Advanced Information Systems Engineering

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If it is true that a scientific event inevitably bears the quality mark of its contributors and of its organizers, it is the same true that we owe to the editors the conception of the Proceedings so that to highly and inspiredly reflect the structure of the event. When assuming an editing task of such importance as that presupposed by the Volume *"Advanced Information Systems Engineering ", which makes the Proceedings of the 11th International Conference CaiSE '99 (Heidelberg, Germany),* one should have been fully involved in the event organisation and fully aware of its large spectrum. As it is the case of the Editors- Matthias Jarke –Program Chair, and Andreas Oberweis –Organizing Chair, who embarked upon the difficult mission of placing the event on its scale of importance and of singling out its core subject from the topics of many previous editions of the Conference. They followed a clear–cut idea-that of grouping the full papers presented at the Conference according to their immediate or distant connection to the main subject, i.e. component-based information systems.

9 Chapters, each subsuming three regular papers, refer the domains: *Components, IS Management, Method Engineering, Data Warehouses., Process Modelling, CORBA Distributed IS, Workflow, Heterogeneous Databases, IS Dynamics.* There follows twelve Short Papers and Author Index.

The main corpus of the Proceedings was trimmed with a Preface, a four-page exposition of the principal names related with the Conference Organization: Advisory Council, Program Committee, with Additional Referees, Organizing Committee, Supporting and Sponsoring Organizations and with mentioning the CaiSE'99 tutorials and the CaiSE'99 Pre-conference Workshops.

The **Preface,** which starts with an outline of the CaiSE series since its inauguration in the late 1980's, follows with the definition of the special theme of the 1999 Conference – *Component – based information systems engineering* , a theme largely debatable but less tractable, with praise words about the venue of the Conference-Heidelberg, and thankful words addressed to those who technically assisted the Conference .

Our presentation of the contributions to the Conference is a selective one.

I. Jacobsen in the invited talk **"The Unified Process for Component-Based Development",** emphasizes that a better development process is the key of the software future. The proven Unified Process, originally developed by Ivar Jacobsen, now incorporating the work of Booch, Rumbaugh, Kruchen, Royce and other people inside Rational Software Inc., answers this long felt need. Component and object based, the Unified Process enables reuse; use-case driven, it closes the gap between what an user needs and what the developer offers, architecture centric, it guides the development process and by an iterative and incremental approach it manages risk.

"From Business Process Model to Application System-Developing an Information System with the House of Business Engineering (HOBE)" is the second invited talk contributed by A.W. Scheer and K. Hoffmann, which shows a concept for describing and implementing business processes and a software development project. This approach is compatible with new organizational concepts (e.g. virtual enterprise, profit centers), e-commerce and supply chain management.

A brief description of the Regular Papers included follows.

"CPAM, A Protocol for Software Composition", by L.Melloul, D.Beringer, M. Sample and G. Wiederbold, presents a solution for composition of megamodules in large- scale applications. This high-level protocol supports heterogeneity and preserves megamodules autonomy. It enables efficient composition of large-scale services by optimizing the

invocation sequence and minimizing data flow between megamodules.

F. Matthes, H. Wegner and P. Hupe in their paper titled: **"A Process -oriented Approach to Software Component Definition"**, argue that a process-oriented view on cooperating software components based on the concepts and terminology of language/action perspective on cooperative work, provides a more suitable foundation for analysis, design and implementation of software components in business applications. The conceptual basis is illustrated by three Case Studies, supported by a set of dedicated tools for process-oriented development.

"Configuring Business Objects from Legacy Systems", by W. J. van den Heuvel, M. Papazoglou and M. Jeusfeld, proposes a methodology (BALLES), that allows to blend modern business object and processes with objectified legacy data and functionality in order to construct flexible, configurable applications, that are able to respond to business changes in a pro-active way.

