

Keynote @ Tridentcom, Orlando, Florida, May 22nd, 2007

From Open Testbeds to Open Source Toolkits - Experiences from the FOKUS Open IMS Playground and an Introduction to the Open Source IMS Core System

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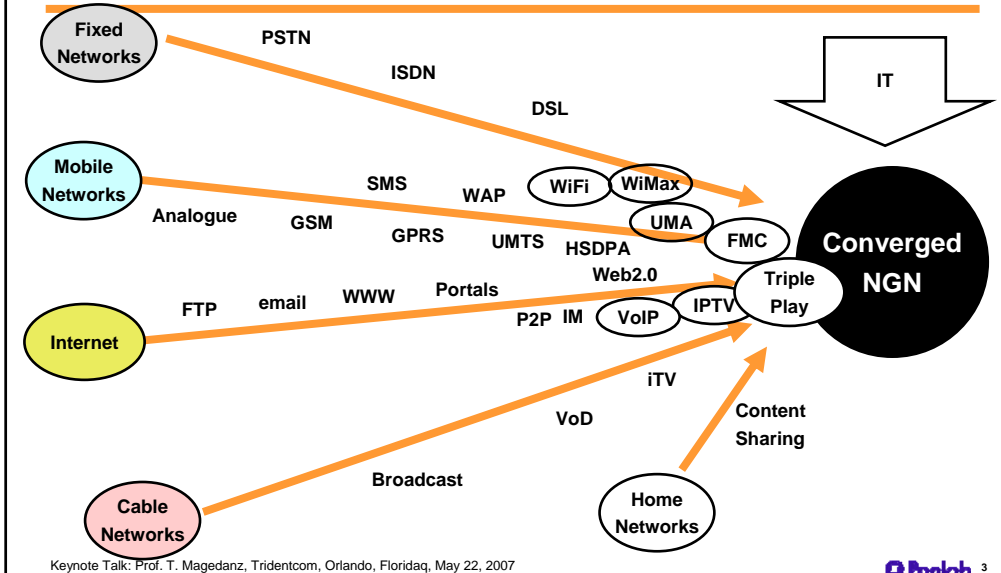
Agenda

- **IMS as Basis for NGN Implementation**
- **The Challenge of getting IMS acceptance in the Market**
- **The Role of Open IMS Testbeds to stimulate IMS Technology adoption**
- **The FOKUS Open IMS Playground stimulating IMS platform evaluation and IMS Applications Development**
- **The Open Source IMS (OSIMS) Core as toolkit to develop own NGN testbeds**
- **The IST Project Panlab and the way forward to IST FIRE**
- **Summary**

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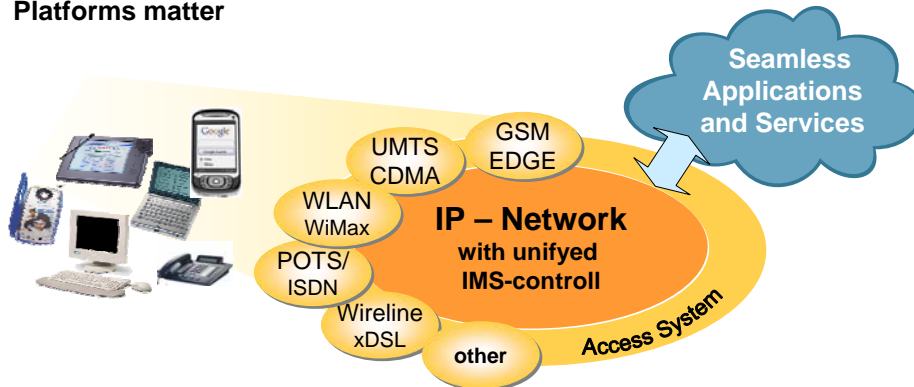


Evolution towards Converged Networks



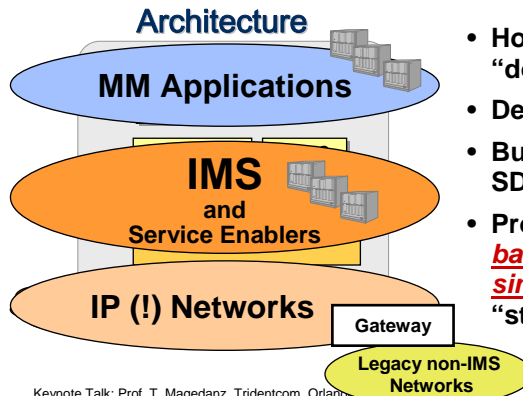
Seamless Services – The Network doesn't Matter

- Network diversity and network innovation pace has lead to network abstraction based on IP as common denominator
- Connectivity Services versus Multimedia Services
- Users are interested in services – thus End Systems and Service Platforms matter



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 !!



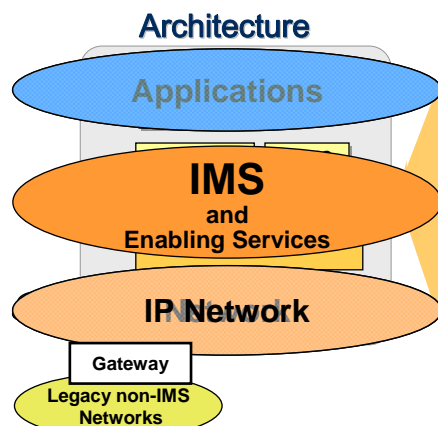
- Horizontal Architecture defining a “docking station” for applications
- Defines service enabler capabilities
- Builds on existing IETF and telco SDP standards
- Provides ***better security, Service based QoS, flexible charging and single sign on*** compared to the “standard” open internet

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IMS Core Infrastructure Functionality

