CIAO!

Enterprise Engineering Network (CEEN)

6th Enterprise Engineering Working Conference (EEWC 2016)

Program Guide

Funchal – Madeira - Portugal
May 30 to June 3, 2016

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Keynote Speaker

What's in a Service?: An Ontological Perspective

Giancarlo Guizzardi - Ontology and Conceptual Modeling Research Group (NEMO), Federal University of Espírito Santo (UFES), Brazil.

Brief bio: Giancarlo Guizzardi has a PhD (with the highest distinction) from the University of Twente, The Netherlands. He currently leads the Ontology and Conceptual Modeling Research Group (NEMO) in Brazil and is an Associate Researcher to the Laboratory of Applied Ontology (LOA), in Trento, Italy. Two well-known results of his laboratory are: the ontologically well- founded version of UML termed OntoUML, which has been adopted by many research, industrial and government institutions worldwide; and the foundational ontology UFO (Unified Foundational Ontology), which has influenced international standardization activities in areas such as Software Engineering and Enterprise Architecture (e.g., the Archimate Standard). He has been active for two decades in the areas of Ontologies, Conceptual Modeling and Enterprise Semantics. Over the years, he has conducted many technology transfer projects in large organizations in sectors such as Telecommunications, Software Engineering, Digital Advertisement, Product Recommendation, Digital Journalism, Complex Media Management, Energy, among others. Moreover, he has authored 182 peer-reviewed publications in the aforementioned areas, which have received more than 10 paper awards. He has also been invited to be a keynote speaker in a number of international scientific events (e.g., ER, BPM, I3CK). Furthermore, he is currently the general chair of the International Conference on Formal Ontology in Information Systems (FOIS 2016) and is an associate editor of the Applied Ontology journal. Finally, he has also been elected twice as an Executive Council member of the International Association for Ontologies and Applications (IAOA) and is currently a member of the Advisory Board of the same association.

Abstract: The concept of "service" has been characterized in different disciplines and by different authors from various points of view. This variety of characterizations has emerged because although this notion seems intuitive, it is far from trivial, with many interrelated perspectives. Given their importance in Enterprise Computing and Service Science in general, we believe that a clear account of services and service-related concepts is necessary and would serve as a basis for communication, consensus and alignment among approaches and perspectives. In this talk, I will discuss a commitment-based account of the notion of service captured in a core reference ontology called UFO-S. This ontology addresses the commitments established between service providers and customers, and account for how such commitments affect the service lifecycle. I will also demonstrate how UFO-S can serve to harmonize different notions in the literature. Finally, I will discuss how this ontology has been used in the design of an Ontology-Based Pattern Language for the Service Domain (S-OPL).

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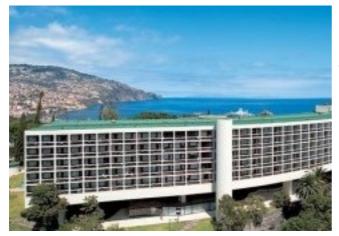|	
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Program

