Beam in Nokia NWDAF Distributed Architecture

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Agenda

• What is Nokia NWDAF?
• Nokia NWDAF architecture
• Requirements and challenges
• Using Beam in Nokia NWDAF edge and central
• Use Case Example
What is Nokia NWDAF?
What is NWDAF?

The NWDAF is a network function that collects data from 5G Core network functions, performs network analytics and provides insights for closed loop automation to authorized network data/analytics consumers

Network Exposure for the 4 key application types relying on 5G capabilities
Data processing pipelines high level requirements

Nokia’s distributed NWDAF architecture makes analytics available where needed to meet the varying latency requirements of 5G use cases

- Be able to process large volumes of streaming data in near RT
- Create complex event processing pipelines including
  - sophisticated data integration
  - calculate KPIs using data windows with different velocity
- Ability to support many use cases
- Ability to use parameters that configures the pipelines for data collection, processing and exposure
- Ability to run on multiple technologies (Flink, Data Flow)
- Flexible linear scalability
- Integration with Kafka, Redis, Yugabyte, Pub/Sub
- Monitoring and debugging
- Running in K8s with Service Mesh
Use Case Example
### Analytics Use Case Example

#### Data Processing Layer

**Network Function**
- User Equipment Location: Movement notifications, varying frequency (sec / min / hour...)
- Network Performance Statistics: Loaded from a file every X time

**Mobility Function**
- Subscription: Once per User Equipment

**Operation Admin & Maintenance**

**Input**

**Output**
- Prediction Notification: Every X time
- Store in Central Data Repository: Input, Output

**Inference by ML models**

#### Analytics Consumption Layer

**Kafka**

**Central Data Repository**

**Data Collection Layer**

**Data Processing Layer**

**Analytics Consumption Layer**

**Kafka**

**Pub/Sub**

**NWDAF Dataflow**
Analytics Use Case Example
Operational Aspects

• Deploy using flink-Kubernetes-operator
  • Runs on its own namespace
  • Beam pipelines may run on separate namespaces

• Application mode
• Microservices, scale each pipeline separately

• Monitoring
  • Flink built in metrics
  • Applicative metrics using Beam Custom metrics
  • Metrics are exported via Open Telemetry to Metrics Explorer