

The Future of Wireless Internet: A Global Operator's Perspective

Dr. Mehmet Unsoy
Vice President
Chief Wireless Architect
BT Wireless
mehmet.unsoy@bt.com

Outline

- **BT Wireless**
- **Wireless Internet**
- **BT Wireless Technology Roadmap**
- **Role of Internet Protocol (IP)**
- **Success factors**

New BT Organisation

- **BT Openworld**
 - International mass market Internet services (e.g. ISPs, Portals, Email / Messaging services, ADSL to consumer markets)
- **Ignite**
 - Data-centric, broadband IP business for corporate & wholesale markets in the U.K. and continental Europe (e.g. IP VPNs, Web Hosting, ASPs)
- **BT Wireless**
 - International mobile business with emphasis on mobile data and next generation services
- **Yell**
 - BT's International Directory and E-Commerce businesses
- **BT Retail**
 - Primary marketing, sales & distribution channel for the U.K. market
- **BT Wholesale**
 - Target high quality network solutions in the U.K.
- **Concert**
 - Global communication alliance with AT&T for multinational business customers, international carriers & service providers worldwide

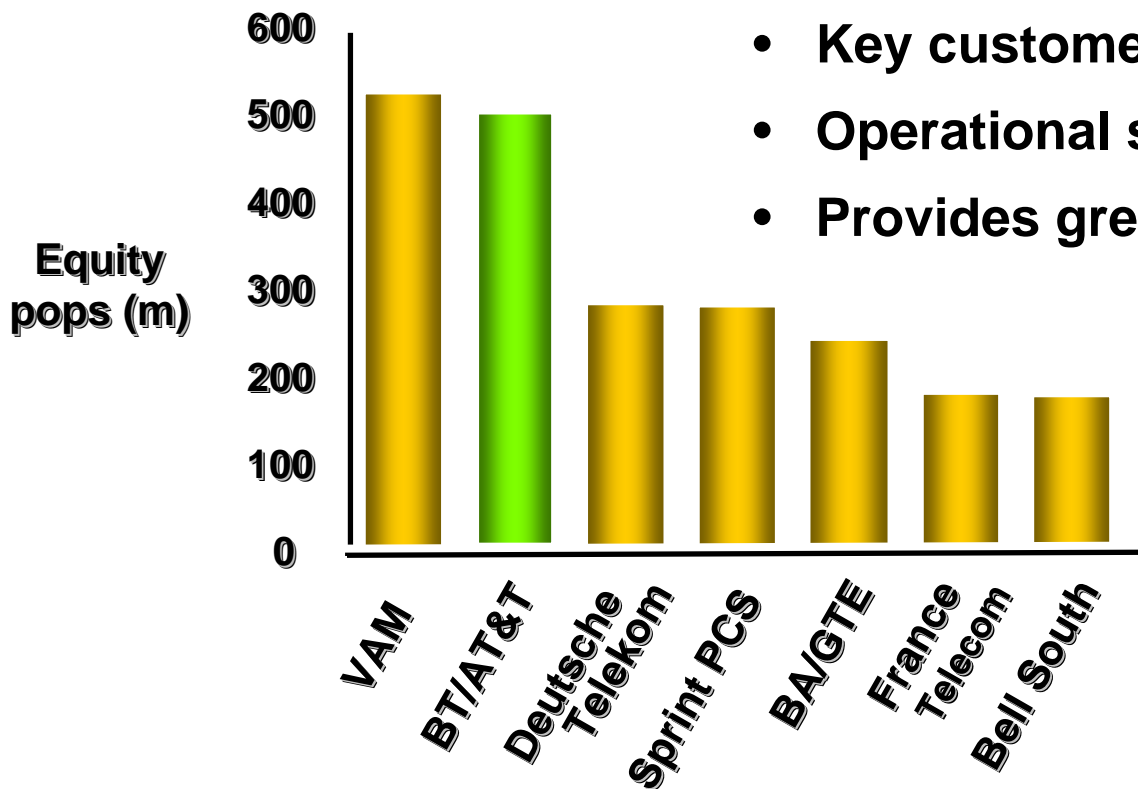
BT Wireless

Global Network with Partners

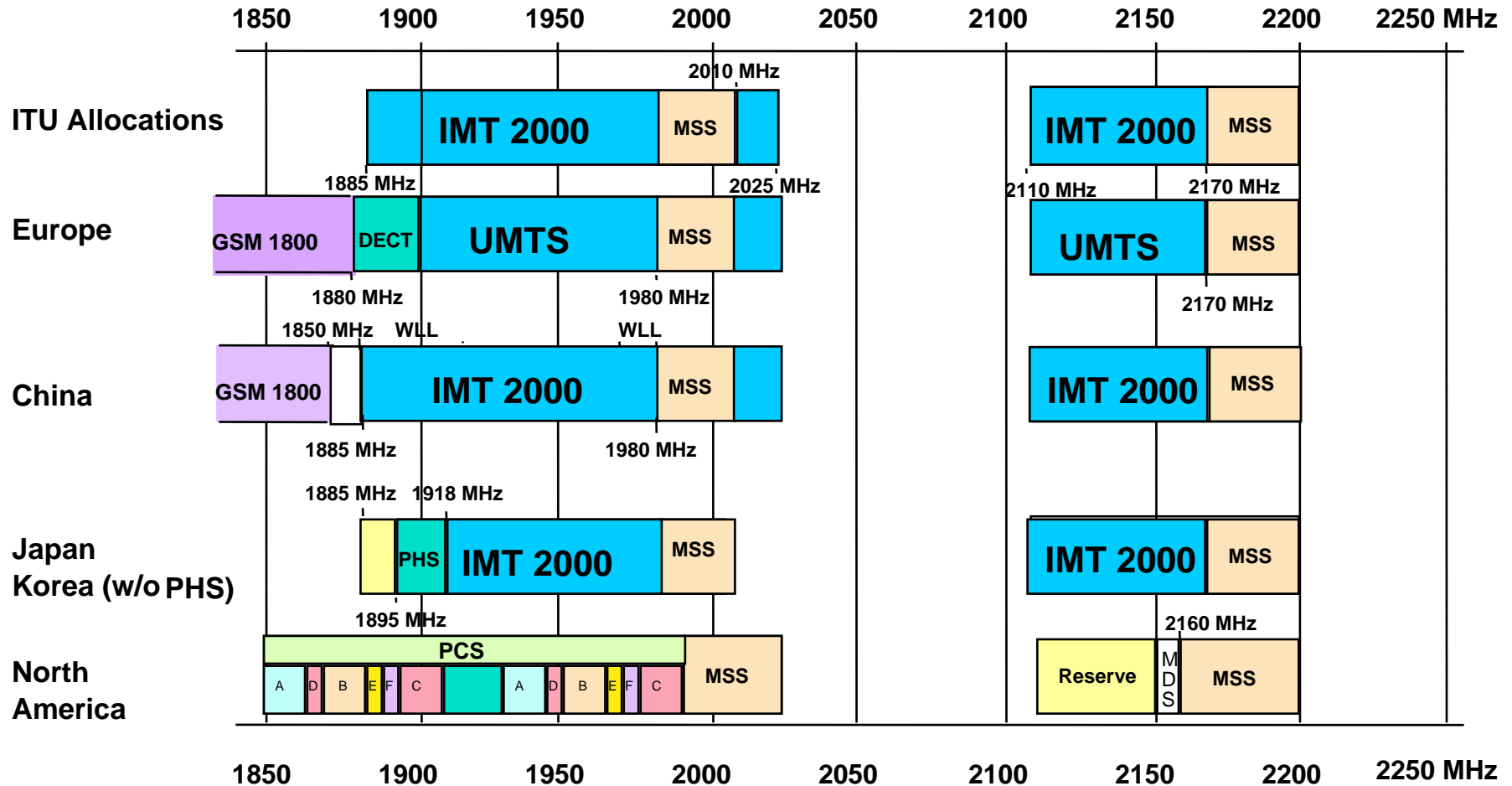
- **Global company with operations in 14 countries**
 - 60 million total customer base
 - 15 million equity weighted customers, and
 - 200 million equity weighted pops
- **Strong Financials**
 - Total turnover of BT Wireless in 2000 is around £ 4.5B, expected to grow to £ 14B by 2005
 - Non-UK revenues 35 % in 2000, expected to grow to 60 % by 2003
- **Significant growth momentum with recent acquisitions & increased stakes in joint ventures**
 - Viag in Germany and Telfort in Holland most recently
 - Cellnet in the U.K., Esat in Ireland
 - LGT in Korea, JT in Japan, Rogers Cantel in Canada

Advance Alliance with AT&T Wireless

- Strongest GSM-TDMA footprint
- Unique products
- Key customer segments
- Operational synergies
- Provides greater scale and reach



