



# Key drivers for LTE success: Services Evolution

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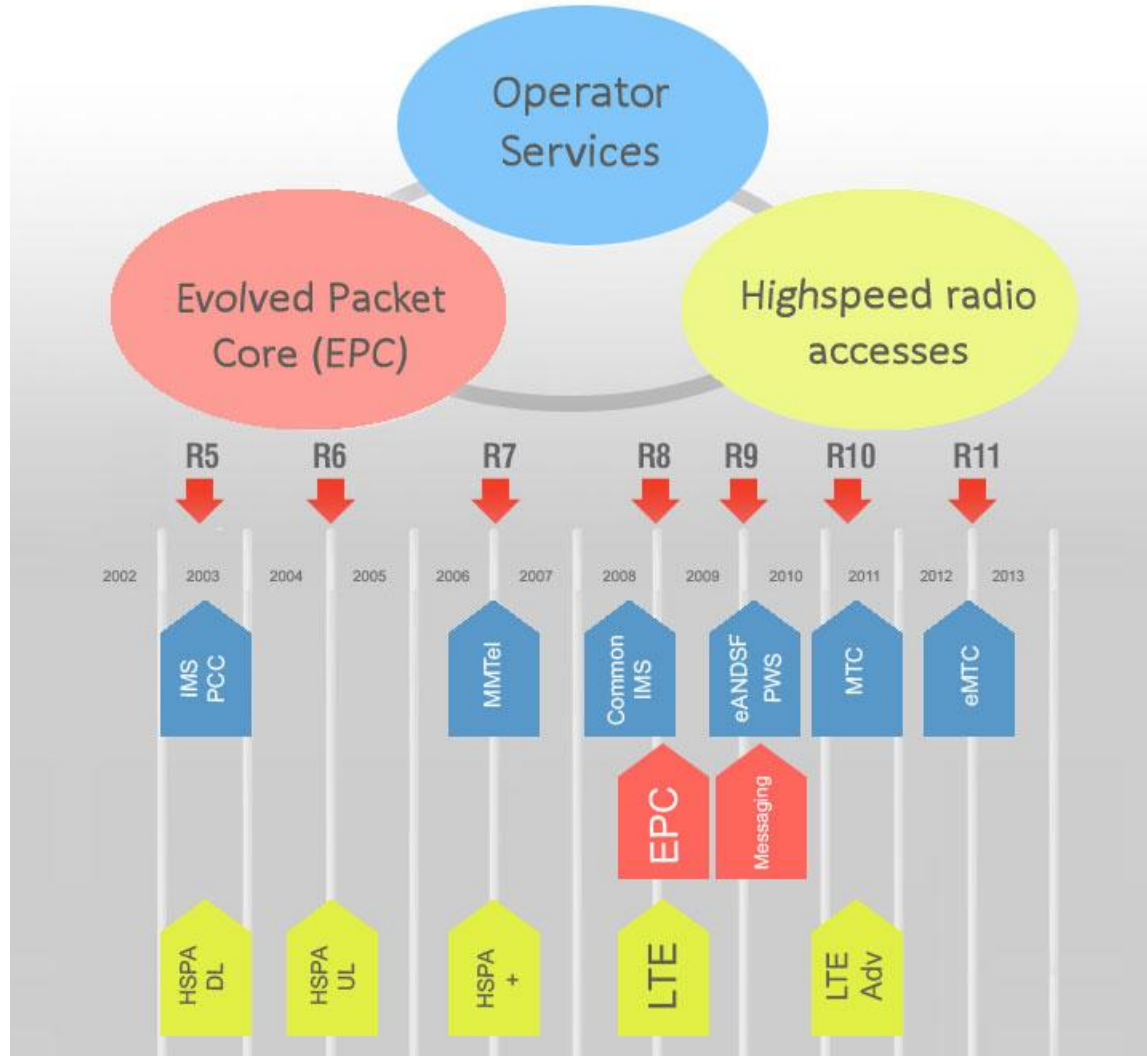
# Outline



- 📶 Overall 3GPP work areas
- 📶 IMS – the service platform for operators
  - Multimedia Telephony (MMTel)
- 📶 Policy Control evolution (PCC)
- 📶 Access discovery and selection (ANDSF)
- 📶 Machine Type Communications (MTC)
- 📶 Device-to-device communication (D2D)
- 📶 Regulatory features (disaster warning, emergency calls, priority service)
  - Public Warning System (PWS)
  - Priority Services