Time	Mon May 30	Tue May 31	Wed Jun 1	Thu Jun 2	Fri Jun 3
08h00 / 08h15	Coffee & DC Registration		Coffee	Coffee	Coffee
08h30 / 08h45	DC Session 1: Mark Mulder "Cross Channel Communication Design Research proposal"	Coffee & Registration	Paper Session 3	Workshop by the Enterprise Engineering Institute: Connecting EE research to EE value in practice	CEEN Research Discussion Session
09h00 / 09h15		Conference Opening Session			
09h30 / 09h45	DC Session 2: Alexey I. Sergeev "Enterprise Operating System"	Keynote Speaker			
10h00 / 10h15					
10h30 / 10h45	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
11h00 / 11h15	DC Session 3: Katia Coelho "Towards an account for dealing with documents in DEMO Method"	Paper Session 1	Paper Session 4	CEEN Research Discussion Session	CEEN Research Discussion Session
11h30 / 11h45					
12h00 / 12h15	DC Session 4: Tatiana Poletaeva "From the Essence of an Enterprise towards Enterprise Supporting Information Systems"		General discussion and working session		
12h30 / 12h45					
13h00 – 13h45	Lunch break	Lunch break	Lunch break	Lunch break	Lunch break
14h00 / 14h15	DC Session 5: Duarte Gouveia "Core Component of Communication"	Paper Session 2	Paper Session 5	CEEN Research Discussion Session	CEEN Research Discussion Session
14h30 / 14h45 / 15h00					
15h15 / 15h30	Coffee break	Coffee break	Coffee break		
15h45	DC Session 6: Tetsuya Suga "Theory of Algebraic Foundation for Manipulation of DEMO Models"	General discussion and working session	General discussion and working session	Coffee break	Farewell
16h00 / 16h15 / 16h30					
16h45		Break	Conference Closing Session	CEEN Board Meeting (16h30-18h30)	
17h00 / 17h15	Break				
17h30 / 17h45	EEWC Welcome Cocktail	Social Program: Bus tour (75 min) stopping at "Cabo Girão", "Véu da Noiva" in north coast, and at "Porto Moniz" for the second conference dinner (at 7 pm)	Break		
18h00 / 18h15	Social Program: Bus tour to"Pico dos Barcelos" and "Eira do Serrado" (50 min). Walk to sightseeing spot (40 min) over "Curral das Freiras" valey. Dinner at "Eira do Serrado" Lodge (at 7.30 pm).		Social Program: Dolphin and whale watching tour from 6 pm to 9.30 pm (no dinner or meal service included, but bar with drinks/snacks available on the boat)		
18h30 / 18h45				Break	
19h00 / 19h15					
19h30 / 19h45				CEEN VIP Dinner (CEEN Board members only) - 19h30	
20h00 – 21h00					

Practical Information

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Conference Location

Casino Pestana Park Hotel *****

Rua Imperatriz D. Amélia – Funchal

Tel: +351 291 209 100

5-10 minute walk to Funchal Town Center

1 minutes by bus in the Mobi Green Line 1, 2 or 4 (high frequency)
On-board ticket 1,95€

Wireless connection

Free wi-fi connection.
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Doctoral Consortium

- *Cross Channel Communication Design*
  Mark Mulder
  Abstract:

Nowadays, companies communicate with their customers using multiple channels. For new channels a new department and application is created, often resulting in a silo organisation and application landscape. Therefore, reorganising the organisation is needed as frequent as channels change. The Cross Channel Communication Design (C3D) as suggested in this research proposal, is a design that supports communication through multiple digital bi-directional channels. This design builds on the communication of the transaction concept of the Performance in Social Interaction theory (-theory). The design supports the carrying out of communication transactions by means of a protocol, which comprises the complete transaction pattern, that is put between users and (legacy) applications. The research has progressed and the first literature review paper has been published. Currently the research can go for Design Research, Action Research and/or Case Study options each with their own advantages and issues.

- *Enterprise Operating System*
  Alexey Sergeev
  Abstract:

In this paper, we introduce the term "enterprise operating system" as the essential component of enterprise which supports its viability. We further explain its notion, and investigate its relevance for the enterprise. We consider enterprise to be a viable system, therefore, enterprise operating system should correspond with the viable system model. We also explore concept of distributed systems to compare them to the enterprise.

- *Towards an account for dealing with document act in DEMO Method*
  Kátia Coelho
  Abstract:

This paper introduces an on-going research that seeks some sort of combination between the Organizational Engineering (OE) approach and the Theory of Document Acts (D-Acts). The motivation for such research is the possibility of improvements in DEMO Method from the application of some tenets formulated in Document Acts Theory and D-Act ontology. Even though DEMO is already consolidating method, we believe that the benefit to deal with documents, especially document that register rights and obligations. In order to reach our goals, we present a brief background about DEMO Method, Document Act Theory and d-act ontology. Finally, we present our Methodological proposal wherein we introduce the scenario of the model application and in next we introduce the steps of model development. We advocate that our proposal has been fruitful, once to implement document act in DEMO Method is a gap still open.

