

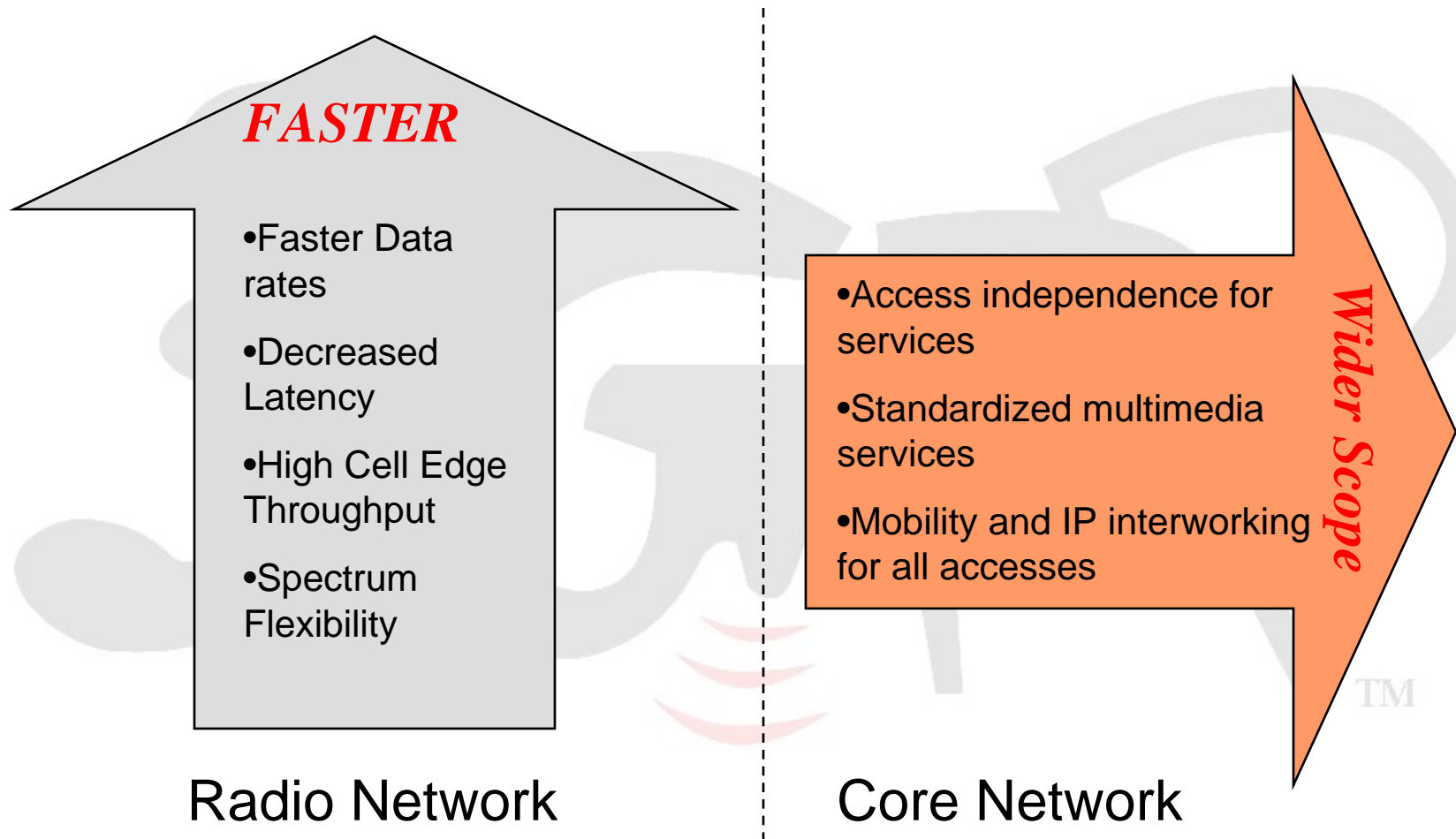
A man and a woman are sitting at a table, looking at a laptop screen. The man is on the left, wearing a white shirt, and the woman is on the right, wearing a brown jacket. They are both smiling and appear to be in a meeting or collaborative work environment. There are coffee cups and a glass of water on the table.