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

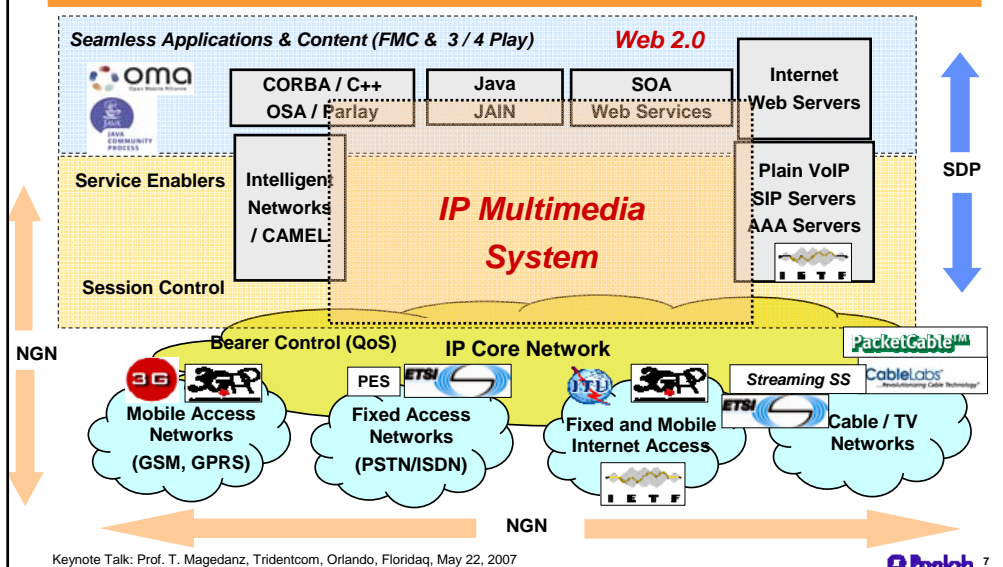


- Multiparty / Multimedia Session handling based on SIP Control
- Multimedia Content Pull & Push
- Messaging Support
- Conferencing and Group Com. Support
- Fixed Mobile Convergence / 3P
- Single-Sign-On User-Authentication
- High Secure Service Access and Provision
- Service based Bearer QoS
- Flexible Charging
- Legacy Network Interworking Support
- ***Docking Station for Service Enablers***
- ***Docking Station for Applications***

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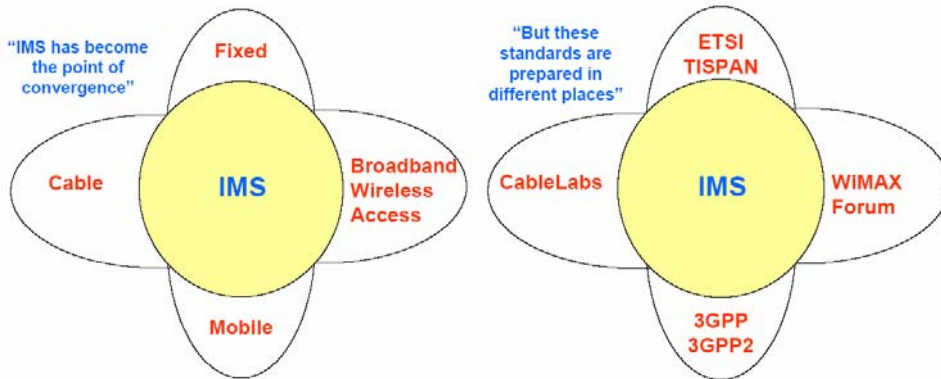
IMS is a global Standards for Converging Networks



Agenda

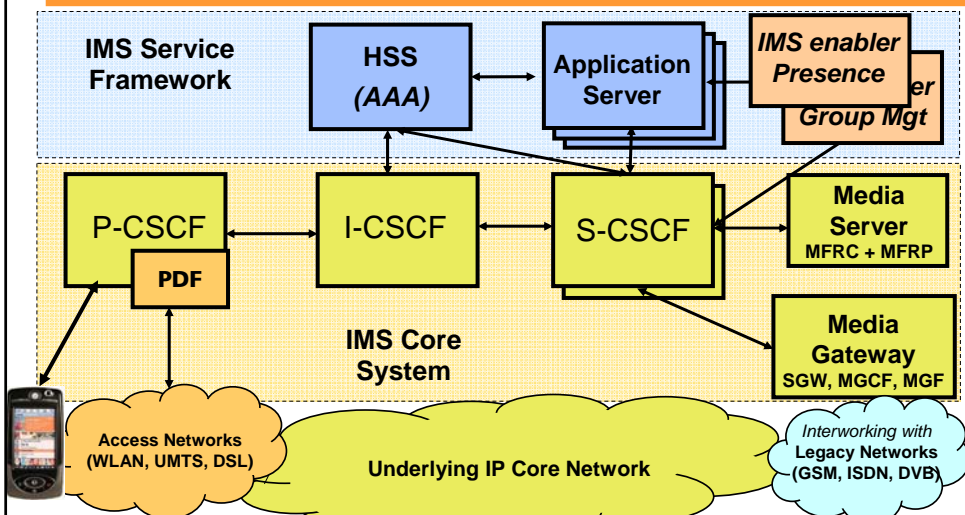
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IMS - One Language but different Dialects



The scope of 3GPP should be extended to include the requirements coming from other communities. A mechanism should be put in place to ensure efficient requirements capture. 3GPP should be responsible for producing one set of IMS specifications that satisfies these requirements. It is expected that these new arrangements will be put in place during 2007.

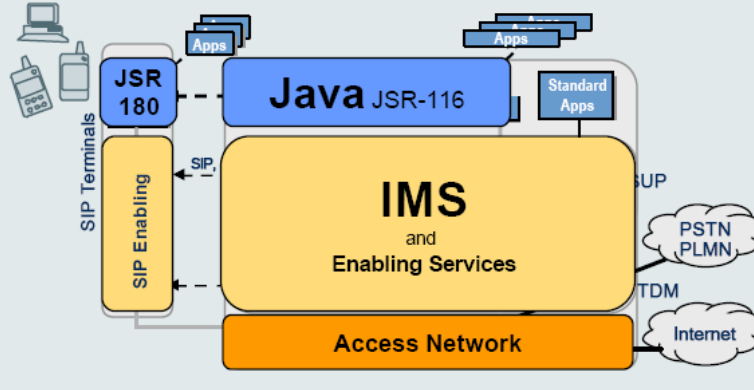
Complexity of 3GPP / 3GPP2 IMS Architecture



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

Show Stopper No.2: IMS Development Kits

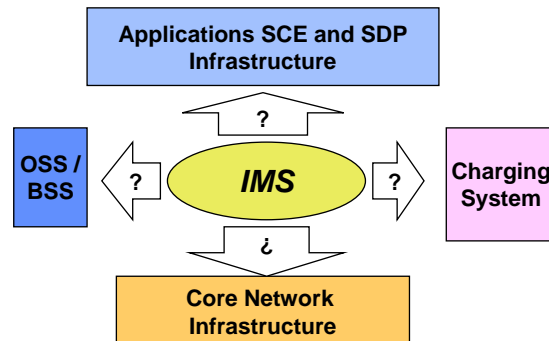
- The SIP application server supports APIs and SDK
- Java supports easy implementation of new SIP services



