Voice Evolution & Fixed-Mobile-Internet Convergence

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Summary

- About the UMTS Forum
- « Magic Mobile Future 2010-2020 »
- Voice traffic forecasts
- FMC & FMS: the various aspects of convergence
- UMA: the first step towards fixed-mobile convergence
- Towards IMS
- Conclusion: a bright future for convergence

ITU-D/ITU-T Seminar on Standardization & Development of NGN for the Arab Region
29 April-2 May 2007, Manama, Bahrain

About The UMTS Forum

The UMTS Forum is an international, cross-sector industry body comprising operators, manufacturers, regulators, application developers, research organisations and IT industry players.

OBJECTIVES

To promote a common vision of the development and evolution of 3G/UMTS and to ensure its worldwide commercial success:

- by expressing a strong industry voice promoting 3G/UMTS technology and its evolutions through lobbying and promotional actions globally
- by forging dialogue between operators, manufacturers, administrations & regulators, and other market players that can ensure commercial success for all
- by providing market knowledge to aid rapid development and uptake of new services and applications

To provide practical support to industry, administrations and policy-makers:

- by offering guidance to governmental and financial communities, providing marketing input to technical standardization bodies (the Forum is a Market Representation Partner of 3GPP), and advising on spectrum requirements both for the present and future 3G systems
- through its membership of the three sectors of ITU, in the activities of which it participates regularly - such as the ITU-R WP8F – in view of preparation for the next World Radio Conference 2007 (WRC-07)

The UMTS Forum serves the interests of all its members through educational and promotional activities in its role as the voice of the 3G mobile market.

UMTS Forum Key Focus Areas

Work-plan 2007 in summary

Vision, Future Research & Market	Spectrum & Regulation	Technical Issues & Implementation
Evolution of 3G/UMTS	Global spectrum and spectrum arrangements for UMTS/IMT-2000 and its evolutions	Complementary technologies (mobile, Broadband Wireless Access...)
Services & Applications	Preparations for WRC-07	Mobile TV
Market forecasts, customer perspective and trends	Advice to industry and administrations on 3G licensing	3G standardisation and support to 3GPP
Relationships with international bodies (ITU, EC, CEPT/ECC...)		
Emerging markets action plan (including 'BRIC')		
Relationships with international media and financial community		
Visibility and participation at conferences, exhibitions, seminars and workshops		

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Towards the Magic Mobile Future

Objectives of UMTS Forum report n°37

- The UMTS Forum Report n°37: ***"Magic Mobile Future 2010 – 2020"*** **was communicated to ITU WP 8F as a contribution, in order to assist preparatory work of the World Radiocommunication Conference 2007 (WRC-07) under agenda item 1.4, concerning long term market forecasts needed to determine spectrum requirements for future development of IMT-2000 and systems beyond IMT-2000.**
- **The report builds on previous UMTS Forum market studies to provide forecasts for the next decade (2010 – 2020) on the evolution of penetration rate (including machine-to-machine applications), expected services and evolution of usage of these services.**

Mobile scenarios for 2010-2020

Scenario 1:
"Low price, Voice-dominated Growth"

…is a pessimistic scenario that describes a mobile industry evolving to bigger volumes rather than enhanced capabilities.

Consumer and business voice increase in volumes but revenue flows diminish, and are not replenished with robust adoption of new applications.

Communication industry revenues decline as pricing levels fall, and consumers spend their discretionary money on alternative activities. Preservation of wireless access may require the intervention of government authorities.

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Mobile scenarios for 2010-2020

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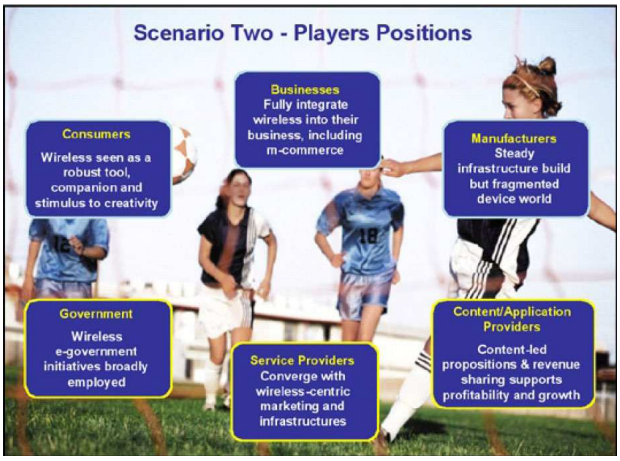
Scenario 2: "Balanced, Broad-based Growth"

…describes an environment where mobile networks deliver compelling new services customised to the needs of users, stationary or otherwise.

