USING OPENSTACK FOR RADIO ACCESS NETWORK VIRTUALIZATION

ERLEBEN, WAS VERBINDET.

MOTIVATION

- Expected diversity of services, use cases and applications in 5G requires a flexible, adaptable and programmable architecture
- Many participants, Deutsche Telekom, Nokia, Huawei and more, are working on concepts as well as practical implementations
- Prof. Michael Einhaus from Hochschule für Telekommunikation in Leipzig provides research for new key technologies in the context
- Hochschule für Telekommunikation Leipzig and Open Telekom Cloud analyze OpenStack as possible cloud architecture solution

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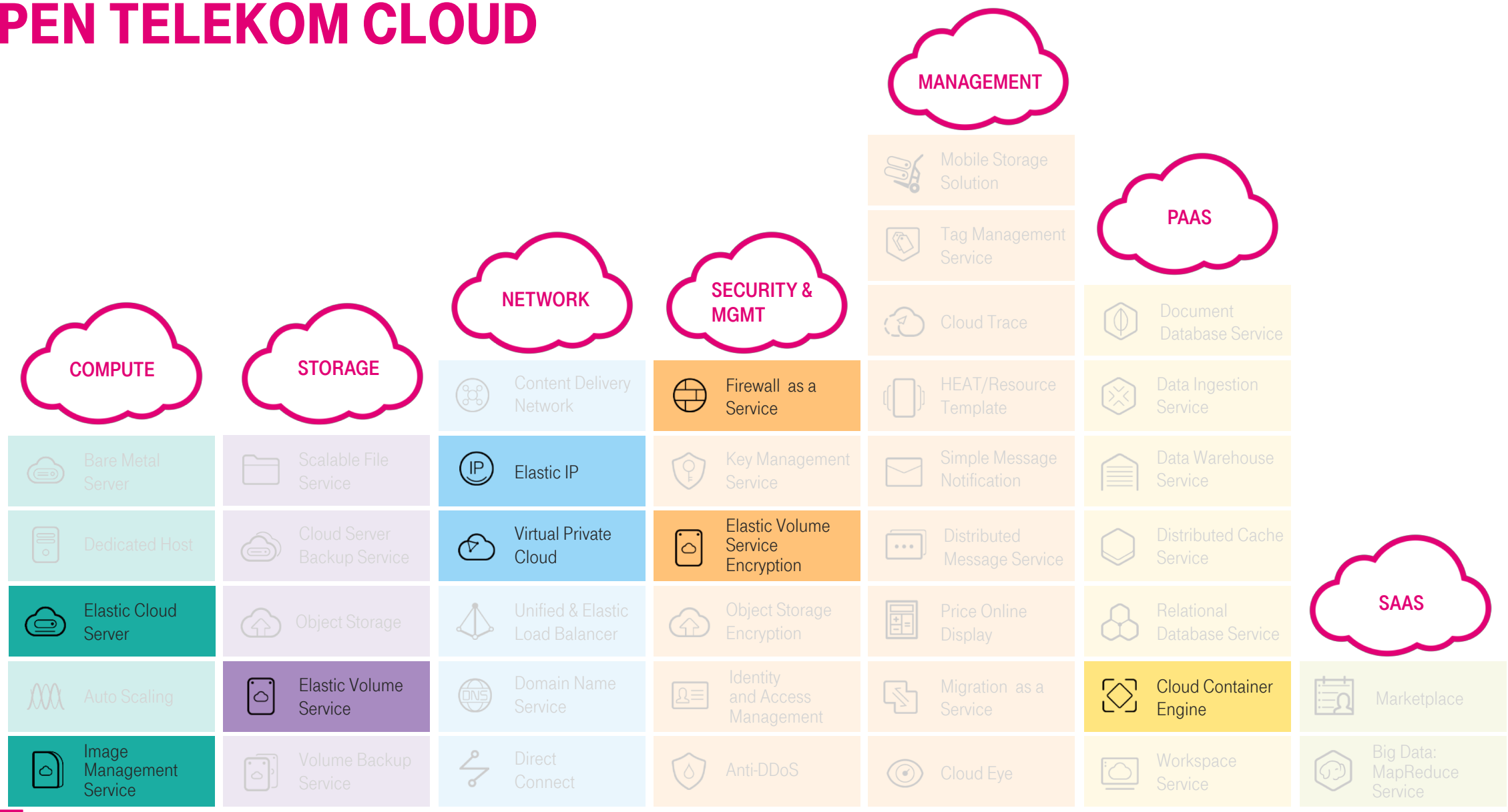
OPEN TELEKOM CLOUD