# ***3GPP System Architecture Evolution***

***ATIS LTE Conference  
January 26, 2009***

**3GPP TSG SA Chairman  
Stephen Hayes**

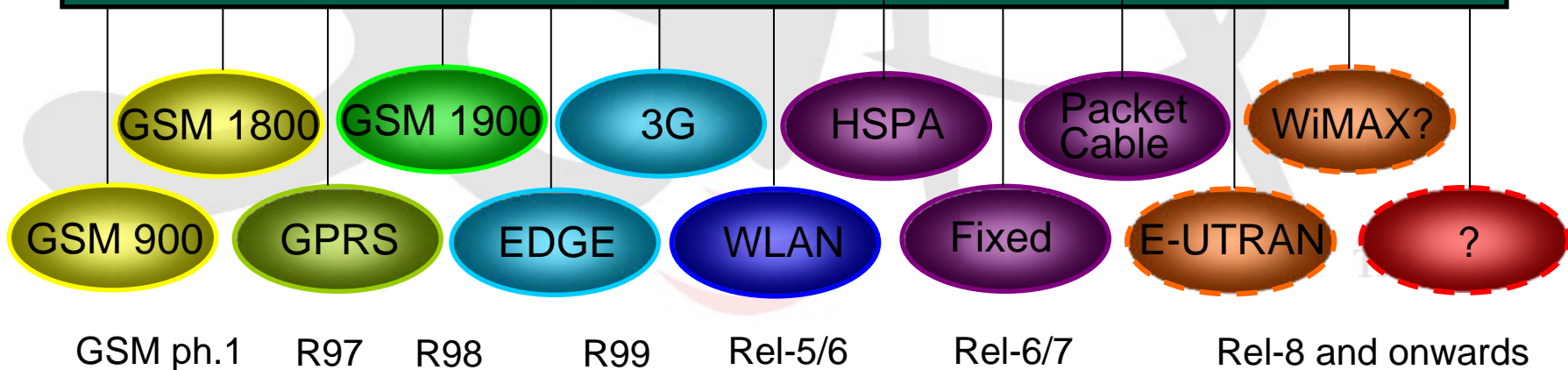
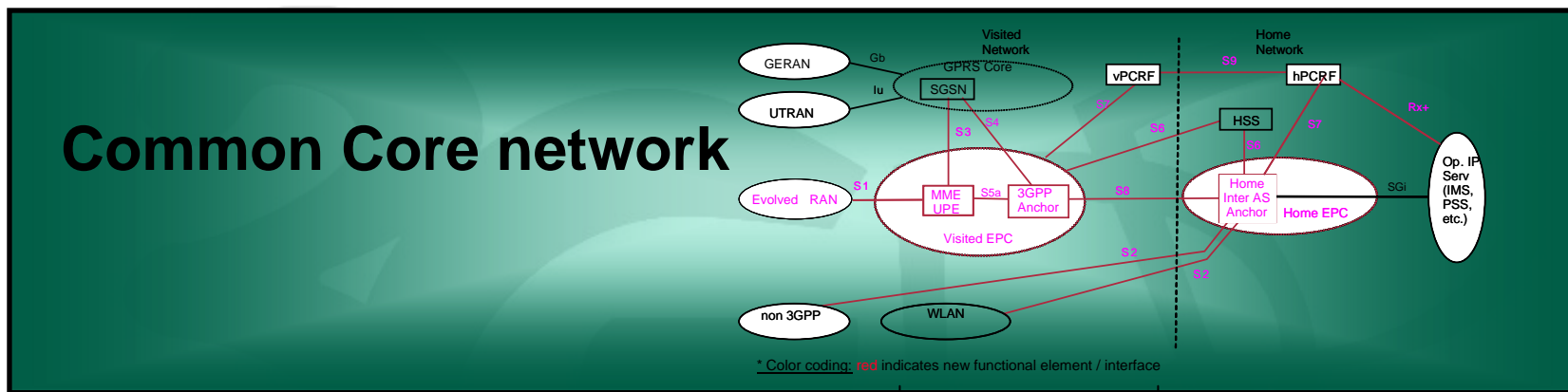
# 3GPP Directions



# From GSM to multi-access



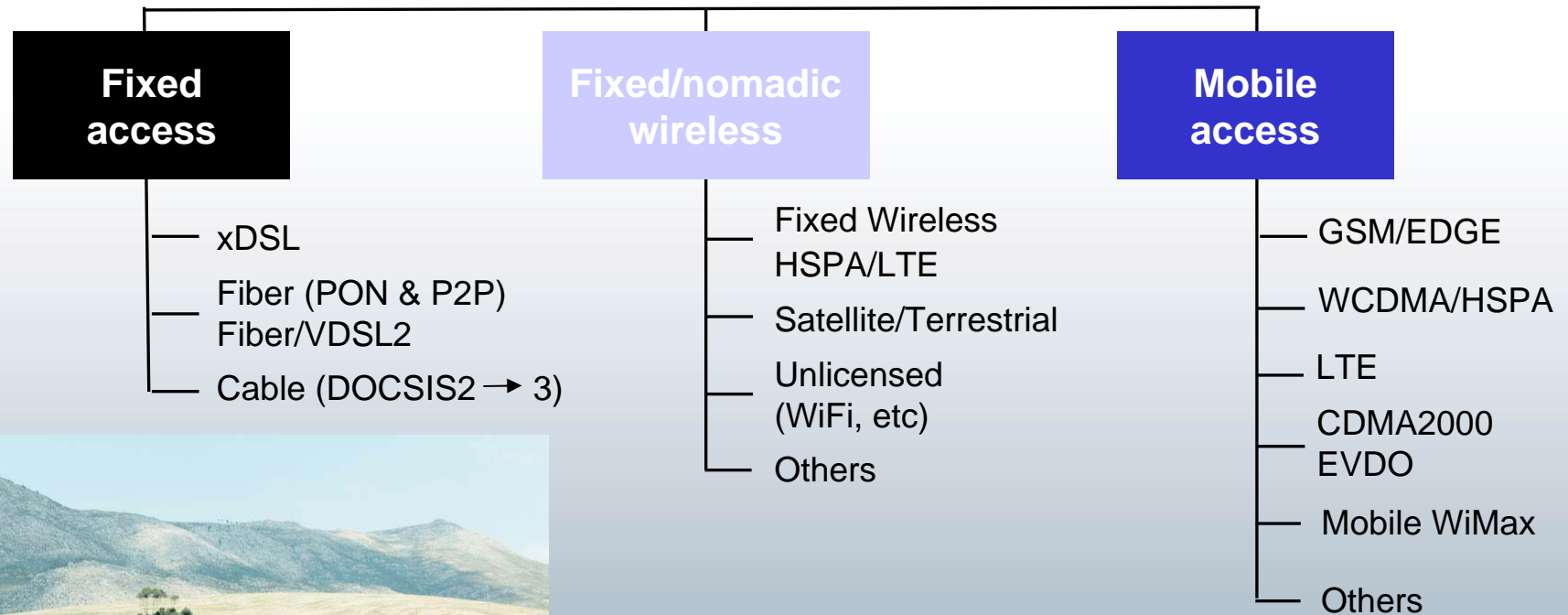
*Continuous improvement of access technologies*  
*Provision of services over any access network*



