

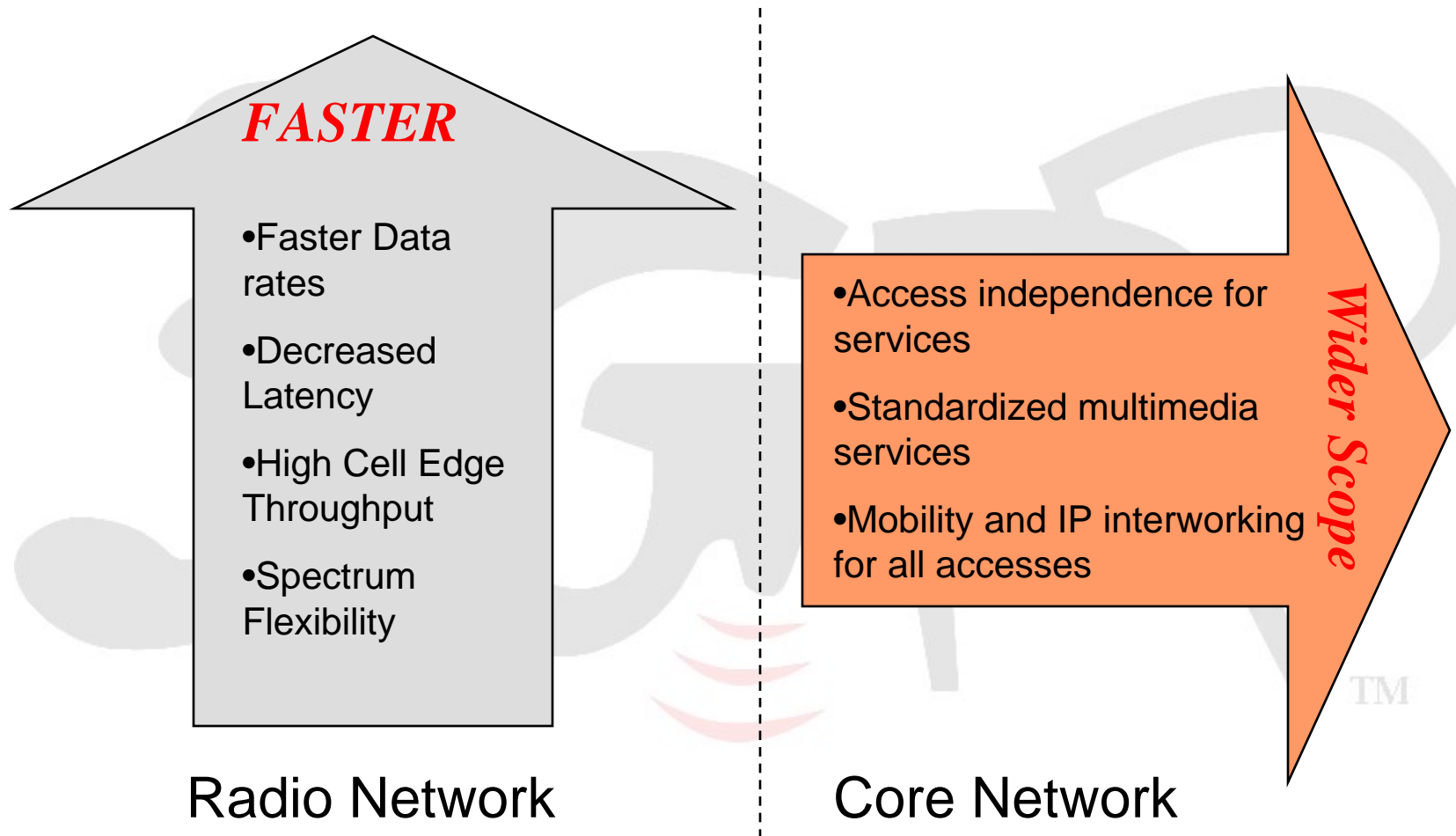
A man and a woman are sitting at a table, looking at a laptop screen. The man is on the left, wearing a white shirt, and the woman is on the right, wearing a brown jacket. They are both smiling and appear to be in a meeting or collaborative work environment. There are coffee cups and a glass of water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