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IMS Introduction Challenges

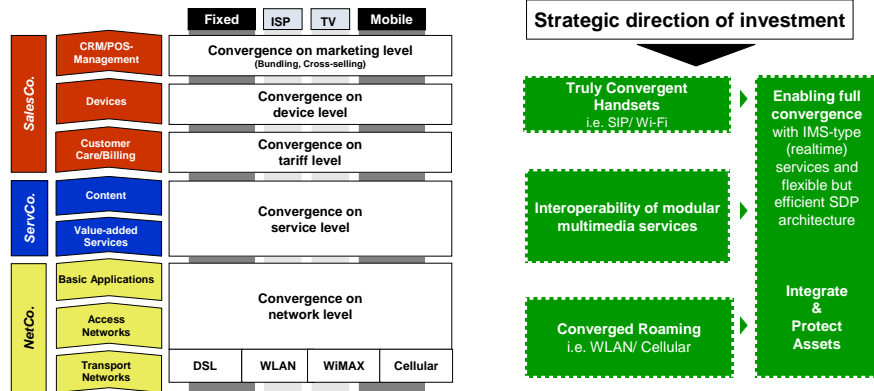
- IMS Integration Challenges
 - Core Network, SCE&SDP, OSS/BSS, Charging System



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The Future IMS / NGN Business Landscape

During the journey to convergence, operators face the challenge for higher integration, whilst ensuring customer control points facing 'wholesale co-competition'.



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Testbed Motivation

- **The IP Multimedia System (IMS) is a quite complex technology, merging technologies from**
 - Telecommunications, i.e. Intelligent Networks
 - Internet, i.e. VoIP and AAA protocols, as well as web services
 - Entertainment and broadcasting, i.e. television
 - Information Technologies for programming services
- **IMS may act on various IP-based bearer networks, but interworking and migration from circuit switched networks is mandatory**
- **Future business models for networks and services in the convergence market are unclear and investments from vendors and telcos are limited**
- **IMS is not fully understood by the affected industries**
- **Testbeds and software toolkits, optionally based on open source, represent a means to gain experiences and confidence in IMS**

The Role of Open Testbeds

- **Network convergence and the new multimedia service world is a subject of huge complexity**
- **Required infrastructure is expensive**
- **The IP Multimedia System (IMS) becomes of fundamental importance for unifying the seamless multimedia applications delivery above several network types**
- **Operator specific or vendor specific testbeds are not sufficient for addressing this complex market, as they are limited in technology exploitation and business models and likely will not address the needs of end users adequately (→ technology push model)**
- **Learning from the internet, a huge number of application developers acting on an open infrastructure (the internet) is needed to enable successful market driven services (→ technology pull model)**
- **Thus open testbeds are key for exposing the network variety and complex service platforms to an open set of developers and to provide a**
- **Adequate software toolkits are of help to start working without a testbed first**
- **The testbed infrastructure provides the technological basis for early platform component testing and applications prototyping and thus interoperable solutions and vendor independence**

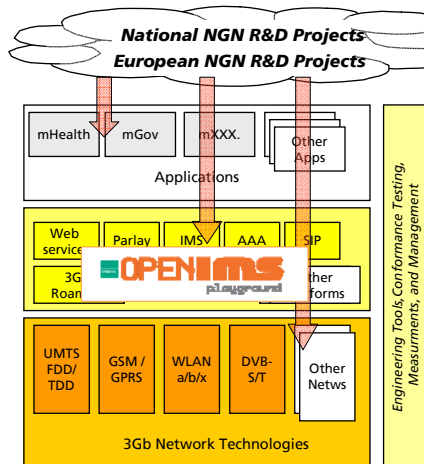
Turning IMS into Reality

- 1. Prototyping IMS Components – Is IMS really working or are there critical design flaws?**
- 2. Contributing to the community – We have opened our sources and talking with everybody interested on what are NGNs**
- 3. Help the industry design, develop, debug and test next generation communication enablers and services**
- 4. Prototyping Use Cases – Can Service Providers really use IMS? Is IMS a benefit for them**
- 5. Provide means of comparison between components in NGNs**

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Open NGN / IMS Testbed @ Fraunhofer FOKUS



<http://www.fokus.fraunhofer.de/ngni>

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Open NGN Test & Development Center

- Has been launched in 2001
- Provides all NGN layers but focus on service platform layer
- IMS Playground has been launched 2004
- Foundation for industrial and academic projects
 - Applications development support
 - Applications validation
 - Service Platform prototyping
 - Infrastructure component testing
 - Network Technologies integration
- Officially supported by



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IMS Testbeds as R&D Base @ FOKUS



- In November 2004 – after 2 years of development sponsored by BMBF and FOKUS – the FOKUS Open IMS Playground has been officially opened
 - www.open-ims.org
 - Technical foundation was the expertise and available software in the fields of Open Source SIP Express Router (SER) und FOKUS OSA/Parlay Gateway (OCS)
 - The Open IMS Playground is the globally pioneering open IMS Testbed und contains FOKUS own developed and industry partner IMS products
- In November 2006 the FOKUS Open Source IMS (OSIMS) Core System - the core of the IMS playground - has been officially released to the general public via the BerliOS Download site
 - www.openimscore.org
 - OSIMS allows industry and academic institutions to setup own testbeds (with or without FOKUS support and components)
 - Since then OSIMS has been downloaded many thousand times from all over the world

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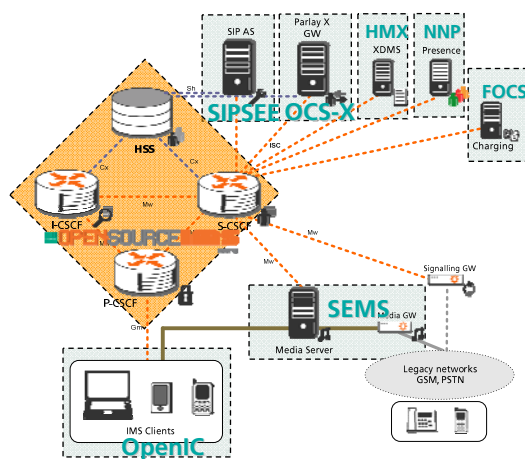
IMS Playground @ FOKUS

- Has been launched in 2004
- forms a globally unique state of the art IMS infrastructure featuring all major IMS components and interfaces
- is a key infrastructure of the FOKUS NGN Service Delivery Platform test and development center
- comprises
 - a full IMS based on own developments
 - additional carrier grade components from industry partners
- Goals:
 - Provision of an open IMS platform and planned interconnection to Operator IMS test beds
 - Interoperability test of IMS components (S-CSCFs, Media Gateways, SIP AS, etc.)
 - Environment for development of new MM applications, application platform extensions and IMS mobility, QoS and security research
- Contact: www.fokus.fraunhofer.de/ims