- *From the Essence of an Enterprise towards Enterprise – Supporting Information Systems*
  Tanja Poletaeva
  Abstract:

Our research aims at developing a method to link collaborative enterprises with their supporting information systems. The proposed method is founded on the ontology-based enterprise conceptual modeling, the subsequent transformation of enterprise ontology conceptual patterns into factual knowledge of (artificial) cognitive agents, as well as the use of this knowledge on execution of action rules assigned to agents. The discussed ontology conceptual patterns allow better link the metadata of both the production and the intersubjective world of an enterprise and, consequently, to provide support to cognitive agents in their perception of observed situations. Better "understanding" of situations contributes to more accurate run-time execution of agent's action rules supporting business transactions. The proposed method is demonstrated and discussed in application to a fictitious but realistic case study from the pizza production domain

- *Core Component of Communication*
  Duarte Gouveia
  Abstract:

This work aims at contributing to the design of an Information System (IS) that adequately support human interactions in organizations in an message-based asynchronous network. We move forward based on previous work [1], presented at the CIAO! 2015 Doctoral Consortium, where two protocols were given for DEMO Engines: PSI and Tell&Agree. In this work, we propose a unification of these two protocols based on the development of a Core Component of Communication. This component can be used to create state machines for complex communication ensembles, like PSI and Tell&Agree (which are used in its validation), but is generic enough to a broader range of application. The Core Component of Communication establishes that each interaction between parts starts with an Initial State, and can successfully end, either in a Quit State or one of the available Answer State(s). Although the Core Component is unique, it can have several possible configurations obtained by joining several Quit/Answer States in unique terminal states. This solution is a message-based protocol to be used in asynchronous networks, and its main advantages are increased flexibility and modeling power, and, we believe, it moves DEMO closer to Habermas "ideal speech situation".

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- *Research Proposal: Theory of Algebraic Foundation for Manipulation of DEMO models – Towards Analysis and Synthesis of DEMO models*
  Tetsuya Suga

  Abstract:

  The spread of business process management has induced the growing size of business process models and distributed executions. Meanwhile, an enterprise is more likely to be considered as a human activity system and often redesigned by aggregating several systems into one. These contexts underscore the importance of establishing techniques and theoretical supports for processing large models; it is also in demand to analyze requirements for large enterprise models that are capable of being handled with ease; namely split and merged. This Ph.D. project with two years left aims at shedding light on mathematical structures observed in DEMO models and manipulations of DEMO models in the framework of Universal Algebra, namely in the form of Boolean algebra. Extensive investigations are focused on algebraic characteristics such as closedness, commutativity, and associativity. It is also planned to develop preliminary implementation towards computer-aided manipulations and instantiate them on specific real-life cases for evaluating validity. The author hopes to formulate theoretical foundations and preliminary implication which may actualize computer-aided design automation in enterprise engineering.

Paper Sessions

Session 1 – Foundations of Enterprise Engineering

- *Towards the Ontological Foundations for the Software Executable DEMO Action and Fact Models*
  Marek Skotnica, Steven van Kervel and Robert Pergl

  Abstract:

  The discipline of enterprise engineering and the DEMO method- ology enable a model-driven approach to enterprise software systems de- velopment. Apart from the graphical notation, the DEMO models may be fully spec- ified in the DEMOSL language, which may become a basis for an work- ow software system implementation. However, the current specification of DEMOSL has been designed mostly for the reasoning between human stakeholders. In this paper a formal calculation construct called a DEMO Machine is proposed and basic ontological foundations of this machine are elabo- rated based on the alignment with the theories of enterprise engineering, various ontological and formal quality criteria and the application of the Generic Systems Development Process for Model Driven Engineering (GSDP-MDE methodology).

