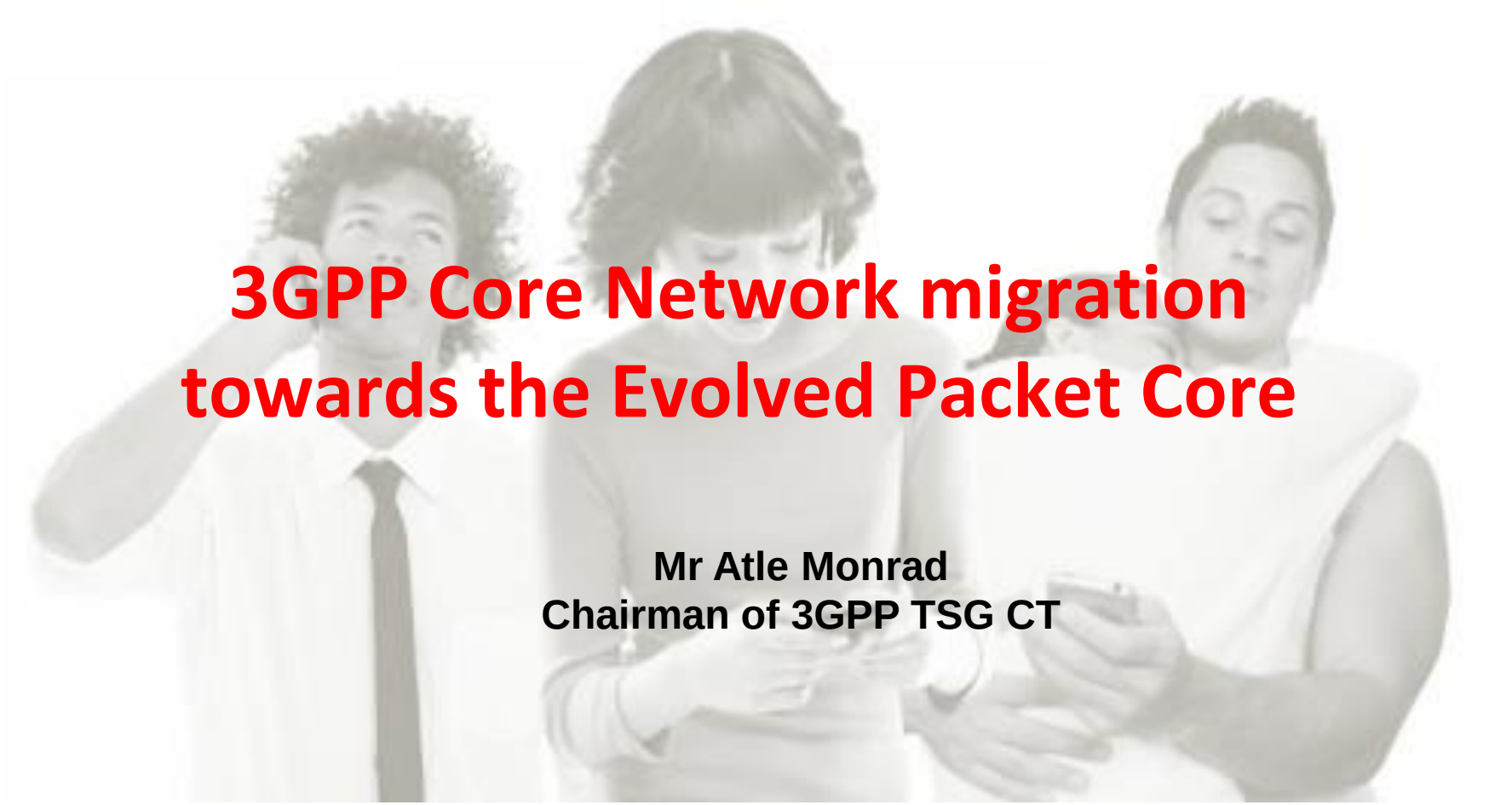