Businesses integrate mobile deeply into their operational practices as quality and interoperability concerns no longer prevail. Other service providers are effectively converged into mobile-led companies, while content and application providers find a healthy, growing marketplace.

THIS SCENARIO ASSESSED AS MOST LIKELY



Mobile scenarios for 2010-2020

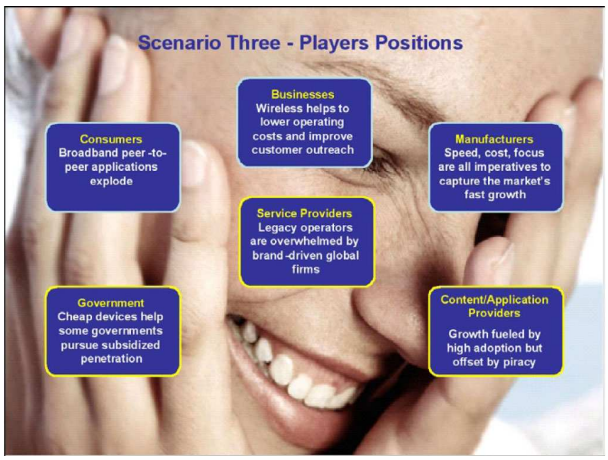
UMTS Forum

Scenario 3: "Pervasive Data-driven Growth"

…is a disruptive scenario where ad-hoc broadband wireless networks start to take significant part of the traffic. In highly populated areas costs are low and many services are close to, if not, free.

Traffic volumes increase as the cost of providing access falls dramatically. Despite multiple connectivity options, consumers must cope with a patchwork of options.

Larger mobile networks ensure complementary coverage on a national level.



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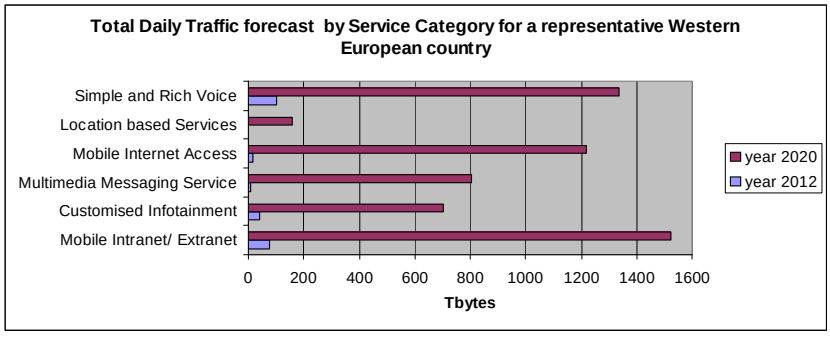
Traffic forecast 2012-2020
Key Predictions

- **Traffic will increase by a factor of 23x**
  250➔5750 Tbytes total average daily traffic
- **Internet access will be the driver**
- **Voice will stay a key service:**
  In 2012, voice (simple and rich) is still the first service category in terms of daily traffic volumes. Simple voice duration will remain flat in both consumer and business segments. However, total call duration will be higher in 2020 than in 2012 thanks to the increase of rich voice and VoIP calls
- **Relations between people will expand**
- **More personalised services… from entertainment to life coaching**
- **A world under individuals' own control via sensors and location based services**

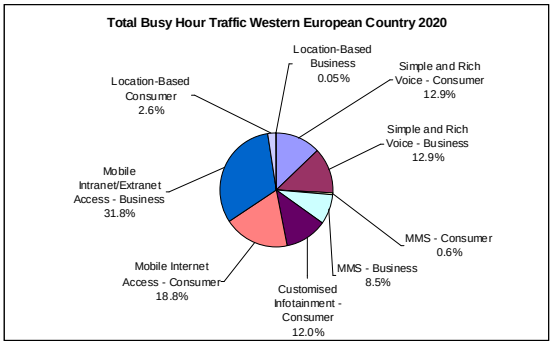
Traffic forecast

- From 2012 to 2020, total daily traffic in the Representative Western European country will grow from 250 Tbytes to 5750 Tbytes. This large growth is due to the increasing number of available services using photos, videos… which lead to exchange higher data volumes.



