

BT's Vision for Mobile Networks



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Vision for Mobile Evolution

- Mobile will dominate
 - Absolutely for voice services
 - Mobile will also dominate for time-critical, personalized, location-sensitive (i.e. high-value) Internet 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 access in terms of subscribers
- A hand-held device that combines WAP, Java, MeXe, GPRS, packet, IP, GPS, Bluetooth, Smartcard, etc
 - Device limitation being overcome through new technologies
 - For remaining limitation, network-based solutions will be available
- From (always on / anywhere / anytime) To (between anything / everything)
 - communication between any (limited!) intelligent entities
 - Devices, networks, systems to accommodate such proliferation / diversification / explosion of communication

Vision for Mobile Evolution (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
 - more users / entities communicating, and more often, rather than high-bandwidth applications
- Seamlessness
 - Near-term: Local area wireless and wide area wireless, e.g. Bluetooth / WLAN and Cellular networks
 - Fixed & mobile seamlessness - demand to be driven by customers requirements
- Addressing & numbering
 - IPv6 is essential IP technology for the growth of mobile communication
 - We need IP addresses for everything, dynamic and/or static

BT's Roadmap for Mobile Networks

1. Early launch

- Based on 3GPP Release 99
- Leverage current GSM/GPRS networks,
- Transport (IP & ATM) opportunity.

2. Evolve to All-IP Foundation

- Based on 3GPP Release 2000
- Real time services over PS & IP based call control
- Confine MSC deployment & minimise CS investment.

3. Aim for 'All-IP' beyond Release 2000

- Refine IP infrastructure, add value & new services
- Specialised routers for mobility
- Harmonise Multimedia over IP for wired & wireless

Evolve to All-IP architecture

Near-Term Business Interests for 3G

- Time-scales driven by spectrum auction & allocations
- Successful launch & deployment:
 - Current infrastructure reuse: efficient investment
- Launch architecture must be standards-based
 - Available equipment based on 3GPP Release 99
 - Minimise impact to 'live' GSM/GPRS network
 - But integrate into live network

Early, on-time launch is essential!

BT's Goals: 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
Cost Curve and Innovation Cycle**

BT's Goals - When do we need IP?

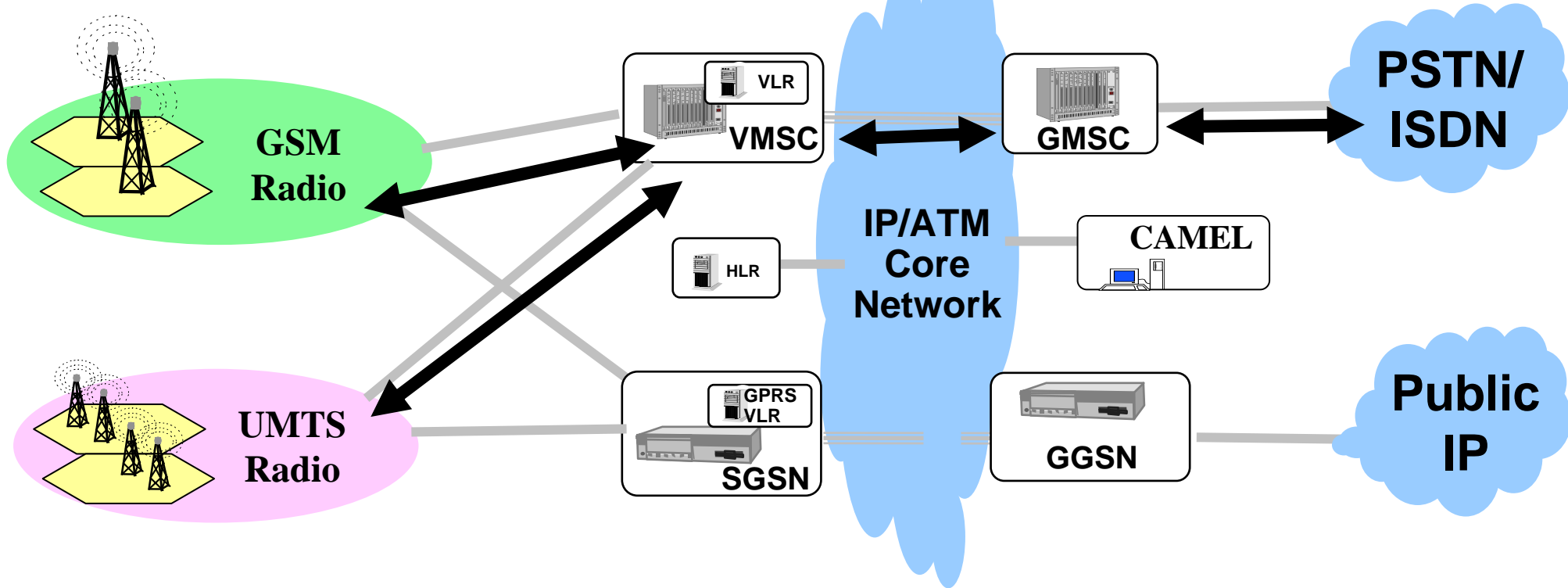
- **IP architecture needed in 3GPP Release 2000 to get implemented by 2003/4**
 - limit further investment in circuit-switch technology
 - enable new IP-based multimedia applications as early as possible
 - avoid large population of non-IP terminals