# Overall 3GPP work areas



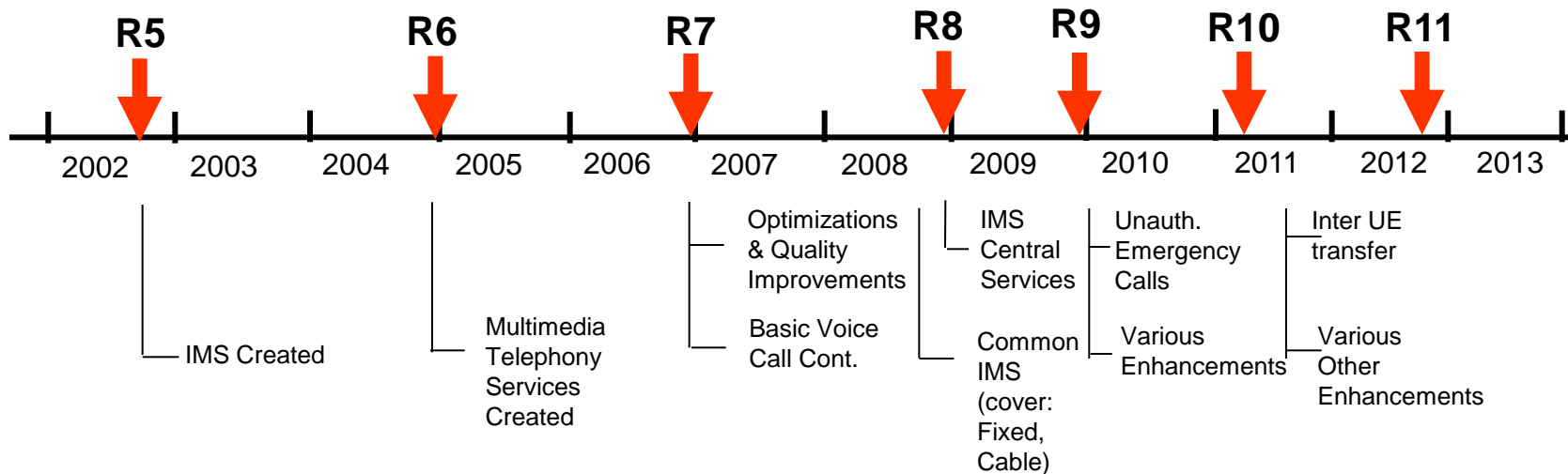


# IMS and its evolution (1/2)



 Basic IP Multimedia standards have been available since 2003

- Gradual addition of functions has created a carrier grade service platform





## IMS and its evolution (2/2)



### Work still ongoing on operational-related aspects

- Jointly with the GSM Association on aspects of interconnect, roaming and charging
- Local Breakout is utilized for connecting IMS media
  - Optimized media path is important to reduce cost
- Legacy Charging Accounting and Interconnect principles should be re-used

### Location requirements being addressed

- Authorities in many countries require network-authenticated location information stored for certain sessions (e.g. for court cases)
- Standards are being developed to address this