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# Broadband Accesses

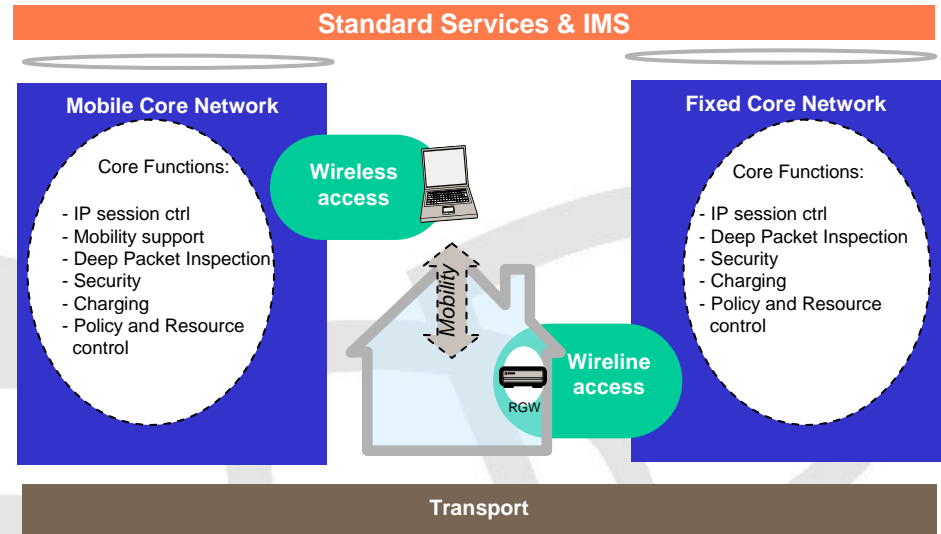
*They come in many flavors*



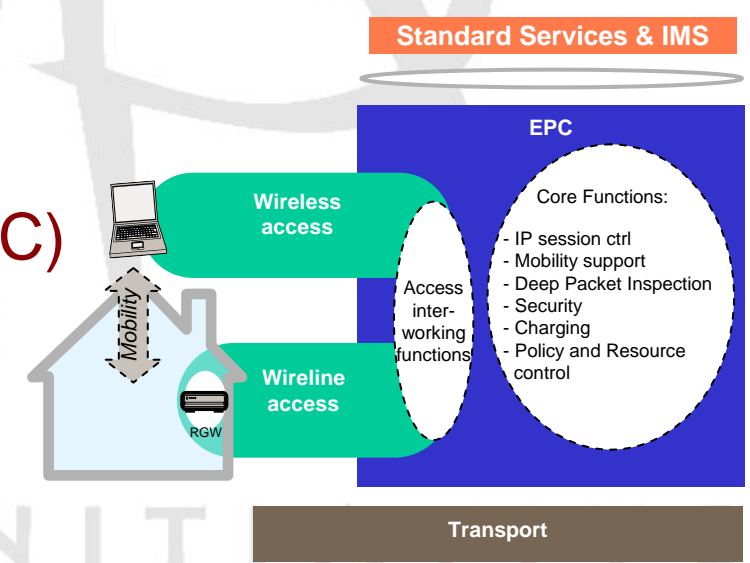
The borderline between fixed and mobile is getting less clear

