

# ***The GSM Evolution to UMTS***



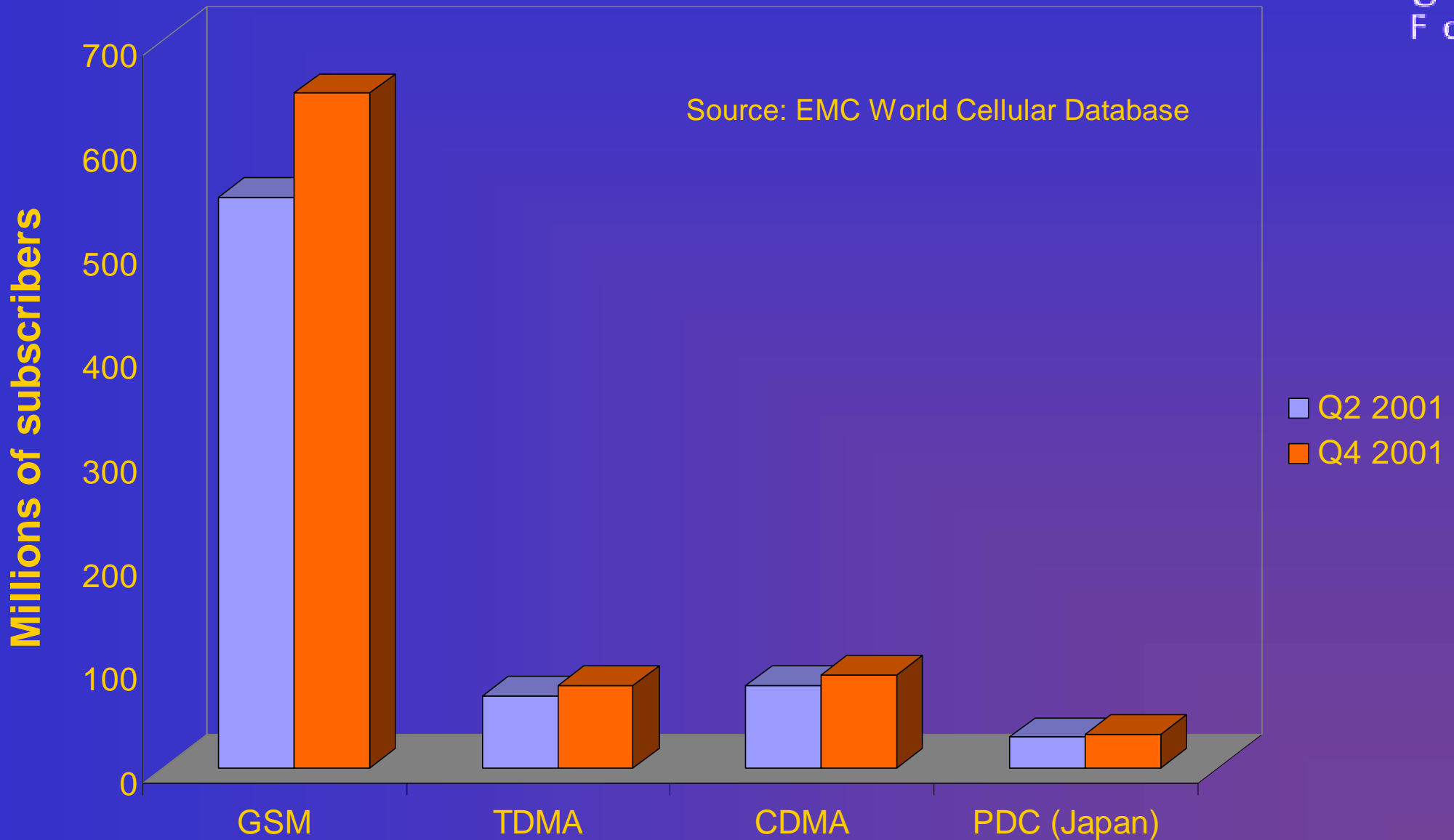
***Josef F. Huber***  
***Siemens AG***

***Vice Chairman UMTS Forum***



# *GSM dominates in the Mobile Market*

## *September 2002 ~ 800 mio users*



# UMTS: IT & T Integration

## Internet / Intranet

- E-Mail
- WWW
- Voice over IP
- E-Commerce

## Information - Data

- Audio/video on demand
- Infotainment/Education
- TV & radio distribution

## Telecommunication

- Person-to-Person Audio/Video, Fax (ISDN)
- Mobility-Roaming (GSM)
- Mailbox services (SMS, Voice)
- Callcenter services etc.

