



The Future Wireless Internet

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OUTLINE



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- **CELLULAR & INTERNET**
- **IP MULTIMEDIA SUBSYSTEM**
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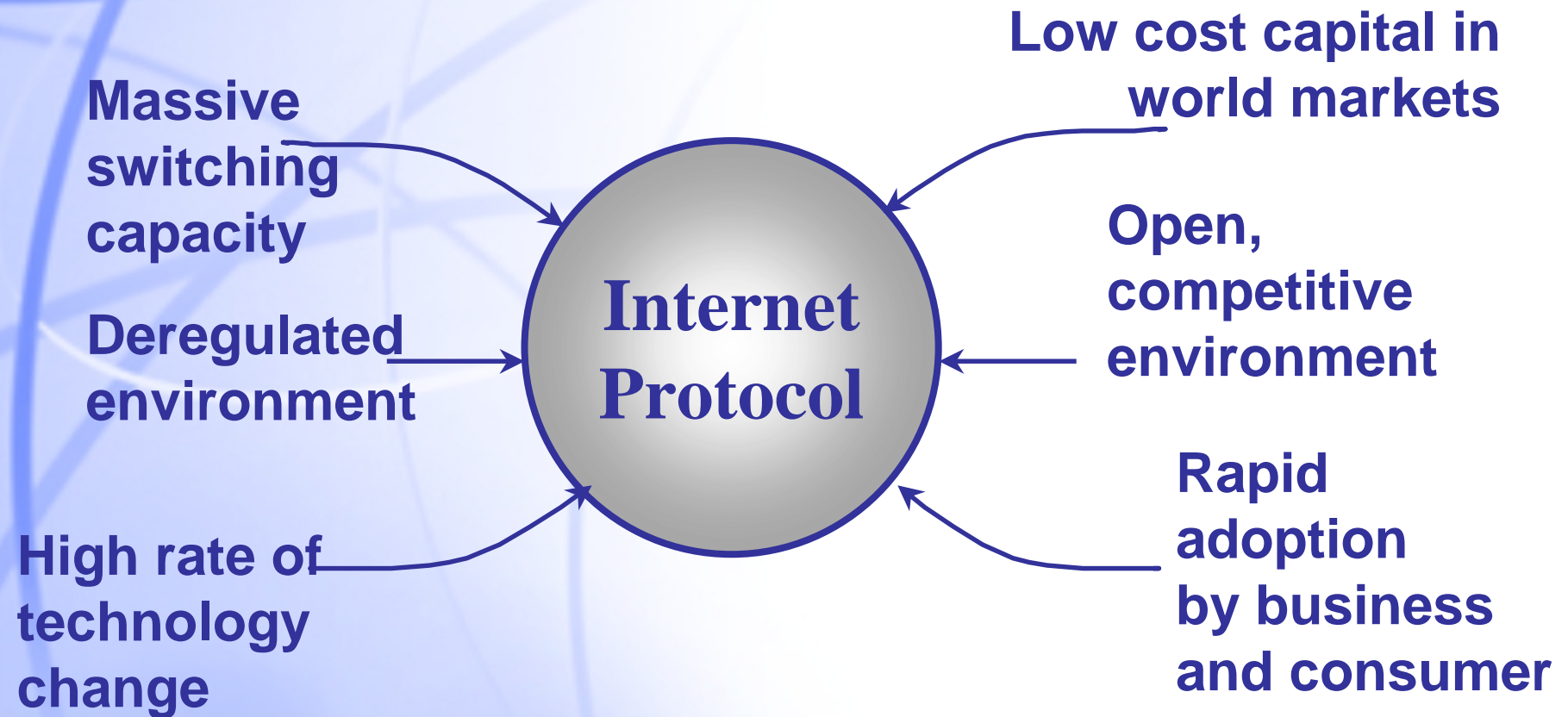
IP as the world catalysts



- **Common & More Flexible Service bundling**
- **Millions of different peering options and levels of quality**
- **Flexible way of accessing and distributing content**
- **New revenue opportunities**
- **Dynamics of new IP broadcasting**
- **IP streaming to dispersed audiences**



The future - an IP World?



