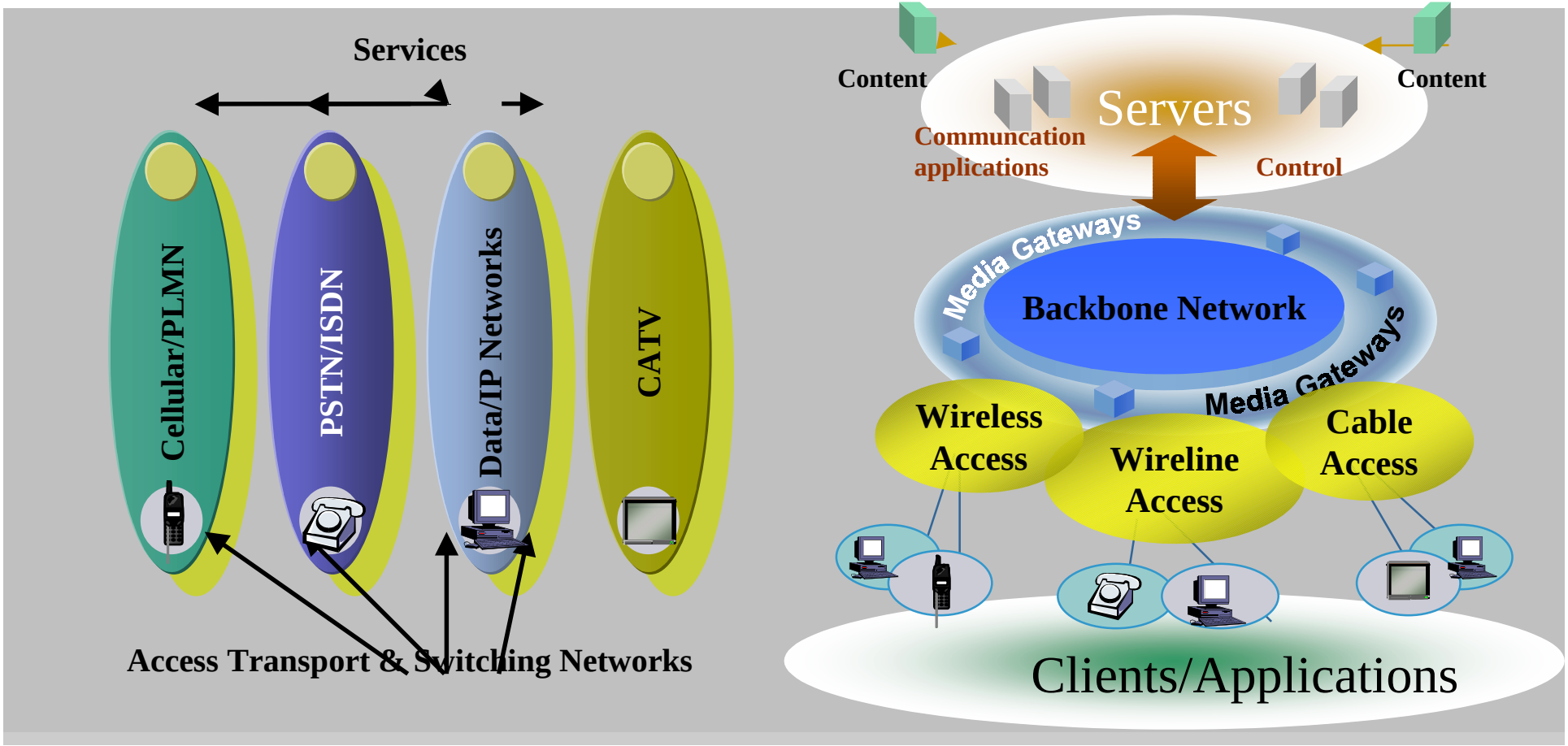
Next-generation network structure

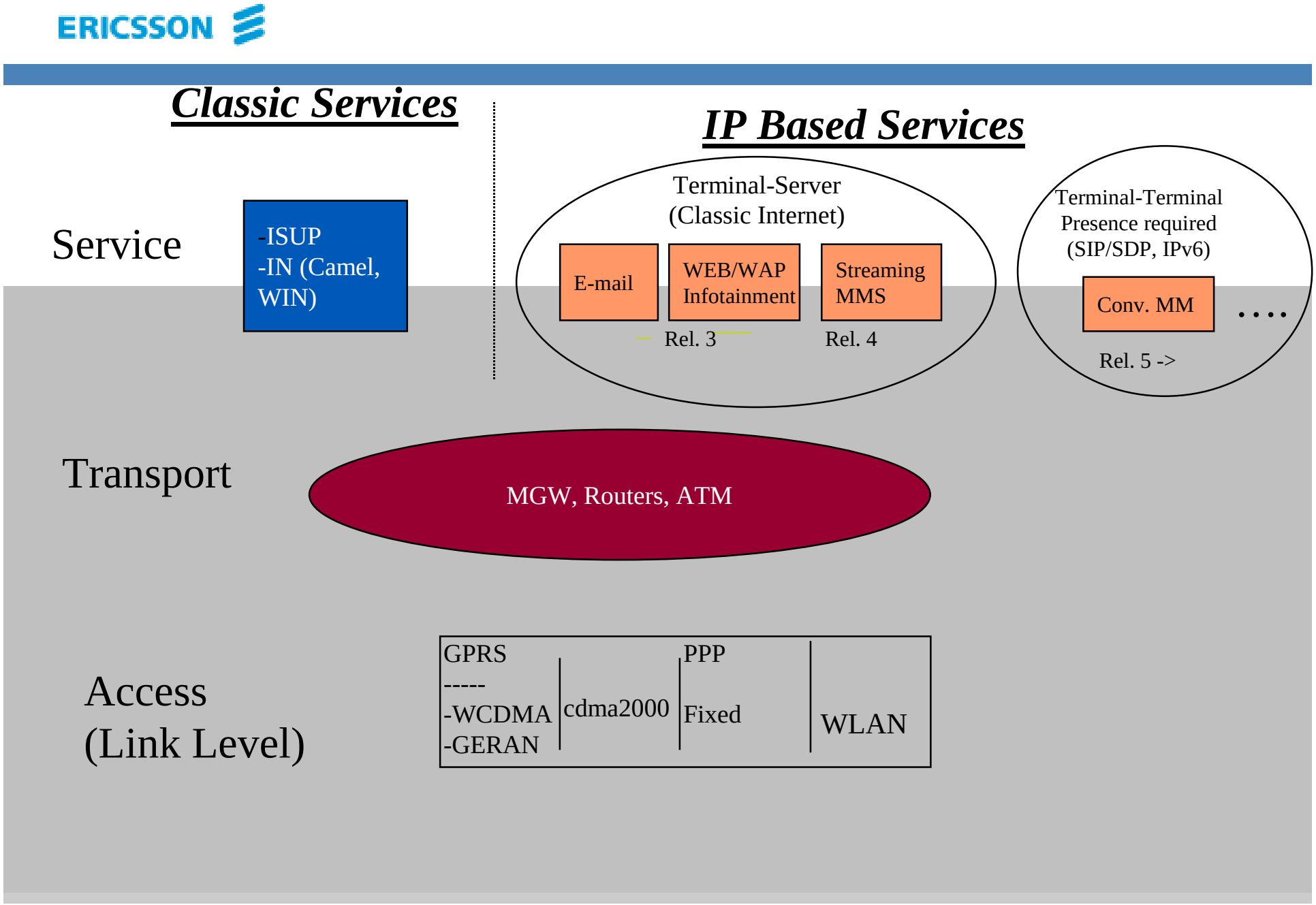
Today

Single-service networks

Future

Multi-service networks/client-server




Classic Services
IP Based Services
Service
-ISUP
-IN (Camel, WIN)
Terminal-Server
(Classic Internet)
E-mail
WEB/WAP
Infotainment
