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Architectural principles

3GPP All IP Workshop

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Main goals for “All IP” standardization effort

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- to enable cost effective high quality IP-based multimedia services (including wireless voice over IP as a volume service)
- rationalized teleservices with service continuity of GSM/UMTS teleservice speech (and GSM/UMTS CS data)

2 different service domains, 2 different purposes

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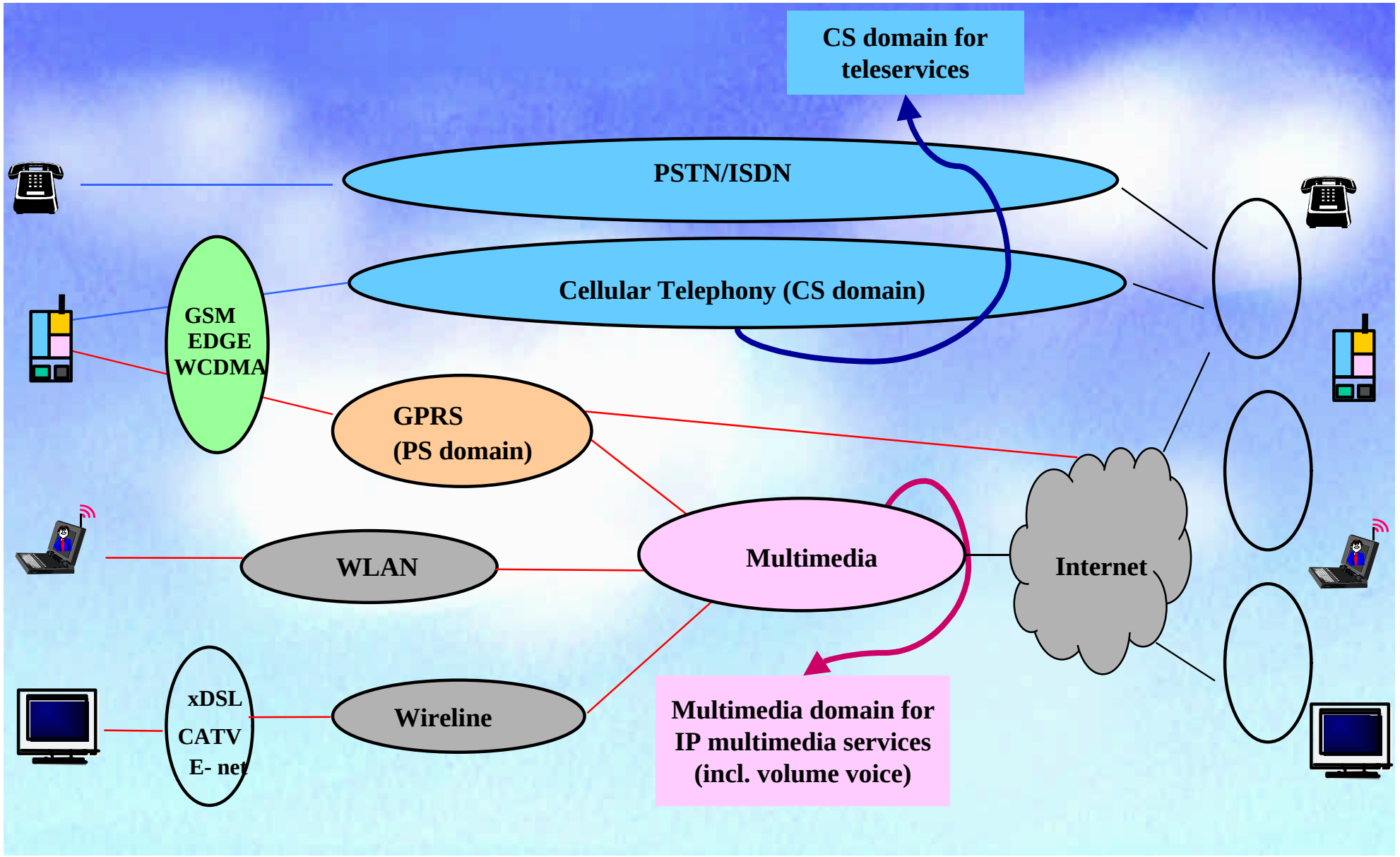

Service continuity within each domain

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- Cost effective high quality IP-based multimedia services, including VoIP, is the fundamental requirement for “All IP” networks.
- The market driver for “All IP” is the development of mobile IP based services supporting **new** end user needs.
- Few market drivers for copying all “old” CS end-user services to new IP services.
  - An end-user does not care which CC protocol is used. ISUP/ISDN based CC, such as 24.008, is mature, widespread and appropriate for teleservice speech. Redoing ISUP/ISDN within IP multimedia call control will hinder the IP multimedia development.
- The battle of VoiceOverIP vs. GSM/UMTS-TeleserviceSpeech
  - Current PSTN/PLMN voice business are rationalised and costs are cut.
  - Development of methods to carry the PSTN/PLMN traffic over an IP-transport.
  - Dual mode mobile devices, combining telephony and GPRS-based always-on packet data, provides mobile end-users with multimedia feeling.
  - IP-telephony is still very much in its infancy, especially for mass deployment in public carrier class networks.
  - The massive footprint of the PLMN/PSTN/ISDN and specifically the strength of today’s Cellular Telephony.
- GSM/UMTS-TeleserviceSpeech will be a tough competitor to voice on IP