3GPP Release 2000 needs to include as much IP technology as possible

Mobile Network Architecture - Voice Path



Release 99; Early Launch by 2002

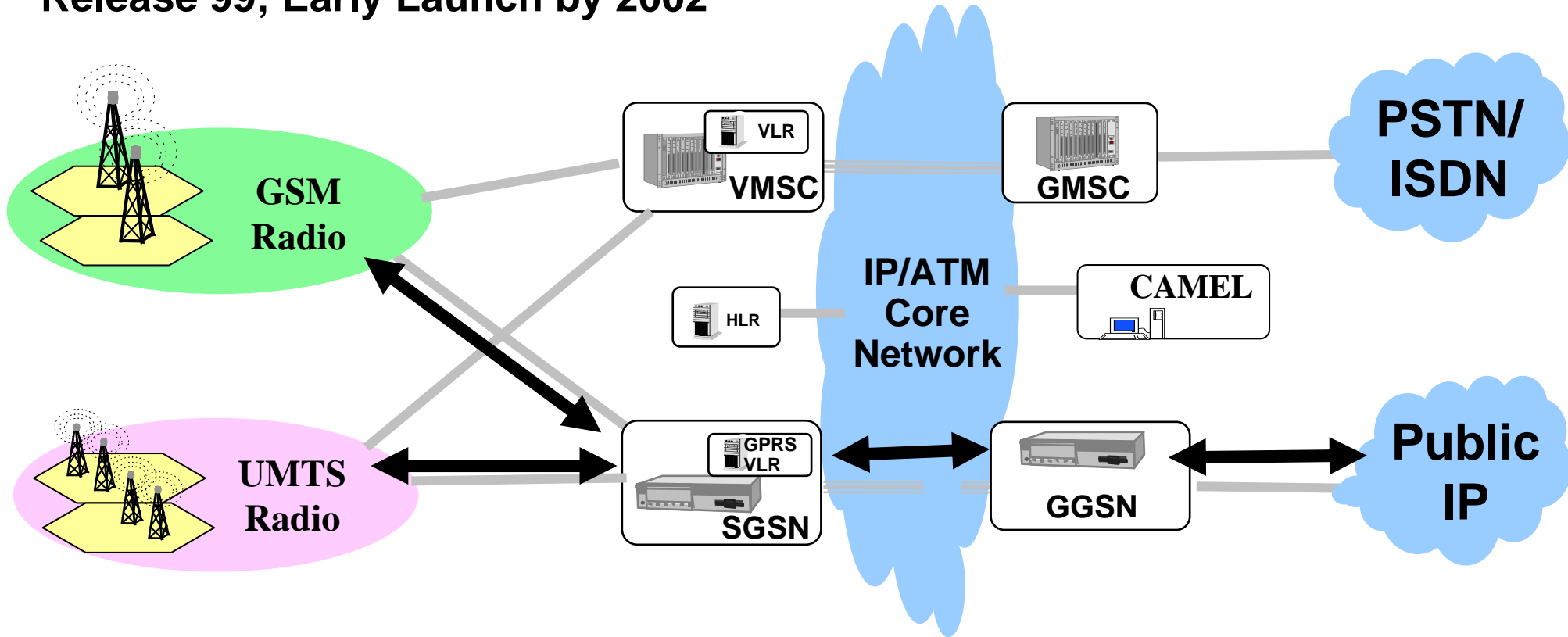


Voice Path - leverage IP/ATM transport

