

# Kommunikationsplattformen für maßgeschneiderte Dienste

*... über die Rolle des IP Multimedia Systems als Konvergenz-  
dienstplattform und deren Nutzung zur Realisierung von  
eCommunity-Anwendungen*

Prof. Dr. Thomas Magedanz

Technical University of Berlin / Fraunhofer FOKUS

Email: [magedanz@fokus.fraunhofer.de](mailto:magedanz@fokus.fraunhofer.de)

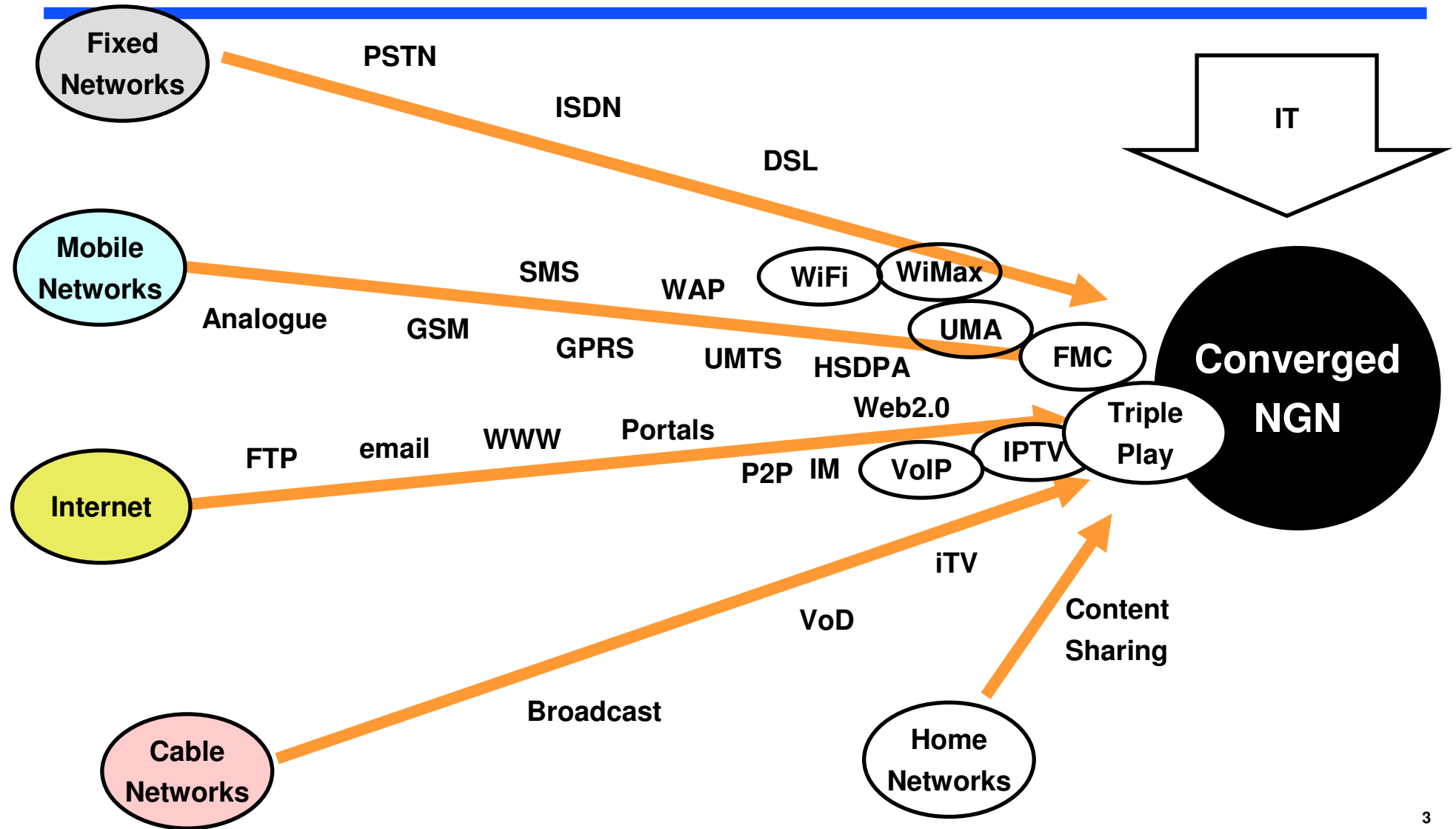
Internet: [www.fokus.fraunhofer.de/ngni](http://www.fokus.fraunhofer.de/ngni)



# Overview

- **Market Drivers for FMC - Convergence**
- **Next Generation Networks and related Standard Bodies**
- **The IP Multimedia System as universal Service Delivery Platform**
- **Community Services as NGN Killer Application Framework**
- **The FOKUS Open IMS Playground as globally known NGN Testbed**
- **Case Study CoSIMS Project**
- **Summary**
- **Q&A**

# Evolution towards Converged Networks



# Triple Play + Mobile = Quadruple Play

Integrated multi service networks are able to deliver value added services which will leverage the end user experience:



view online TV guide on your mobile / handheld and program your PVR at home or your NetPVR

view live TV, VoD or stored (Net)PVR records on your mobile / handheld while travelling – quality will be automatically optimised for respective access network and CPE capabilities



see who of your buddies watches actually the same program as yourself – invite them to join a (multi user) videochat in parallel to the live program



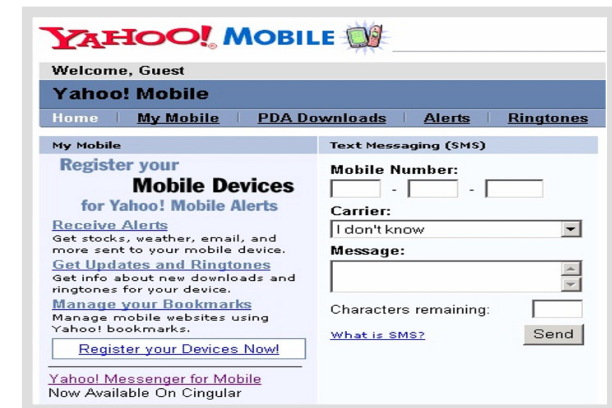
see CLI (or V-Card, if available) on your TV screen while watching a movie and decide whether you want to pause the movie and pick up the call

navigate on your mobile / handheld through your data stored on your home device and send files or invites to any recipient you like – e.g. make your holiday photos available to your parents – they can watch them on their TV screen, PC, mobile, ...



