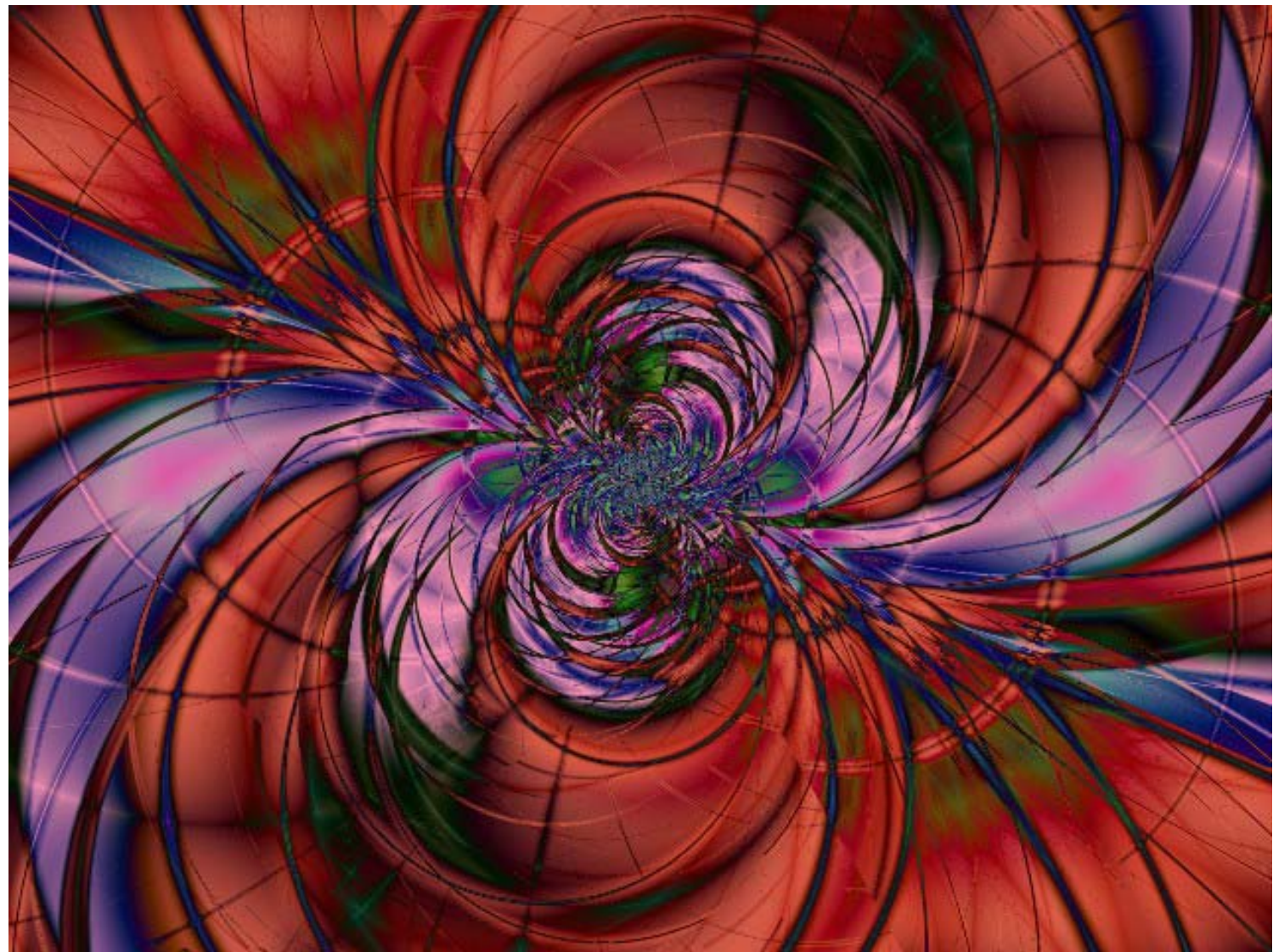


Service Convergence and IP Multimedia Subsystems



NKD
August 2006



Barnsley 2 Julia fractal

Global Mobile Market at the beginning of 2006

Ranking	Country	Mobile Subscribers 2005 (million)*	Mobile Subscribers 2004 (million)	Growth rate 2004/2005	Mobile Penetration 2005*
1 st	China	400	335	19%	31%
2 nd	USA	201	181	11%	68%
3 rd	Russia	120	74	62%	83%
4 th	Japan	95	91	4%	75%
5 th	Brazil	86	66	31%	47%

* Estimated by Teleco

Sources: Teleco (Brazil) – jan/2006

ANATEL (Brazil) – jan/2006

Indian Scenario

	March'06 Millions	March'05 Millions	Annual growth
Total Subscriber	140.32	98.4	42.6%
Mobile	90.14	52.2	72.62%
Tele Density	12.8	9.11	40.5%
Internet	6.9	5.5	25%
Broadband	1.34	0.178	650%
ARPU (GSM)	Rs 366 -ve growth on YTY basis		
ARPU (CDMA)	Rs 255 no change on YTY basis		

Indian Scenario

Mobile Subscribers growing @ 5M Per Month

	2004-05	2005-06	Annual growth
Revenue	67,523 Crore	87,962 Crore	30%

Talk Cheap

Country	Call Rate
Brazil	11 c/min
US	5 c/min
Japan	33 c/min
Australia	24 c/min
India	2 c/min

Global Data

- Capex will grow from \$202 bn in '05 to \$236 bn in '09 - Infonetics Research
- Telecom Revenue will grow from 1.2 trillion in 2006 to 1.6 trillion 2010 – INSIGHT
- Voice revenue will continue to decline as plain vanilla application become more commoditized
- Lower Call Rate will impact ARPU
- IDC predicts that US market for bundled services will grow from current \$45mn to \$84mn in 2010 – moving from double to triple to quadruple play

Services on Mobile



- PTT
- Email
- Web Access
- Digital TV and Video
- Gaming
- VOD
- IPTV
- Internet Video and Audio
- Dual Mode Phone
- IM
- LBS
- Presence Based Service
- Personal Video Recording