# 3GPP Approaches to Multi-Access

## Service Convergence using Common IMS

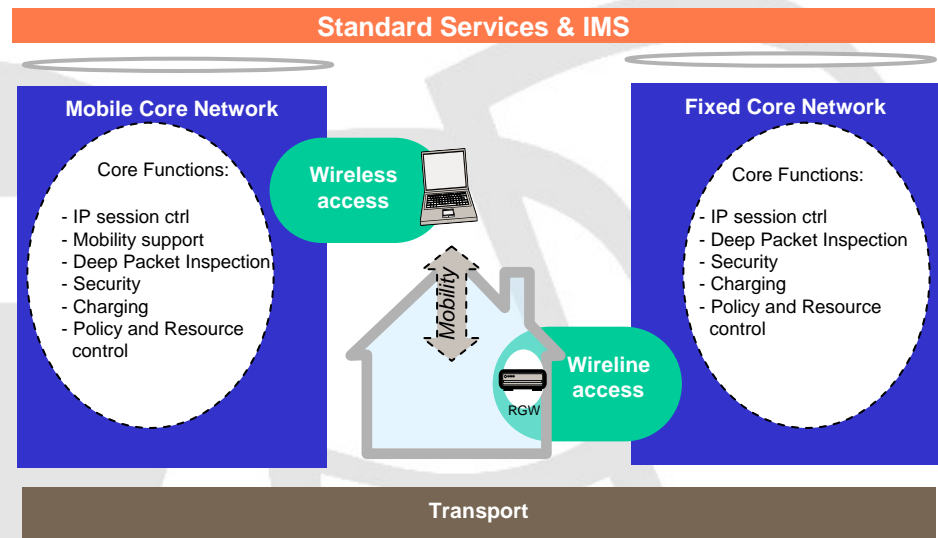


## Session Convergence Using Evolved Packet Core (EPC)



# Service Convergence

## Service Convergence using IMS/Common IMS

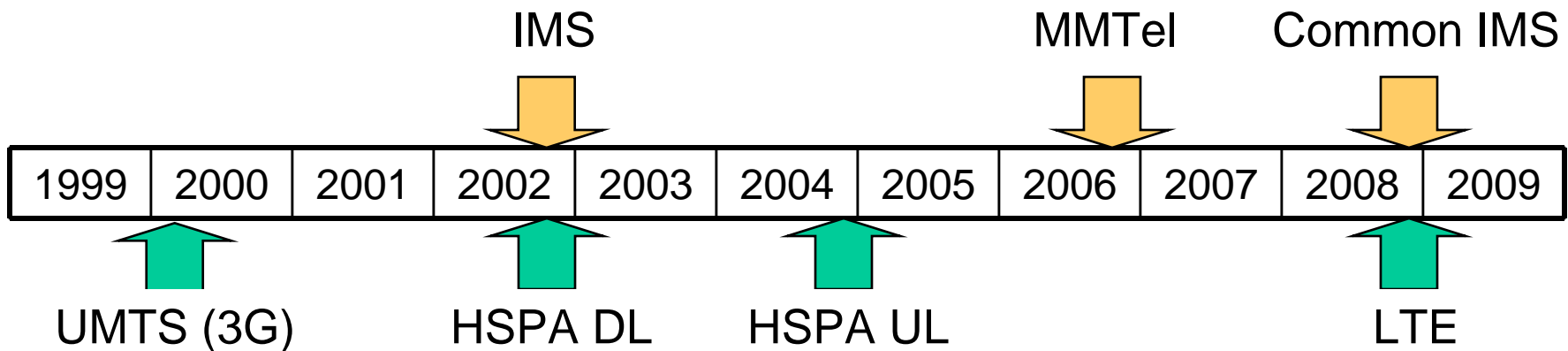


TM

# IMS/Common IMS

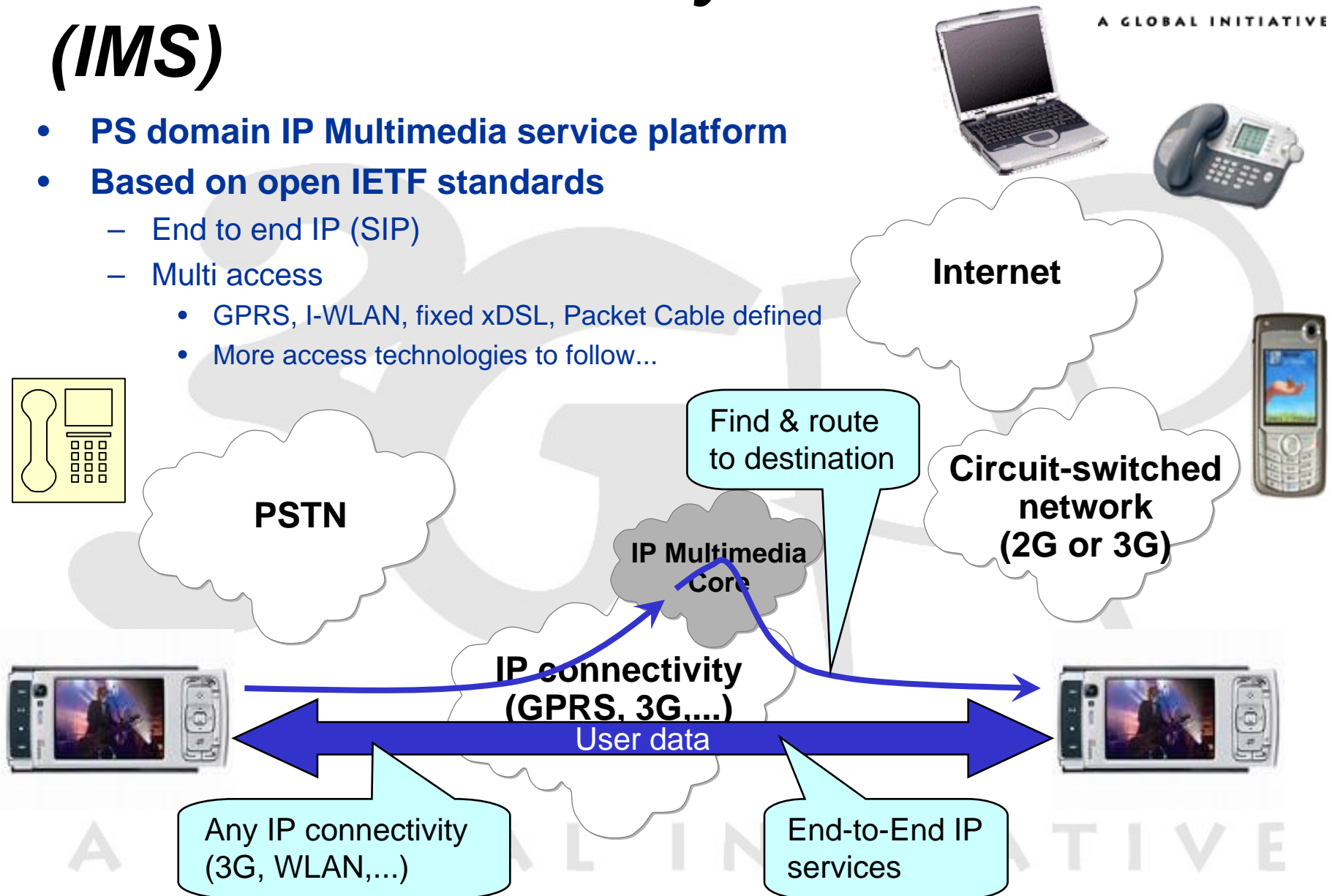


- IMS developed as part of 3GPP Rel 5 as an application development environment
  - Encourage new applications to use environment
  - Greater operator policing than native SIP/SDP
  - Home control allowing customization
- IMS retargeted in Rel 7 for telephony replacement
  - Standardized multimedia suite developed
  - Optimizations to improve performance
  - Access independence
- Common IMS specified in Rel 8
  - Integration of IMS variants and requirements from 3GPP2, TISPAN, and Cablelabs



# IP Multimedia Subsystem (IMS)

- PS domain IP Multimedia service platform
- Based on open IETF standards
  - End to end IP (SIP)
  - Multi access
    - GPRS, I-WLAN, fixed xDSL, Packet Cable defined
    - More access technologies to follow...