Cellular architectures



- **Highly optimized for voice traffic (low delay, guaranteed bandwidth), not data**
- **Tend towards „intelligent network“ philosophy which for IP is a misplaced focus of control**
- **Operators want to migrate towards „All-IP“ Solutions for simplicity and reduced cost reasons**



Wireless and the Internet



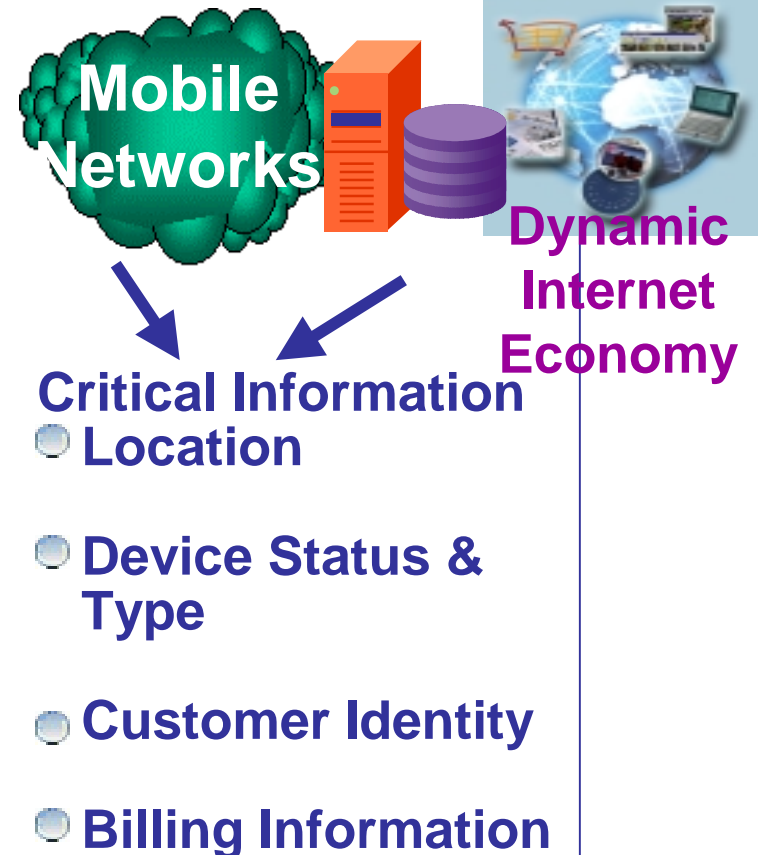
**Mobile Users have
Unique
Information Needs**

