MobileStream – A New Scalable, Programmable and Evolvable Mobile Control Plane Platform

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Overview

Three emerging concerns in control plane for 5G networks

#1. New services for 5G

- MME: Control plane & data plane
- G-SGN: Cellular IoT SG node
- MEC: Mobile Edge Computing

#2. Control signal storm

- ~26 billion IoT by 2020

#3. Software-based EPC on cloud

- Can fail anytime

Control plane requirements

- Programmable & Evolvable
- Scalable
- Reliable (Fault-tolerance)

MobileStream

#1. Provide basic building blocks:

Decompose control functions

- Protocols
- Functions
- Others
- Your own Blocks

#2. Assemble what you want:

- MME supporting NB-IoT

#3. Run it on realtime stream frameworks

- Scalable
- Reliable

MobileStream Architecture

Design Control Plane Application

- Stateless
- Smart Partitions

Prototype & Preliminary Results & Future Works

MobileStream Prototype

- Control plane library (~ 7000 LOC C++)
- Support most of events
- Apache Storm extension
- SCTP transport & interactive compute nodes
- Storm-based control plane
- Using JNI to bridge C++ and Java layer
- Redis as remote key-value storages

Validating Standards Compliance

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<thead>
<tr>
<th>UE</th>
<th>Terminals</th>
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<tr>
<td>srs eNB &amp; Nexus 5</td>
<td>srs eNB, OAI eNB, Commercial ip.access small cell</td>
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<td>OAI &amp; OpenEPC emulator</td>
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C-SGN vs MEC Comparisons

Future Works

- Large scale evaluations
- Evaluate robust functions
- Build several architectures as stream applications
- Explore the feasibility of using our design for S/P-GWs