# SMS and Messaging over LTE



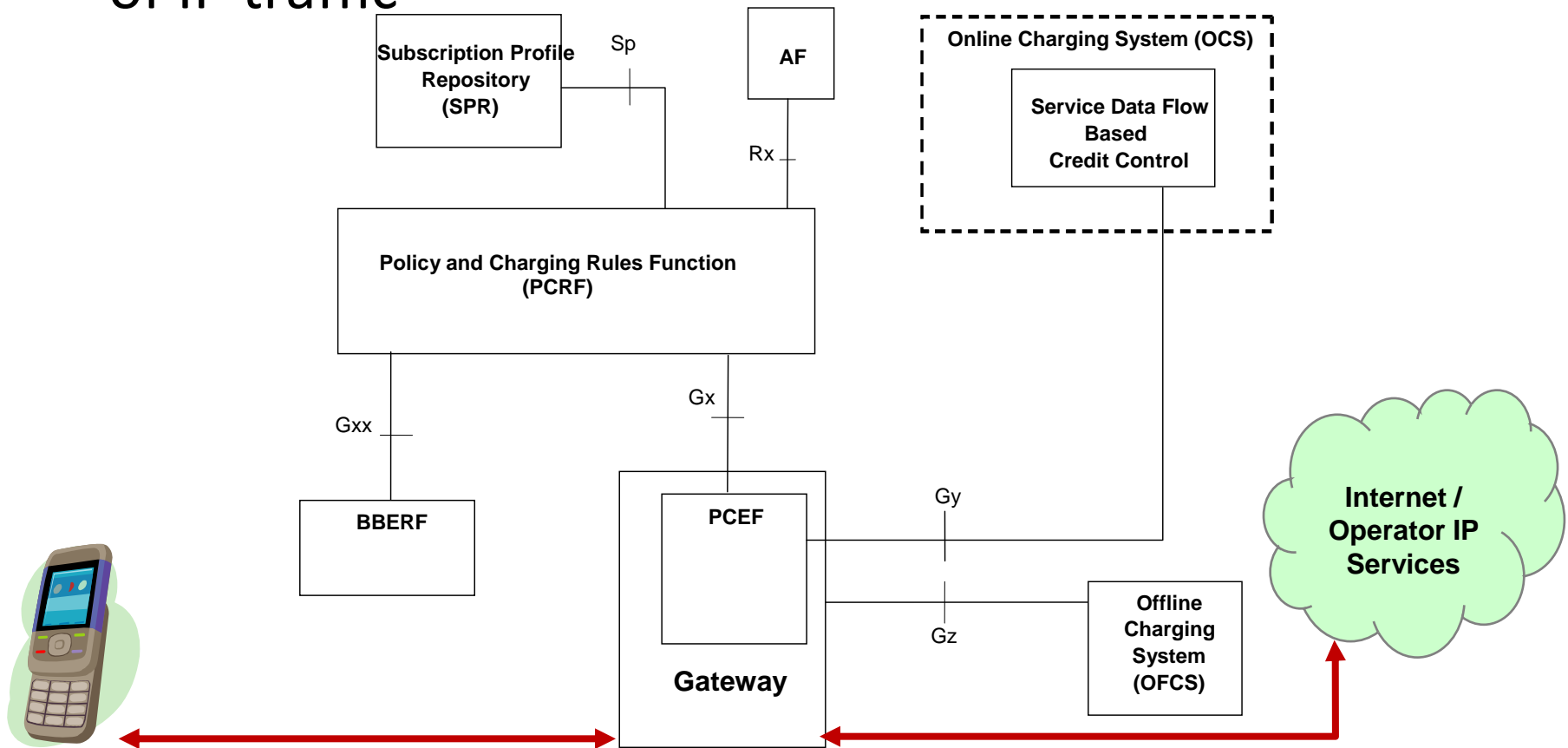
- LTE is packet only and hence does not natively support legacy SMS
  - IMS based messaging may not be available at initial LTE deployments
- ➔ Standards were developed to deliver legacy SMS over LTE
- A device that is attached both to LTE and 2G/3G can send and receive legacy SMS over the legacy CS core network
  - Enhancements to the necessary interfaces were defined to pass SMS between legacy CS core and EPC/LTE



# Policy Control (PCC)



 The PCC framework allows QoS and Charging control of IP traffic





# PCC evolution







- 📶 The PCC framework has been further enhanced to give operators an even wider range of control tools
- 📶 Support for sponsored data connectivity has been added
- 📶 Service awareness, deeper lookup of packets is also supported
- 📶 Handling of privacy policies has been standardized





# Access Discovery and Selection (ANDSF)





-  EPC is a multi-access IP core system supporting both native 3GPP cellular radio technologies and other IP access systems (802.x, etc...)
  
-  Legacy selection mechanisms have been available to choose a 3GPP cellular radio and PLMN
  
-  Additional standards were developed to take into account non-3GPP access technologies
  - Access technology policies are uploaded to the device using Device Management procedures
  