**Range of
Devices**

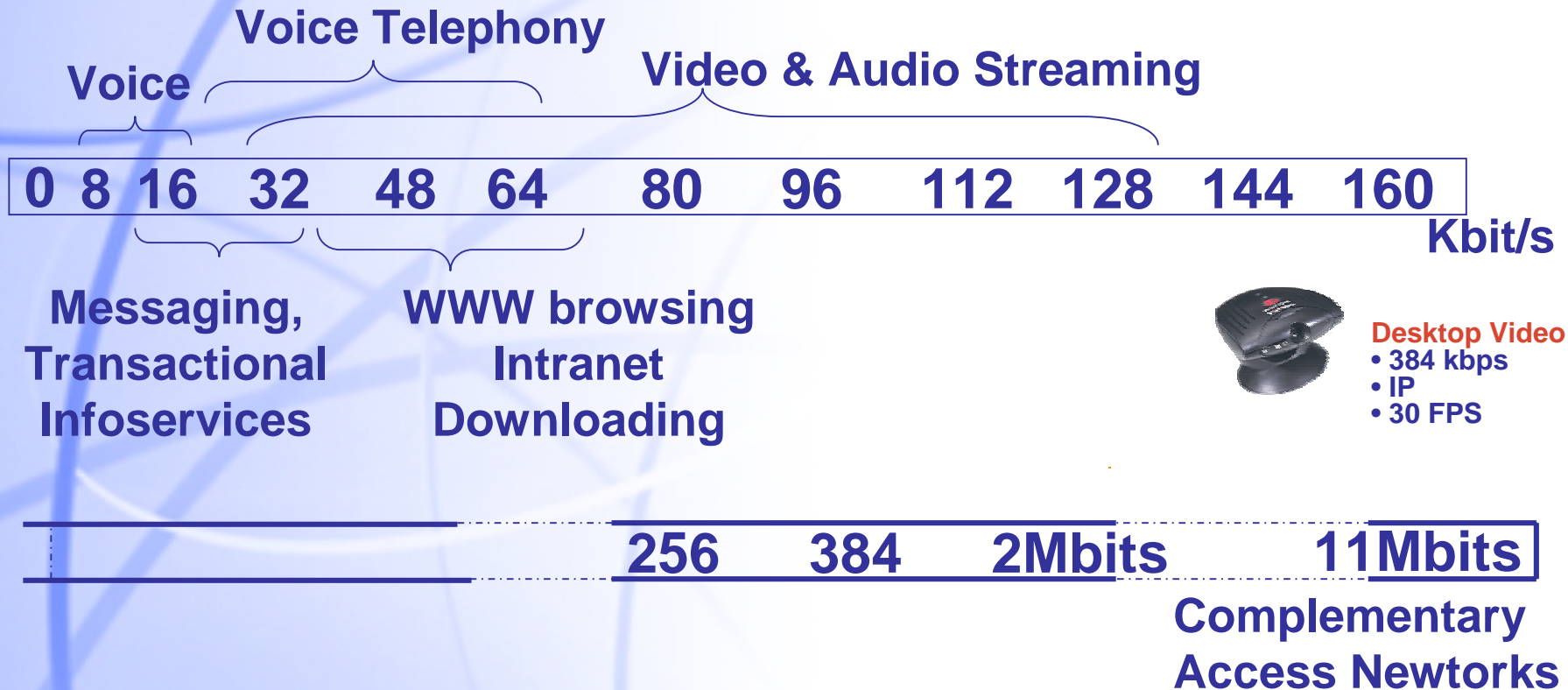
- **Location Sensitive**
- **Time Sensitive**
- **Device Dependent**



Service Complex



Data Rates for Applications



3G will offer much higher Data Rates

IP-Based Networks



Need to Supply functions and Services
Hence:

- **Support real-time traffic**
- **Flexible congestion control schemes**
- **Security features**



IPv6 Coexistence with IPv4



- Introduction of IPv6 into IPv4 networks will require a number of different approaches
- New mobiles will have to support both IPv6 and IPv4 protocol stacks and addresses
- Interactions with the public Internet and IPv4-based services will depend on the specific applications and edge routers

Peer-to-peer needs IPv6 !



- **IPv6 provide enough addressing**
 - 64+64 format: $1.8E+19$ networks, units
 - assuming IPv4 efficiency: $1E+16$ networks, 1 million networks per human
 - 20 networks per m² of Earth (2 per sq. meter)
- **Enables peer-to-peer!**
- **Solves the NAT problem**
- **Helps designing Firewall Traversal solutions (IPSEC, global addresses)**

IPv6 deployment tool-box



- **IPv6 stateless address autoconfiguration**
 - Router announces a prefix, client configures an address
- **6to4: Automatic tunneling of IPv6 over IPv4**
 - Derives IPv6 /48 network prefix from IPv4 global address
- **Teredo: Automatic tunneling of IPv6 over UDP/IPv4**
 - Works through NAT, may be blocked by firewalls
- **ISATAP: Automatic tunneling of IPv6 over IPv4**
 - For use behind a firewall.