Global Spectrum Allocations for Next Generation Mobile Networks

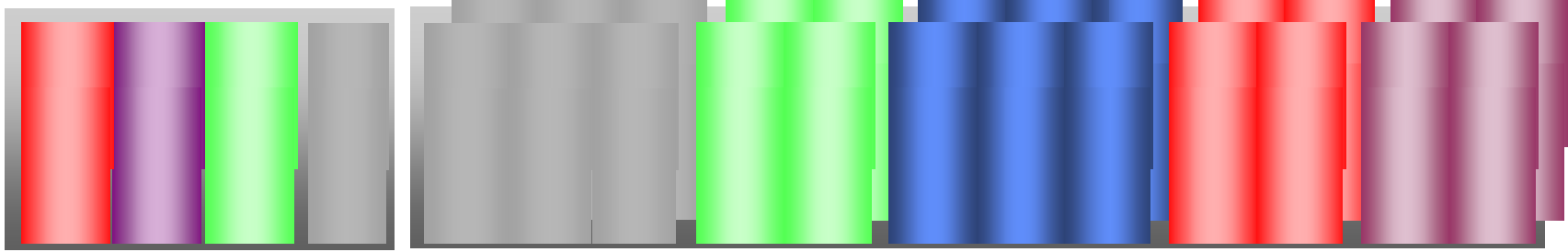


UK 3G Spectrum Allocations



TDD

FDD



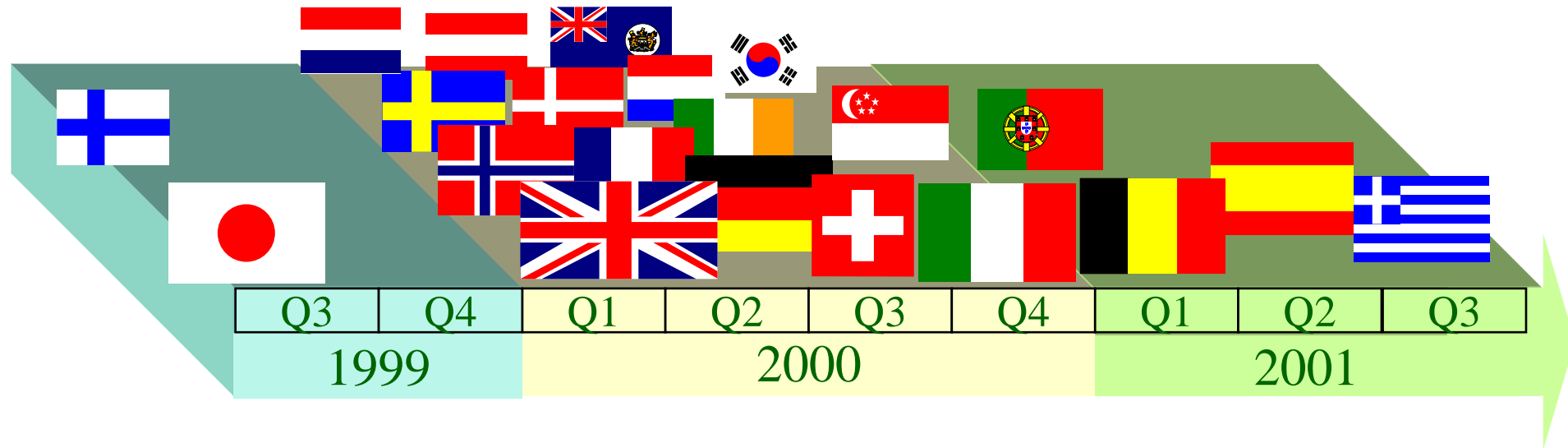
1900MHz

1920MHz

1980MHz

- Paired & Unpaired spectrums
- Existing and new entrants
- Different packages
- Different values

Global 3G / UMTS Licences



BT Wireless 3G / UMTS Licences:

Japan, Spain, UK, Holland, Germany and counting!!

Our Mobile Internet Vision

- **Mobile domination**
 - Absolutely for voice services
 - Also for time-critical, personalized, location-sensitive (i.e. high-value) services
- **Second coming of Internet will be based on Mobile**
 - 80% of Internet appliances will be mobile devices by 2004
 - That's about 900 Million mobile devices, dwarfing the fixed Internet access
- **A hand-held device that combines WAP, Java, MeXe, GPRS, packet, IP, GPS, Bluetooth, Smart-card, etc**
 - Device limitation being overcome through new technologies
 - For remaining limitation, network-based solutions will be available
- **From (always-on / anywhere) To (between anything / everything)**
 - communication between any (limited!) intelligent entities
 - Devices, networks, systems to accommodate such explosion

Always-on  **Between Anything / Everything**

Our Mobile Internet Vision (Cont'd)

- **Mobile penetration**
 - exceeding 100%, multiple devices per person, and all sorts of new entities communicating
- **Mobile applications**
 - all types, but mostly low to medium bandwidth requirements
 - Audio, vision, auto-based, location-based applications
 - Mobile driven, mobile aware applications, e.g. m-commerce
- **Seamless Applications**
 - Local area wireless (e.g. tetherless) and wide area wireless, e.g. Bluetooth / WLAN and Cellular networks
- **Addressing & numbering**
 - We need IP addresses for everything, (500M IP addresses for mobile by 2004)
 - IPv6 is essential IP technology for the growth of mobile communication

3G + IPv6



Mobile Information Society

Why do we need IP?

- **Deliver high-value, high-margin mobile multimedia services**
 - IP is the protocol of choice for application developers
- **Faster time to market for new services**
 - tap into internet innovation life cycle
- **Major cost reduction**
 - use IP technology widely to replace expensive CS infrastructure

**IP enables Mobile Operators to ride on
Innovation Cycle up and Cost Curve down**

All-IP Summits among Mobile Operators

- **3G.IP and MWIF**
 - two industry organisations pursuing All-IP networks goals with different starting points and agendas
- **All-IP Summit meetings**
 - between major mobile operators belonging to 3G.IP and MWIF
 - to explore areas of agreement and possible collaboration toward the common architecture of all-IP networks
- **Participants:**
 - 3G.IP: AT&T Wireless, BT Wireless, TIM, T-Mobil
 - MWIF: DDI, Orange, Sprint PCS, UUNet, Vodafone
- **Last meeting held in July produced a set of agreements of collaborations, as well as a communique, which states that**
 - “The Operators present at this All-IP Summit agree that we need a convergent architectural direction leading to a common Internet-based target architecture, which we believe to be in the best interest of the global community.”

