Technology options for evolution from existing mobile systems to IMT 2000
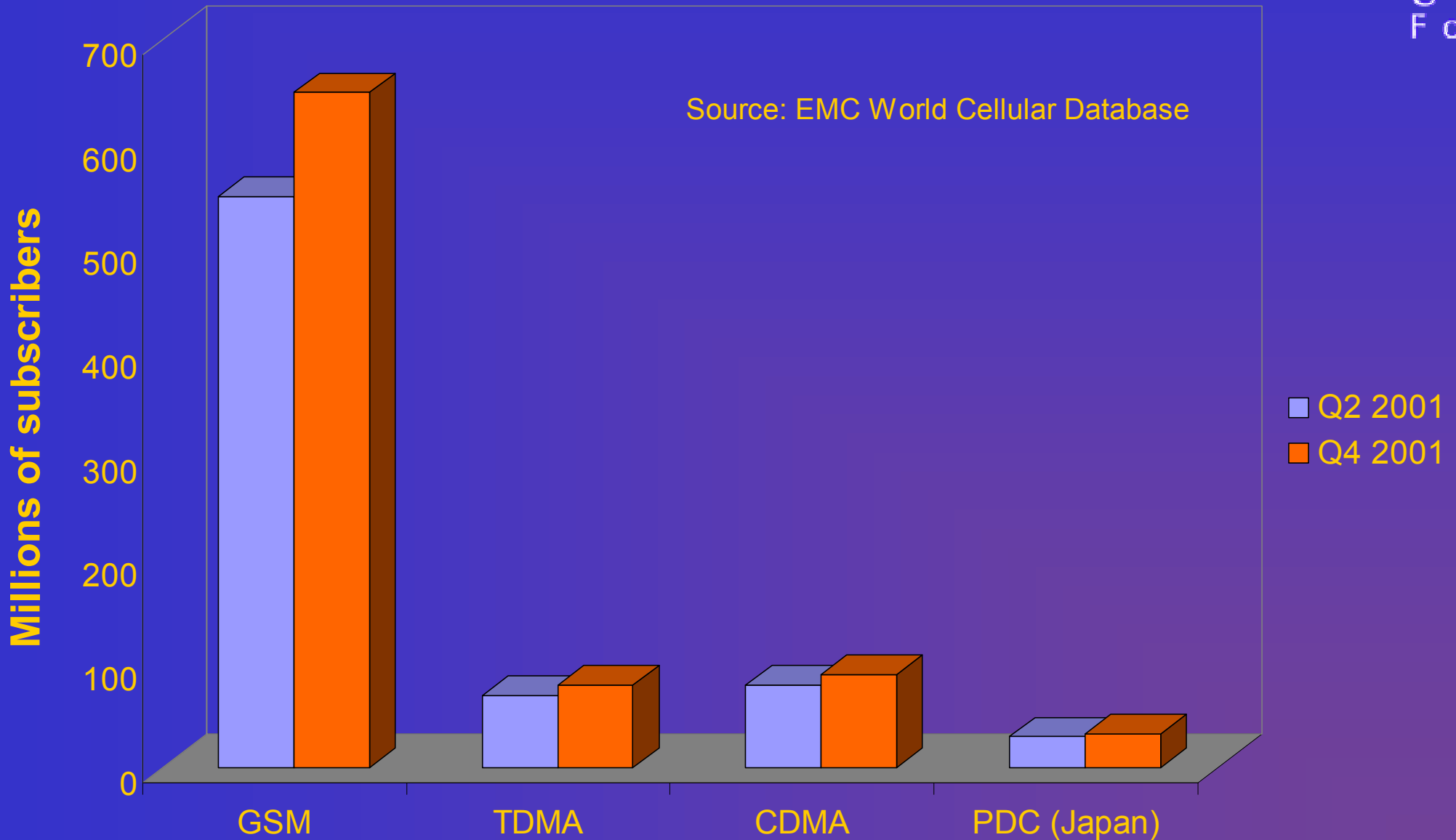
UMTS Forum