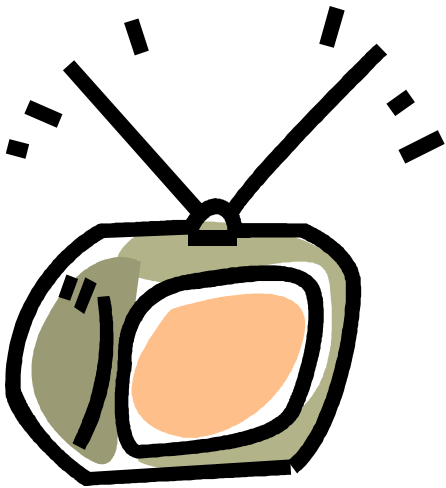
Services on Computer



- IPTV
- Video Phone
- Gaming
- PVR Access
- All Internet Based Services
 - Internet Video
 - Internet Audio
- Voice Mail
- Call Log
- Click to Dial
- Service Management



Services on TV



- Digital TV and Video
- VOD
- IPTV
- Gaming
- Internet Video and Audio
- IM
- Personal Video Recording
- Internet
- Voice Mail
- Caller ID
- Voice services



... more Convergence

- Fixed Mobile
 - Ability to switch between different types of access network e.g. Bluetooth, IP, WiFi hotspot
- Skype
 - Voice, Video, Data
- Google Talk



Convergence Enabler - IMS

- The IP Multimedia Subsystem (IMS) is an IP multimedia and **telephony** core network that is defined by 3GPP and 3GPP2 standards and organizations based on IETF Internet protocols
- “IMS is intended to be the system that will merge the Internet with the Telecom world. IMS enables the convergence of fixed and wireless networks and seamless user roaming irrespective of access technologies, and facilitates services transparency and enables common service and application development.”
- *Morianna Group Operator Guide to IMS Aug 05*

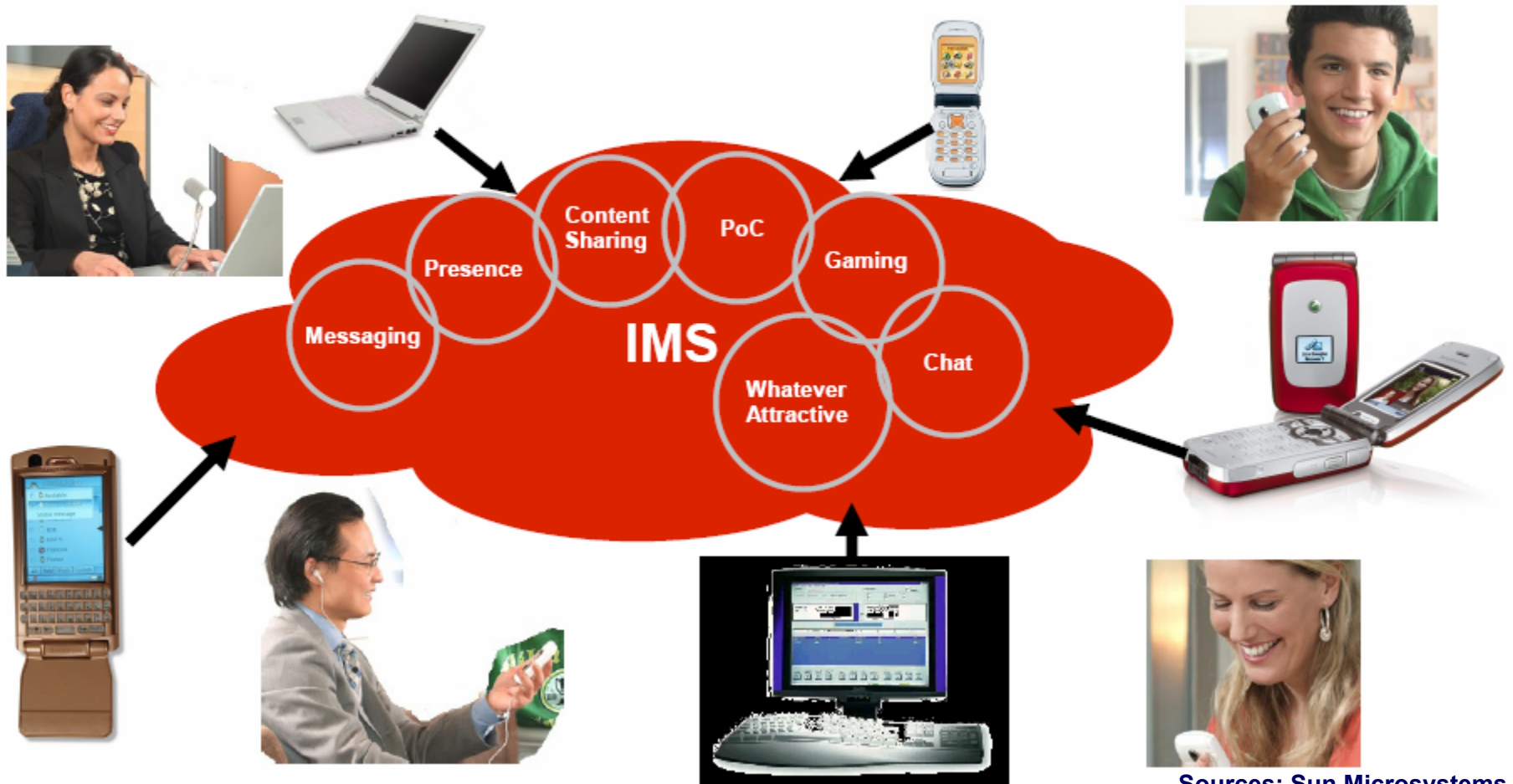
Convergence Enabler - IMS

- “IP multimedia subsystem is a layered architecture containing a collection of hardware and software elements that sit on top of an IP core network using SIP to supply end users with a wide range of multimedia services” ABI Research, September 2005
- Ubiquitous access to any service from any device

What is IMS?

