Taming Mobility Management Functions in 5G: Handover Functionality as a Service (FaaS)

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5G & Beyond: Enabling Technologies and Applications
GLOBECOM 2015 – San Diego, CA
In a nutshell ...
Modelling topology of mobile networks similar to the fixed network

Topology of Mobile Devices \(\rightarrow\) dynamic graph

Abstract view of topology \(\rightarrow\) available at the top-level controller

Measuring signal quality \(\rightarrow\) identifying graph dynamics
One common network

- Service/User centric
- Optimized usage of resources
- Full integration
- Smart and smooth access network selection
Convergence

Of technologies and infrastructure

Convergence
Devices are powerful and can act autonomously.
Big data surge the power of predictability

Predictability
Mobility management as a Service

Self-regulatory networks

Topology of Mobile Devices → dynamic graph

Abstract view of the topology available at the top-level controller

Measuring signal quality & Predicting mobility → identifying graph dynamics

Controller might decide to reconstruct the topology i.e., trigger a handover.
Mobility & Handover

- Topology of the mobile network is modeled as a graph assuming each UE is connected to only one eNodeB at any time instant.
  - This graphical representation is evolving with time and therefore, it is obtained by iteratively applying some given operator on the initial graph.

- Initial graph $X = \{E, V\}$

- Operator $T$

- Dynamic nature of graph is expressed by $(X, T)$, where $T: X \rightarrow X$ recursively.

- Operator $T$ is triggered based on UE’s measurement of the received signal level from eNodeB.
  - The existing periodical UE reporting is used.

- Operator $T$ is defined by thresholding the measurements.
Simulation Model

Simulation Model

Controller

Open flow

UE

LTE model

UE

X2 interface

S1-AP interfaces

MME

S11 interface

SGW/PGW

internet

remote hosts

Controller

Open flow

UE

LTE model

UE
How often to update
Further considerations

- Prediction of mobility patterns.
  - Self-regulatory and self-governed graphs.
  - Inclusion of analytics, in identifying the pattern.

- Replacing the frequent update of UE signal level, with an event-based update.

- The actual routing protocol.
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