UMTS

GSM

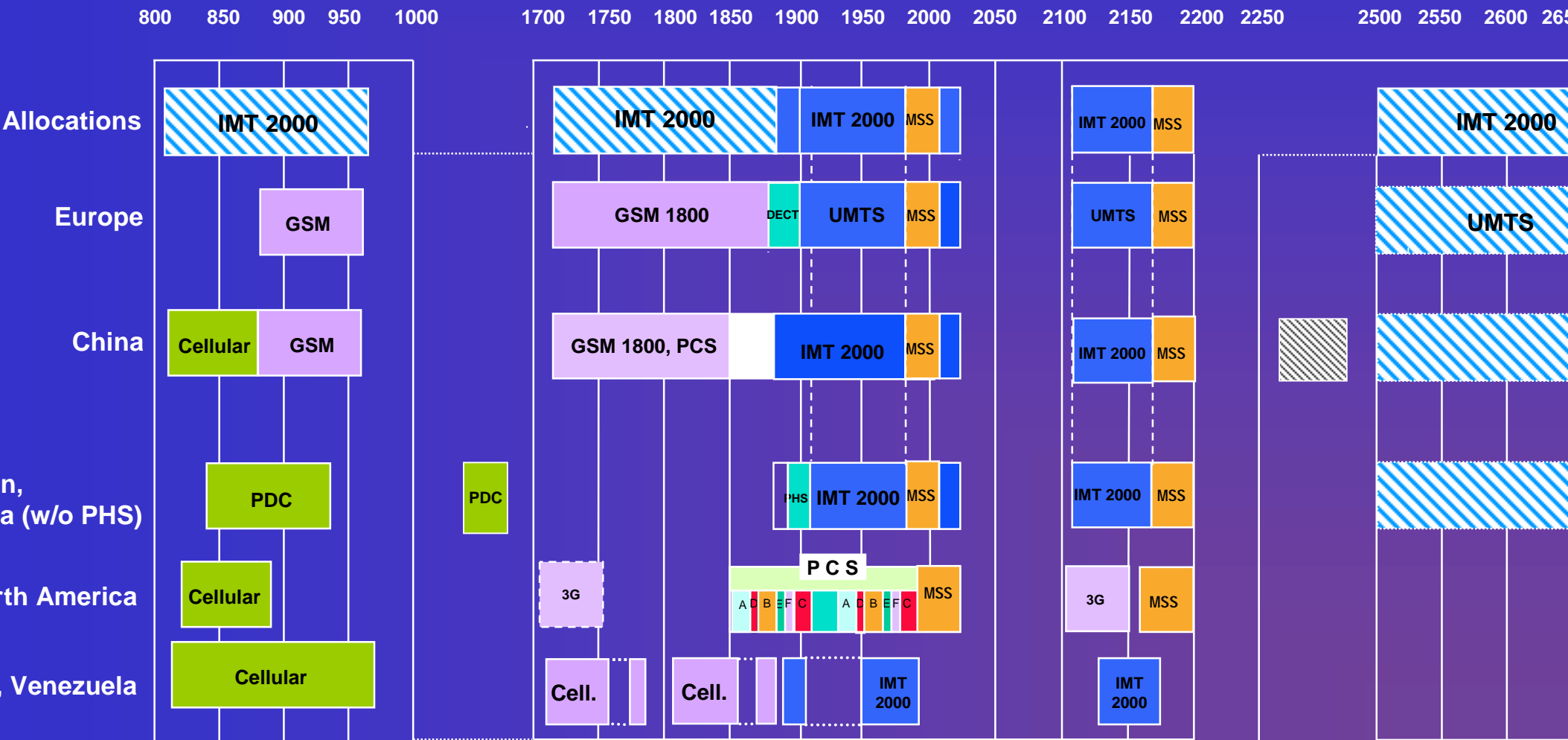


# *2G + 3G Spectrum*

- **Bandwidth allocations in the regions depending on market demand**
- **Spectrum overload visible in countries with high penetration rates (speech)**
- **New services require additional spectrum**