Mobile Network Architecture - Data Path



Release 99; Early Launch by 2002

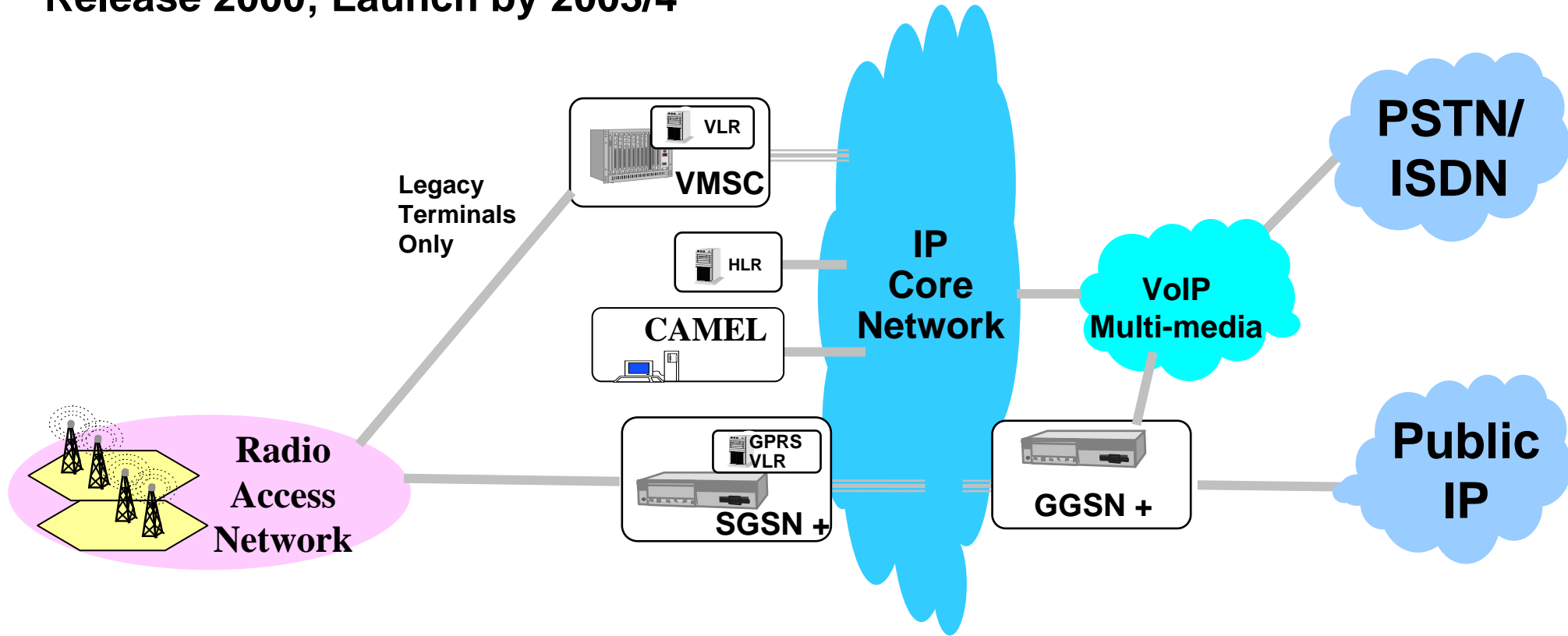


**Data Path - leverage GPRS,
limited IP capabilities & IP/ATM transport**