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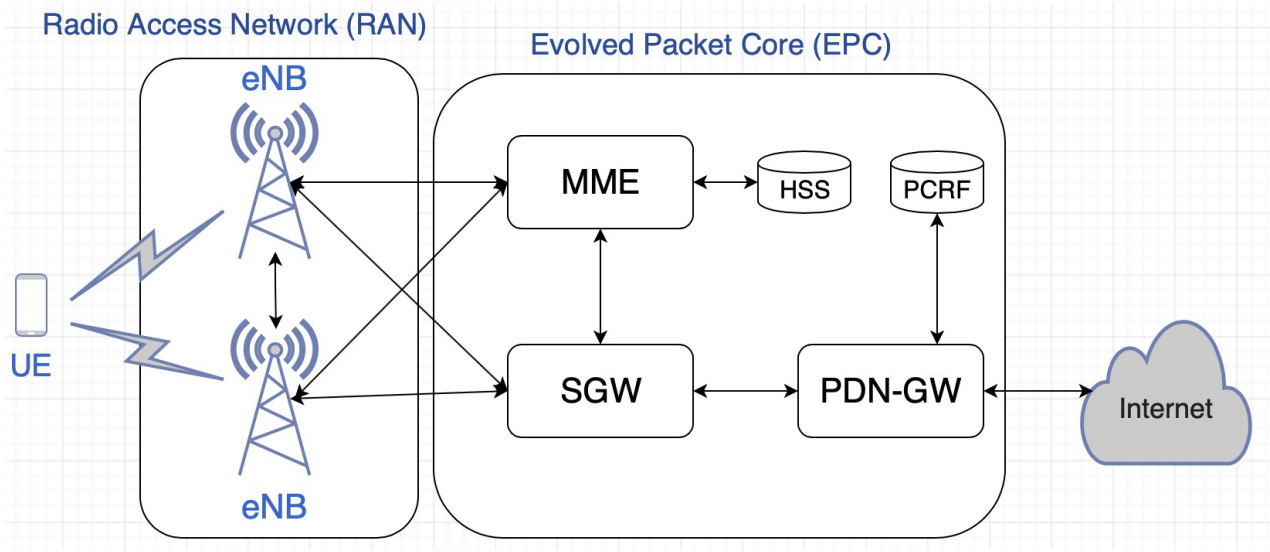
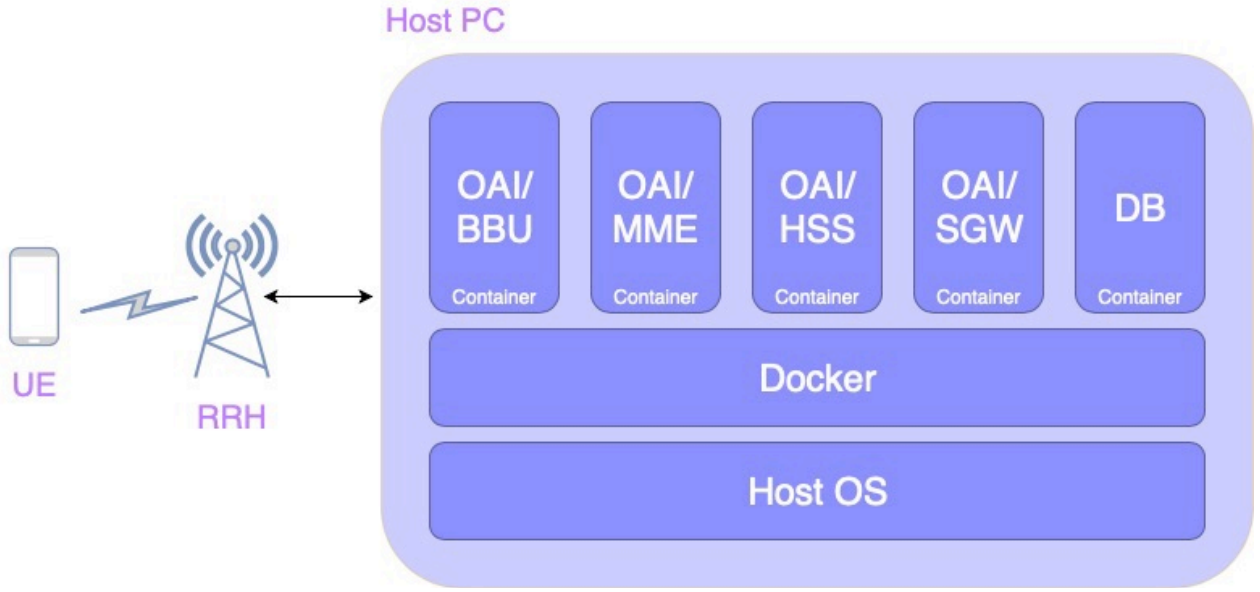
LTE/RAN INTRODUCTION