Two service paradigms

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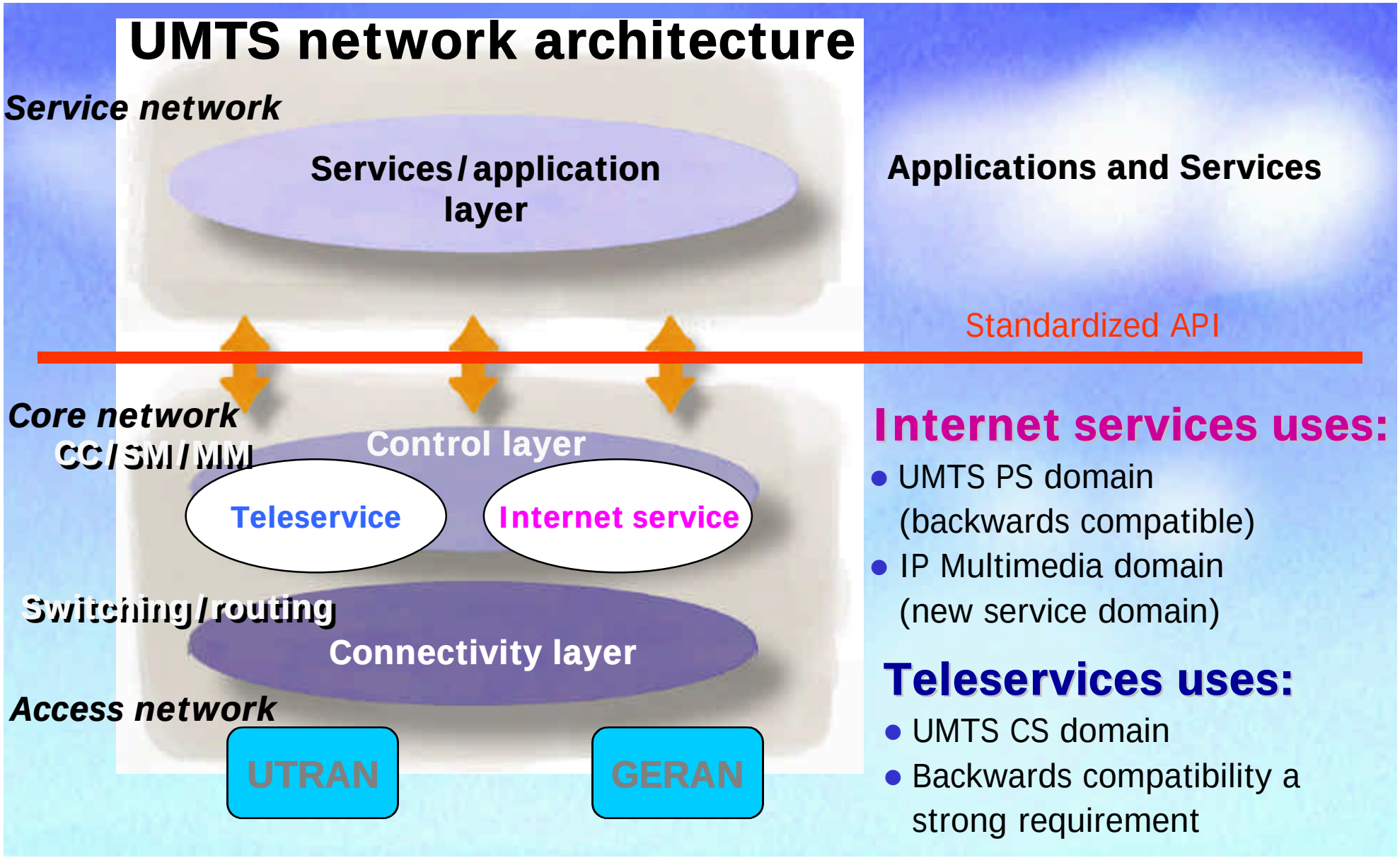

Internet services uses:

- UMTS PS domain (backwards compatible)
- IP Multimedia domain (new service domain)

Teleservices uses:

