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I-ESA'08 Paper Summary

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Introduction

The following is a short summary of the papers presented at the I-ESA'08 Conference, held in Berlin, 2008-03-26/28. The content of all papers available in electronic form is described in an abstract type format listing only the first (and second) author. The papers are grouped according to their main subject following partly the grouping of the conference sessions and proceedings. Papers in the groups are arranged in alphabetic order of the authors. Conference session and paper number are indicated by (xn-m) at the end of the paper summary.

Business Impact of Interoperability

R. Goncalves et al, present an analysis of the current Portuguese practices relating to European eGovernment. Starting with examples of International efforts on ICT integration and the expected evolution of proprietary, National and International standards, the paper describes the three most important Portuguese initiatives: enterprise's portal, citizen's portal and citizen's card. A frame work for common services and a model-driven interoperability frame work based on ATHENA developments will be the base for further initiatives(a1-2).

S. Izza et al, discuss the concept of agility of information systems, provide an approach to measure agility and study the role of interoperability in achieving agility. It evaluates the agility combining the agility measure of five complementary aspects: Process, Organizational, Informational, Resource and Environmental(a1-1).

H. Weigand, explores how the strategic value modeling approach c3-value can be of help in the decision making process in an IT outsourcing evaluation. The outsourcing process is described(b6-3).

Frameworks and Architectures for Interoperability

N. Chungoora, R. Young, discuss the possible configuration of frameworks to capture semantically enriched manufacturing knowledge for manufacturing interoperability. Feature oriented ontology-driven semantic frameworks, based on explicit definitions of manufacturing terminology and knowledge relationships, offer an attractive approach to solving manufacturing interoperability issues(c2-2).

A. De Nicola et al, propose an ontological framework supporting ALS (autonomic logistics services) and the dynamic composition of its ad-hoc maintenance programs. In particular the authors propose BPAL (Business Process Abstract Language) as the formal ontological foundation, derived from the BPMN proposed by the OMG(b7-1).

M. Heather et al, discuss the logical foundations for the infrastructure of the information market and propose an architecture for achieving interoperability using categorical higher order logic while meeting Gödel's requirements for soundness, completeness and effectiveness(a3-2).

K. Mertins et al, give an overview about SME situation regarding enterprise interoperability and related research activities. A network systems framework and integrated methodological and software service solutions will be introduced for tackling SME challenges for cooperation establishment and operations starting and ending from a business perspective. An extended MO²GO software based process assistant will be explained in more detail(b5-1).

N. Protogeros et al, present the European project FUSE approach, which provides a methodology and a framework for support of services unified process to be used both by the IT industry and by individuals with little or no IT-experience, such as specific domain experts, end users, testers and community members. The FUSE Framework is based on and makes use of the Unified Process OPEN, extended participatory design (PD) and similar methodologies(b1-2).

W. Qingqing et al, propose a data exchange framework for data exchange in distributed and heterogeneous systems constructed on the architecture of Web services, in which a data provider deploys Web services for data exchange, publishes description of service function and exchange data on a register centre. Data requesters search for web services on the register centre according to their requirements on function and data. A prototype system is implemented to verify the proposed framework and matching mechanism(a5-1).

M. Rabe, P. Gocev, propose a semantic Web framework for rule-based generation of knowledge and simulation for cooperation and interoperability within product design and manufacturing engineering projects. Data and knowledge within the manufacturing domain are modelled within ontologies applying rule-based mapping. The framework facilitates the generation of new knowledge through rule based inference that enriches the ontology(c2-1).

S. Radeschütz et al, introduce a framework that offers various alternatives for matching process data and operational data to obtain a consolidated data description. The concept of deep business analysis is introduced to allow profound analysis and optimization of relevant data(c6-1).

T. Scheibler, F. Leymann, introduce a framework that provides configuration capabilities for EAI (executable enterprise application integration) patterns. The framework also allows to generate executable integration code from EAI patterns using a model-driven architecture approach. A tool providing this framework is presented(a6-1).

J. Ullberg et al, present a service interoperability framework implemented as an extended influence diagram describing a theory of enterprise service interoperability. The theory is augmented with a meta-model containing the information needed to perform an analysis of interoperability. A fictional example is provided to illustrate the employment of the meta-model and the theory in the context of IT decision making(a3-1).