-  Further work ongoing to fine-tune the granularity of the policies



# Machine Type Communications (MTC)



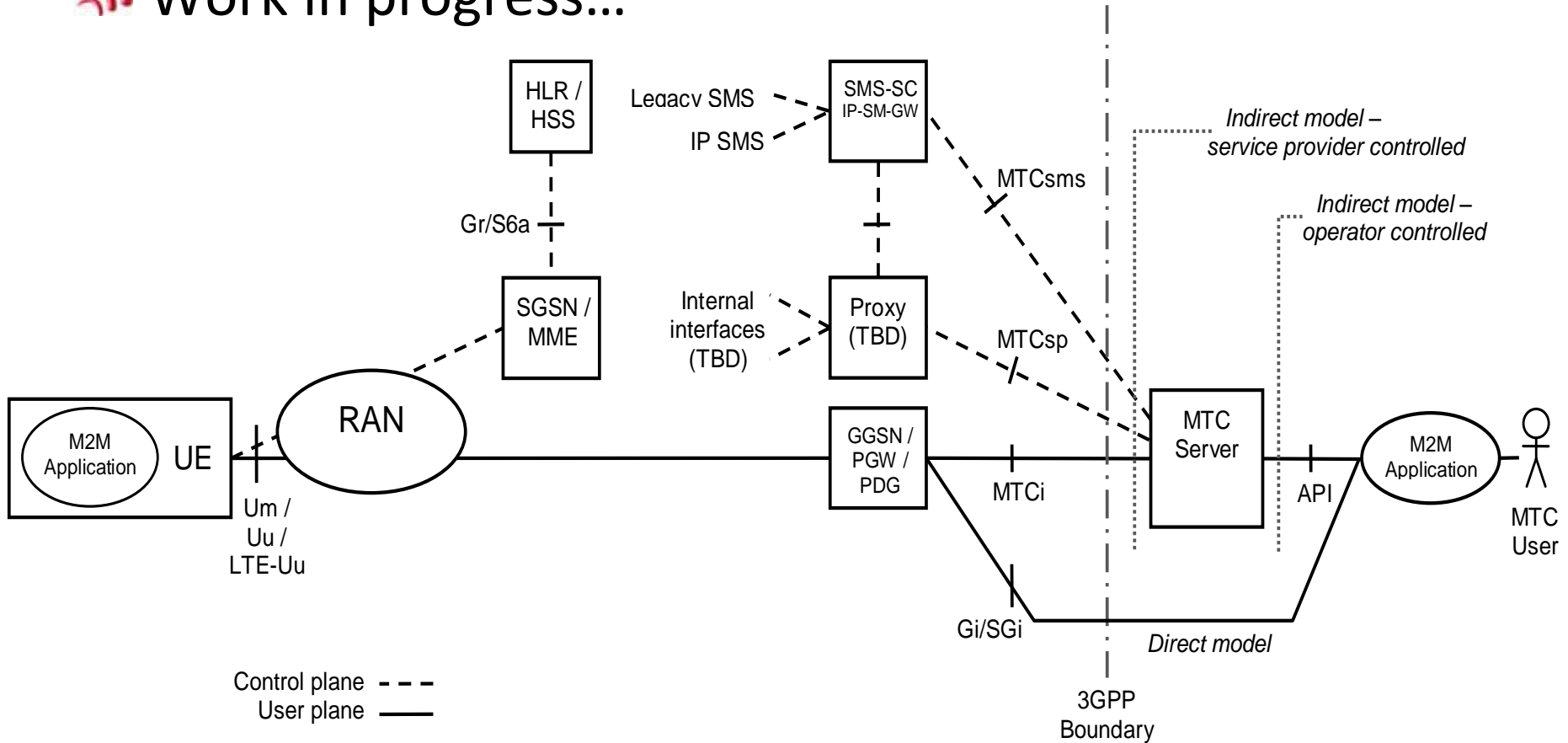
-  M2M is recognized as a key segment in future packet networks
-  Initial 3GPP efforts have focused on the ability to differentiate machine-type devices
  - This allows the operator to selectively handle such devices in overload situations
    - Low priority indicator has been added to the relevant UE-network procedures
    - Overload and Congestion control is done on both core network and radio access network based on this indicator



# MTC – basic architecture



 Work in progress...





# Evolution of MTC



 Further functionality being added to 3GPP standards in the following areas

- Reachability Aspects, MTC Feature control, Device Triggering
- Addressing, Identifiers - especially removal of MSISDN dependencies in the architecture
- Signaling Optimizations
- Small Data Transmissions
- MTC Monitoring
- ....

 MTC is a substantial technical area, full completion will span across multiple future Releases



# Device-to-device Communication (D2D)




- Proximity-based applications and services represent a recent and enormous social-technological trend
  - These applications and these services are based on the awareness that two devices or two users are close to each other
  - Awareness of proximity carries value, and generates demand for an exchange of traffic between them
- Direct D2D communication is also essential for public safety services
  - e.g. in case of lack of network infrastructure in disaster situations)
- 3GPP has initiated work on enhancing the LTE-EPC platform to support these capabilities



# Regulatory features – disaster response



 Recent events have brought the different disaster response functions of the 3G/4G networks to the forefront

- Public Warning System (PWS) provides a secure framework for delivering Warning Messages to the devices
  - The Japanese version of this system saved thousands of lives in the recent earthquake/tsunami disaster
- Priority Services
  - Mechanisms have been standardized to allow priority access to the network services (voice calls, Internet, multimedia calls, etc...) for e.g. government officials in the event of a mass disaster



# Thank You



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