Dr Bernd Eylert
Chairman UMTS Forum

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

UMTS

Telecommunication

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

GSM

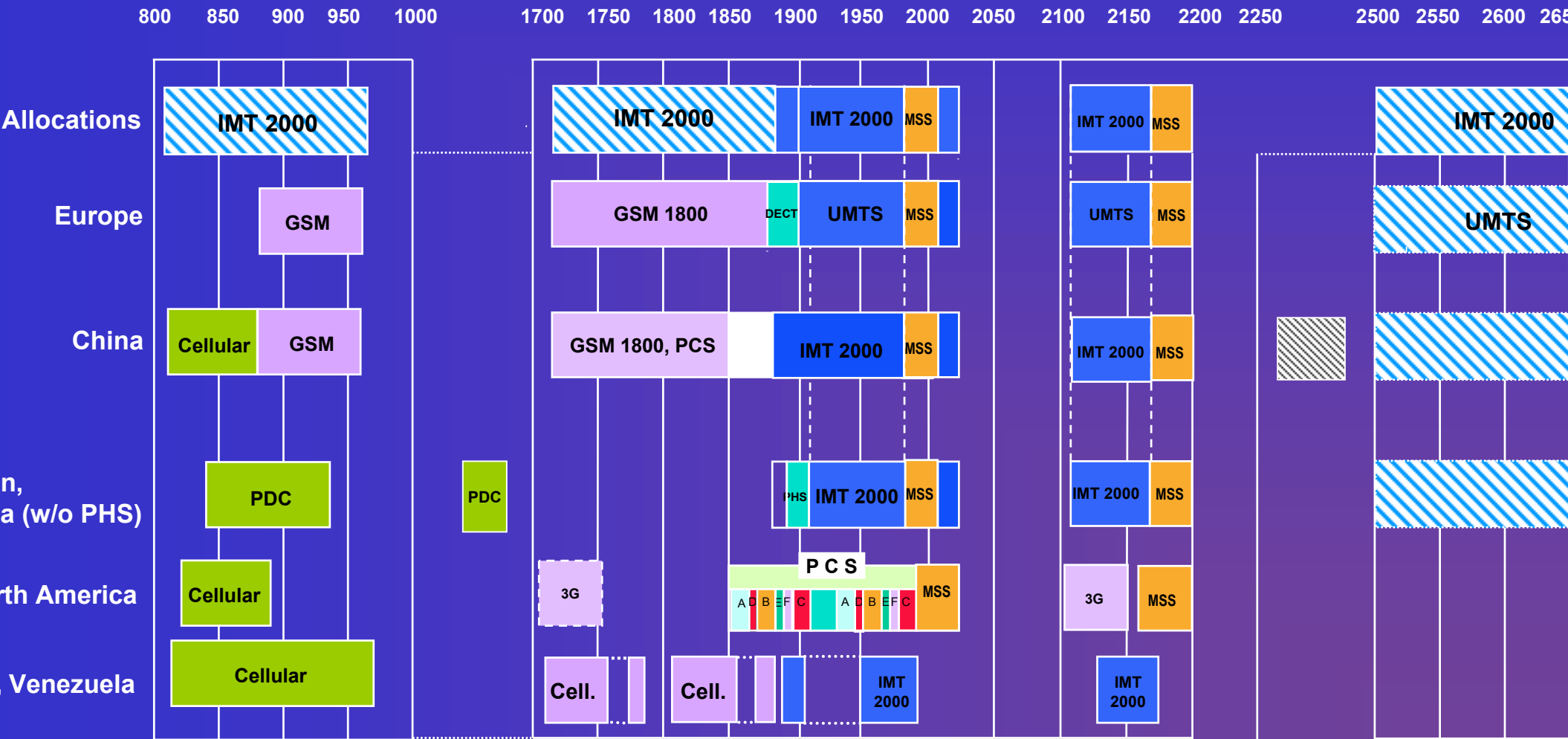# *UMTS: IT & T Integration*

It is compliant with IMT - 2000:

- It builds on ITU Standards (3GPP)