It's Not Just About Technology

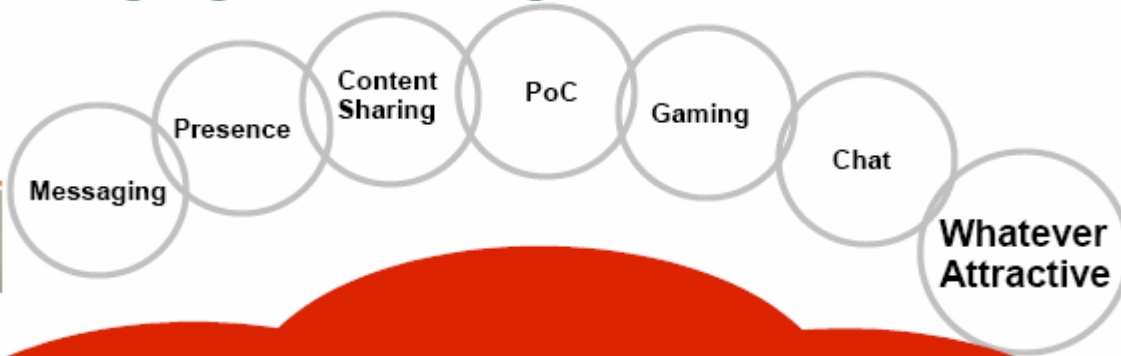
It's About People Sharing Experience in Their Devices



What is IMS?

IMS...

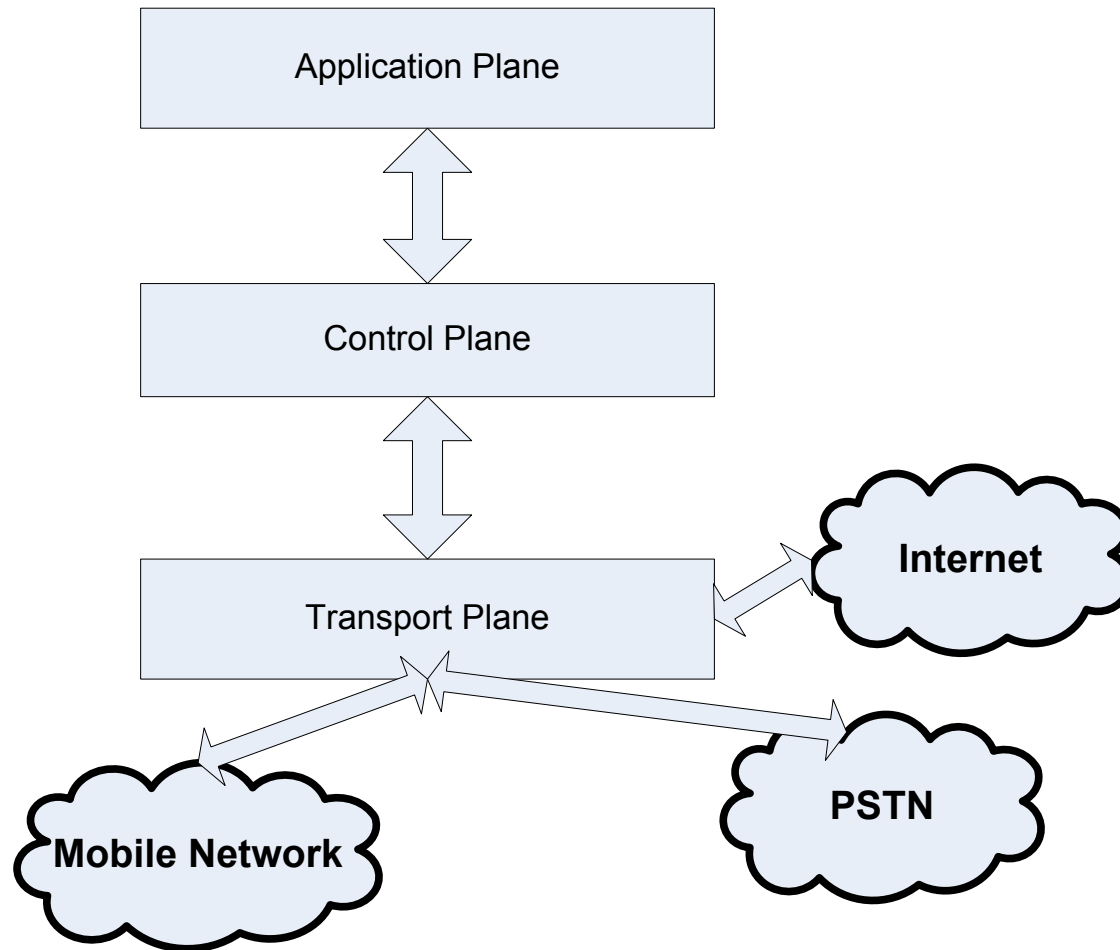
Is About Merging Technologies to Deliver E2e Services