Busy Hour Traffic in 2020

Busy hour traffic by Service Category for a Western European Country in 2020 is shown in the figure below:



– **The aggregate traffic asymmetry is 2.9. The highest asymmetry that could occur is 10.8.**

Magic Mobile Future 2010-2020: Some observations and conclusions

- **Traffic forecasts presume a certain environment being in play in the period 2010-2020, corresponding to Scenario 2 "Balanced Broad-based growth". This is an environment with:**
  - **relatively stable prices,**
  - **healthy investment in new products and services,**
  - **a co-operative regulatory climate.**
- **3G/UMTS and its evolution will enable the true marriage of mobile communications with internet technologies. Frontiers between IT, Media and Telecom are blurring.**
- **In 2020, total daily traffic in the Representative European country is expected to be in the range of 5750 Tbytes: 23x 2012 traffic.**
- **Mobile Internet/Extranet access will generate highest traffic, but voice will remain a key service.**
- **Total traffic will be a combination of mobile (34%), stationary/nomadic (52%) and M2M (14%) traffic.**

Promoting the global success of third generation mobile
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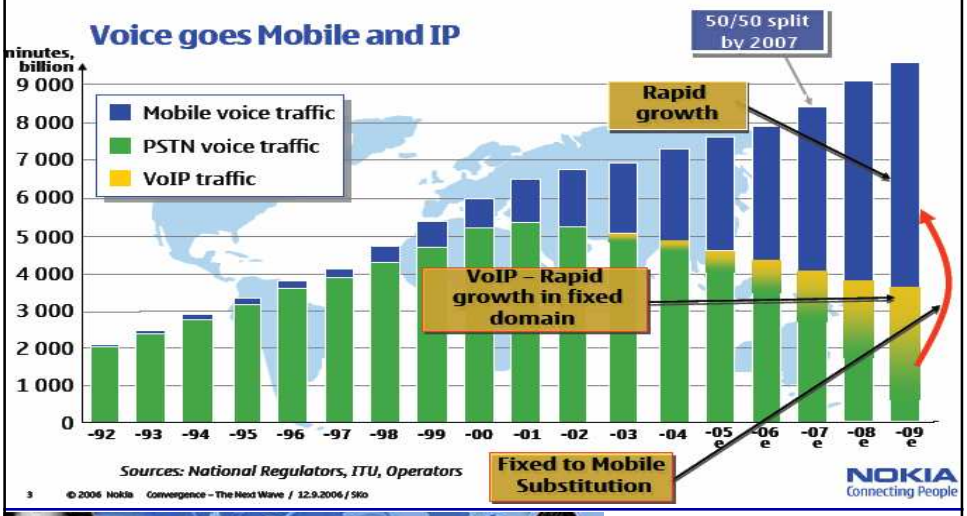
Voice traffic forecasts



Voice services could benefit from 3G Long Term Evolution (LTE)

Next Report from UMTS Forum (May 07):
« Market potential for 3G LTE»

➔ Mobile VoIP: efficiencies enabled by 3G LTE would remove most overheads associated with VoIP for operators – Presence information, messaging & multimedia as first applications

➔ Videotelephony could take a fast growth by integration with applications such as IM, VoIP, file sharing and other attractive applications enabled by 3G LTE high performance network (e.g. enabling deaf users to use mobile devices for sign language and remote surveillance,…)

Convergence will abolish borders inside digital world…

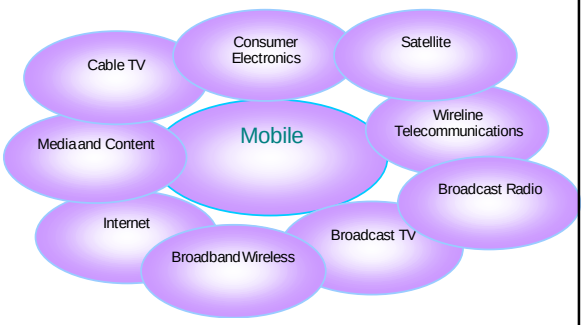
➔ Future changes will not be limited to the introduction of new entrants. Convergence between the different sectors of the communications environment has already taken place and is expected to accelerate in the near future.