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FOKUS Open IMS Playground

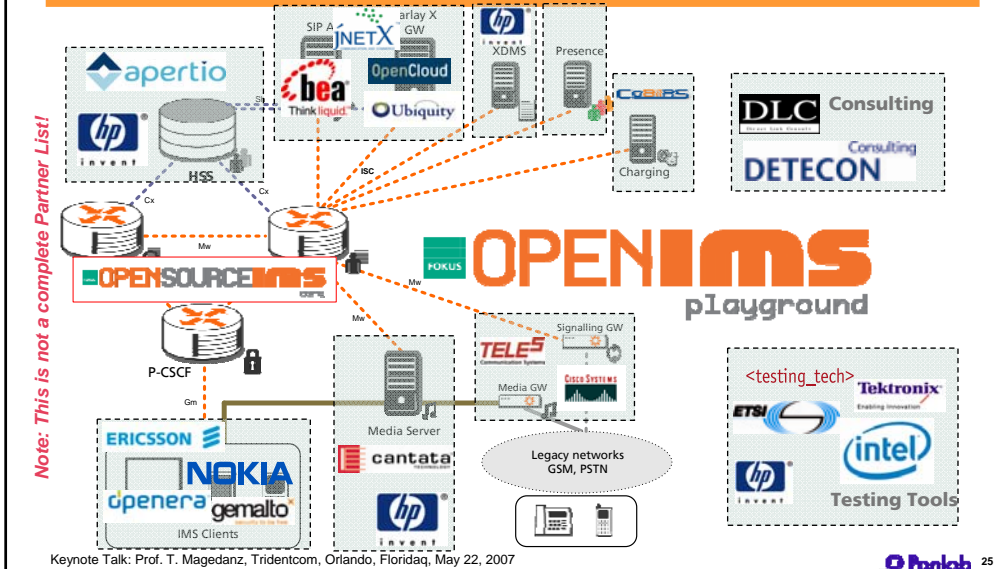


- FOKUS components covering all the major IMS nodes
- Based on a powerful legacy in IP communication – eg. SIP, SIP Express Router, iptel.org
- In 2003 FOKUS started prototyping IMS protocol stacks and new IMS components

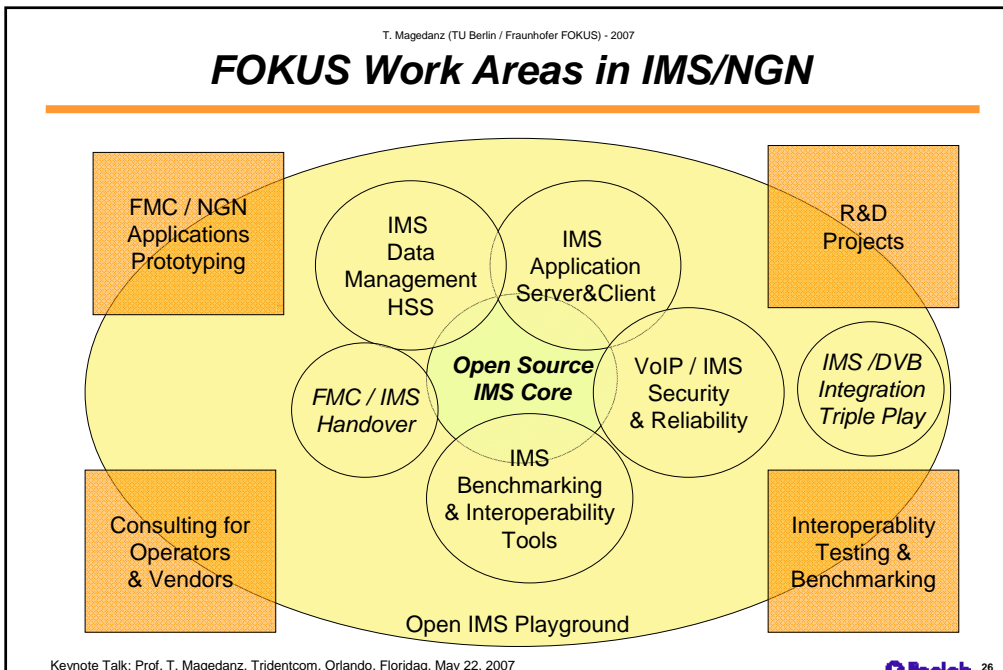
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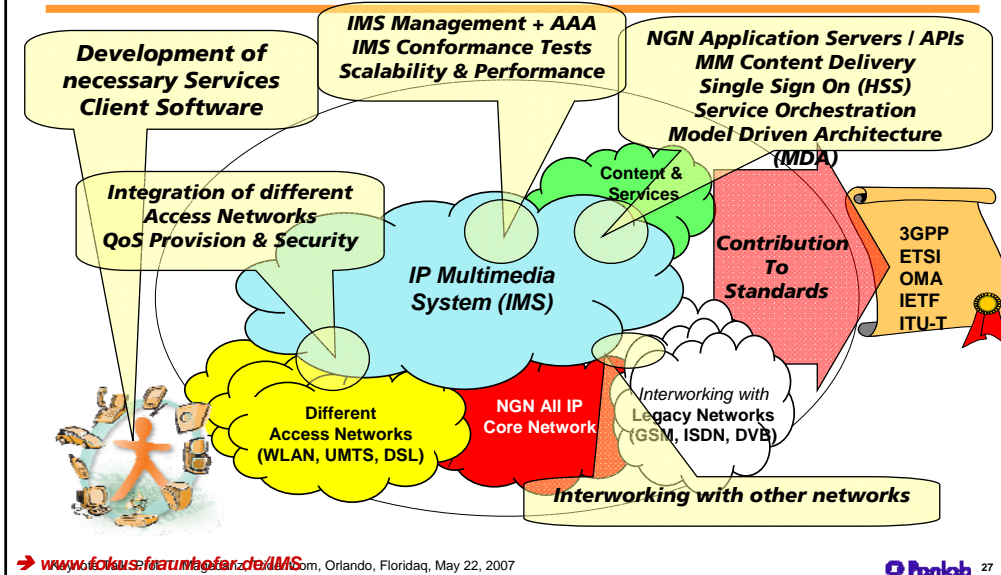
FOKUS Open IMS Playground and Core



