

Challenges of Global Roaming

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Outline

- **Global roaming - Definition & Requirements**
- **Technical Areas of Concern**
- **Ongoing Standards Efforts**
- **An Assessment**
- **Summary**

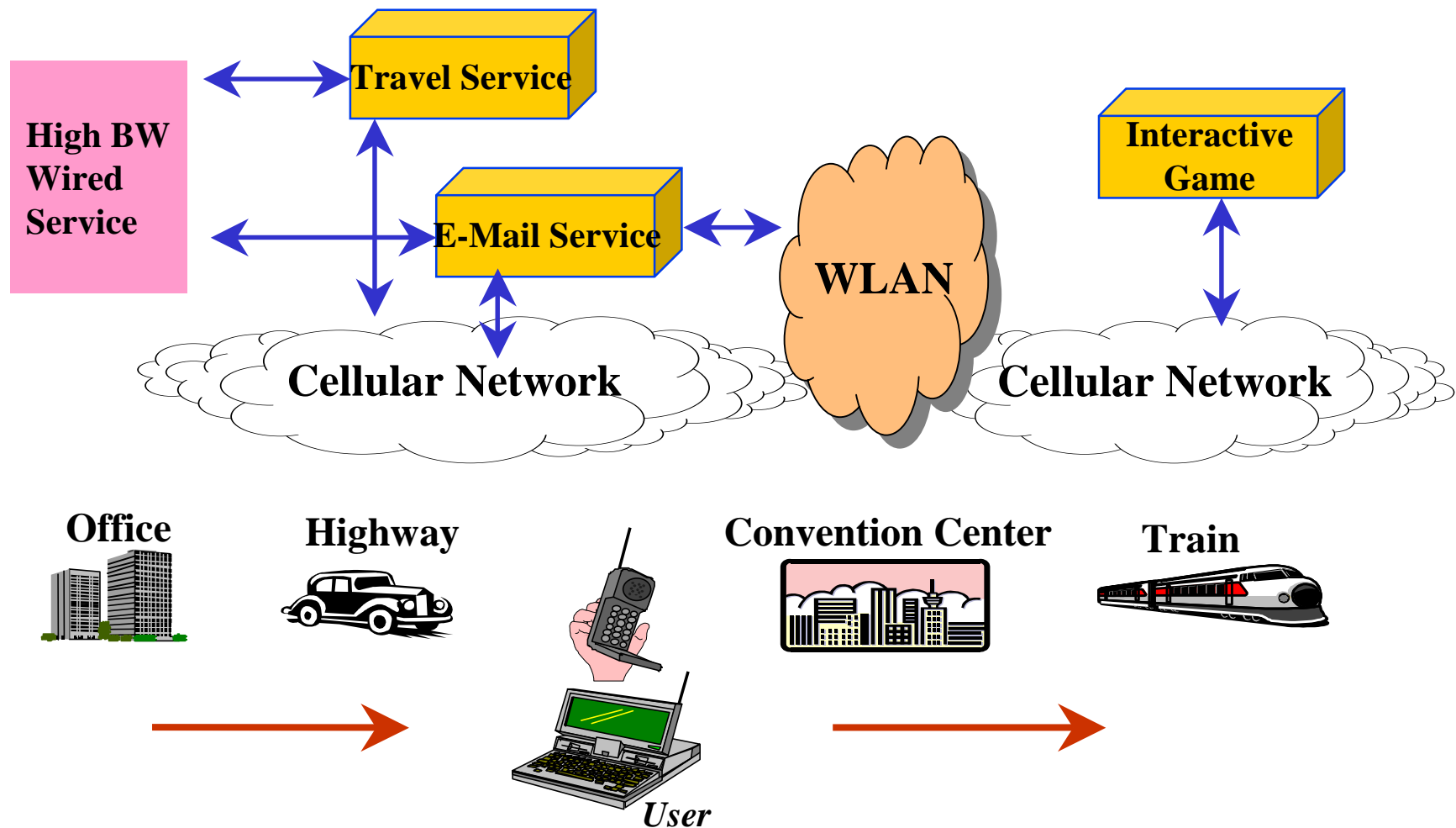
Global Roaming Definition



Global Roaming: Offer seamless services by hiding network and radio access differences from the users.