# Perspective: the money is on services !!!

- IPTV and Quadruple Play can be provided on different broadband networks
- Physical networks become transparent due to decreasing IP connectivity (i.e. flat rates)
  - Market entry barriers for service providers are vanishing
- Users are interested in content and services irrespective of the network access
  - The Value Chain splits horizontally
- The roles of the fixed, mobile and cable operators is changing
  - *Who will own the subscriber?*
  - *For what services users will pay in the future?*
  - *Is there a life for real net operators besides bit pipe provisioning?*



# Web 2.0 = Communities and new User Experience



# Overview

---

- **Market Drivers for FMC - Convergence**
- **Next Generation Networks and related Standard Bodies**
- **The IP Multimedia System as universal Service Delivery Platform**
- **Community Services as NGN Killer Application Framework**
- **The FOKUS Open IMS Playground as globally known NGN Testbed**
- **Case Study CoSIMS Project**
- **Summary**
- **Q&A**

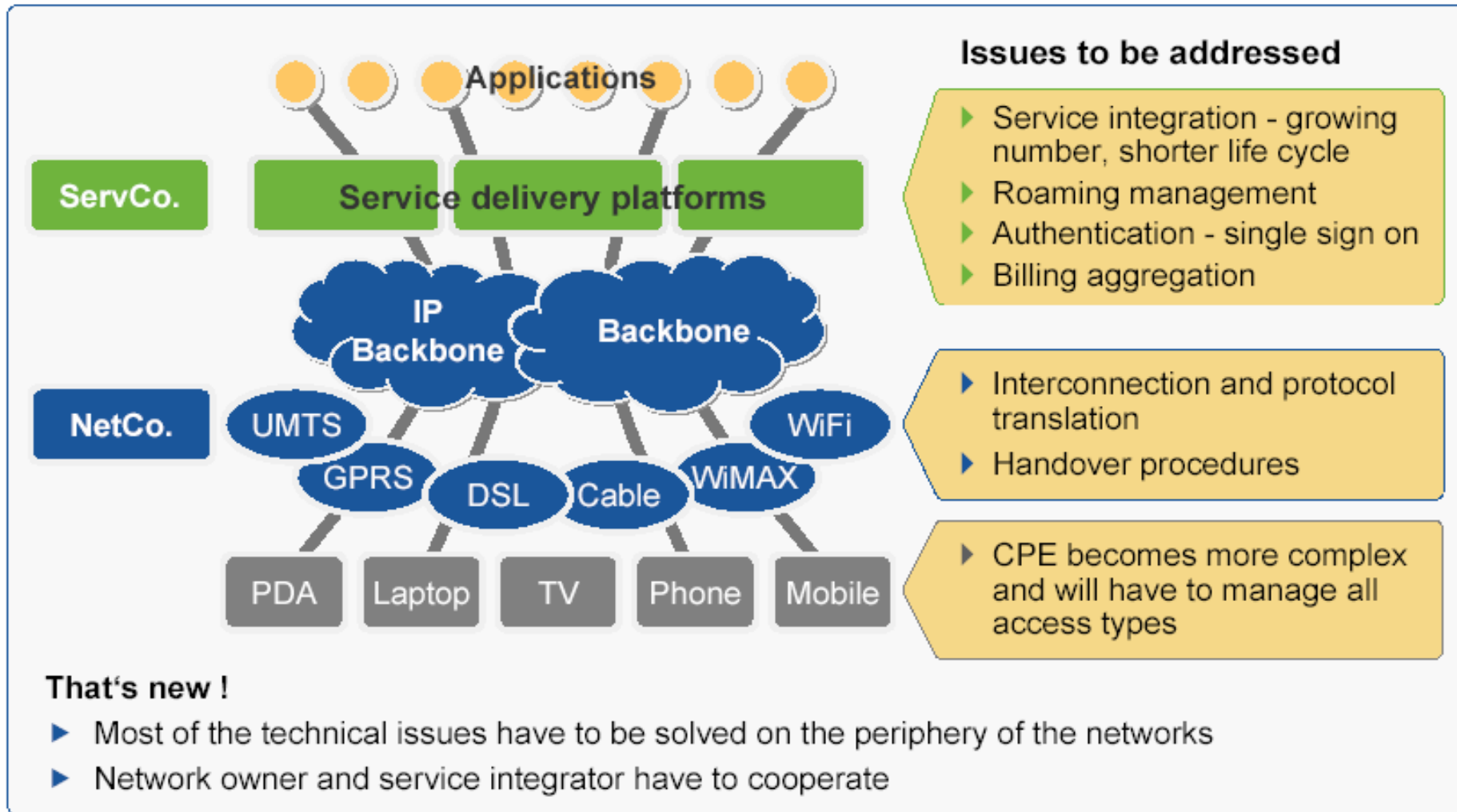
# ***Convergence requires ONE Service Platform***

---

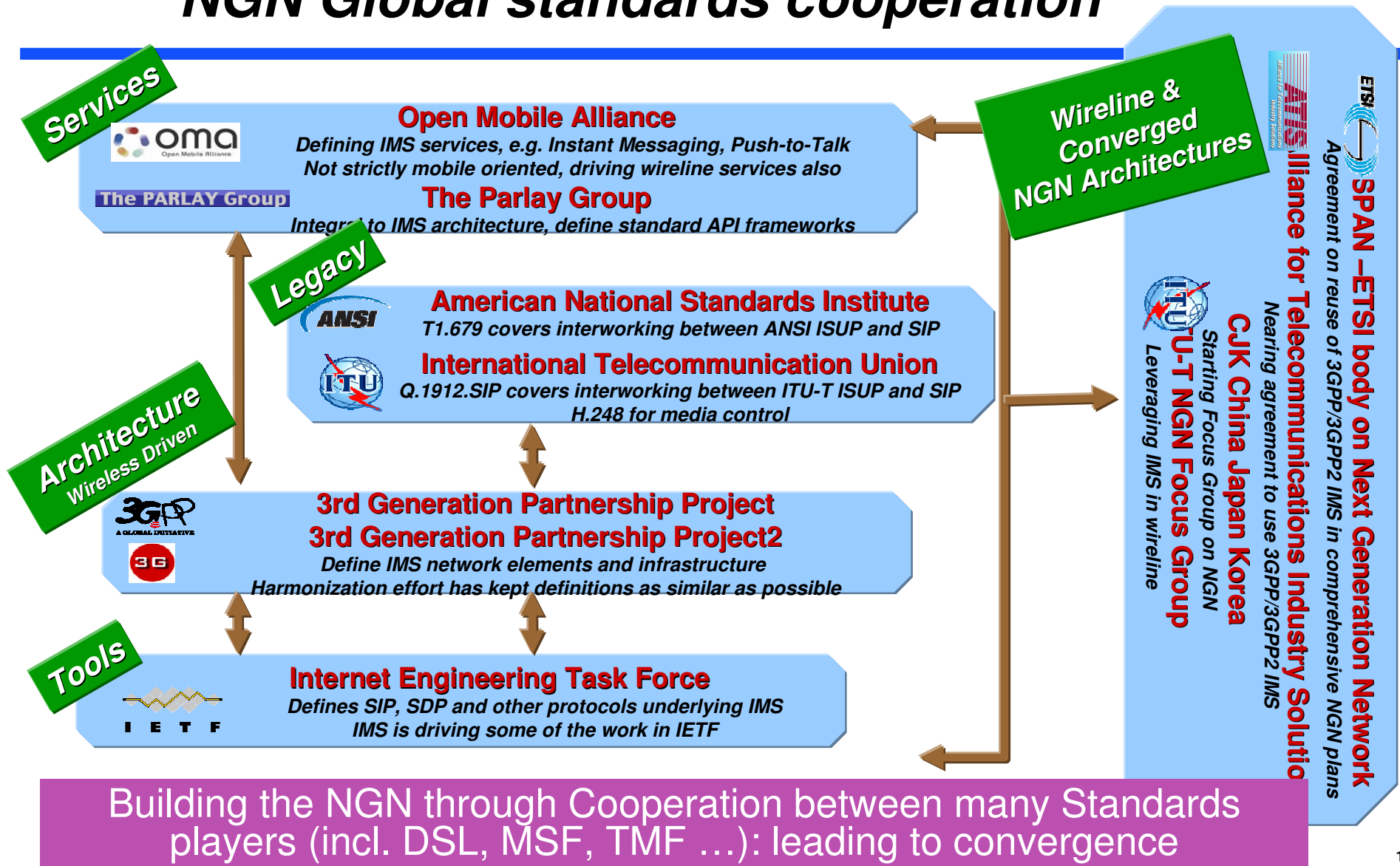
- **Technically convergence means to unite the currently still separated fixed and mobile network operator domains into a single one**
- **This convergence is not about a NEW MARKET, but just the combination / migration of several previously existing markets into one common (and probably one smaller market)!**
- **Anyhow, convergence is a chance (or a war) for operators to expand their coverage**
- **Technical prerequisite is a common service delivery platform on top of fixed, mobile and IP-based networks**
- **The **IP Multimedia System (IMS)** is defined for that**
- **Started in 3GPP and 3GPP2 for the mobile domain, IMS today is also considered by ETSI, ITU-T, ATIS for the future (IP-based) fixed network as well (under the banner of NGN)**
- **Thus IMS represents the common denominator service platform**



