



# Cloud Native for Vertical Services

EUCNC 2018, Ljubljana

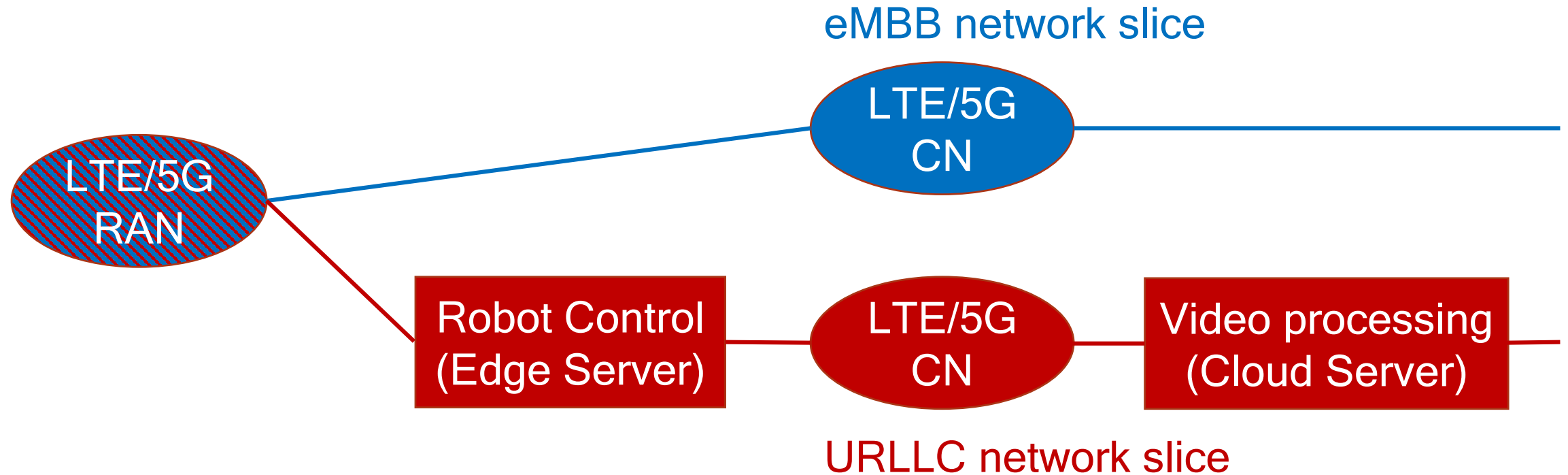
June 18<sup>th</sup>, 2018

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# Introduction

- Different approaches for being cloud-native for different types of applications
  - ‘typical’ web applications
  - Telco systems
- 5G-networks will have different deployments
  - Several network slices on common infrastructure
  - eMBB, URLLC, mIoT, public safety, ...
- Verticals may deploy their applications into these network slices
- How would verticals develop applications in a cloud-native way?

# Example of Vertical Services



# General Rule

- Traffic characteristics of vertical applications may be different
  - Web-style application
  - Similar to telco control- and/or user plane
  - Traffic aggregation/analysis
  - Real-time processing
  - ...
- → Depending on traffic characteristics all implications of the white paper on cloud-native for telco apply as well to verticals

# Distributed Computing

- Applications may be distributed across multiple data centres
  - Applications deployed at the mobile edge
  - Limited control of deployment to data centres
- One or multiple instances of an application
  - One distributed application
  - Multiple non-distributed applications communicating with each other
  - For large regions: multiple distributed applications
- → Backing services should have a notion of locality
  - Do not move data unnecessarily among data centres
  - Control which data to keep locally

# Multi-version Deployments

- Multiple deployments in one network slice
  - Support of rolling upgrades
  - Different versions might use different versions of backing services
- Multiple deployments in different network slices
  - Same or different operator
  - Different platforms used for different deployments
- ➔ Increased versioning and testing efforts

# Multi-vendor Scenario

- Applications developed by vertical
- Telco system developed by operator/infrastructure vendor(s)
- → Independent developments have to be kept aligned
  - Robust, versioned interfaces between platform and application needed
  - E.g. services of multi-access edge computing

# Shared Network Slices

- Ideally, dedicated network slices per vertical service
  - PNFs (e.g. gNbs) shared among network slices
  - Avoid excessive numbers of network slices
    - E.g. multiple mMTC applications within same network slice
- Multiple backing services operated within one network slice
  - → backing services have to be tenant aware to provide isolation
  - → service discovery has to be tenant aware
- → Authorization/Authentication needed



# Summary

- Cloud-native for vertical applications
  - Additional implications on top of cloud-native for telco
  - General Rule
  - Distributed Computing
  - Multi-version Deployments
  - Multi-vendor Scenario
  - Shared Network Slices