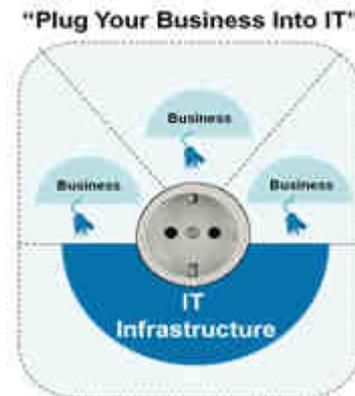


# 1 Publishable summary

## Summary description of the objectives

Today we're witnessing the necessity to align Business and Information Technology (IT) as well as a change in the role of IT from an enabler to an industrial sector in its own right. The reasons for this are manifold: legal aspects, regulations, business requirements, economic factors, etc. Technological trends such as SOA, Software as a Service and Virtualisation are influencing the way in which IT services are rendered. Model-based approaches and IT-Governance are prominent candidates to bridge evolving business contexts and IT, in order to adapt the provisioning of IT for business needs. This challenge can be met by capitalizing on semantic technologies for IT-Governance. Based on the assumption that businesses in different sectors of the economy will require IT for different reasons and in different ways, plugIT aspires to develop an IT-Socket. Based on concrete end-user scenarios, the IT-Socket that will realize the vision of businesses "plugging-in" to IT as illustrated in Figure 1.



**Figure 1 The IT-Socket idea**

For the development of the "IT-Socket" a model-based approach is applied. The rationale is as follows: as graphical models can be interpreted by the domain expert in the form of semi-formal graphical representations and hence can act as mediator between domain experts and formal semantic representation that can be interpreted by machines.

plugIT will develop concepts, tools and methods summarized within the "Next Generation Modelling Framework" that allow experts from both business and IT domains to use modelling languages that fit to their concrete needs.

This development relies on

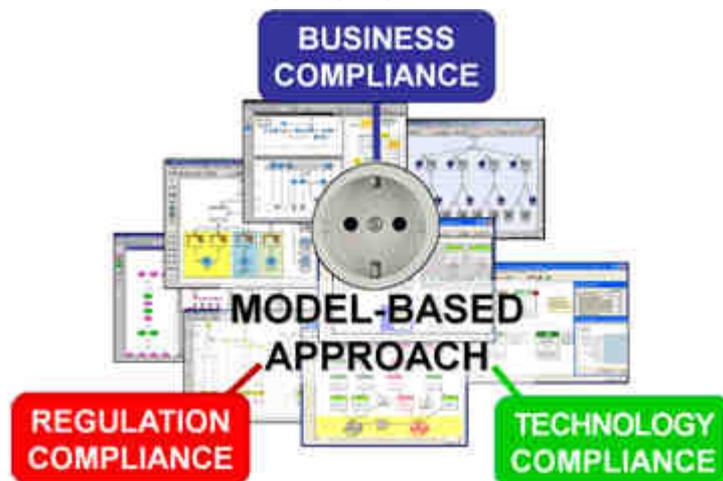
- a tighter involvement of domain experts when expressing formal knowledge by using graphical modelling languages as input,
- different graphical modelling languages for the IT-Socket to provide modelling languages the domain expert is used to work with, as well as
- a domain specific notation for semantics by integrating formal concepts of semantics with the graphic notation from modelling languages.

plugIT proposes a "Conceptual Integration" and a "Technical Integration".

Conceptual Integration targets the integration of modelling languages currently existing on the market (e.g. business process modelling languages such as EPC, BPMN, ADONIS<sup>®</sup>, UML Activity Diagrams, BPEL), or new modelling languages that need to be developed and

integrated.

The integration within the “Next Generation Modelling Framework” targets the translation possibilities between different modelling languages.



**Figure 2 The Model-Based Approach**

Technical Integration enables the usage of different modelling tools. The service-oriented middleware is responsible for the technical integration of heterogeneous modelling tools, whereas the semantic kernel implements for the conceptual integration of different modelling languages.

plugIT demonstrates the applicability of the results achieved within 3 use cases: (1) Certification, (2) Virtual Organizations and (3) Governance.

The “Certification Use Case” demonstrates how the alignment between business and IT during the certification process for regulations such as SOX, EuroSOX, ITIL®, CoBIT®, ISO20000 or BASEL II can be established.

The “Virtual Organization Use Case” demonstrates how virtual organizations can be supported using business context in the semantic description for SLAs.

The “Governances Use Case” demonstrates how intelligent agents are used to identify the business required IT infrastructure in distributed and complex data centre.

### **Work Performed in the second period**

Within the second period, plugIT has three major working lines: (1) the use demonstration, (2) the specification and research of the Next Generation Modelling Framework and (3) The tool implementation of the Next Generation Modelling Framework.

#### **The Use Case Demonstration**

The use case demonstration was the focus of plugIT within the last period. Based on the use case specification and the set of graphical models that describe the use case in detail the semantic supported IT-Socket had been realised in form of prototypes.

Domain relevant ontologies have been identified and combined with the graphical models at use case site. The results were use case specific domain ontologies in form of D5.3.2 in WP5.3 that act as common reference model for the corresponding IT-Socket.

A key challenge was to introduce the IT-Socket and the model-based approach at the use case site. At this stage a clear distinction was made of IT-Socket prototypes that use models as explicit knowledge and of the 2<sup>nd</sup> Prototype of the Next Generation Modelling Framework that enables the creation of model and provides the Semantic Modelling Kernel for distributed semantic processing.

In the iTG use case, existing business process modelling toolkits that are currently used by consultants, are the legacy applications that are extended by parts of the NGMF. HLRS identifies the Open Proposal Submission System (OPS) as the legacy application that is currently used by the academic clients of HLRS, which is extended by parts of the NGMF. CINECA identifies its CCMDB and the according tool family as the legacy applications that are extended by parts of the NGMF. The results are published as D5.4.