3GPP System Architecture Evolution

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

**3GPP TSG SA Chairman
Stephen Hayes**

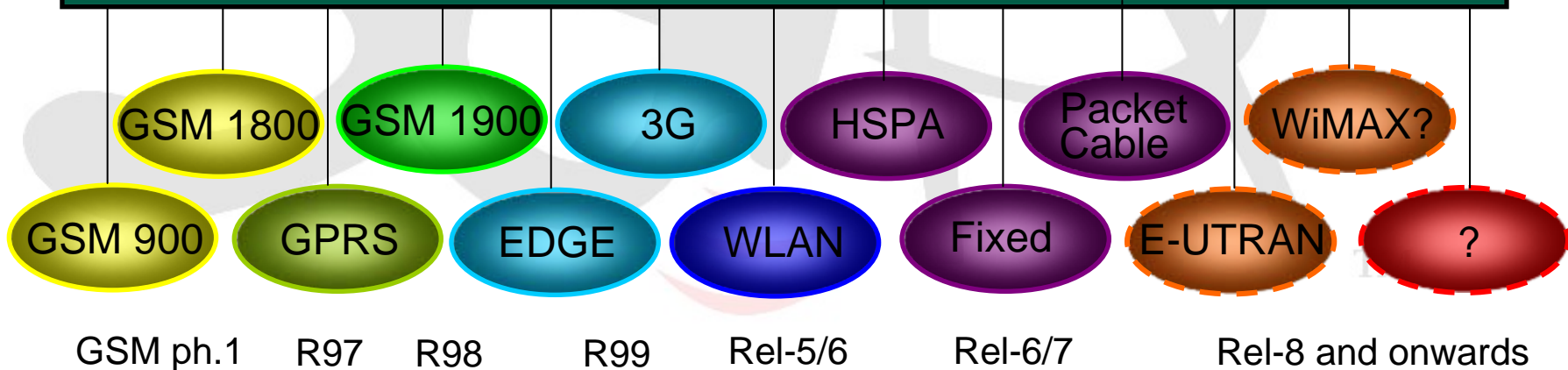
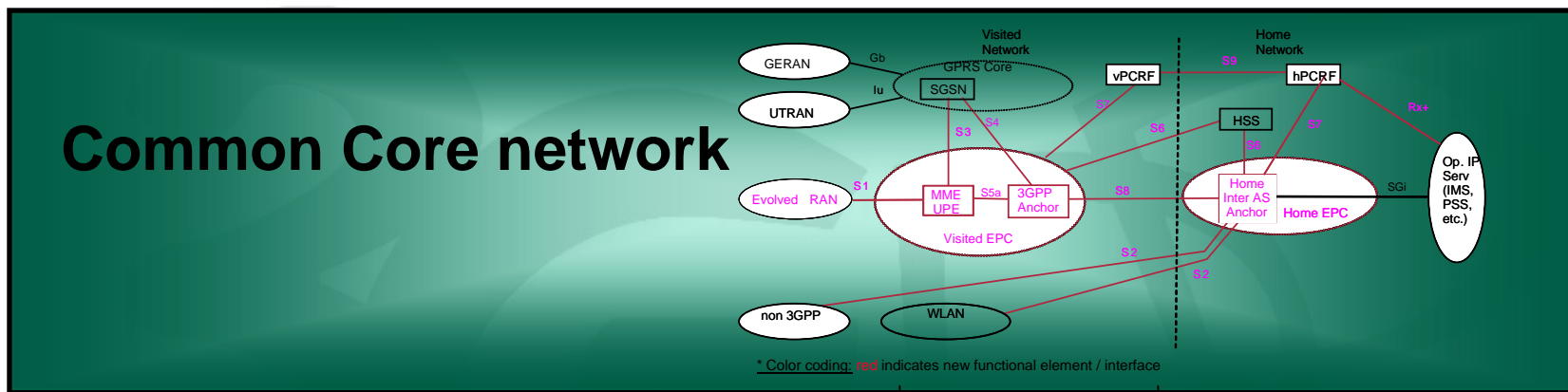
3GPP Directions



From GSM to multi-access



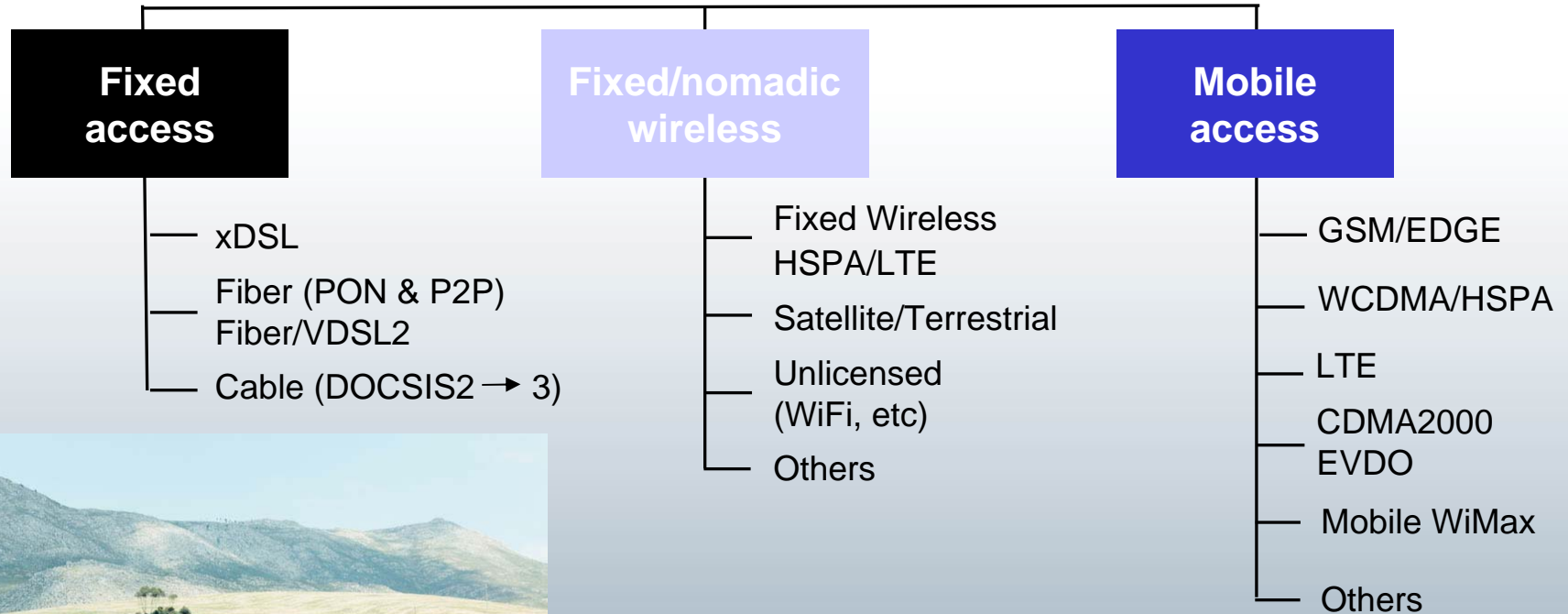
Continuous improvement of access technologies
Provision of services over any access network