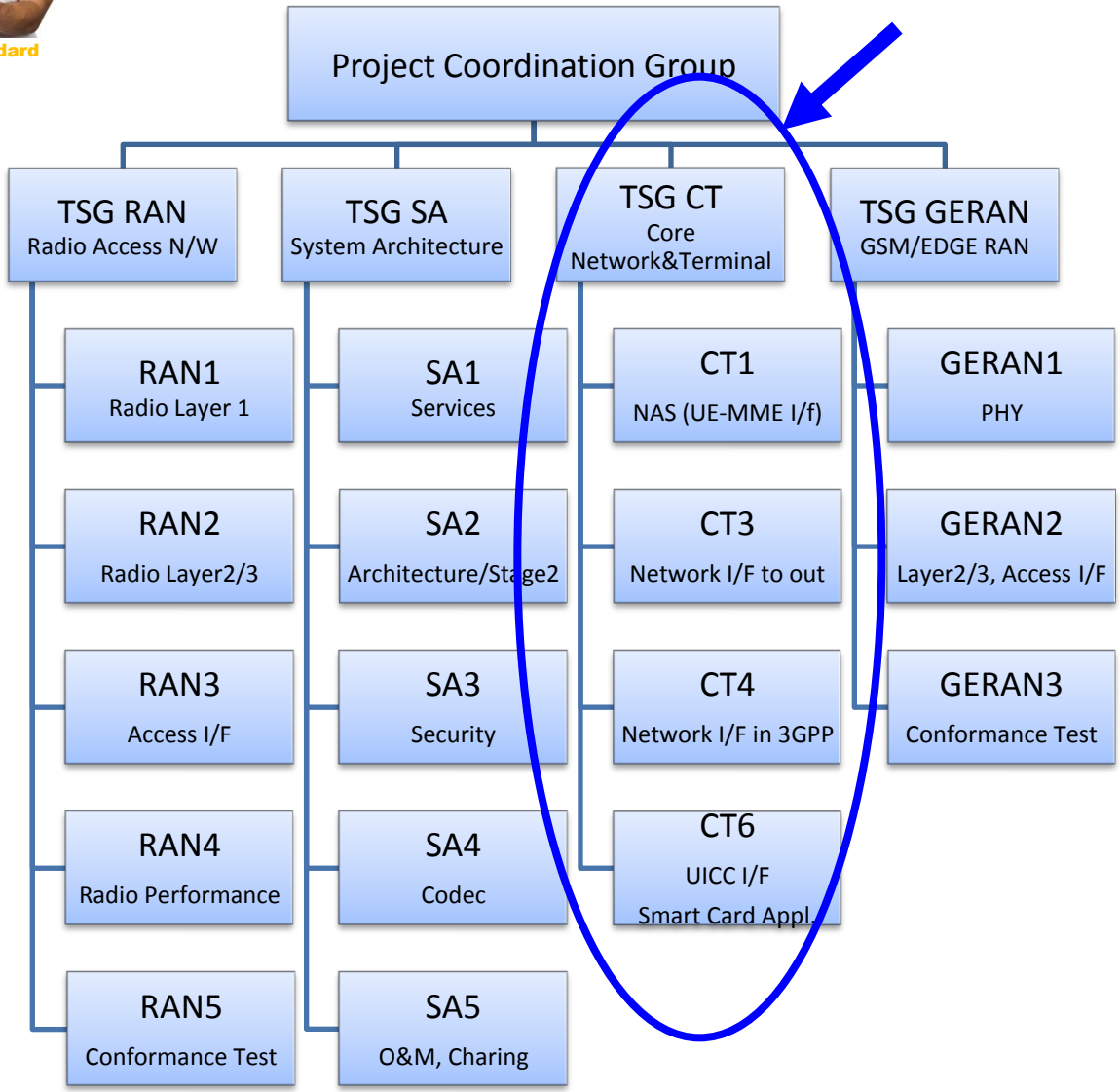