➔ At the Consumer Electronic Show (CES) in Las Vegas, Jan.07, *Convergence, Mobility and Digital Home* were dominant. Innovations tend to abolish borders between telephones, MP3 terminals, Internet, TV, photo pictures, video,…

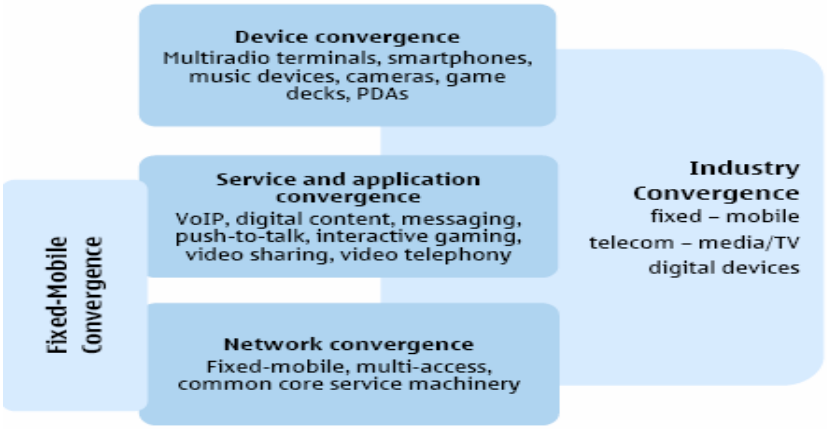
➔These *innovations* will push content providers, operators and Internet portals to multiply partnerships

➔ 3G/UMTS and its evolution will enable true integration and interaction between different services and applications.

➔



Convergence is adopting various aspects at the same time



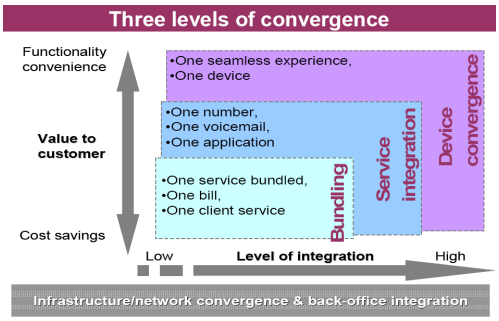
Battle between convergence (FMC) and substitution (FMS) ?

- **Three levels of convergence:**

  1. Bundling offers <

  2. Service integration <

  3. Device convergence



Source: Ovum (May 2006)

- **Fixed-Mobile substitution**

Customer Expectation Evolution

Today's customers expect …

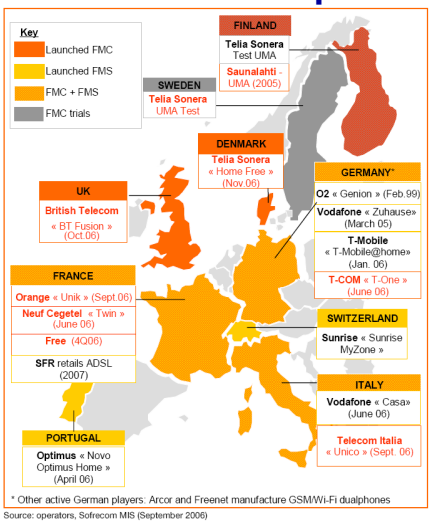
- **Mobility**
- **Portability**
- **Convenience**
- **Value for money**
- **Their preferred facilities and services irrespective of type of network and their geographical location**
  - **e.g. SMS/F-SMS, MMS/F-MMS**

Benefits of convergence for customers

Convergence and substitution solutions offer value for customers via a single handset:

- ➔ **Convenience and simplification,** particularly for enterprises that manage both fixed and mobile telephony systems
- ➔ **Cost savings,** for both operators and customers
- ➔ **Advanced services,** content-based services that customers cannot find for free on the Internet

Substitution (FMS) vs. convergence (FMC): the battle in Europe



Source: operators, Sofrecom MIS (September 2006)

Orange case study: *Unik,* the first emblematic brick in France Telecom's convergence strategy