A GLOBAL INITIATIVE

Broadband Accesses

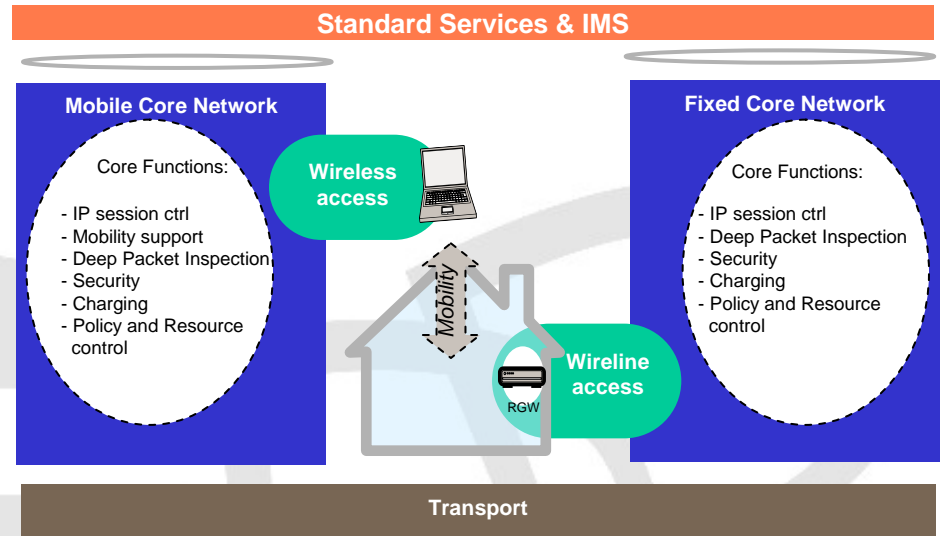
They come in many flavors



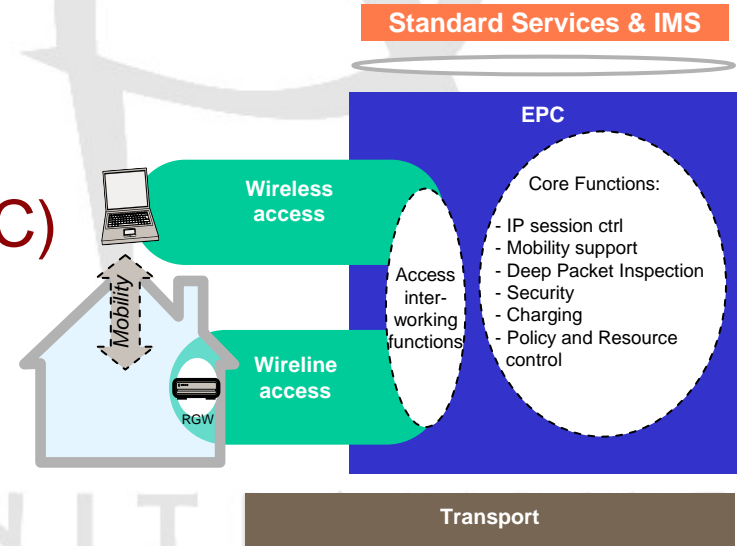
The borderline between fixed and mobile is getting less clear