- It builds on GSM

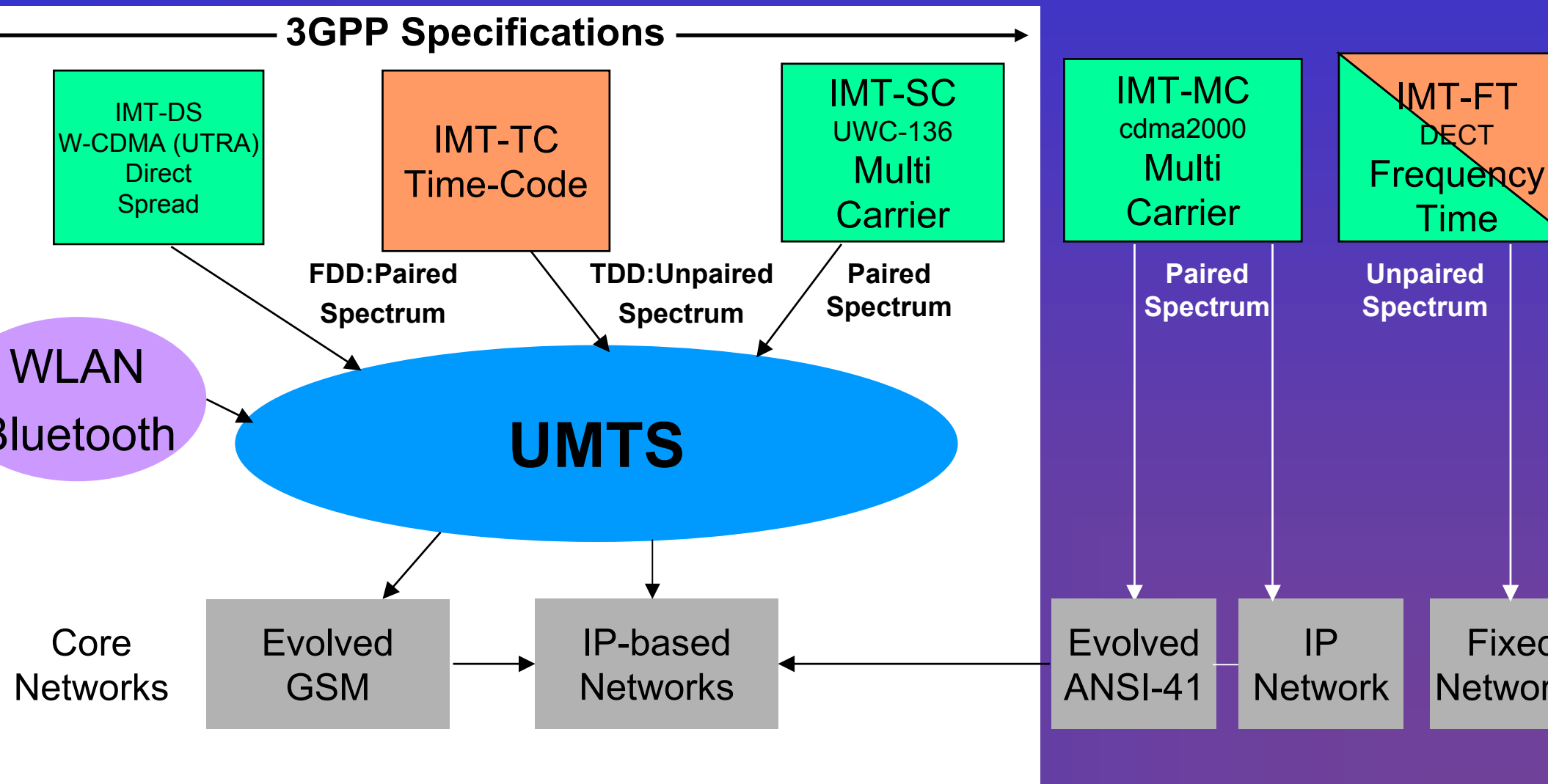- It builds on IMT – 2000 Spectrum Plan from ITU

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

ITU Seminar IMT-2000, 21-24th January 2003
Sofia, Bernd Eylert Chairman UMTS Forum

The ITU IMT-2000 Standards (Terrestrial)

3GPP Specifications →

IMT-DS W-CDMA (UTRA) Direct Spread	IMT-TC Time-Code	IMT-SC UWC-136 Multi Carrier	IMT-MC cdma2000 Multi Carrier	IMT-FT DECT Frequency Time

FDD:Paired Spectrum   **TDD:Unpaired Spectrum**   **Paired Spectrum**   **Paired Spectrum**   **Unpaired Spectrum**

WLAN Bluetooth

UMTS

Core Networks

Evolved GSM	IP-based Networks	Evolved ANSI-41	IP Network	Fixed Networks

The Paths to UTRA

GSM
(incl. HSCSD)

→ **EDGE**
GPRS

→ **UTRA**

FDD
TDD High Chip Rate

Low Chip Rate

=TD-SCDMA

IMT-2000 family

| DS |
| TC |

Voice & low-speed data
Circuit
Switched

Voice & medium-speed data
Packet
Switched

Voice & high-speed data
IP
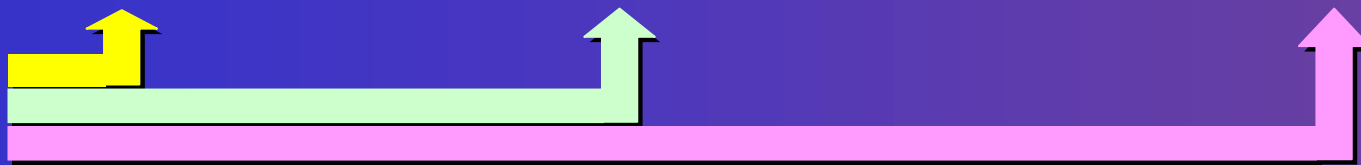
Paths from other technologies, e. g. IS-136, PDC ...

