LFNETWORKING
Developer & Testing Forum

5G SBP Birds of Feather: Is there value in adding Nephio?

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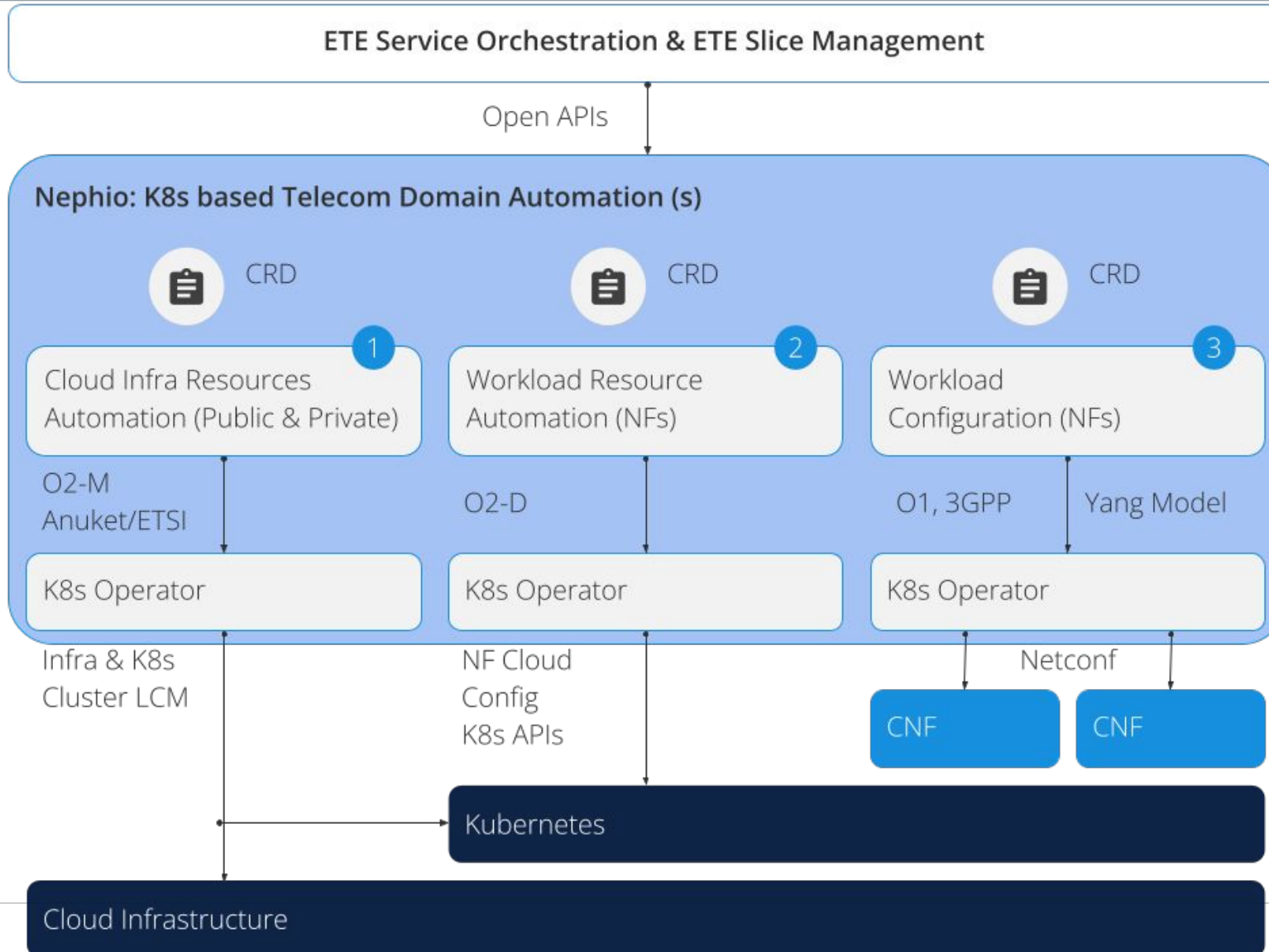
https://lfnetworking.org

Background

- The 5G Super Blueprint has been an initiative to integrate multiple LF, LFN, and LF Edge projects together to show value for Private 5G use cases

- Prior versions have include:

  - Capgemini RAN⇔Capgemini 5GC⇔Kaloom UPF with Red Hat OpenShift and Aarna Multi Cluster Orchestration Platform (AMCOP)

  - GXC RAN⇔Capgemini 5GC⇔Kaloom UPF with Red Hat OpenShift and IBM computer vision ML application

  - Rebaca RAN simulator⇔Magma 5GC with Anuket Kuberef and ONAP & EMCO

What is Nephio?

Nephio is a Kubernetes-based intent-driven automation of network functions and the underlying infrastructure that supports those functions. It allows users to express high-level intent, and provides intelligent, declarative automation that can set up the cloud and edge infrastructure, render initial configurations for the network functions, and then deliver those configurations to the right clusters to get the network up and running.

How Does Nephio Work?