3GPP Core Network migration towards the Evolved Packet Core

Mr Atle Monrad
Chairman of 3GPP TSG CT

3GPP Organization structure



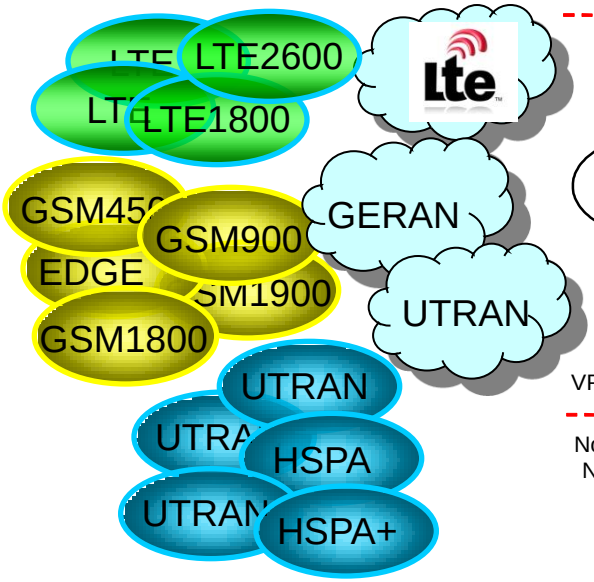
Outline

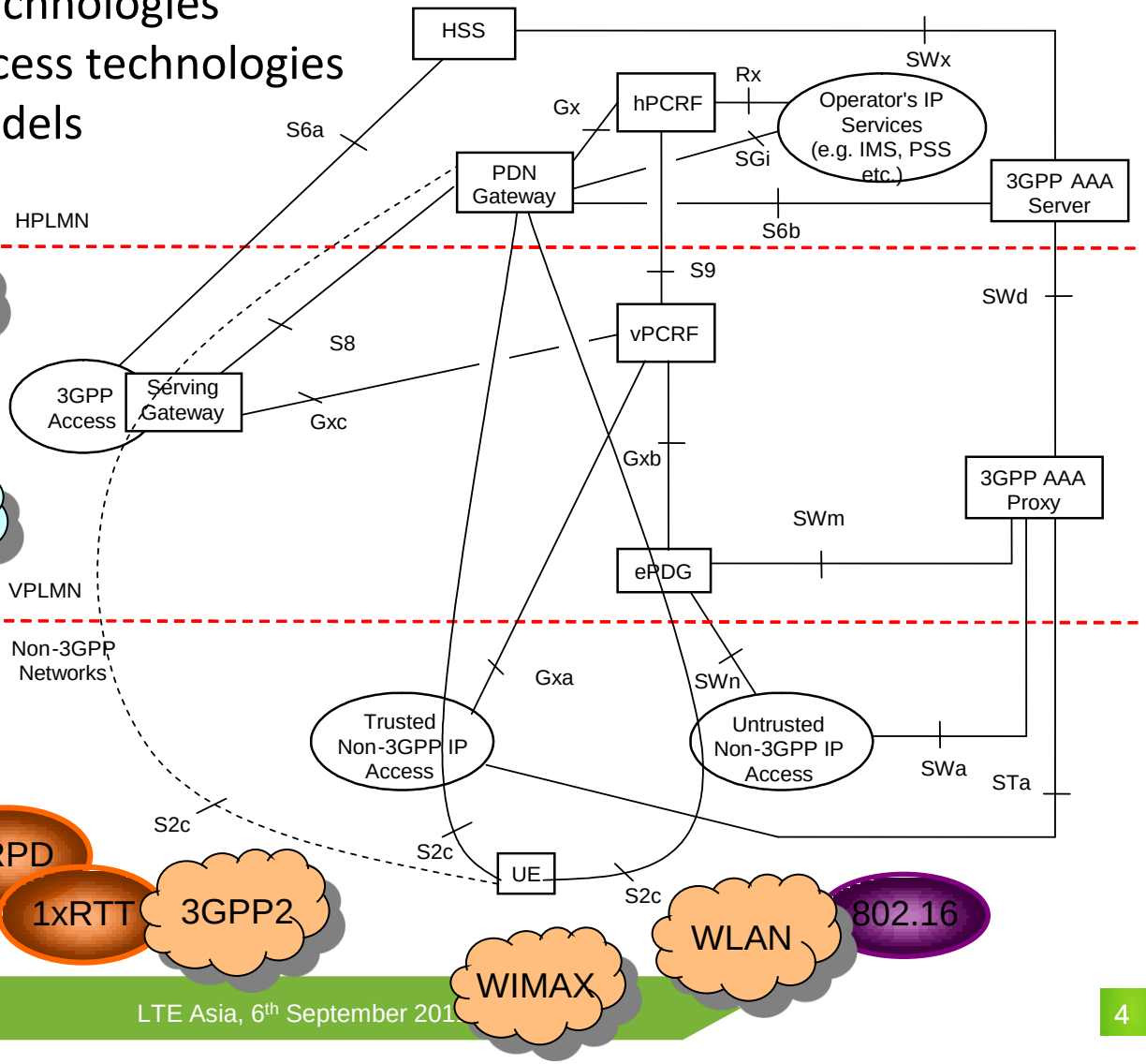
- 3GPP Core Network, Rel-8 – Rel-10
- Network optimised for IP traffic
- Voice over both CS and PS
- Future plans, Rel-11 and beyond

