Railway Operational Communications Industry Group

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3rd world conference on Rail Transport Telecoms

Application centric future network architecture

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17th/18th of May 2017

Ensuring an interoperable transition

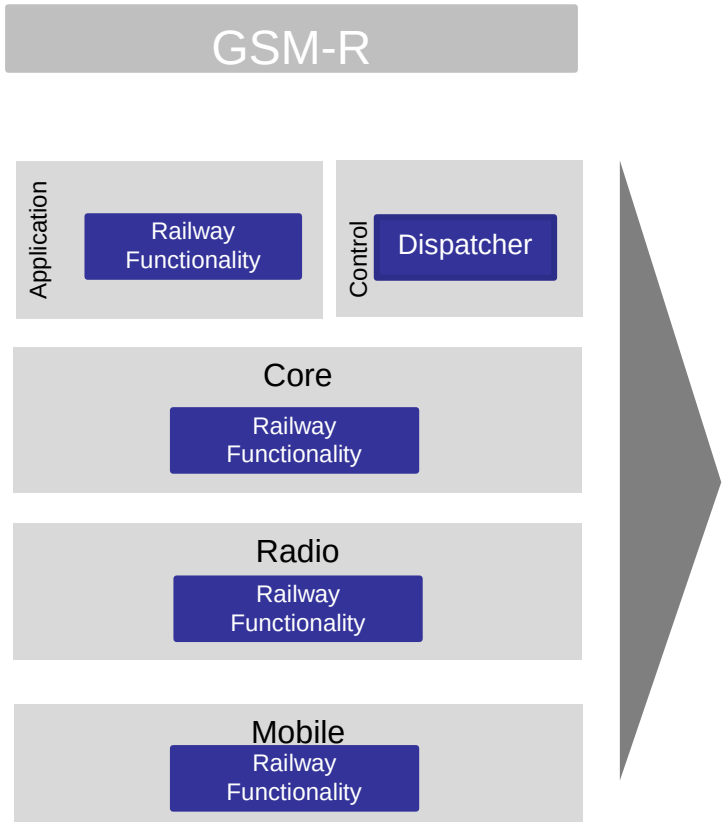
Topics

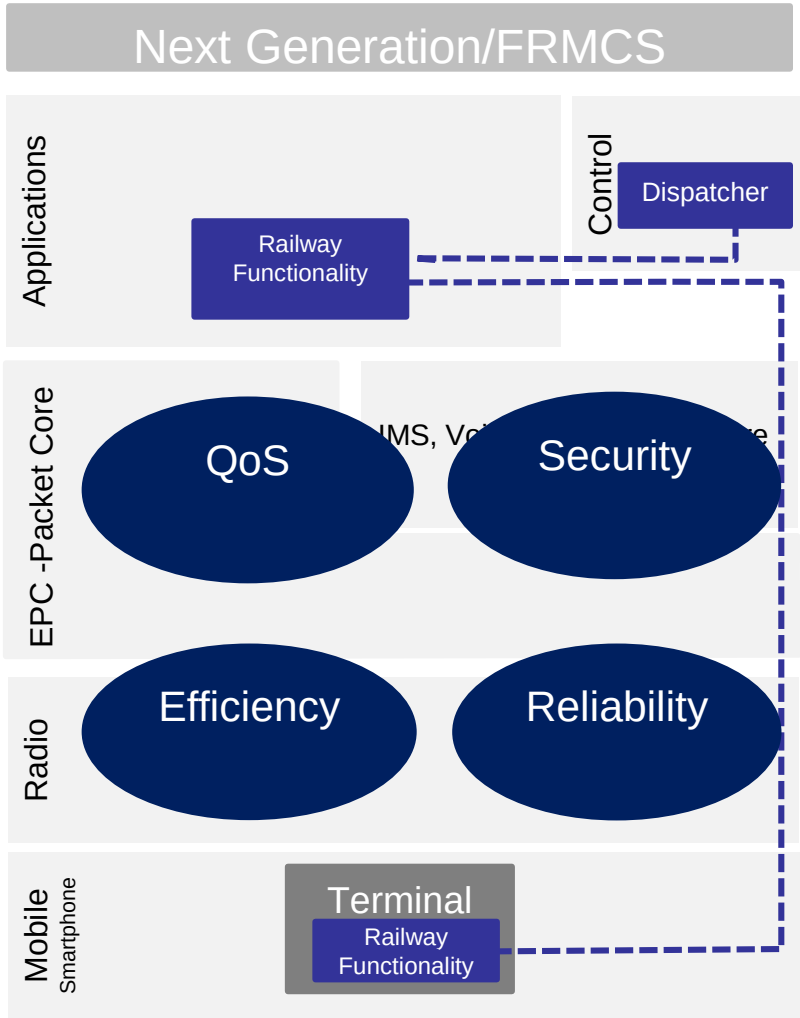
- From network to application centric solution for FRMCS
- How 3GPP Networks support application deployments
- Benefits and use cases
- Summary