IPv6; an essential enabler



- **Due to limited IPv4 legacy networks, Mobile operators will prefer a full IPv6 routed solution**
 - operational (tunneling, NAT-PT) and interworking reasons
 - building new multi-service core backbones incl. IP transport
- **Connectivity in UTRAN will be a mixture of technologies**
 - ATM for coverage (rural)
 - IP (over Optical Ethernet) for capacity (metro/dense area's)

Network Operators need



- Higher revenue from new, SIP-based multi-media applications
- IP Transport: Reduced cost of ownership of converged IP backbone

Major architectural change



- **Session Initiation Protocol (SIP) Control and Dynamic QoS negotiation**
- **IMS (IP Multimedia Subsystem)-IPv6 Only**
- **IPv4/IPv6 Backbone**
- **IPv6 for security Issues**

IP Multimedia Subsystem



IMS brings two crucial features:

- **The ability to set-up real-time, person-to-person IP sessions e.g. Voice.**
- **The ability to integrate any number of Services.**

Key IMS network capabilities



- **One-to-many; Broadcast and Multicast**
- **Interactive / Real-time**
- **Guaranteed Quality of service (QoS)**
- **Location and Presence between Networks**
- **Voice-over-IP**



Audio IP (VoIP)
• 64 kbps
• Audio
• 30 FPS

IMS- The IPv6 Platform



IMS offers a promising platform for innovative multimedia services

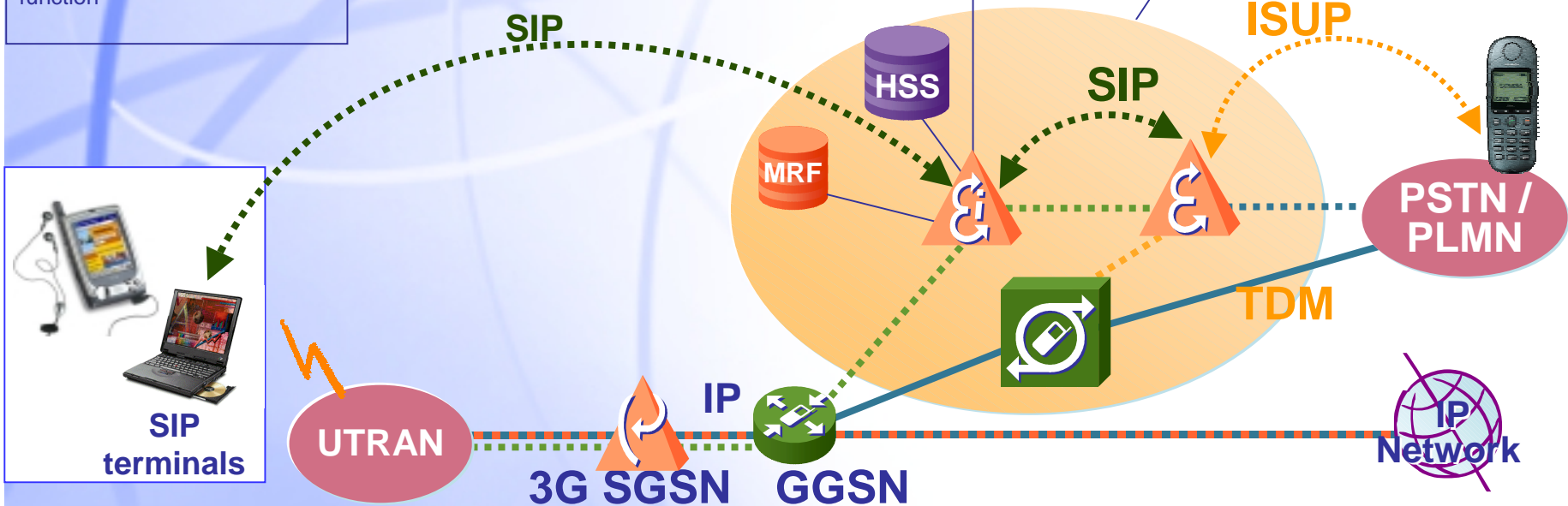
IMS further enables combined voice-data services

