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GSM-R Core Evolution

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Strategy Trend : Evolve GSM-R
from TDM to IP Fully Secured Networks

- R99 to R4 evolution : Packetization of Voice GSM-R key component

  - « Built for IP » and fully compliant with GSM-R standards

- IP interfaces with key functional elements : Standardization + Implementation

  - SIP for dispatchers

  - VoIP for VRS

- GPRS / EGPRS introduction in GSM-R networks

  - TEN 3rd call as global framework

- Access infrastructure IP evolution : Abis over IP, A over IP for GSM-R

Infrastructure First… Radio is the Last Mile of the Transition

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What is R4 Core ?

- The Next Generation Voice Core Network
  is the **Evolution of legacy TDM based voice core networks**
  to **packet based voice networks**

- The **B**earer **I**ndependent **C**ore **N**etwork architecture
  was first **defined by 3GPP in the Release 4 specifications**
  and is already widely **deployed in public wireless networks**
  around the world

- **'Layered Architecture'** :
  Separation of the **control** and **signalling plane** (Call Server)
  from the **bearer plane** (Media Gateway)

- Next Generation Voice Core solution can be built
  to be **fully compliant** to **EIRENE**
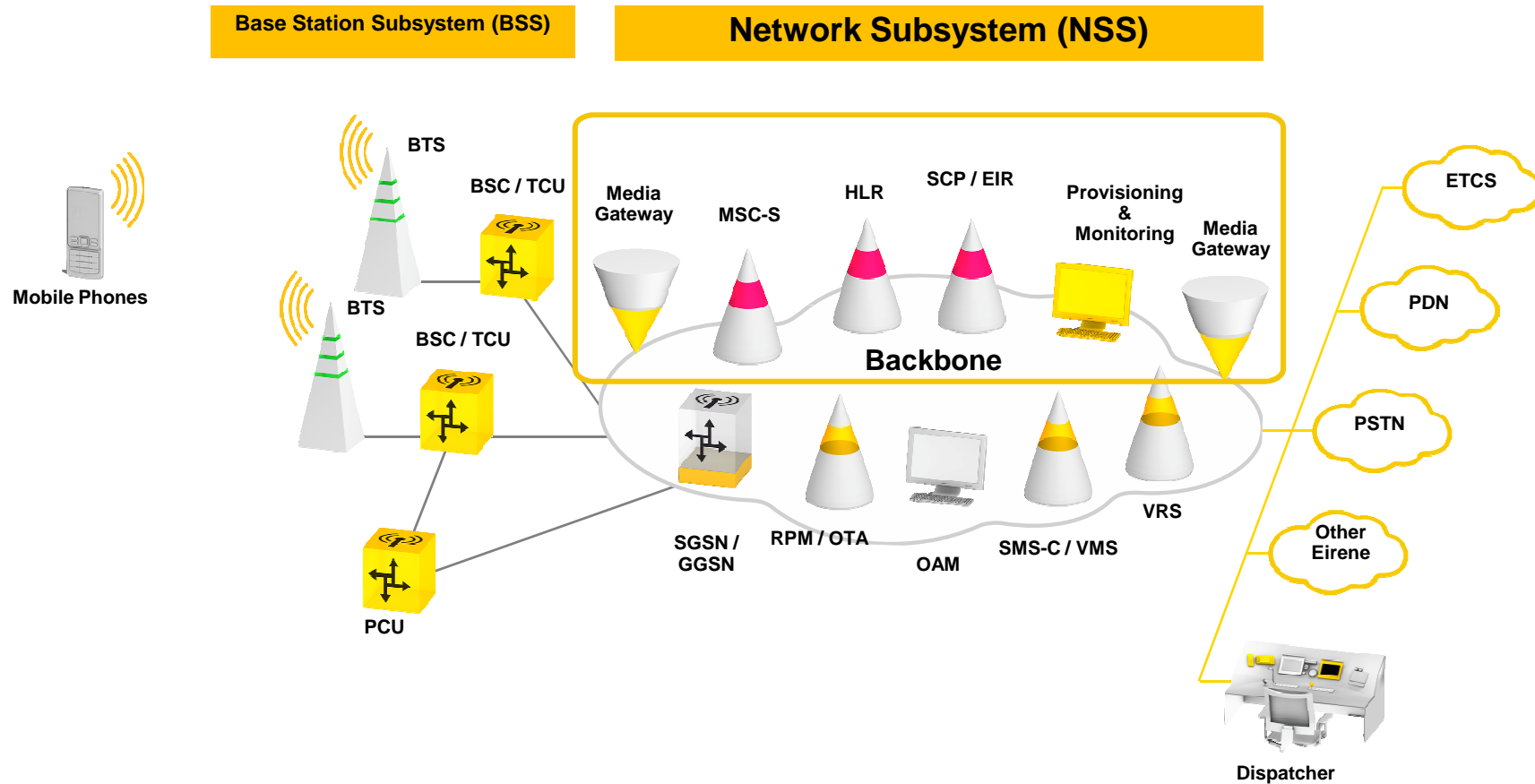 and GSM-R relevant **ERTMS** standards

Full Service Transparency & Optimized Network Efficiency

3GPP R4 / BICN Network Components

Base Station Subsystem (BSS)

Network Subsystem (NSS)

- Mobile Phones
- BTS
- BSC / TCU
- BTS
- BSC / TCU
- PCU
- Media Gateway
- MSC-S
- HLR
- SCP / EIR
- Provisioning & Monitoring
- Media Gateway
- **Backbone**
- SGSN / GGSN
- RPM / OTA
- OAM
- SMS-C / VMS
- VRS
- ETCS
- PDN
- PSTN
- Other Eirene
- Dispatcher

R4 Core Networks for Railways - Why?