How to address FRMCS requirements

- FRMCS requests to implement railway functionality on application layer
- Network and application **together** build a reliable railway solution
- 3GPP provides a system architecture with enabling mechanisms and services to support railway requirements, e.g.:
  - Quality of Service
  - Efficiency (e.g. group communication)
  - Reliability and robustness, geo redundancy
  - Security
  - Flexibility for service deployment and orchestration
  - One service for multiple access technology
  - Interworking

Application centric solution design

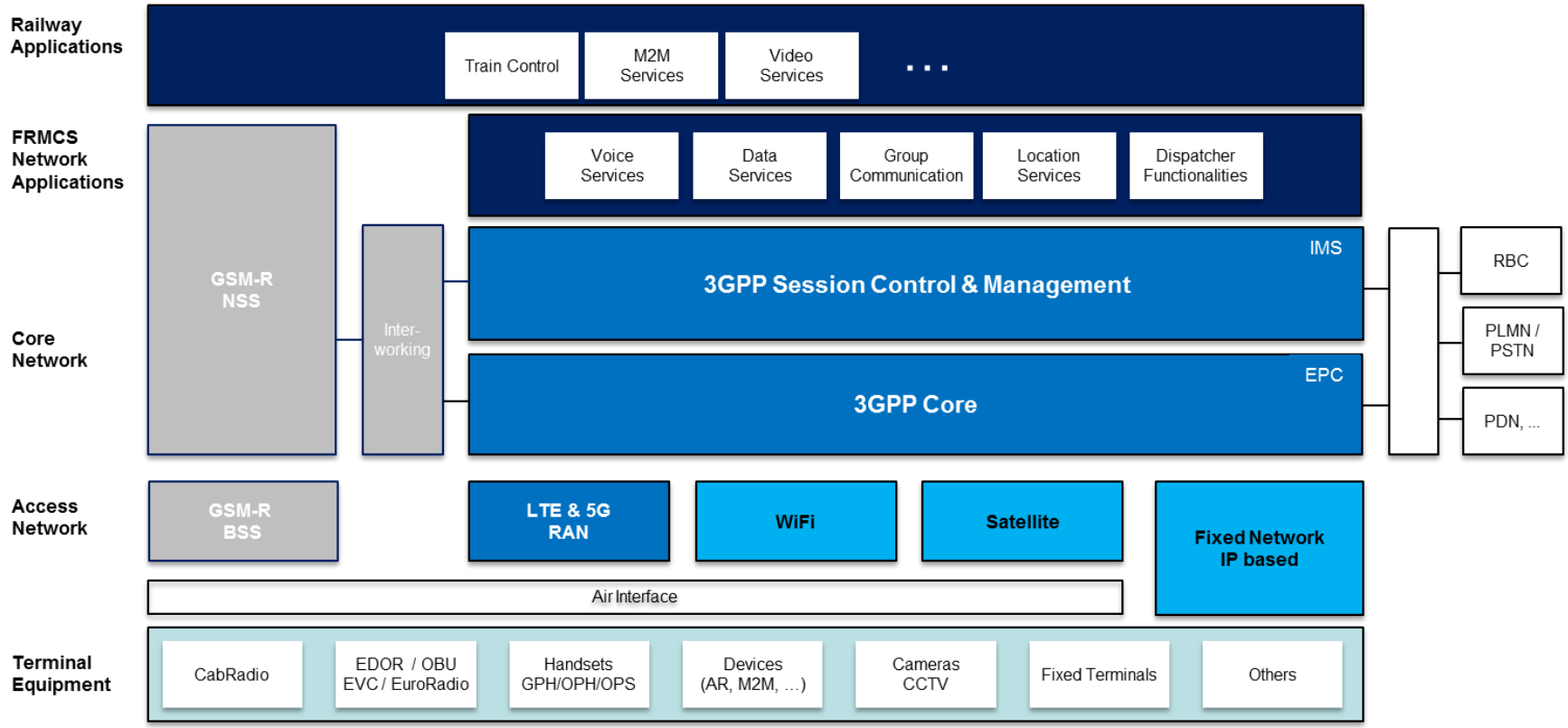




Design target:

- Railway specific function on application layer
- Supported by service enablers in the network
- QoS, efficient transmission security, reliability - required to be provided from a high reliable network

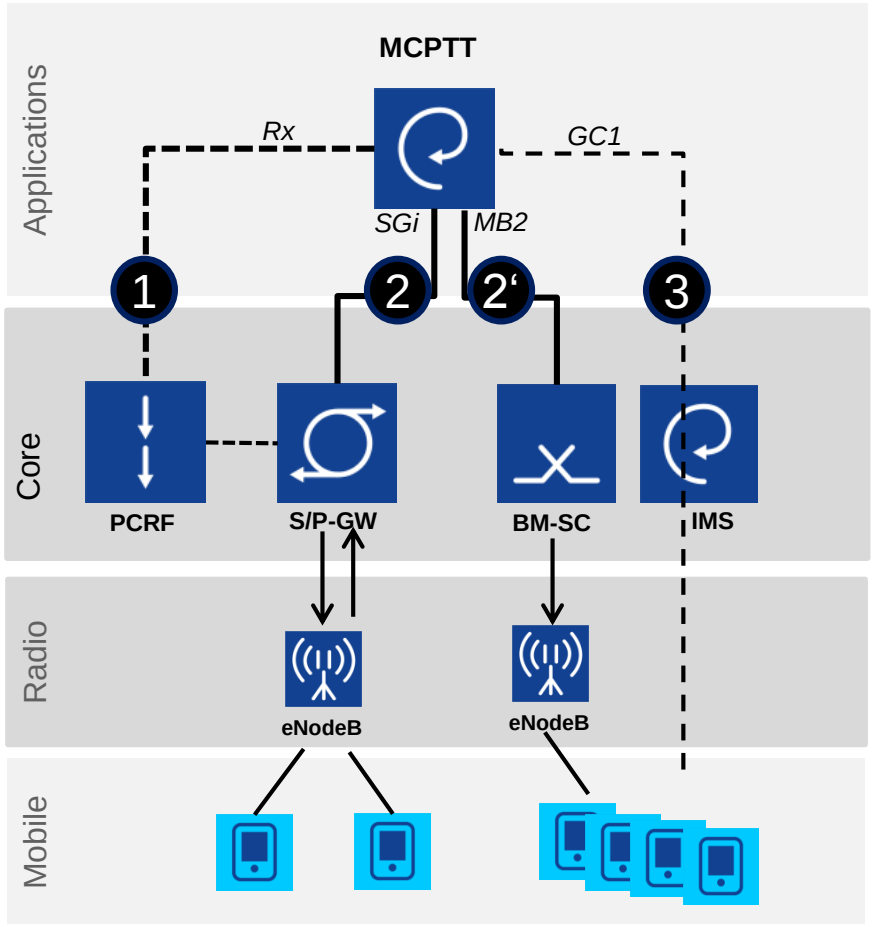
End to End System Architecture – concepts under evaluation



Design target: Railway specific function on application layer.

3GPP Service Enablers

Example: MCPTT/Group Call



MCPTT Service:

- MCPTT mimics the behavior of Push to Talk (PTT) services provided by legacy systems
- MCPTT allows a user e.g. to register, join and leave group communication, request the floor to speak, manage group settings, create groups based on permission