- *Cross Channel Communication Design Critical Literature Review*
  Mark Mulder

  Abstract:

  Literature on cross channel communication design shows that customer inter- action is too often implemented from a technology viewpoint which keeps us from a fundamental design of the problem and solution. Implementations that have started from a technical or business case point of view have not been very successful. Customer interaction is using processes, Customer Relationship Management (CRM) or portals from a functional viewpoint but is not constructed from a Performance in Social Interaction theory (-theory) viewpoint. In literature we have found channel characteristics and a maturity model that can help us reach the cross communication goal. With these findings in mind, we have defined our channel and service concepts. We summed up the usable concepts we need, to change the perception of multichannel and introduce a design that starts from communication and realises a cost effective way of integration existing and emerging channels.

- *Things, References, Connectors, Types, Variables, Relations and Attributes – Contribution to FI and MU Theories*
  Duarte Gouveia and David Aveiro

  Abstract:

  This work builds upon the FI [1] and MU [2] theories, that belong to the 2015 ensemble of theories from the discipline of enterprise engineering [3]. We critique several aspects of those theories and build upon them proposing a modelling ontology to represent the world, having an asynchronous network of actors, as a requirement. This modelling ontology has seven building blocks to enable modelling data and structures of the world (Things, References, Connectors, Types, Variables, Relations and Attributes). Things address the problem of identity. References introduce the notion of Pointer, extending the FI Theory [1] and clarifying concepts. Connectors address the problem of linking mutable and immutable Things in a network environment. The most innovative contribution is the usage of Types as a dynamic expression of constraints over attributes. Variables and Relations are defined using the revised Relational Theory [4][5]. Variables are mutable structures that hold values using temporal logic. Relations can be assigned to Variables that also follow the temporal logic. Attributes are Variables within the closure context of a Thing. Together these seven building blocks allow for better modeling in line with the FI and MU theory.

Session 2 – Organization Implementation

- *Formalizing Organization Implementation*
  Marien Krouwel, Martin Op 'T Land and Tyron Offerman

  Abstract:

  Our research program aims at finding building blocks that are able to deal quickly with the constant change that organizations face. In order to do so, a deeper understanding of possible organization implementation variants is necessary, as well as the

implications on the operation and IT support of organizations. In earlier research, we have composed a list of Organization Implementation Variables to informedly decide upon organization implementation, enabling traceability in governing enterprise and IT transformations. This list has been validated and extended by four practical case studies and has been formalized afterwards and validated by prototyping. In this paper the resulting framework is presented which a) is broader and more detailed than before, b) has a sound theoretical basis, and c) contains precise and validated definitions of the variables itself. This paper shows that the framework is not only suitable for organization modeling, but also has possibilities for designing software in which implementation choices can be made explicit and variable. This paper also provides insights in the implications of implementation choices on the operation of an organization.

- *Supporting Organizational Implementation Decisions by DEMO and Process Simulation*
  Lotte de Laat, Martin Op 'T Land and Marien Krouwel

Abstract:

The increasing need for agility on one hand, and for timely and well-founded decisions on organization implementation on the other hand makes goal-oriented process simulation increasingly popular. How- ever, a computer simulation may be of little value without a concep- tual model which precedes the simulation. The Design and Engineer- ing Methodology for Organizations (DEMO) assists in understanding and (re)designing business processes and their implementation. How- ever, current simulation methods based on DEMO lack the notion of goal-orientation on desirable KPIs, such as service windows and reaction time. We developed a goal-oriented combined method that addresses the aforementioned issues, and tested it using both an educational and real-life case. This method helped deciding on the organization imple- mentation, including e.g. number of FTEs and order of working, making modeling choices explicit. Combining DEMO and process simulation al- lows the modeler to make a well-defined balance between (a) project time and money constraints and (b) completeness of the simulation model.