Note: Global Roaming does not only mean that one has to travel far. Within a small geographic area global roaming requirements also apply.

Global Roaming Requirements





Global roaming – Requirements

- **Multi-mode user equipment to support diverse access technologies**
- **Multi-homed user equipment to support multiple IP addresses**
- **Support of Enhanced services**
 - VHE/IN, UPT, IP Multimedia
- **Mobility management across multiple service provider domains**
 - Location management
 - Service portability
 - Authentication, Authorization and Accounting
 - QoS / bandwidth management (wired to wireless)
- **Interoperability using single subscription**



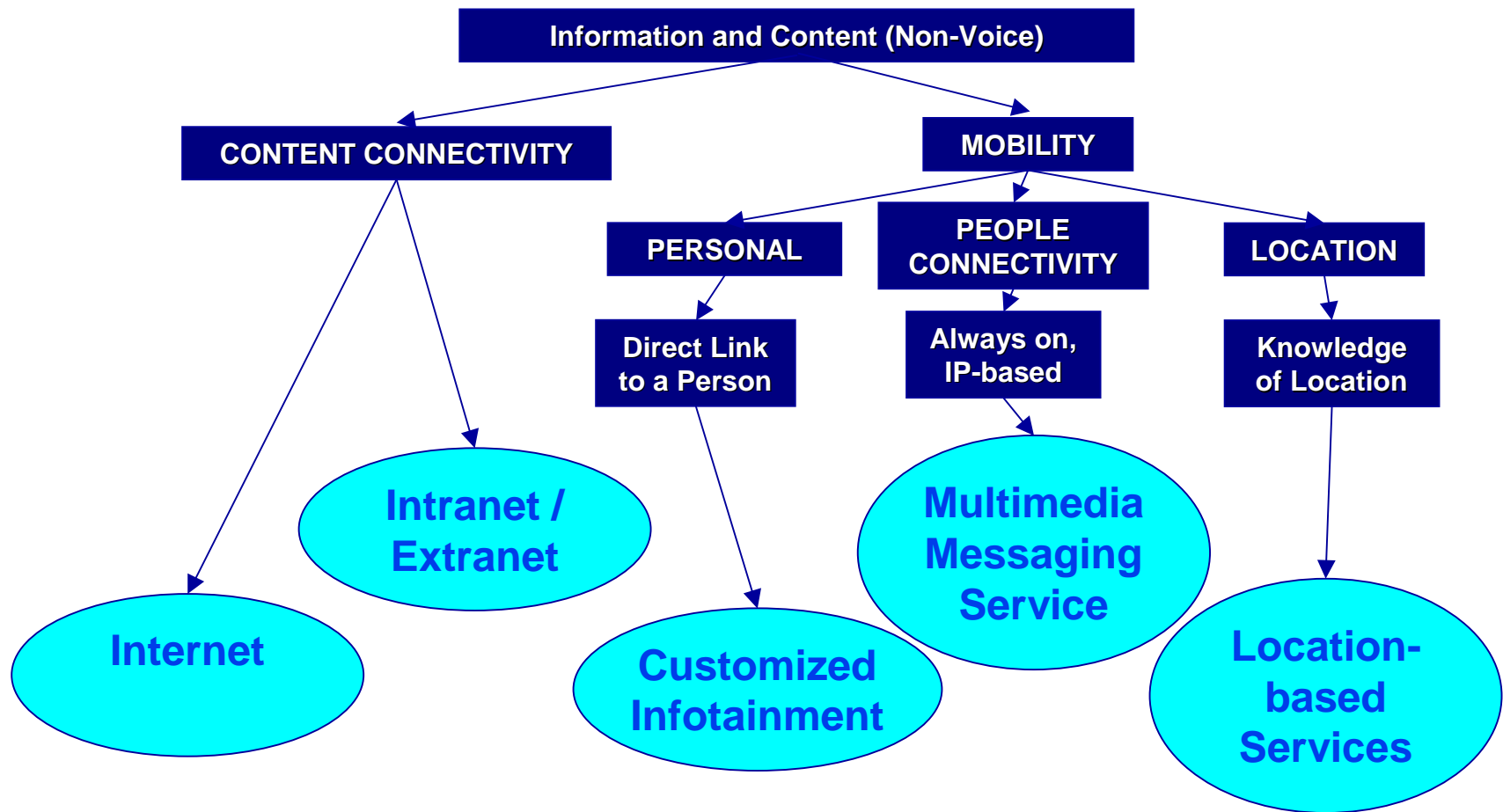
Diverse Wireless Access Technologies

- **ITU Approved 3G/IMT-2000 Radio Standards:**
 - CDMA Multi-carrier (cdma2000)
 - 1xEV-DO
 - CDMA TDD (Universal Terrestrial Radio Access)
 - CDMA TDD (TD- SCDMA)
 - W-CDMA (UTRA FDD)
 - UWC-136 (FDD)
 - Digital Enhanced Cordless Telecommunications (DECT)
- **WLAN IEEE 802.11 Series**
- **HIPERLAN**
- **Bluetooth**