- ➔ **Integrated fixed/mobile offering based on a single handset: a single telephone, a single number and a single address book at home and out…**
- ➔ **At home, the mobile handset connects in WiFi mode to the Livebox and the calls transit via the Internet. Outside the home, Unik is a conventional mobile phone, using the Orange network**
- ➔ **A call begun with Unik via the Livebox automatically switches over seamlessly to the mobile network once customers leave home, thanks to the « handover » made possible by UMA (Unlicensed Mobile Access) technology, remaining under the same tariff plan**

Unik: matching consumer needs

- **a single phone**
- **a single number**
- **a single voicemail**
- **a single adress book**
- **voice call continuity**
- **automatic connection**
- **the best network / the best price**
- **all mobile features available**

➔ ***designed to make life easier for the customer***

➔ ***Unik: a simple and seamless experience***

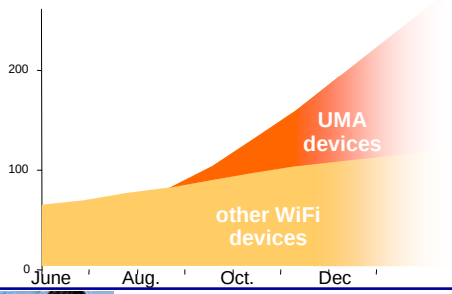
Offer : Unik in France (Consumer market)

A basic option	An advanced option featuring unlimited calls
Unlimited calls to fixed lines **Unlimited calls 24 hours a day, 7 days a week from your mobile when connected to the Livebox** - To fixed lines within mainland France €10 a month	Unlimited calls to fixed lines + Orange mobiles **Unlimited calls 24 hours a day, 7 days a week from your mobile when connected to the Livebox** - To fixed lines within mainland France - To Orange mobiles

Available on postpaid and hybrid offers €22 a month

Unik is already a success

- **130,000 Unik phones sold in France at end March 2007**
- **A real benefit for the users:**
  - **53% traffic increase with Unik**
  - **calls from home x3**
- **25% customers connect their Unik phone to 2 or more Liveboxes**
- **15% to 20% of Unik calls generate a handover**
- **Unik becomes the reference for WiFi phones**



Western Europe: 'Unik'-type convergence offerings

country	mobile operator	offering	date of launch	mobile network used	subscription conditions			included		customer advantages		
					fixed line subscription	broadband Internet subscription	mobile subscription	unlimited from home	time of fixed and/or mobile calls	one bill	one number	nbr of supported users
Germany	T-Com	T-One	sept-06	T-Mobile	✓	✓	✓	✓	✓	✓		5
Denmark	Telia Sonera	Home Free	nov-06	Telia Sonera	✓		✓	✓		✓		5
France	France Telecom	Unik	oct-06	Orange	✓	✓	✓	✓	✓	✓	✓	5
	Neuf Cegetel	Twin	juin-06	Neuf Mobile (MVNO SFR)	✓			✓	✓			5
Italy	TIM	Unica	oct-06	TIM		✓	✓	✓	✓			5
United Kingdom	BT	BT Fusion	sept-05	BT Mobile (MVNO Vodafone)	✓	✓		✓	✓			5

Source: operators, Sofrecom MIS (September 2006)

FMC and FMS in emerging markets

- **Convergence offers**
  - **Brazil: Brasil Telecom – Unico (dual GSM/Bluetooth handset)**
  - **China: China Telecom, China Netcom – QBox (Personal Access System/Mobile /Internet)**
  - **Czech Republic: Telefonica 02 – 02 Internet Komplet (Quadruple play Fixed/Mobile/Internet/TV)**
  - **India: BSNL, Airtel, MTNL – One India (Advantageous Fixed/Mobile/WLL tariffs)**
  - **Jamaica: MiPhone (MNO) + Flow (ISP) – Partnership for Fixed/Mobile tariffs**
- **Substitution Offers**
  - **Cameroon: Camtel – CTPhone (Fixed/Mobile/Internet)**
  - **Hungary: Vodafone – Otthon Classic (Fixed/Mobile)**
  - **India: Airtel – Airtel Mega (fixed-mobile substitution)**
  - **Jamaica: Digicel – Digicel@Home/Digicel@Work (fixed-mobile substitution)**

