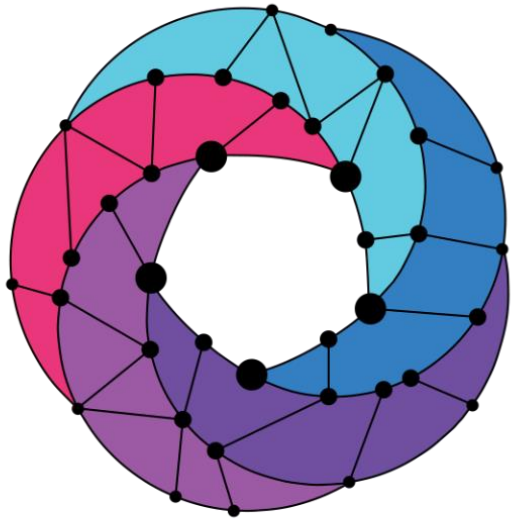

Open Source MANO

ETSI ENI Technology Workshop on 25 September 2020

The relation of ENI policy management to network intelligence

Relation to Open Source MANO (OSM)

Francisco Javier Ramón (Telefonica)
Subhankar Pal (Altran)

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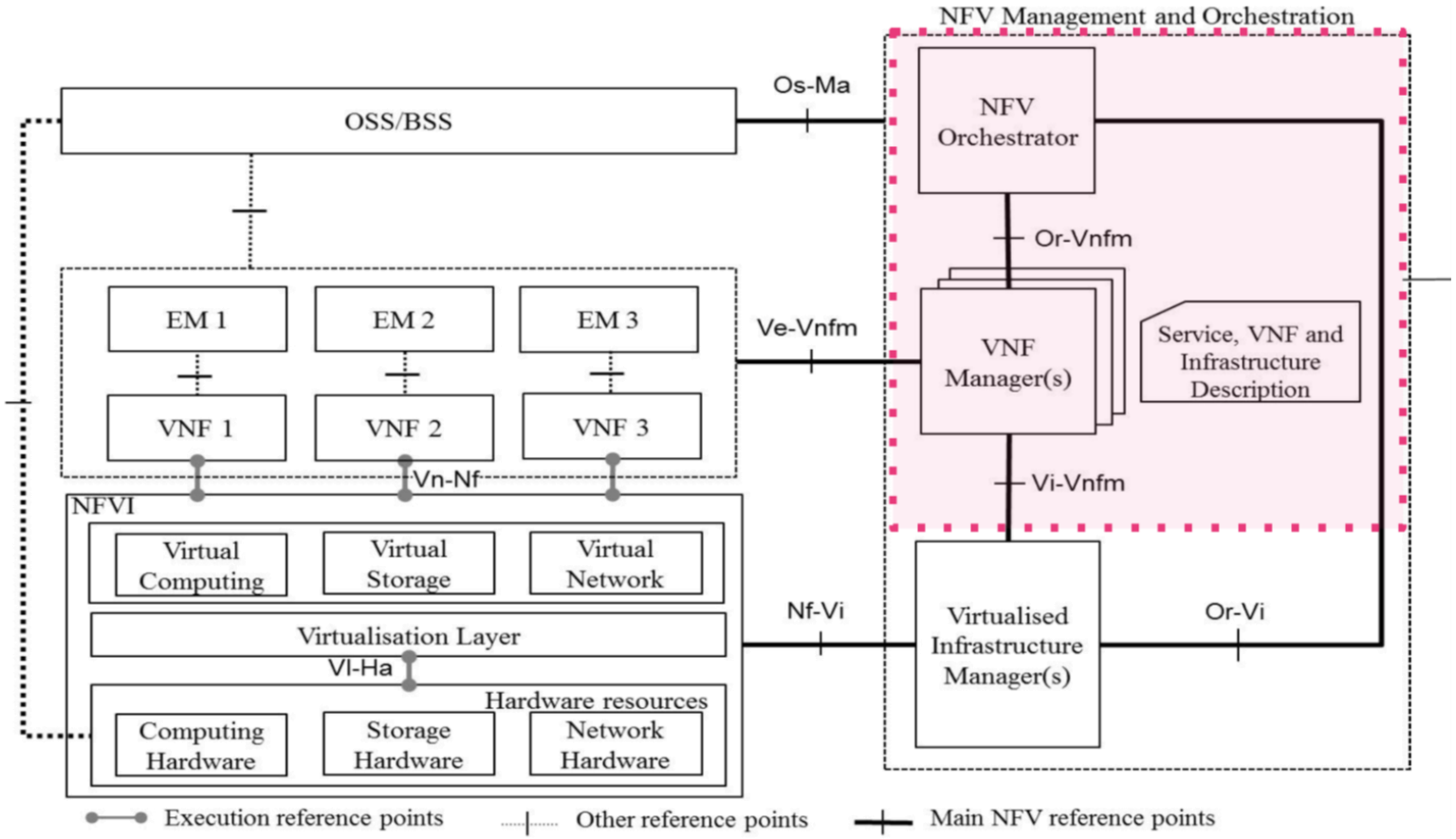
The Open Source MANO Project

Open Source MANO is an ETSI-hosted project developing an Open Source NFV Management and Orchestration (MANO) software stack aligned with ETSI NFV.