- LTE Network architecture was introduced in the 3rd Generation Partnership Project (3GPP)
- LTE has two main parts:
  - The Evolved Packet Core (EPC) represents the core network controls the data traffic between User Equipment and Packet Data Network Gateway
  - The Radio Access Network
- This architecture defines lowest latency and highest traffic requirements



INTRODUCING VIRTUALIZATION WITH DOCKER



- Based on current LTE solution
- Introduces OpenAirInterface & Docker
- While several scenarios can be applied, the picture shows the „all-in-one“ virtualization, utilizing the Docker platform
- All EPC software components run on one local machine on Docker platform
- eNB has been separated into two entities: Base Band Unit (BBU) and Remote Radio Head (RRH)

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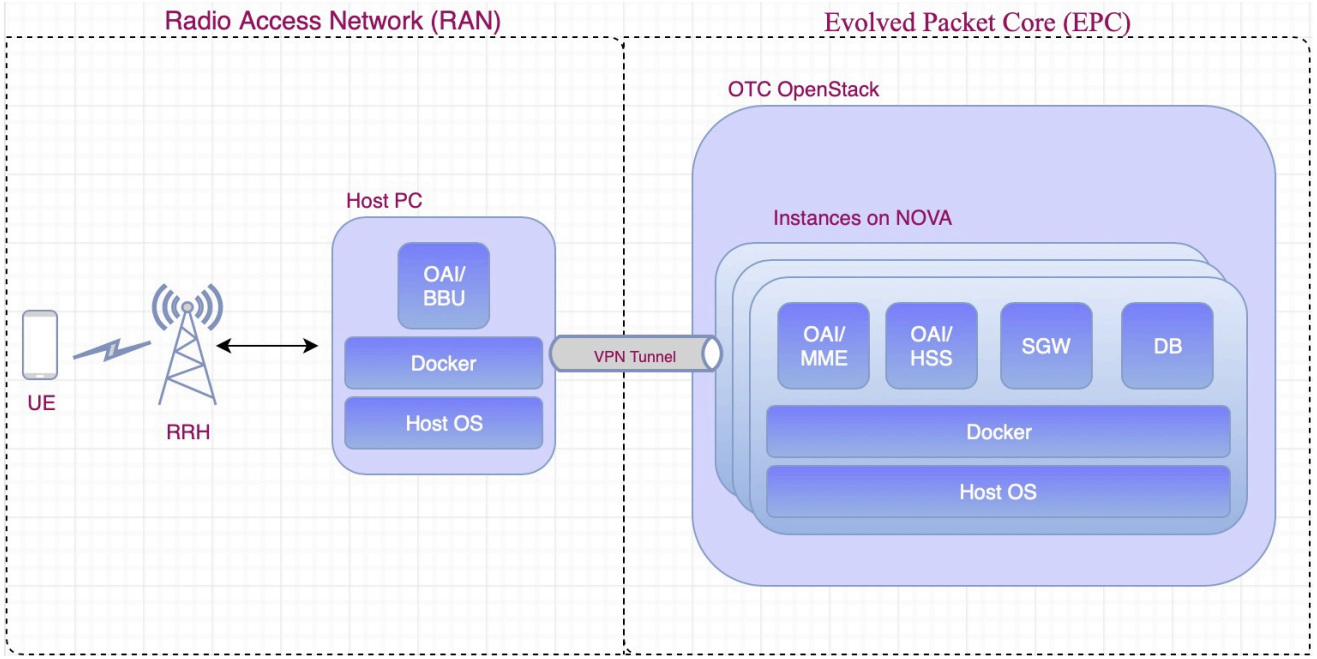
INTRODUCING CLOUD UTILIZING THE OPENSTACK ARCHITECTURE