- UMTS CS domain
- Backwards compatibility a strong requirement

Internet services

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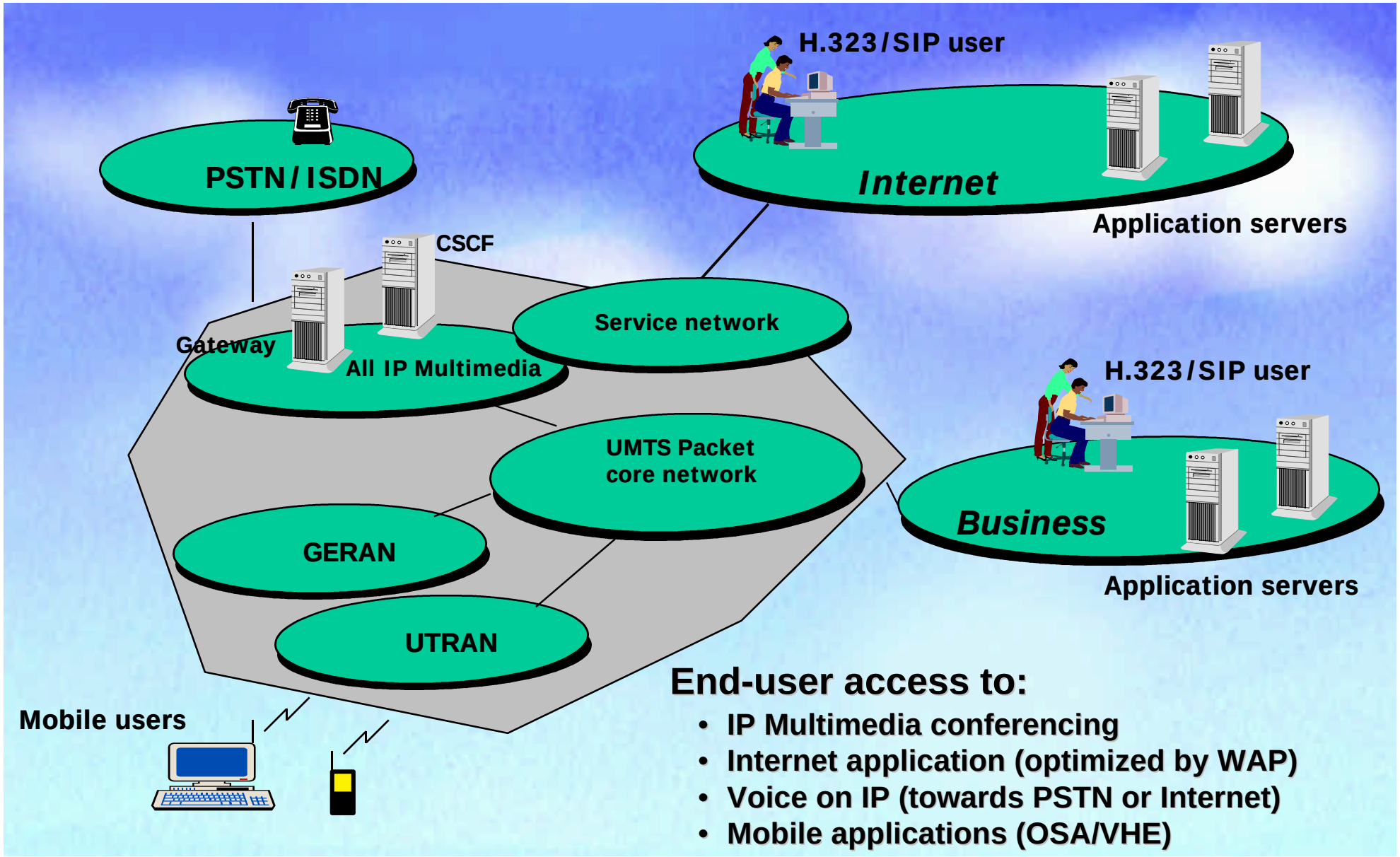

End-user access to:

- IP Multimedia conferencing
- Internet application (optimized by WAP)
- Voice on IP (towards PSTN or Internet)
- Mobile applications (OSA/VHE)