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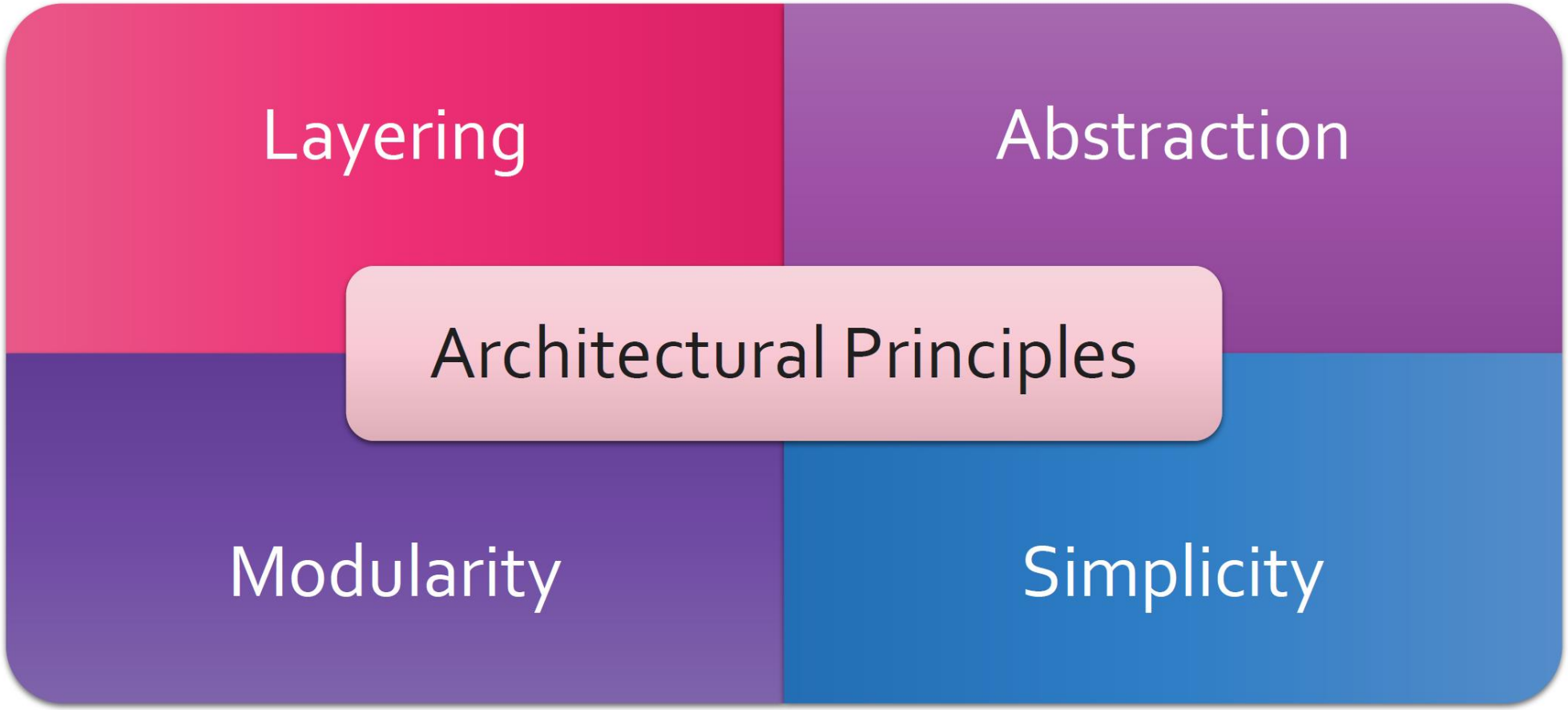
OSM Architectural Principles



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OSM's Approach Aims To Minimize Integration Efforts

- A well-known **Information Model (IM), aligned with ETSI NFV**, that is capable of modelling and automating the full lifecycle of Network Functions.
- A unified **northbound interface (NBI), based on NFV SOL005**
- The **extended concept of "Network Service"** in OSM, so that an NS can span across the different domains identified and therefore control the full lifecycle of an NS interacting with VNFs, PNFs and HNFs.
- The lifecycle management of **Network Slices**, assuming if required the role of Slice Manager, or integrating with an external Slice Manager