FOKUS Work Areas in IMS/NGN



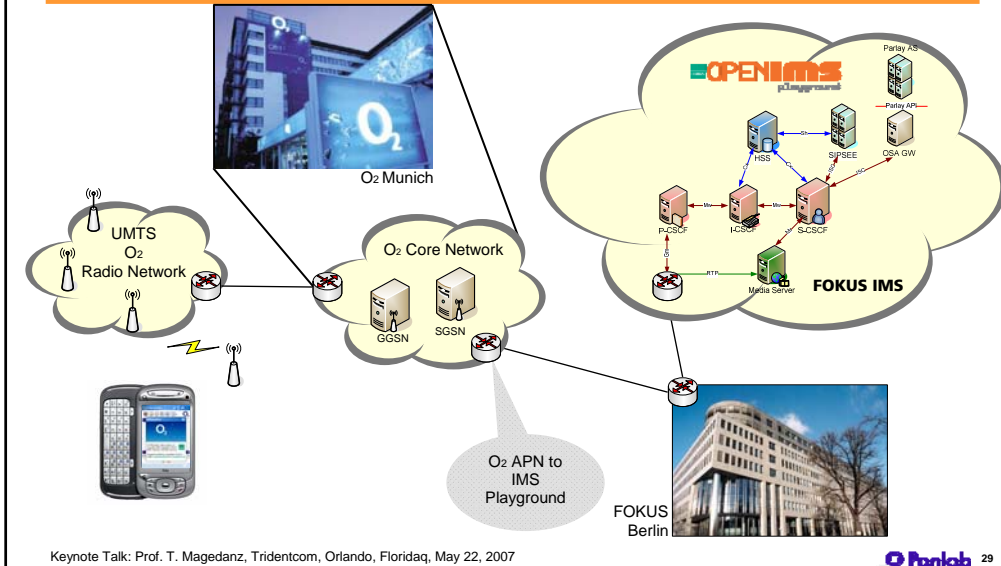
FOKUS NGN/IMS R&D Focal Points



Reference Customers

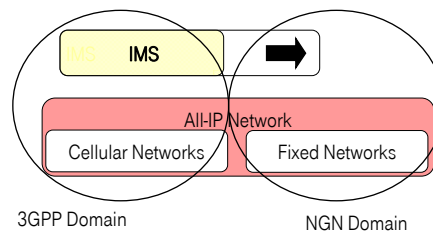
- Consulting on IMS development strategies for major vendors
- Consulting on bids and gap analysis of commercial products for key global integrator
- Extensions (Interfaces/Reference Points) of commercial solutions of various vendors
- Implementation of prototypes for vendors and operators
- Integration and Compliancy testing of commercial solutions
- Consulting on IMS integration strategies for major German Operator
- Interoperability testing for major European vendors
- IMS Load- /Performance testing for key global hardware vendor
- Application Service development for major German operator
- Consulting for establishing IMS Testbeds at remote sites
- Plus German and European R&D projects on Feature Interaction and Service composition

Case Study 2: O₂ / FOKUS Testbed Setup



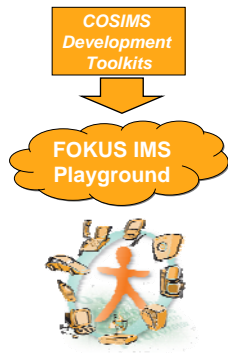
Case Study 1: DTAG Communities with IMS

- 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
 - “Click to” Communications

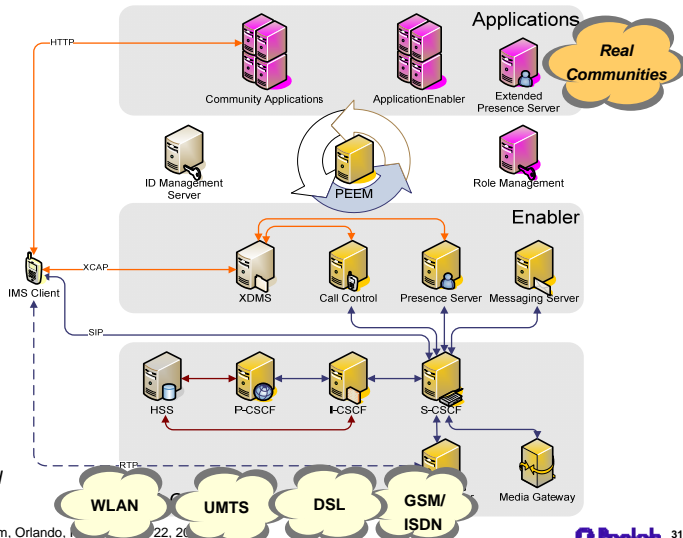


FOKUS explores communities in the CoSIMS Projekt together with Telekom Laboratories, T-Systems, HP

Example Deutsche Telekom Labs using FOKUS IMS Playground



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



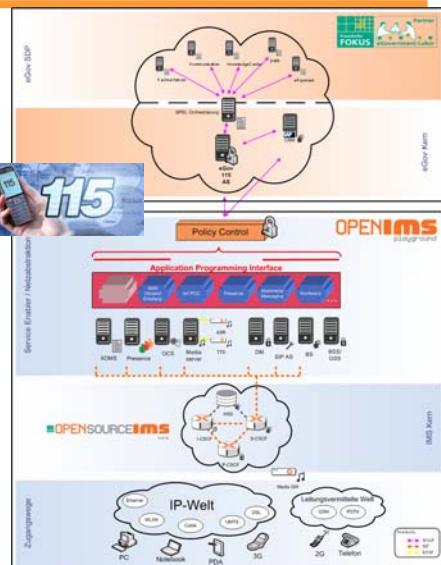
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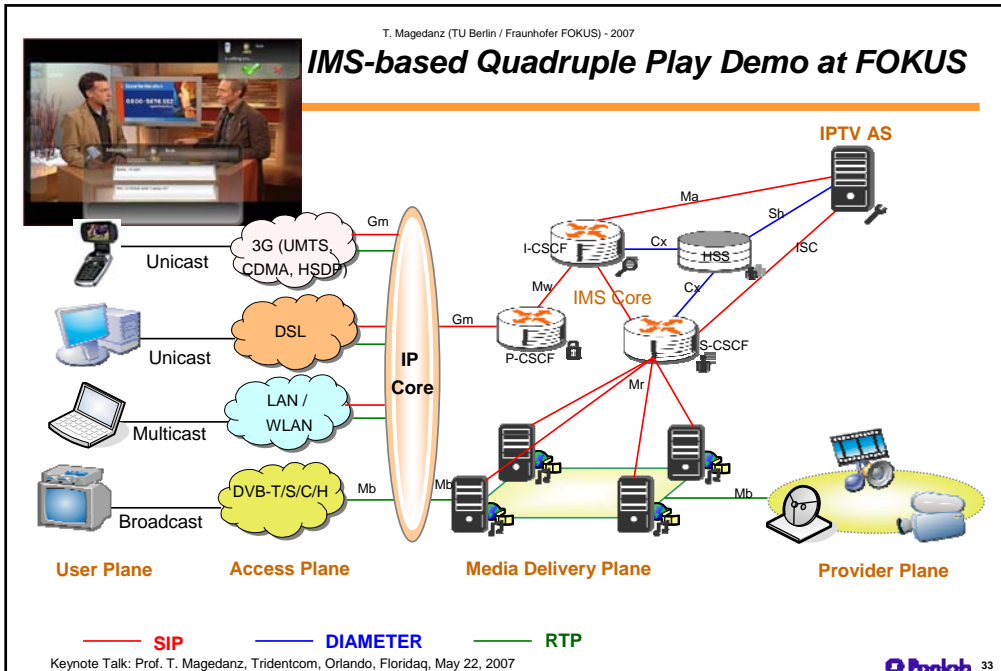
Case Study 3: German Service Line 115