I. Zinniku et als, describe a solution which supports rapid prototyping by combining a model-driven framework for cross-organisational business processes with an agent-based approach for flexible process execution and demonstrate how the W3C recommendation for semantic Web

service descriptions can be combined with the model-driven approach for rapid service integration(a4-1).

Service Oriented Architectures for Interoperability

L. Bastida et al, analyse the organisational and technological challenges an organisation adopting service-oriented architectures (SOA) faces and propose a set of best practices that will enable an organisation to efficiently adopt SOA. Discussing myths about COA like easy integration of legacy systems and others, the four pillars of SOA (maturity, technology, governance and change management) and implications of adopting SOA are presented(b1-3).

M. Hiel et al, introduce an extension to the Service Oriented Architecture, called Adaptive Service Oriented Architecture (ASOA), leveraging it with concepts and mechanisms from Autonomic Computing and Agent Technology. The constituents and implications of an ASOA are illustrated with an prototypical architecture which deals with interoperability issues(b1-1).

C. Schroth, discusses a service-oriented reference architecture for business media that overcome the drawbacks of today's B2B software products and services. Based on the IEEE Recommended Practice for Architectural Description (IEEE 1471-2000) in combination with Schmid's Media Reference Model, this reference architecture provides four main views: community (structural organization), process (process-oriented organization), services and infrastructure(c1-1).

C. Schroth, presents a reference architecture for service-oriented business media which allow the different involved stakeholders to organize and implement cross-company collaboration as efficiently as possible. Applying this reference architecture to the case of public administration, demonstrates that "Lean" service consumption and provision between organizations can be realized and the seven major categories of "waste" (defects, overproduction, excessive inventory, transportation, waiting, motion, over-processing) are reduced(a2-3).

Approaches and Solutions for Model Driven Architectures

R. Grangel et al, present a proposal for goal-oriented enterprise knowledge modelling based on UML profiles, which is focused on representing enterprise knowledge. It is developed at the CIM level and presents different models to capture software requirements of a knowledge management system. In particular, the meta-model concerning goal dimension and the derived and implemented UML profiles are shown. The resulting goal diagram is explained by means of an example. This work aims on linking enterprise modelling and systems development(a4-3).

Z. Panxiang et al, describe a B/S MIS's UI (user interface) framework based on model-driven runtime (MDR) and introduce the modelling process of the UI requirement analysis model in the requirement analysis stage, including the task model and domain model showing how BSMDR (business service model driven runtime) transform such models into platform independent models, including Object Model, Layout Model, Content Model, Presentation Model, Interaction Model and Mapping Model. Finally, the authors focus on the design and implementation of the BSMDR Framework and demonstrate their approach with an example(a4-2).

Enterprise Modelling for Interoperability

R. Anderl et al, introduce an object oriented approach for a process modeling language. Using UML as a starting point an object oriented process modeling method is differentiated. The basic concepts which are needed for process modeling are put into an object oriented context and are explained. The paper also deals with the most important methods behind object oriented process modeling and gives an outlook about this approach(b5-3).

Approaches for Cross Organizational Processes

E. Folmer, J. Bastiaans, compare several methods that can be used for design of semantic message-based B2B interaction standards thereby supporting the search of adequate methods for design of B2B standards(c6-2).

S. Koussouris et al, present generic models of the most common e-business transactions carried out mainly by small and medium enterprises. These models are constructed using state-of-the art notations and methodologies, which facilitate the application-to-application interconnection and the automated business document exchange between enterprises, governmental and banking institutions, covering not only national or sector specific business domain transactions but also cross-border and cross-sector processes(c5-2).

J. Touzi et al, describe a prototype to support morphism between a BPMN collaborative process model and a collaborative SOA architecture model. The authors propose the design of a collaborative SOA architecture according to MDA (model-Driven Approach) principles, using the business model (the needs) to design a logical model of a solution (logical architecture). The business model is a collaborative business model (BPMN, at the CIM level), while the logical model is a collaborative architecture model (UML, at the PIM level). This paper presents the theoretical aspects of this subject, the mechanisms of morphism and the dedicated translation rules. A prototype of a demonstration tool embedding the transformation rules and running those principles is described(c5-1).

S. Truptil et al, present the first results of a French project on IT system interoperability in emergency situation: a meta-model of crisis situation and its ontological links with collaborative process design, and also the treatment of a first case of study, a NRBC (Nuclear Radiological Bacteriological Chemical) exercise(b7-2).