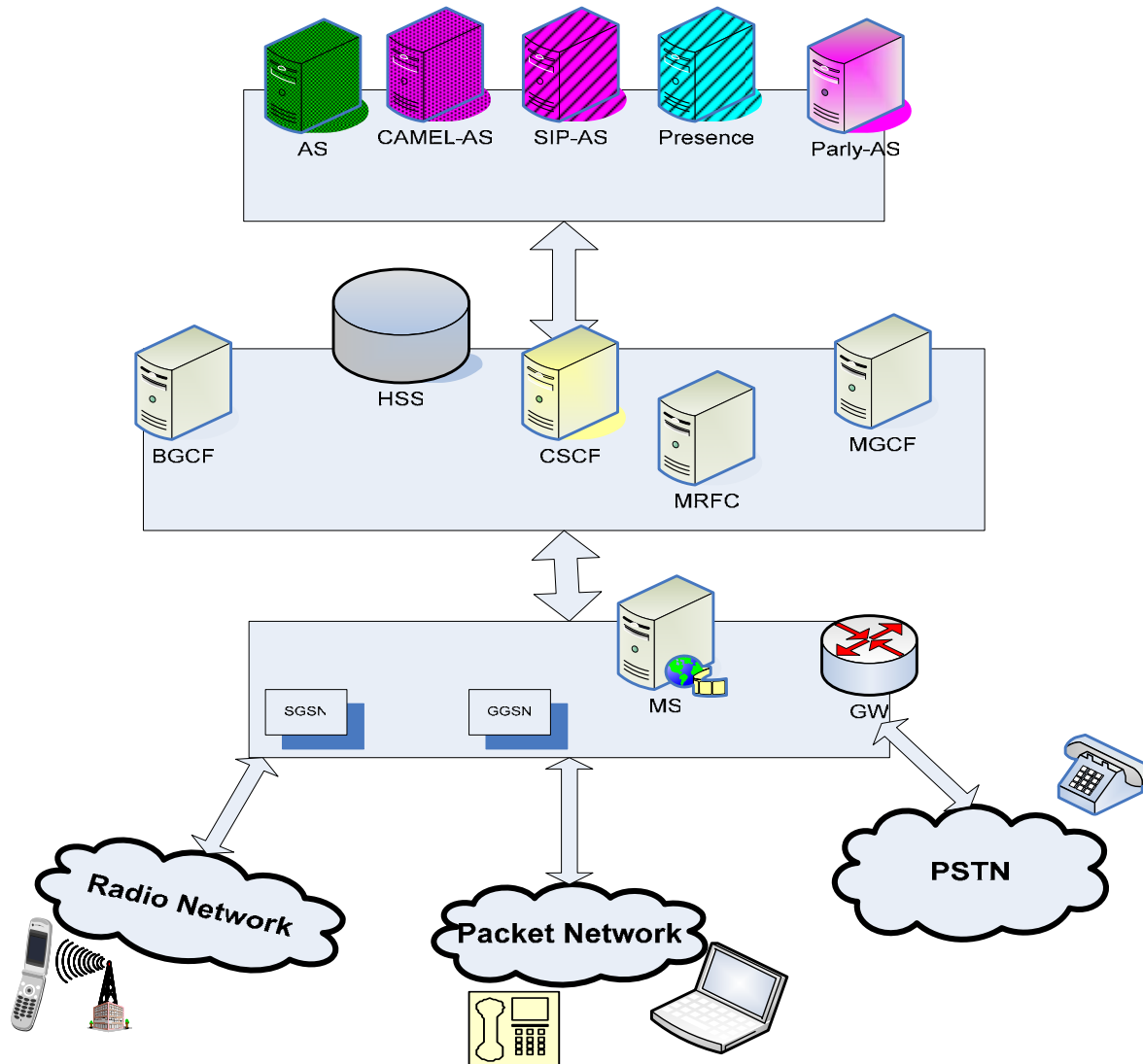
IMS

- Openness
 - Innovation
 - Short TTM
 - Multimedia
-
- Standardization (3GPP and IETF, ITU-T, ANSI, ATIS, TISPAN, OMA, GSMA)
 - Interoperability
 - Multiaccess
 - Secure reachability
 - Payment security
 - Quality of Service