UMTS/GPRS + IP Multimedia domain only network

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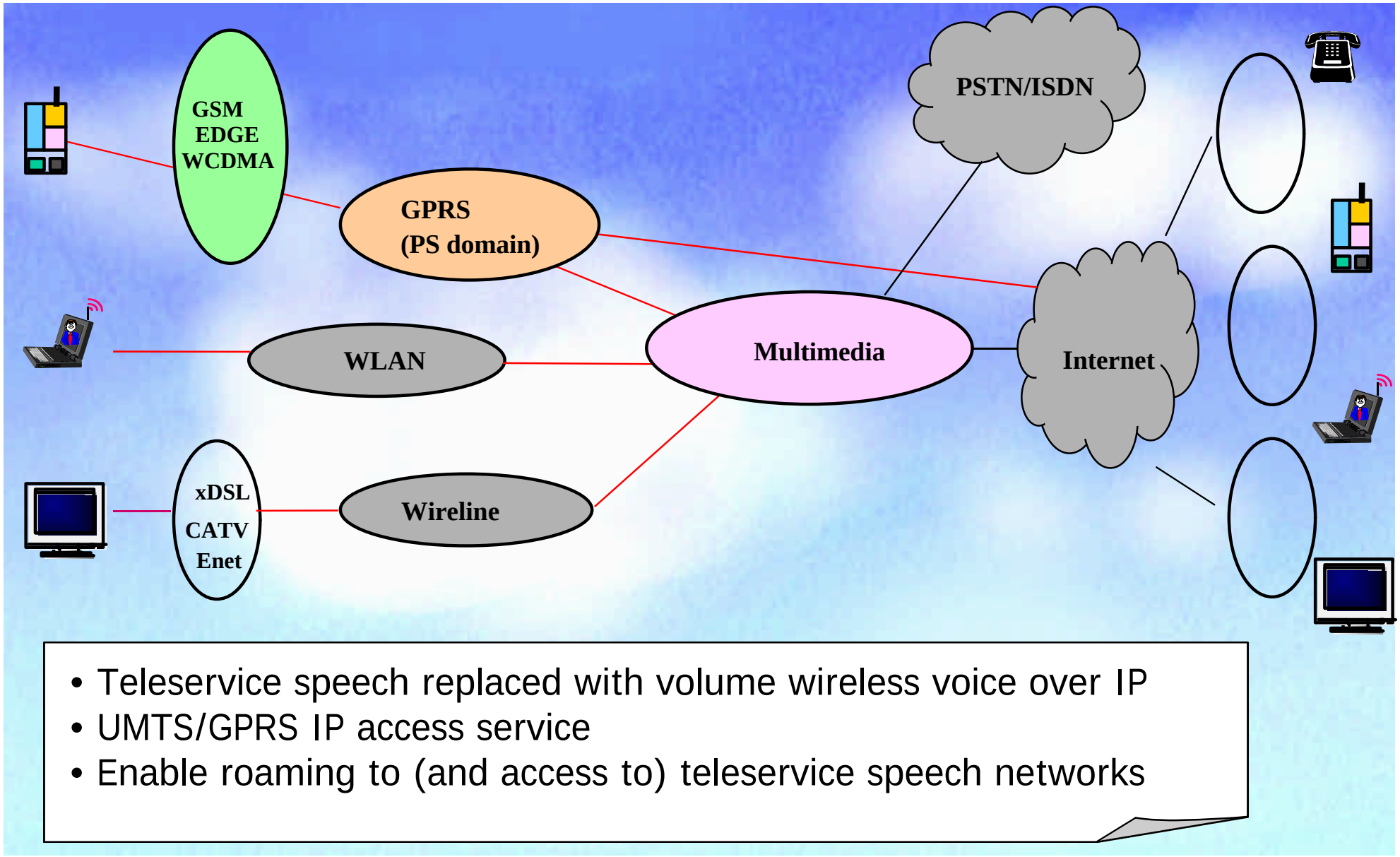

- Teleservice speech replaced with volume wireless voice over IP
- UMTS/GPRS IP access service
- Enable roaming to (and access to) teleservice speech networks

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Basic requirements:

- IP end-to-end
- IP Multimedia includes call control of one (or several) types (H.323, SIP is the main candidates)
- Shall be possible to access from various access networks
  - Must thus follow mainstream IP and Internet standards
- Support for IP QoS
- Support for global roaming
- Radio optimizations shall allow IP based volume voice services
  - Header compression, Header stripping
  - General means for unequal bit protection (remotely located Codec)
  - GSM speech is the benchmark

Teleservices

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End - user perspective:

- GSM teleservices (and CS data) continues
- Full backwards compatibility

Operator perspective:

- Increased network flexibility for transport of user traffic and signaling
- Develop IP transport of user traffic and signaling
- Develop signaling network based on IP transport and IP addressing
- Allow migration from today's networks

Technology enablers:

- Transport independence
- Call and bearer separation
- IP QoS

Summary

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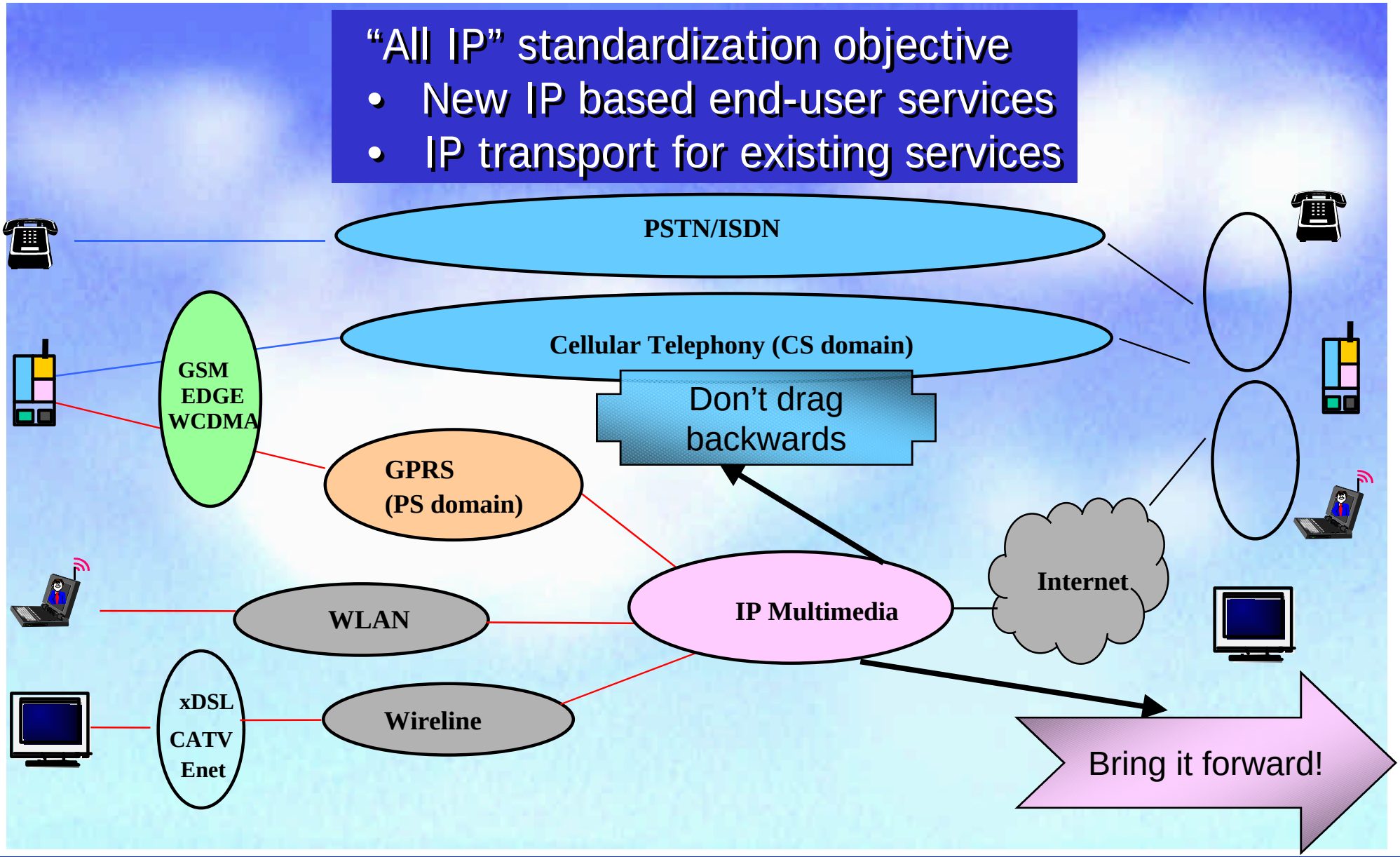