- On behalf of the German ISPRAT Institute (Interdisciplinary Studies on Politics, Law, Administration, and Technology) → www.isprat.net/
- FOKUS is developing a Service Line 115 prototype based on the two FOKUS labs on
 - E-government Lab
 - www.fokus.fraunhofer.de/testbeds/egov-labor/index.php?lang=en
 - operated by the FOKUS Competence center ELAN
 - www.fokus.fraunhofer.de/ELAN
 - Open IMS Playground
 - www.fokus.fraunhofer.de/testbeds/ims_playground/index.php?lang=en
 - operated by the FOKUS Competence center NGNI
 - www.fokus.fraunhofer.de/NGNI
- More Info about this reference project: www.fokus.fraunhofer.de/ServiceLine115

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IMS-based Quadruple Play Demo at FOKUS



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The FOKUS **OPEN SOURCE** IMS Core

- A version of the Open IMS Core (OSIMS) has been developed and was successfully tested with commercial IMS products over the last 3 years

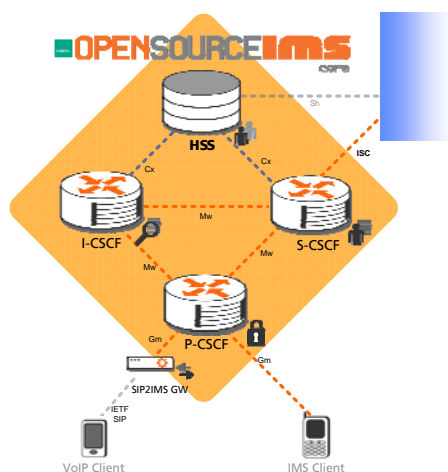


- provides first time implementations of core IMS components
 - Call Session Control Functions
 - Home Subscriber Server
- offers an Open Source IMS platform to make use of the ISC interface
- can act as a tool for IMS services proof-of-concept
- allows to test alpha/beta versions of commercial IMS products
- **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!***

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OSIMS – Components & Licensing



- a **Home Subscriber Server**
 - GNU General Public License v.2
- a **3GPP compliant IMS Call Session Control Functions (CSCFs)**
 - GNU General Public License v.2
- a **SIP2IMS gateway**
 - GNU General Public License v.2

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Specification Guidelines for OSIMS

- IETF RFCs (selection)
 - SIP: Session Initiation Protocol – RFC 3261
 - Hypertext Transfer Protocol (HTTP) Digest Authentication Using Authentication and Key Agreement (AKA) - RFC 3310
 - SIP Private Header Extensions - RFC3455
 - Diameter Base Protocol – RFC 3588
 - SIP Event Package for Registration - RFC3680
- 3GPP IMS Release 6 Specifications (selection)
 - TS 23.228 – IMS Stage 2 (Rel.6)
 - TS 24.229 - IP Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage3 (Rel.6)
 - TS 29.228 – Cx and Dx Interfaces, Signalling flows and message contents (Rel.6)
 - TS 33.102 - 3G Security; Security architecture (Rel. 6)
 - TS 33.203 - Access security for IP-based services (Rel.6)

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Call Session Control Functions



- CSCF = SIP proxy to route and process the SIP signaling

- Proxy-CSCF

- outbound proxy for User Endpoints – entry point in the IMS network
- keep local registrar and firewall the core network
- add important network/charging/etc information to the messages
- bridge between access network (visited network) and user's home network



- Interrogating-CSCF

- entry point in the Home Network
- originating/terminating party assigned Serving-CSCF retrieval
- stateless forwarding of messages



- Serving-CSCF

- local registrar for served users
- authenticate the users
- subscription server for registration status events
- evaluate Initial Filter Criteria and route messages accordingly to Application Servers for service processing



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SIP2IMS & Home Subscriber Server



– Home Subscriber Server

- evolution of a Home Location Register to the all-IP core network
- stores user profile, provisioning data
- keeps registration status
- keeps location information



– SIP2IMS Gateway

- allows transformation of IETF SIP messages to IMS conformant messages
- translates MD5 authentication to IMS AKA authentication
- enables developers to access core elements and to trial multimedia services by using a non-IMS VoIP client (e.g. Eyebeam, SJphone, Kphone)



Elements around the Open IMS Core

• Functionality of the Open IMS Core can be verified with additional components

– IMS UE /OpenIC

- must be capable of performing IMS AKA registration
- IMS specific SIP behaviour e.g. subscription to own registration event



– SIP client

- uses IETF SIP protocols without IMS extensions (e.g. Kphone, eyebeam)
- attaches to IMS Core via SIP2IMS Gateway



– Application Servers

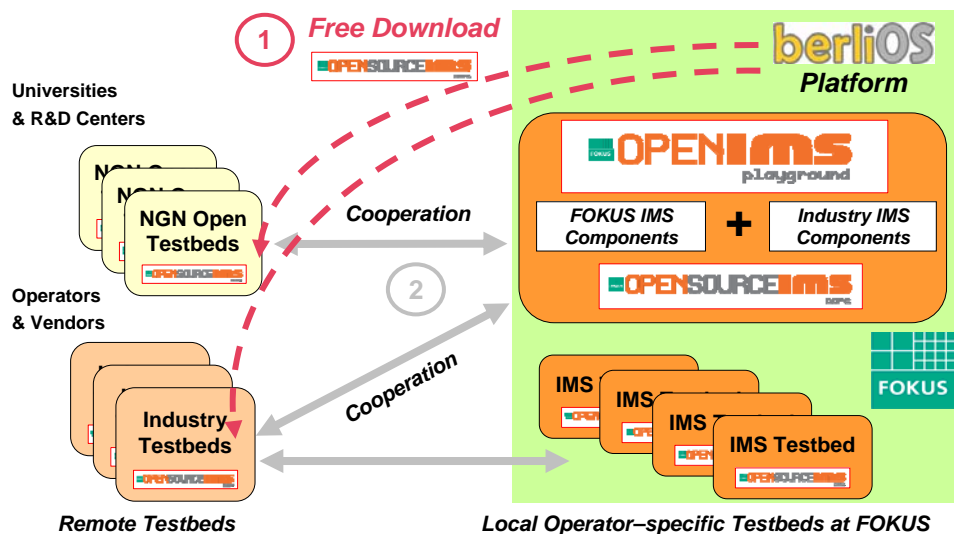
- tested Service platforms for the Open IMS Playground
 - SIPSEE (SIP AS)
 - Open Communication Server (Parlay Gateway)
 - Open Communication Server X (Parlay X Gateway)



