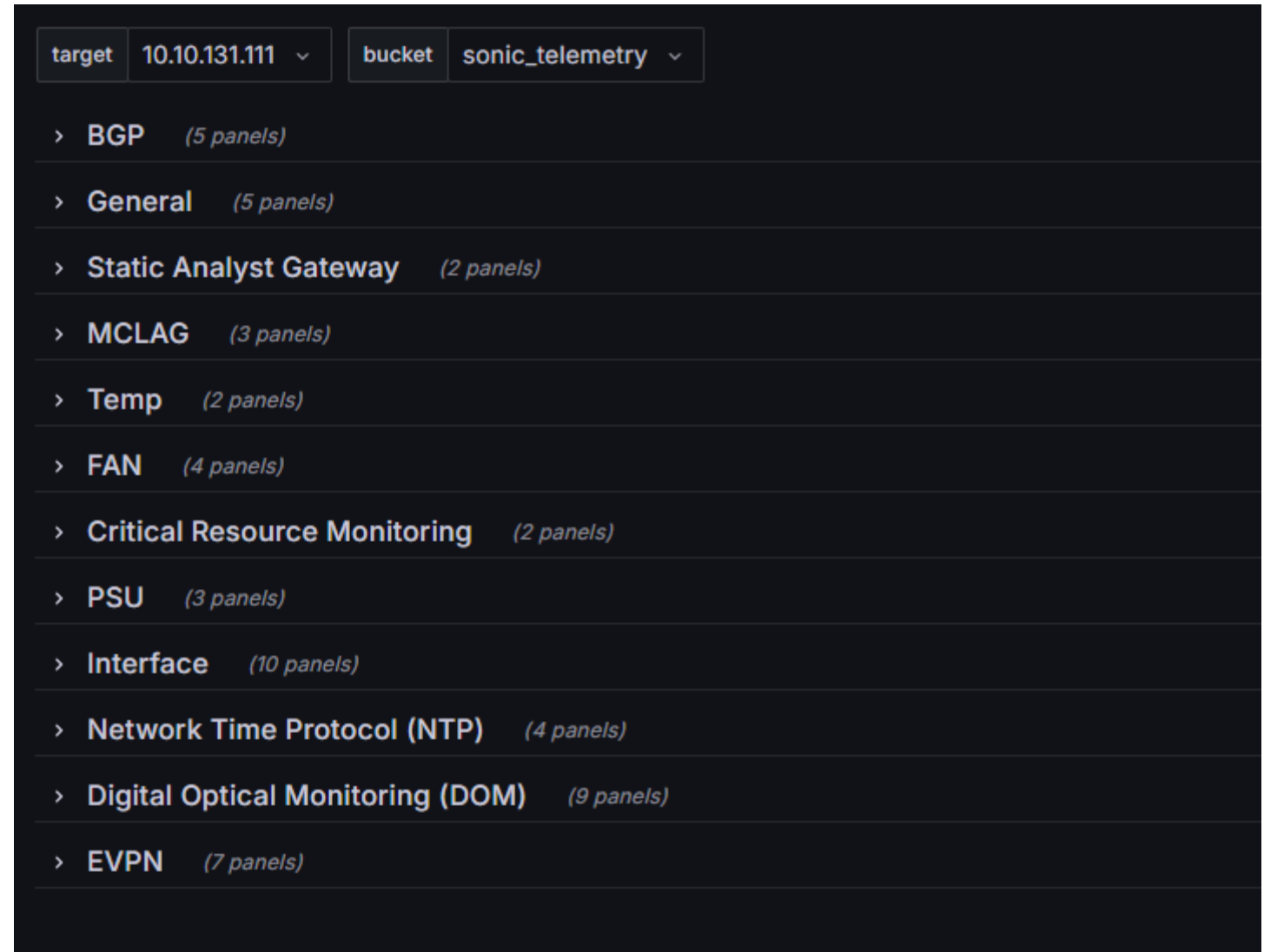orca_nw_lib

influxdb

Prometheus

Grafana

Topology Database
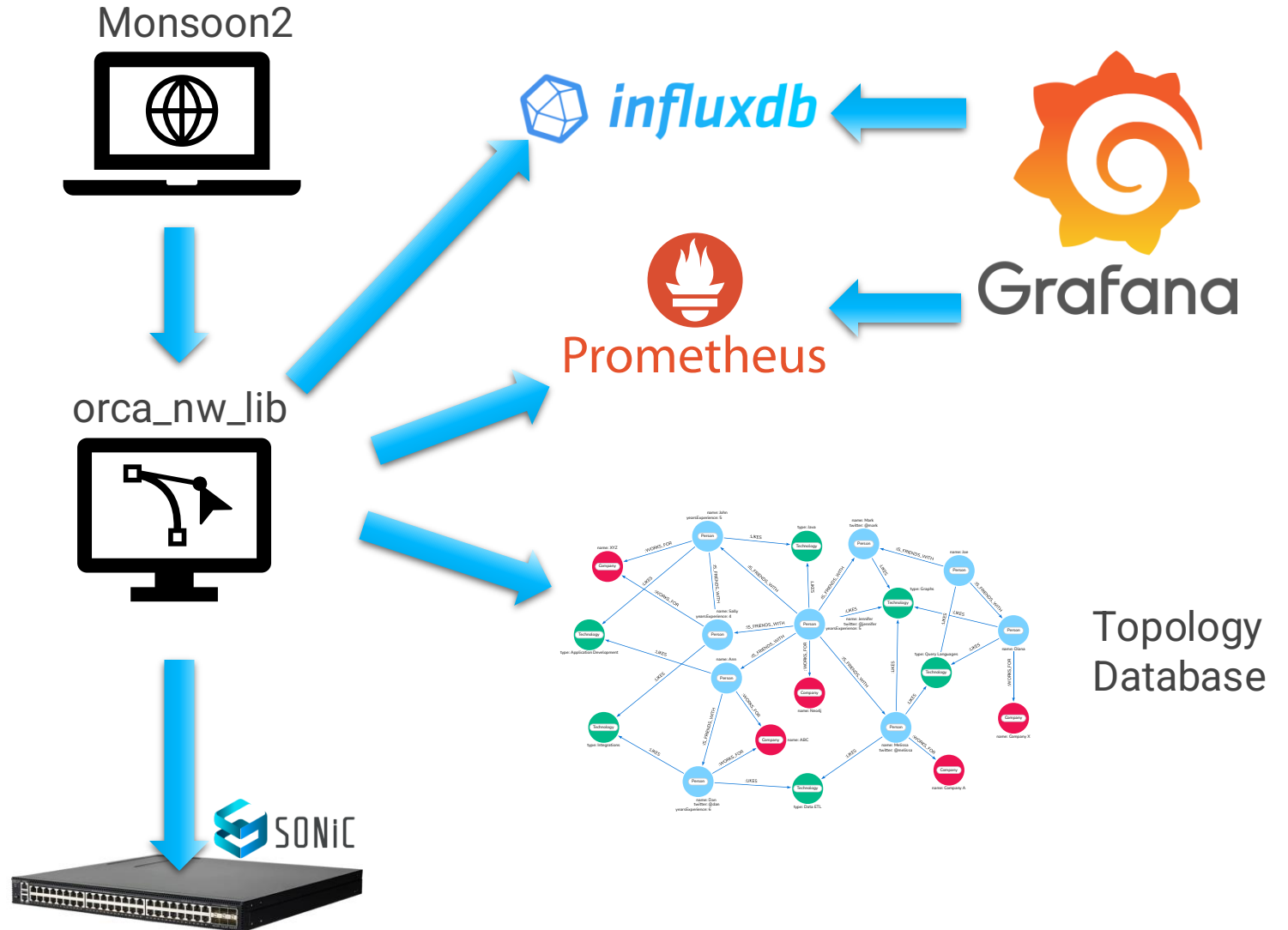
Monsoon2 – Supported Metrices

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- Contains All metrices available in Monsoon1

- Comes with pre-defined Dashboard as before.

| target | 10.10.131.111 ⌄ | bucket | sonic_telemetry ⌄ |

> **BGP** *(5 panels)*

> **General** *(5 panels)*

> **Static Analyst Gateway** *(2 panels)*

> **MCLAG** *(3 panels)*

> **Temp** *(2 panels)*

> **FAN** *(4 panels)*

> **Critical Resource Monitoring** *(2 panels)*

> **PSU** *(3 panels)*

> **Interface** *(10 panels)*

> **Network Time Protocol (NTP)** *(4 panels)*

> **Digital Optical Monitoring (DOM)** *(9 panels)*

> **EVPN** *(7 panels)*

Monsoon2 – AI Chatbot

- A Chatbot to visualize the telemetry data on demand.
- Tested with open source LLMs -
  - *deepseek-r1-distill-llama-70b*
  - *llama-3.1-8b-instant*