Technology enablers

Reference architecture

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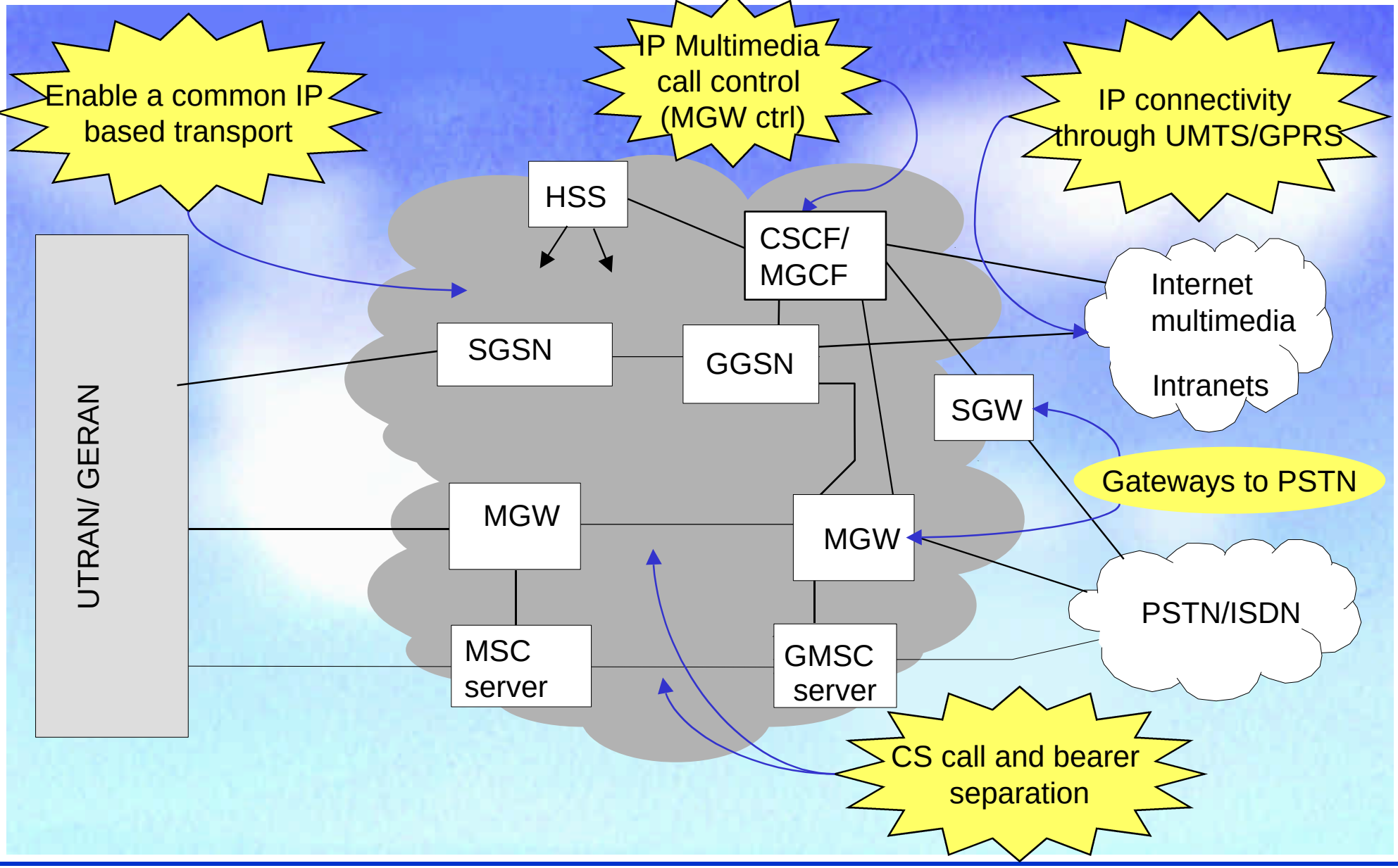