IMS Architecture

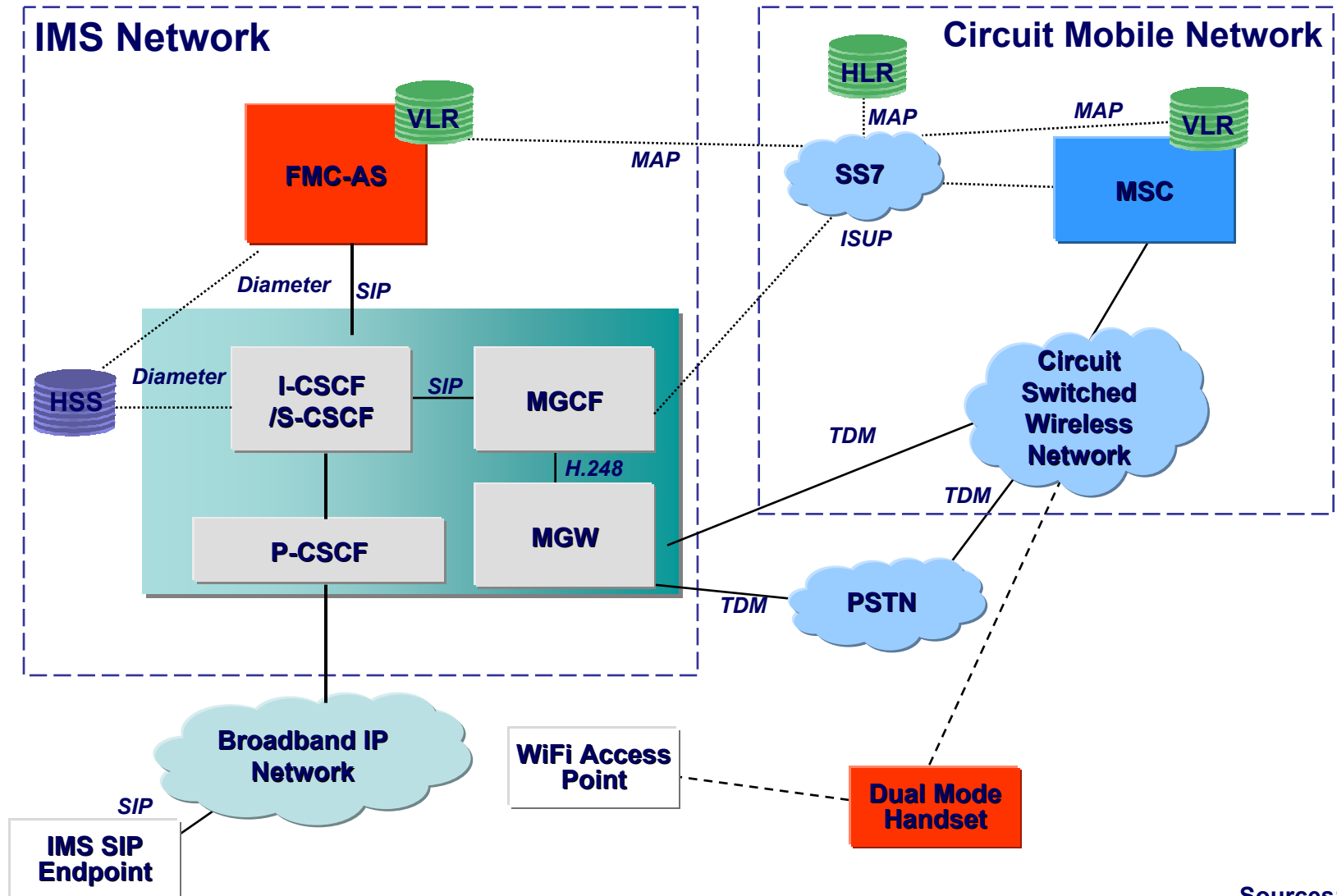


IMS Architecture



- SIP – Session Initiation Protocol
- AS – Application Server
- HSS - Home Subscriber Server (HLR/AUC)
- BGCF – Breakout Gateway Control Function
- CSCF - Call Session Control Function
- GGSN – Gateway GPRS Support Node
- SGSN – Serving GPRS Support Node
- MGCF – Media Gateway Control Function
- MRFC – Media Resource Function
- GW – Gateway
- MS – Media Server
- PSTN - public switched telephone network
- CAMEL - Customized Applications for Mobile networks Enhanced Logic

FMC Solution – IMS Compliance



Enabling Protocol - SIP

- Signaling protocol to create, manage and terminate sessions in an IP network [IETF RFC 3261]
 - Mechanism for call management – add/drop/ transfer participants.
- SIP allows for the establishment of user location
 - Address translation : user's name to network address
- SIP provides for feature negotiation so that participants in a session can agree on the features to be supported among them.
- SIP is not
 - a Transport Protocol
 - a QoS Reservation Protocol
 - a Gateway Control Protocol

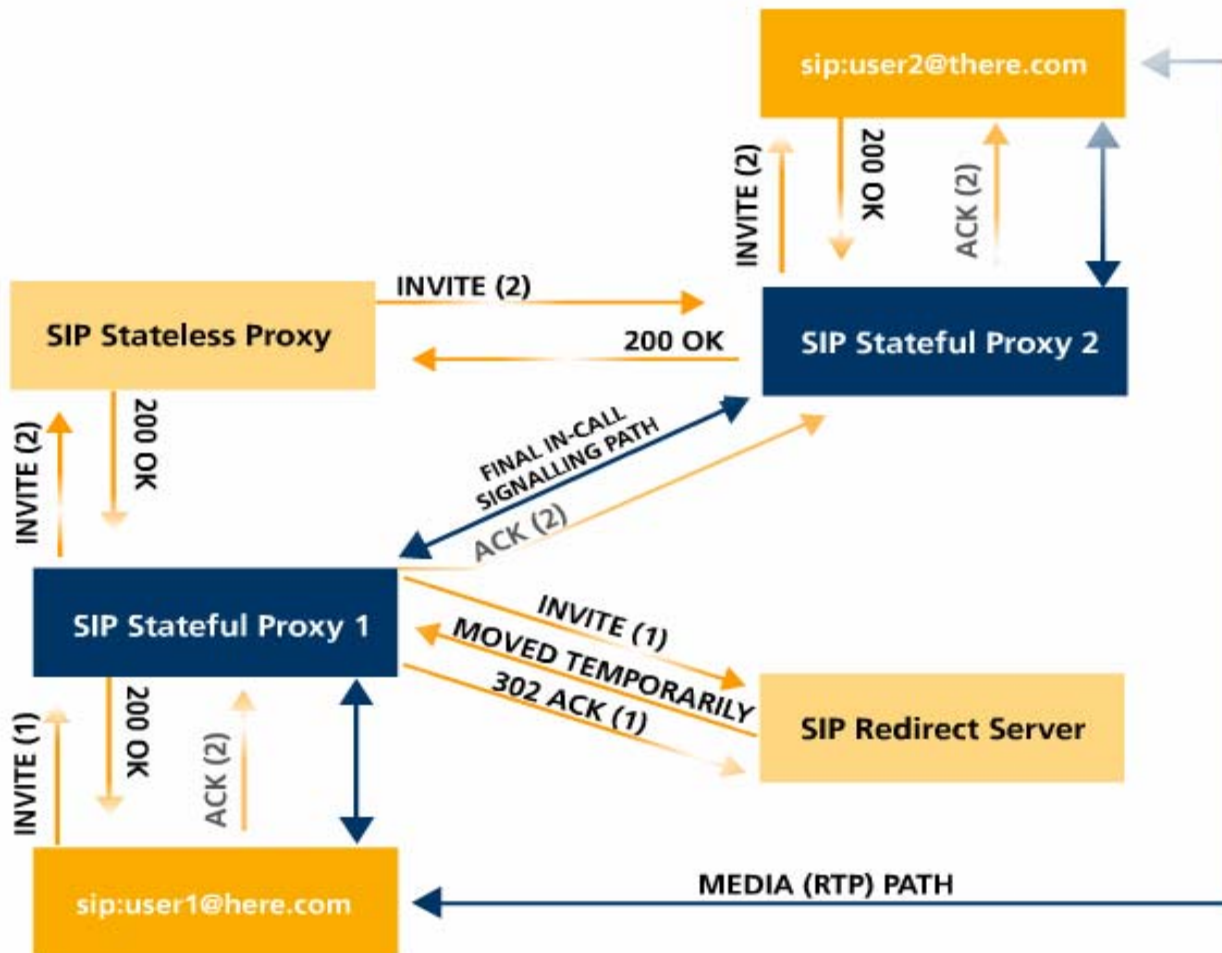
Enabling Protocol - SIP

- SIP Components
 - SIP Client, SIP Server
- SIP Server - provide name resolution and user location
 - SIP Proxy
 - SIP Redirect
 - SIP Registrar
 - SIP Location Server

SIP Commands

- INVITE
 - Invites a user to a call
- ACK
 - Used to facilitate reliable message exchange for INVITEs
- BYE
 - Terminates a connection between users or declines a call
- CANCEL
 - Terminates a request, or search, for a user
- OPTIONS
 - Solicits information about a server's capabilities
- REGISTER
 - Registers a user's current location
- SIP Extension Commands
 - INFO : Used for mid-session signaling

