



OLF NETWORKING

LFN Developer & Testing Forum

Orchestration and Service Assurance Of 5GC Functions with EMCO

Presented by

Sriram Rupanagunta, Aarna Networks

Sandeep Sharma, Aarna Networks

Problem Statement

- Automating the Orchestration and operation of a Private 5G.
- 5G network optimization using machine learning (ML).

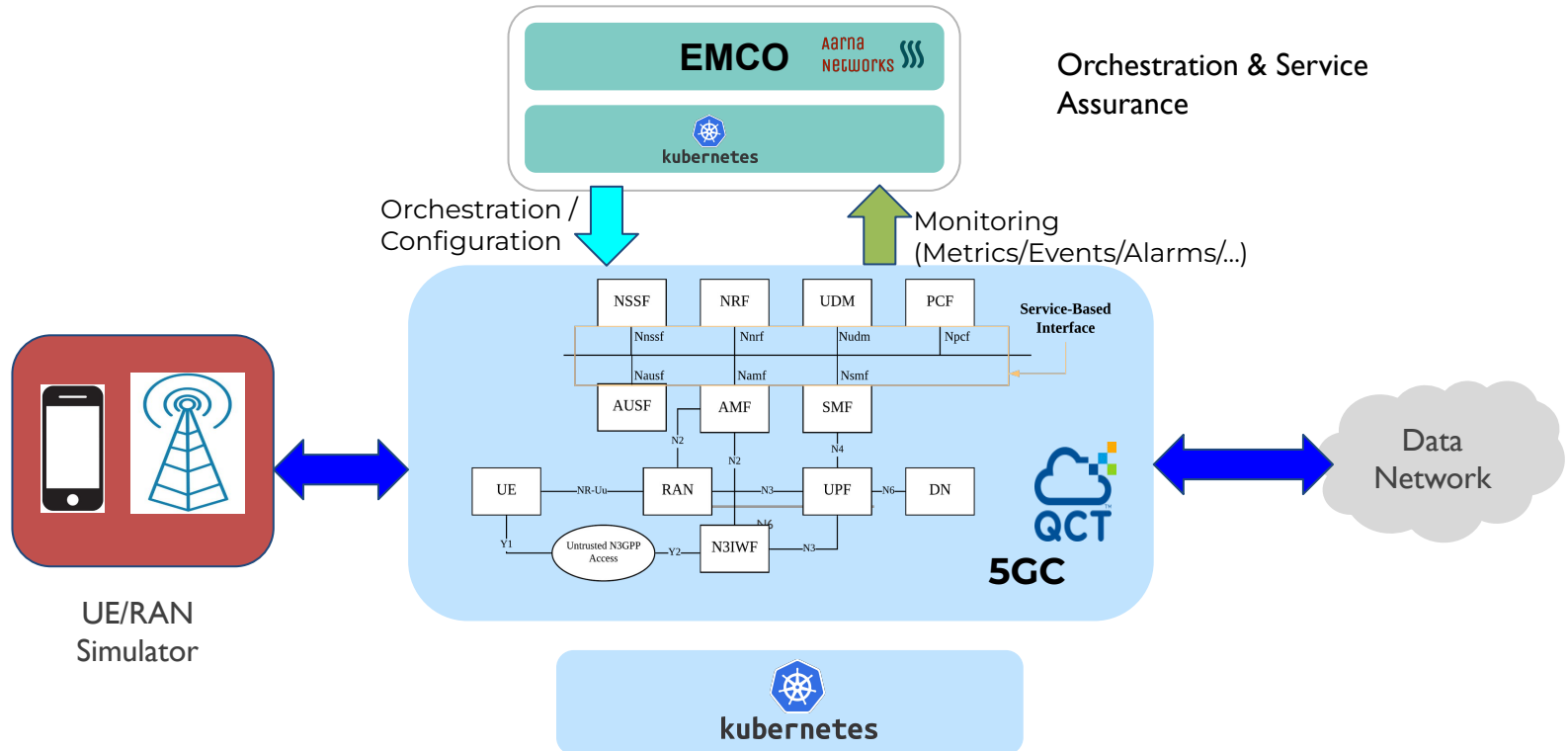
Solution

- Use EMCO as the platform for 5GC orchestration with Day 0 Configuration.
- A load(CPU) prediction ML based NWDAF, which exposes 3GPP specified interfaces to expose the analytics service for other NFs in the 5GC.
- Analytics applications in edge clusters, which subscribe to the NWDAF services and automate the service assurance by taking autocorrective actions.