# IMT-2000/UMTS Frequency Spectrum after WRC-2000



# ***UMTS: IT & T Integration***

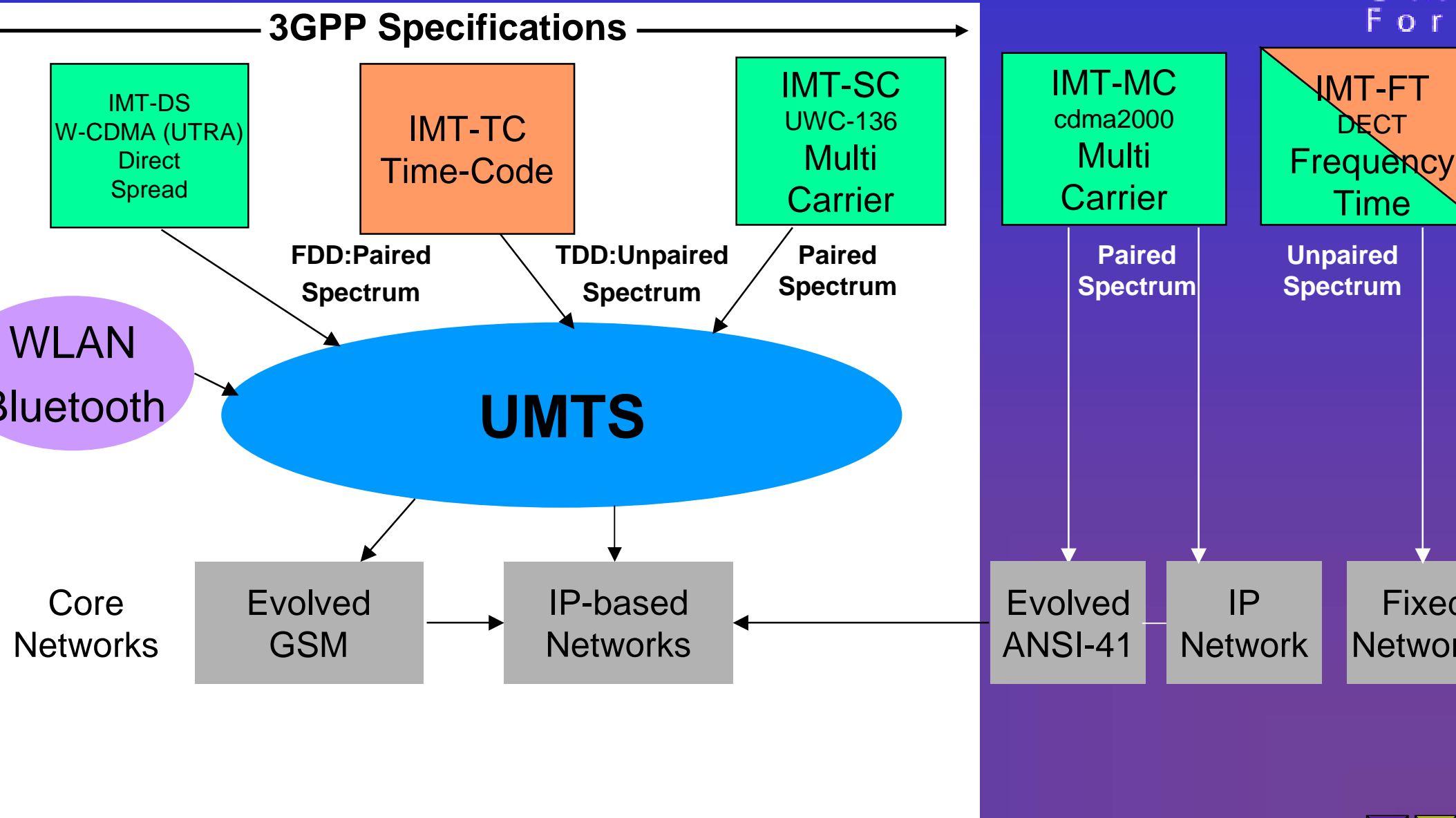


**It is compliant with IMT - 2000:**

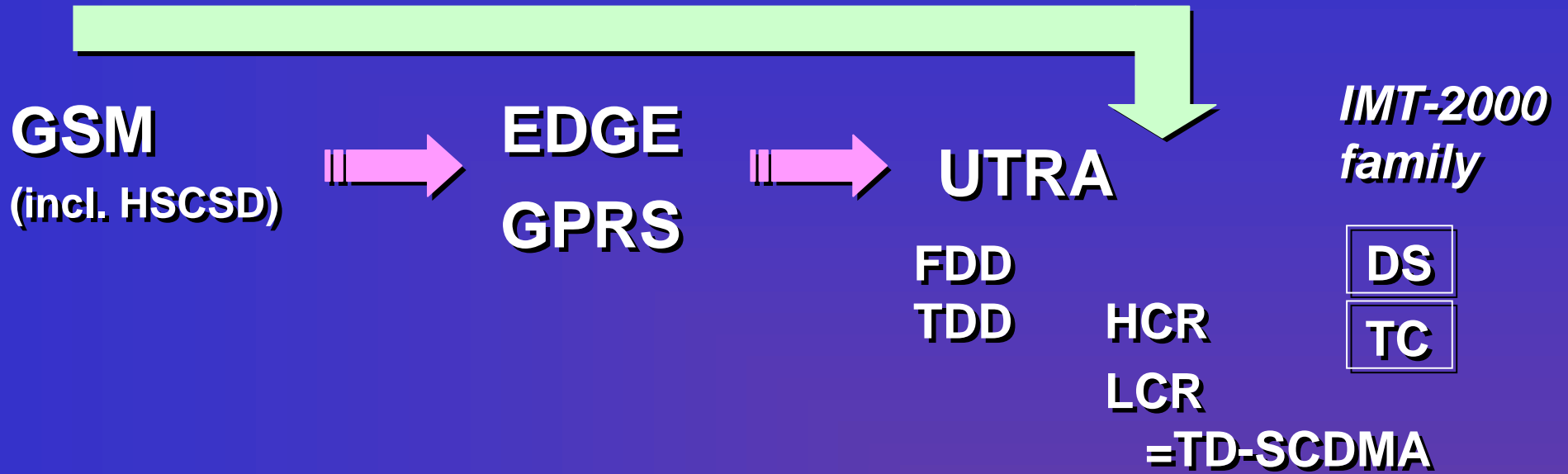
- **It builds on ITU Standards (3GPP)**
- **It builds on GSM**
- **It builds on IMT – 2000 Spectrum Plan from ITU**



# The ITU IMT-2000 Standards (Terrestrial)



# The Paths to UTRA



Voice & low-speed data

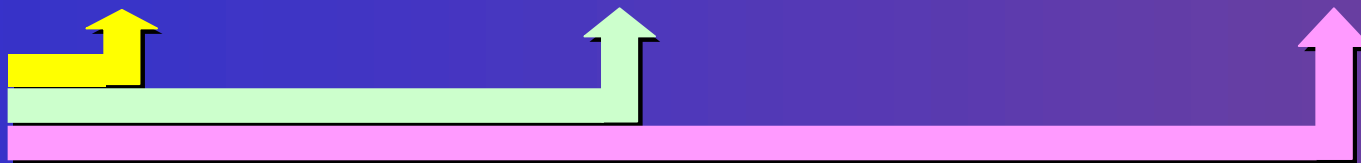
Voice & medium-speed data

Voice & high-speed data

**Circuit**  
**Switched**

**Packet**  
**Switched**

**IP**



*Paths from other technologies, e. g. IS-136, PDC ...*



# ***GSM & WCDMA - one seamless network***

## **GSM/GPRS/EDGE**

- GSM/EDGE radio
- 800/900/1800/1900 MHz spectrum
- Nationwide

## **Common Parts**

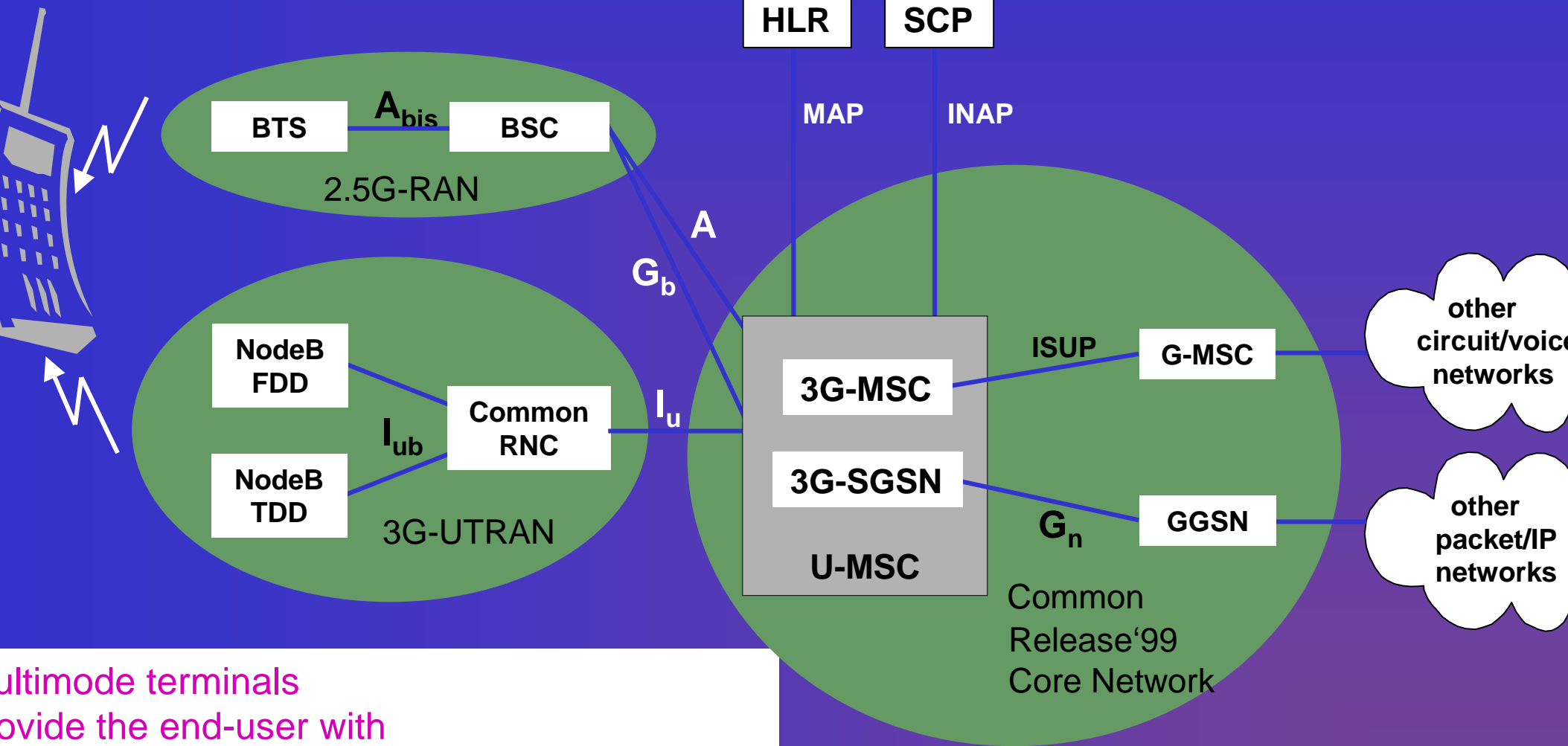
- One core network
- One service network
- Dual mode handsets
- QoS and CoS based load sharing
- Commonalities & transport