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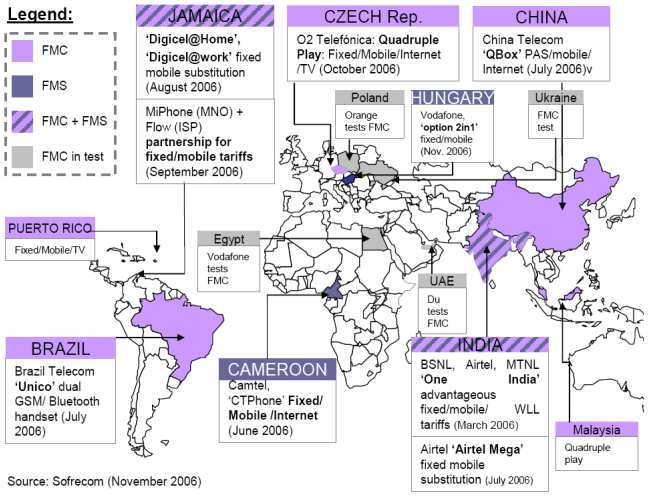
Convergence and substitution in emerging markets



Source: Sofrecom (November 2006)

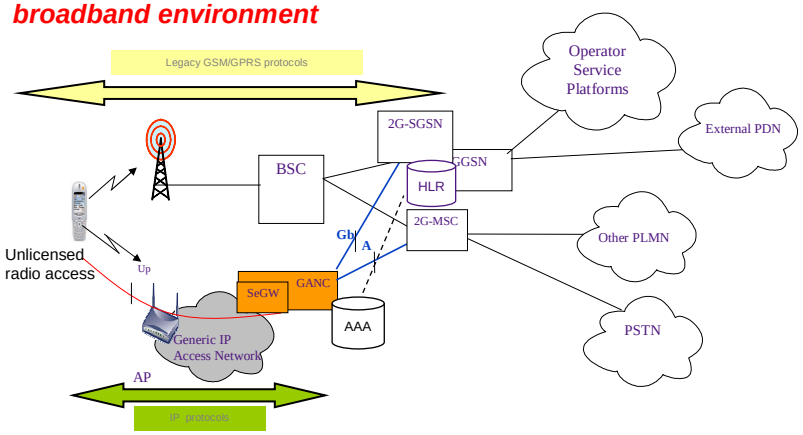
Convergence and substitution in emerging markets: offer features

country	operator	offer	date	subscription conditions: fixed subscription	subscription conditions: internet broadband subscription	subscription conditions: mobile subscription	included: illimited from home	included: fixed or mobile call	clients advantages: one bill	clients advantages: one number	clients advantages: nb. of users possible
Convergence offers											
Brazil	Brazil Telecom	Unico	Jul-06	✓	n.a	✓				✓	3
China	China Telecom, China Netcom	QBox	in test from May 05	Unique subscription to Qbox							10
Czech Rep.	Telefonica O2	O2 Internet Komplet	Oct-06		✓	✓					na
India	BSNL, Airtel, MTNL	One India	Mar-06	✓ or	✓ or	✓		✓	✓	✓	1
Jamaica	MiPhone, Flow	-	Sep-06	✓ or		✓	✓		✓	✓	1
Substitution offers											
Cameroon	Camtel	CTPhone	Jun-06		✓ or	✓		✓			3
Hungary	Vodafone	Otton Classic	Nov-06		✓			✓	✓	✓	n.a
India	Airtel	Airtel Mega	Jul-06			✓			✓	✓	n.a
Jamaica	Digicel	Digicel@Home, Digicel@Work	Aug-06			✓			✓	✓	n.a

Source : Sofrecom (November 2006)

UMA brings the first step of a convergent offer in an ad-hoc time-to-market timescale

- ***UMA for access to 3GPP CS over WLAN (or Bluetooth)***
- ***Extending with a generic IP access the mobile networks to the broadband environment***



UMA : a smooth introduction in the networks

	GAN
Integration in the network	***Reuse of standards GSM interfaces but impact on the CN to be minimized by introduction of key features***
Mobility management	***Handover mandatory as Wifi coverage is poor: additional features needed to configure handover Wifi to GSM and GSM to Wifi***
Location based services	***No standardization of short numbers for emergency call handling, additional configuration required***
Capacity	***Gb interface can be the bottleneck of the system, which will be solved by Gb over IP introduction***

Technology maturity: UMA is available and easy to integrate

	UMA
Handset TTM	Available, based on low or medium range handsets
Network integration/ Simplicity	Standardized interfaces allow simple IOT. HO and access control are also standardized
Scalability	Signalling impact mitigated by some key features
Costs	Close to GSM core network costs

IMS (IP Multimedia Subsystem): what will it provide?