GSM & WCDMA -
one seamless network

GSM/GPRS/EDGE   **Common Parts**   **WCDMA**

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

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

Evolving Proven 2G Network Infrastructure

HLR **SCP**

MAP **INAP**

BTS A_{bis} **BSC**

2.5G-RAN

A

G_b

NodeB FDD

I_{ub} **Common RNC** I_u

NodeB TDD

3G-UTRAN

3G-MSC

ISUP **G-MSC**

3G-SGSN

GGSN

G_n

U-MSC

Common Release'99 Core Network

other circuit/voice networks

other packet/IP networks
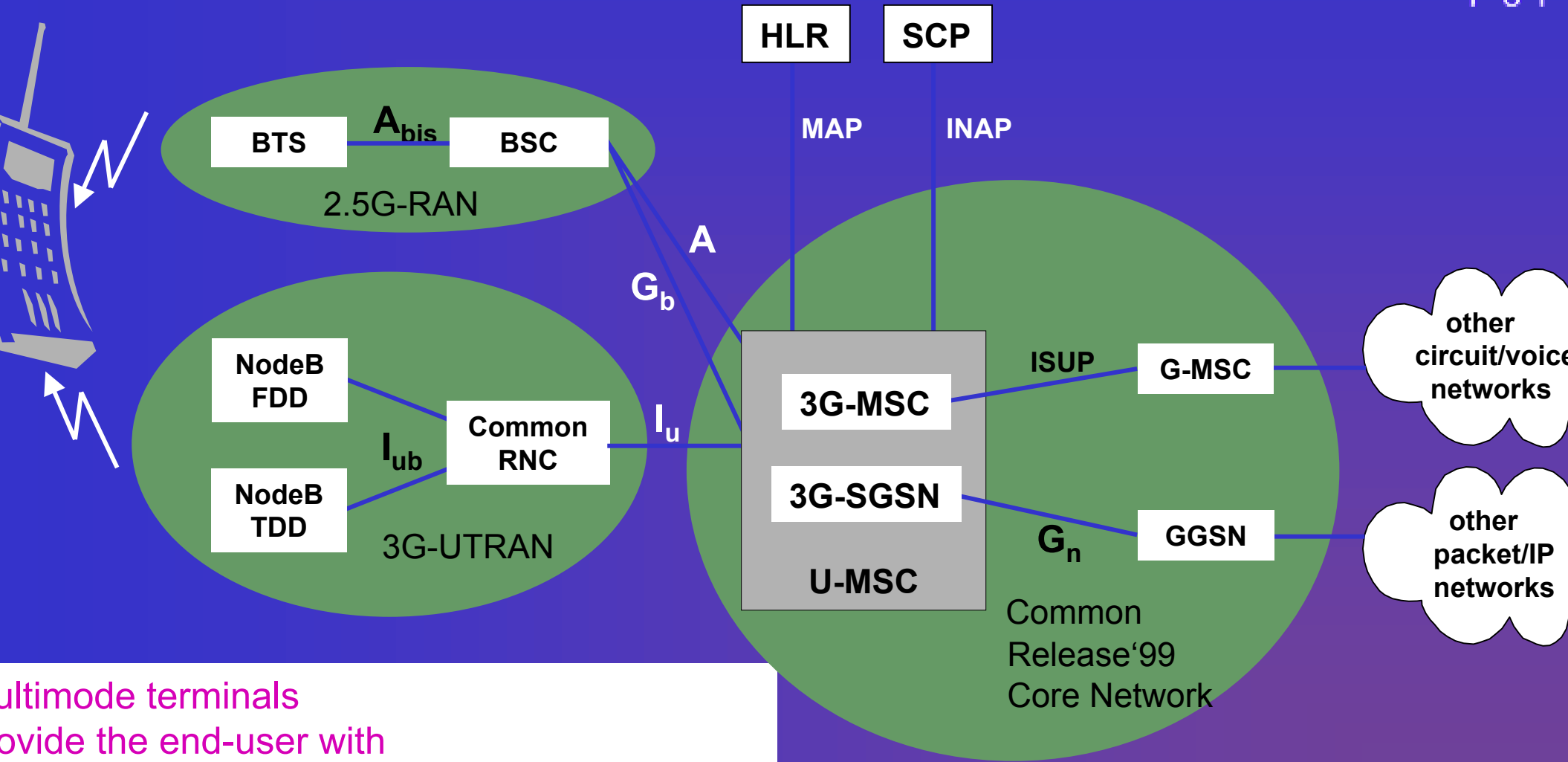
ultimode terminals
ovide the end-user with
ccess to the best of both worlds