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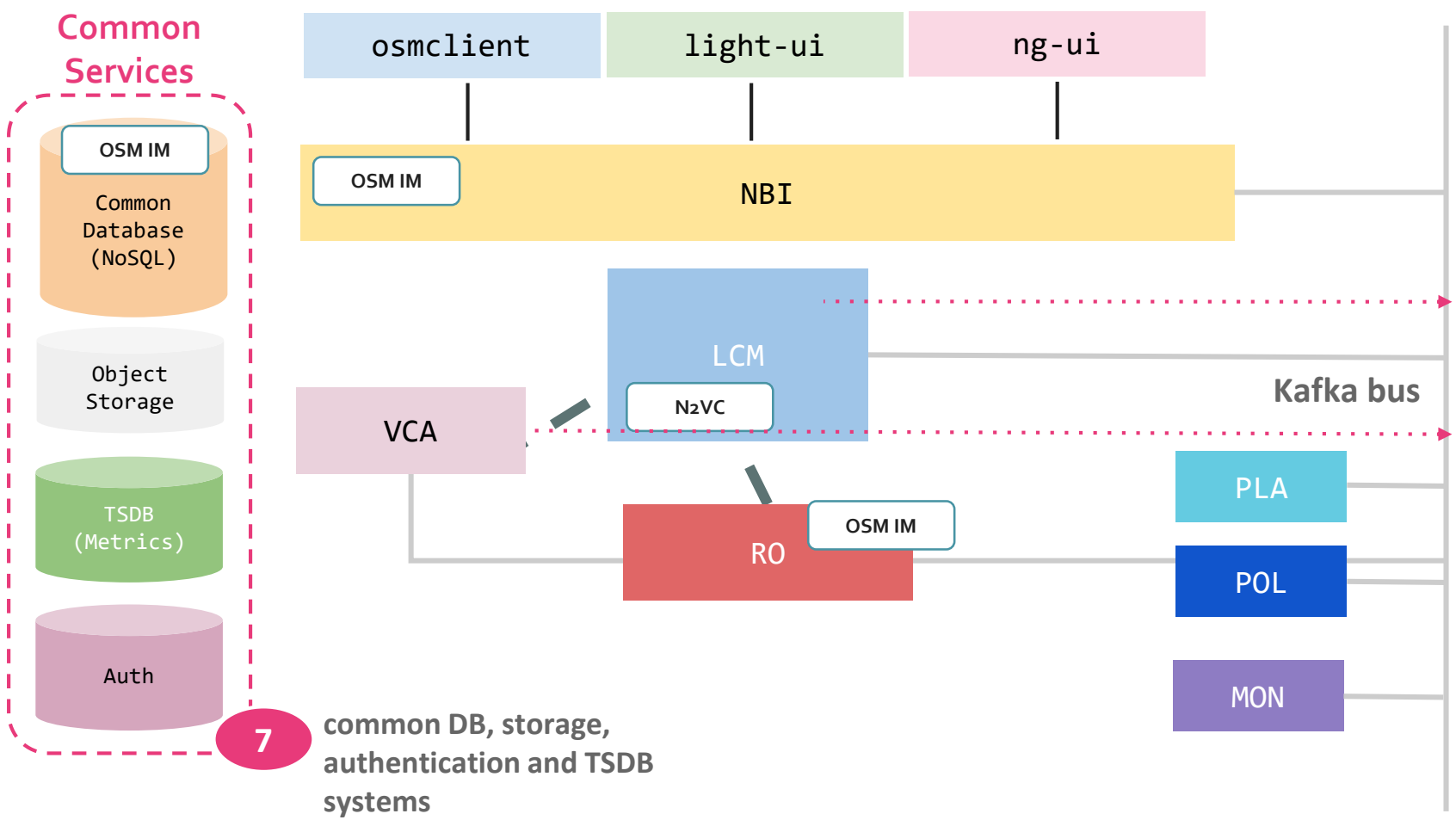
OSM Architecture Overview



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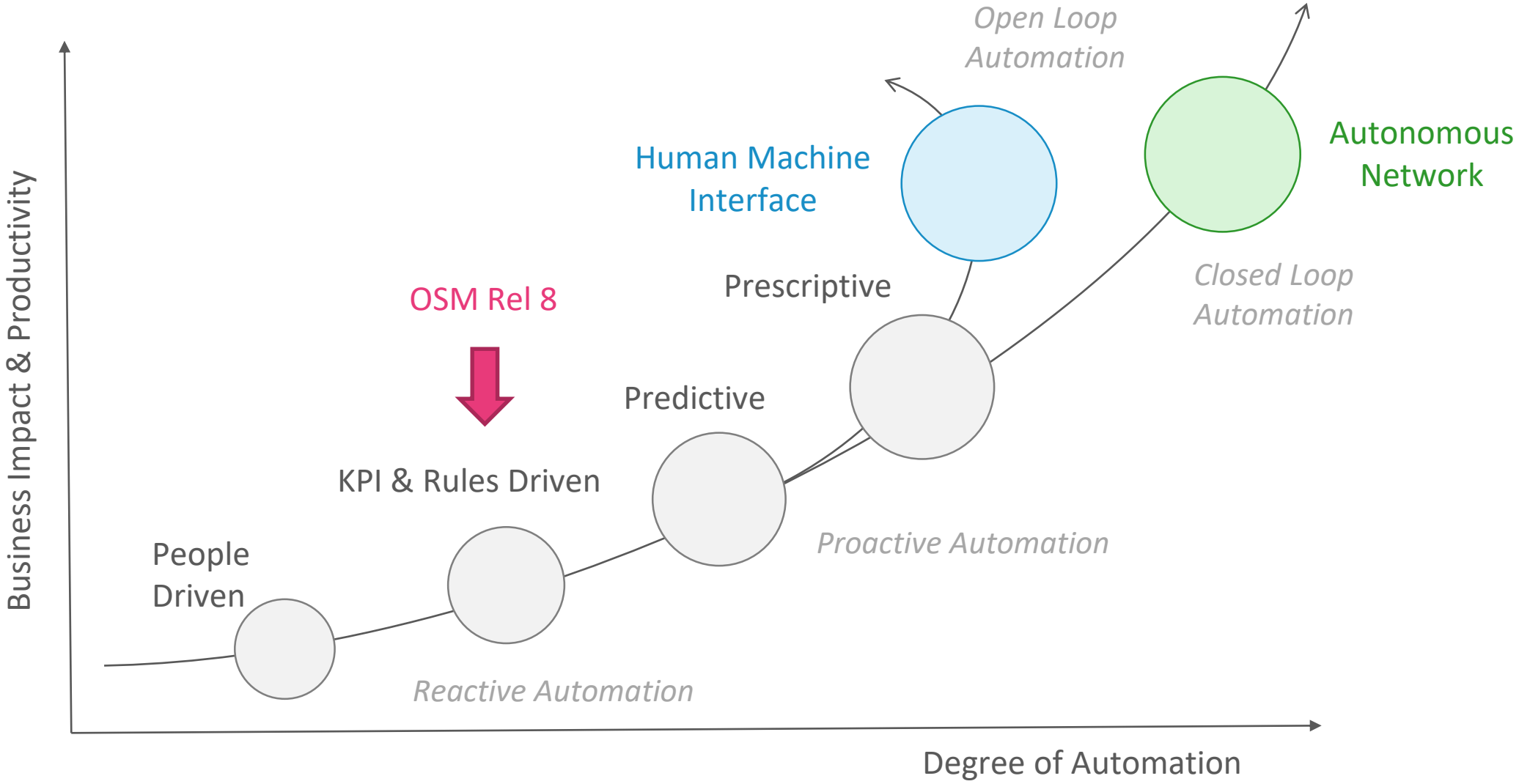
Network Intelligence Maturity Model