# Common IMS



- **3GPP members, 3GPP2, WiMAX forum, ETSI TISPAN and CableLabs contribute to 3GPP common IMS specifications**
  - Different requirements are supported in common implementation
- **All IMS specifications are harmonized to 3GPP specifications**
  - Common parts are defined in 3GPP specifications only
    - Core IMS entities (CSCFs, AS, UE IMS client,...) + agreed common functions
  - Other organisations either reference or re-use 3GPP specification as it stands
  - Any changes or additions in the Common IMS area are made in 3GPP
    - All 3GPP members can contribute on their favourite work items
    - Ongoing work initiated by 3GPP members, CableLabs, 3GPP2 and ETSI TISPAN
  - The scope and coverage of Common IMS have been agreed by the SDOs
- **Common version of IMS specifications in Rel-8**
  - Business or architecture specific additions to 3GPP Common IMS are possible outside the agreed Common IMS area

# Multimedia Telephony Service



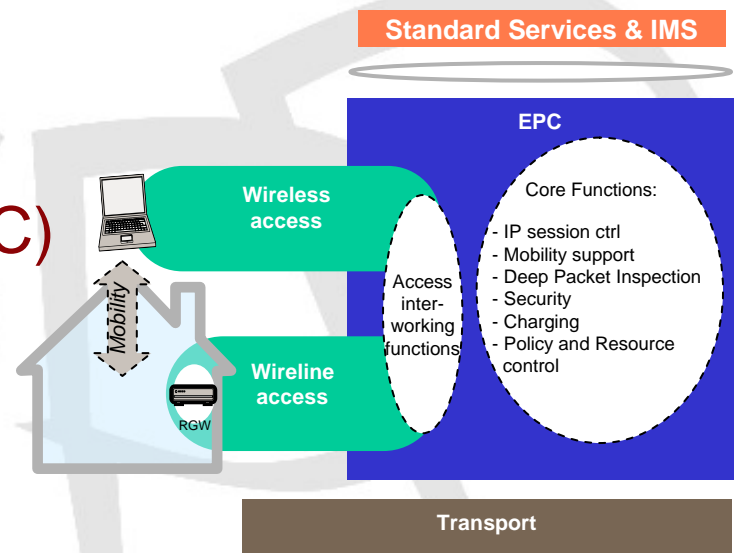
- **Multiple Simultaneous Media Streams**
  - Voice
  - Text
  - Video
  - File Transfer
  - Video/Photo/Audio Sharing
- **Multimedia analogs of traditional PSTN supplementary services**
  - Originating Identification Presentation (OIP)
  - Originating Identification Restriction (OIR)
  - Terminating Identification Presentation (TIP)
  - Terminating Identification Restriction (TIR)
  - Malicious Communication Identification (MCID)
  - Anonymous Communication Rejection (ACR)
  - Communication Diversion (CDIV)
  - Communication Waiting (CW)
  - Communication Hold (HOLD)
  - Communication Barring (CB)
  - Completion of Communications to Busy Subscriber (CCBS)
  - Message Waiting Indication (MWI)
  - Conference (CONF)
  - Advice Of Charge (AOC)
  - Explicit Communication Transfer (ECT)
  - Reverse charging
  - Closed User Group (CUG)
  - Three-Party (3PTY)

# *But what if you need?*

- **Session Continuity**
- **Mobility for non IMS applications**
- **Common IP level services**
  - Filtering
  - Deep Packet Inspection
  - Firewall
- **Common Management**

# Session Convergence

## Session Convergence Using Evolved Packet Core (EPC)



# *Examples of non-IMS apps*



- **Multimedia Broadcast Messaging Service (MBMS)**
- **High Quality Audio**
- **Packet Streaming**