# NGN - It is all about Service Integration!



# NGN Global standards cooperation



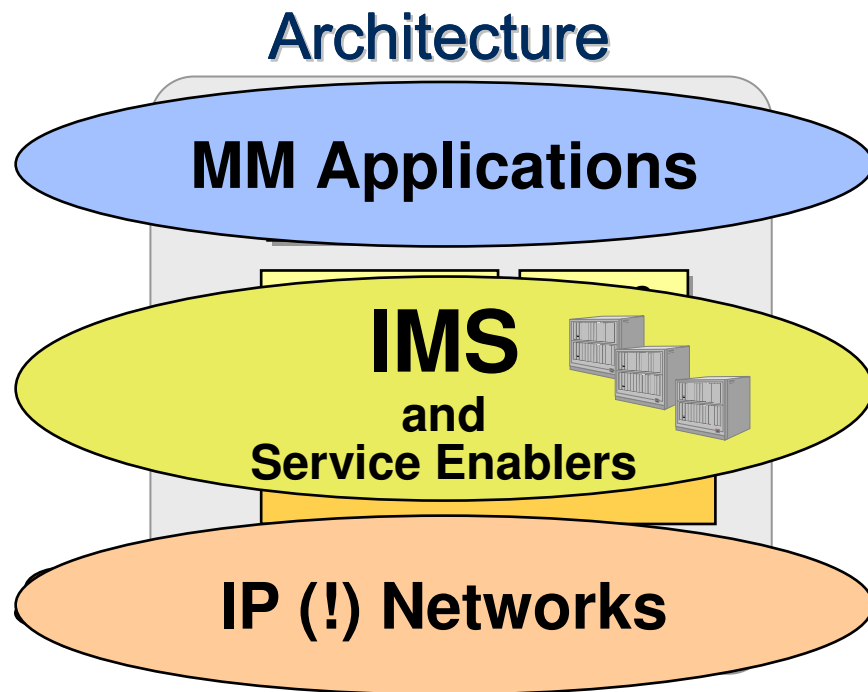
# Overview

---

- **Market Drivers for FMC - Convergence**
- **Next Generation Networks and related Standard Bodies**
- **The IP Multimedia System as universal Service Delivery Platform**
- **Community Services as NGN Killer Application Framework**
- **The FOKUS Open IMS Playground as globally known NGN Testbed**
- **Case Study CoSIMS Project**
- **Summary**
- **Q&A**

# IMS Architecture Principles

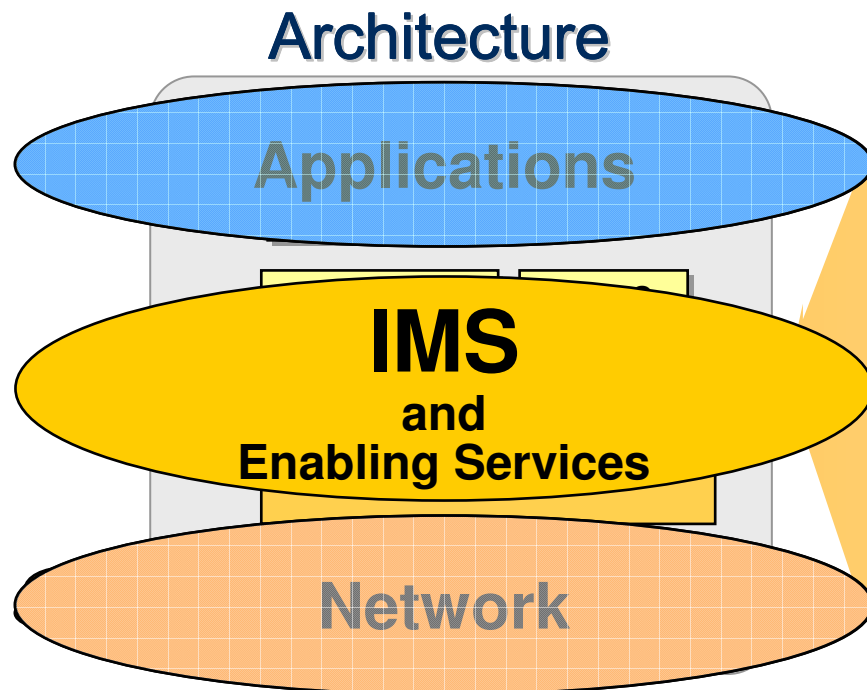
- IMS does NOT standardise specific services, but enablers
- BUT supports inherently multimedia over IP, VoIP, IM, presence (SIP)
- IMS enables the flexibility in providing IP-based applications !!



- Horizontal Architecture defining a “docking station” for applications
- Defines service enabler capabilities
- Build on existing IETF and telco SDP standards
- Provides compared to standard internet
- **Better security, Service based QoS, flexible charging and single sign on**

# ***IMS Core Infrastructure Functionality***

- **Implementing generic functionality in the infrastructure is most economical !!**