Key IP Principles for Mobile Network Evolution

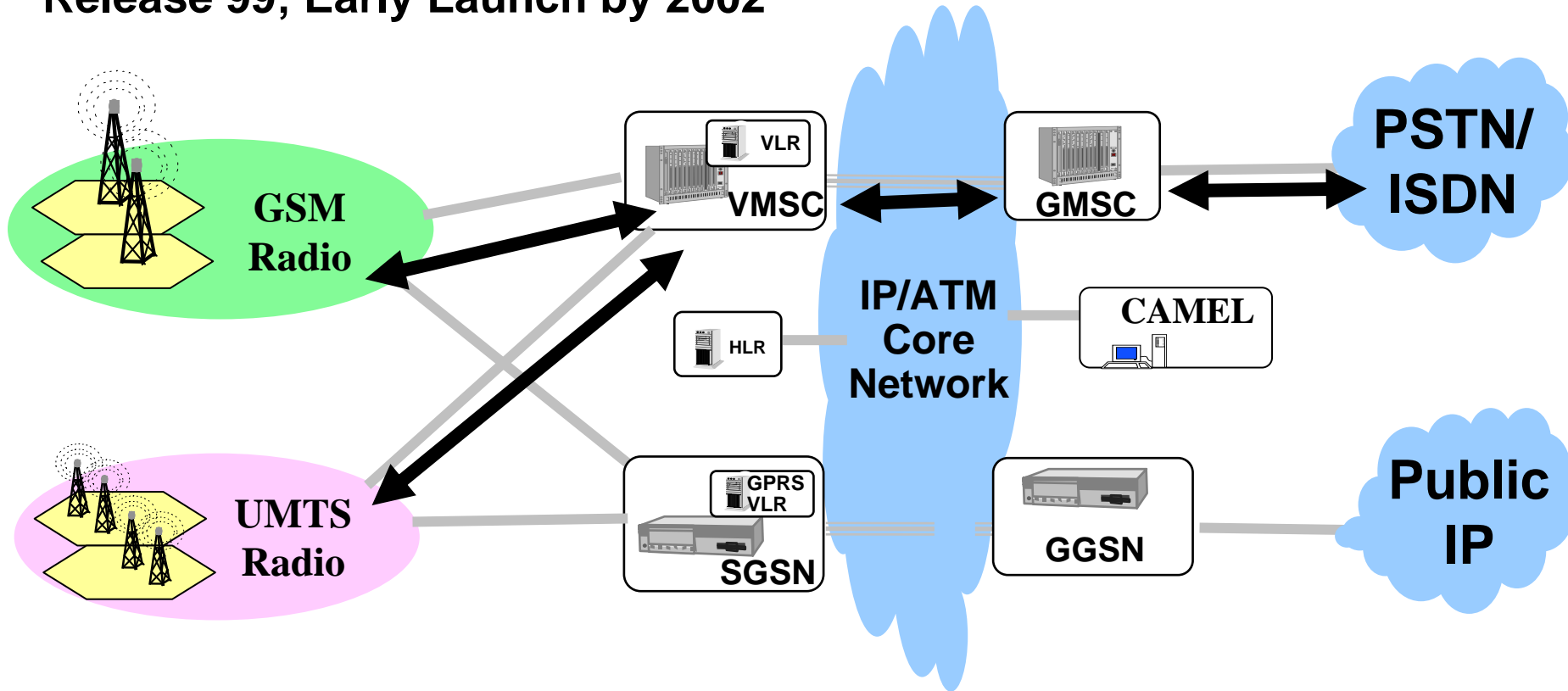
- **IP based services, voice over IP, multimedia over IP**
- **End-to-end IP at services:**
- **Air interface independence at the application level**
- **Harmonised multimedia services over IP across fixed & mobile access**
- **Support of IPv6 formats / addressing for networks, services and devices**
- **Single integrated multimedia network management**
- **Mobility-enabled core IP networks**
- **Application of IP technology to MSC (or disappearance of MSC as we know it)**
- **Single, simple & consistent user paradigm on the mobile device for all multimedia services**
- **Roaming to 2G and release 99 networks essential**