3GPP Approaches to Multi-Access

Service Convergence using Common IMS

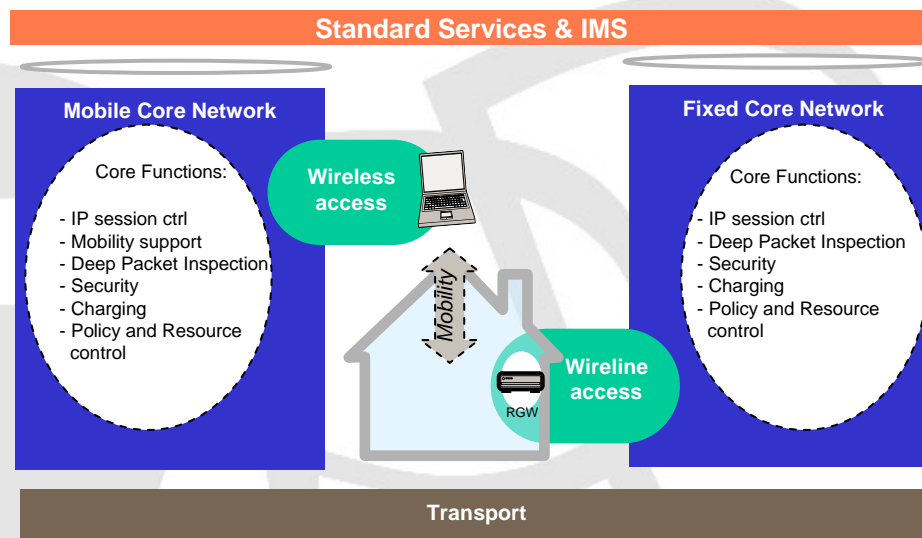


Session Convergence Using Evolved Packet Core (EPC)



Service Convergence

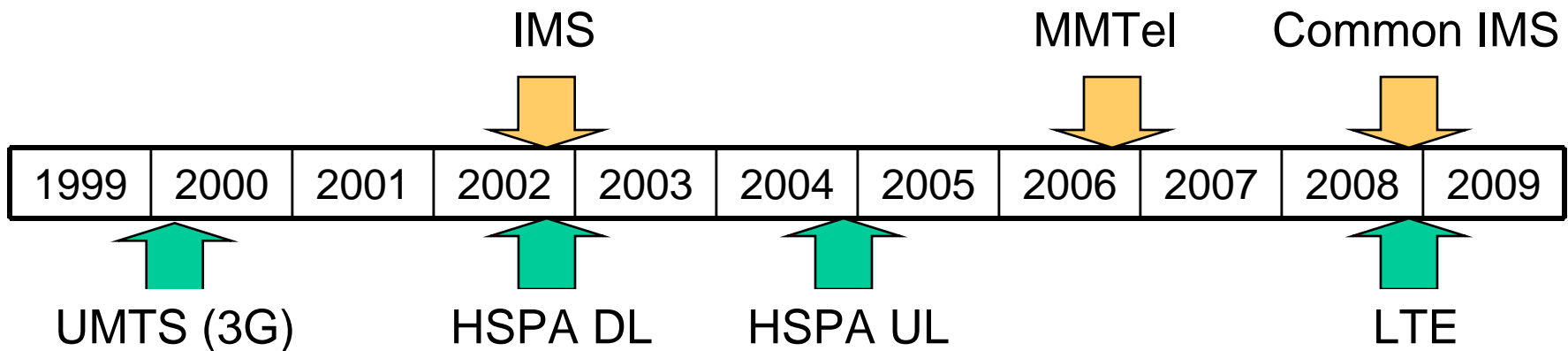
Service Convergence using IMS/Common IMS