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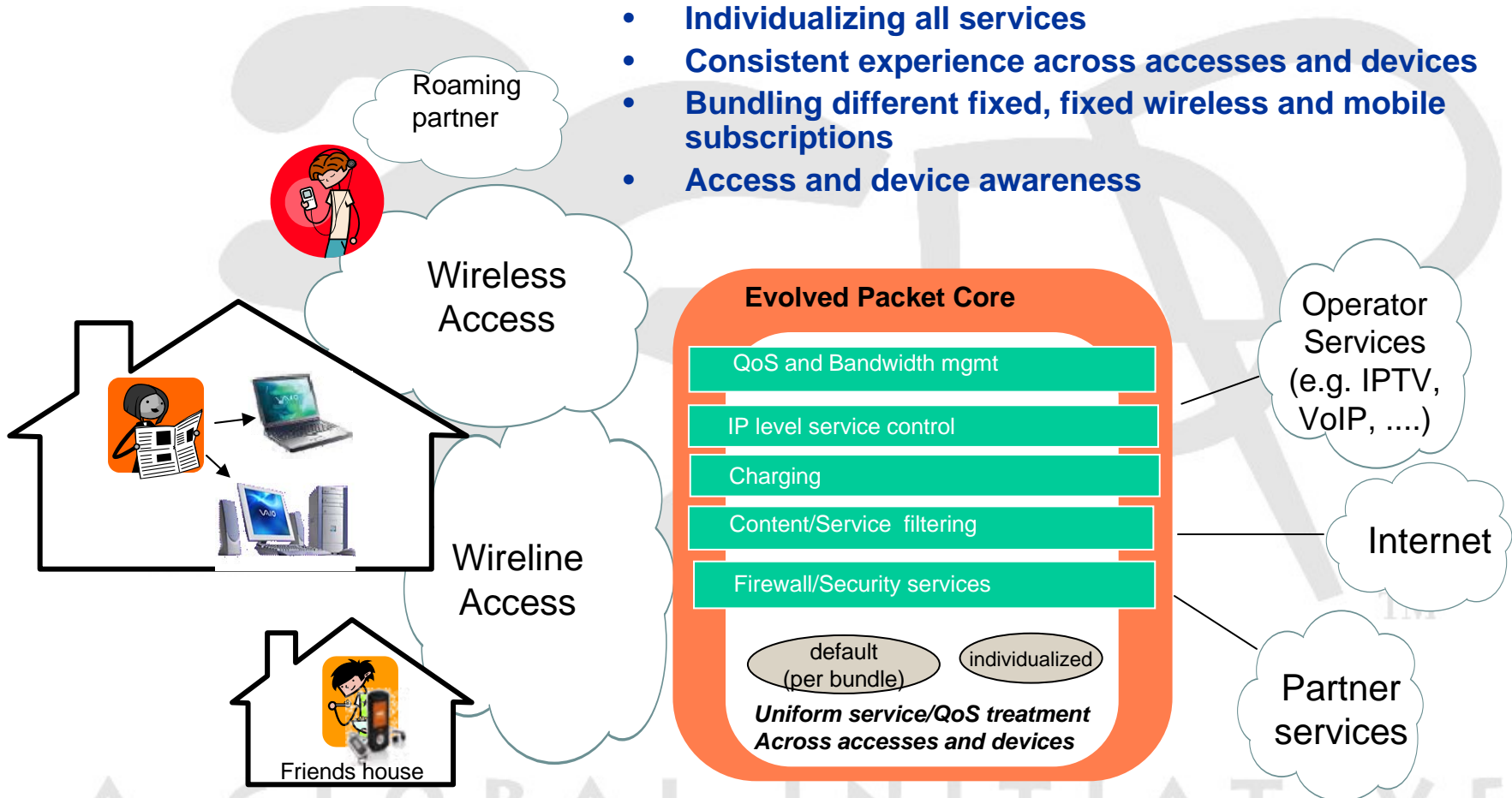
# ***System Architecture Evolution*** **(SAE)**



- **LTE = E-UTRAN = evolved radio network**
  - Megabit class data rates
  - Short delays
  - Short transition from idle to active
- **SAE = System Architecture evolution**
  - SAE is the project name, the evolved network is called EPC
  - Evolved IP oriented multi access architecture
- **E-UTRAN integrates only to SAE, A/Gb or lu not possible**
- **Strongly IP based PS only network**
- **EPC covers both 3GPP and non-3GPP access technologies**
- **Seamless roaming between E-UTRAN, 2G and 3G (tight interworking)**
- **Loose interworking with non-3GPP accesses**
- **GTP solution for intra-3GPP mobility and IETF based solution for non-3GPP mobility**
  - The main Architecture specifications 23.401 and 23.402 frozen in June 2008
  - Protocol work is ongoing and frozen with exceptions in December 2008