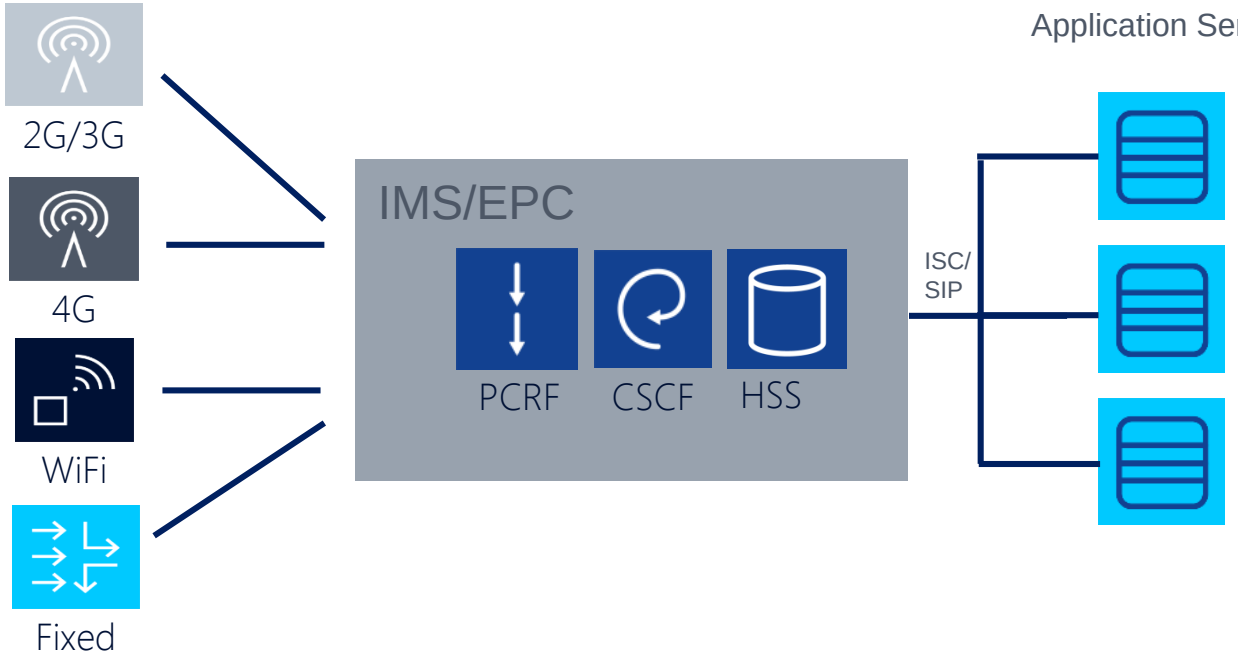
Network / Enabling Interfaces:

1. QoS/Policy Control
2. Voice/Media Packets (unicast)
2‘ Voice/Media Packets (broadcast)

Application E2e interfaces

3. Application e2e Control (e.g. Floor Control)

3GPP IMS – IP Based Multimedia Subsystem

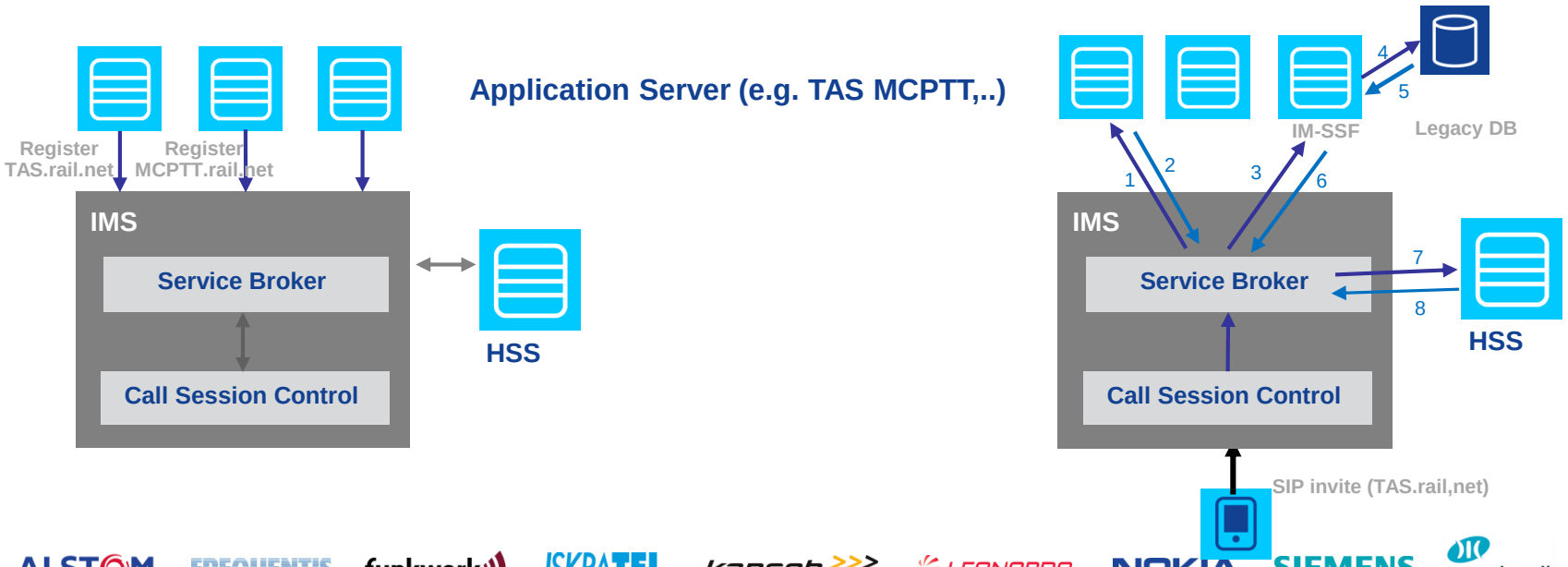


- **Access agnostic**
  for seamless service continuity
- **Service agnostic**
  allowing service orchestration

- **Identity management**
  with common subscriber data management
- **Core technology**
  for all mobile-fixed-cable standards

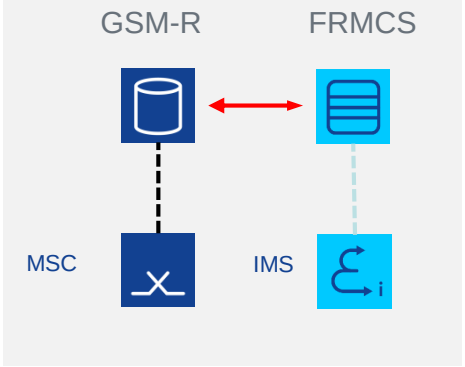
3GPP IMS –
Service registration and routing concepts

- Service routing & orchestration by Service Broker
- Service registers towards IMS (SIP Domain), e.g. TAS (Telephony Application Server) for VoLTE call, or MCPTT server for Group Call
- Service selection on various parameter (SIP addresses, source,…)
- Typically programmable engine (e.g. JAVA based)

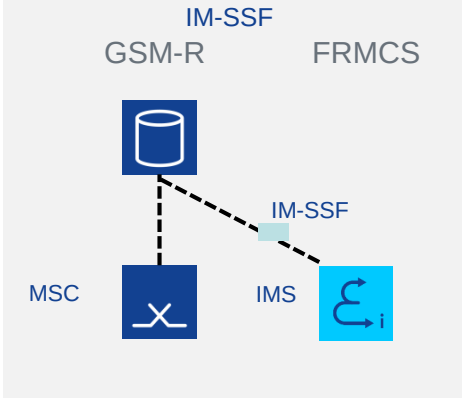


3GPP Service routing:
Flexible options to address databases

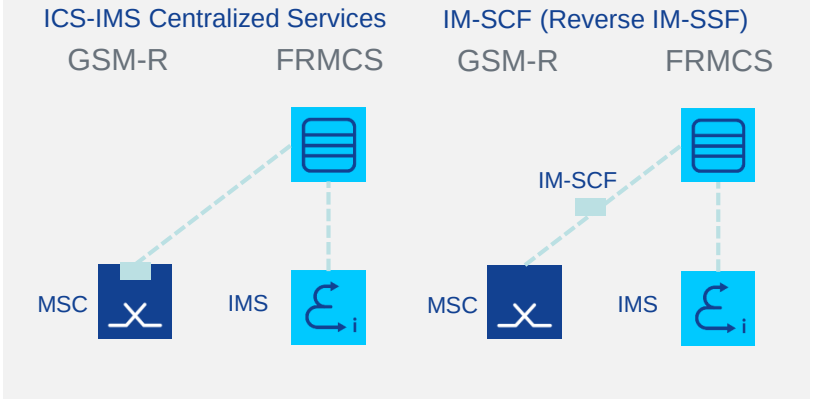
a) System in parallel



b) Reuse existing GSM-R Database



c) Shift database to FRMCS system.



- Railway application databases needs to be accessible by both technologies
- Data to be kept synchronized (Functional Number Registration Data,…)
- Use of one common database preferred
- 3GPP provides means to transparently access from each system (IM-SSF, IMS centralized Services, IM-SCF)
- Target to provide application in FRMCS, migration scenarios could benefit from scenario b)

Summary

- 3GPP core network technology based on EPC and IMS provides a framework for a flexible deployment of applications on a multi access system architecture , incl. mobile and fixed access

- The network provides all required means fulfilling railway requirements for a reliable, efficient, secure and QoS enabled communication system

- Interworking technologies are available to support smooth migration of services incl. access to/from legacy systems

- A cornerstone for FRMCS …

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On track!

Thank you

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