ETE Service Orchestration & ETE Slice Management

Open APIs

Nephio: K8s based Telecom Domain Automation (s)

CRD — 1 — Cloud Infra Resources Automation (Public & Private)
O2-M Anuket/ETSI
K8s Operator
Infra & K8s Cluster LCM

CRD — 2 — Workload Resource Automation (NFs)
O2-D
K8s Operator
NF Cloud Config K8s APIs

CRD — 3 — Workload Configuration (NFs)
O1, 3GPP   Yang Model
K8s Operator
Netconf
CNF   CNF

Kubernetes

Cloud Infrastructure

- CRDs to establish declarative intent (configuration-as-data)
- Operators to implement actual logic
- Constant reconciliation (addresses day 2 and configuration drift)
- CI/CD as the underlying framework
- Meant to scale

Nephio Declarative Intent

Orchestration Cluster

User Interaction Layer (APIs/GUI/CLI) with KRM / CaD Templates

Intent Design

Intent Design Studio
Package Authoring, Publishing, Catalog

Intent Specialization
Package Instantiation, Customization

Intent Validation
Policy, Resource, Consistency Checks

Intent Deployment

Cluster Selection
Package Cluster Placement, Specialization

Cross-Cluster Dependencies
Package Delivery Order, Status

Intent Delivery
Package Distribution, Progressive Rollout

Control Loop

Automated Intent Revisions

Metric Aggregation

Status Aggregation

Cloud Mgmt Cluster

Regional Clusters

Edge Clusters

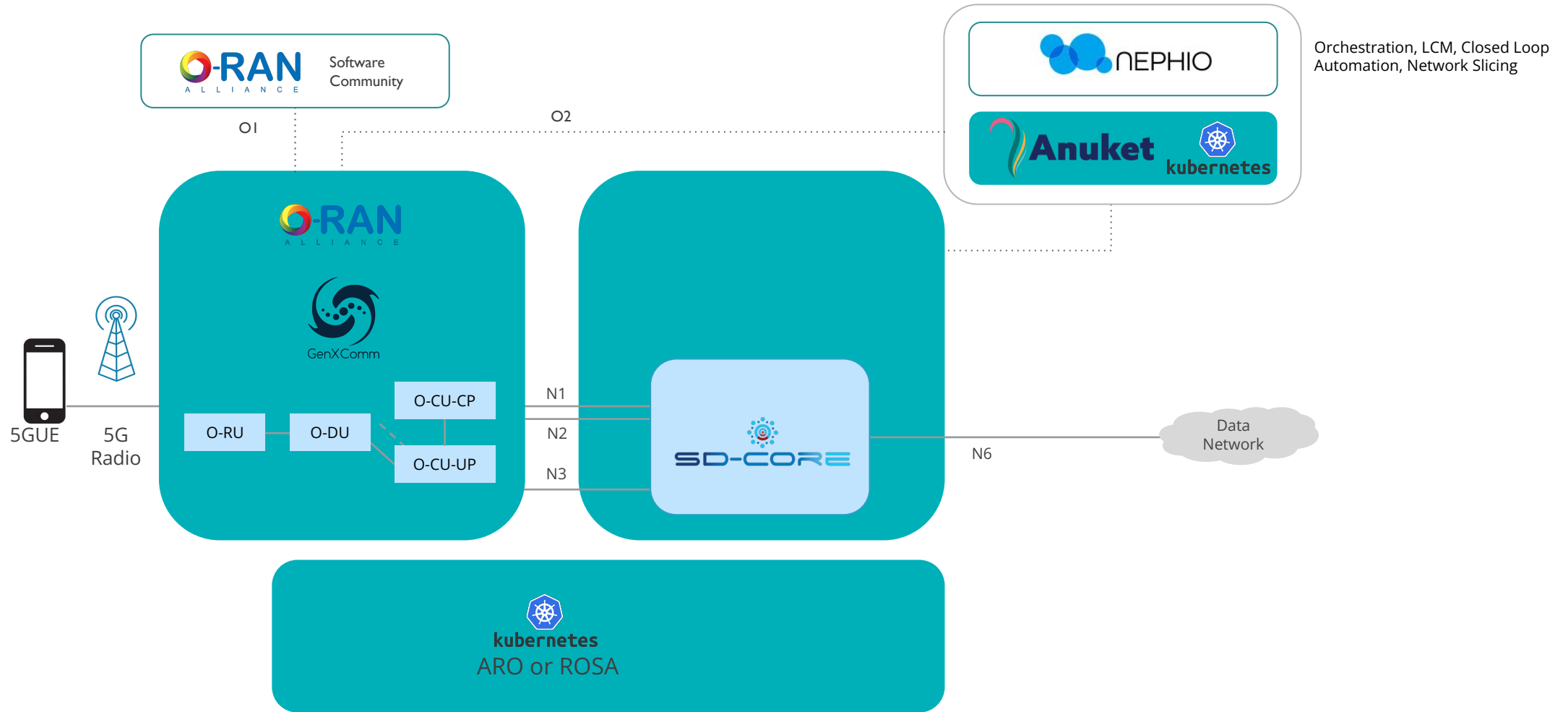### Intent Actuation

Local Policy Validation

Package Ingestion

Cross-Resource Dependencies

Intent Reconciliation

Resource Actuation

5G Super Blueprint and Nephio

New Operators/CRDs

- Nephio for FOCOM/IMS over O2 interface
  - Leverage community work
- Nephio based SD-CORE orchestration and day 0 configuration
  - Leverage community work done on Free5GC
- Nephio based GXC orchestration and day 0 configuration for NFO/DMS over O2 interface
  - New activity
- Network slicing intent to NSMF to NSSMF
  - New activity
- Nephio for O1 can be optional (we can continue to use O-RAN-SC for that)
- We would also have to find a MEC application to make the demo "cool"

In Summary

- Showcase a new LF project in the 5G Super Blueprint: Nephio

Discussion?