THE Mobile Broadband Standard

EPS architecture

- Many 3GPP access technologies
- Mobility between access technologies
- Multiple roaming models
- Non-3GPP accesses





Network Architecture Evolution

3GPP A GLOBAL INITIATIVE

Operator's IP Services (e.g., IMS, PSS etc)

PSTN

GGSN

MSC

SGSN

Circuit/GPRS Core Network

RNC

Node B

Operator's IP Services (e.g., IMS, PSS etc)

P-GW

MME

S-GW

Evolved Packet Core Network

eNode B

'99 '01 '03 '05 '07 '09 '11 '13

EPS Core Network key-points

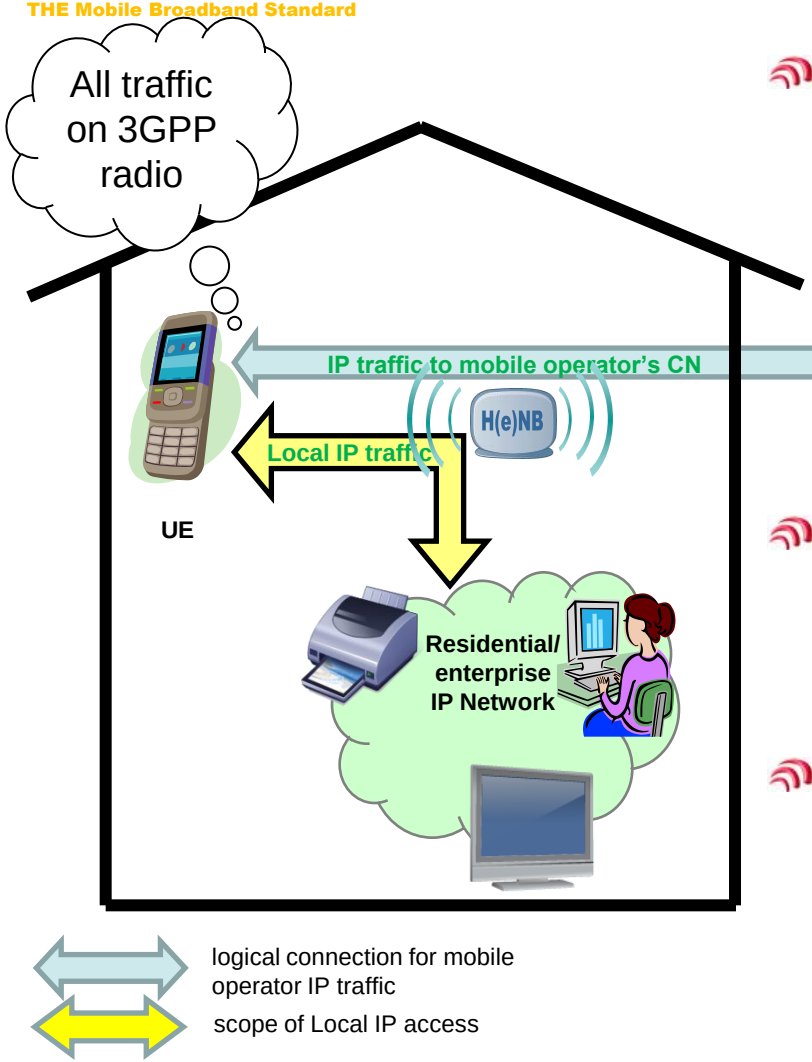
- Flat Packet Switch (PS) only architecture, two network nodes for control plane
- Security mechanisms to facilitate various traffic cases
- GTP and PMIP roaming interfaces (S5/S8)
- Optimised interworking with legacy cellular systems
- Various ways to combine or split traffic off at various points
- Advanced policy-functions in network as well as in terminals
- Interworking with non-3GPP access technologies
- Facilitate mobile as well as fixed networks

Network optimised for IP traffic

- Dual-stack IPv4/6 connectivity
- Terminals as well as network can influence the QoS
- Operators can influence the selection of access by ANDSF
- Various ways to combine or split traffic off at various points
  - Local IP Access (LIPA)
  - Selective IP Traffic Offloading (SIPTO)
  - WLAN offloading
  - Multiple PDN Connections to Same APN (MUPSAP)
- CS traffic is still supported ...