Streaming
MMS
Rel. 3
Rel. 4
Terminal-Terminal
Presence required
(SIP/SDP, IPv6)
Conv. MM
. . . .
Rel. 5 ->
Transport
MGW, Routers, ATM
Access
(Link Level)
GPRS

-WCDMA
-GERAN
cdma2000
PPP
Fixed
WLAN

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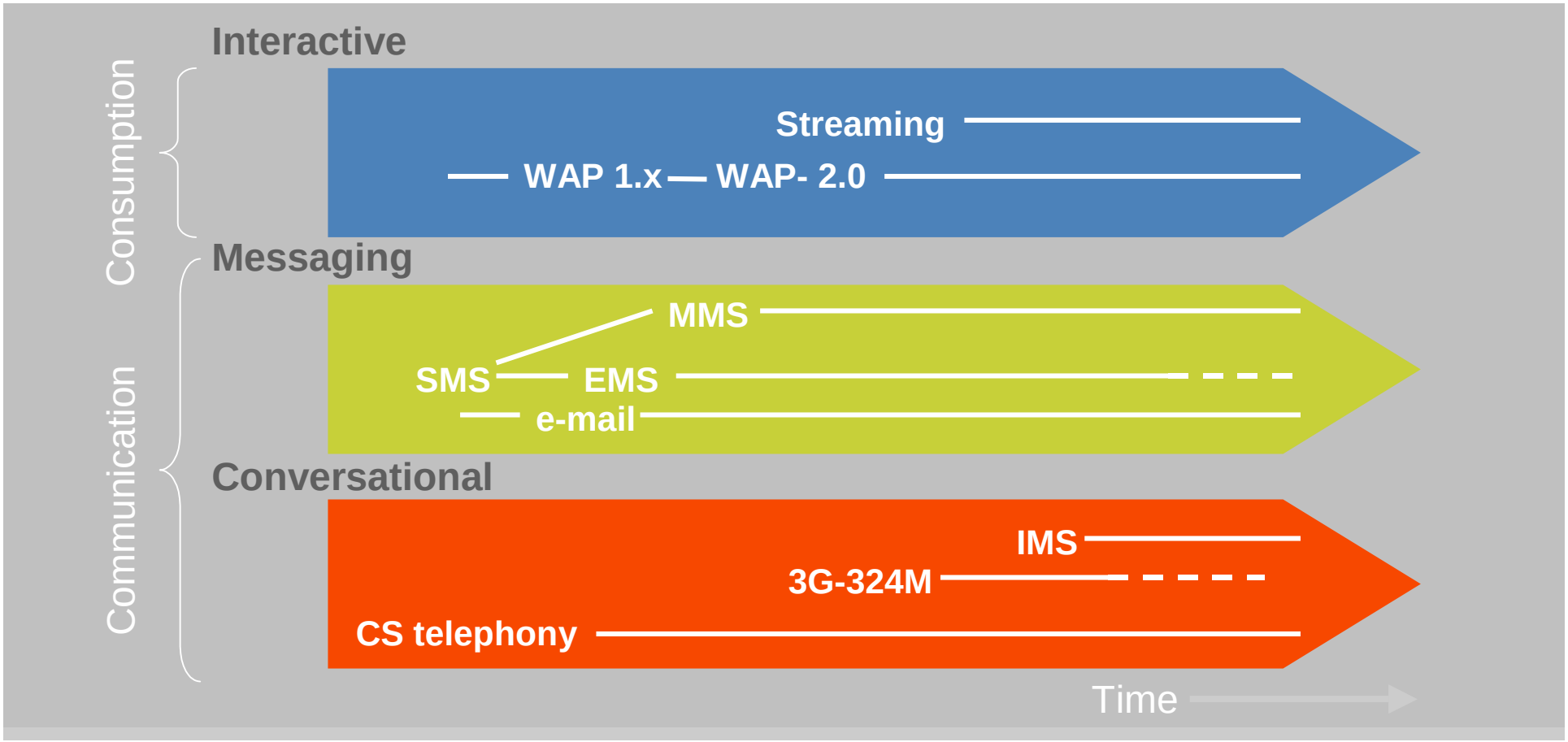
The *Evolution* of Mobile Multimedia