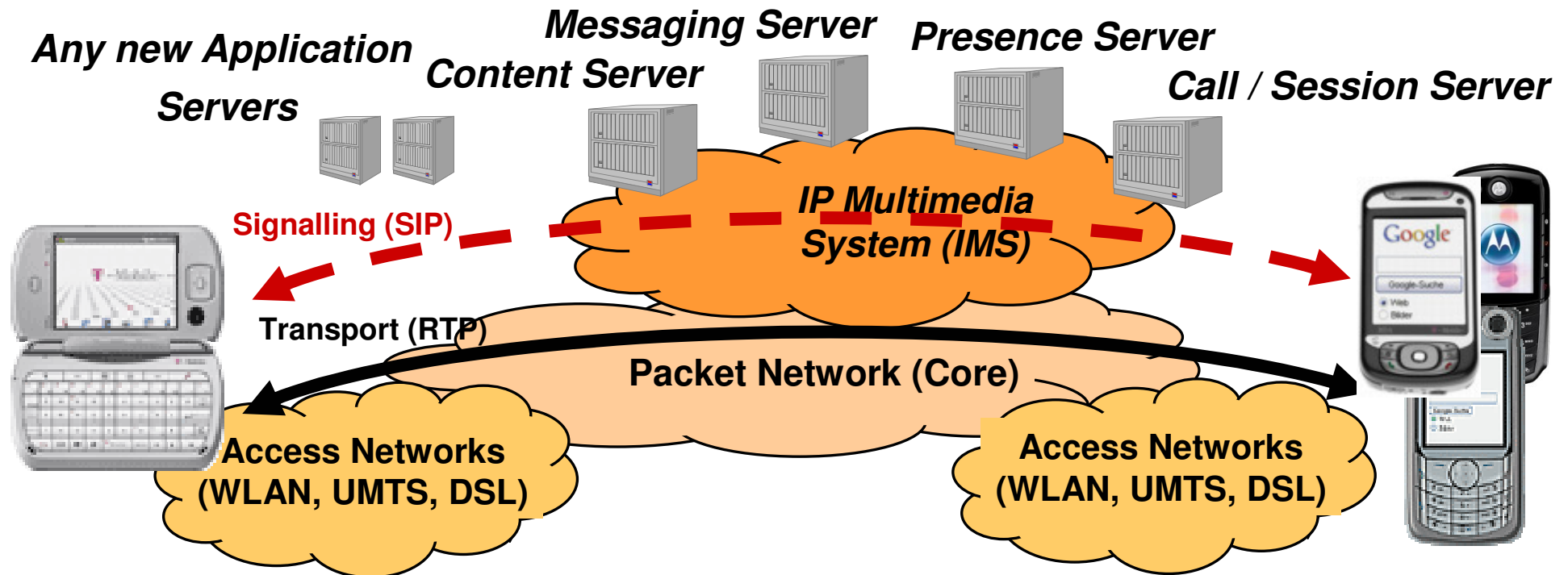


- **SIP Session-/Service Control**
- **Messaging support**
- **Single-Sign-On User-Authentication**
- **Subscription Handling**
- **QoS/Media Authorization**
- **Signaling Compression**
- **Charging Support and Correlation**
- **Routing/Addressing Support**
- **Regulatory Service Support (e.g. LI)**
- **Conferencing Support**
- **PSTN Interworking Support**
- ***Docking Station for Service Enablers***
- ***Docking Station for Applications***

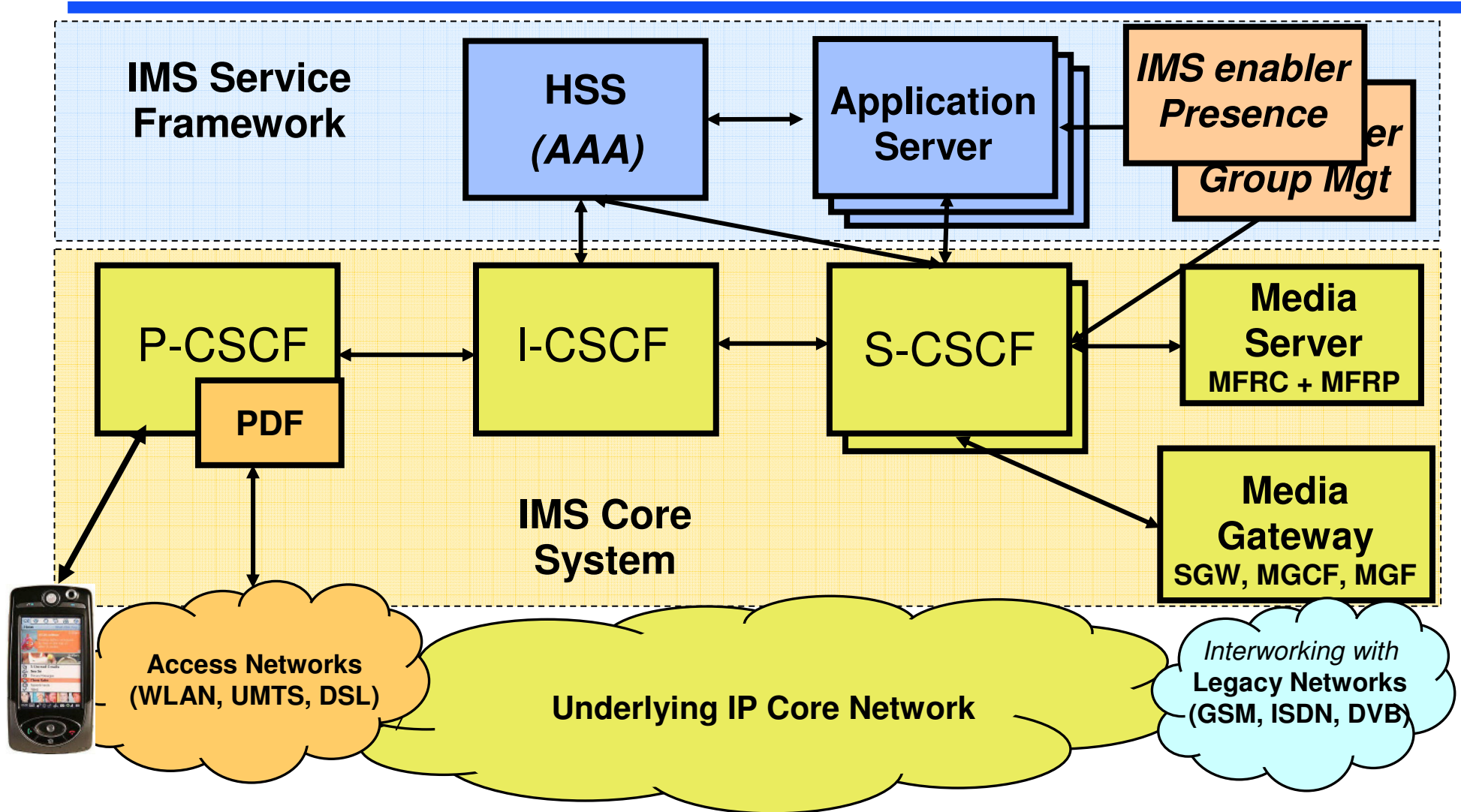
# IMS Motivation – Flexible Service Provision

Provision of service enablers and dynamic service portfolio extension

- Presence and Group server are considered key for the future
- Application Servers can be control and/or content servers



# IMS Layers: Transport, Session Control, Apps



Note: IMS Charging Architecture is not reflected on this slides = Diameter Interfaces to many entities

# ***3GPP IP Multimedia Subsystem (IMS)***

---

- **The IMS has been originally defined by the 3rd Generation Partnership Project (3GPP) as part of UMTS Release 5 / IMT2000**
  - Extensions have been made in release 6 to adapt to real world (e.g. IPv4)
- **3GPP2 has adopted the IMS architecture on top of Multimedia Domain (MMD)**
- **ETSI TISPAN is defining Next Generation Network SDP for all IP Networks based on IMS**
- **Open Mobile Alliance (OMA) defines IMS Enablers & Services**
- **The IMS represents an overlay network on top of GPRS networks and provides an all IP service delivery environment for mobile multimedia service provision (VoIP, Videotelephony, MM Conferencing, Mobile Content, etc.)**
- **The IMS is based on the IP world protocols, namely**
  - SIP (Session Initiation Protocol) for Session Control, and
  - Diameter for AAA (Authentication, Authorisation & Accounting)
  - plus many others, i.e. SDP, RTP, RTCP, MGCP, etc.