Local IP Access (LIPA)

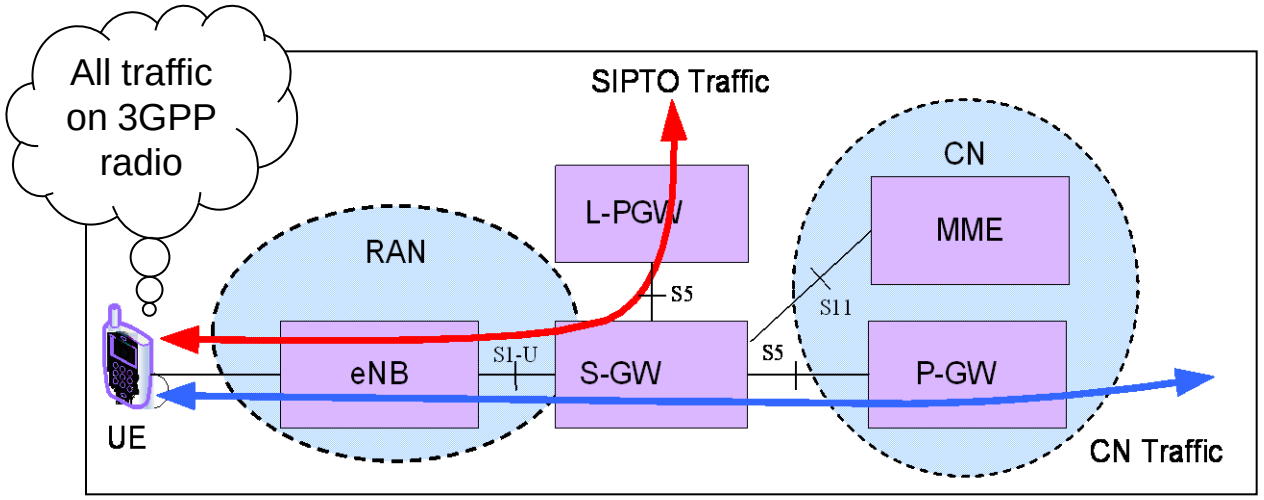
A GLOBAL INITIATIVE



- LIPA is primarily for end user's benefit, to allow access to local residential or corporate network through a 3GPP device
- LIPA provides access for IP capable UEs that are connected via a H(e)NB subsystem to other IP capable entities in the same residential/ enterprise IP network.
- Simultaneous access from a UE to the mobile operator's core network and Local IP Access to a residential/enterprise IP network will be supported.

Selective IP Traffic Offloading (SIPTO)

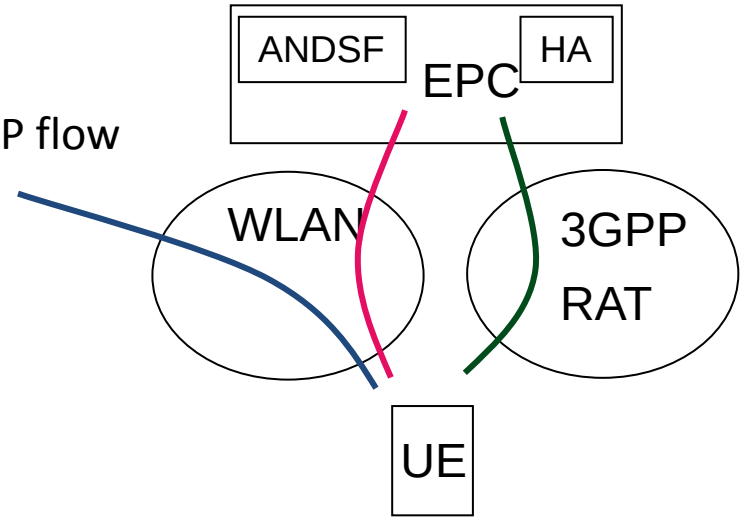
- Optimising “cost per bit” is becoming essential in the “flat rate” era
- SIPTO is a specific routing scenario within the operator’s network, allowing *selective* offloading of the traffic away from the Evolved Packet Core network
- SIPTO benefits the cellular operator and it is transparent for the end user
- SIPTO is intended for allowing cost optimized handling of the internet traffic that is not intended for the operator’s core network
- Local GW is selected for the traffic to be offloaded