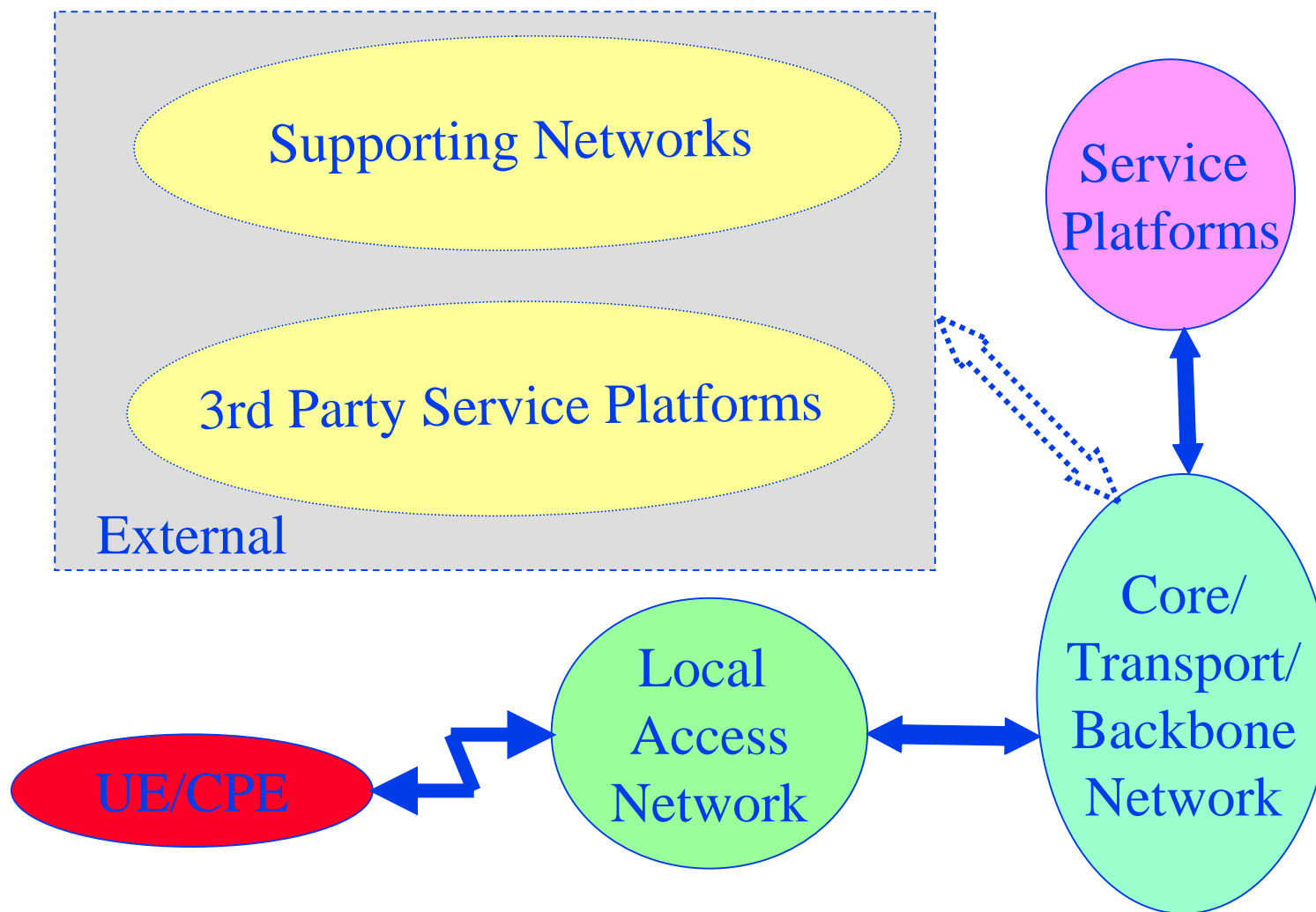
Evolution of Mobile Services

(IP Multimedia Services)