Mobile Network Architecture Evolution

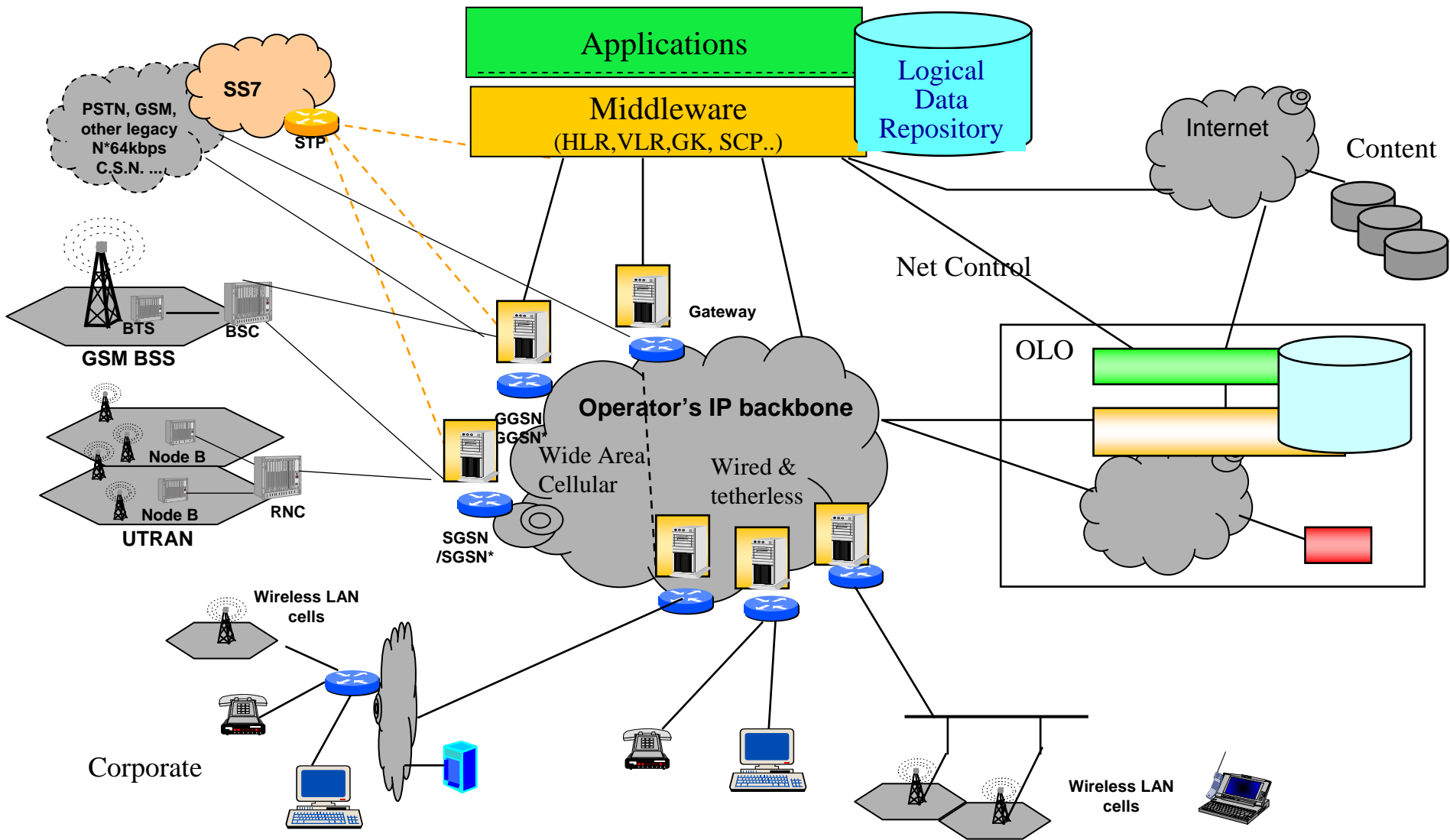


Release 2000; Launch by 2003/4



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

All-IP Network Architecture - Release 2001?