IMS/Common IMS

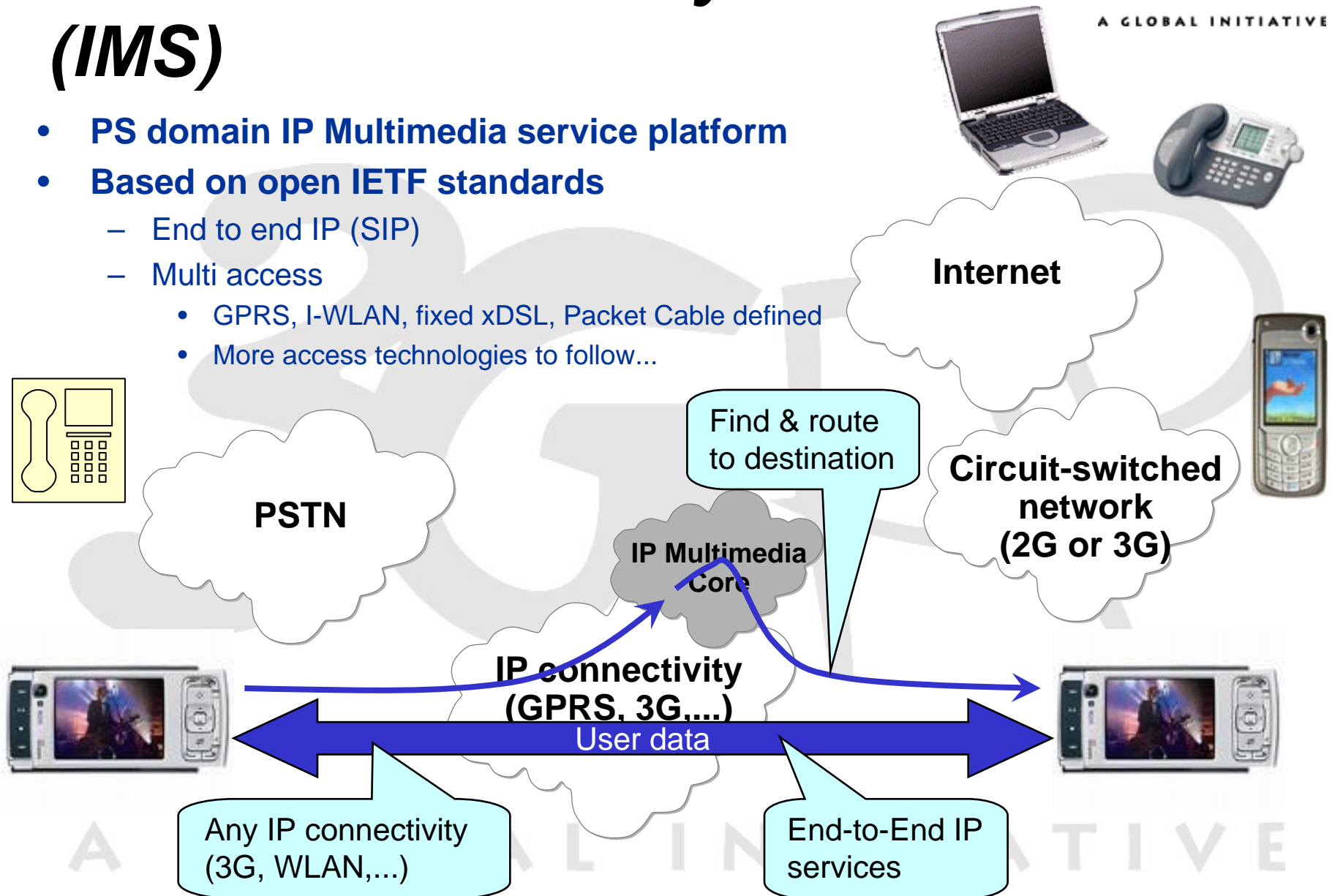


- IMS developed as part of 3GPP Rel 5 as an application development environment
 - Encourage new applications to use environment
 - Greater operator policing than native SIP/SDP
 - Home control allowing customization
- IMS retargeted in Rel 7 for telephony replacement
 - Standardized multimedia suite 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



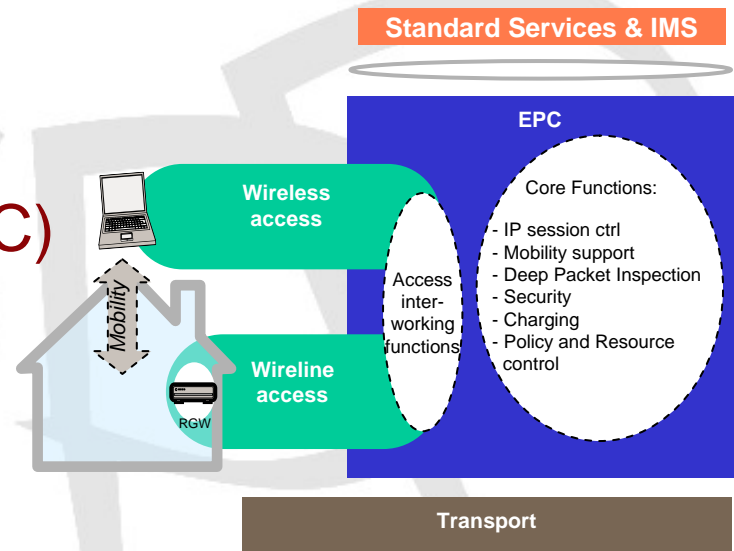
- **Multiple Simultaneous Media Streams**
 - Voice
 - Text
 - Video
 - File Transfer
 - Video/Photo/Audio Sharing
- **Multimedia analogs of traditional PSTN supplementary services**
 - Originating Identification Presentation (OIP)
 - Originating Identification Restriction (OIR)
 - Terminating Identification 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**