Transport independence allows different migration scenarios

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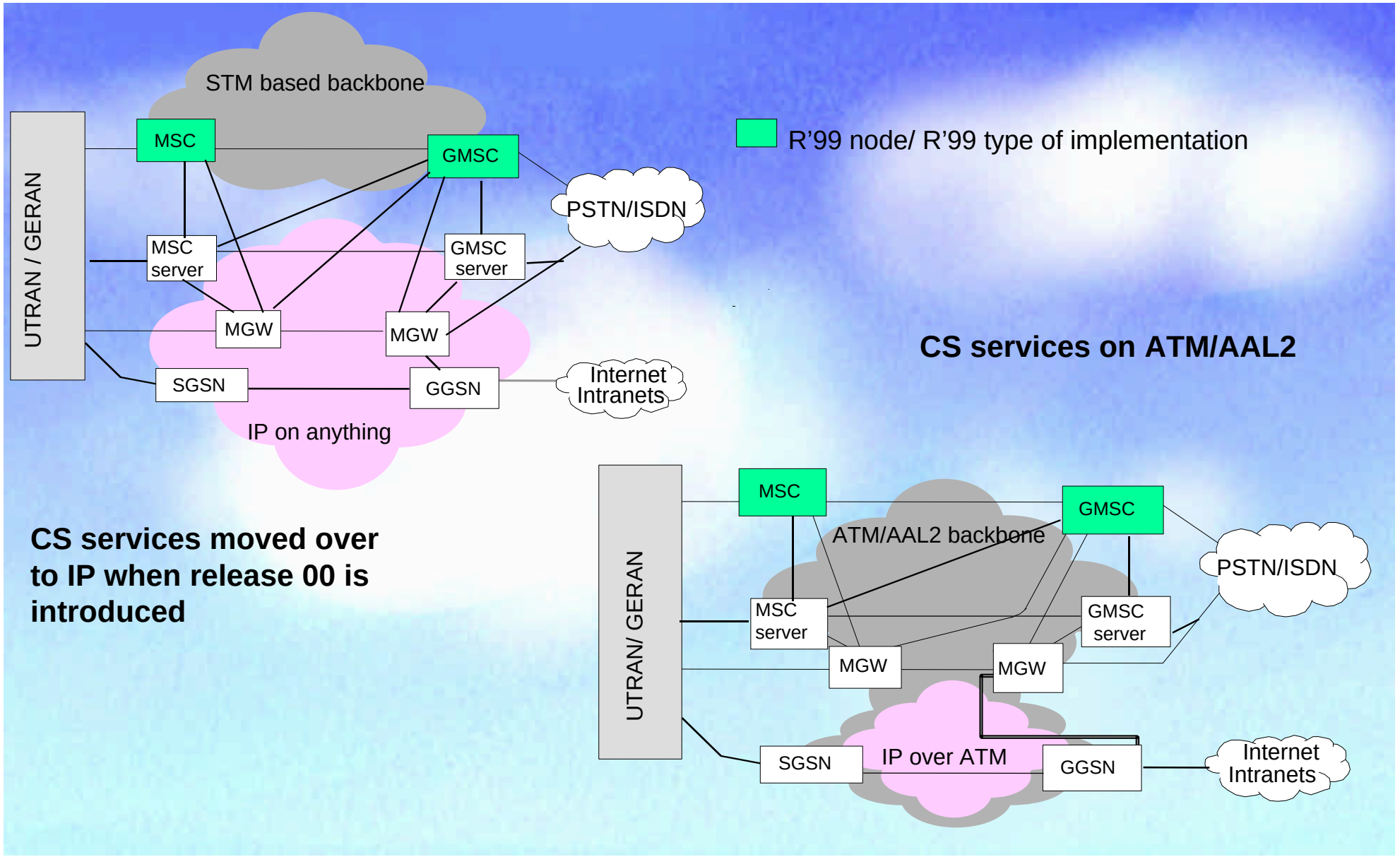
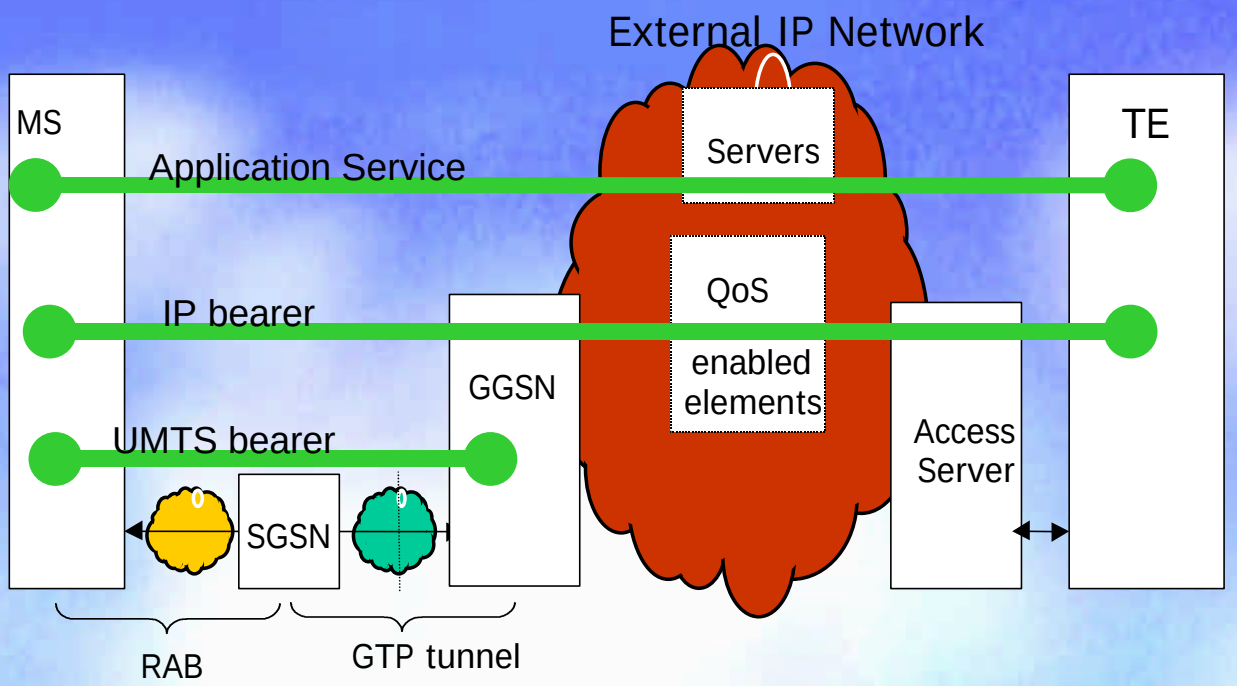