HSS=home subscriber server
MRF=Multimedia resource function

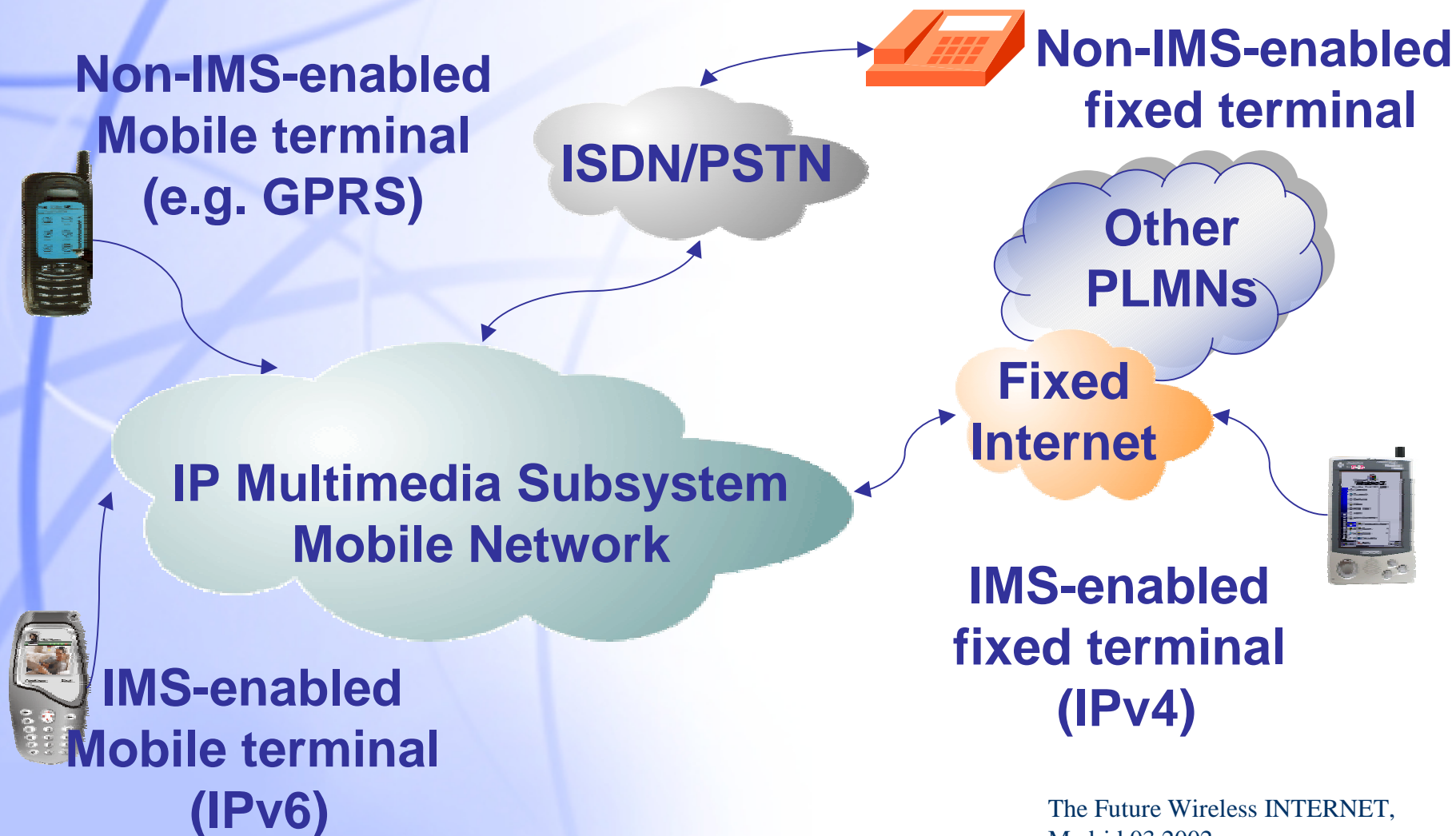
Applications

Enabling Services

Payment
Prepaid
Rating
Location, Presence,
...