Source : Siemens

Standardisation: Definition of the Third Generation Partnership Project

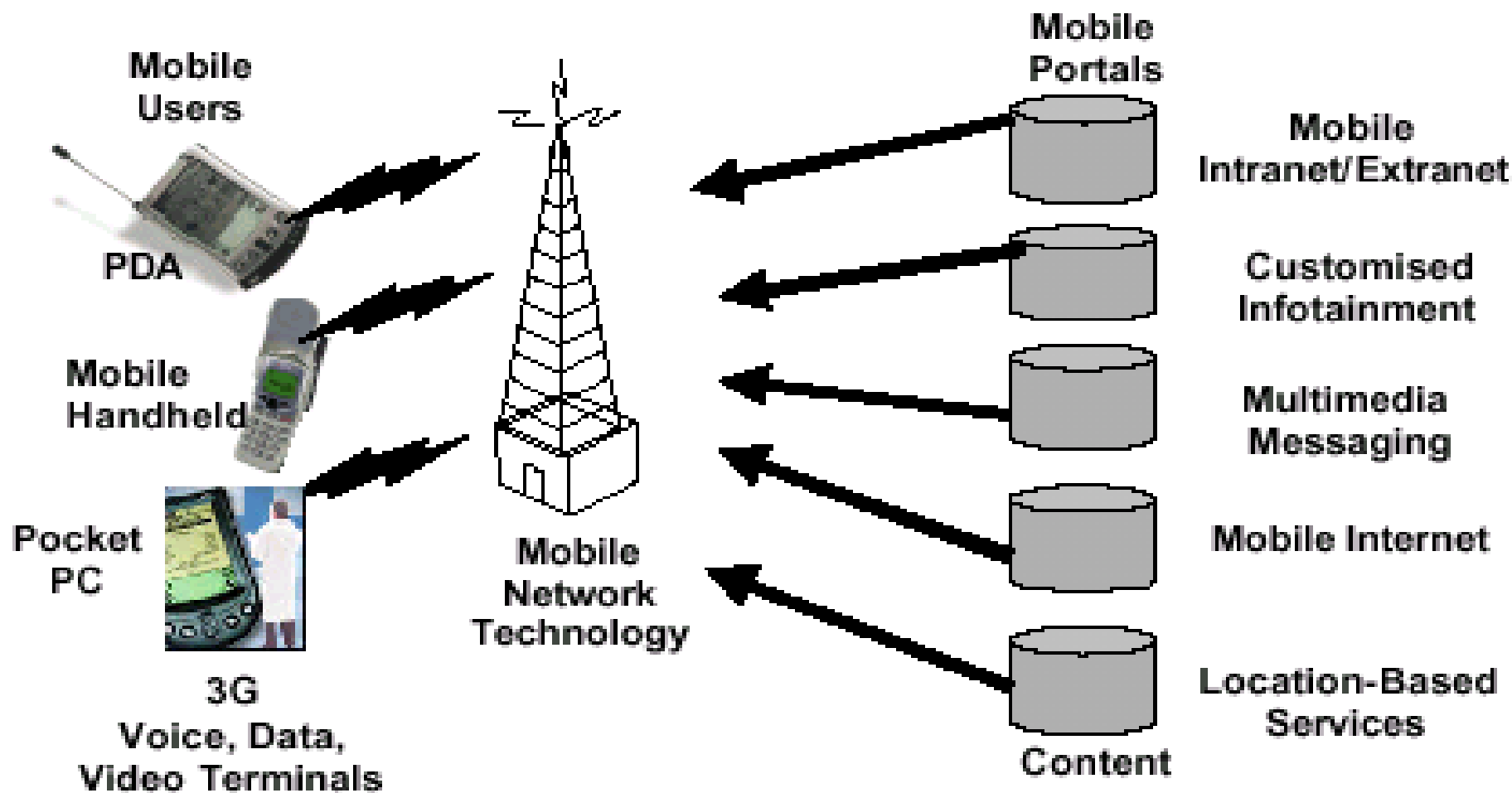**GPP develops globally applicable technical pecifications for a Mobile System**

- **based on the evolved GSM core network, and th Universal Terrestrial Radio Access (UTRA),**

- **to be transposed by relevant standardisation bodies (organisational partners) into appropriat deliverables (e. g. standards).**

One Set of Specifications for UMTS and GSM

3GPP	Specified Features
1999: Release 99	**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)**
2001: Release 4	**EDGE Radio** **TDD Low Chip Rate Radio (1,28 Mcps)** **Improved Location Services (Emergency), USIM toolkit, MExE** **Repeater Specification** **Multimedia Messaging**
2002: Release 5	**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.**
2003: Release 6	**IMS improvements, Presence service** **WLAN Integration** **Multimedia Broadcast and Multicast (MBMS)** **Digital Rights Management** **Network Sharing**

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

Mobile Users
- PDA
- Mobile Handheld
- Pocket PC
- 3G Voice, Data, Video Terminals

Mobile Network Technology

Mobile Portals
- Mobile Intranet/Extranet
- Customised Infotainment
- Multimedia Messaging
- Mobile Internet
- Location-Based Services

Content

Source: UMTS Forum

ITU Seminar IMT-2000, 21-24th January 2003
Sofia, Bernd Eylert Chairman 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**

**ITU Seminar IMT-2000, 21-24th January 2003
Sofia, Bernd Eylert Chairman UMTS Forum**

2E Standardisation for Interoperability Open Mobile Alliance

Launched June 12th 2002

Aligning of equipment identity standards
In order to facilitate tracing of terminal equipment regardless of system standard

Interoperability testing platform
Aiming at enhancing interoperability of equipment