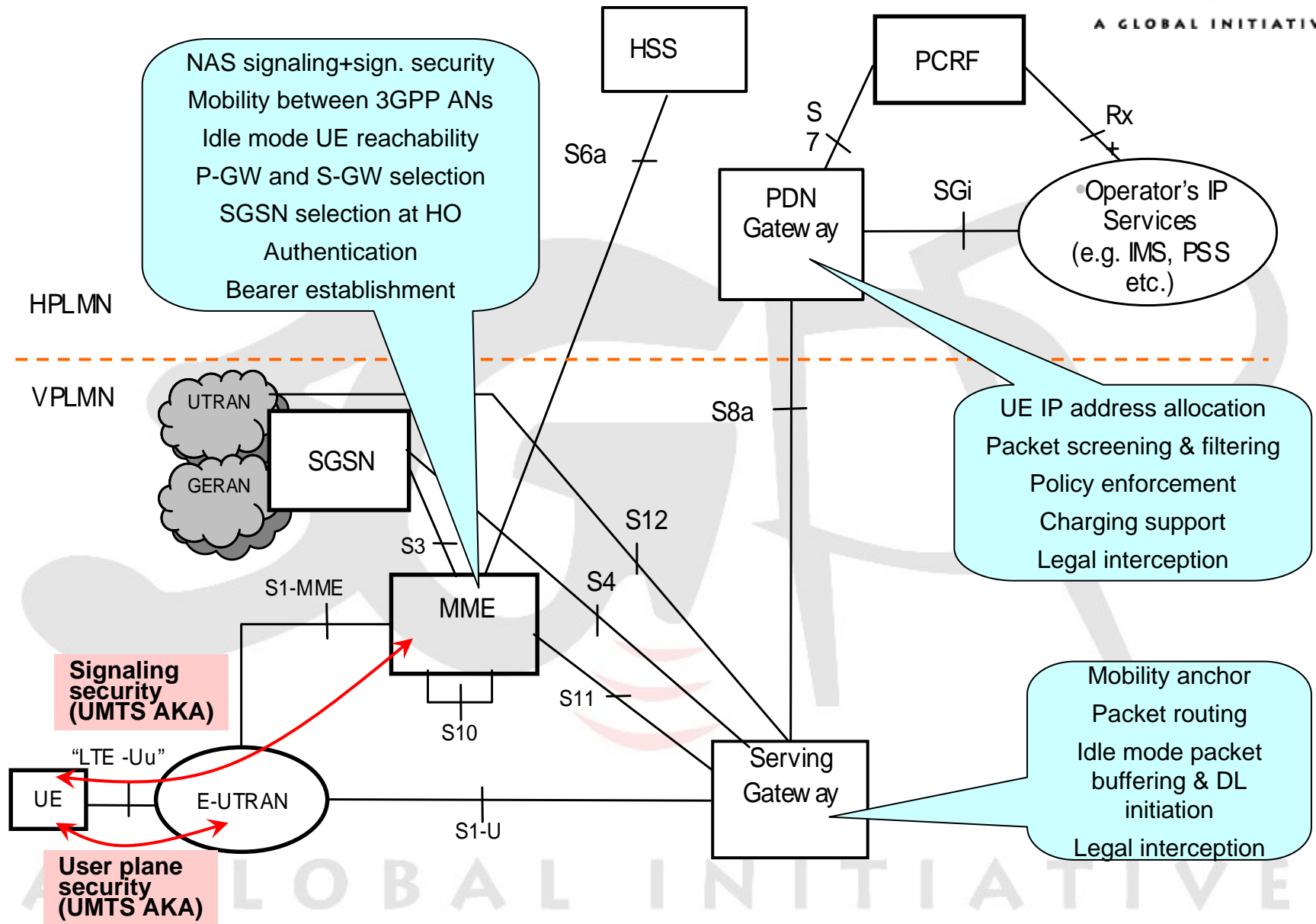
# Convergence Using EPC

- **Mobility and ubiquity adds value to all services**
- **Individualizing all services**
- **Consistent experience across accesses and devices**
- **Bundling different fixed, fixed wireless and mobile subscriptions**
- **Access and device awareness**



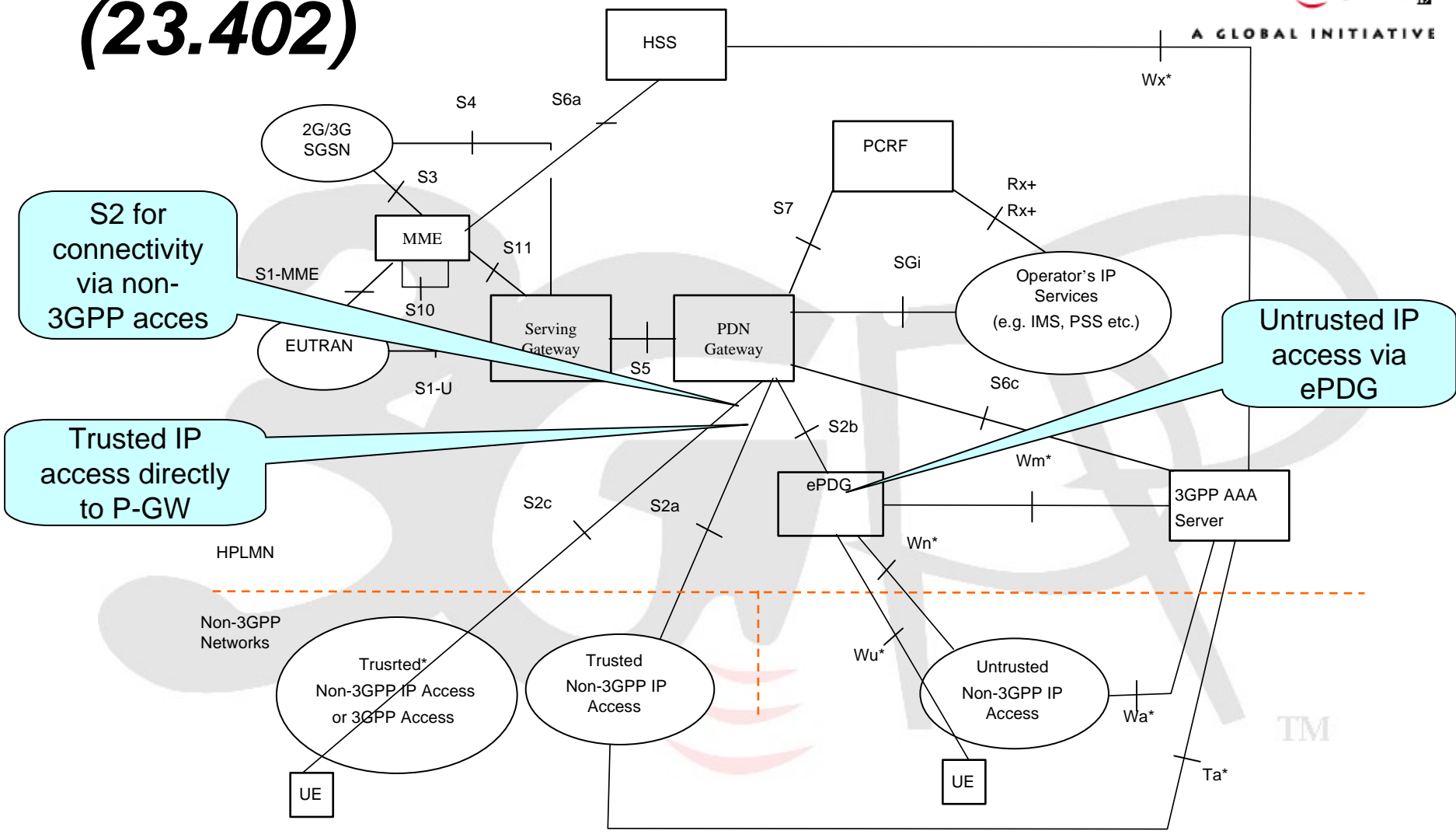
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# SAE architecture (23.401)