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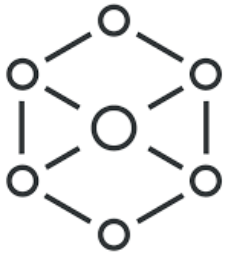
Current State of OSM Service Assurance



MON

Covers the exporters based monitoring, with a solid architecture to expand them to more exporters.

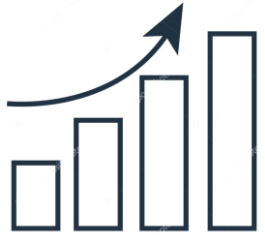
Static thresholds for alerting policies

No correlation of metrics

POL

Designed around basic auto scaling & alerting

No correlation of alerts and events



Dashboard

Automated dashboards for monitoring VNF timeseries metrics using Grafana

Log analytics using Elastic stack

Placement

Placement optimization of network services

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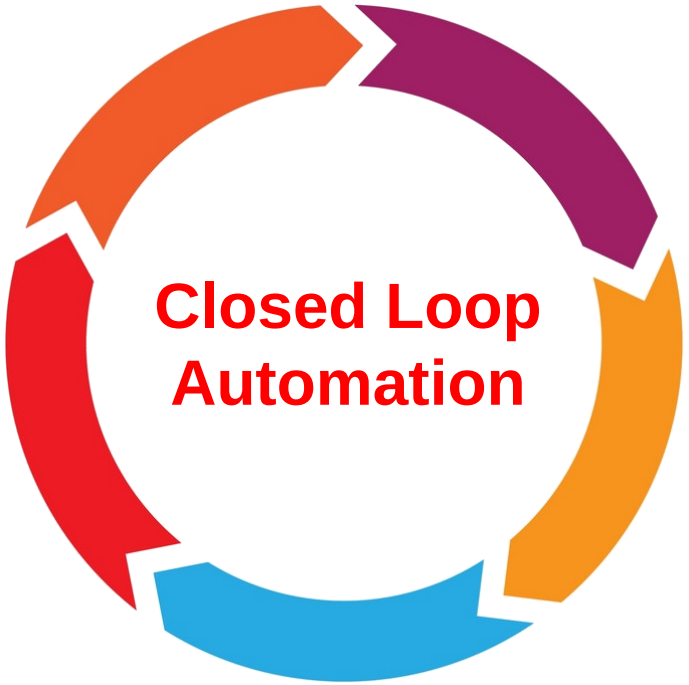
Closed Loop Automation Vision

Open Source MANO

Closed loop automation drives autonomous network.

1. Observe

Collect network metrics through different telemetry interfaces.



2. Decide

Processes collected metrics to determines the network status, decides action to be taken based on network policies. This phase is not responsible for executing the action.

3. Act

Acts upon orchestrated object and implements given lifecycle action.

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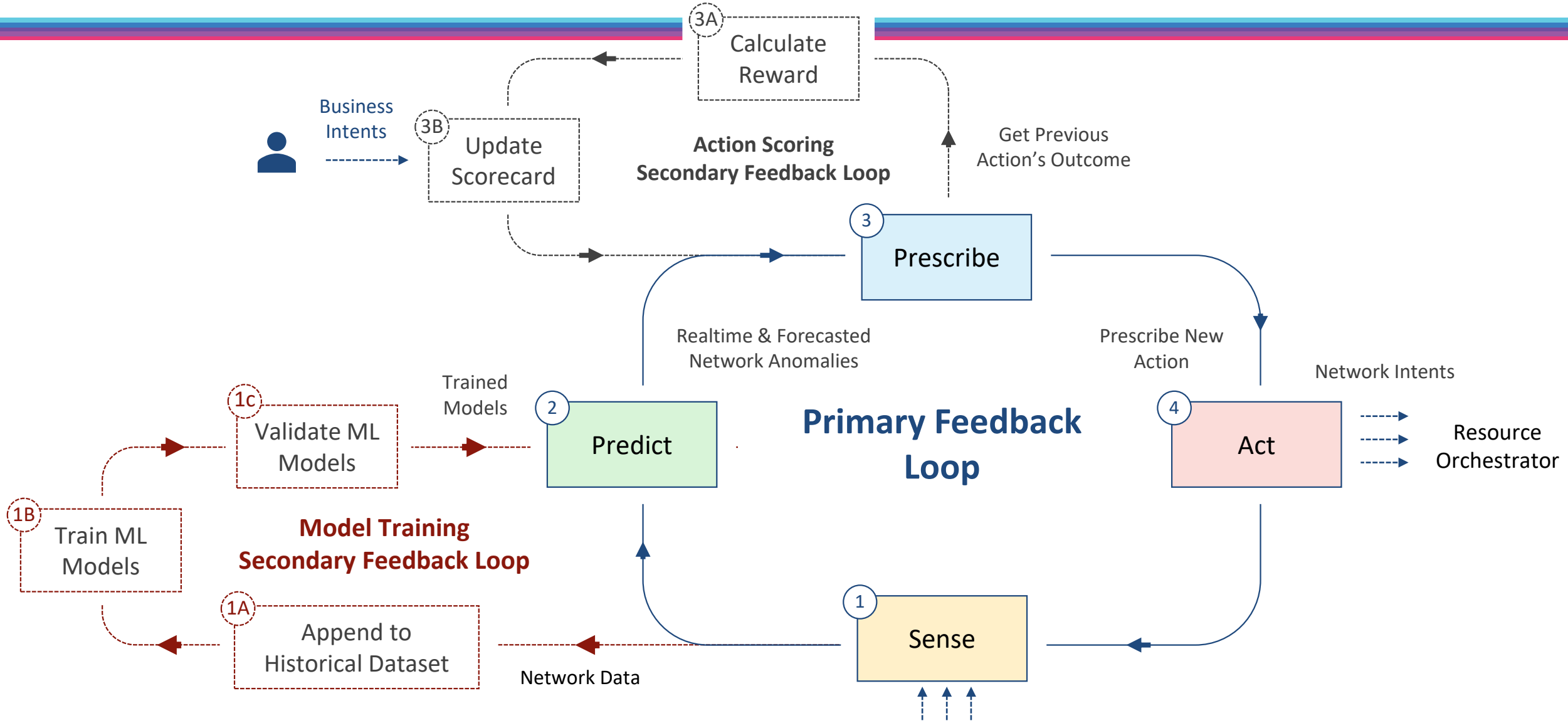
Self Learning Through Closed Loop Automation