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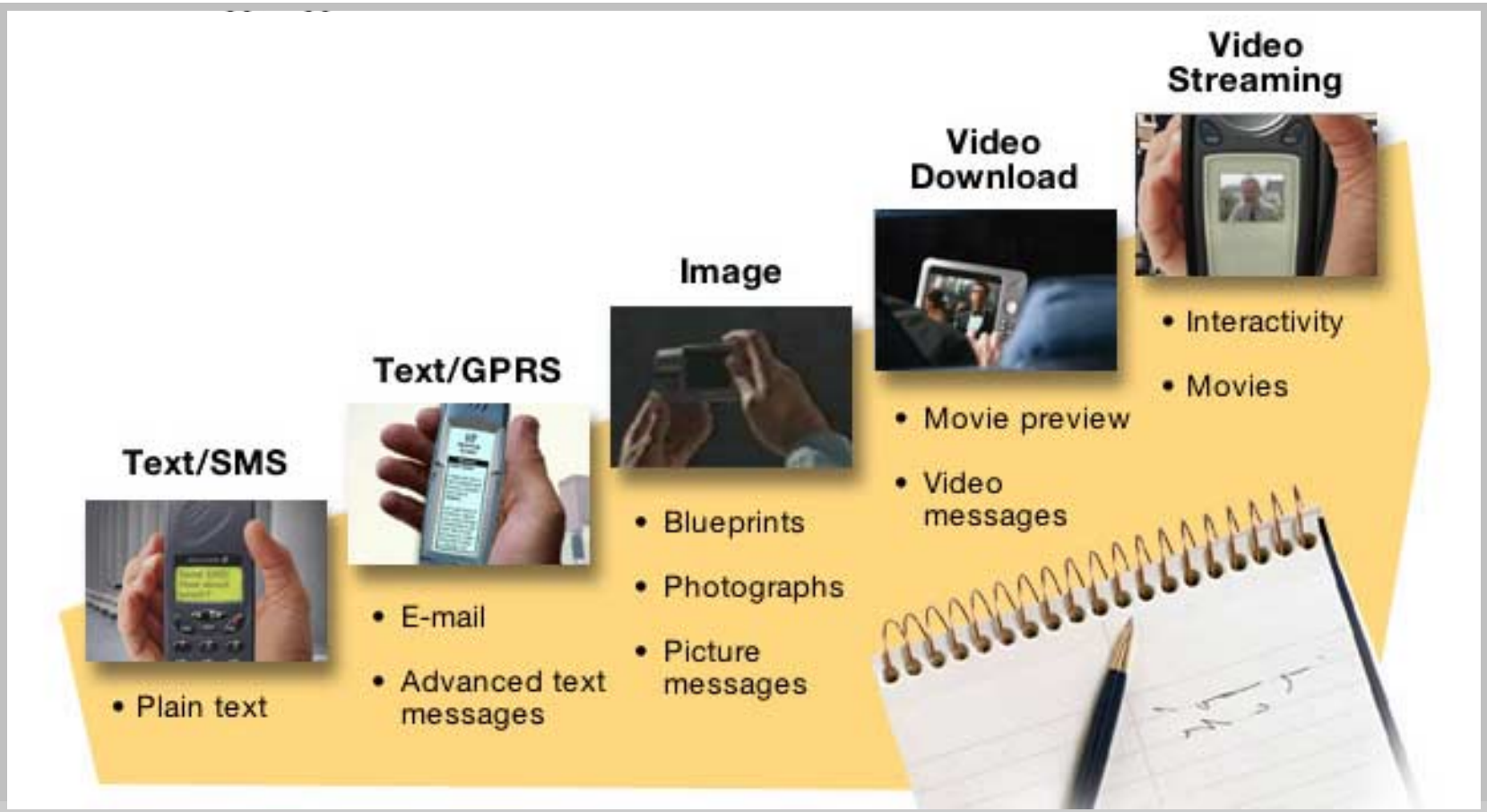
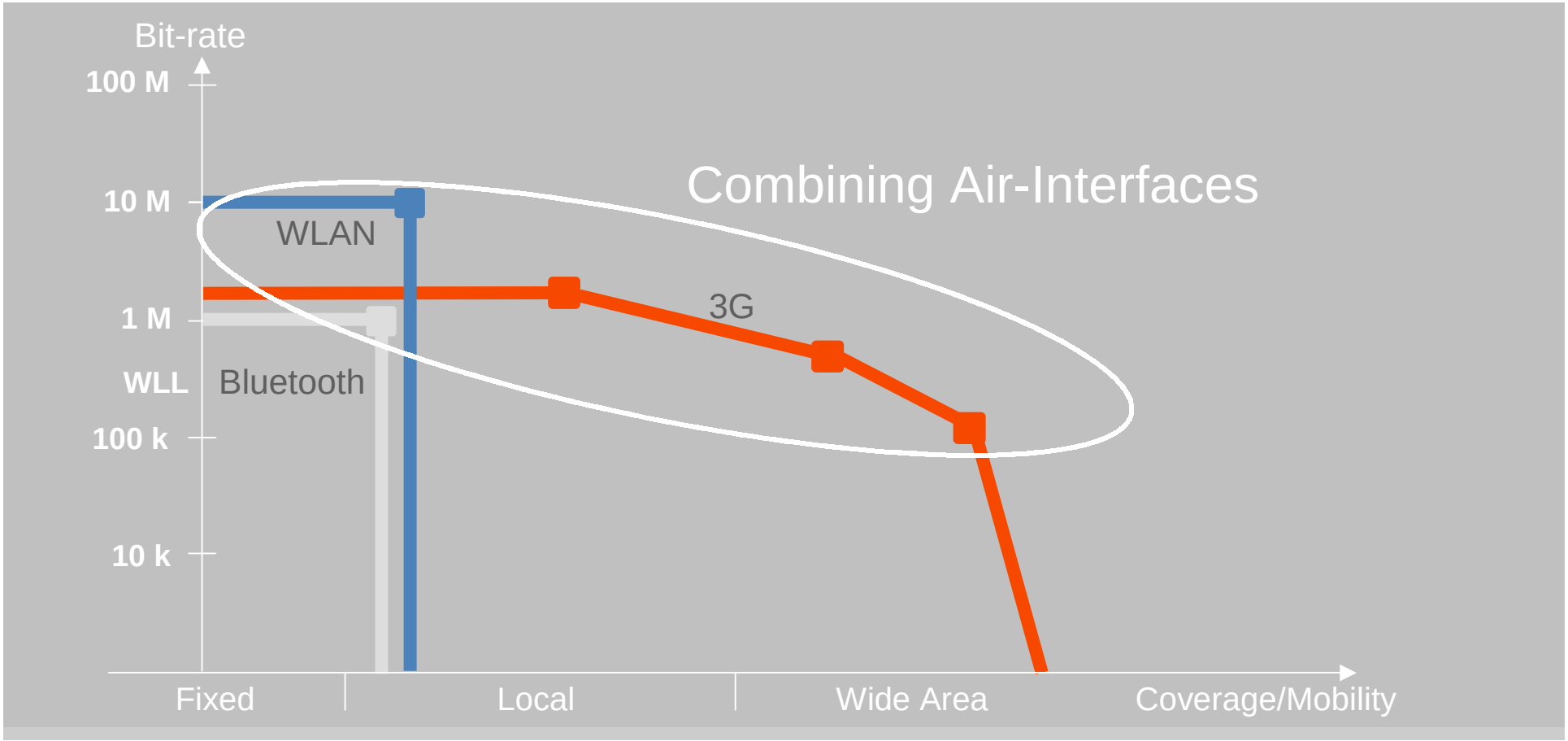
Enhancement of services as infrastructure evolves