## **WCDMA**

- WCDMA radio
- Initially 2 GHz spectrum
- Start in urban areas



# Evolving Proven 2G Network Infrastructure



multimode terminals  
 provide the end-user with  
 access to the best of both worlds

Source : Siemens



# *Standardisation: Definition of the Third Generation Partnership Project*



**GPP develops globally applicable technical specifications for a Mobile System**

- based on the evolved GSM core network, and the Universal Terrestrial Radio Access (UTRA),**
- to be transposed by relevant standardisation bodies (organisational partners) into appropriate deliverables (e. g. standards).**



# One Set of Specifications for UMTS and GSM

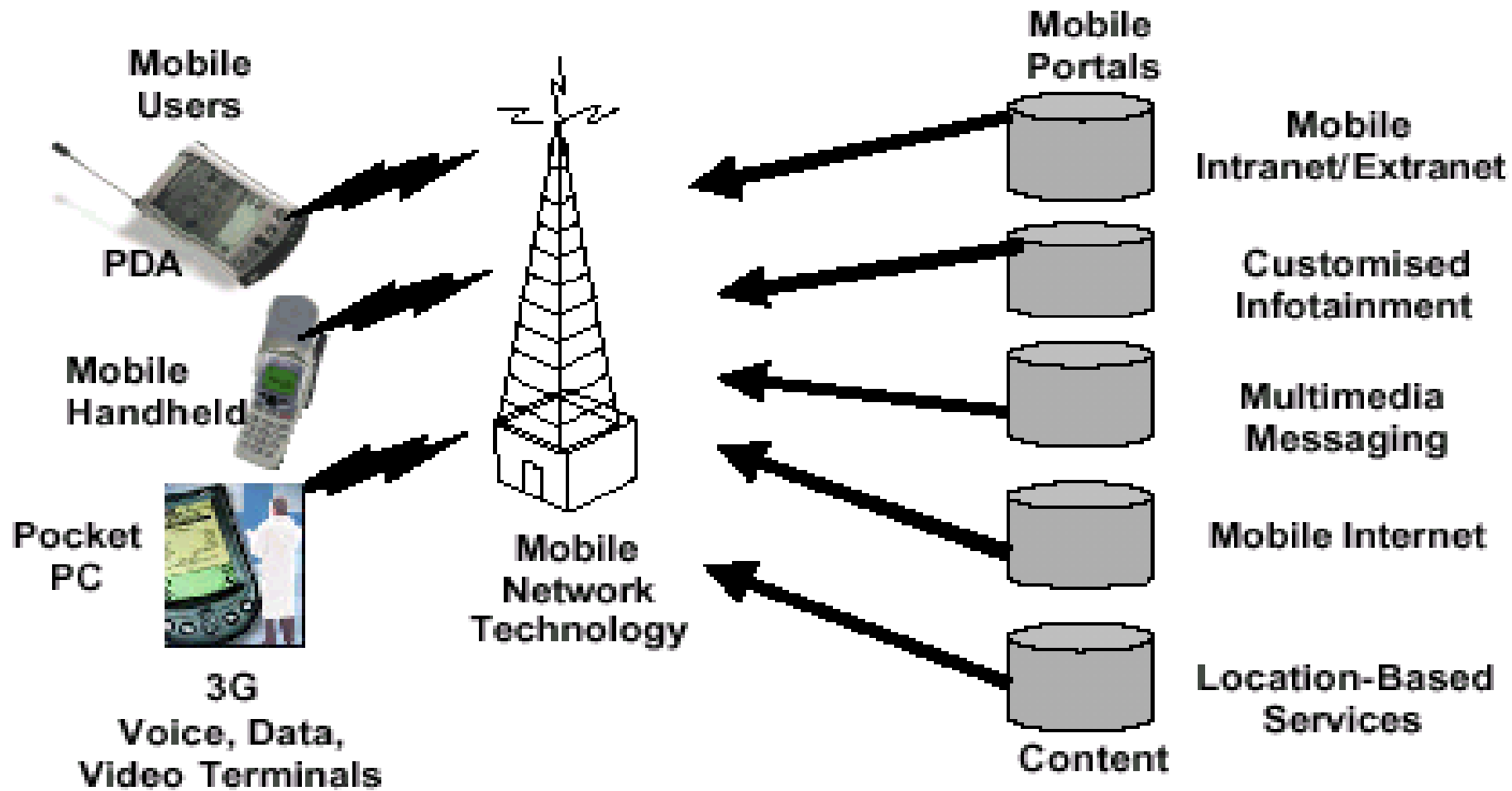


UMTS  
Forum

3GPP	Specified Features
1999: Release 99	<p>Bearer Services:            64 kbps circuit switched            384 kbps packet switched            Call services: GSM compatible, USIM based, CAMEL Phase 3            FDD and TDD Radio (3,84 Mcps)            Location Services            New Codec (AMR)</p>
2001: Release 4	<p>EDGE Radio            TDD Low Chip Rate Radio (1,28 Mcps)            Improved Location Services (Emergency), USIM toolkit, MExE            Repeater Specification            Multimedia Messaging</p>
2002: Release 5	<p>IP Multimedia Subsystem (IMS)            IPv6, IP transport in UTRAN            HSDPA 10 Mbps (ITU-R update of M.1457)            CAMEL Phase 4            Wideband AMR (16 kHz)            Improvements in GERAN, LCS, MExE, etc.</p>
2003: Release 6	<p>IMS improvements, Presence service            WLAN Integration            Multimedia Broadcast and Multicast (MBMS)            Digital Rights Management            Network Sharing</p>