The IMS Service challenge



The evolution in Terminals



Today

- Phone- to with low speed Data capabilities Intelligence in the
- Network

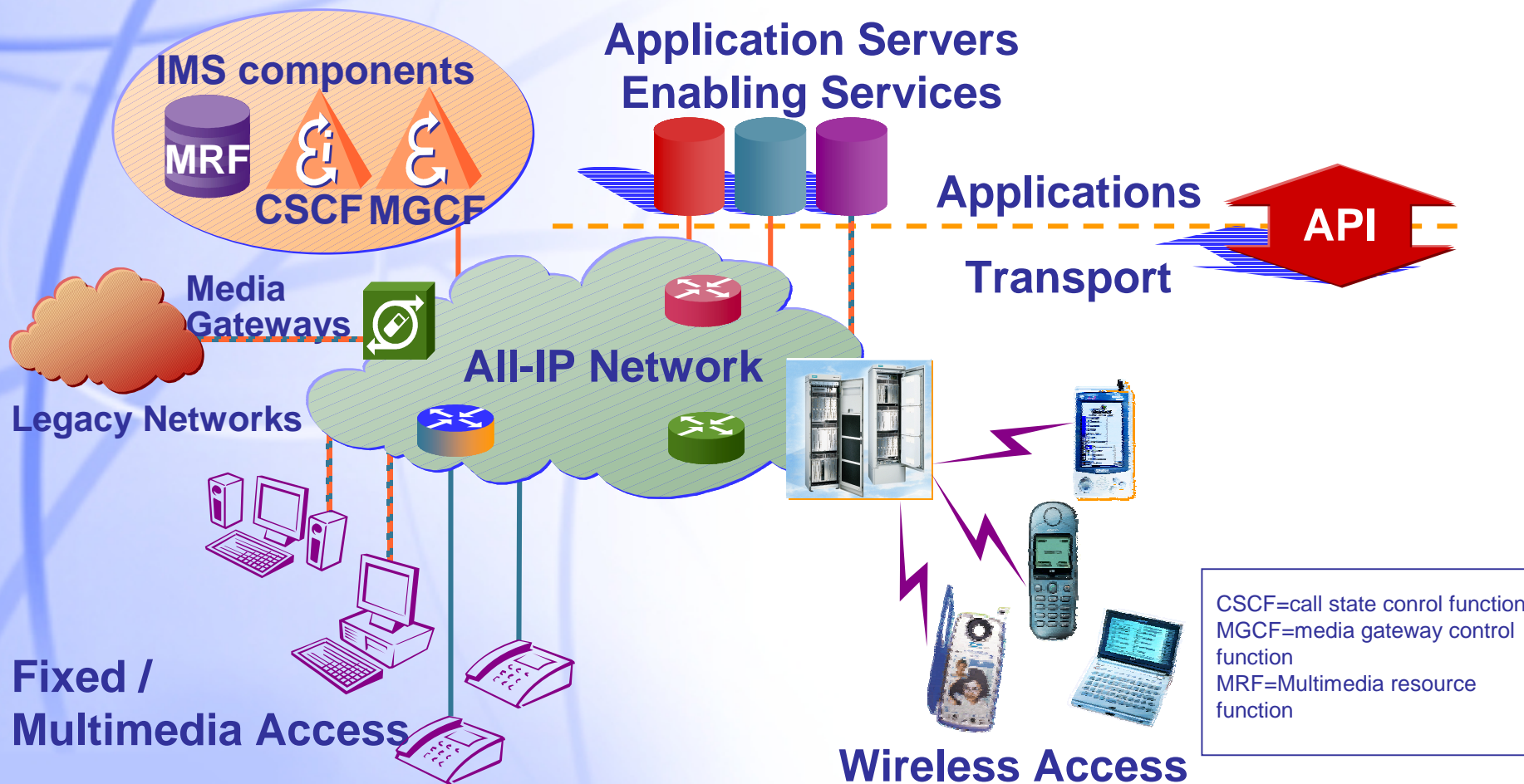


Tomorrow

- Converging 3G and Portable Computers
- Use „Software Clients“ for high-end services
- End-to end Qos and Policy Personalise
- Presentation customised to the device

**An Intelligent Server
not a Terminal**

IMS, an End-to-End IP Network



SUMMARY



The future wireless Internet will:

- **Offer a massive business market with cost-effective pan-European VPNs.**
- **Besides low cost voice and data (and eventually video), it will be all about information access and delivery.**
- **IPv6 will play the predominate role of a delivery protocol.**
- **The next Generation Internet, by nature will better match the usage model for wireless access**



*Thank you for your
attention!!*