Example: messaging



Radio access alternatives for high bit-rates

Coverage vs. Bit-rate



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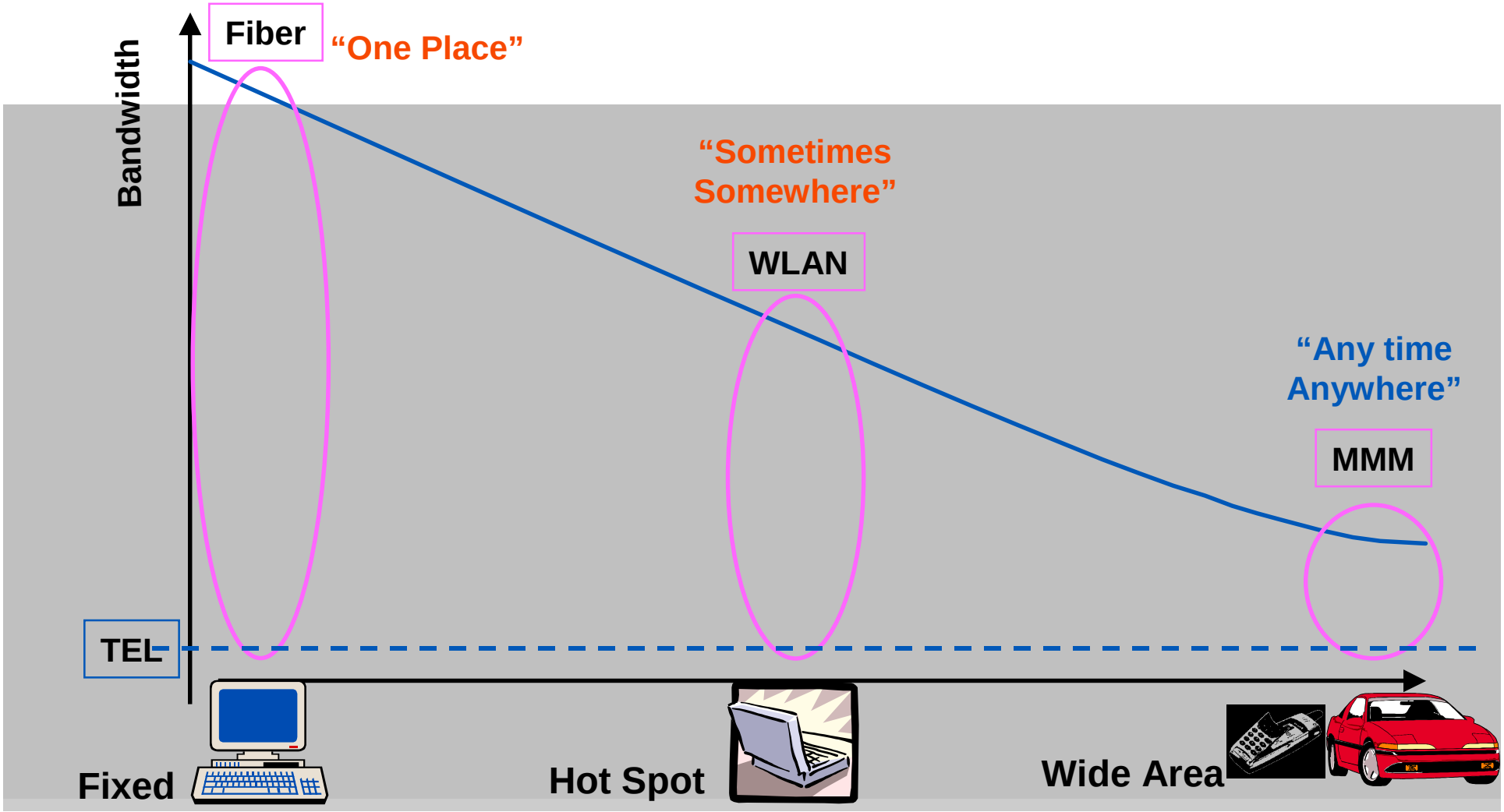
The bandwidth - coverage trade-off



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3G vs. WLAN

- 3G
  - Up to 2 Mbps (384 kbps wide area)
  - Wide Area Coverage
  - “Anytime, Anywhere”
- WLAN
  - Up to 5 Mbps user bitrate (11 Mbps physical layer bitrate)
  - Local Area Coverage (up to 50 m)
  - “Sometimes, Somewhere”