The integration within the legacy applications have been performed by extending the existing legacy applications with prototypes. In parallel, research and technology partners re-visited the implemented prototypes to adapt the prototypes according the concrete and complex environment of the use case partners. The realisation of research prototypes into a concrete demonstration setting as well as the integration of the Next Generation Modelling Framework into legacy applications at use case site was much more challenging than originally planned.

At the end of the reporting period, the IT-Socket prototypes were able to be realised on all three use case sites. The demonstration phase is performed in three cycles that introduces stepwise the complexity of the model-based IT-Socket. All use case partners are finalising their use case demonstration with a delay by 1 month and will publish D5.5.

#### Objective 1: The Next Generation Modelling Framework - The Specification and Research:

In objective 1, the Specification of the Next Generation Modelling Framework the domain specific graphical notation approach has been developed and published in D3.3. After a survey on relevant approaches the graphical notations of concepts have been divided in two aspects. First approach is, to convey additional meaning into the models, like the introduction of colour codes depending on the results of the semantic matching. The second approach is to provide an abstract view on the concepts, like the graphical representation of IT elements of the CCMDB and their – implicit – relations.

Prototypes for the graphical notations have been implemented and published on Open Models. In case of supporting modelling method engineering, the graphical notations of similar modelling concepts can be searched and the notation can be downloaded. In case supporting the application of modelling methods, the graphical notations can either (a) generate an abstract view on models that do not explicitly exist, but are the result of the semantic processing (e.g. in the abstraction scenario), as well as (b) change the graphical notation of existing models for additional meaning (e.g. by colour coding parts of the models).

This specification of the Next Generation Modelling Framework is currently assessed during the IT-Socket demonstration and will be re-visited in the last period for integrating the lessons learned during the demonstration.

#### Objective 2: The Next Generation Modelling Framework - The Tool Implementation

The implementation of the Next Generation Modelling Framework is divided in two development cycles, where the first cycle is performed in the first year and the second cycle is performed during the second project's period.

Within the second cycle the design D 4.1.2, the implementation and integration D 4.2.2 as well as the evaluation D4.3.2 has been performed. The second implementation cycles was based on the first NGMF prototype that provides the Web-Modelling Portal, the Service Oriented Modelling Framework including model services as well as model repositories.

Within the second cycle the focus was on the Semantic Modelling Kernel (SMK), which is a service orchestrator that orchestrates semantic services. Workflows of semantic services can be defined to arrange the sequence of semantic processing. The 2<sup>nd</sup> prototype of the NGMF provides this additional layer on top of the 1<sup>st</sup> NGMF prototype.

Two integration aspects have been considered, first the integration of the SMK into the NGMF and second the integration of the SMK into the legacy application of the use case sites. Beside the integration of the SMK some adaptations of the NGMF have been made, mainly driven from feedback from the use case.

The dissemination, exploitation, cooperation and standardisation work covered the participation of conferences – partly organised by plugIT members – with exhibition stands and scientific publications. One Summer School tutorial had been taught.

### **Main Results achieved within the second year**

#### The Use Case Demonstration

Domain ontologies for the use cases have been derived from the existing models and used to annotate the relevant use case models. The IT-Socket has been realised in form of prototypes at the use case sites and have been integrated via interfaces to the prototypes into the legacy applications. The demonstrations have successfully been performed.

#### Objective 1: The Next Generation Modelling Framework - The Specification and Research

The Next Generation Modelling Framework specification has been finished by specifying mechanisms for domain specific graphical notations within the NGMF. Prototypes have been implemented and published.

#### Objective 2: The Next Generation Modelling Framework - The Tool Implementation

The 2<sup>nd</sup> prototype of the Next Generation Modelling Framework has been implemented with focus of the Semantic Modelling Kernel. The 2<sup>nd</sup> prototype is published and integrated as a prototype at the use case sites.

### **Expected results to be achieved till the end of the project**

#### The Use Case Demonstration

For the remaining project period the IT-Socket demonstration of the IT-Socket at the use case site will be finalised and an evaluation phase will be performed. The finalisation of the demonstration will improve the current IT-Socket, by introducing more semantic services and hence raise the complexity and expressiveness of the semantic workflow. In the evaluation phase the use case partners express the usability of the IT-Socket approach.

#### Objective1: The Next Generation Modelling Framework-The Specification and Research

The specification of the Next Generation Modelling Framework will be re-visited and improve the specification documents, in order to integrate the lessons learned at the use case sites.

#### Objective2: The Next Generation Modelling Framework - The Tool Implementation

The 2<sup>nd</sup> prototype will be published in individual parts as well as a demonstration platform at the Open Models platform. The transfer to the use case partner site will accompanied by the development team.

### **Potential Impact**

plugIT uses the Open Model Initiative (OMI, [www.openmodels.at](http://www.openmodels.at)) as joint exploitation platform. OMI applies the open source community concepts for models. Hence plugIT exploits results from the use case demonstration – the IT-Socket demonstration – as a so-called “Modelling Method: Application project” and publishes the selected approach, the used modelling languages and the used modelling tools. This addresses the business and IT alignment community, as they can exchange approaches, modelling methods and tools in a similar way like software is exchanged in open source community.

The results the Specification of the Next Generation Modelling Framework are shared by a so-called “Modelling Method: Engineering project” that is called Open Knowledge Models (OKM). The plugIT approach of using graphical models for interacting with ontologies is shared with the OKM communities. The results of the implementation of the Next Generation Modelling Framework are provided within OMI. Parts of these mechanisms are open source, parts are open use and parts are under specific licensing models.

#### **Homepage:**

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