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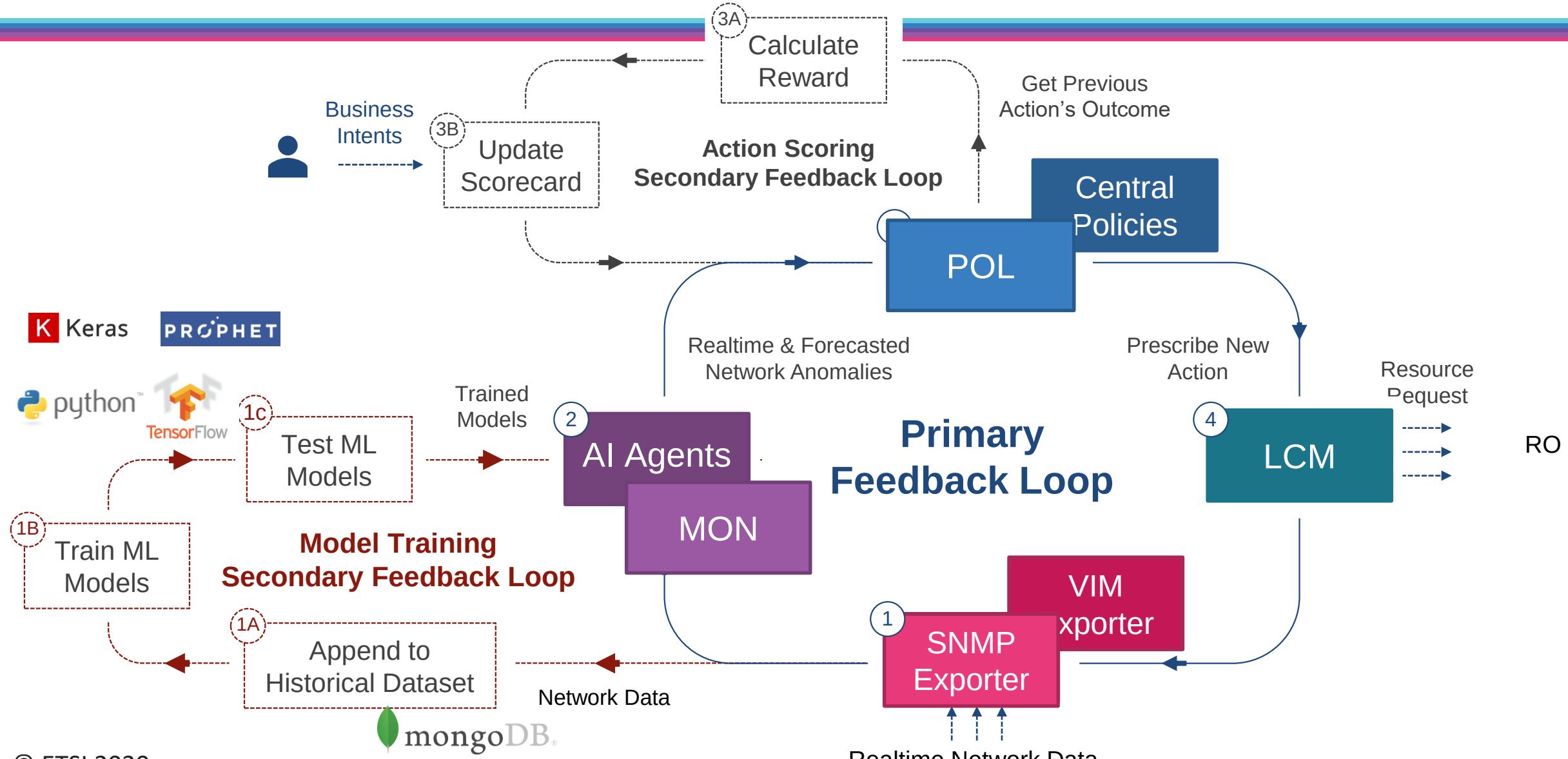
Mapping with OSM Service Assurance Components