"Risk Management for IT in the Large", by D. Verhoef and M. Franckson, presents a systematic approach to managing risks within the acquisition of services and information systems based on situational factors evaluation. Strategy options are offered to mitigate risks in large, complex and uncertain IT undertakings, to plan a sequence of decision points for acquisitions, to attack the root causes of risks. This approach has been elaborated on the basis of the results of the EUROMETHOD project.

"Linking Business Modeling to Socio-technical System Design", by A. G. Sutcliffe and S. Minocha, describes a method for analysing dependencies between computer systems and users/stakeholders in the operational environment. A method is proposed to define business organisational relationships, according to the coupling between agents determined by types of event flow and by operationalising transaction cost theory to obtain an a priori view of the market context for client and supplier.

"Towards Flexible and High-Level Modelling and Enacting of Processes", by G. Joeris and O. Herzog, proposes an object-oriented approach to modelling and enacting of heterogeneous processes that deals with the challenging requirements of flexibility, reuse, distribution and provision of a process modelling language at a high level of abstraction. The encapsulation of a workflow definition by the tasks interface, the definition of different behaviour classes, and the definition of user -adaptable control flow types characterize the modelling formalism and enhance reusability.

"Method Enhancement by Scenario Based Techniques", by J. Ralyté, C. Rolland and V. Plihon, proposes a set of operators to support the integration of scenario-based techniques into existing methods. This set includes two sub-sets: the one dealing with the integration of the product models into two initial methods and the one concerned with the integration of their process models. The motivation for such an approach is that scenarios have proven useful to elicit , validate and document requirements but cannot be used in isolation.

In **"Support for the Process Engineer : The Spearmint Approach to Software Process Definition and Process Guidance"**, U. Becker-Kornstaedt et al, report the development and application of the software process modelling environment SPEARMINT, which specially focusses on helping in the creation of process models and on their dissemination using Intranet technology. It supports Process Engineers during elicitation, editing, review and analysis of process models by providing navigation and abstraction support. Positive feedback from the users encourages the authors to further enhance and to improve this technology.

"Managing Componentware Development - Software Reuse and the V-Modell Process", by D. Ansorge et al, proposes changes and extensions of V-Modell (the German Standard process model for information systems development in the public services) for component-oriented development, mainly by introducing new roles and new activities, by evolving a new sub-model concentrating on reuse and by switching to a pattern-based process definition instead of a flow-based one.

"Modelling Multidimensional Data in a Dataflow-Based Visual Data Analysis Environment", by F. Wietek, presents a dataflow-based visual programming environment for multidimensional data analysis (VIOLA). Providing a foundation of basic operations, data processing, navigation and user interaction, an appropriate data model (MADEIRA) is developed. Epidemiological studies (i.e. investigations of aggregate data on population, their state of health, and potential risk factors) serve as a typical application area.

"Towards Quality-Oriented Data Warehouse Usage and Evolution", by P. Vassiliadis, M. Bouzeghoub and C. Quix, proposes an architectural framework and a repository of metodata which describe all the data warehouse components to which is added a quality model (quality dimensions and quality factors). Additionally, there is provided an operational complement: how to use quality factors and to achieve user quality goals.

In **"Designing the Global Data Warehouse with SPJ View"**, D. Theodoratos, S. Ligoudistianos and T. Sellis provide a generic method for designing a global DW which detects and exploits common subexpressions between the queries and guarantees the existence of a complete rewriting of the queries over the selected views.

"A Multivariant Approach to Software Process Modelling", by W. Hesse and J. Noack , presents a new approach to software process modelling for a large banking organisation based on a two-level framework: a base level defining all the raw-materials (e.g. activities, techniques, results and roles), and a composition level combining the given material to process variant.

In their paper titled: **"An Ontological Analysis of Integrated Process Modelling"**, P. Green and M. Rosemann propose and use the BWW representation model to analyse the four views (process, data, function and organisation) provided in ARIS, popularised by Scheer; it attempts to provide a theoretical basis for the improvement of information systems modelling techniques.