Multimedia Session Handling

U M
F o r

ultiple services

Service 1
Service 2
Service 3

→ **single session**

ynchronised services

Service 1
Service 2
Service 3

→ **multiple sessions**

artly synchronised services
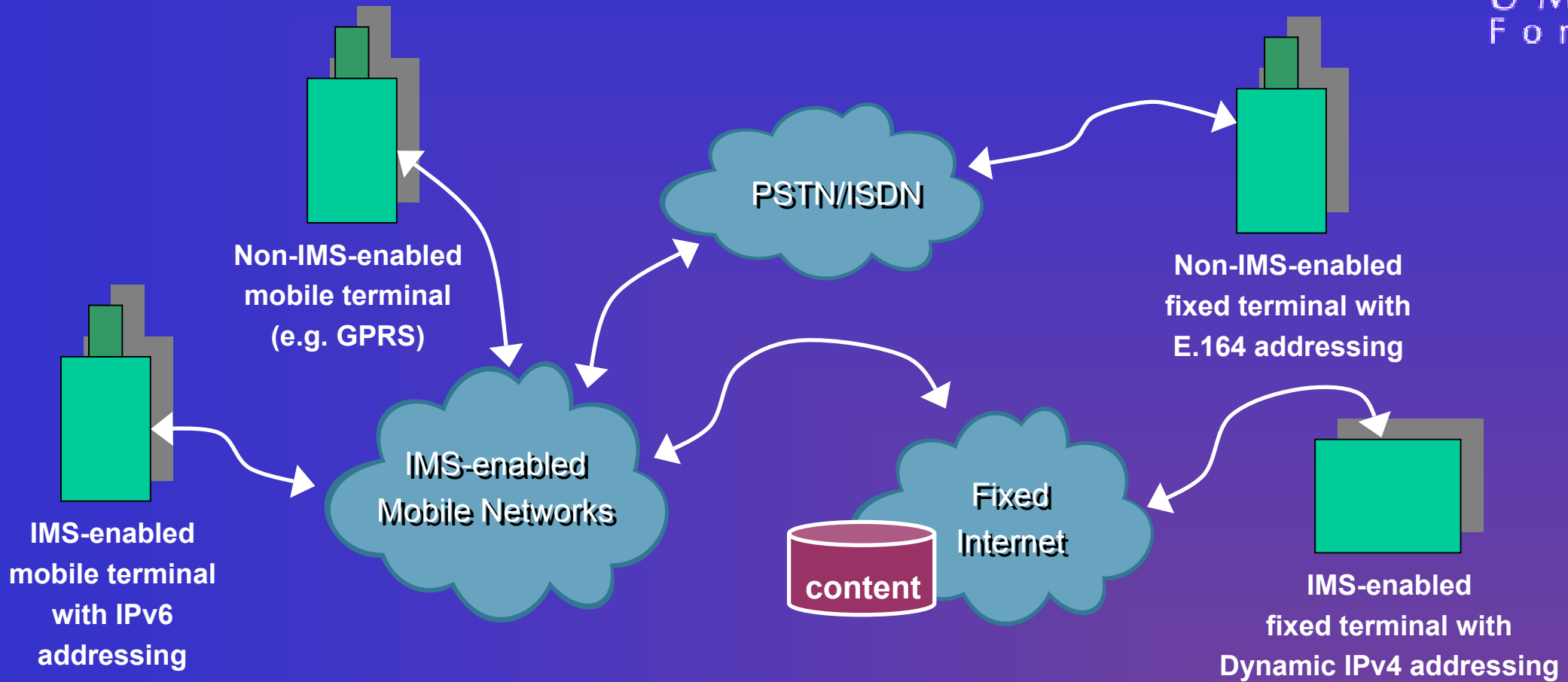
Service 1
Service 2
Service 3

→ **multiple sessions**

IP-Multimedia Subsystem integrates, modifies dynamically multiple sessions

Basic building blocks:
SIP, IPv6

ITU Seminar IMT-2000, 21-24th January 2003
Sofia, Bernd Eylert Chairman UMTS Forum

The IMS Network Interconnectivity

The IMS Service

PSTN/ISDN

Non-IMS-enabled
mobile terminal
(e.g. GPRS)

Non-IMS-enabled
fixed terminal with
E.164 addressing

IMS-enabled
Mobile Networks

Fixed
Internet

content

IMS-enabled
mobile terminal
with IPv6
addressing

IMS-enabled
fixed terminal with
Dynamic IPv4 addressing

Interoperability Between Networks

IMS-enabled Mobile

PSTN
Fixed Internet
Non-IMS Enabled Mobile
Public Land Mobile Network (PLMN)