Mobile Network Architecture

BT wireless

Voice Path

Release 99; Early Launch by 2002

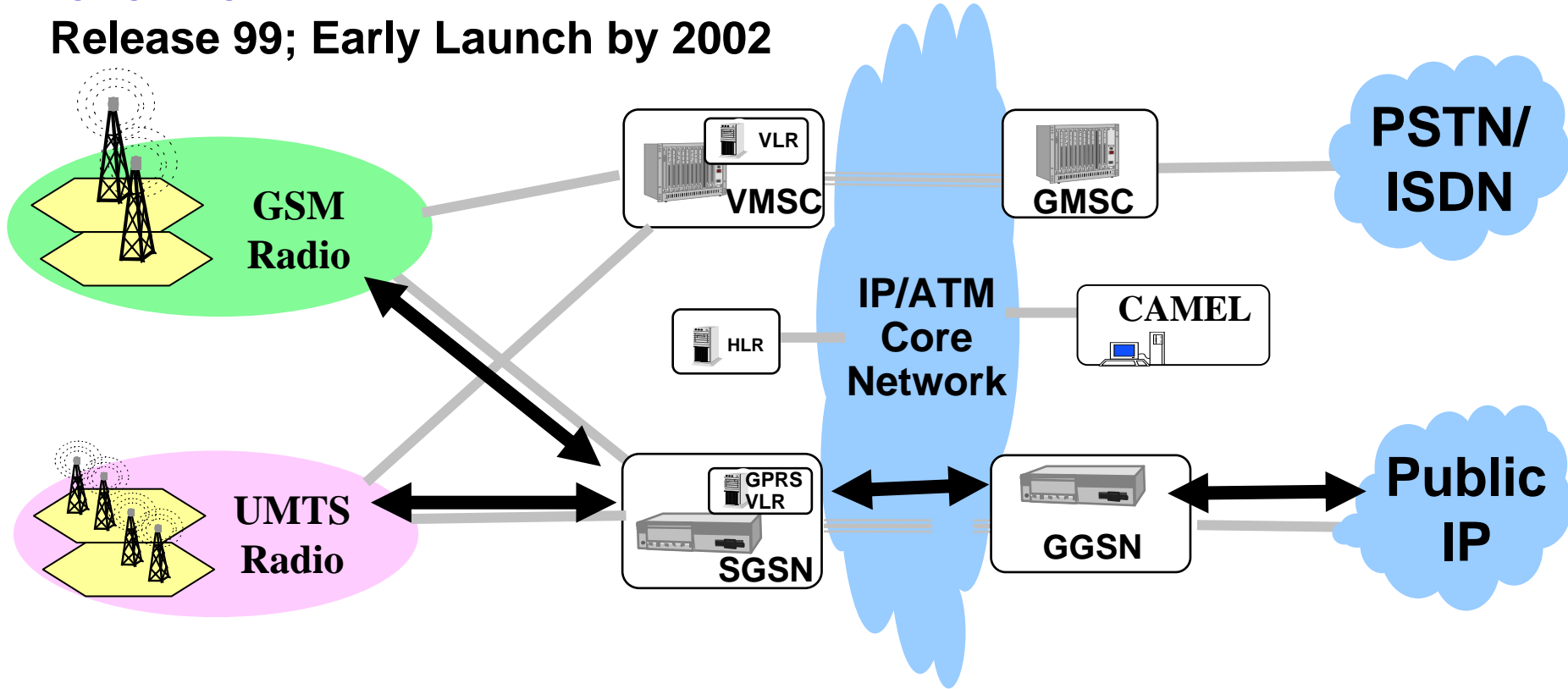


Voice Path - leverage IP/ATM transport

Mobile Network Architecture

Data Path

Release 99; Early Launch by 2002



**Data Path - leverage GPRS,
limited IP capabilities & IP/ATM transport**

3G Radio Technologies

Initial Focus for Launch Networks

W-CDMA **(FDD)**

Wide-area technology

32kb/s - 384kb/s

Cell range dynamically linked to capacity

Opportunity for evolution

TD/CDMA **(TDD)**

Low-range, high rate technology

Efficient support for asymmetric data

Less well supported by manufacturers

Device Technology Trends & **BT** wireless Requirements

- Broad portfolio of devices - not just mobile phones
- Voice recognition, browser, easy-to-use, customisable
- Colour displays, MP3 download / playback
- GPS, Bluetooth, USB supports