Key Principles for All-IP Mobile Networks

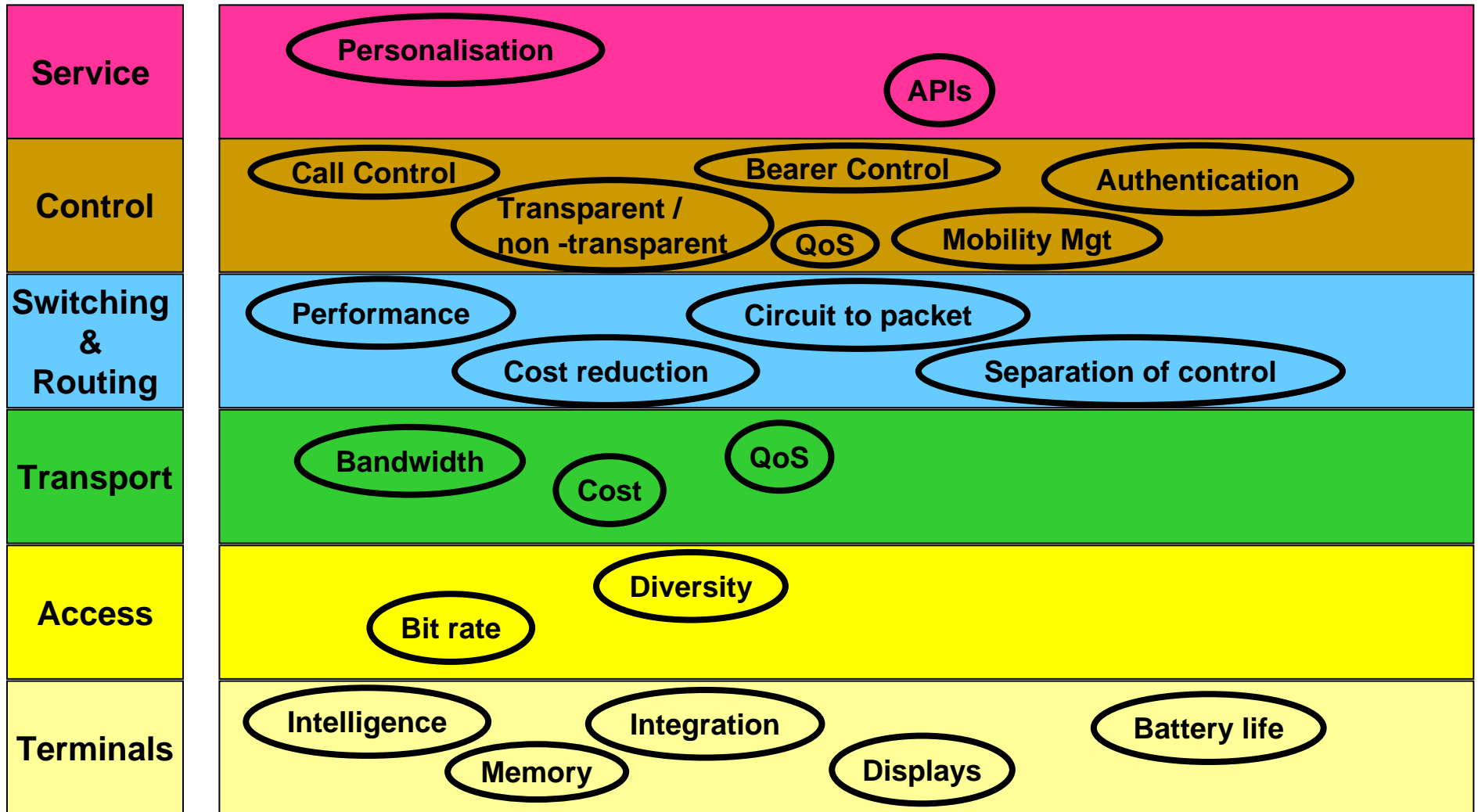
(under discussion)