➔ ***Services and Control***

- Adds call session control to the packet network (GPRS)
- enables peer-to-peer real-time services - such as voice, video - over a packet-switched domain

➔ ***Mixed Multimedia***

- Ability to pick and mix various multimedia flows in single or multiple sessions
- Can handle real-time voice, video, data

➔ ***Connectivity Independence***

- Provides access to IP based services independent of the connectivity network: mobile (3GPP's UMTS, 3GPP2's CDMA2000), fixed networks (TISPAN's NGN),…

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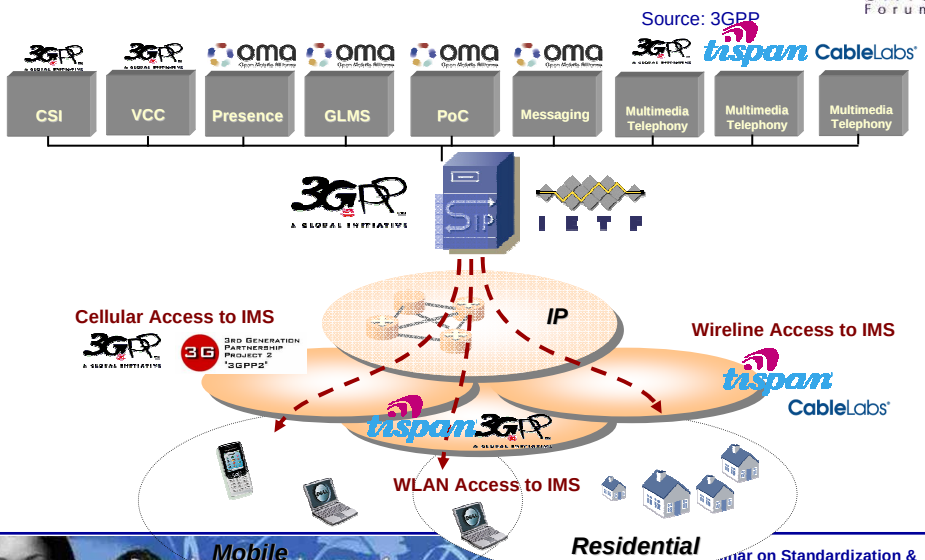
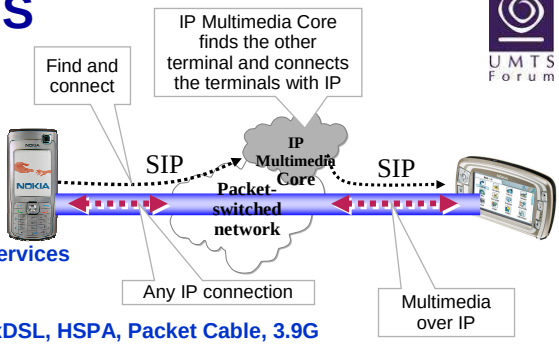
IMS Access Independence



IMS



- IP Multimedia Subsystem
- Emergency calls
- Multimedia telephony
  - including supplementary services
- Policy control
- Bearer agnostic
  - GSM, UMTS, WLAN, fixed xDSL, HSPA, Packet Cable, 3.9G
- PS domain service, but interworks with CS telephony
- SMS over IP (in Rel-7)
- SIP / SDP driven sessions on whatever media
- Endpoint-to-endpoint or endpoint-to-service
  - Multimedia, Messaging, Presence, etc
  - The protocol is there, what are your application needs?
- IETF defined protocols re-used by 3GPP
  - Initial version was frozen in Rel-5
  - Improvements with more functionality in Rel-6 and Rel-7
  - Common platform for services in many architectures and access technologies

Source: 3GPP

Multimedia call

John is in WLAN coverage.