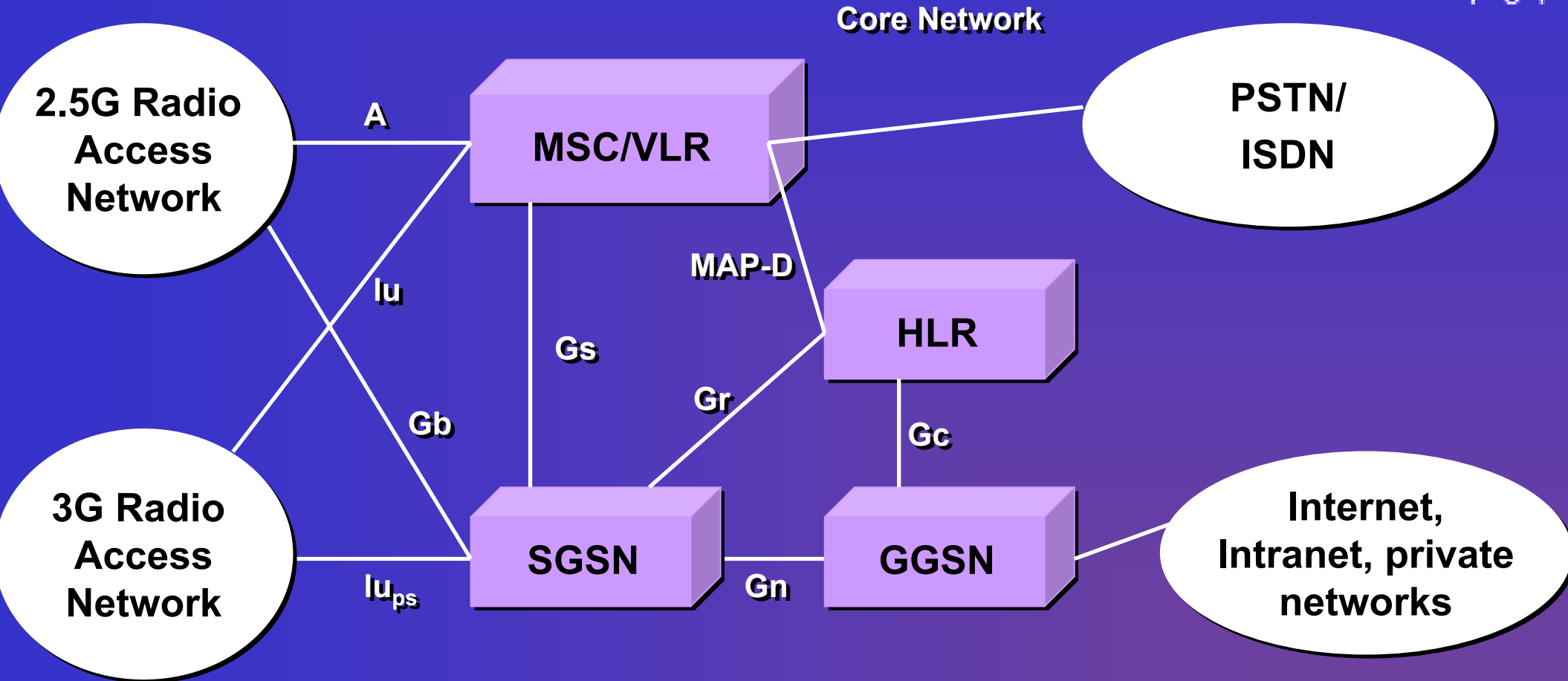**ITU Seminar IMT-2000, 21-24th January 2003
Sofia, Bernd Eylert Chairman UMTS Forum**

Options

Network Architectures GSM & UMTS

Core Network

2.5G Radio Access Network

A

MSC/VLR

PSTN/ ISDN

Iu

MAP-D

Gs

HLR

Gr

Gb

Gc

3G Radio Access Network

SGSN

Gn

GGSN

Internet, Intranet, private networks

Iu_ps

Source: Siemens AG

Network Architecture CDMA2000 1 x RTT + 1 x t 1 x EV - DO

Core Network

MSC/VLR

A

ANSI-41

HLR

1xRTT Radio Access Network

R-P

PSDN

Foreign Agent

1xEV-DO Access Points

1xEV-DO AR

IWF

HomeAgent

Private IP network

AAA (Radius)