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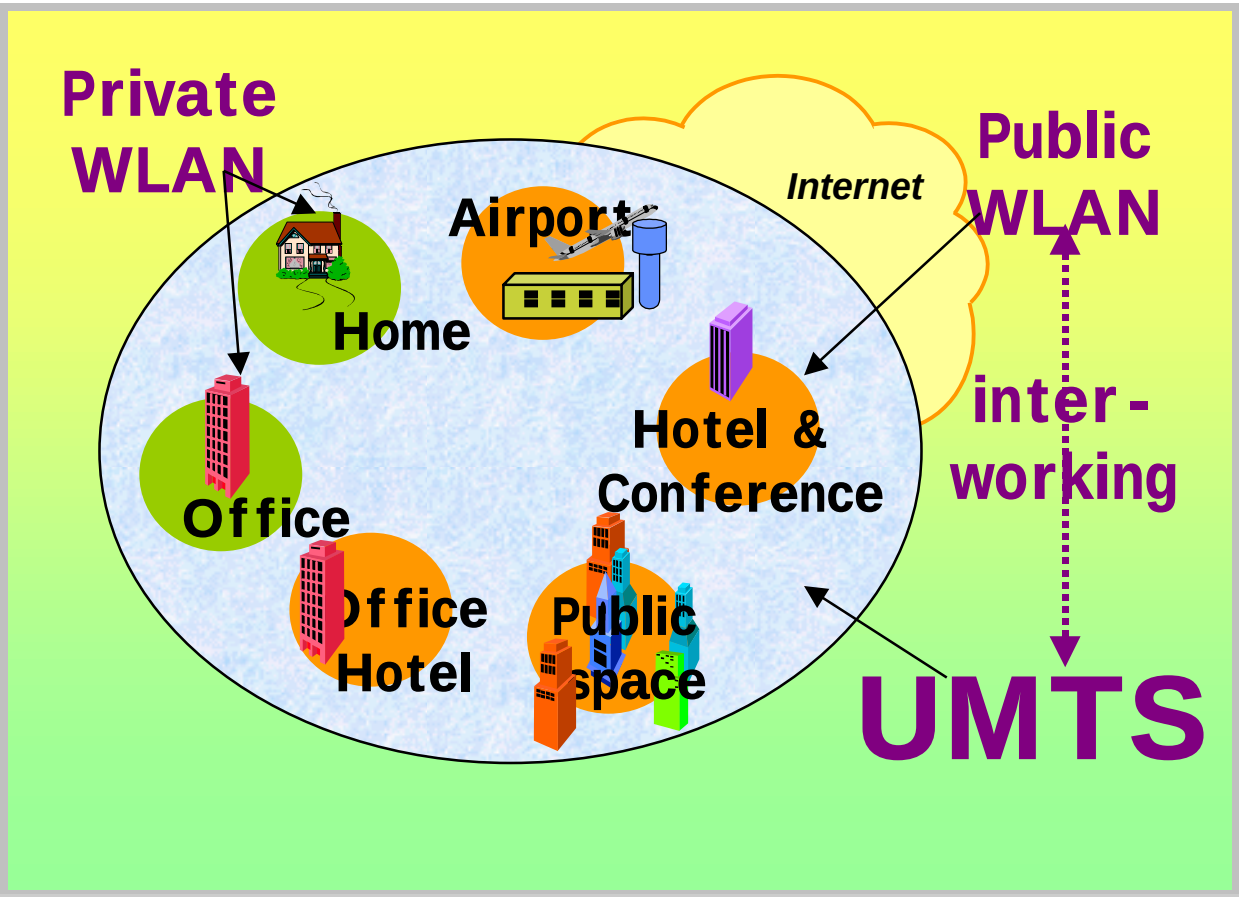
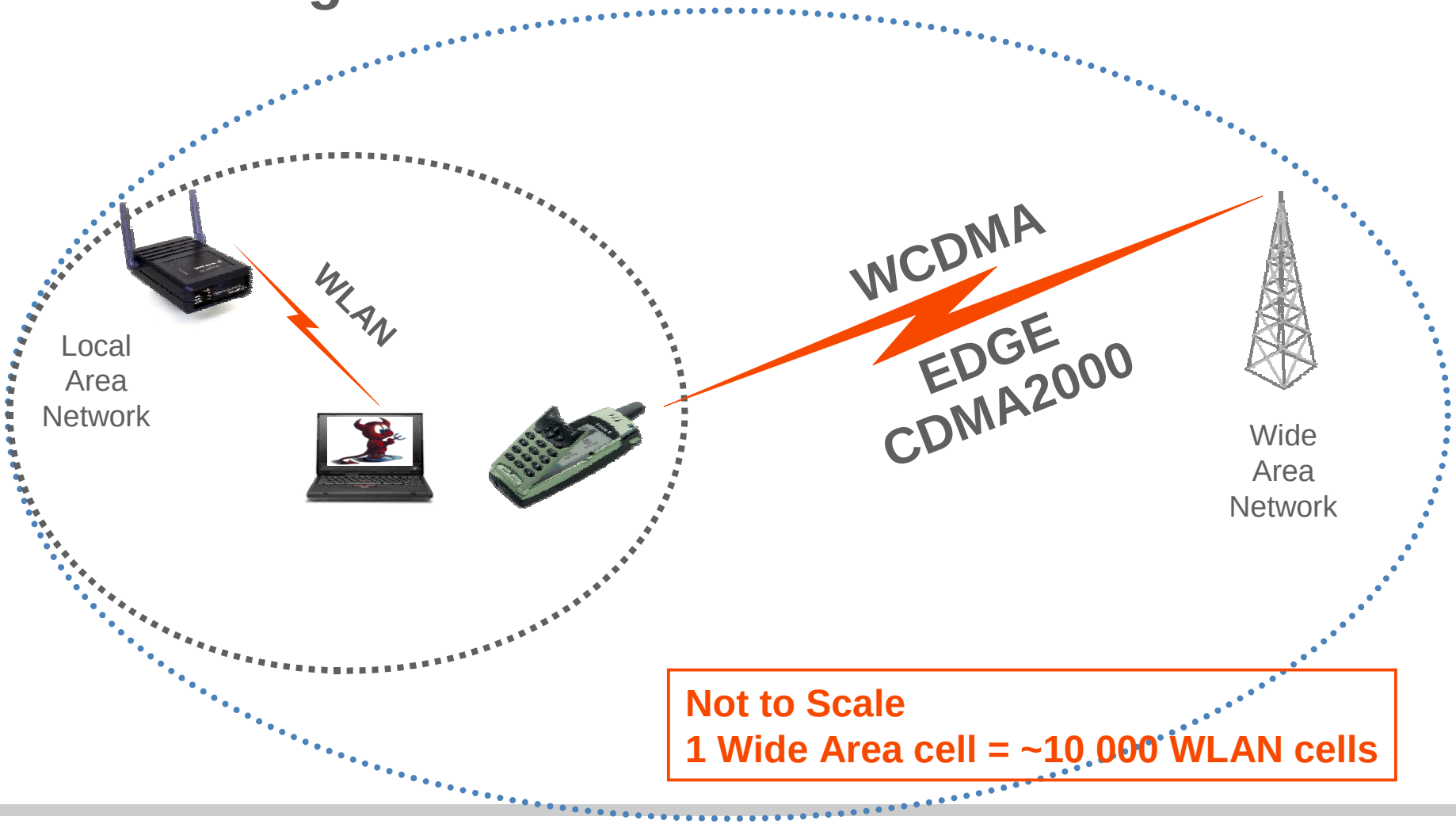
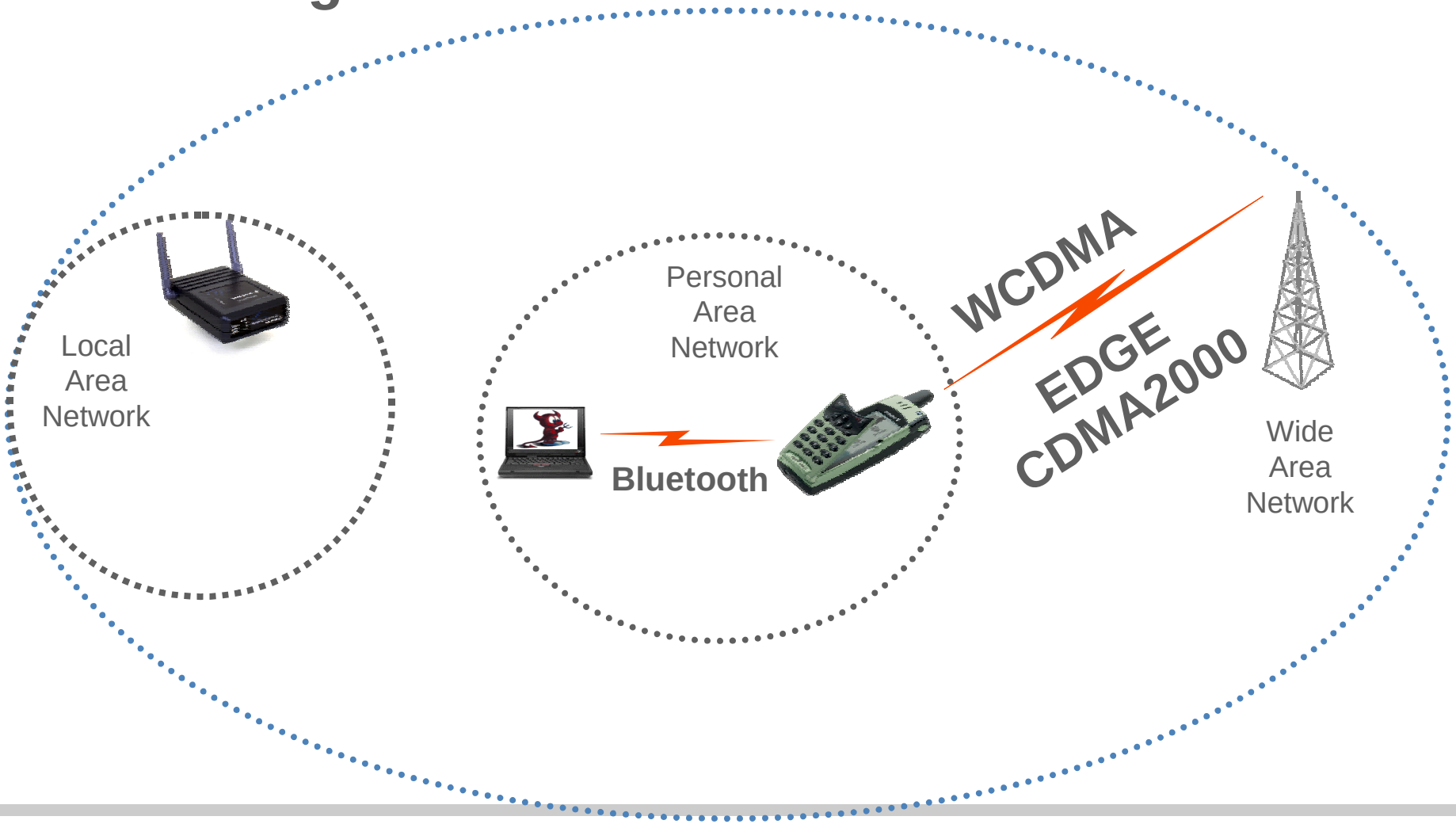
WLAN as complement to 3G