# *IMS Major Components*

---

- The IMS is an Overlay Session/Service Control architecture on top of the packet domain (GPRS, UMTS, WLAN, DSL) based on IP technologies and IETF protocols (e.g. SIP, Diameter):
  - **IMS Core**
    - **S-CSCF** (Serving Call Session Control Function) the IS anchor point in the home network
    - **I-CSCF** (Interrogating Call Session Control Function) providing topology hiding
    - **P-CSCF** (Proxy Call Session Control Function) Entry point into IMS world
    - **MS** (Media Server) – Media Server hosting special resources
    - **MGF** (Media Gateway) for Interworking with legacy networks
    - **PDF** (Policy Decision Function) for QoS Control using Policies (COPS)
  - **IMS Application Layer**
    - **HSS** (Home Subscriber System) for maintaining subscriber and AS profiles
    - **AS** (Application Server Function) for hosting applications
    - **IMS enablers** (e.g. Presence, Group Mgt.) are specific ASs with generic functions
  - And the **IMS end system (IMS Client)** plays an important role real multimedia / IMS services

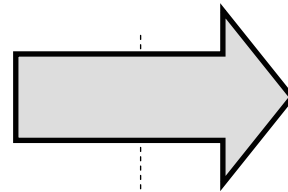
# ***IMS Enablers = Reusable IMS Application Servers***

---

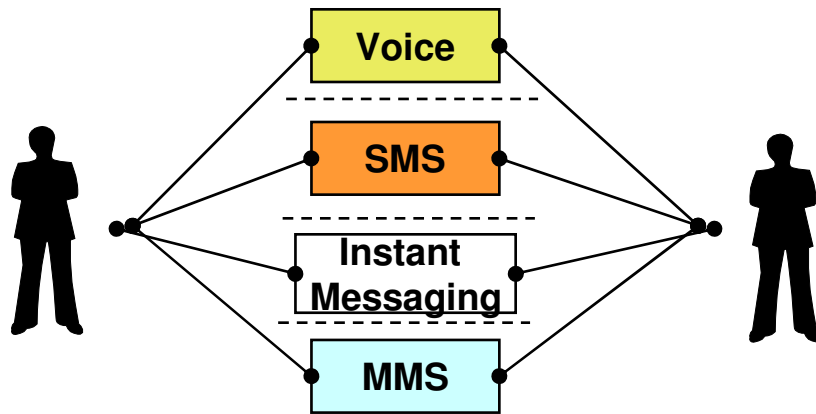
- **IMS did not address the standardisation of specific application by purpose**
- **Only major AS interfaces are defined = IMS is a „docking station“ for ASs!**
- **Open Mobile Alliance (OMA) is supposed to do service specific standardisation on top of IMS**
- **Examples include Presence, Group Management, Instant Messaging (IM), Push to Talk over Cellular (PoC), etc.**
- **Over time it became clear that there is a set of common servers, i.e. enabling servers → *IMS Enablers, which can be used in the implementation of more complex IMS services***
- ***Major enablers today to be used in IM, PoC and Group Video Calls, etc.:***
  - ***XML Document Management System (XDMS)*** enabler for group configuration
  - ***Presence Server (PS)*** enabler for maintaining presence information
  - ***Device Management (DM)*** enabler is used for client system configuration, as ASs and enablers may need specific software on the client system!

# IMS integrates different Communication Services

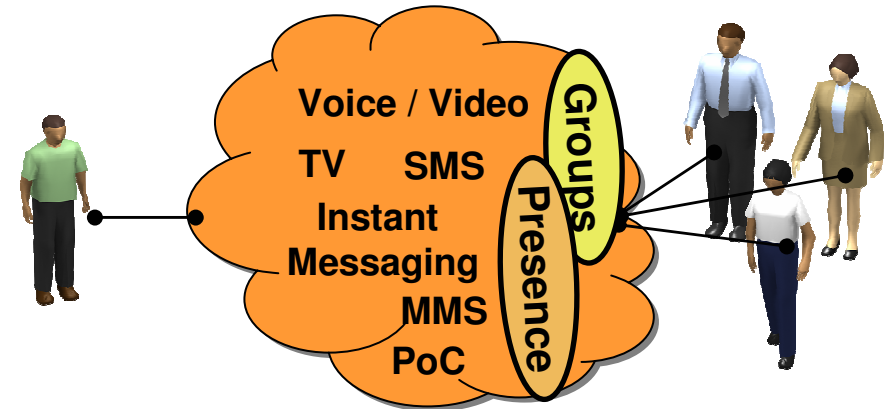
Pre-IMS Communication  
("Service Islands")



IMS Communication  
("Combinational Services")



From the usage of specific individual communication services ...



... to the **integrated** usage of different communication services centered around **presence** information and within **groups** (→ communities)

# Overview

---

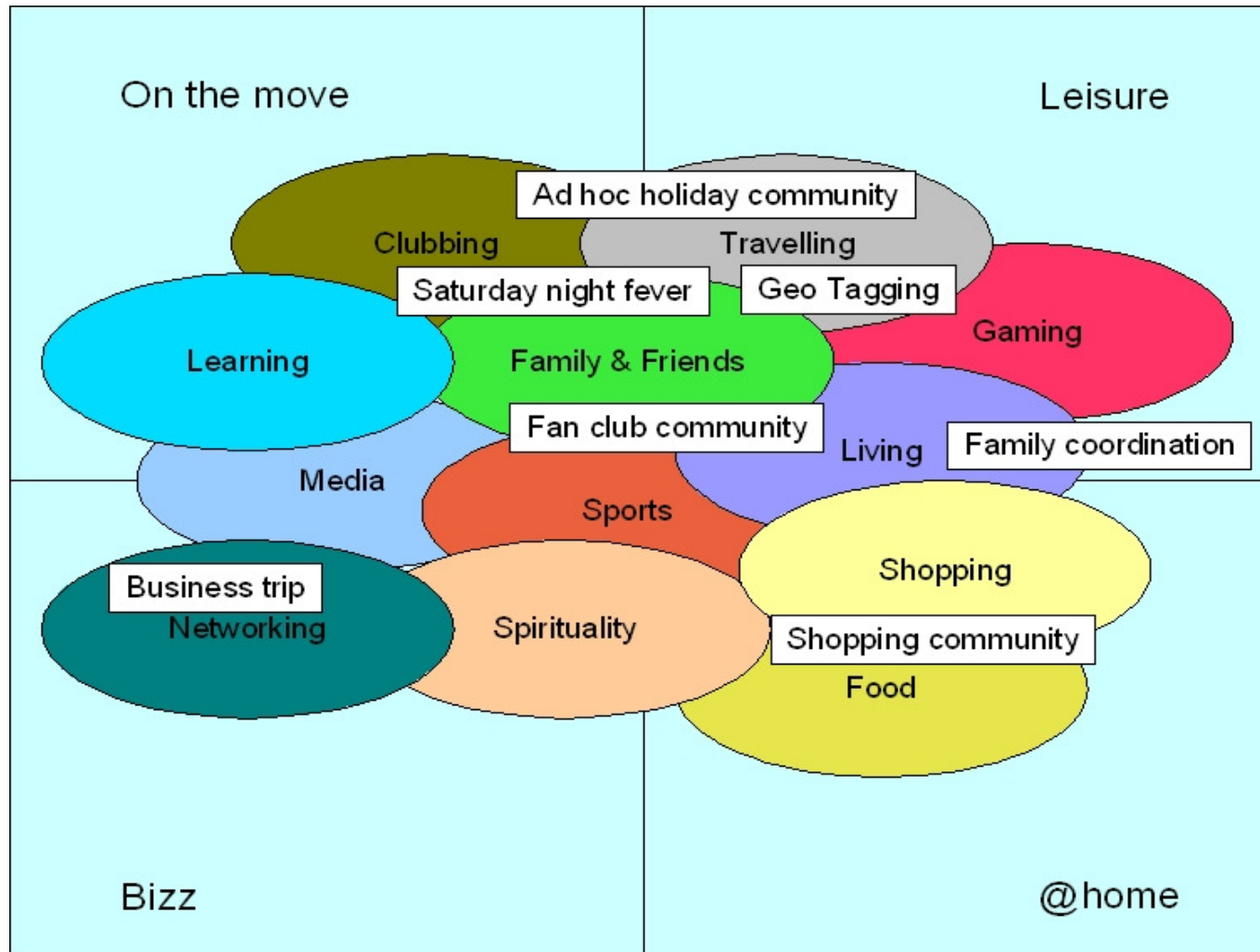
- **Market Drivers for FMC - Convergence**
- **Next Generation Networks and related Standard Bodies**
- **The IP Multimedia System as universal Service Delivery Platform**
- **Community Services as NGN Killer Application Framework**
- **The FOKUS Open IMS Playground as globally known NGN Testbed**
- **Case Study CoSIMS Project**
- **Summary**
- **Q&A**