# End-to-end harmonised 3G portal services for mobile users



Source: UMTS Forum

# *Web Services - What Comes with 3G?*

- **3G will offer transparent HTML access in addition to cHTML, xHTML**

**Various Microbrowsers for handhelds, PDAs and portable computers will be available.**

- **Higher Bitrates: HSDPA = 10 Mbps (ITU-R update M.1457)**

- **E-2-E QoS in the Packet Domain**

- **Java Download**



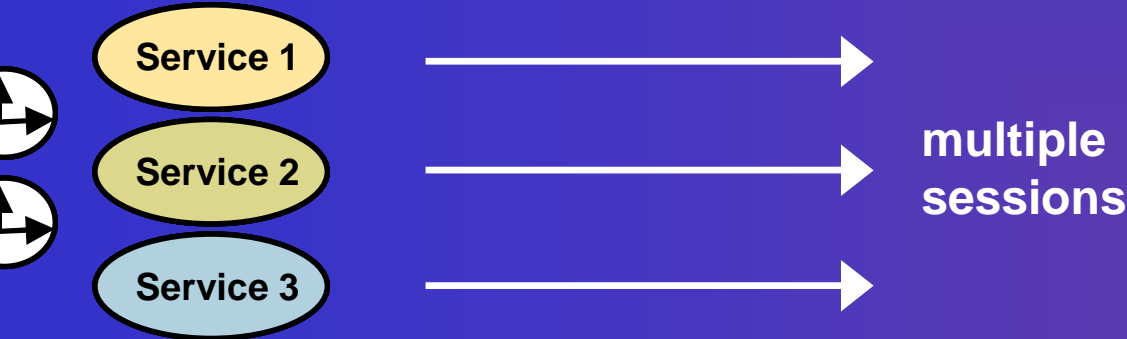


# Multimedia Session Handling

## Multiple services



## Synchronised services



## Partly synchronised services



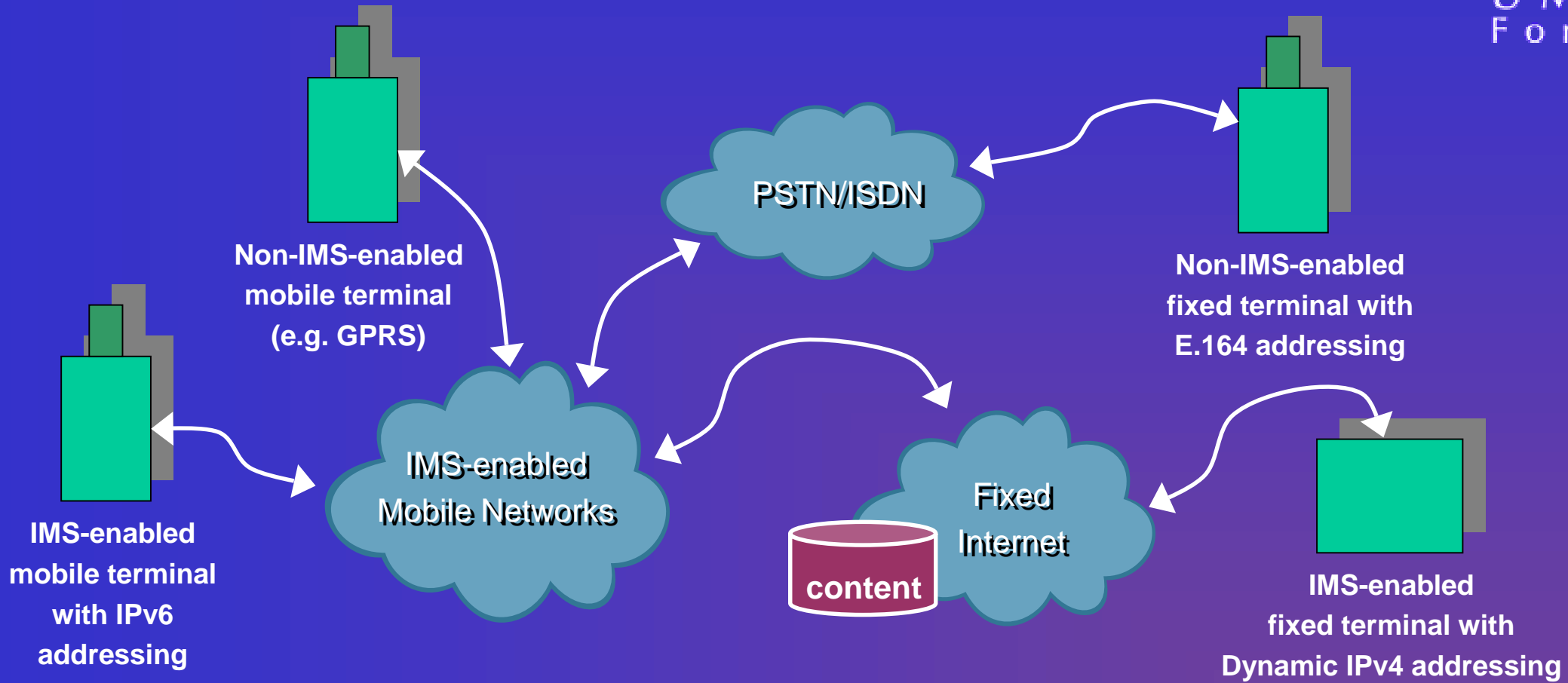
**IP-Multimedia  
Subsystem  
integrates, modifies  
dynamically  
multiple sessions**