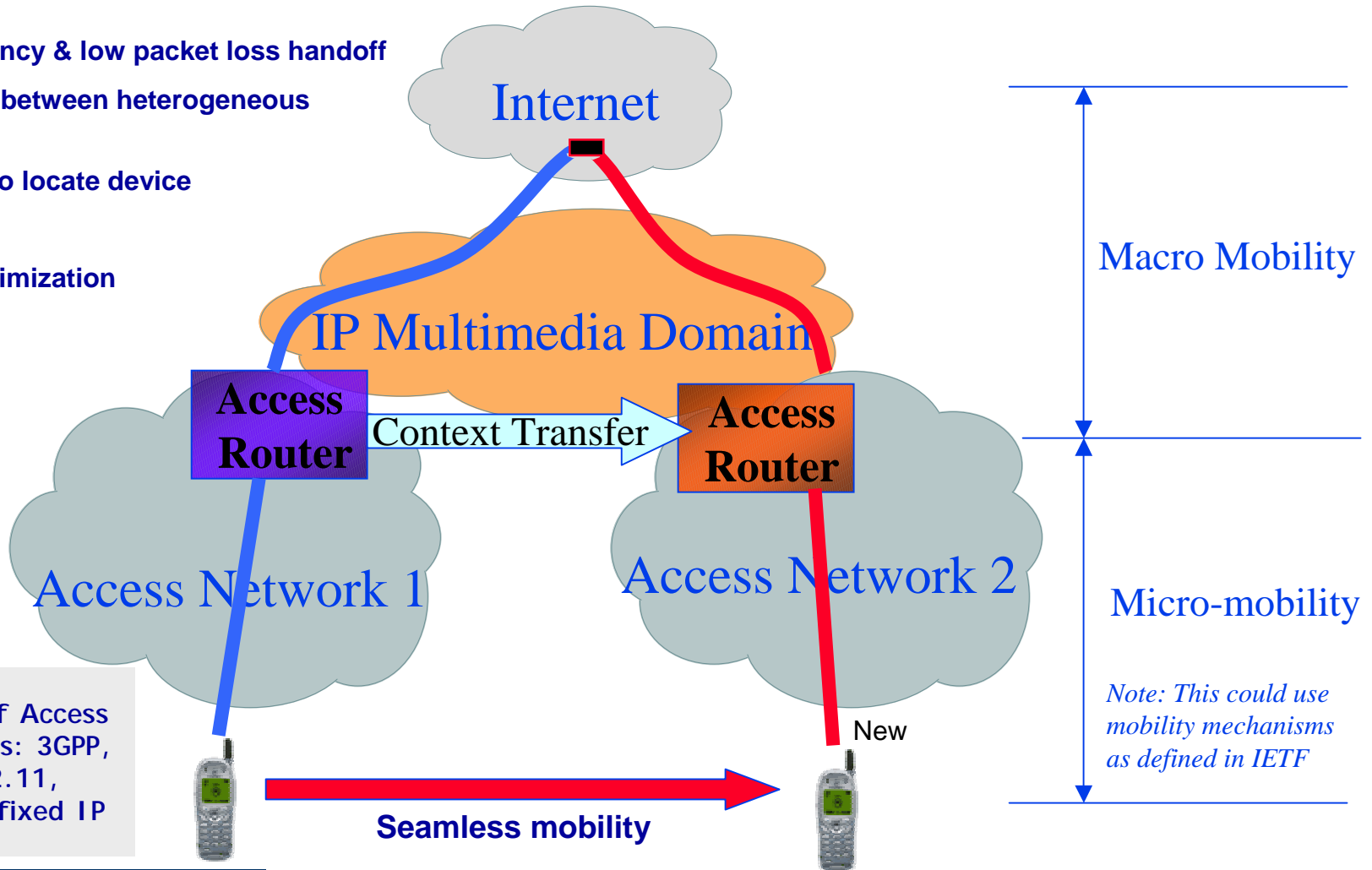
Evolution of Mobile Services

(Multiple Service Providers)



Multiple Dimensions of Mobility

- Low latency & low packet loss handoff
- Handoff between heterogeneous networks
- Paging to locate device
- AAA
- Path optimization