Combining Air-Interfaces



Combining Air-Interfaces



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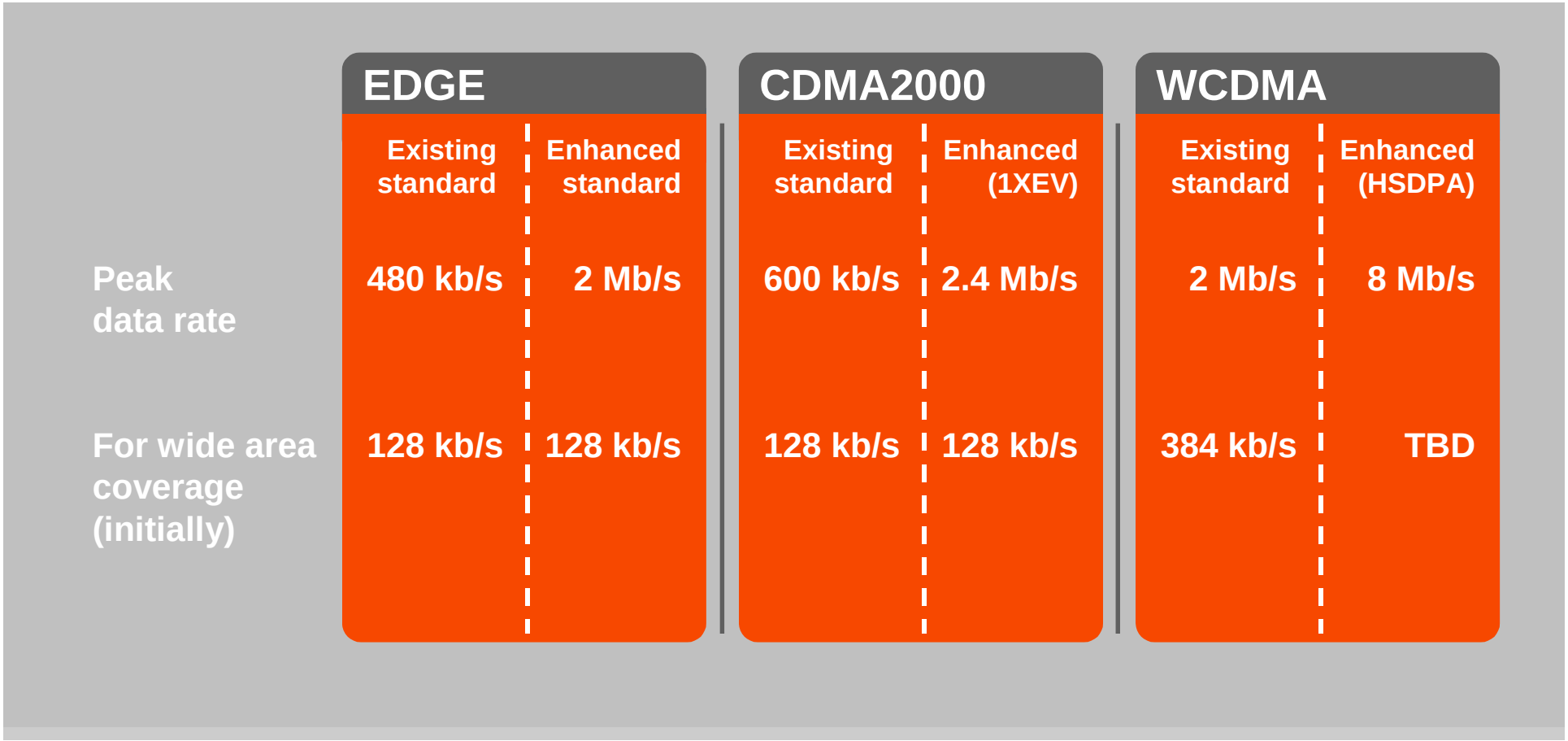
End User Data Rates; 3G