- **IP based services, voice over IP, multimedia over IP**
- **End-to-end IP: (in principle IP-enable the base station, as well as IP to the mobile device, use IP over the air interface)**
- **Air interface independence (UTRAN, EDGE, others) at the application level**
- **Harmonized / seamless multimedia services over IP across fixed and mobile access**
- **IP addressing for mobile devices**
- **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**

Principles vs Drivers

Principle	Business Driver	Priority
IP based services, voice over IP, multimedia over IP	Differentiation, Mobile Commerce, Leading Edge Devices	High
IP in the network layer	Cost, Differentiation	High
Air interface independence (UTRAN, EDGE, others) at the application level	Seamlessness	High
Harmonized / seamless multimedia services over IP across fixed and mobile access	Seamlessness	High
IP addressing for mobile devices	Seamlessness	Medium?
Support of IPv6 formats / addressing for networks, services and devices	Cost, Differentiation	Medium?
Single integrated multimedia network management	Cost, Differentiation	Medium?
Application of IP technology to MSC (or disappearance of MSC as we know it)	Cost, Seamlessness	Disappearance = High Apply IP = Medium
Single, simple & consistent user paradigm on the mobile device for all multimedia services	Seamlessness	Low (we probably need a different paradigm for each device)

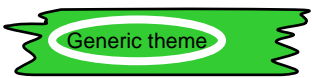
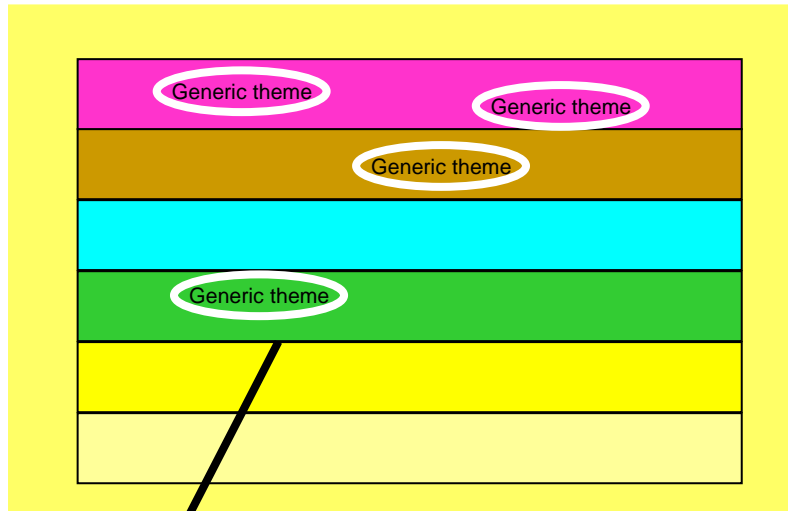
Major Focus Areas



Specific Technologies

Service	IN CAMEL	SAT	Location server WAP	PARLAY MeXe	JAIN OSA
Control	04.08 H.323	SIP	HLR/MAP	MIP GSM AuC	Radius AAA Digital Certificates Diameter
Switching & Routing	64K ATM	IPv4	IPv6 Call Server	MegaCo Media Gway	SigTran CODECS Transcoding
Transport					
Access	GSM	GPRS	EDGE W-CDMA	Bluetooth Hiperlan	BRAN TDD
Terminals	SIM/Smartcards WAP	MeXe Displays		Batteries	