Design and Execution of interoperable Services

T. Dirgahayu et al, present a design concept called abstract interaction for designing interaction behaviour of service compositions and demonstrate in an example the suitability of the concept for designing interaction behaviour at high abstraction levels by comparing it to BPMN interaction concept(b2-3).

S. De Labey, E. Steegmans, show that interoperability in Java applications can be achieved without compromising transparency by deferring interoperability provisioning to a pre-compiler allowing programmers to focus on the implementation of the business logic without being distracted by heterogeneity issues occurring in the service architecture in which their application will eventually be deployed(b2-1).

Y. Shiyang et al, present a preference-based service level matchmaking concept for composite services. The model is particularly efficient for multi-QoS by using utility function and suitable for price-sensitivity situation by introducing an acceptable price and propose a preference-based service level matchmaking model and algorithm. Experimental results indicate effective matching of a service level conforming to consumer preference(b3-1).

M. Tong et al, analyse the state of the art of service models in and look at several key aspects of such models in details, e.g., roles, interactive behaviours, value and risk, etc. A new service behaviour model for co-production features of services named “Service-Provider-Customer (SPC)” is presented, including its graphical representations and attribute-based semantics descriptions as well as its validation through a case study in ocean logistics(b2-2).

Semantic Services

S. Izza, L. Vincent, present a service similarity approach for service matching in the context of ODSOI (Ontology-Driven Service-Oriented Integration) project that concerns the intra-enterprise integration issues in the field of manufacturing industry. The approach is based on an extension of

OWL-S service similarity. It proposes a rigorous quantitative ranking method based on some novel semantic similarity degrees. An implementation of this ranking method is provided in the form of a prototype coded on a Java platform(c7-1).

T. Kul et al, propose a novel event pattern based on a semantics operator for complex event processing pattern-oriented application to process RFID data. A formalized event hierarchy is used to model complex events together with an event ontology and abstract hierarchical views allowing to view the system activities at different levels. Several complex event patterns are proposed based on semantic event operators(b7-3).

K. Popplewell et al, outline the approach to be followed in the European research project SYNERGY, which envisages the delivery of Collaboration Knowledge services through interoperability service utilities (ISUs): trusted third parties offering web-based, pay-on-use services. The approach aims to (a) provide semantic ontology-based modelling of knowledge structures on collaborative working; (b) develop a service-oriented self-adaptive solution for knowledge-based collaboration services; and (c) facilitate the testing and evaluation of the efficiency and effectiveness of the solution in concrete case studies(c7-3).

Interoperability in Engineering

R. Anderl et al, aim to advance knowledge integration in product development, to support successful communication and cooperation in collaboration efforts and to tackle the new challenges in global engineering(c6-3).

A. Errasti, R. Poler, explore a methodology to support the redesign of internal and external operational integrated processes, applying the GRAI meta model and the design principles for interoperability, in order to improve the overall performance of an engineer to order supply chain. This research also includes a case study in the producer goods sector from an original equipment manufacturer (OEM) point of view(b5-2).

P. Mihók et al, summarize how trust and security can be considered in collaborative environments. Partial results of the field studies of two European IST projects, FLUID-WIN and SEAMLESS, are presented. Identity management problems and trusted operational scenarios are treated(b4-4).

R. Moksony, A. Giuliano, promote enterprise interoperability B2(B2B) platforms - developed in the European FLUID-WIN project - within the manufacturing sector for SMEs that are interested in cross-border business interactions. Focus is on the integration of different domains along the supply chain integrating both logistic service providers and financial service providers into the supply chain network(b4-1).

H. Weinaug, M. Rabe, The FLUID-WIN project is developing and using new business process models and methods for web support of a multi-disciplinary B2(B2B) network as base for the related tool developments for the smooth integration of logistic and financial services into a B2B manufacturing network(b4-2).

M. Zanet, S. Sinatti, follow an approach for platform design that introduces a new level of business, that has been called B2(B2B). The paper describes briefly the FLUID-WIN project that targets this new approach, and sketches the platform components to be developed in order to integrate the activities between significantly different business entities(b4-3).

