Paper Review:
SDN-Based Vs. Software-only EPC (Evolved Packet Core) Gateways – A Cost Analysis

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Introduction

- Evolved Packet Core (EPC) comprises of gateways like
  - S-GW (Service Gateway)
  - P-GW (Packet Data Network Gateway)
  - MME (Mobility Management Element)
  - HSS (Home Subscriber Server)
  - PCRF (Policy Control and Charging Function)

- NFV: concept of virtual EPC
Challenges

- Virtualization is difficult...
- Strong interaction between forwarding plane and control functions of the EPC
- Cost reductions from virtualization Vs. costs of additional transport and processing
EPC functional entities

- SDN allows separation of control plane (C-plane) from the data forwarding plane (U-plane)

- EPC’s pure C-plane functions can be completely virtualized e.g. MME, HSS, PCRF

- EPC functions like S-GW, P-GW with strong C-plane and U-plane interaction pose a challenge
NE+ approach

- C-plane is separated from U-plane
- U-plane is handled with SDN switches (forwarding elements) and SDN controller
- GTP Tunneling and policy enforcement functions will need to be added to the FE (forwarding elements)
- 10% overhead in traffic due to SDN signaling is assumed
Gateway Virtualization Approaches

- Fully virtualized approach – Software-only

- Partially virtualized – NE+
  - Aggregation switches (AG-S) can act as EPC gateway U-plane node
Virtual EPC (vEPC) deployment aspects

- Transport network topology including the location of AG-S
- Geographical placement of virtual EPC gateways
- Approach to gateway virtualization
Transport network topology

Fig. 1. Infrastructure of a scenario in a three level aggregation network
EPC deployment scenarios

- Software-only
- NE+ in TN
- NE+ in DC
Continued…

(a) AG-S only site

(b) Site hosting a “Software-only” based EPC GW

(c) Site hosting an “NE+ in TN” based EPC GW

(d) Site hosting an “NE+ in DC” based EPC GW

LEGEND

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<th>Line Style</th>
<th>Description</th>
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<tbody>
<tr>
<td>Dotted line</td>
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<tr>
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<td>user plane</td>
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<tr>
<td>Red line</td>
<td>SDN control</td>
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Results
Continued…