A GLOBAL INITIATIVE

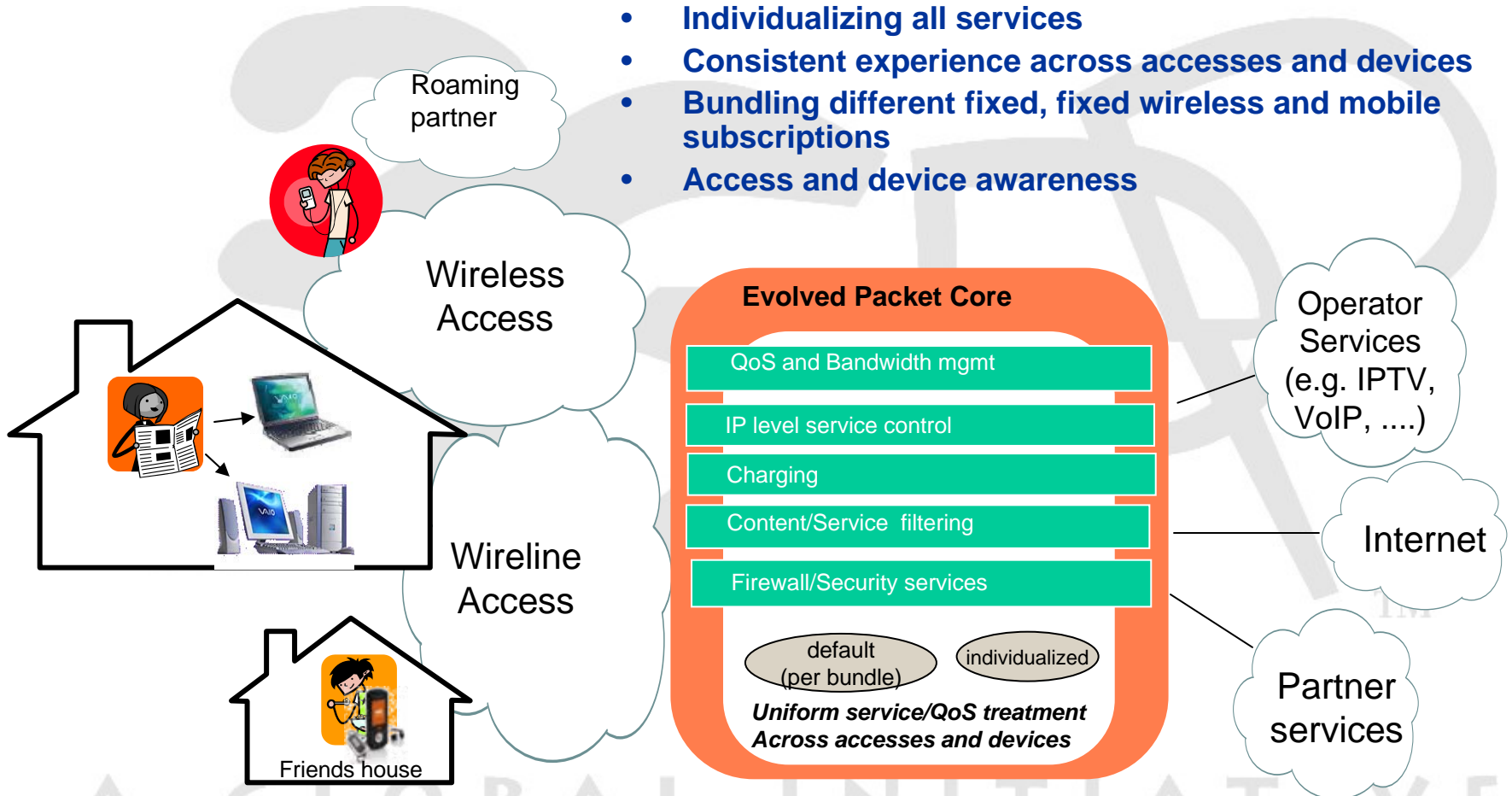
System Architecture Evolution **(SAE)**



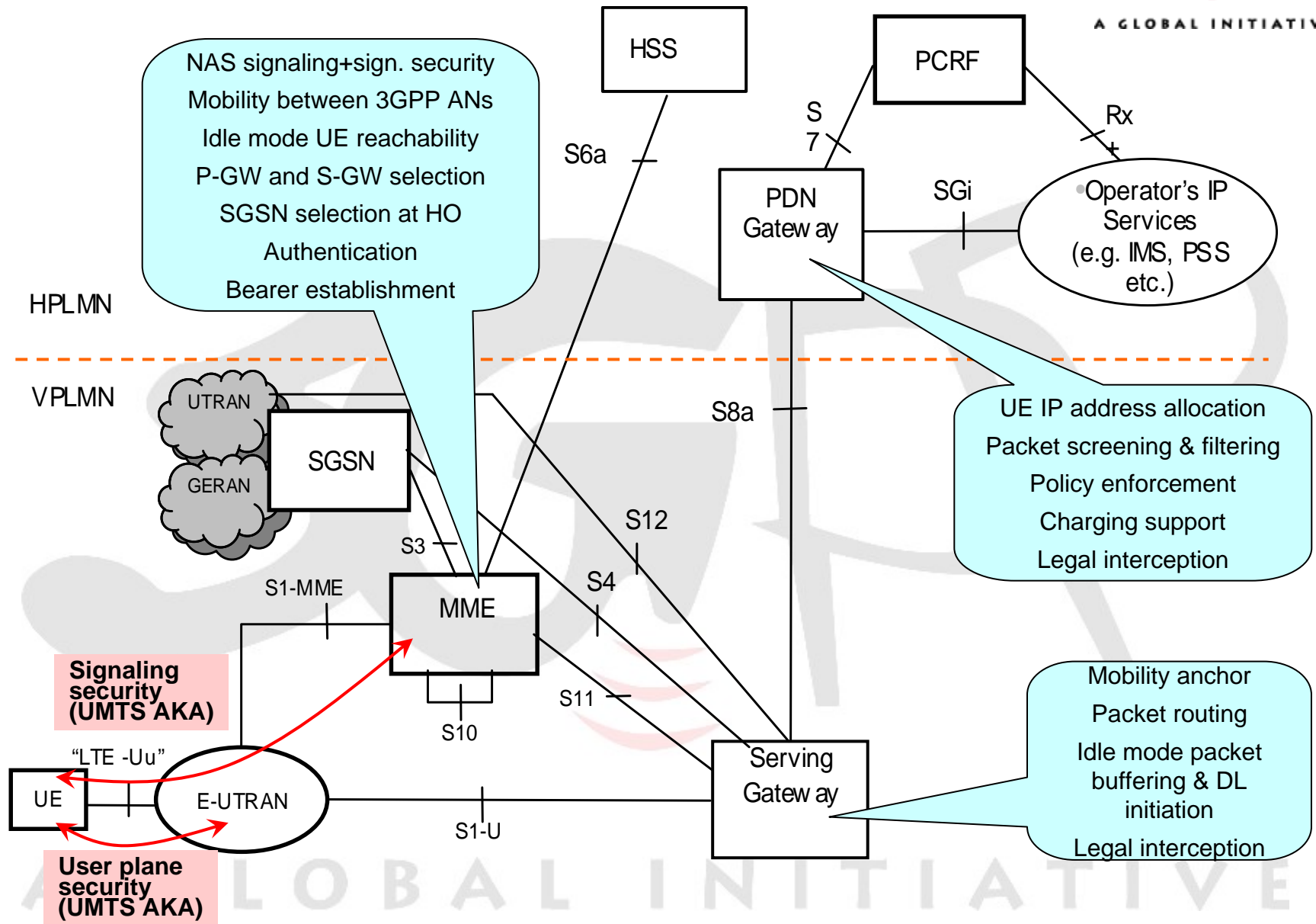
- **LTE = E-UTRAN = evolved radio network**
 - Megabit class data rates
 - Short delays
 - Short transition from idle to active
- **SAE = System Architecture evolution**
 - SAE is the project name, the evolved network is called EPC
 - Evolved IP oriented multi access architecture
- **E-UTRAN integrates 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