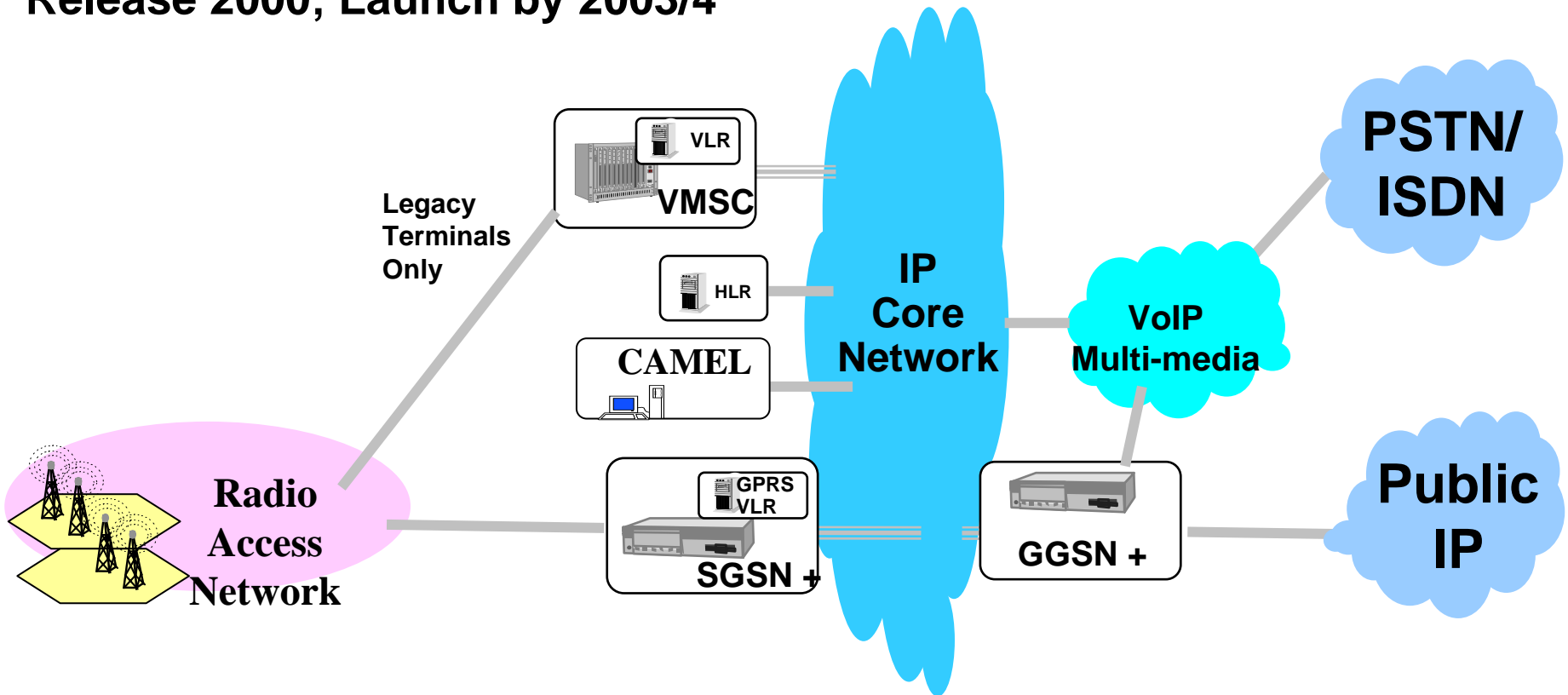


Mobile Network Architecture

BT wireless

Evolution

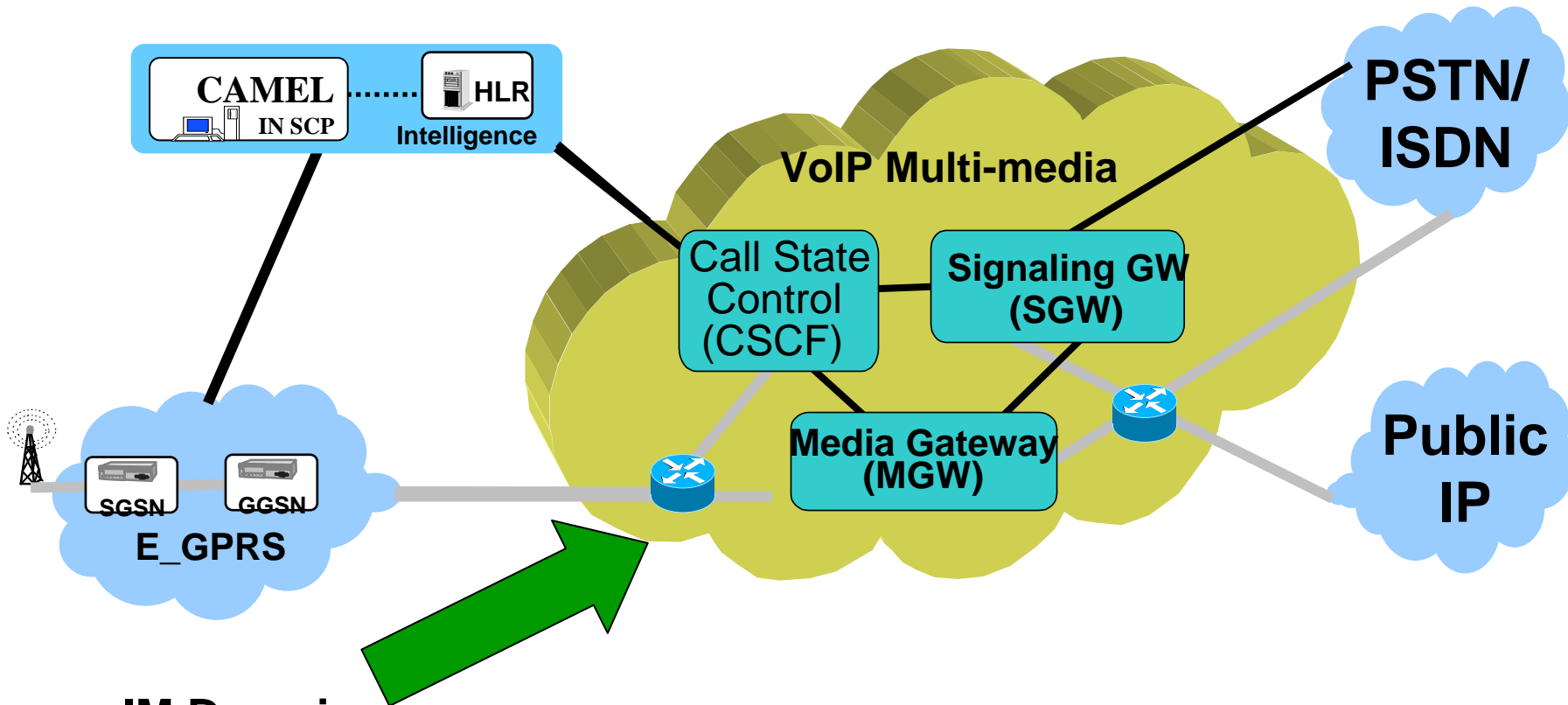
Release 2000; Launch by 2003/4