Interoperability in Product Design and manufacturing Engineering

N. Lanshun et al, propose a novel iterative multi-attribute auction mechanism for reverse auction settings with one buyer and many sellers based on competitive equilibrium. The auctions support incremental preference elicitation and revelation for both the buyer and the sellers. Experimental results show that the co-evolutionary computation based iterative multi-attribute auction is a practical and nearly efficient mechanism. Mechanism and framework can be realized as a multi-

agent based software system to support supplier selection decision and/or deal decision for both the buyer and the suppliers in B2B markets and supply chain(c3-3).

L. Shu et al, propose a new service engineering methodology named SMDA, to assist service providers to build better service system, which has as a part, the Service Quality Function Deployment (SQFD) to consider quality aspects of a service system. SQFD focuses on designing, evaluating and optimising service quality in the lifecycle of services. The three phases of SQFD, i.e., build-time QFD-oriented service quality design, run-time service performance evaluation and service performance optimization, are illustrated in this paper(c3-2).

Methods and Application for Semantic Mediation

D. Beneventano et al, developed a unified description of data models for ontology-driven semantic mapping, which is called the Logical Data Model (LDM) Ontology to support semantic mapping. LDM is a superset of the relational, hierarchical, network, object-oriented data models, which is represented as a graph consisting of nodes with labelled edges(a5-2).

M. Jankovic et al, presents an approach in IV&I (Inventory Visibility and Interoperability) business application development, which is based on business processes and user requirements represented in a form of an enterprise model. This approach is beneficial in supporting cross-enterprise business application integration when used in conjunction with semantic mediation tools(b6-2).

A. Smirnov et al, propose an approach to creation of self-organising service networks to support semantic interoperability between virtual enterprise members. Since the centralized control is not always possible, the approach proposes decentralized communication and ad-hoc decision making based on the current situation state and its possible future development. It proposes usage of self-organising networks of knowledge sources and problem solvers. The paper is devoted to questions of semantic interoperability in a kind of agent-based service networks and virtual enterprises. Ontologies are used for description of knowledge domains(a5-3).

Methods and Tools

G. Gautier et al, compare the organisation and the human perspectives on collaboration in order to identify the barriers to its implementation. In particular, it focuses on issues related to the life cycles, organisation structure, information flow and human motivation. It also introduces the case of virtual organisations and their difficulty to generate efficient collaboration(c1-3).

J-P. Pesola et al, describe a configurable tool integration solution (the Merlin ToolChain) that integrates project management, requirements management, configuration management and testing tools. Experiences from real life industrial case demonstrate the usefulness in collaborative software development and validation(a6-2).

V. Rajsiri et al, present a knowledge-based methodology for collaborative process definition dedicated to automate the specification of virtual organization collaborative processes. The approach takes as input, knowledge about collaboration from a collaborative platform (6napse developed by EBM WebSourcing), and produces as output a BPMN (Business Process Modeling Notation) compliant process. The knowledge instantiates an ontology contributing to the collaborative process definition. The ontology consists of (i) collaboration attributes, (ii) description of participants and (iii) collaborative processes inspired from the enterprise Process Handbook (MIT) and is described in some details(c3-1).

A. Välimäki, J. Kääriäinen, describes in a case study the process of mining distributed Scrum organizational patterns (Scrum is an agile project management method). The experiences and improvement ideas of distributed Scrum have been collected from a global company operating in the automation industry(c1-2).

Case Studies in Healthcare and Lifecycle Management

R-M. Åhlfeldt, E. Söderström, examined healthcare and its information security problems and needs in the three Scandinavian countries: Norway, Sweden and Finland. Data were collected via case studies, and the results were compared to show both similarities and differences between Norway and Finland vs. Sweden. Similarities include the too wide availability of patient information, an obvious need for risk analysis, and a tendency to focus more on patient safety than on patient privacy(a7-2).

G. Benguria, I. Santos, present a strategy for becoming and staying interoperable in SME environments. This strategy consists of three pillars: an improvement cycle to guide the establishment and the maintenance of the interoperable status; an interoperability maturity model as a repository of good practices for being interoperable; an assessment method to be able to measure the level of interoperability and being able to establish feasible goals. A preliminary case study shows first results(a7-1).

J. Kääriäinen, A. Välimäki, studied the concept of Application Lifecycle Management (ALM) and gathered first experiences with a company moving towards distributed application lifecycle management. The results show that several benefits were gained when introducing an ALM solution in the case company(a7-3).