Mary is in cellular coverage

Both are registered to IMS

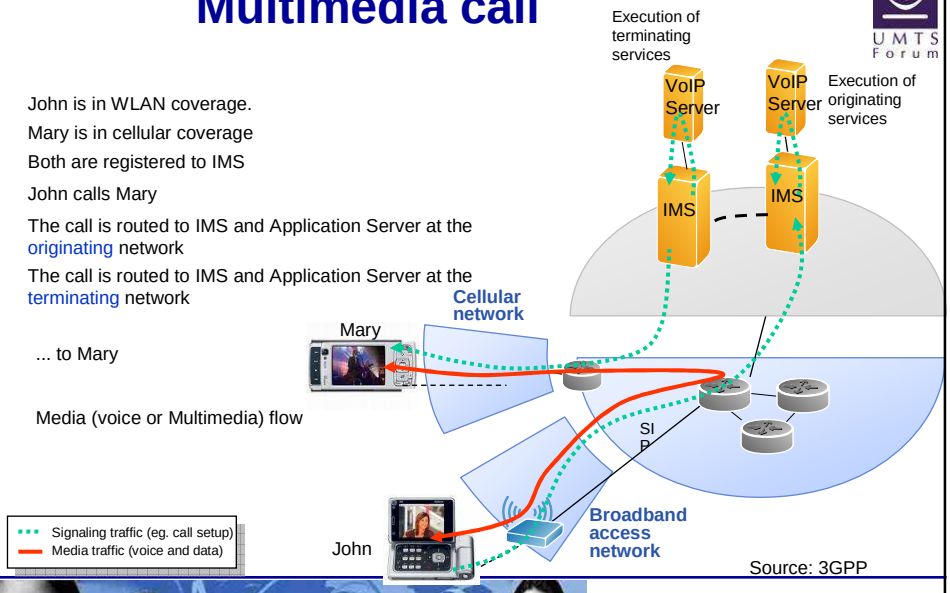
John calls Mary

The call is routed to IMS and Application Server at the originating network

The call is routed to IMS and Application Server at the terminating network

... to Mary

Media (voice or Multimedia) flow

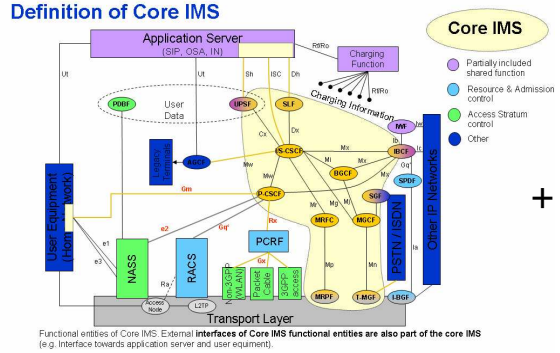


Source: 3GPP

Common IMS

- **The scope of 3GPP has been expanded to encompass "Common IMS" (decision at PCG #18 in Delhi, on 19 April 07)**
  ➔ *a real boost to Fixed-Mobile Convergence, paving the way for IMS to be used in NGN of all kinds, fixed & mobile*
- **Common IMS = Core elements and interfaces + agreed common services**

Definition of Core IMS



Functional entities of Core IMS. External **interfaces of Core IMS functional entities are also part of the core IMS** (e.g. Interface towards application server and user equipment).

+

Source: 3GPP

Agreed common services:
- Telephony
- O & M
- Security
- Web services
- RACS interface
- NASS interface
- Charging interface
- LI (in common parts)
- Testing (of common parts)
- Residential & Enterprise networks (subject to req's)

Conclusion: Convergence has a bright future ahead of it

- **Operators are offering two forms of convergence:**
  - **Price convergence, with substitution offerings which enable customers to make calls from home on their mobiles at rates wich are similar to fixed lines rates**
  - **Convergence of services and handsets, with the launch of single handsets capable of linking up with both the mobile network outside and a WLAN at home for VoIP calls**
- **Some critical factors of success:**
  - **Availability of handsets: UMA and SIP-compatible handsets**
  - **User's perception of the benefits of convergent solutions: mind not to complexify the offerings…**
- **Single handset solutions have a bright future ahead of them:**
  - **By 2015, VoIP on mobile should account for 23% of fixed and mobile calls in Western Europe (Analysis)**
  - ***UMA* access technology is the first step towards fixed-mobile convergence, before migrating towards an *IMS* architecture, designed to support a whole range of new combined services on an all-IP network, such as voice, video, videoconference, IM and presence indicators…**

For more information

www.umts-forum.org

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