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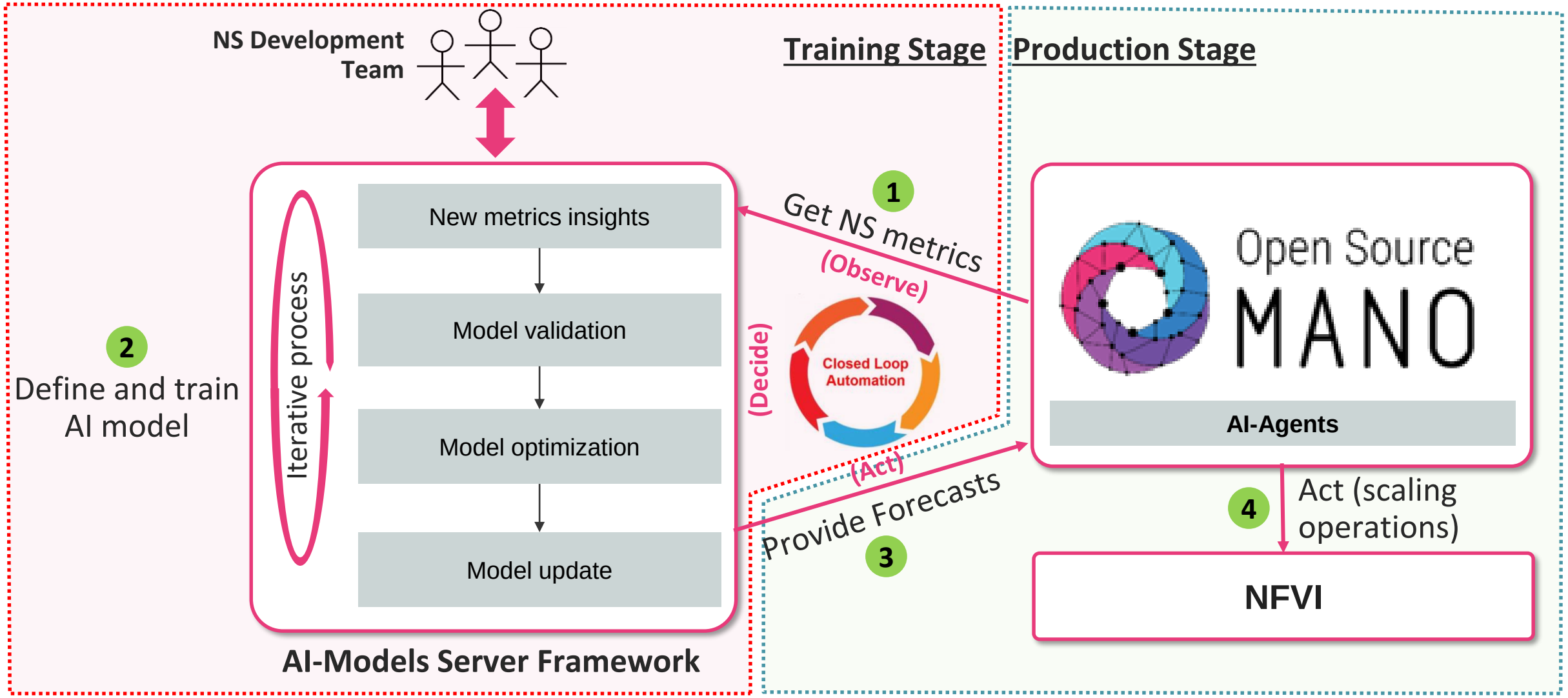
Integrating ML in OSM – Architecture Proposal. High-level Overview.



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Predictive Threshold

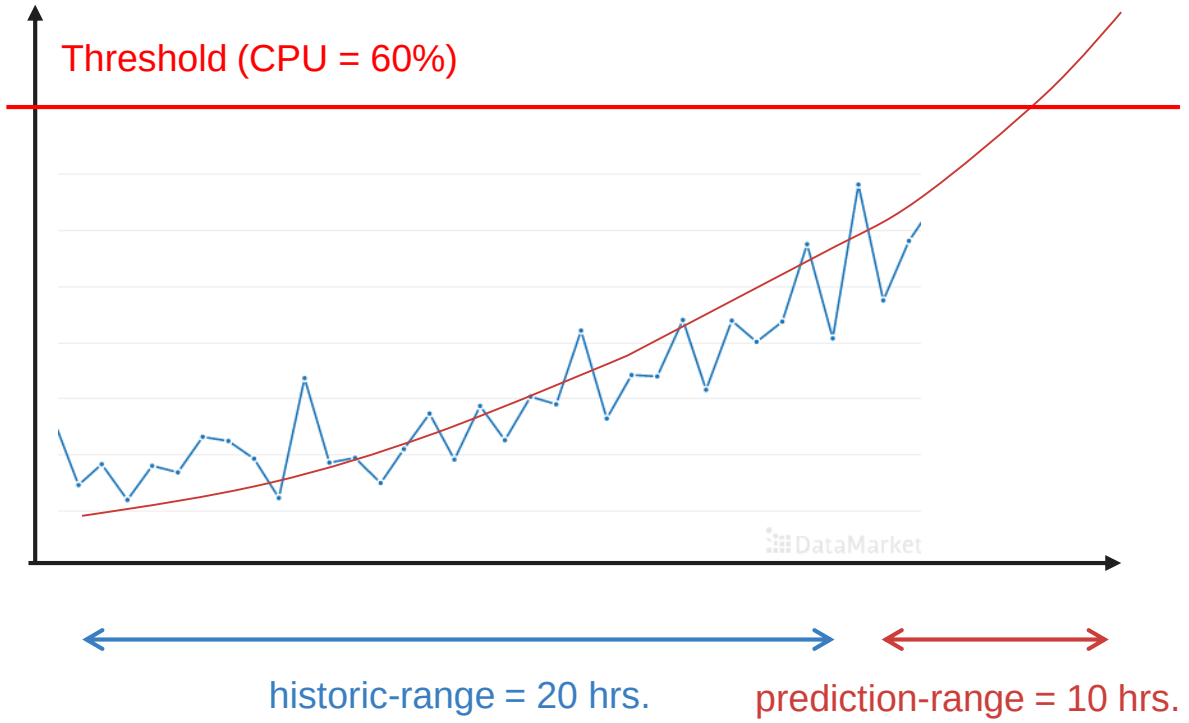
Feature Description: https://osm.etsi.org/gerrit/#/c/osm/Features/+/9178/