DEMO - High level Description

- EMCO deployed in central DC.
- QCT 5GC orchestration and day 0 configuration using EMCO, across edge clusters.
- QCT 5GC parameter monitoring and ML based network optimization using the monitored data
- NF Load prediction analytics - Scaleout of service
 - Orchestrate the Load prediction NWDAF and Analytics application function along with other 5GC NFs via EMCO.
 - Scale out a Network Function based on load. The predictions are produced by the NWDAF.

Demo Configuration



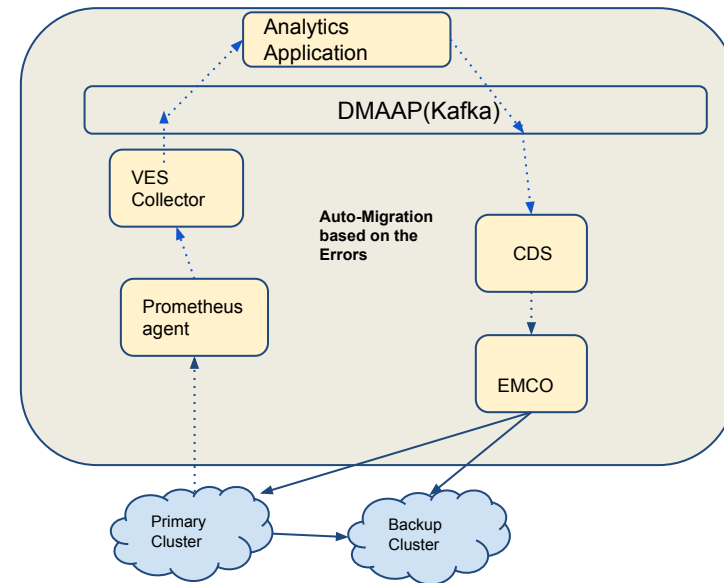
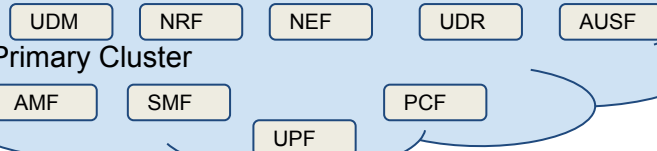
Service Scale out

Service Design and
Orchestration

EMCO GUI

1. Onboard 2 K8s clusters (Primary & Backup)
2. Create Service Tenant.
3. Design a service, upload the 5GC helm charts.
4. Create service instance on Primary Cluster
5. Day 0 Configuration.
6. Specify Intents.
7. Instantiate.

Primary Cluster



1. Create Policy in AMCOP for Error Threshold for Migration
2. Configure Prometheus agent to collect the load data
3. Set the Actor as CDS
4. Simulate load on one of the Worker nodes of Primary Cluster

1. Service gets scaled out to Backup Cluster
2. UE can establish connection with 5GC on the new cluster

Scale out/in Flow

1. Create Service mesh across target clusters.
2. Orchestrate 5GC, NWDAF and AF.
3. AWE to discover the 5GC service endpoint and maintain a mapping (DNS) of NF id to SE.
4. Simulate high CPU usage for 5GC.
5. AF requests for Analytics Info.
6. AF on getting high CPU prediction, invokes Scale out as action.

NWDAF - Service Assurance



On High CPU prediction of AMF, Trigger
AF, Scaleout

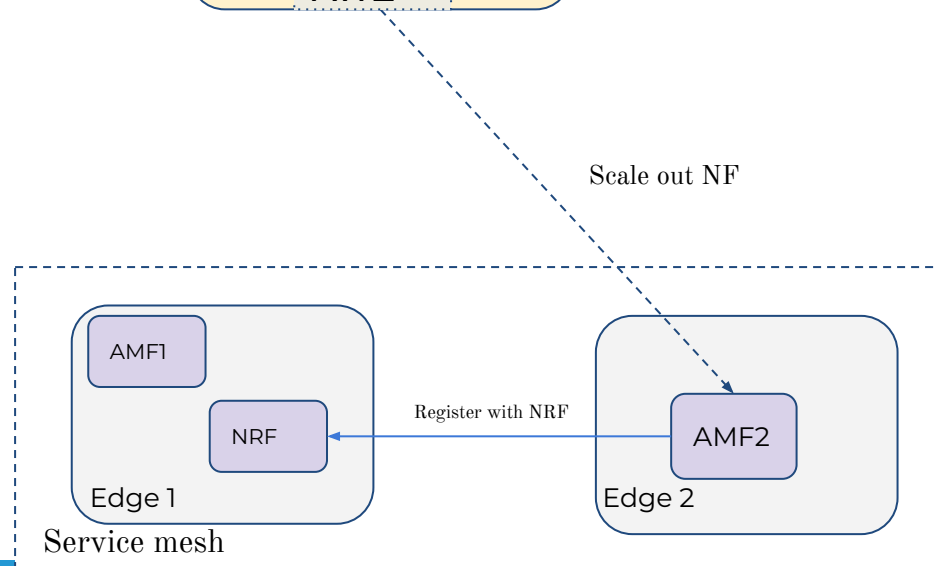
1. Action : Scaleout
2. Actor: CDS
3. NF ID