Getting started with IMS – An IMS Testbed

- Operators and vendors are challenged strongly by the ongoing convergence (VoIP, FMC, Triple Play, Internet multimedia / web 2.0)
- IMS is a complicated subject due to convergence domains
- Success of IMS will depend strongly on open / interoperably solutions and many niche market services
- Instead of deciding for one or two vendors and/or integrators the establishment of a local IMS/NGN testbed enables all players to gain early insight into the IMS
- Currently many international testbeds are under development
- Testbeds and related tools allow to engage all players of the emerging convergence ecosystem at an early stage to develop many and really demanded services
- Universities could be part of this approach to educate staff as soon as possible

FOKUS Open IMS Playground Concept

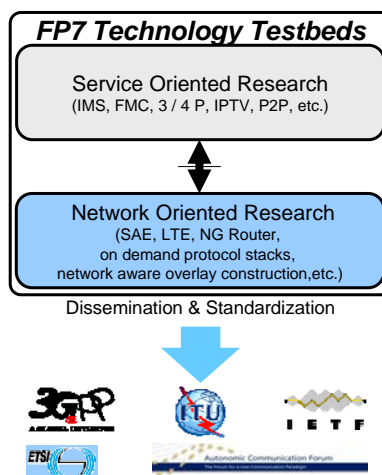


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Some Testbed Requirements

- Independence from specific business models
- Functional independence (not limited to specific project scopes)
- Open scope / comprehensiveness (Network as well as Services Domains)
- Extensibility (by customer demands and technology innovation)
- Openness (neither vendor nor operator specific)
- Distributable / interconnectivity (via Toolkits and Open Source)
- Instant support for
 - Open Source technologies
 - Validation of new ideas
 - Interoperability and benchmarking tests
 - user trials
- Supporting and bridging academics and industry



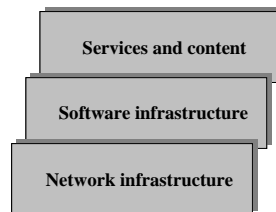
What is Panlab

- A project (SSA) funded by the European Commission under FP6
- ... and which enables and facilitates the Pan-European laboratory vision

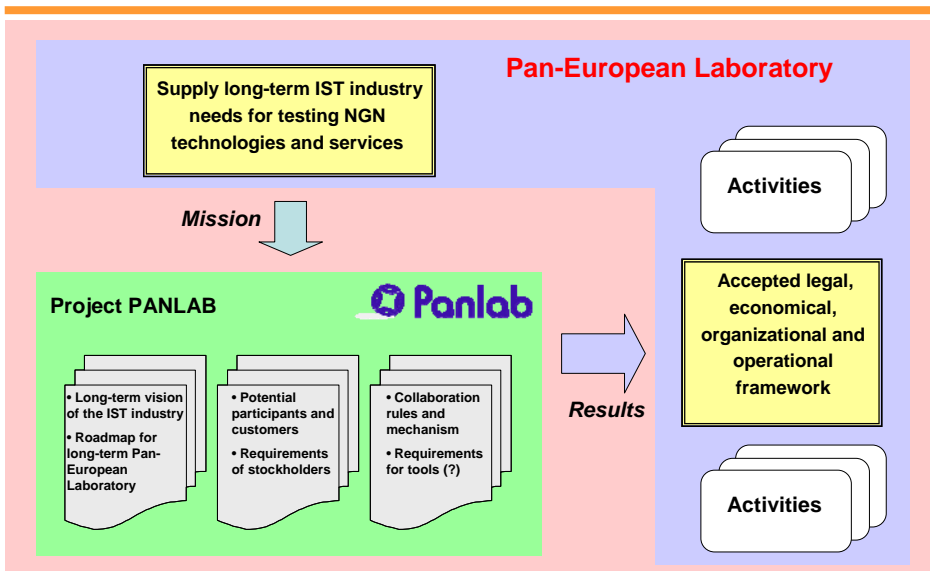
Vision for Pan-European Laboratory

- Identify the long-term ICT industry requirements for end-to-end testing and present a plan and roadmap for how to satisfy such requirements in the long-term
- Based on the concept of federation of distributed test laboratories and testbeds that are interconnected and providing access to required platforms, networks and services for broad interoperability testing

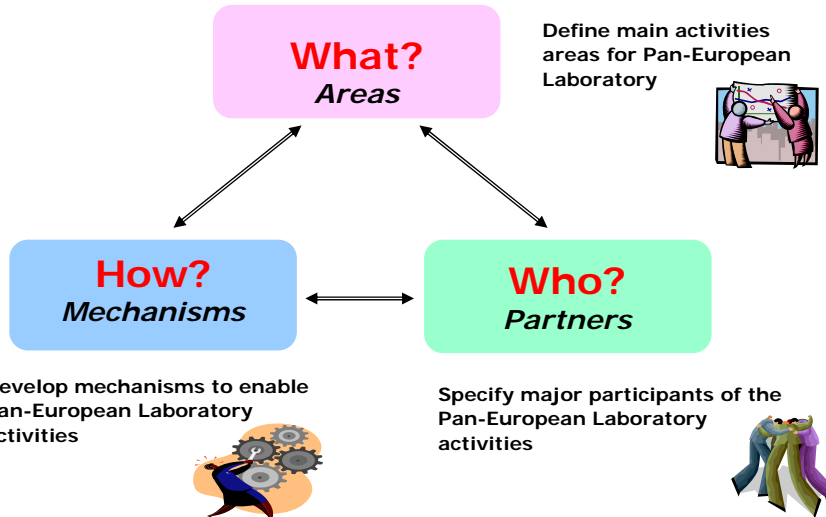
- Provision of testing facilities for the big picture