**Growth of Voice & Data over IP,
Limit CS / MSC to legacy terminals only**

'Mobile' VoIP & Multi-Media

IM Domain

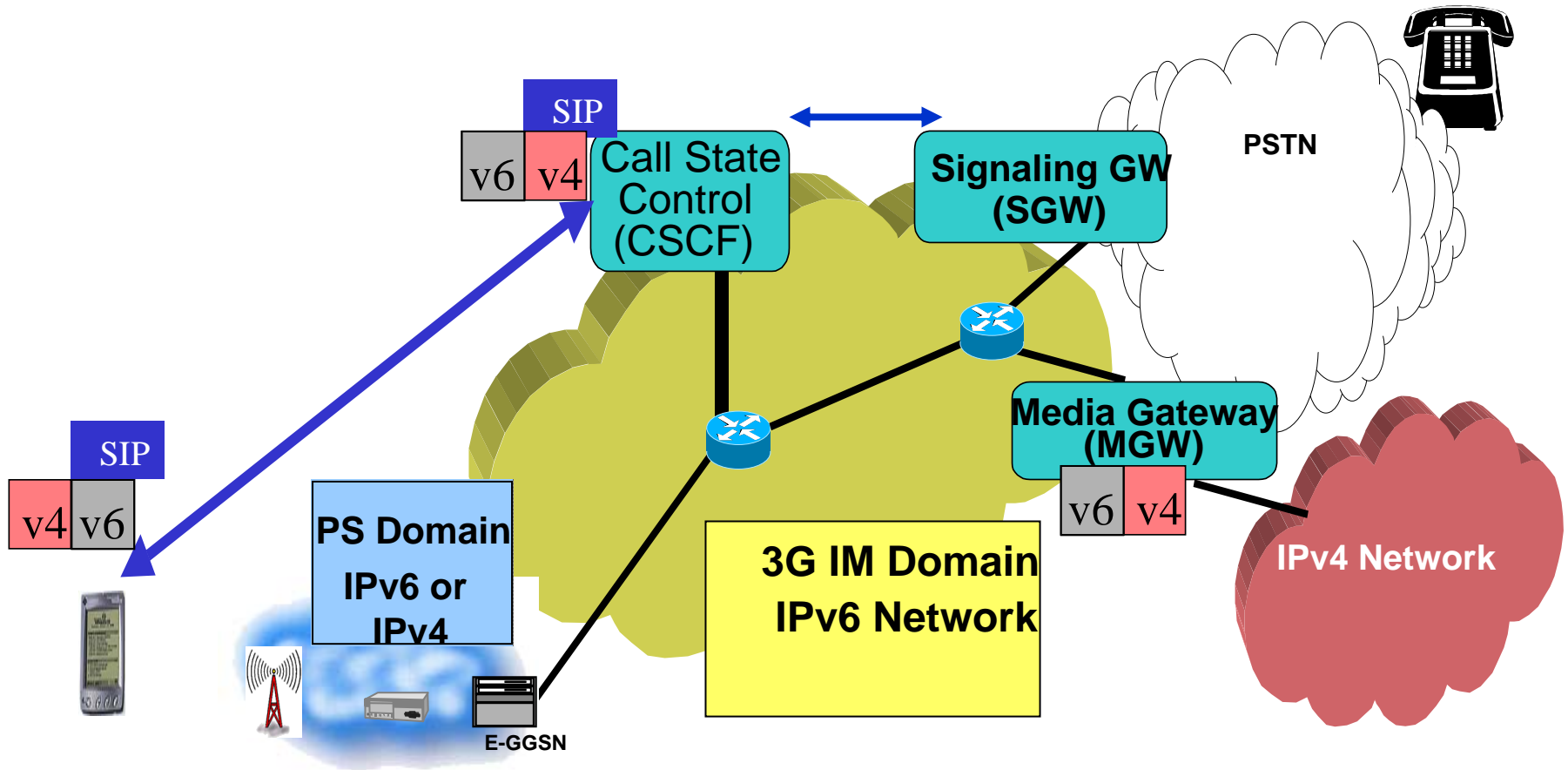


IM Domain:

- 3G mobile network domain for real-time services
- Signaling is between mobile & CSCF
- User plane is between mobile & MGW

IPv6 and SIP for IM Domain

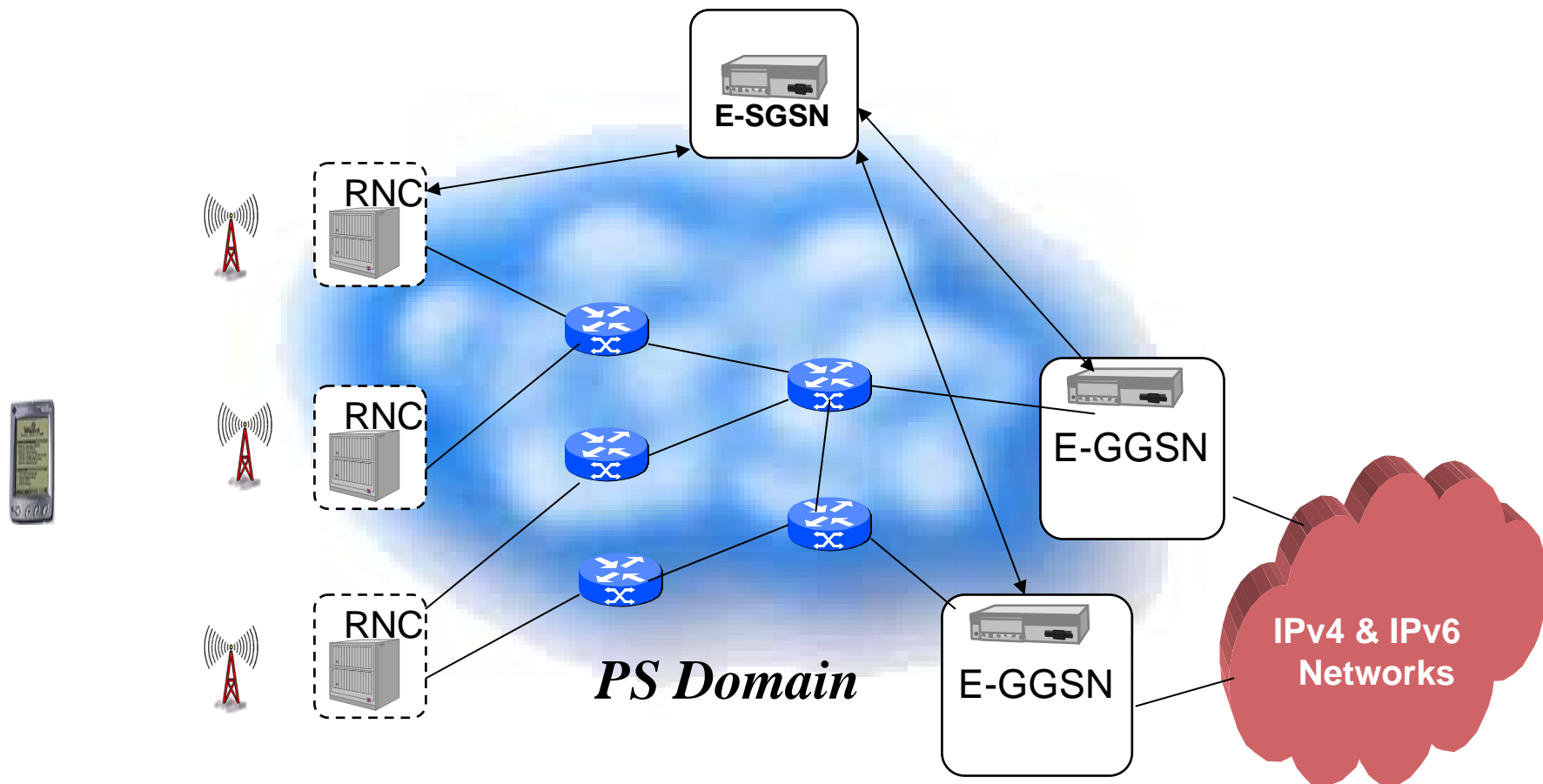
BT wireless



- Since IM Domain is brand new, we want it to be IPv6 only
- PS Domain can transition from IPv4 to IPv6 depending on requirements / economics
- SIP is critical signaling protocol to realize the IP-based real-time mobile services

Release 2001 PS domain

BT wireless



Separation of SGSN into server for control and mobility enabled router for traffic

Conclusions

- **Mobile Internet is the next major growth area in the communication field**
- **Critical Success Factors:**
 - **3G / UMTS and the associated spectrums will be major enablers**
 - **IP is the most critical technology for the development of Mobile Internet**
 - **It is important to have industry alignment / agreement on the all-IP mobile network architecture**
 - **Availability of compelling, cost effective and easy-to-use mobile devices and services**
 - **Effective partnerships across industries to bring high-value services to end users**
- **BT Wireless is well positioned to deliver Mobile Internet on a global basis**