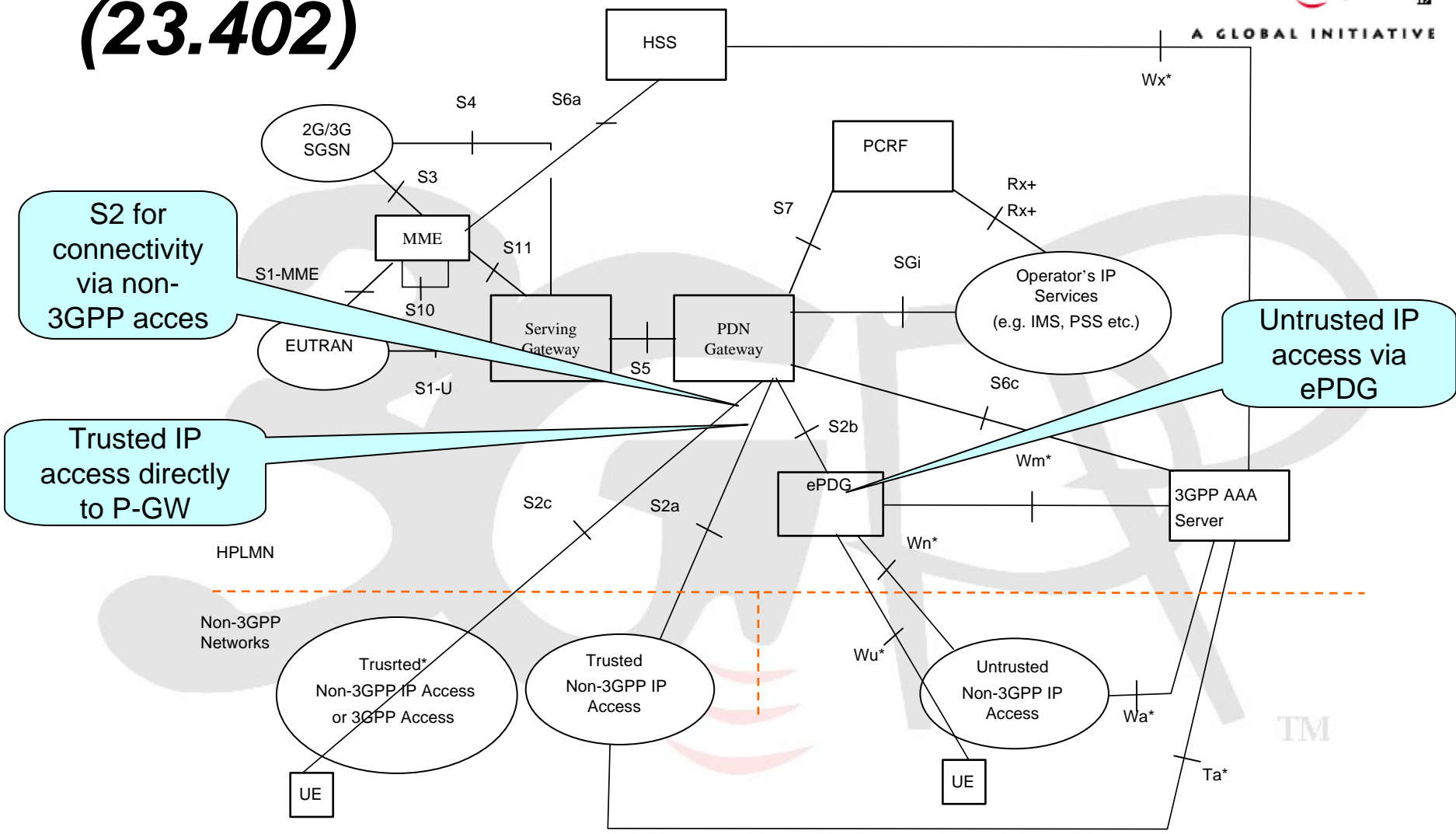
- **Mobility and ubiquity adds value to all services**
- **Individualizing all services**
- **Consistent experience across accesses and devices**
- **Bundling different fixed, fixed wireless and mobile subscriptions**
- **Access and device awareness**