Why it means?

- Metrics will be forecasted in future using timeseries forecasting algorithm.
- Threshold will also be applicable in forecasted period
- VNFD will define how much forecasted value will be considered as valid for prediction

Why we care?

- Move away from reactive to proactive
- Take action before actual problem occurs.



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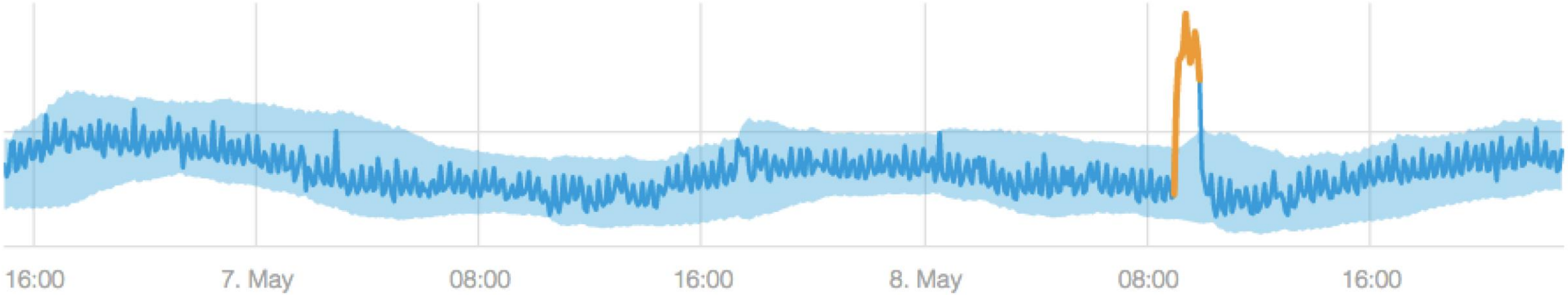
Dynamic Thresholds



Step 1 | Step 2 | Step 3

Model the normal behavior of the metric(s) using a statistical model (e.g. trend and seasonality).

Devise a statistical test to determine if samples are explained by the model.

Apply the test for each sample. Flag as anomaly if it does not pass the test.