# SAE non-3GPP access (23.402)



\* Untrusted non-3GPP access requires ePDG in the data path

# SAE/LTE Deployment



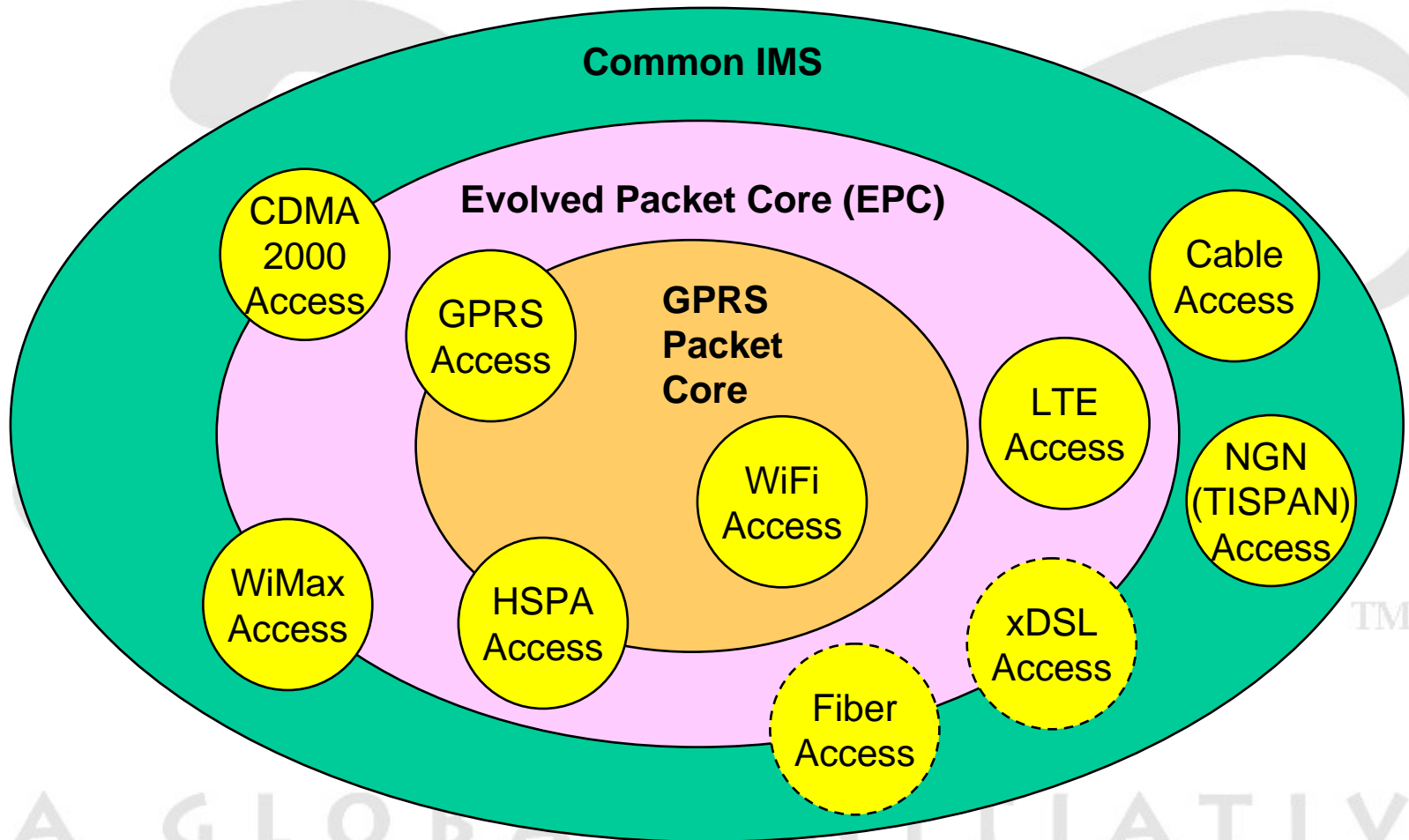
- **Deployments are expected to start with overlapping cellular coverage**
  - E-UTRAN overlapping with legacy 3GPP GERAN / UTRAN coverage
  - E-UTRAN overlapping with legacy 3GPP2 coverage
  - Multi-mode networks and terminals
- **E-UTRAN is a packet-only radio with no CS capacity**
- **Initially E-UTRAN is foreseen as “islands” in the sea of legacy cellular access**
  - Mobility between E-UTRAN and legacy access is required
  - Mobility between PS and CS domains is required
  - Multi-mode terminals expect to use PS coverage where available
  - Desire to keep the connectivity and services

# Other Improvements

- **Continuously Improving Security**
  - EPC requires USIM (or non-3GPP equivalent)
- **Multi-mode terminals and networks**
  - Service continuity
  - Multiple registration
  - Voice Call Continuity
  - CS Fallback
  - Network selection
- **Rel 9 will focus on**
  - Regulatory enhancements to LTE/EPC
  - Home(e) NodeB enhancements to EPC

# Summary – The 3GPP Access Onion

Integration of different accesses at different levels



# Summary

- LTE is only part of what 3GPP works on
- EPC (SAE) is the core network for LTE  
...but
- IMS and EPC (SAE) can be used to provide service and session convergence across a variety of accesses

For further information: [www.3gpp.org](http://www.3gpp.org)