# Web 2.0 - Communities

- **Groups of people with similar interests meeting in public networks, e.g., the Web**
- **Exchange comments and ratings**
- **Online Communities ...**
  - ... can filter and sort almost all information
  - ... help to find new similar interested users
  - ... allow for advance presence management
  - ... enhance customer relation management
  - ... make use of social network analysis
- **Areas of Application:**
  - **Friendships / Family**
  - **Business contacts**
  - **Company internal communication**
  - **Public areas (e.g. tourism)**

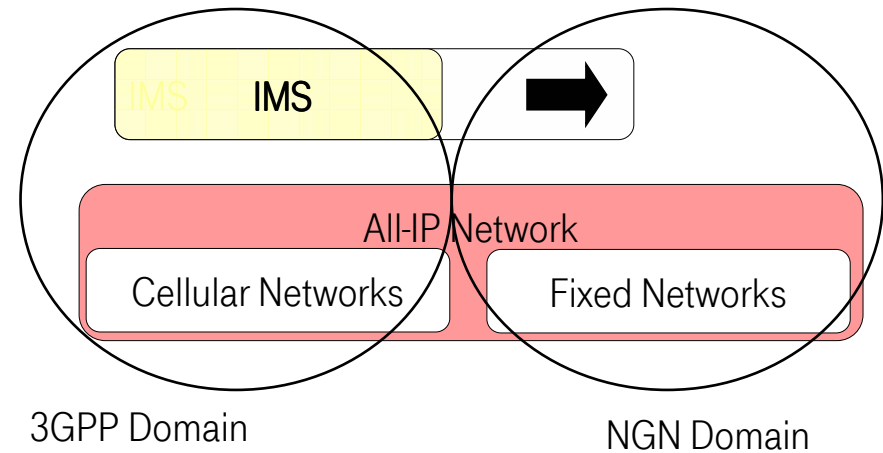


# *eCommunities - sooooo many Options*



# *IMS is a perfect basis for eCommunity services*

- **IMS is today considered as the common platform for FMC and NGNs**
- **A convergent community-service can ideally be based on the IMS platform granting:**
  - **convergence and compatibility between fixed/mobile networks**
  - **multi-media and converged services support**
  - **providing key community service enablers, such as**
    - **Group Management**
    - **Presence**
    - **IM / PoC**
    - **generic VoIP/MMoIP support, etc.**



# ***Mapping of eCommunity Features to IMS Enablers***

---

- **Support of various end user systems (PC from home, Notebook/Phone on the go) for seamless communications everywhere and any time**
- **Dynamic group management (open vs. closed groups)**
- **Presence information of community members**
- **Location information of community members and navigation support**
- **Click to communicate functionality (voice calls, video calls, SMS, MMS, email, IM, PoC, etc)**
- **Common multimedia archives and shared White Boards**
- **IMS is designed as an overlay to various access networks and also defines Gateways to legacy technologies (CS networks)**
- **XDMS enabler supports Group management**
- **Presence enabler supports presence**
- **Location information can be obtained from dedicated Location servers (Lc interface) or from HSS/SIP registrars**
- **SIP Servlet application server can provide „Click to“ services via HTML service page or dedicated client application in end systems**
- **IMS „Push to“ functionality e.g. via INFO method**



## ***Mapping of eCommunity Features to IMS Enablers (cont.)***

---

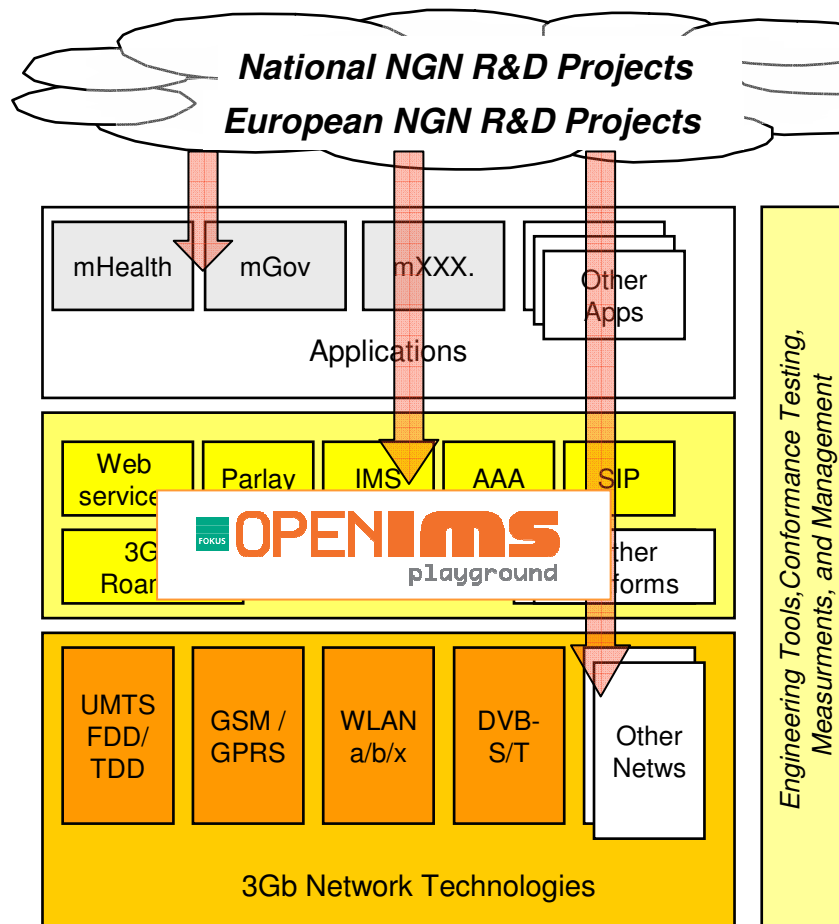
- **Automated appointment scheduling & logistical support**
- **Optional profile matching capabilities for bringing people together**
- **In the future: Virtual reality support**
- **Communities are third party driven!**
- **Support of third party services targeted towards specific communities**
- **Application server integration with corporate databases/outlook**
- **Application Server and optional HSS interrogation**
- **IMS supports any media (here interactive dynamic rendered video) and application server control (VR server)**
- **Usage of OSA/Parlay and later OMA OSE will enable controlled 3rd party services in IMS**

# Overview

---

- **Market Drivers for FMC - Convergence**
- **Next Generation Networks and related Standard Bodies**
- **The IP Multimedia System as universal Service Delivery Platform**
- **Community Services as NGN Killer Application Framework**
- **The FOKUS Open IMS Playground as globally known NGN Testbed**
- **Case Study CoSIMS Project**
- **Summary**
- **Q&A**

# Open NGN / IMS Testbed @ Fraunhofer FOKUS



[www.fokus.fraunhofer.de/ngni](http://www.fokus.fraunhofer.de/ngni)