THE Mobile Broadband Standard

WLAN Offloading

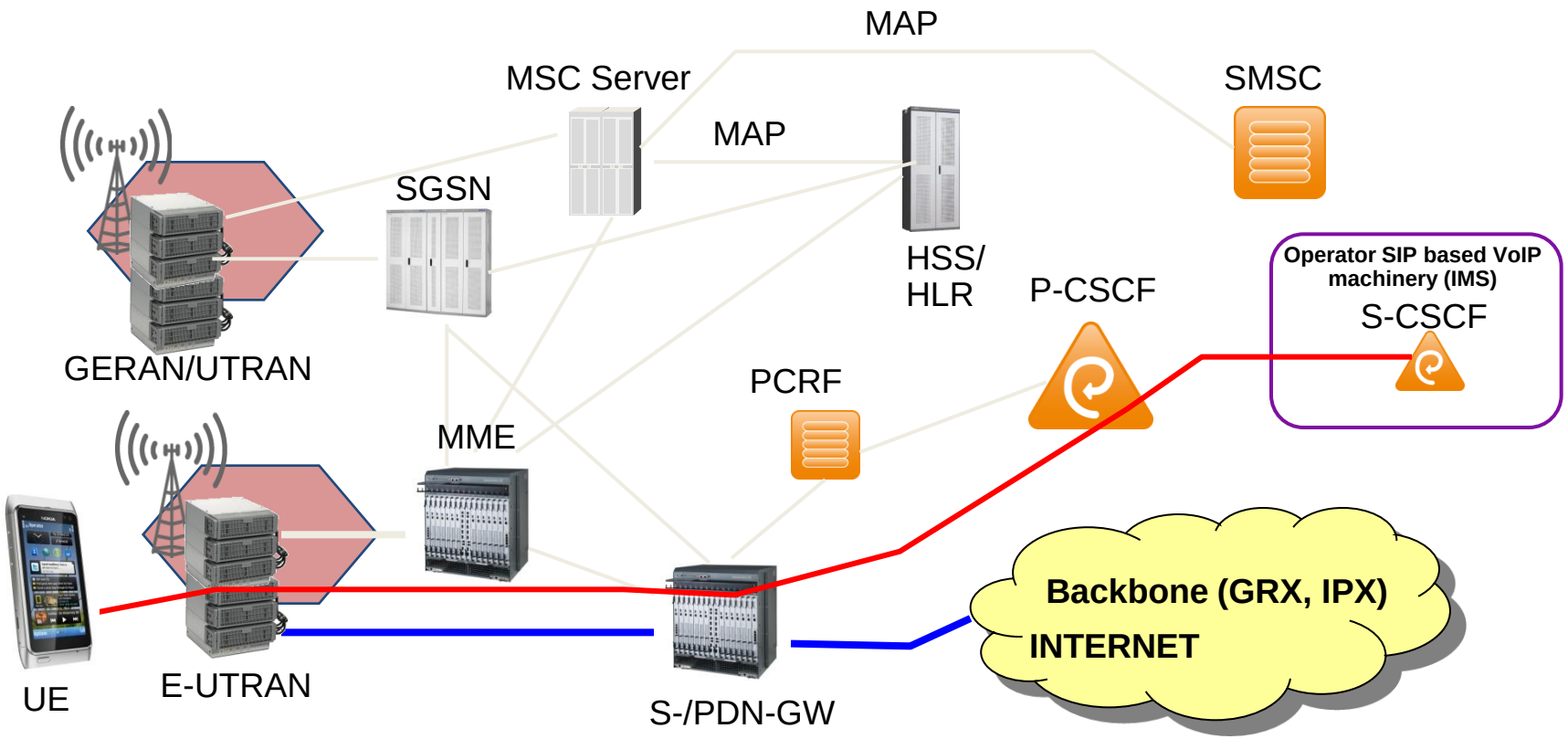
- WLAN offloading refers to the dual radio scenario where part of the traffic is routed via WLAN access and part via 3GPP access
- WLAN offloading covers both the scenario where the traffic via WLAN radio is anchored in the EPC (i.e., seamless offloading) and the scenario where it is not anchored (i.e., non-seamless offloading)
- Access Network Discovery and Selection Function (ANDSF) is there to provide the UE with the access network discovery information and the policy on how to use the available access networks
  - Available access networks
  - Preferred routing of the traffic per APN, per IP flow