Pan-European Laboratory and PANLAB Project

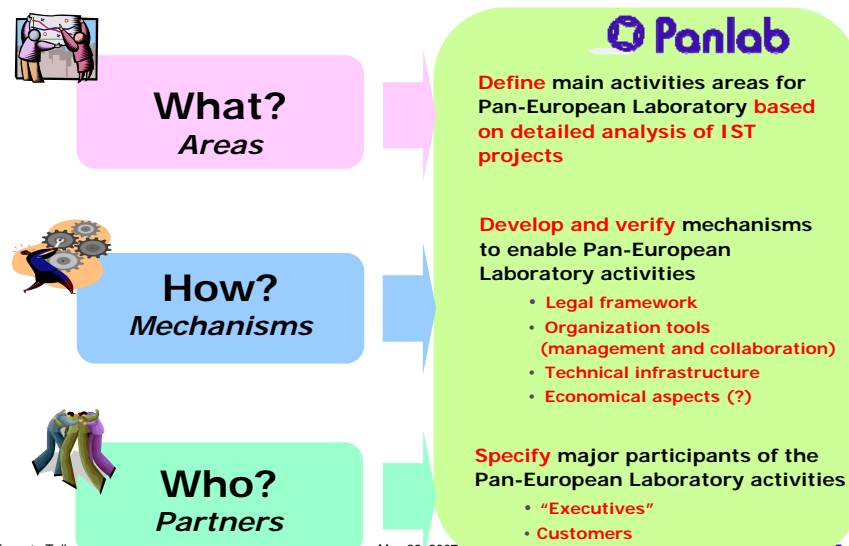


Building Pan-European Laboratory



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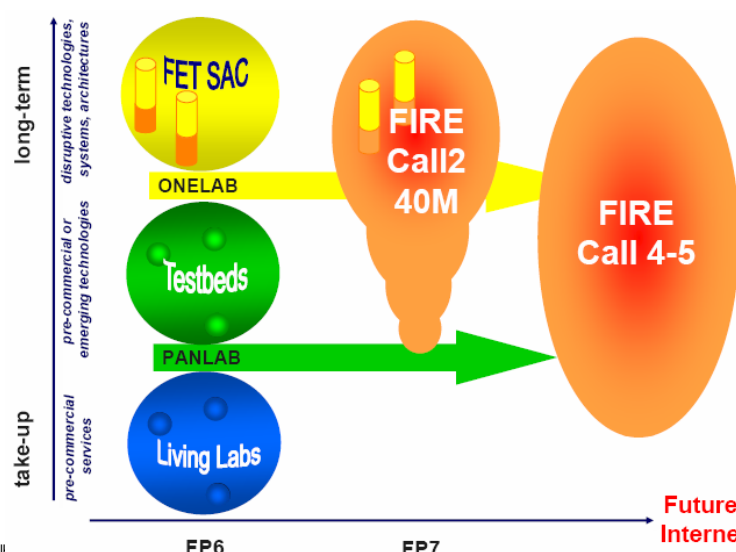
FIRE Strategy

- Experimentally-driven long-term research, including an important testbed dimension
 - starting from the running FET SAC projects, to include the new IPs which will be selected in call 2

How to build large-scale testing environments?

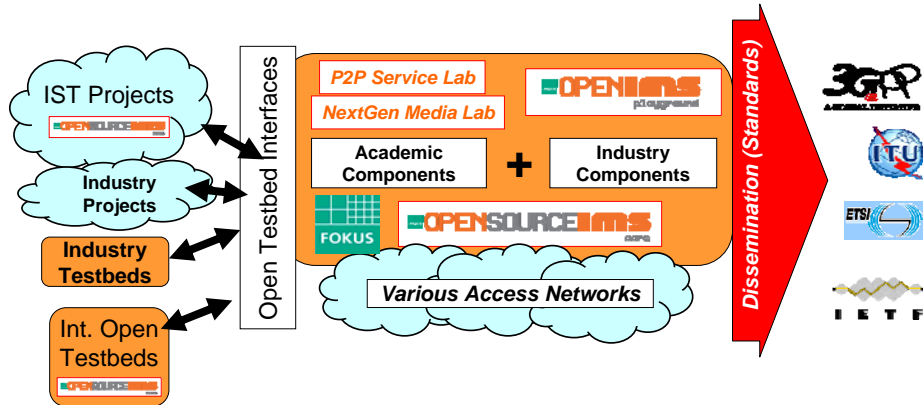
- Creating a European Laboratory for testing potentially disruptive internet concepts
 - building on ONELAB and on the advanced testbeds parts of SAC projects
- Federating existing and planned testbeds for emerging technologies
 - exploiting synergies between pre-commercial technologies and services testbeds (possibly including LivingLabs) in line with the framework provided by PANLAB

Panlab within the FIRE Initiative Context



NGN Testbeds stimulate the Market

Academic and Industry R&D Projects for Applications and Service Platforms
(Proofs of Concept Validation, Interworking, Benchmarking, etc.)



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- The FOKUS Open IMS Playground stimulating IMS platform evaluation and IMS Applications Development
- The Open Source IMS (OSIMS) Core as toolkit to develop own NGN testbeds
- The IST Project Panlab and the way forward to IST FIRE
- Summary

Keynote Talk: Prof. T. Magedanz, Tridentcom, Orlando, Florida, May 22, 2007

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Summary

- **IMS is the next big thing in telecommunications after VoIP**
- **Open source software is getting popular in the telecommunications field**
- **The FOKUS Open Source SIP Express Router has paved the way for high performance low cost VoIP solutions**
- **The FOKUS Open Source IMS (OSIMS) Core System represents an evolution of SER in face of the extended IMS scope compared to VoIP**
- **Add-on modules enable the rapid implementation of IMS environments and applications**
- **OSIMS forms the heart of the globally recognised Open IMS Playground at FOKUS**
- **You can start your own testbed by downloading the OSIMS core today from www.openimscore.org**
- **For more information visit www.fokus.fraunhofer.de/ims**

Note your Calendars!

3. FOKUS International IMS Workshop

“IMS Deployment reviewed in Face of Triple Play, IPTV, SOA and Web 2.0”

Berlin, Germany

November 15-16, 2007

Featuring:

- *IMS Starters Tutorial, Open Source Starters Tutorial*
- *Mostly Operator Talks*
- *4 interactive Workshops*
- *Vendor Exposition*
- *IMS Playground Visits and IMS Service Demonstrations*
- *FOKUS SOA and Next Gen Media Lab Tours*

More than 280 people from 29 nations attended last years event



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.

Contact



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