In **"Design of Object Caching in a CORBA OTM System"**, T. Sandholm, S. Tai, D. Slama and E. Walshe address large-scale Object Transaction Monitor (OTM)-based systems, and focus on the quality factors of system performance, scalability and reliability. The authors propose an object caching strategy that employs OTM concepts and show how this strategy improves an existing distributed CORBA system.

"Constructing IDL Views on Relational Databases", by K. Jungfer, U. Leser and P. Rodriguez-Tomé, presents a method for the semi-automatic generation of CORBA wrappers for relational databases and a declarative language to describe the mapping between relations and IDL constructs.

"A Multilevel Secure Workflow Management System", by M. H. Kang et al, proposes a solution for the Department of Defense needs, to enable globally distributed users and applications to co-operate across classification levels to achieve securely mission critical goals.

"Time Constraints in Workflow Systems", by J. Eder, E. Panagos and M. Rabinovich, presents a framework for computing activity deadlines so that overall process deadline is met and all external time constraints are satisfied.

In their paper titled: **"TOGA -A Customizable Service for Data-Centric Collaboration"**, J. Sellentin, A. Frank and B. Mitschang introduce the TOGA service (Transaction-oriented Group and Coordination Service for Data -Centric Applications), which offers group management facilities and a push model for change propagation w.r.t. shared data, thus allowing for group awareness. Through TOGA's customizability and its layered architecture the service can be adapted to a variety of different collaboration scenarios. Multiple communications protocols (CORBA, UDP/IP, TCP/IP) are supported as well as basic transaction properties.

"A Practical Approach to Access Heterogeneous and Distributed Databases", by F. de Ferreira Rezende et al, presents a database access interface which allows users to formulate SQL 2 queries in a homogeneous way against a federation of heterogeneous databases. Further the users can navigate through the database complex and compare, join and relate information via a single graphic interface.

"A Uniform Approach to Inter-model Transformations", by P. Mc Brien and A. Poulovassilis, presents a method for specifying semantic data models in terms of the constructs of a low-level hypergraph data model (HDM). Such definitions can be used to automatically derive schema transformation operators for the higher-level data models, to perform inter-model transformations and to define inter-model links.

"OTHY: Object To HYpermedia", by F. Barbeau and J. Martinez, presents a web-based universal browser for heterogeneous and non-federated databases. The proposed tool directly supports the conception, the navigation and the presentation phases without requiring any modification of the databases.

In their paper titled: **"Modeling Dynamic Domains with ConGolog"**, Y. Lespérance et al, describe the process specification language

ConGolog and show how it can be used to model business processes for requirements analysis. The ConGolog framework is an attempt to develop a middle ground between state-oriented and predicate-oriented models of dynamic domains.

"Towards an Object Petri Nets Model for Specifying and Validating Distributed Information Systems", by M. Aoumeur and G. Saake, presents first results towards a tailored conceptual model for advanced distributed information systems regarded as open reactive and distributed systems with large databases and application programs. The proposed model is based on a complete integration of object - oriented concept with some constructions from semantical data modelling into an appropriate variant of algebraic Petri Nets (ECATNets).

"Relationship Reification: A Temporal View", by A. Olivé, is a well-known schema transformation in conceptual modelling of information system. The author identifies three temporal reifications of relationships in temporal conceptual models and extends current reification theory in conceptual modelling of IS.

The **Short Papers** deal with the following general topics: Workflow Management, Resource Management , IS and Business Processes Modelling, Database Design and Maintenance.

The book addresses to researchers and professionals from universities, research, industry and public administration, interested in the field of Advanced Information Systems Engineering. The approaches , methods and solutions offered are highly topical and illustrate the synergy of new organisational and business process reengineering concepts (e.g. virtual enterprises, profit centers, mobile enterprises, changing competitive rules, ability step-level change) with advanced information and communication technologies (e.g. new computing architectures, advanced DBMS capabilities, web-based applications).

This Volume makes a successful addition to the valuable *Lecture Notes in Computer Science* series, by now rich in titles, of the well-reputed Springer. The series is remarkable in both contents and graphical presentation, with its grey cover bordered with red, which reader always finds pleasant and easy to remember.

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