



## **Fraunhofer FOKUS Open Source IMS Core Mission Statement**

### **Fraunhofer Institute FOKUS**

The Fraunhofer Institute FOKUS is a German research institute carrying out national and international research and development projects in innovative research areas, including strategic studies and software prototyping in the field of converging networks and seamless services.

Fraunhofer FOKUS works closely with the Computer Sciences and Electrical Engineering Faculty of the Technical University of Berlin for joint education (Diploma, Masters, PhDs) and research activities.

Fraunhofer FOKUS acts as an independent organization, working with and bringing together different players of the Next Generation Network and service convergence value chain, i.e. operators, vendors, integrators, service providers, content providers and application developers.

Fraunhofer FOKUS is not a software company developing products! But Fraunhofer FOKUS is providing Proof of Concept (PoC) implementations based on both open source and its own developments for performing proof of concept implementations within research and development projects, i.e. software is only developed for R&D purposes.

The emerging convergence field requires access to various end systems, network technologies and service platforms.

OPEN test-beds are considered an important means for providing such complex enabling infrastructure to speed up innovation in the NGN field. I.e. test-beds provide the foundation for performing research and development activities and bringing together different players of the future value chain to establish confidence in specific technologies. The basic goals of such test-beds are interoperability testing, benchmarking, as well as prototyping of technology extensions and the prototyping of innovative multimedia applications.

For many years FOKUS has been providing - funded by the German Government (BMBF) and various industry sponsors - such technology test-beds. Examples include the first VoIP test-bed iptel.org, the first national German UMTS test-bed, the first open OSA/Parlay playground and since 2004 the first IMS test-bed - namely the Open IMS playground.



### **The FOKUS Open IMS Playground**

The IP Multimedia System (IMS) represents an international standard for a multimedia service provisioning platform based on a combination of internet and telecommunications concepts for future all IP networks. There is no doubt that IMS will become the common technology denominator for converging fixed,



mobile and cable networks for providing seamless triple and quadruple play services.

An important key to IMS success will be the availability of interoperable, scalable IMS infrastructure components, corresponding management solutions and most importantly innovative applications driving the adoption of IMS. Thus IMS only has a chance of being a success if it becomes a mainstream technology. But IMS technology is complex due to the convergence aspects and expensive, which is hindering the early adoption of IMS.

Based on the excellent know how in the different contributing domains of IMS, namely Internet and telecommunication protocols, information technologies, and service delivery platforms, FOKUS has decided - based on its mission to act as an independent technology advisor - to develop an IMS core system for research and development purposes and to establish around it an open IMS test-bed - the Open IMS Playground. This playground combines FOKUS IMS prototype components as well as vendor IMS components to provide access to the state of the art in IMS technology for IMS applications prototyping.



### The Open Source IMS Core System

The idea for developing an Open Source IMS Core System has been sparked by the experiences FOKUS has encountered with the development of the SIP (Session Initiation Protocol) Express Router (SER). SER was developed many years ago in the early years of VoIP as an open source SIP server based on GPL (GNU Public License) to enable the fast prototyping of VoIP for R&D purposes and thus to stimulate the adoption of VoIP technologies and related vendor products in the real world.

IMS extends the vision of VoIP as IMS is an overlay service network on top of IP networks for the carrier grade provision of *combinational*, presence based messaging, conversational, and streaming services. IMS is based primarily on extensions of SIP for session control and Diameter for AAA purposes, but represents from an architectural point of view a combination of VoIP and the classic Intelligent Network concepts. An IMS Core System - which is an IP based overlay - comprises a set of extended SIP servers, so-called Call State Control Functions (CSCFs), and a Home Subscriber Server (HSS), which is a customer provisioning data base for AAA purposes. Furthermore, adequate end systems - so-called IMS clients - are needed to obtain access to and use of IMS services, which are implemented on an open set of potentially different SIP application servers connected to a dedicated "serving" CSCF.

In face of setting up the Open Source IMS Core System for implementing IMS test-beds, the SER has been extended over time by FOKUS to cope with the extended version of SIP for IMS and to act as an IMS Call State Control Function (CSCF). Additionally a minimum Home Subscriber Server (HSS) has been developed based on a MySQL and the JavaDiameterPeer stack to interact for IMS service provisioning via Diameter with the CSCFs. Furthermore, some existing



SIP clients, such as KPhone, have been extended for IMS purposes to act as an IMS client or SIP2IMS gateway.

The Open Source IMS Core System has been extended by FOKUS by additional IMS core components, such as media servers, media gateways, as well as IMS application components, such as IMS service enablers and different types of (SIP) application servers, to set up a real IMS ecosystem for test purposes - the "FOKUS Open IMS Playground".

Since its opening in 2004, the Open IMS Playground has received attention from many vendors, operators, integrators, consultants and application developers around the world. The playground is used for conformance, interoperability and benchmarking testing of IMS components as well as prototyping of Fixed Mobile Convergence, Triple /Quadruple Play services and also advanced ambient intelligence services in the context of WWRF (Wireless World Research Forum) research activities. The results of this work are delivered back to the standards bodies and to vendor implementations.

### **Towards the Distribution of the Open Source IMS Core System**

FOKUS has become a pioneer in NGN / IMS testing and prototyping and many universities, research organizations and R&D departments of operators around the world have asked to gain access to the FOKUS Open IMS playground and/or to get support in setting up their own IMS test-bed to obtain early IMS experiences.

As FOKUS will not be able to provide substantial assistance at remote sites for setting up and managing an IMS test-bed, FOKUS has decided to distribute the IMS Core System as Open Source code.

*It has to be noted that this Open Source IMS Core System is not intended to become or act as a product in a commercial context! Its sole purpose is to provide an IMS core reference implementation for IMS technology testing and IMS application prototyping for research purposes, typically performed in IMS test-beds. This target has also motivated the decision to use open source software (i.e. SER based on GPL), which makes product development quite unattractive.*

***Furthermore, users of the Open Source IMS Core System have to be aware that IMS technology may be subject to patents and license terms, as specified within the various IMS-related IETF, ITU-T, ETSI, and 3GPP standards. Thus all Open Source IMS Core System users have to take note of this fact and have to agree to check out carefully before installing, using, and extending the Open Source IMS Core System whether related patents and licenses may be applicable to the intended usage context.***

In addition, it has to be noted that the Open Source IMS Core has some inherent technological limitations with regard to capacity, availability, performance, and scalability as it is not designed to be used to provide commercial IMS services.

The FOKUS Open Source IMS project - i.e. the sharing of the FOKUS IMS Core implementation with other developers and the coordination of further enhancements - is only targeted to make the Open Source Core System a stable reliable test-bed infrastructure, which is as much as possible standard



compliant, to illustrate the applicability of concepts as well as to identify potential errors and gaps.

Academia and industry, i.e. universities as well as operators, integrators and vendors, will benefit tremendously from the availability of the IMS Open Source Core System, as the later substitution of OSIMS components by carrier grade IMS products can happen smoothly. In addition, OSIMS allows interconnection and interaction with carrier grade standard compliant IMS products from various vendors within test-beds, as can be witnessed within the FOKUS Open IMS Playground. Thus early adoption of IMS technology can be achieved and can stimulate the international take up of IMS technology and the development of end user driven IMS multimedia services for a converging world.

In this regard, enjoy the FOKUS IMS Open Source Core System!

The FOKUS NGNI Team

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