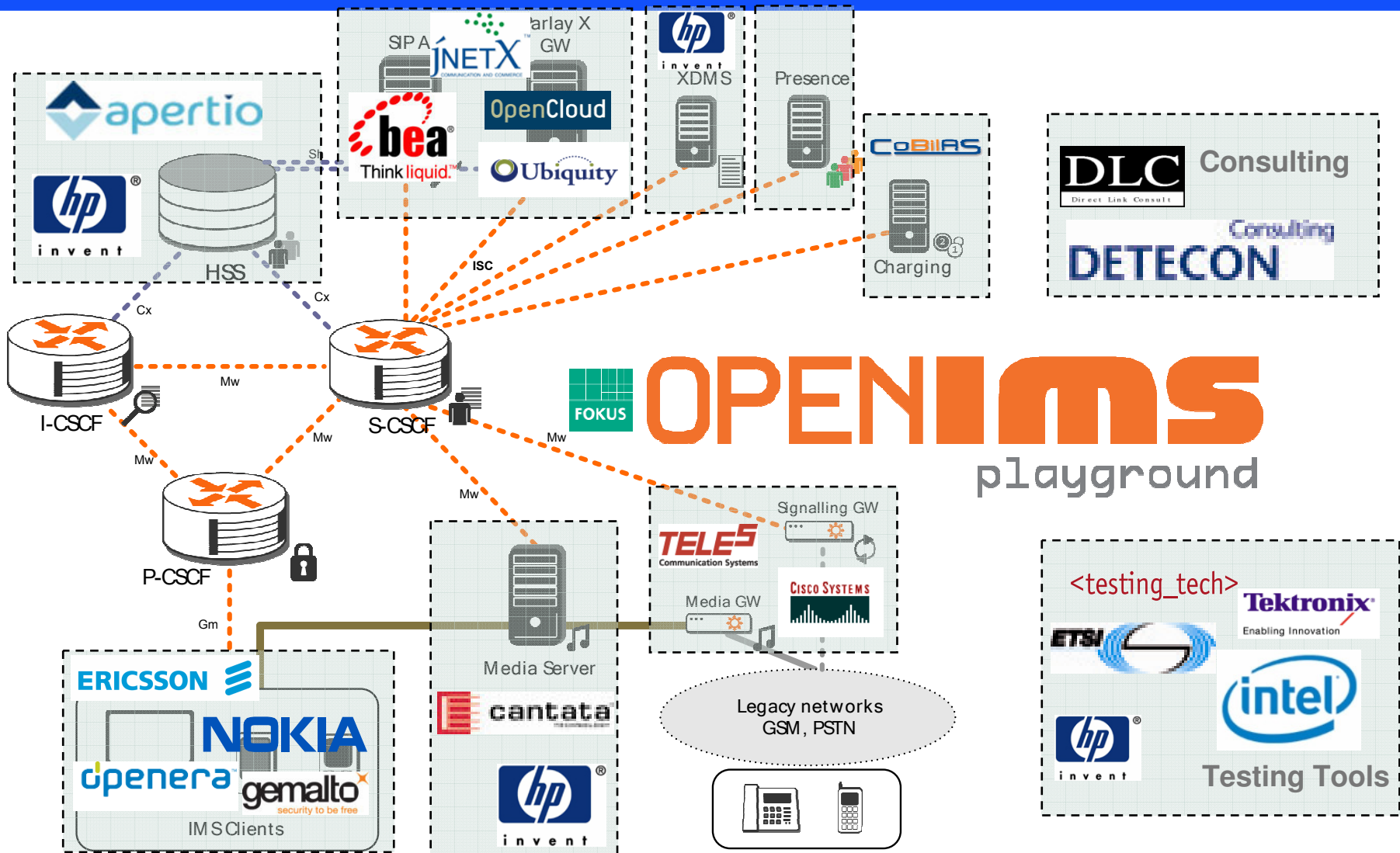
## Nat. Open NGN Test & Development Center

- Provision of a unique NGN Testbed covering all NGN layers
- Foundation for industrial and academic projects
  - Applications development support
  - Applications validation
  - Service Platform prototyping
  - Infrastructure component testing
  - Network Technologies integration
  - ....
- Officially supported by



# Integration of Partner Components @ FOKUS IMS PG

Note: This is not a complete Partner List!



# Beyond SER - The FOKUS **OPEN** SOURCE IMS Core

---

- A version of the Open IMS Core (OSIMS) is currently being developed and was already successfully tested with commercial IMS products.



- provides first time implementations of core IMS components
  - Call Session Control Functions
  - Home Subscriber Server
- offers an Open Source IMS platform to make use of the ISC interface
- can act as a tool for IMS services proof-of-concept
- allows to test alpha/beta versions of commercial IMS products
- **does not intend to compete with carrier grade developments but wants to create an Open IMS community and to accelerates IMS adoption**
- ***This software is for establishing IMS testbeds only, not for implementing commercial IMS systems!***
- ***Note: Users have to check potential IMS patents and standards licenses!***

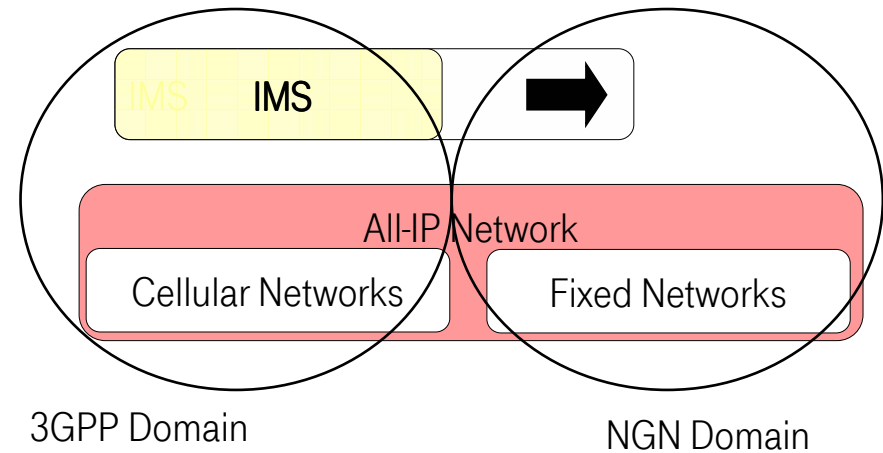
# Overview

---

- **Market Drivers for FMC - Convergence**
- **Next Generation Networks and related Standard Bodies**
- **The IP Multimedia System as universal Service Delivery Platform**
- **Community Services as NGN Killer Application Framework**
- **The FOKUS Open IMS Playground as globally known NGN Testbed**
- **Case Study CoSIMS Project**
- **Summary**
- **Q&A**

# *IMS is a perfect basis for eCommunity services*

- **IMS is today considered as the common platform for FMC and NGNs**
- **A convergent community-service can ideally be based on the IMS platform granting:**
  - **convergence and compatibility between fixed/mobile networks**
  - **multi-media and converged services support**
  - **providing key community service enablers, such as**
    - **Group Management**
    - **Presence**
    - **Communications**



***FOKUS explores communities in the CoSIMS Projekt together with Telekom Laboratories, T-Systems, HP, and Tromsdorf & Drünert***

# Real-life groups communicate during activities

- Real-life communities (groups of friends, sports mates, co-workers, ...) create ad-hoc communities in the contexts of
  - „...family and friends...“ and „...concerts, going out, parties...“
  - „...visiting trade shows...“ and „...work...“ as well as „...college/school work groups...“
  - „...computers and games...“
  - „...health and sports...“
- In a community one-to-many and many-to-many communication is possible even on the go and across modes of telecommunication
- Companies (SME) make offers to the group
  - Group tickets for movies or concerts
  - Special offers for products and services
  - Car pool communities from clubs to home