**Basic building  
stones:  
SIP, IPv6**



# The IMS Network Interconnectivity

## The IMS Service



## Interoperability Between Networks

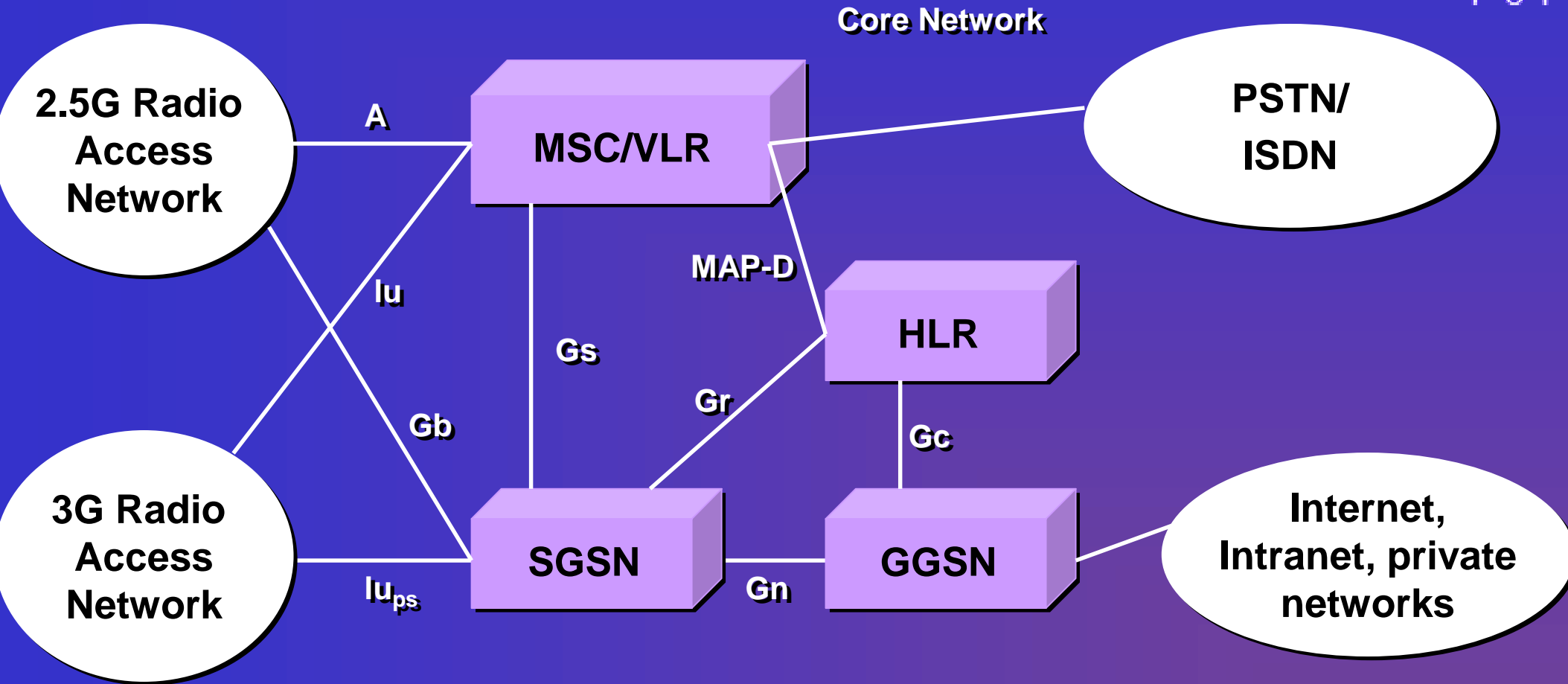




# Comparisons



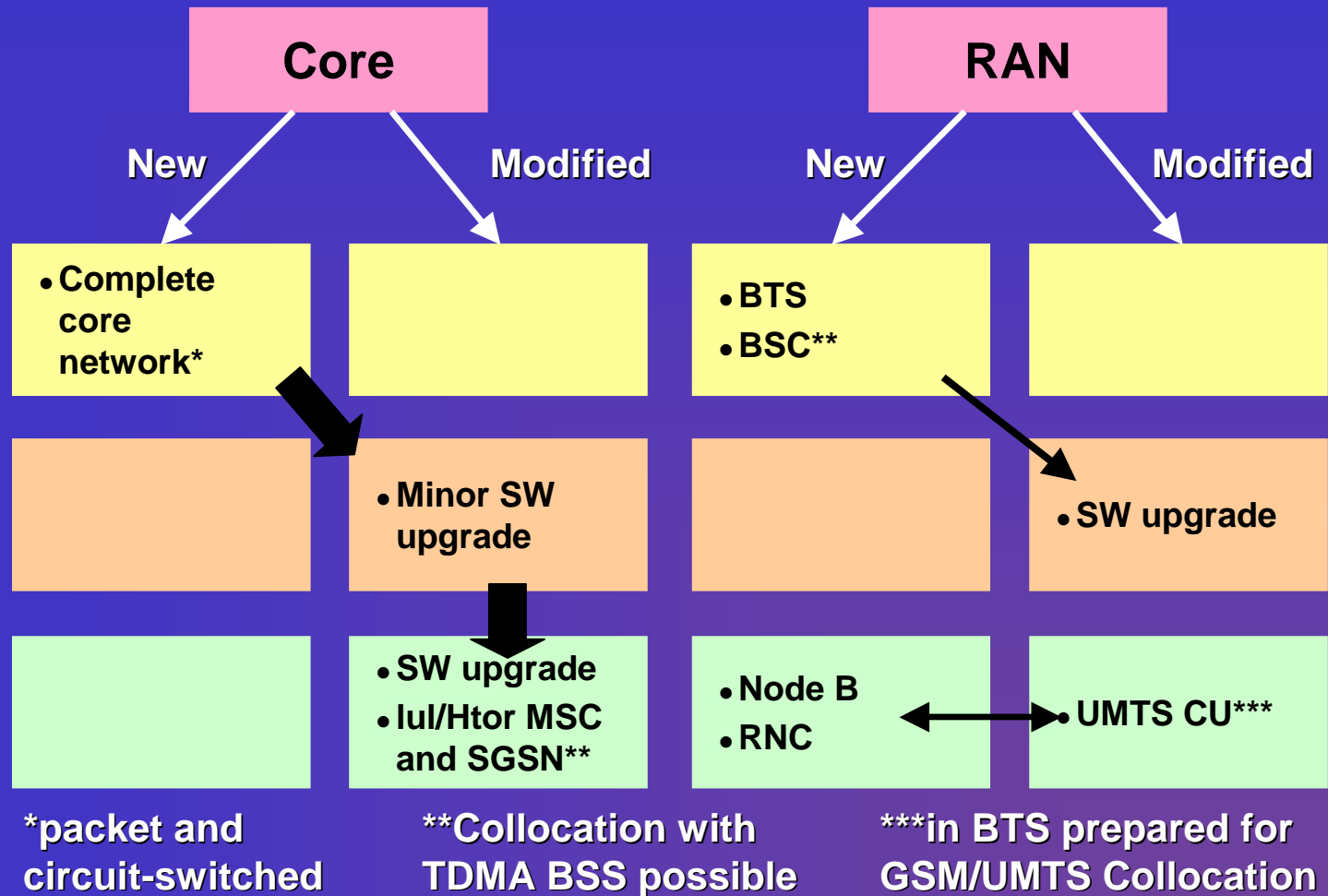
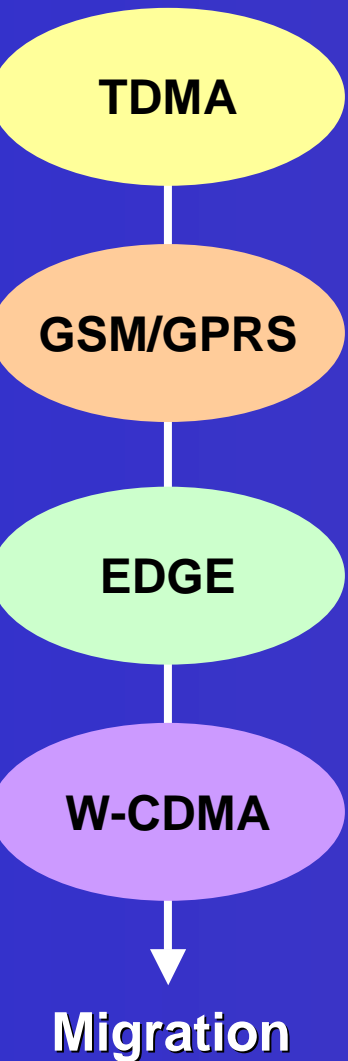
# Network Architectures GSM & UMTS