QoS requirements

- **QoS guarantees from the MS up to/including the UMTS edge (Gi)**
- **End-to-end QoS based on open IP QoS methods (bandwidth broker, QoS policy framework etc.)**
- **IP transmission resources**
  - efficiently utilized for voice, conversational multimedia and data traffic
  - QoS control on a transport independent manner
  - scalable traffic management mechanisms
- **User/application control of radio- and IP QoS through API**
- **Mapping from application to radio bearer is one key for success**

QoS - End-to-end Layered Architecture



- QoS requests originates at different layers
- The layers need to be coordinated to provide end-to-end QoS
- Proper mapping all the way from application (W3C, H.323) to radio bearer (dB) is key to success

Global Roaming

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- Ensure end users experience to be consistent (unaware of change in domains-within or outside of home operator's environment)
- Minimize dependencies between Home and Visiting networks regarding call/session control and services triggering
- Provide flexibility for bearer path optimization
- Support for multiple addressing schemes
- Allow better support for Operator differentiation

Layered Mobility

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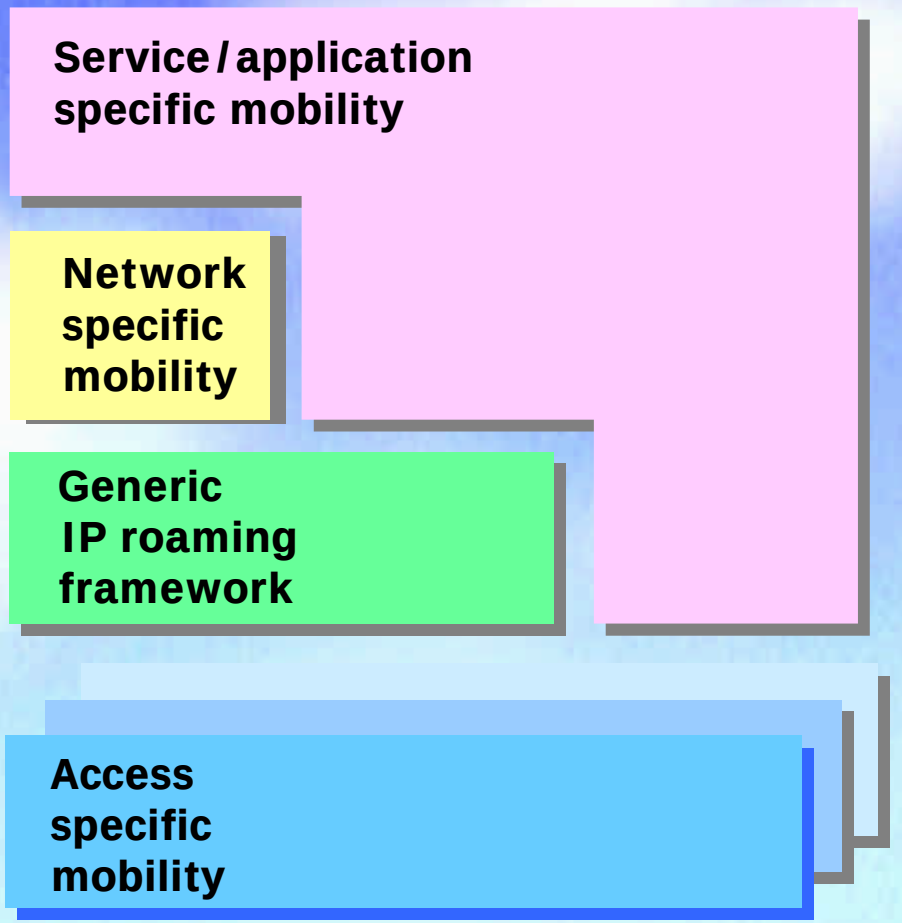
Used for originating calls/session and for reachability (H.323/SIP)