- Once the software components run in containers, OpenStack cloud architecture can be used to centralize functions
- Since OpenStack consists of module services, it may provide the needed flexibility and programmability
- In this concept, only the EPC entities will be moved to the cloud
- RAN components (OAI/BBU) cannot be moved into the OTC due to stringed latency requirements of the interface between RRH and BBU (1 ms)

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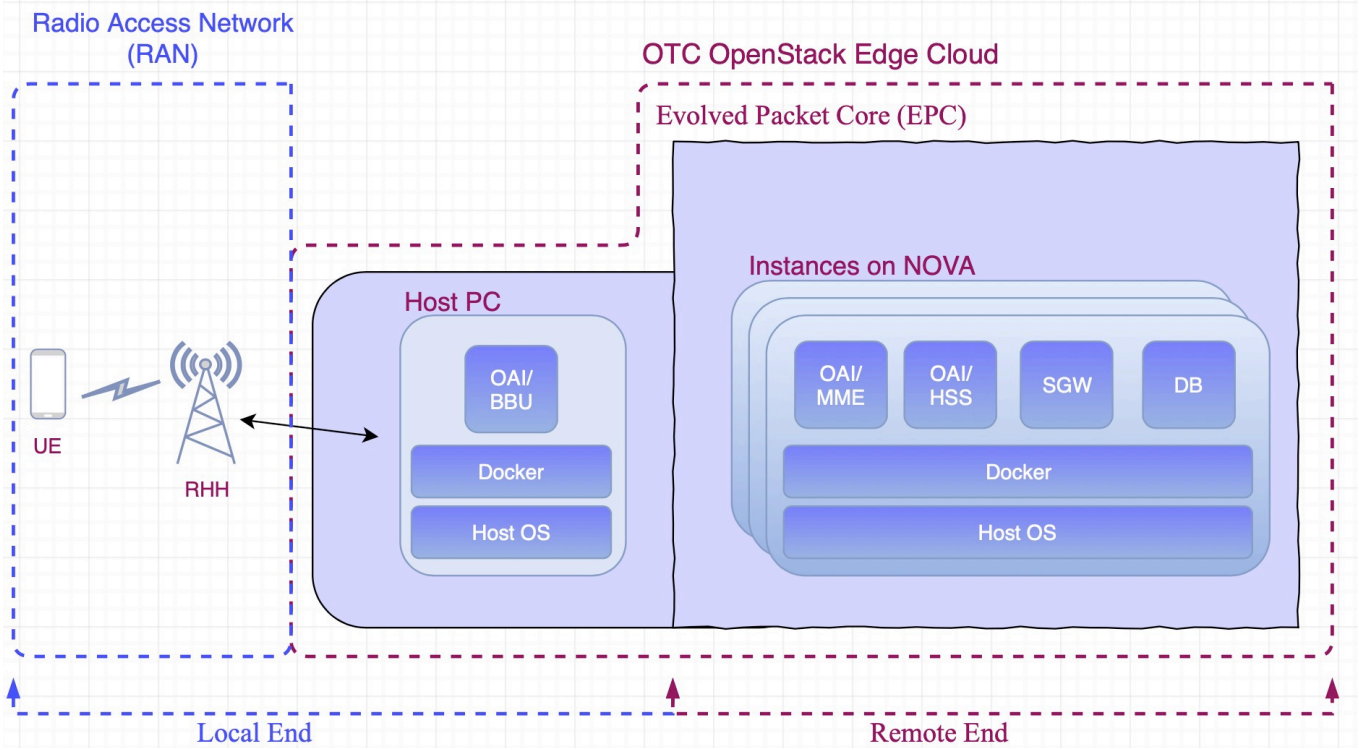
INTRODUCE EDGED CLOUD ARCHITECTURE TO FACE LATENCY



- Facing the huge impact of latency to the RAN and EPC, the second approach will extend the cloud architecture
- Following the concept of edged cloud architecture, OTC will be split into two components: local end & remote end
- Neutron & Nova are required as local service, keeping OAI/BBU entities physically in the local end

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FUTURE WORK

- Full control of all the EPC and RAN entities from a centralized platform (OpenStack)
- Better connectivity between the EPC and RAN entities (now that they share virtualized ressources)
- Decrease latency to the lowest possible value
- Increase overall security
- Determine automation opportunities since EPC and RAN configuration may be automated using OpenStack

THANK YOU!

LTE/5G

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