Security & Robustness

- Highly reliable architecture
- **Full geographical redundancy** at each element level

OPEX savings

- Power consumption (~40%)
- Footprint reduction (~60%)
- **Obsolescence management**

Innovation & Evolution

- New functionalities and capabilities due to **IP technology**
- **Future readiness** (IMS, …)

Network Simplification

- **Less equipment** than hierarchical TDM networks
- Optimized transmission

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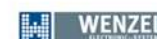# Core Evolution - KCC Keeps Moving

- **KCC led R4 BICN standardization in ETSI TC-RT**
  (Publication of TS 103 066 in October 2011)

- **KCC pioneered R4 BICN deployments**
  in Railway market with several networks in operation today

- **Core portfolio evolution** builds on that unique experience
  to continuously improve our solution
  with an absolute focus on Railway needs

  – Feature continuity & migration path from R99 platforms

  – Easier implementation of Eirene feature evolutions

  – Focus on reinforcing security and safety mechanisms

- **KCC's long term engagement in GSM-R evolution**

  – Readiness for further evolution to IP

  – Leveraging ATCA evolution, consolidating platforms & managing lifecycles

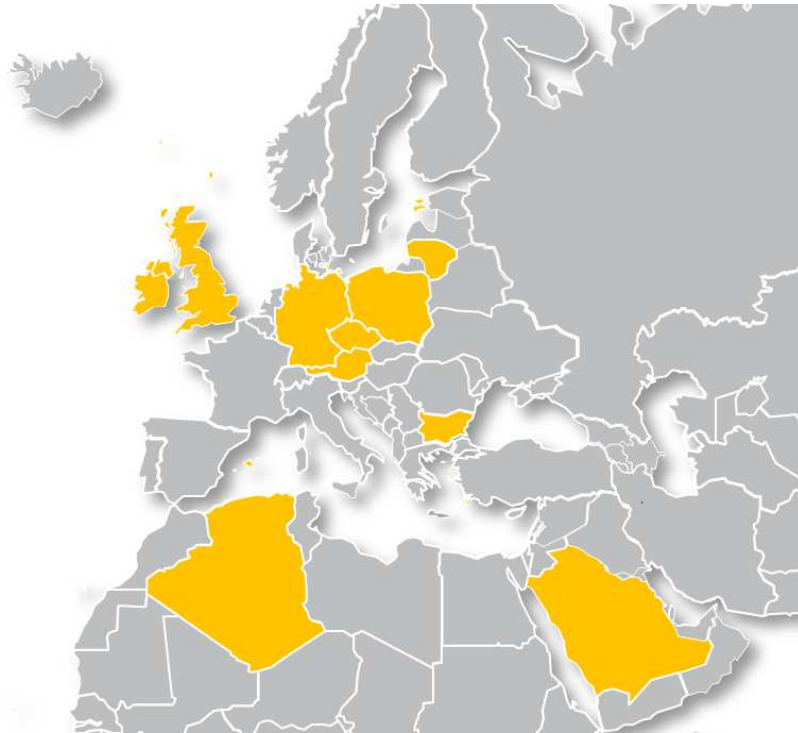 ➡ **KCC 2nd R4 generation for Railways already on going**

Setting the Trend & Maintain Leadership in R4 Core Solutions for Railways

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R4 Deployments - Proof of Experience

Country			
Austria	LIVE R4	ETCS L2	High Speed
Algeria	NEW	ETCS L2	
Bulgaria	LIVE R4		
Czech Republic	LIVE R4	ETCS L2	
United Kingdom	LIVE R4	ETCS L2	High Speed
Ireland	NEW		
Poland	LIVE R4	ETCS L2	
Germany	MIGRATION	ETCS L2	High Speed
Lithuania	LIVE R4		
Saudi Arabia	NEW	ETCS L2	High Speed
Spain		ETCS L2	High Speed
Italy		ETCS L2	High Speed
France		ETCS L2	High Speed
Turkey		ETCS L2	High Speed

KCC Sole Supplier with Live & Full GSM-R R4 Networks, Some Combined with ETCS L2

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In a Nutshell…

- Next generation voice core provides

    the **critical mix of capacity, scalability and reliability**

    combined with **market leading EIRENE compliancy**

    and **superior NSS and IN/SCP features**

- Railway operators can transform

    their legacy core voice network to meet

    the **challenges of supporting safety related services**

    with a **fully geo-redundant solution based on**

    latest IP technology

- **Seamless transition** through successful **migration path** to Next Generation equipment

Ready for a <u>Safe</u> Evolution ?

Thank you !