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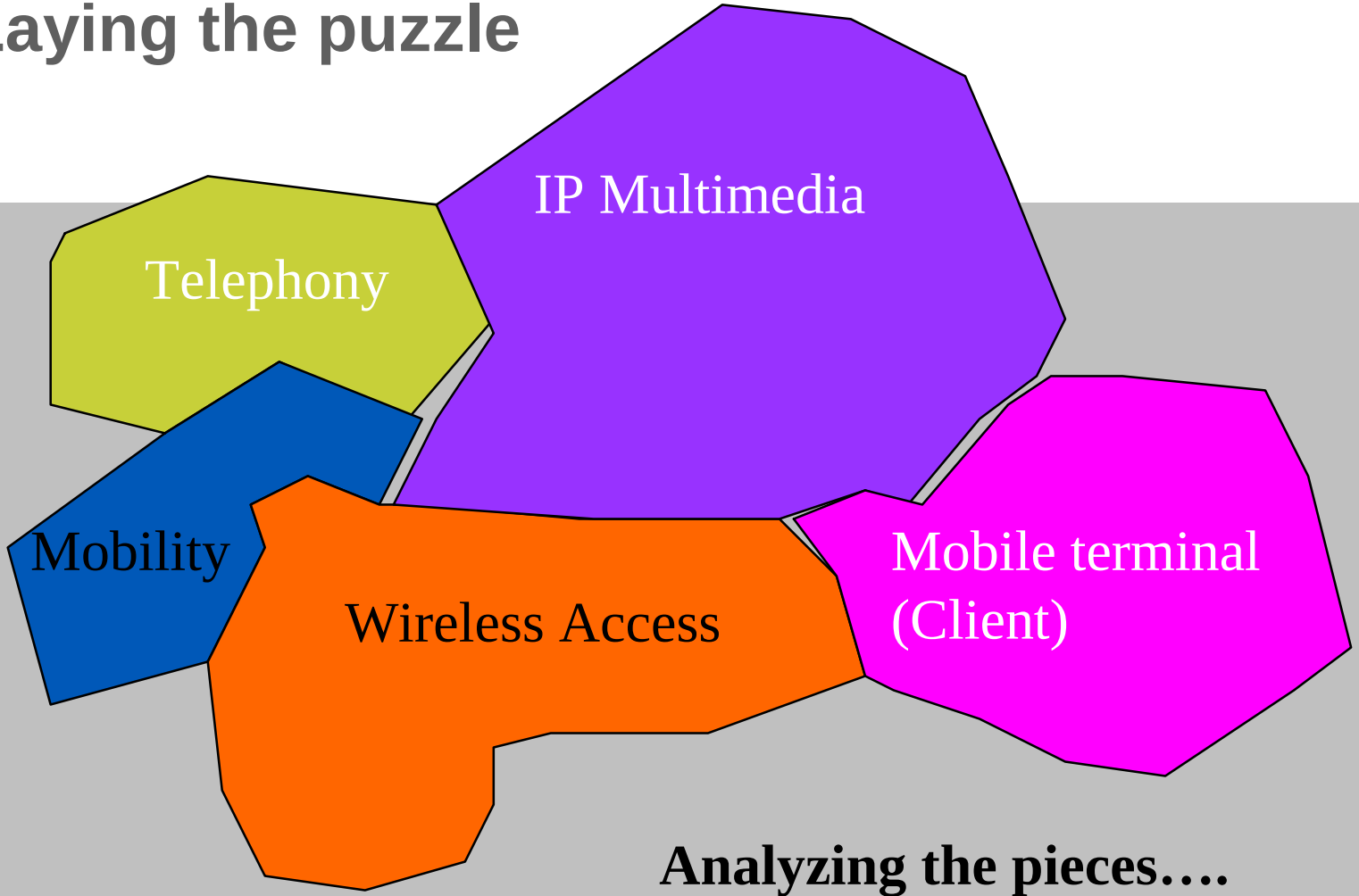
IPv6
The New Generation Internet

- IP address space enhancement
  - Today's Internet (IPv4) has only 4 Billion Internet addresses (in practice only 3 Billion).
  - Addresses allocated unevenly (MIT has more addresses than China).
  - IPv6 has 128 bits address space = $3 \cdot 10^{38}$ addresses (In theory 1 Billion Billion / mm^2 on earth!)
  - Easier administration
- Critical business requirements
  - Mobility
  - Security
  - QoS support
  - IPv4 and IPv6 co-existence and interoperability
- IPv6 Guarantees Mobile Internet Evolution!

Laying the puzzle



Analyzing the pieces….

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IP Multimedia for Wireless

- Combining the most valued Access Form (Mobile) with IP Multimedia is THE main effort
- Main issues
  - Combining radio environment with Internet service environment
  - Add mobile specific support (Positioning, Always on and Always with you, services.)
- Radio environment characteristics
  - Scarce bandwidth resources
  - Fading, interference => Unstable BER up to %
  - Terminal mobility, fast handover
- Standards being defined under the 3GPP-IETF collaboration framework

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3GPP Holds

- Radio expertise necessary to input solutions for radio adaptations
- Systems responsibility for UMTS including the WCDMA air interface
- Backward and forward compatibility (including legacy issues)

IETF Holds

- IP protocols
- The Internet expertise
- Efficient protocol development machinery (stage 3)