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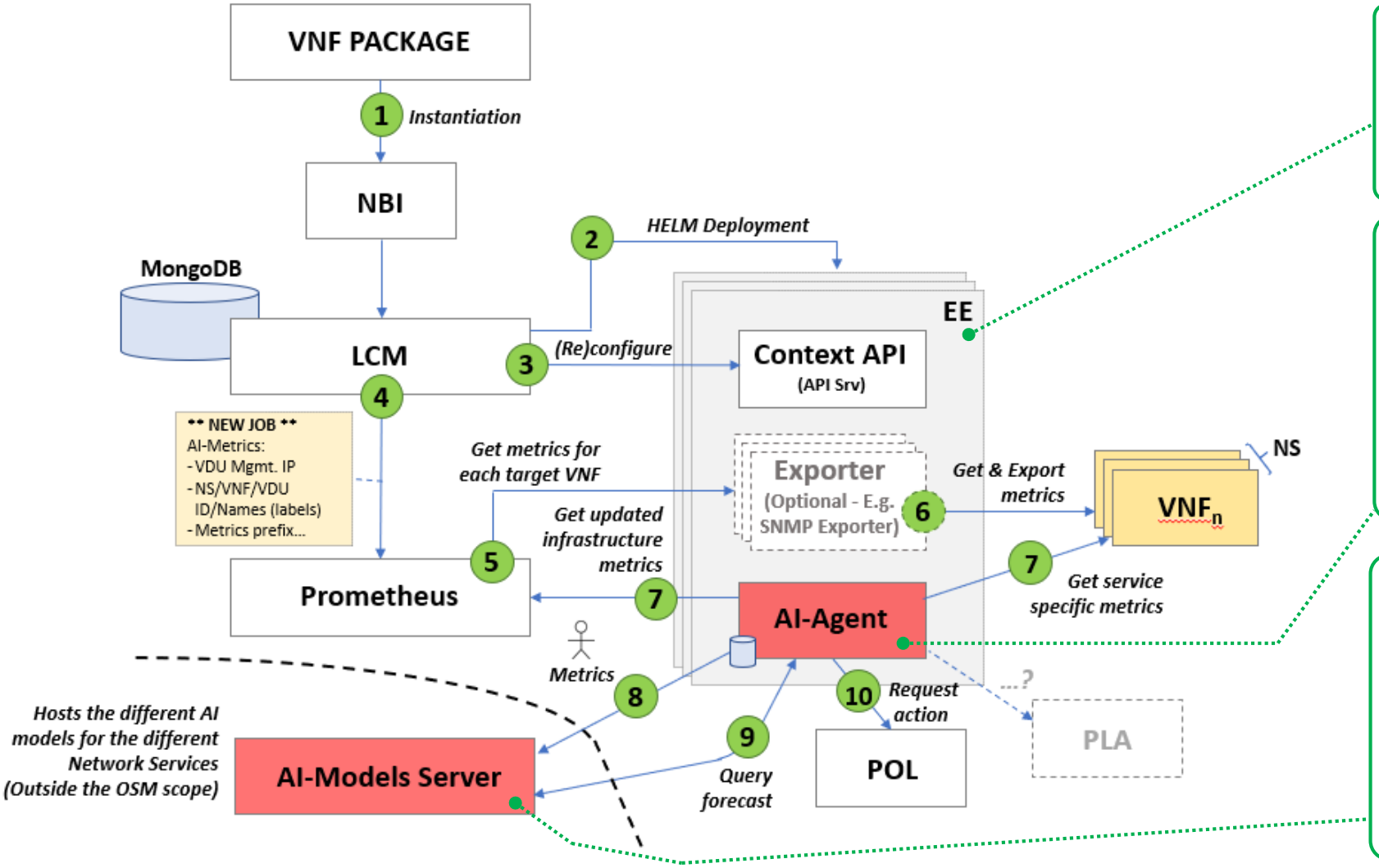
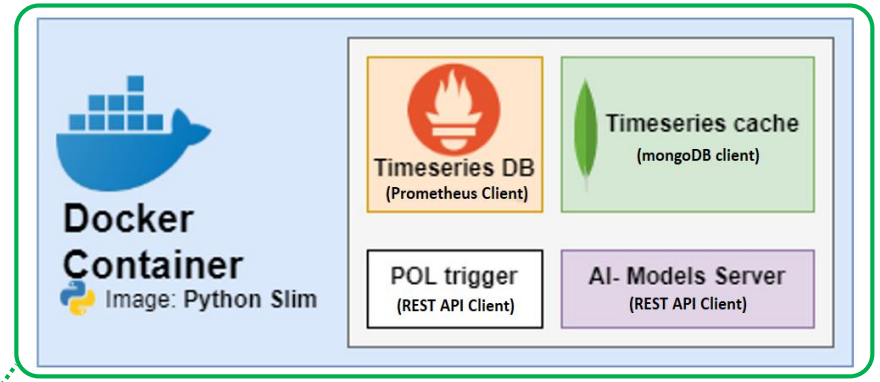
Integrating ML in OSM – Implementation Options.





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Auto Healing

Feature Description: https://osm.etsi.org/gerrit/#/c/osm/Features/+/9617/

What it means?

- Automatically heal the VNF when it fails. The recovery policy specified during deployment controls the recovery.

Why we care?

- Act on and fix unresponsive or dead VDUs
- High availability of network service

How will we implement?

- Automatically heal the VNF when it fails. The recovery policy specified during deployment controls the recovery.
- Metrics –
  - New Metrics Type — ICMP PING —first attempt to reboot the affected VDU; if this fails, then it attempts to redeploy the affected VNFD (on the same host)
  - Polling Frequency — <e.g. polling frequency of 10 seconds>
  - Existing Metrics — OSM_VM_STATUS, OSM_VIM_STATUS
- Recovery Actions -
  - REBOOT_THEN_REDEPLOY—first attempt to reboot the affected VDU; if this fails, then it attempts to redeploy the affected VNFD (on the same host)
  - REBOOT_ONLY—only attempt to reboot the VM
  - REDEPLOY_ONLY—only attempt to redeploy the VM

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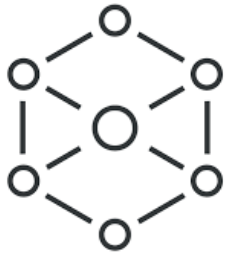
What are Next Steps?



MON

Advance monitoring using streaming telemetry for e.g. gRPC and gNMI

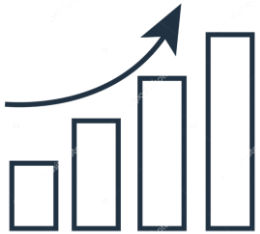
Replace threshold based alerts with ML based advanced anomaly detections.

ML based predictive thresholds

POL

Alert correlation and alarm consolidation

Recommendation engine



Dashboard

Visualize anomaly points in Grafana charts

Visualize timeseries predictions and thresholds

Placement

Intelligent placement as recommended by POL

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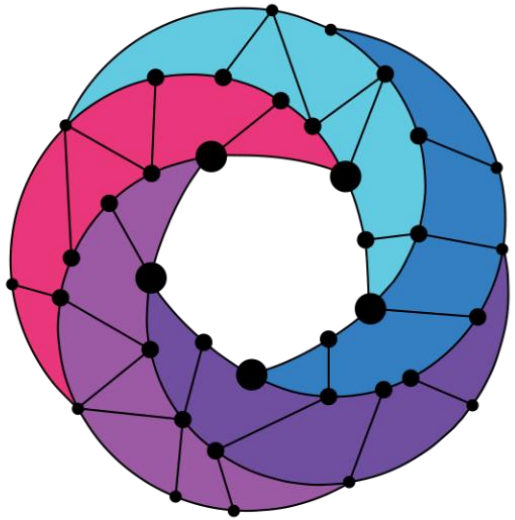

Open Source
MANO

Thanks!

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