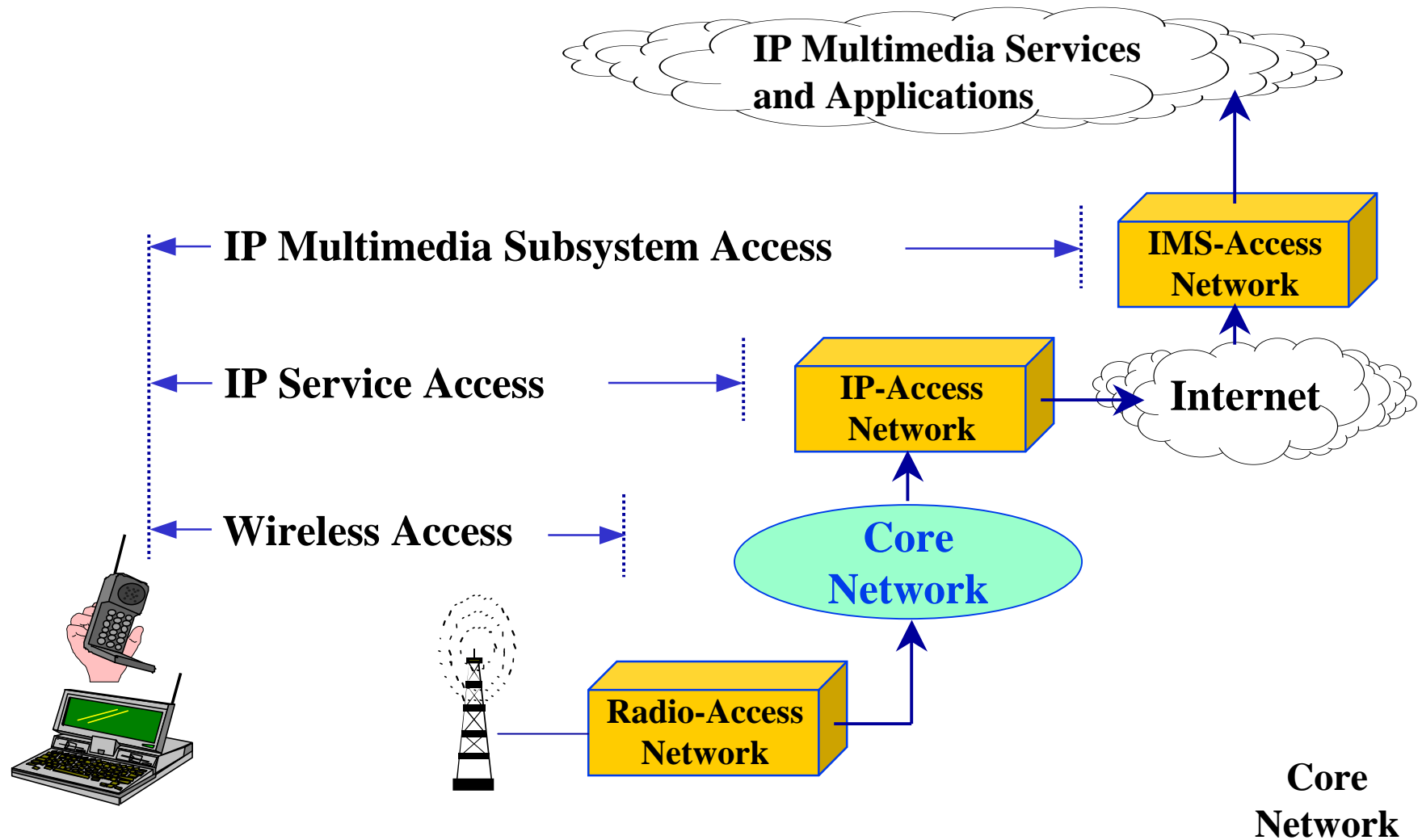


Examples of Access Technologies: 3GPP, 3GPP2, 802.11, Bluetooth, fixed IP

Security Challenges

- **Case 1: Roaming between same network type, same generation**
 - Example, ANSI-41 (2G) to ANSI-41 (2G)
 - A derivative of user secret (SSD) is passed between networks
- **Case 2: Roaming between same network type, different generations**
 - Example, UMTS (3G) to GSM (2G)
 - Backwards compatible if security mechanism is unchanged
 - If security mechanism is enhanced, translation is TBD
- **Case 3: Roaming between dissimilar networks**
 - Example, ANSI-95 to GSM
 - Either assign a dual subscription to the user, or
 - Translate security parameters between networks
- **Case 4: Roaming between cellular-based networks and IP-based networks**
 - Example, WLAN to UMTS
 - Methods are being studied

Security Tiers



Interoperability

- **Services Plane**
 - Voice Services
 - Multimedia Services
- **Transport Plane**
 - IPv4/IPv6 transition
 - SCTP to TCP/IP
 - MTP to M3UA
 - MTP/SCCP to SUA
- **Control Plane**
 - Session Control (e.g., SIP, H.323, ISUP, BICC, PSTN)
 - Mobility Management (e.g., ANSI 41, MAP, Mobile IP)