Voice over both CS and PS - the LTE voice solution

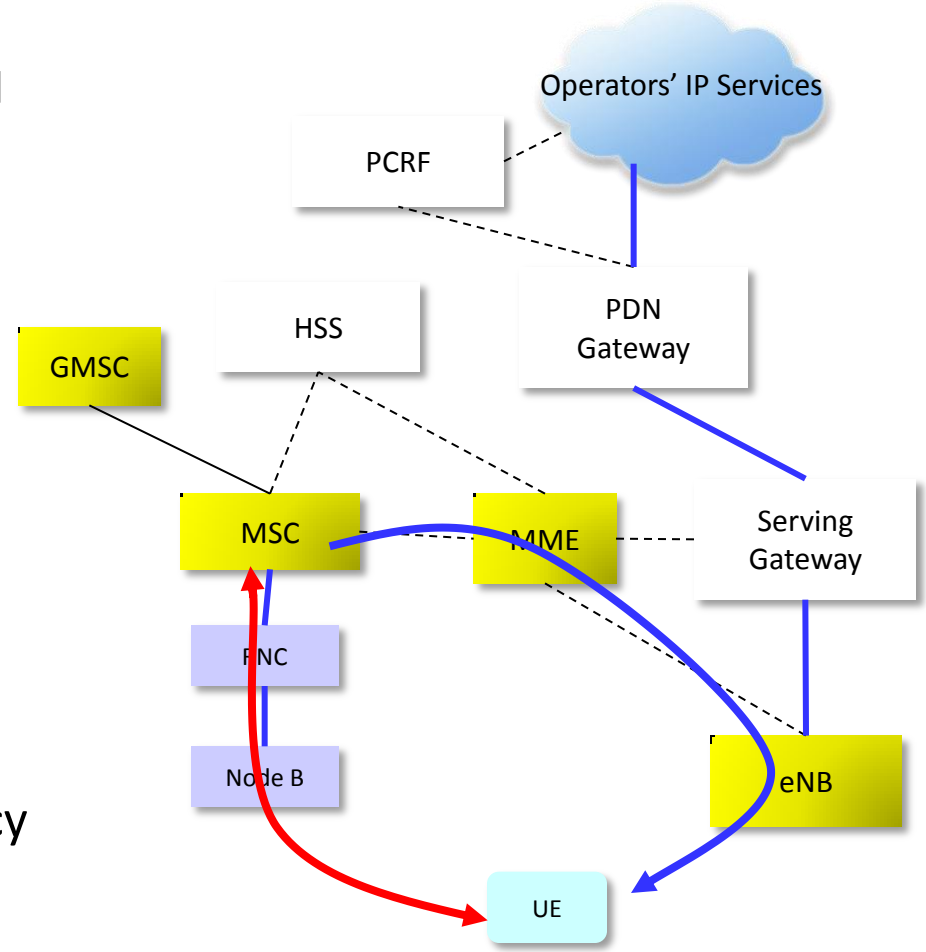
- CS and PS voice service capabilities
- CS and PS voice service architecture
- Multimedia telephony (MMTEL)
- CS FallBack (CSFB)
- Single Radio Voice Call Continuity (SRVCC)
- Emergency calls in LTE