Reachability functions such as mobile IP

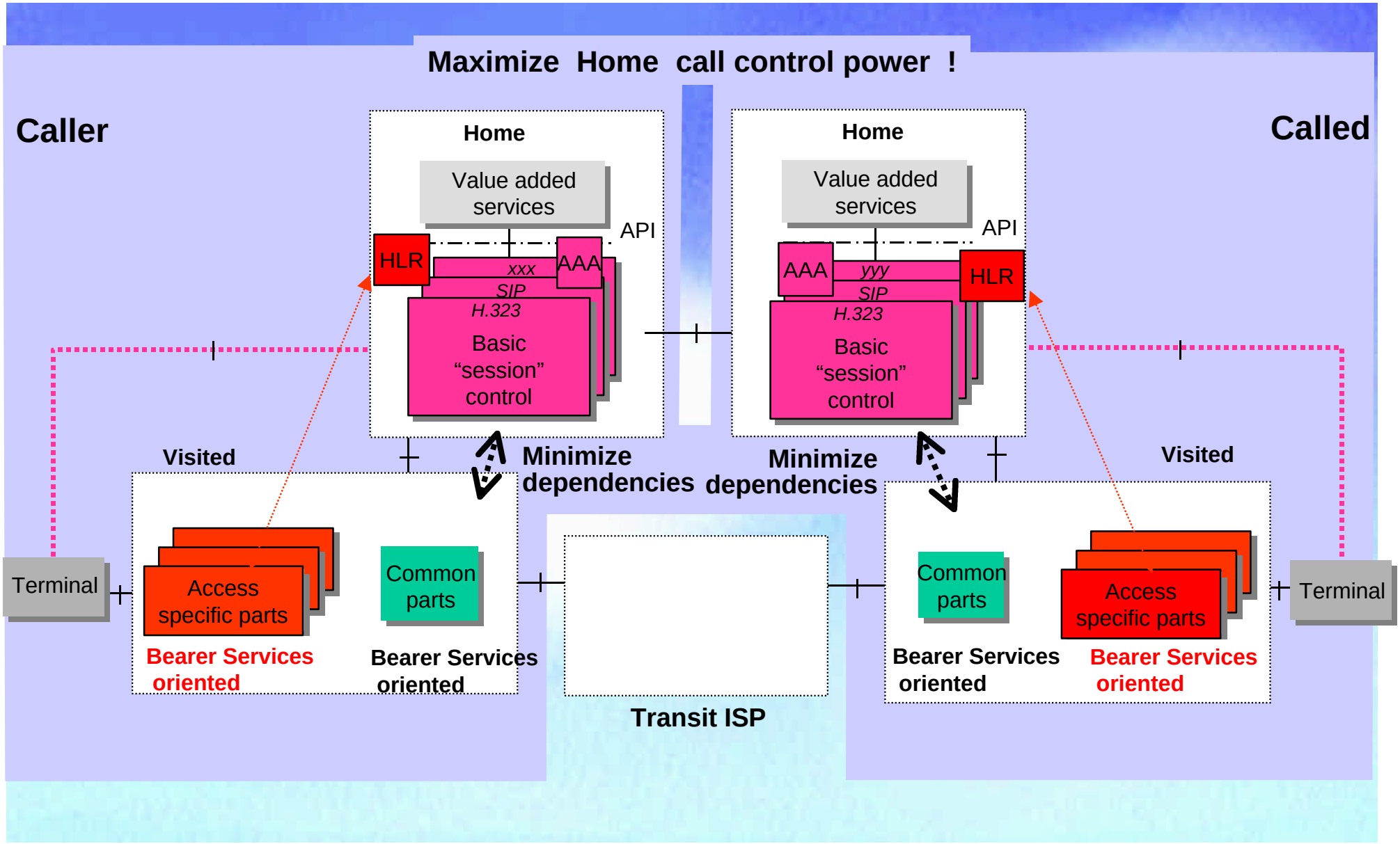
Access granting functionality (AAA):
- Login for internet access
- Login to application

PLMN roaming

GSM/UMTS handover



Minimise coupling between Home and Visited domain.



Conclusions

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The goal for "All IP" standardization effort is to

- ❖ enable cost effective high quality IP-based multimedia services (including wireless voice over IP as a volume service)
- ❖ rationalized teleservices with service continuity of GSM/UMTS teleservice speech (and GSM/UMTS CS data)

- **Key elements**
  - New IP based end-user services
  - Enable IP transport for existing services
  - Access independence
  - Global roaming
- **Technology enablers**
  - End-to-end QoS architecture
  - Radio resource optimization
  - Transport independence
  - Call and bearer separation