SIP Example Call Flow



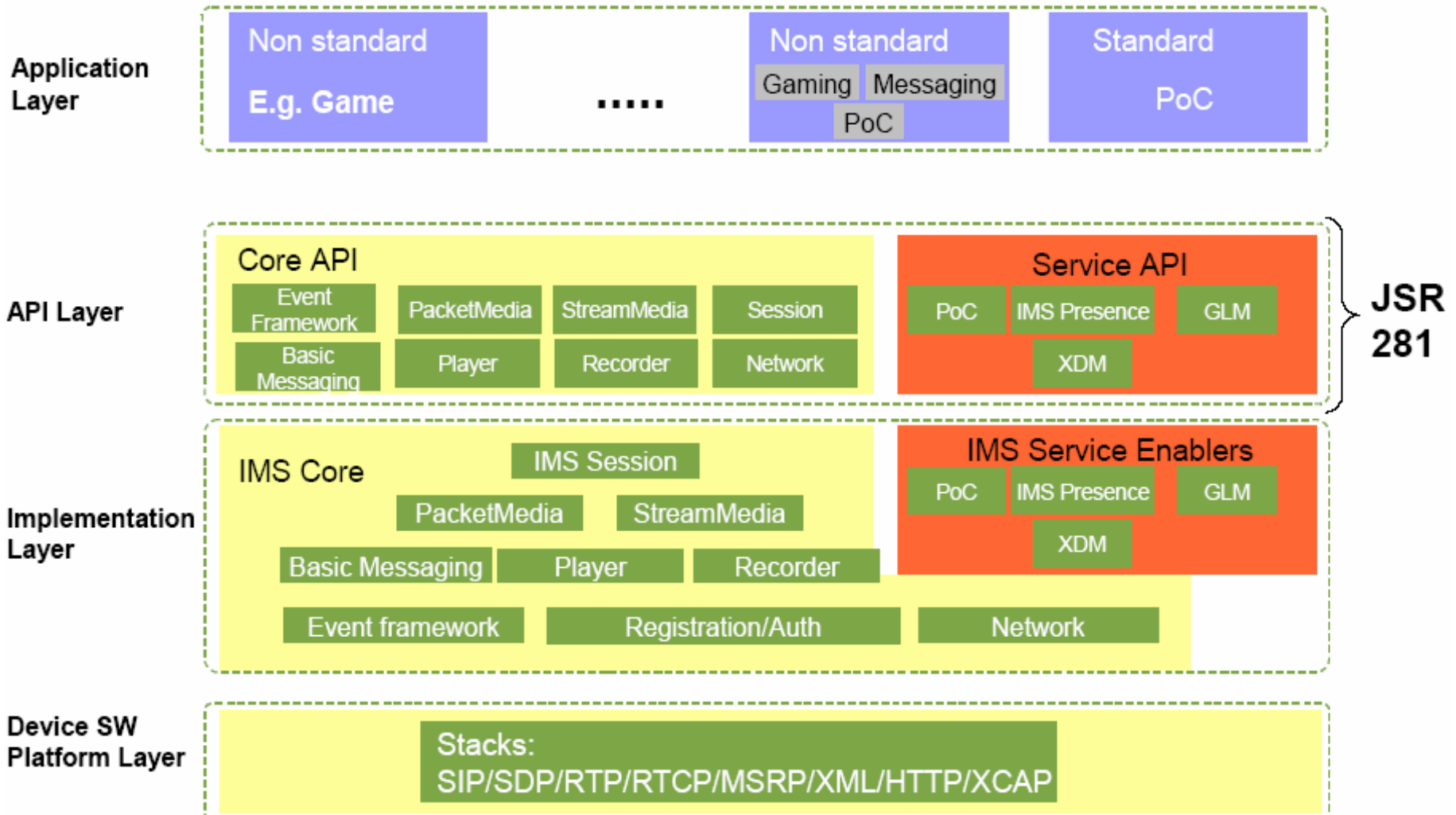
Other Protocols

- **Diameter** - Authentication, Authorization, & Accounting
- **SIMPLE** - SIP for Instant Messaging and Presence
Leveraging Extensions
- **SDP** – Session Description Protocol
- **DNS** – Domain Name Service
- **RTP** – Real Time Transport Protocol
- **TRIP** - Telephony Routing over IP (call from IP to E.164)

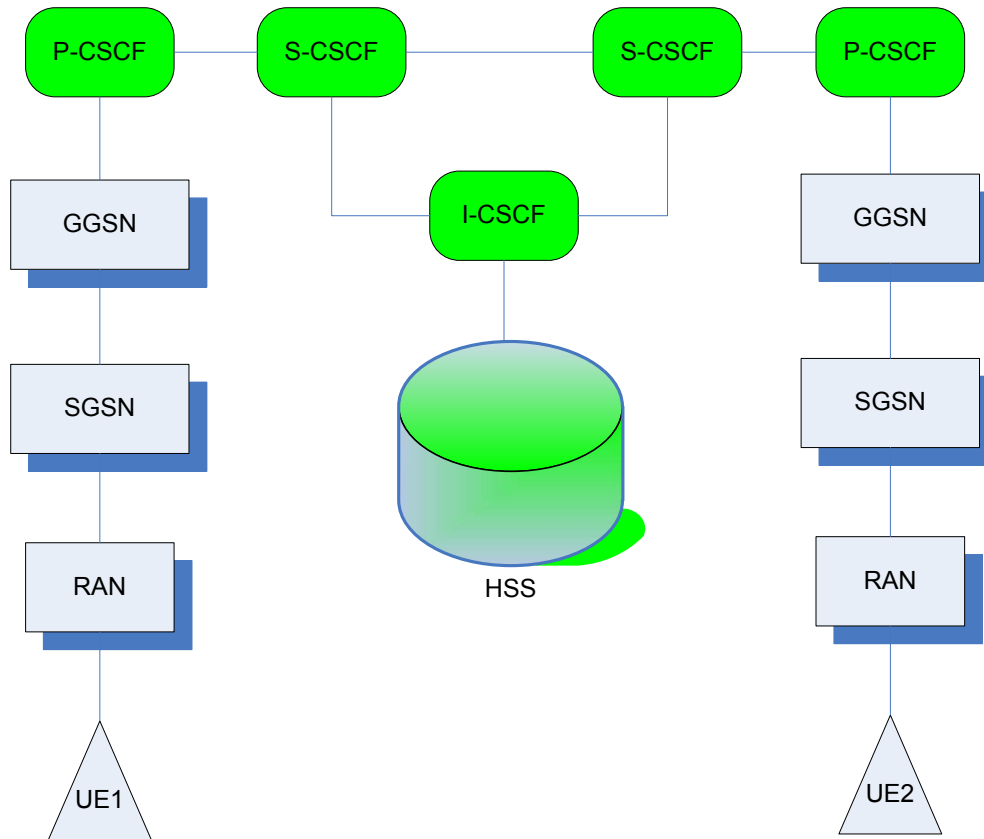
JSR 281

- API for Client application development for Java Micro Edition devices: CDC/CLDC
- Abstracts IMS technology through API
 - Generic IMS API
 - IMS Services API
- Standardized IMS Client Service Creation toolbox for Java Development Community