PSTN/ ISDN

Internet

Source: Siemens AG

U M
F o r
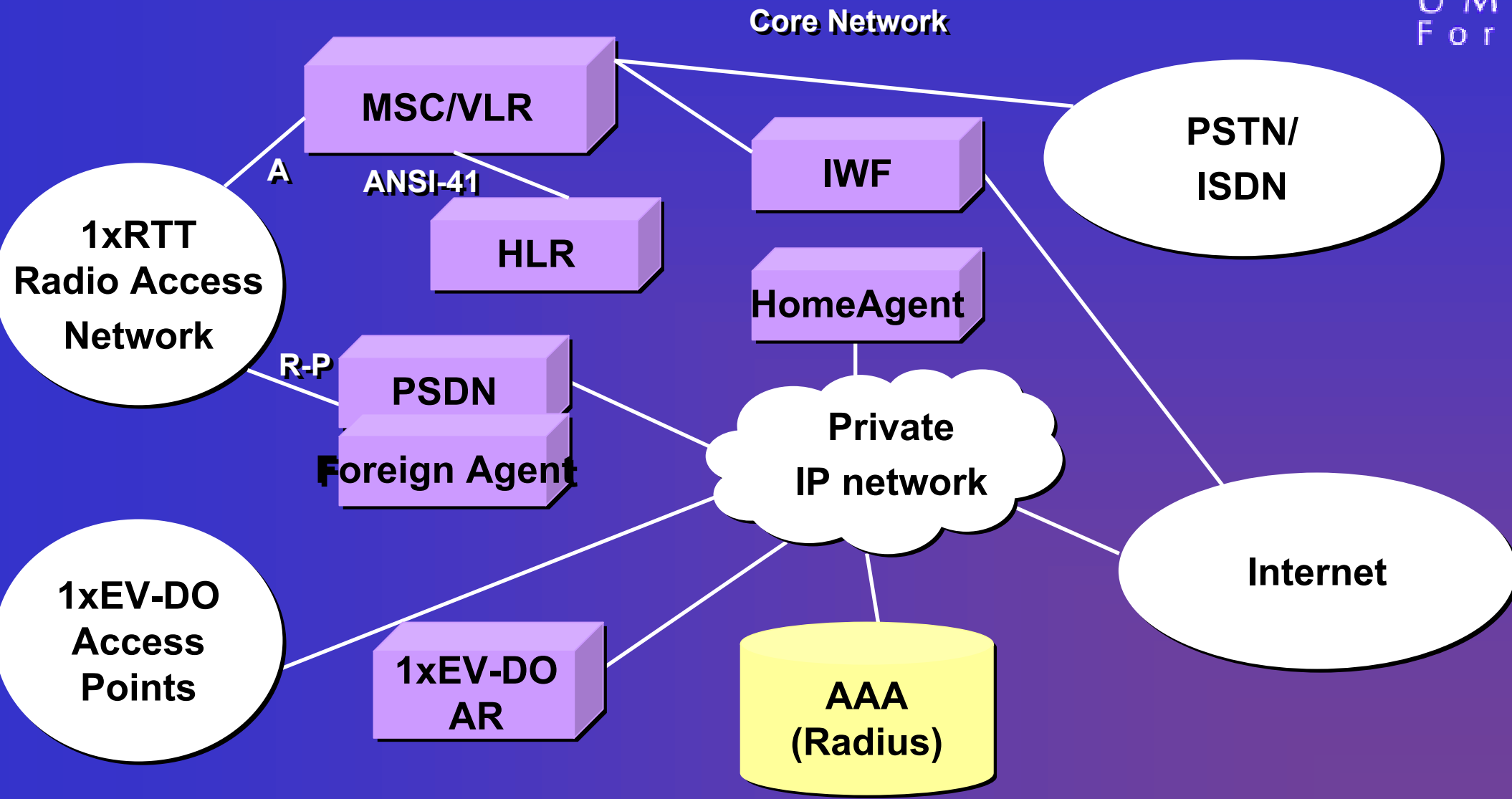
Commercial Operation of W-CDMA Today

W-CDMA technology is available today providing a high number of services used by various applications

pan

- **Location Based Services (LBS)**
- **Video Telephony**
- **I-Mode**
- **Real Time TV**
- **SMS, MMS, …**
- **Internet**
- **Voice Mail Service**
- **Caller ID services, Call Forwarding, …**

Isle of Man

→ **Isle of Man on Air**
  - **Location Based Services (LBS)**
→ **Video Telephony**
→ **Enhanced WAP**
→ **Video Streaming**
→ **Mobile Office**
→ **Online Gaming**
→ **Video Surveillance**

Monaco

→ **Monaco on Air**
  - Location Based Services (LBS)
→ **Local TV**
→ **Video conference**
→ **Chat**
→ **Video Streaming**
→ **Monaco's web portal**
→ **Music Streaming**
→ **Mobile Office**
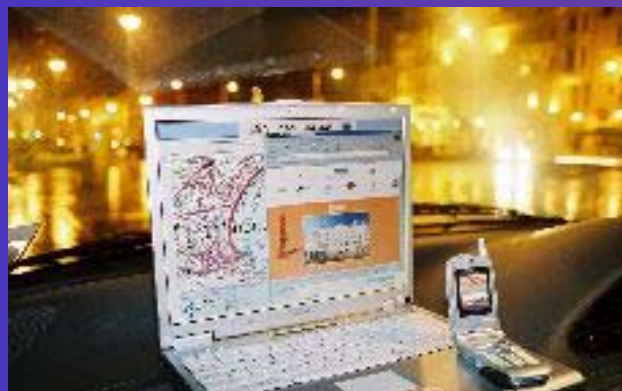
Conclusion

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

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

Of the 114 3G network rollouts 112 are using the 3GPP standard, offering high traffic capacity.

Thank you for your Attention!

UMTS Forum
Russell Square House
10 - 12 Russell Square
London WC1B 5EE
United Kingdom
Website: www.umts-forum.org