CDS

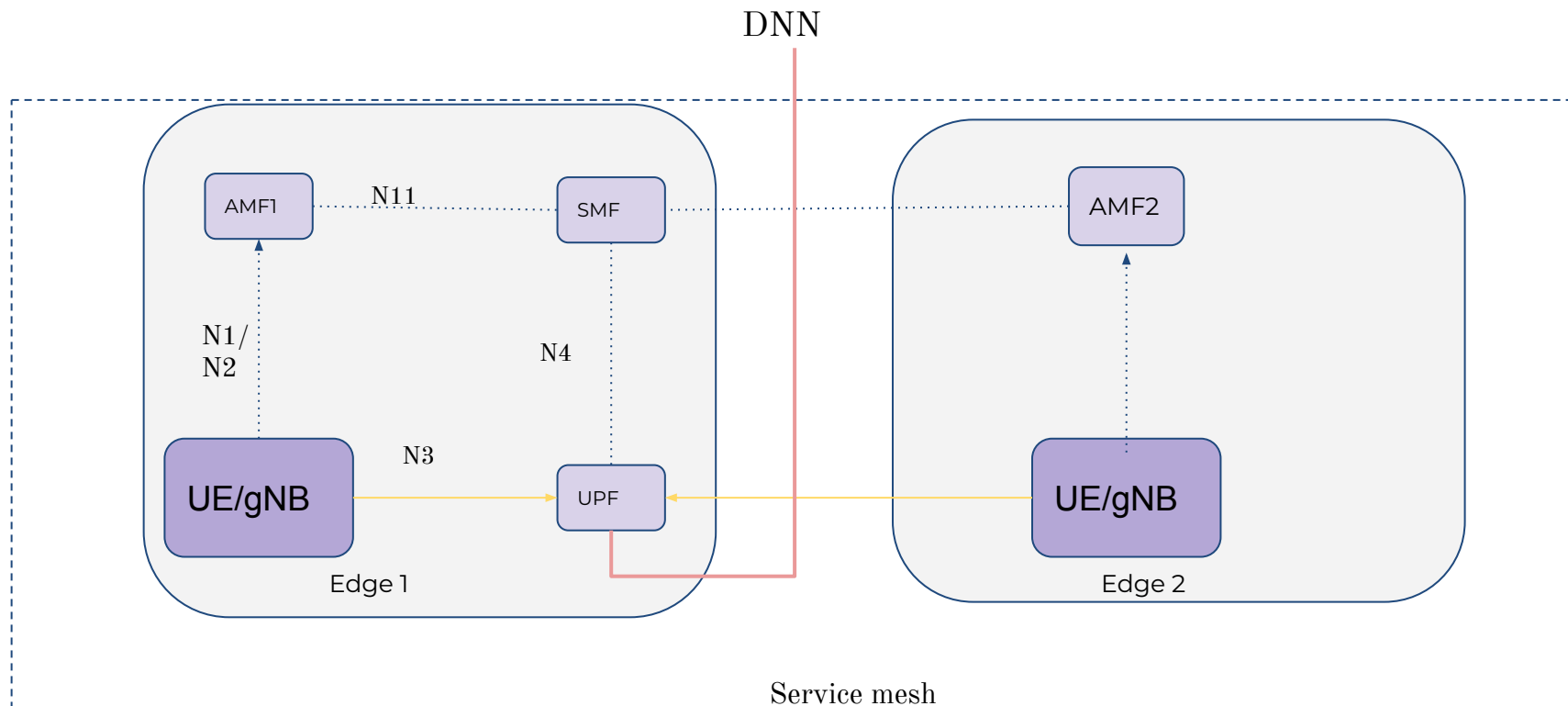
1. Call AWE Scaleout API

AF, Poll

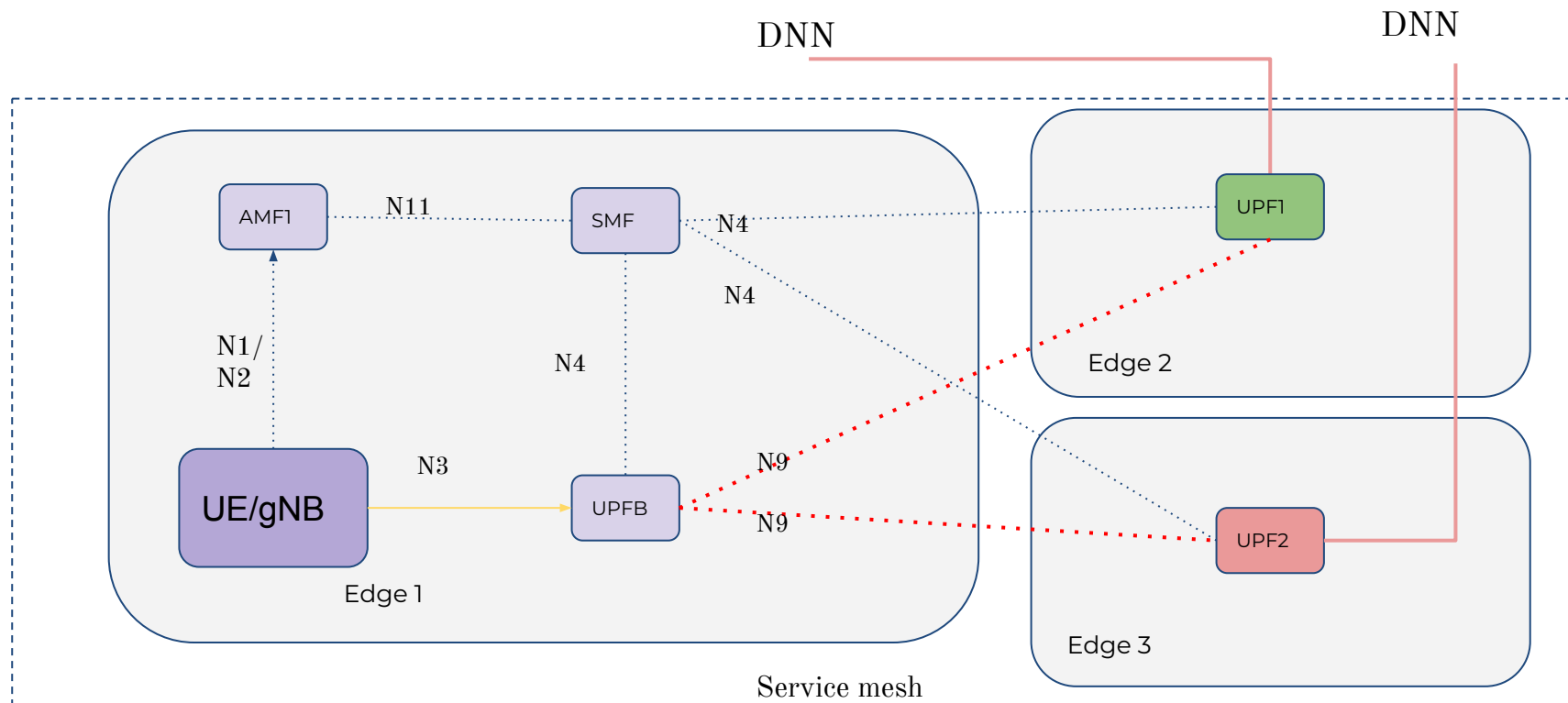
1. Poll NRF for new AMF.
2. Report New AMF (in logs)



NWDAF - Service Assurance



NWDAF - Multiple UPFs



NWDAF - Multiple UPFs

- Trigger Scale out of UPF via AMCOP AWE as Actor.
- Post Scale-out Configurations:
 - The SMF has to initiate the PFCF association with new UPF
 - SMF needs to be configured with UE routing rules for the new UPF



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THANK YOU

Sriram Rupanagunta
srupanagunta@aarnanetworks.com

<http://www.aarnanetworks.com>