JSR 281 Architectural Concept



Basic Call Flow in Home Network



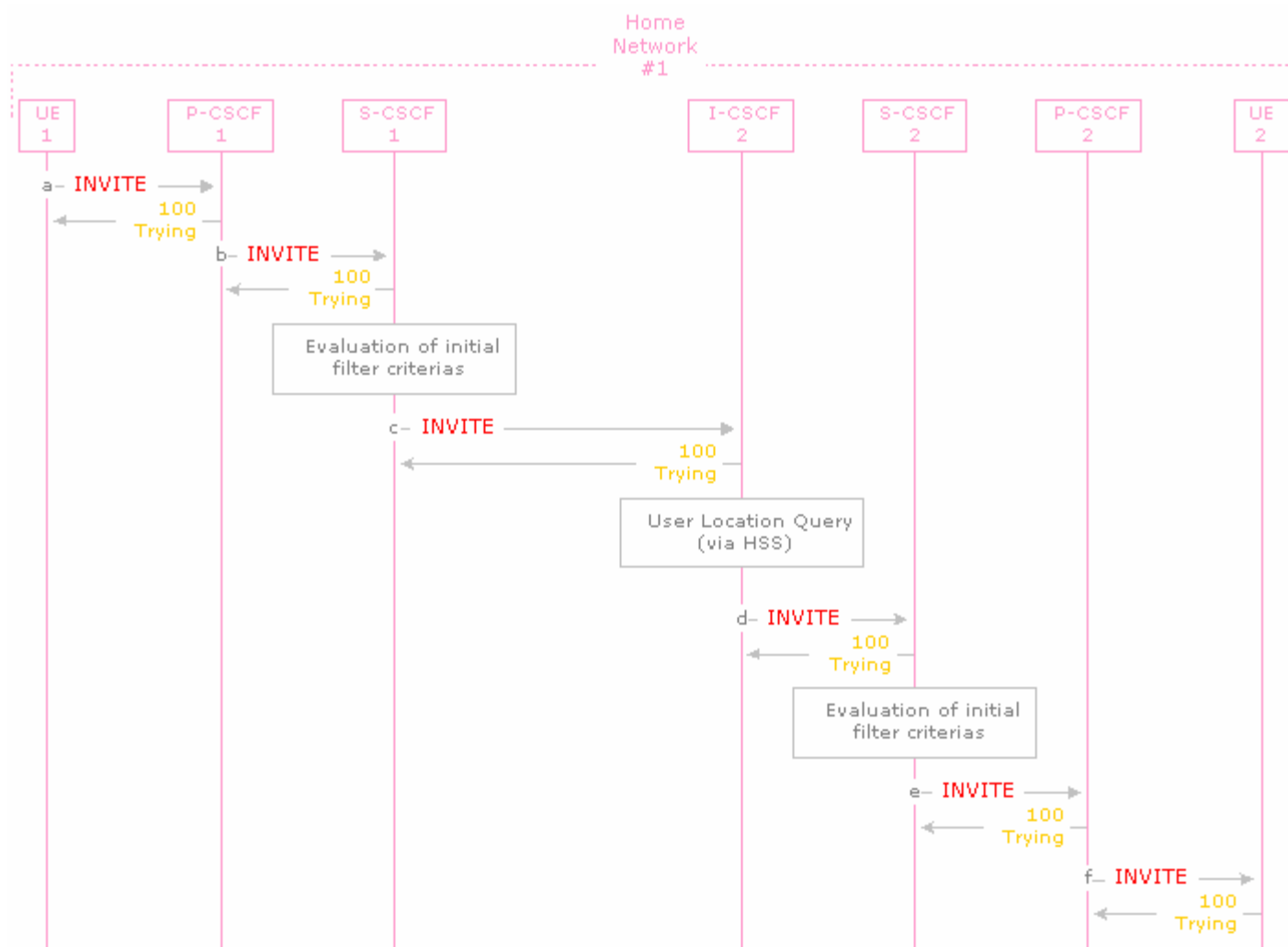
ICSCF- Interrogating
Call Session
Control Function

PCSCF – Proxy Call
Session Control
Function

SCSCF – serving Call
Session Control
Func

RAN – Radio Access
Network

UE – User Equipment



Global Initiatives

- BT, KT, NTT, Vodafone and Verizon will conduct trial of IMS based infrastructure at Global MSF Interoperability 2006 (GMI2006) – VOIPNEWS August 2006
- Telecom Italia has deployed video-sharing service using Nokia's IMS Core Network Product and Handset – LR
- British Telecom's 21CN Project – end to end IP

Global Initiatives

- **Cingular Picks Lucent for IMS – LR Oct 2005**
- **SBC Picks Lucent's IMS - LR Oct 2005**
- Telcos will invest \$10.1bn in IMS over next 5 years to create new revenue stream for IP based services . Expected revenue of \$49.6 bn in 2011 - ZDNet