Source: Siemens AG



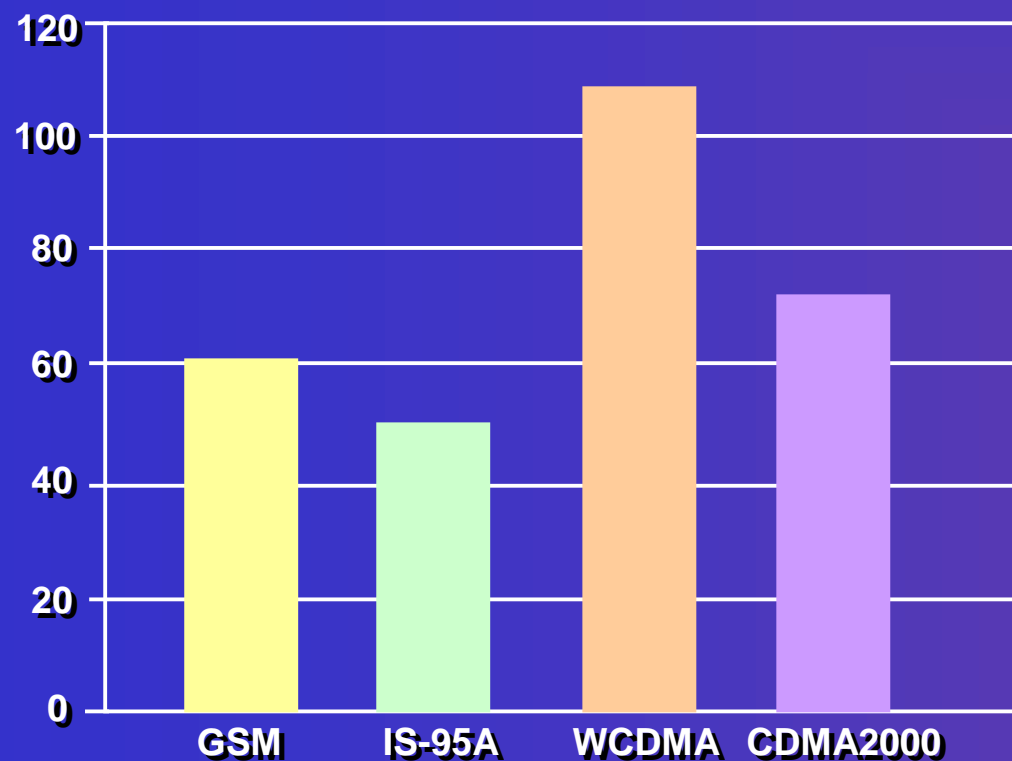
# Infrastructure Investment GSM & UMTS



# Voice Capacity

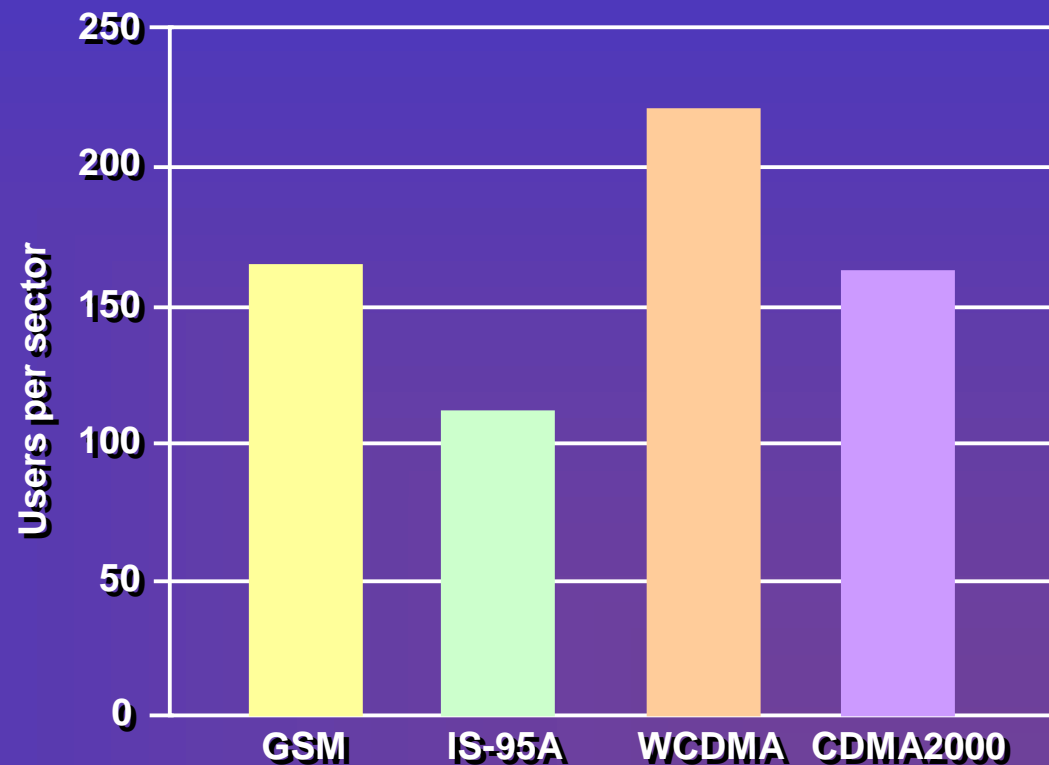
**WCDMA may provide around 30 % higher voice capacity than CDMA2000.**