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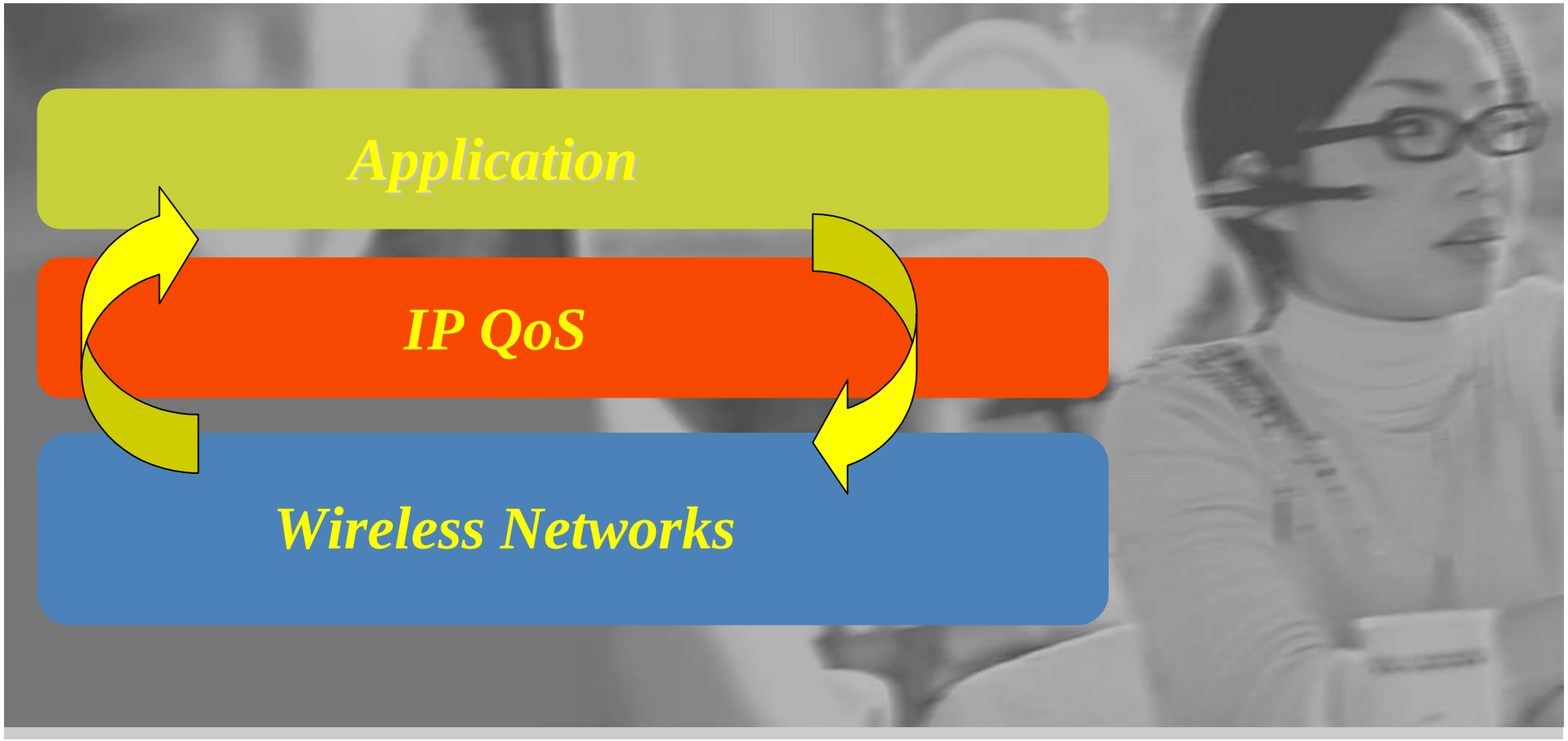
Quality of Service
- Cost effective Solutions



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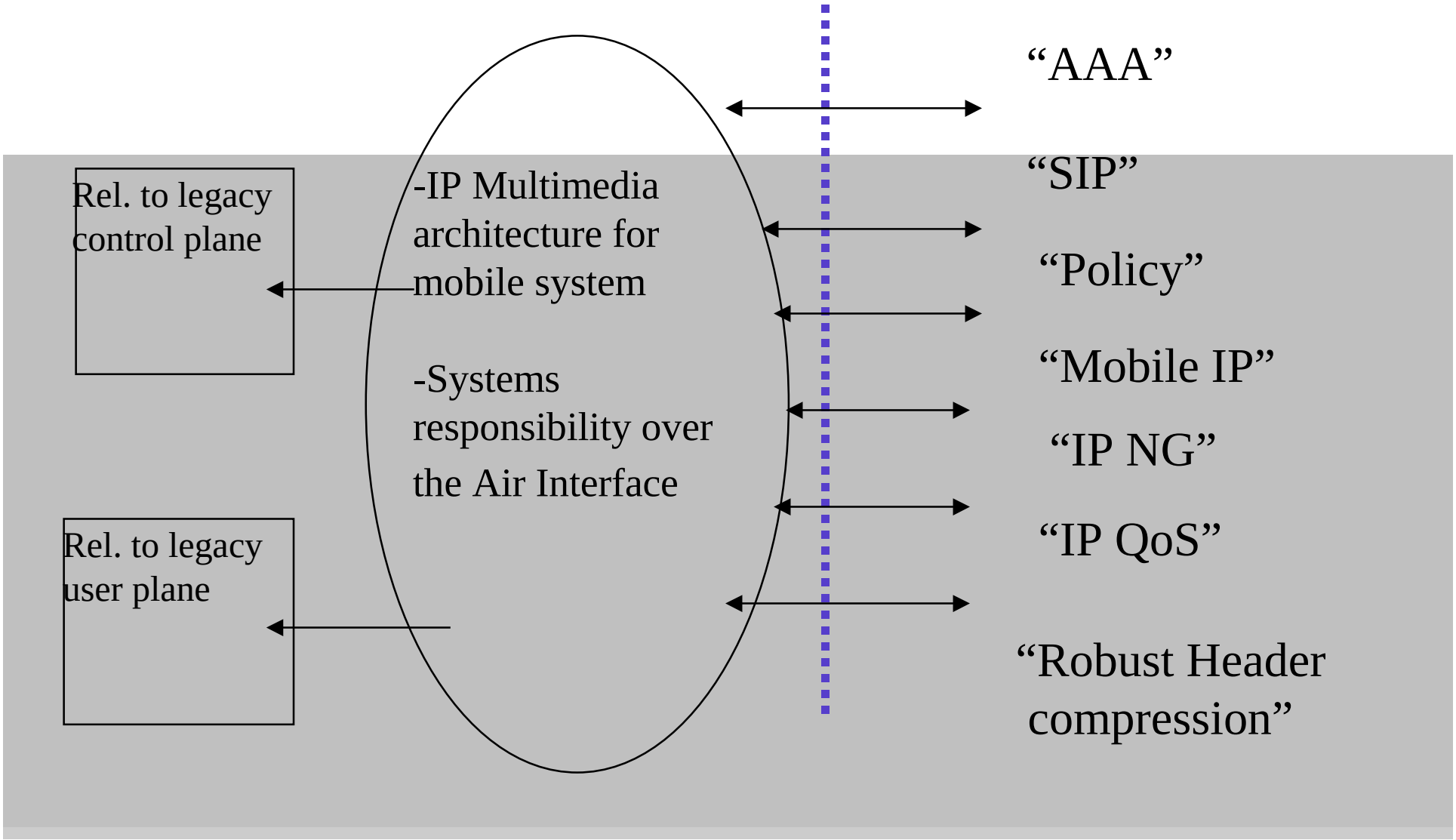
Some activities to facilitate a seamless, scalable Internet from your pocket device up to your large stationary PC

- Header compression IETF ROHC
- WAP 2.0 - xHTML convergence for macro/micro Browsing
- Signaling compression
- TCP and transport mechanisms adopted for cellular links
- QoS mapping and scalable server architecture
- IPv6 in a cellular environment
- SIP/SDP based conversational multimedia


3GPP
IETF
“AAA”
“SIP”
“Policy”
“Mobile IP”
“IP NG”
“IP QoS”
“Robust Header compression”
Rel. to legacy control plane
Rel. to legacy user plane
-IP Multimedia architecture for mobile system
-Systems responsibility over the Air Interface

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A CLEAR WAY FORWARD?