Source: t+d consultants and DT Laboratories study, Q1/2005; n=730; Base: Online-Community members



# *The Business Behind Community Interaction.*

---

## *Five key hypotheses build the case.*

Group or  
Community  
Context

Increased  
Traffic

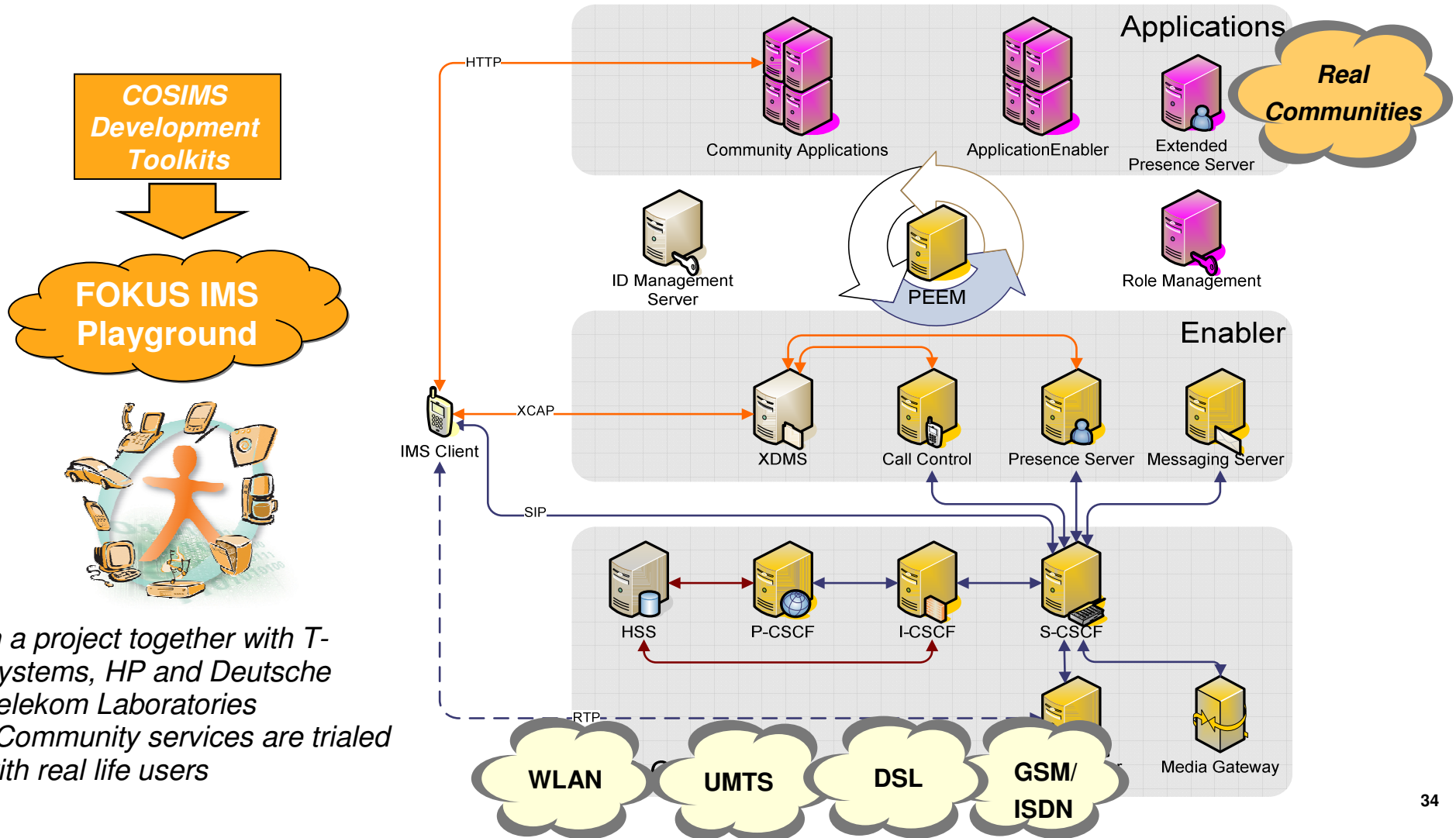
Value Added  
Services

Binding  
Social  
Networks

Willingness  
to pay

- A significant share of a persons total communication takes place in a group context.
- Group communication and its enabling functions (e.g. presence) lead to more communicative acts.
- Group communication is more dynamic than dyadic communication.
- Group communication is less intimate and VAS are not regarded intrusive.
- Group communication mostly serves coordination and need outside info that VAS can provide.
- Enabling group communication leads to higher customer loyalty.
- Social ties are a strong binding factor to a provider.
- Convenient group communication results in a higher willingness to pay for one provider's services vs. other providers.

# Prototyping eCommunities within the FOKUS IMS Playground



*In a project together with T-Systems, HP and Deutsche Telekom Laboratories eCommunity services are trialed with real life users*

# Overview

---

- **Market Drivers for FMC - Convergence**
  - **Next Generation Networks and related Standard Bodies**
  - **The IP Multimedia System as universal Service Delivery Platform**
  - **Community Services as NGN Killer Application Framework**
  - **The FOKUS Open IMS Playground as globally known NGN Testbed**
  - **Case Study CoSIMS Project**
- **Summary**
  - **Q&A**

# Summary

---

- **Convergence will drive service delivery platform unification**
- **The IP Multimedia System (IMS)**
  - is an overlay service network architecture applicable to any IP network (GPRS, UMTS, WLAN, DSL, ..) based on internet standards (IETF)
  - is a global standard (supported by 3GPP, 3GPP2, ETSI, ITU-T, OMA, IETF)
  - can be considered as **THE universal Service Delivery Platform for NGNs**
- **However, IMS should be mainly considered as a service enabler (i.e. no real IMS services are standardised!)**
- **Currently IMS Killer applications are globally looked for**
- **Learning from the internet, biggest IMS service potential is in eCommunity services**
- **FOKUS is prototyping Community-based Services on IMS with Deutsche Telekom**
- ***More information visit us at [www.fokus.fraunhofer.de/ims](http://www.fokus.fraunhofer.de/ims)***



**Any Questions?**

# About the Speaker



## **Prof. Dr. Ing. habil Thomas Magedanz**

*Thomas Magedanz (PhD) is professor in the electrical engineering and computer sciences faculty at the Technical University of Berlin, Germany, leading the chair for next generation networks (Architektur der Vermittlungsknoten – AV) supervising Master and PhD Students*

*In addition, he is director of the “NGNI” division at the Fraunhofer Institute FOKUS, which also provides the national NGN/IMS test and development centre in Germany. Prof. Magedanz is one of the founding members of FOKUS (1988) and member of the management team.*

*Furthermore he is principal consultant of Direct Link Consult e. V., a FOKUS Consulting spin off focussing on professional services, strategic studies and technology coaching.*

*Prof. Magedanz is a globally recognised technology expert, based on his 18 years of practical experiences gained by managing various research and development projects in the various fields of today’s convergence landscape (namely IT, telecoms, internet and entertainment).*

*He acts often as invited tutorial speaker at major telecom conferences and workshops around the world.*

*Prof. Magedanz is senior member of the IEEE, editorial board member of several journals, and the author of more than 200 technical papers/articles. He is the author of two books on IN standards and IN evolution.*

*Since 2006 he is also extraordinary professor at the University of Pretoria and University of Cape Town in South Africa.*