Voice capacity in 5 MHz allocation



Industry Source

Voice capacity in 10 MHz allocation



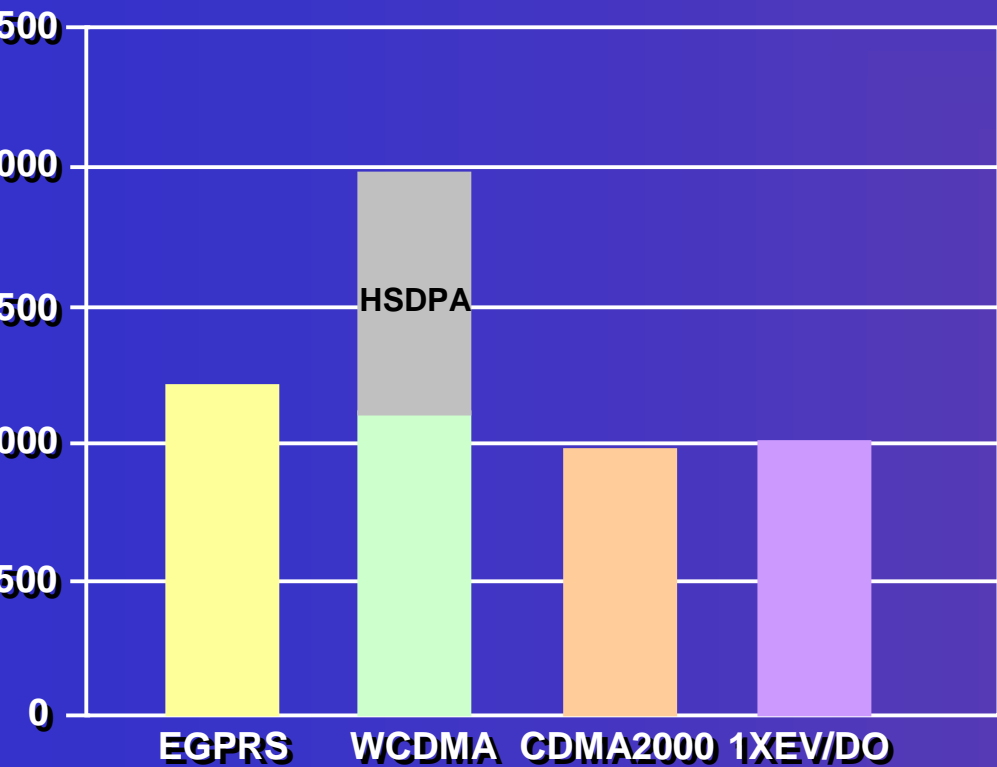
Industry Source



# Data Capacity

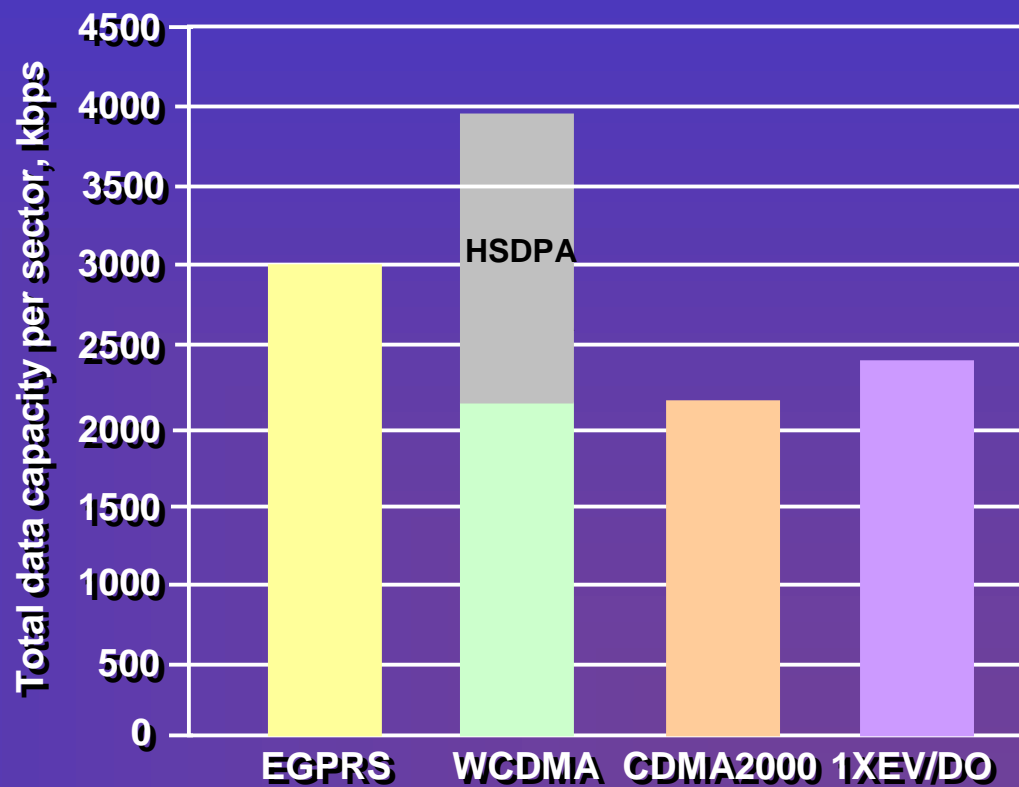
**EGPRS outperforms CDMA2000 1X and 1XEV-DO in capacity per sector.**  
**WCDMA/HSDPA can provide the highest capacity among all standards.**

### Data capacity in 5 MHz allocation



Industry Source

### Data capacity in 10 MHz allocation



Industry Source



# *Conclusion*



**In the near term, GSM/GPRS with the introduction of AMR and EGPRS offers sufficient performance.**

**UTRA/WCDMA is the most efficient of all the 3G technologies. WCDMA and CDMA2000 use the same underlying spread-spectrum technologies, but the wider bandwidth of WCDMA will always mean that there are inherent advantages for WCDMA over CDMA2000.**

**Interoperability between GSM & UMTS and CDMA 2000 still open. USIM/UICC provides a first step.**

**There are 107 UMTS network rollouts on their way using new 3G spectrum, offering high traffic capacity.**



*Thank you for your Attention!*



U M T S  
F o r u m

**UMTS Forum**  
**Russell Square House**  
**10 - 12 Russell Square**  
**London WC1B 5EE**  
**United Kingdom**  
**Website: [www.umts-forum.org](http://www.umts-forum.org)**