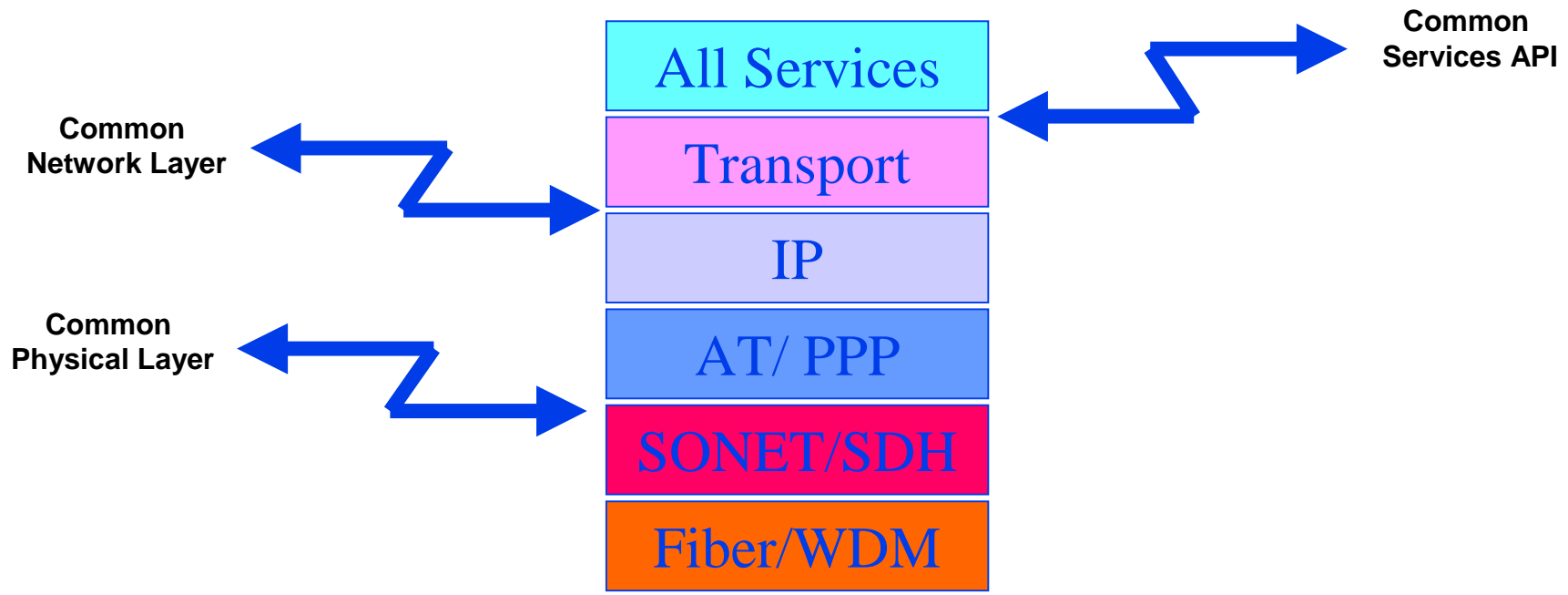


Overview of Standards Development

Technical Areas	ITU-T	3GPP	3GPP2	IETF
Services Plane	SG2, SSG	SA1, SA2, CN1, CN5	TSG-N	SIMPLE, IMPP
Transport Plane	SSG, SG11, SG13	SA2, CN3	TSG-A	ROHC, DIFFSERV
Control Plane	SSG, SG13	SA2, CN1, CN4	TSG-N, TSG-P	SIP, MMUSIC, IPTEL
Mobility Mgmt	SSG, SG11	SA2, CN1, CN4	TSG-P, TSG-N	MOBILEIP, SEAMOBY
Security	SG7, SSG	SA3, T3	TSG-S WG4, TSG-P, AHAG	AAA, RADIUS, IPsec, AVT
Interoperability	SSG	CN3	TSG-N	PINT
Codec		SA4	TSG-C	
UIM (Smart Card)		T3	TSG-S	

An Assessment

(Convergence Opportunities)



An Assessment

(Gap Analysis and Technological Barriers)

- **Radio system compatibility**
- **UIM portability**
- **Inter-system operability**
- **Service portability**
- **Billing/charging**
- **Numbering plans**
- **Authentication & privacy**

Conclusions

- **Global roaming is a key requirement for IMT-2000 and beyond systems**
- **Ease of Interoperability between different networks is demanded by users**
- **Global UIM based on a common UIM-MT interface is needed**
- **Standards are needed to address critical issues of global roaming**