CS and PS voice service architecture



CS Fallback in EPS

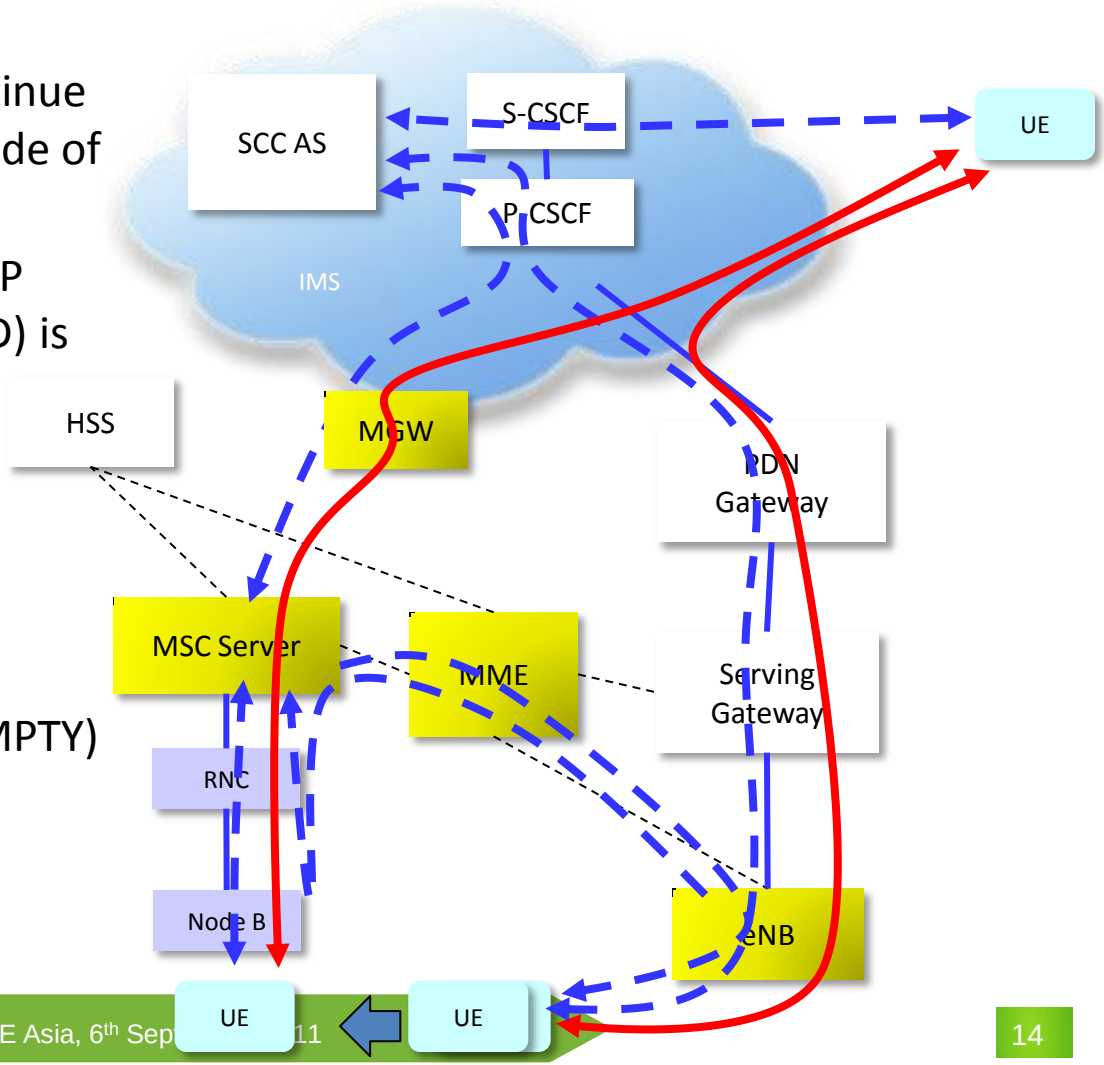
- Application of CSFB:
  - CS capable device camping on LTE cell can establish/receive CS services
  - Reuse of existing CS infrastructure for voice service until IMS VoIP is deployed
  - Provide voice roaming support with LTE
  - Can support emergency calls using existing CS infrastructure
- SMS can be delivered to the UE without redirecting to CS Domain
- After CS service the UE returns to LTE, depending on coverage and policy



Single Radio Voice Call Continuity

SRVCC use case:

- IMS call initiated in LTE can continue in CS domain after moving outside of LTE coverage area
- SRVCC is invoked if no other VoIP capable PS system (HSPA/eHRPD) is available for VoIP PS-PS HO
- Requires overlapping with GSM/WCDMA/1xRTT coverage



SRVCC improvements:

- Mid-call services (like HOLD & MPTY)
- emergency calls
- video calls

Future plans, Rel-11 and beyond thoughts & opportunities

A GLOBAL INITIATIVE

- Multiple accesses
- Multiple technologies
- Network sharing
- National roaming
- Deployment scenario aspects

Deployment scenario aspects

- LTE can co-exist alongside other technologies in multiple configurations
  - Evolutionary approach to upgrade of networks and migration from 2G/3G networks
- LTE overlapping with 2G/3G, data only
  - Saturation of fixed internet subscriptions and growth of mobile subscriptions requires faster mobile connections
  - Decline of fixed subscribers and growth of mobile internet subscribers
- LTE with speech and multimedia support
  - Voice and Multimedia solution for LTE is IMS
  - Rel-9 supports full speech call service in IMS
  - GSMA has published a global solution for VoLTE
  - Regulatory emergency call and public warning system PWS support
  - Comprehensive set of supplementary services over IMS
- Re-farming of 2G/3G legacy frequencies for LTE use
  - Requires voice call continuity between 2G/3G and LTE in both directions
- Femto-cells implemented in 3GPP via Home Cells (NodeB and eNodeB)

Thank You

Atle Monrad

3GPP TSG CT chairman

+47 454 10 665

atle.monrad@ericsson.com

More Information about 3GPP:

www.3gpp.org

contact@3gpp.org