SAE architecture (23.401)



SAE non-3GPP access (23.402)



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

SAE/LTE Deployment



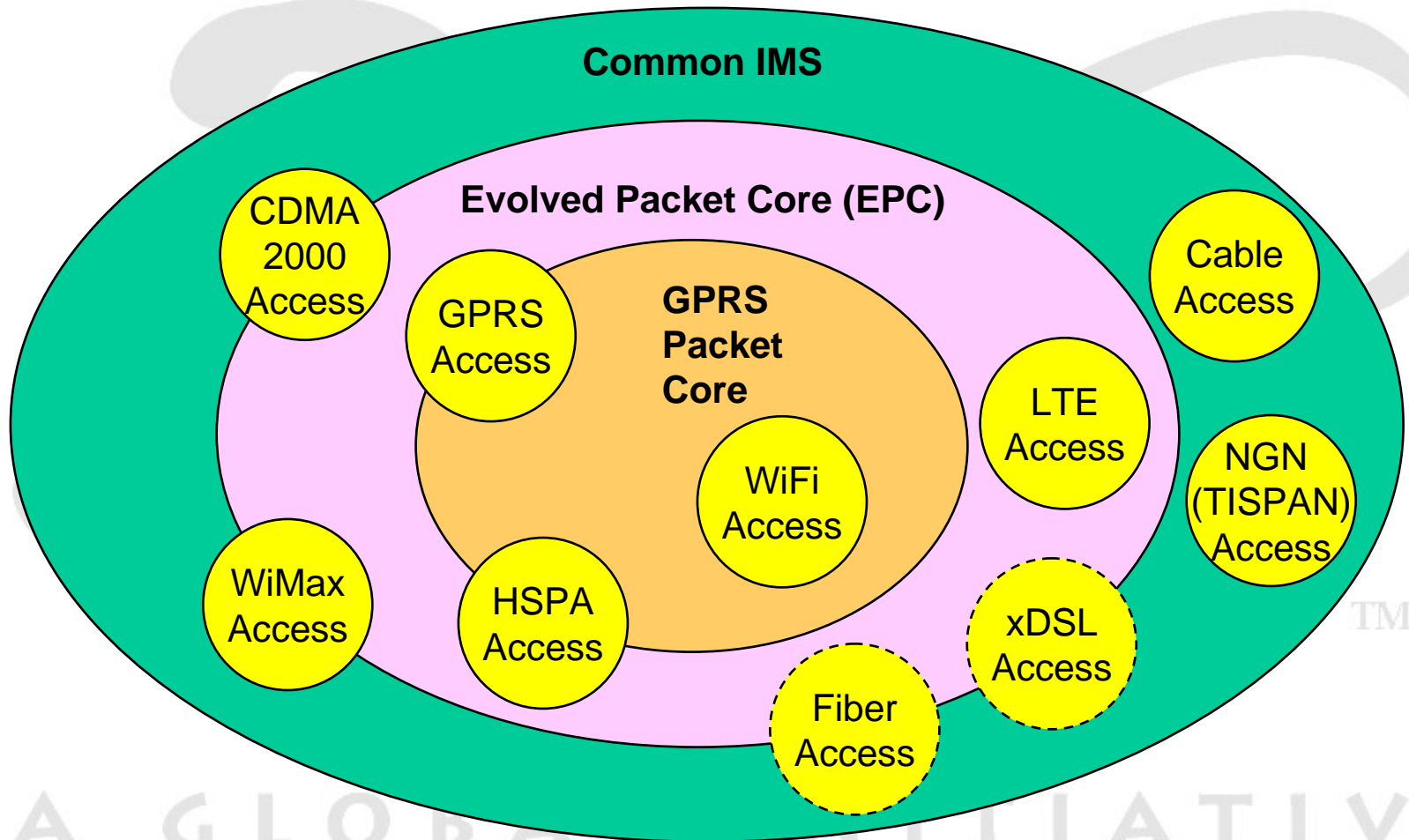
- **Deployments are expected to start with overlapping cellular coverage**
 - E-UTRAN overlapping with legacy 3GPP GERAN / UTRAN coverage
 - E-UTRAN overlapping with legacy 3GPP2 coverage
 - Multi-mode networks and terminals
- **E-UTRAN is a packet-only radio with no CS capacity**
- **Initially E-UTRAN 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