IMS Global Deployment

Wireless Operator	Service Planned	Launch Date
BT (U.K.)	BT Fusion (Formerly Project Bluephone) fixed/mobile converged phone service	Sep-06
eAccessLTD (Japan)	Multimedia, HSDPA	Announced February 2005; launch date unavailable
France Telecom	Fixed-mobile convergence	First two phases of 3-phase project complete; phase three includes ~ 200 customer trial
MM02 (U.K.)	Push-to-talk over cellular (POC), multimedia conferencing	EOY 2005 first launch in 2-year program
Saunalahti (Finland)	VoIP and rich multimedia to both mobile and fixed telephony customers	Announced in June 2005; launch date not yet set
Sprint (U.S.)	EV-DO	Announced in December 2004; deployments of IMS solution starts in 2005
Telecom Italia Mobile	Video sharing	Mass market launch 2Q05
Telefonica (Spain)	Converged wireless/wireline IMS deployment	Announced in April 2005, deployment of IMS solution starts in late spring 2005
Telia Sonera (Nordic region)	Instant messaging, video sharing, gaming among different mobile operators	Trial in spring 2005
Telkomsel (Indonesia)	3G services, such as video sharing.	6-month trial under way now
TMN (Portugal)	Video sharing	Service launched in June 2005

Source: inCode Wireless (www.incodewireless.com) for period ended in June 2005

Conclusion

- Looking for ARPU growth and customer loyalty, Service Providers have started to offer bundled and customized value-added services.
- New service bundles including real-time session-based services, like: live push-to-x, VoIP, IM, P2P should leverage Service Providers Revenues.
- IP Multimedia Subsystem (IMS) comes to merge the better part of Telecom, Internet and Information Technology environments to provide richest communications experiences to end users, reduce Opex and generate new revenues to Service Providers with fast time-to-market.

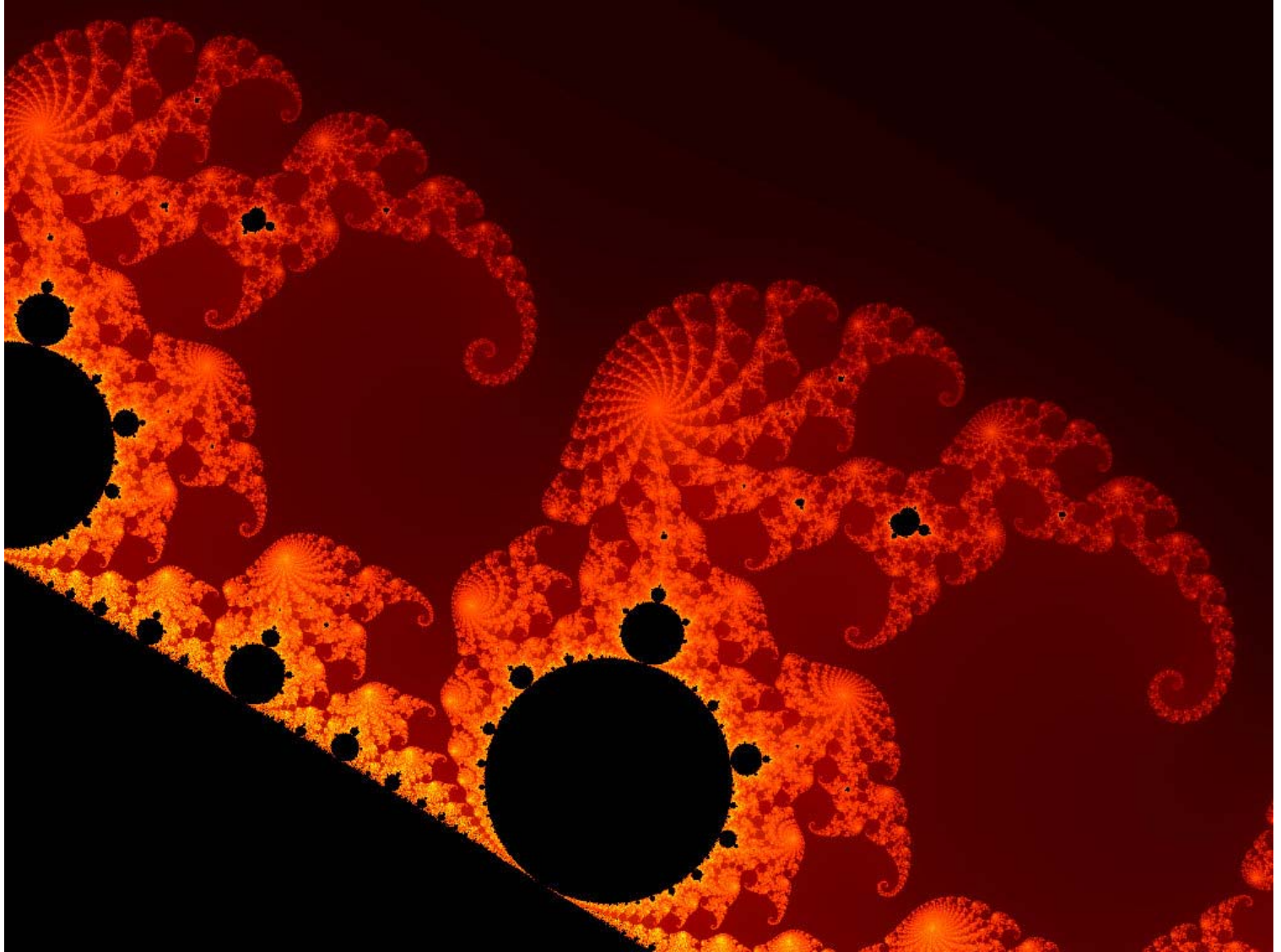
Conclusion

- SIP – an essential basic subcomponent of IMS – is much easier to implement than a full IMS software framework. SIP-capable phones are already in the market.
- Concepts of handset-based “combinational services” and downloadable IMS applications are not yet practical. User interface design and interoperability between multiple vendors’ phones require much more effort & development.
- A good IMS user experience will need handsets capable of full multi-tasking – something which is outside the capabilities of most current phones.
- These problems should be overcome eventually. In 2011, it is forecast that there will be almost 500m IMS-capable phones shipped globally.

For Further Reading

- http://en.wikipedia.org/wiki/IP_Multimedia_Subsystem
- <http://www.cabledigitalnews.com/whtpr.html>
- http://www.iptel.org/ser/doc/sip_intro/sip_introduction.html
- <http://www.sipcenter.com/>

Mandelbrot set



Recursive self-similarity geometric object

Thanks!