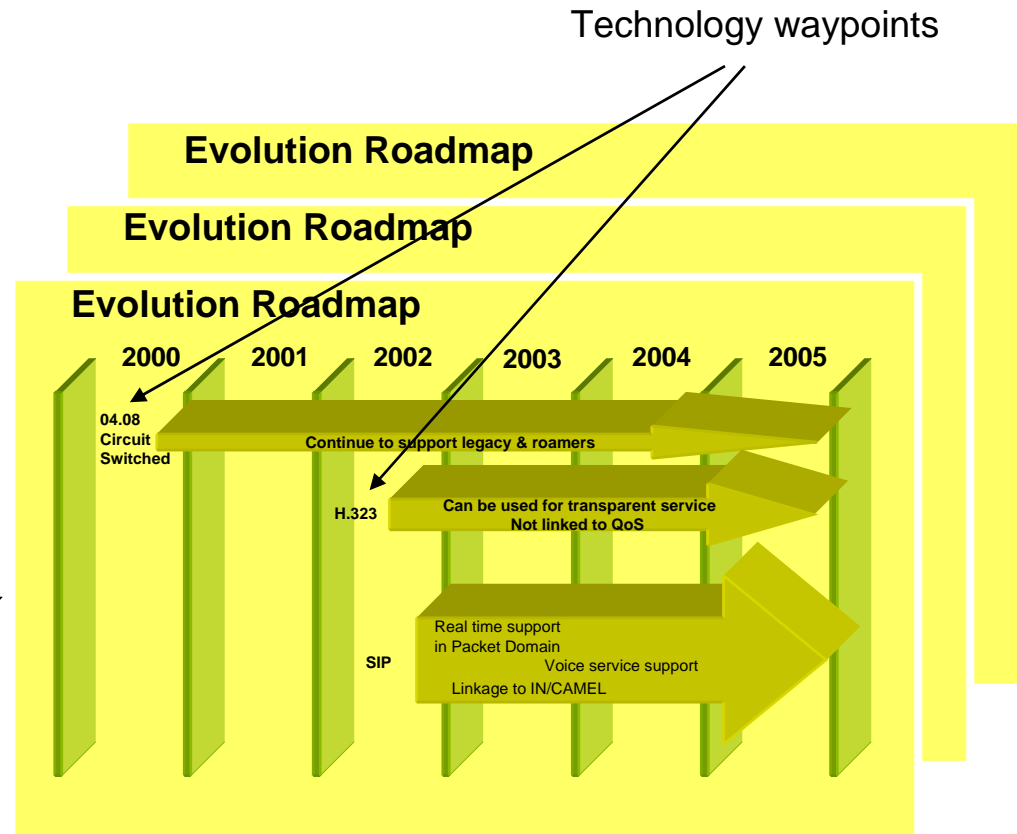
Development of Evolution Roadmaps



Specific Technology

Specific Technology

Specific Technology



IP Technology Areas for Mobile Networks

IP Technology	R00 Status	R01 Status
IP Mobility (how to allow for mobility with IP, GPRS GTP vs EMA)	GPRS GTP	Edge mobility proposed by BT (IP address allocated in visited net space, IP to RNC)
IP Service Control (CAMEL vs other approaches)	Under discussion internally; no substantial discussion in 3GPP. BT/AWS agree to propose that 3G.IP discuss.	Premature
Common approach to SIP Call Control	BT/AWS view aligned. 3GPP S2 still discussing	No difference from R00 proposed
Extensions to SIP to deliver complete Service Set	Under review internally. Premature in 3G.IP/3GPP	Premature
Header compression for efficient IP over the air	3G.IP proposal sent into IETF. Under discussion in IETF	Premature
IP-QoS and mapping into RAB-QoS over the air	Work underway in 3GPP S2. Not complete	Needs work as “next step” from Edge mobility work.
Multimedia applications / services support (additional signalling, QoS, etc)	Few applications known (videophone, video streaming from web,... ?)	Premature
IP based operations and billing / accounting / customer services	XML under discussion in BT	Premature
Presence and Instant Messaging	Needs to be reviewed. SIP presence capability could help.	Premature
IPv6 (addressing and network layer approach)	Needs discussion in 3GPP S2. BT view is “dual stack needed in mobiles”	Premature
AAA and IPsec	AAA/Radius already used in GPRS. Needs study beyond that.	Premature