Session 3 – Modelling, Patterns and Viability

- *Perceptual Discriminability in Conceptual Modeling*
  Jeannette Stark

Abstract:

Perceptual discriminability can be used to help distinguishing modeling constructs in conceptual models. It can further be used to produce parallel processing of modeling constructs that make these constructs virtually pop-out from the model. Moody has described a condition which is necessary to produce a pop-out effect in his principle of perceptual discriminability. This work extends the principle of perceptual discriminability for further conditions to produce a pop-out. Extended perceptual discriminability is exemplarily applied to a modeling grammar.

- *From the Essence of an Enterprise towards Enterprise Ontology Patterns*
  Tatiana Poletaeva, Habib Abdulrab and Eduard Babkin

Abstract:

In this paper we partially present an initial version of a Formal Enterprise Ontology Pattern Language, which has been developed to support conceptual enterprise modeling and a subsequent construction of different design and implementation artifacts. The proposed enterprise ontology patterns address problems related to the correlated modeling of both the intersubjective world and the production world of an enterprise, as well as the effective conjunction of the domain knowledge and the operational knowledge of an enterprise. The proposed language builds on a synthesis of the Unified Foundational Ontology (UFO) and the DEMO Enterprise Ontology. We also demonstrate how the pattern language was applied to the domain-specific enterprise modeling.

- *Extended Viable System Model*
  Alexey Sergeev and Jose Tribolet

Abstract:

Viable System Model (VSM) is a well-known and widely used concept when working with enterprise as a viable system. However, research shows that VSM does not include all the required elements to correctly model enterprise as a viable system. This paper proposes extensions to VSM which help to model enterprise in a more complete way. The proposal is illustrated using case study of a real company. Authors propose to tie extended VSM to the notion of Enterprise Operating System in future research.

Session 4 – Value and Co-Creation

- *Objectifying Value Co-Creation – an exploratory study*
  João Pombinho, Carlos Mendes, Bruno Fragoso, Ricardo Santos, Nuno Silva, Elton Sixpence and Jose Tribolet

Abstract:

Understanding value co-creation has been identified has a critical research topic area due to the evolution on how customers design, produce and consume products/services. Moreover, there is a plethora of theory sources that address it and an apparent lack of alignment between them. In this exploratory study, we use enterprise engineering techniques, namely organizational modelling methodologies (DEMO and e3Value), to clarify the co-creation and co-design concepts. In order to do so, we extended the Flower Shop case with procedures that were identified in the literature as co-creation. The analysis of this case allowed us to objectify the co-design and co-production concepts by defining in which specific modelling patterns these concepts can be

illustrated, in order to make them explicit and assert alignment with the business model. Furthermore, such analysis has supported specification of a generic co-creation (sub)organization which serves as a reference for alignment with service design and management knowledge areas.

- *Towards Co-Creation and Co-Production Chains Modeled in DEMO with REA Support*
  Frantisek Hunka, Steven van Kervel and Jiri Matula
  Abstract:

Co-creation and Co-production in production chains is the typical way of cooperation one observes in high value industrial production chains. The enterprises in these production chains constitute together also a sophisticated virtual enterprise. While many professional IT systems are operational within these enterprises, there are only IT technologies with a limited scope at a small scale available between these enterprises. The new technologies currently provided by enterprise engineering promise substantial operational improvements; operational control, compliance to business rules, optimization of efficiency and effectiveness. Another objective is support for the REA ontology for high quality financial information systems, which requires a conceptual mapping between REA and DEMO to be found. The first step, a generic DEMO model for co-creation and co-production, has been devised and subjected to early validation. This paper is also a positioning paper, defining future research, specifies two challenges for the DEMO theory and provides foundations for a professional production system.

Session 5 – Evolvability

- *Building an Evolvable Prototype for a Multiple GAAP Accounting Information System*
  Els Vanhoof, Peter De Bruyn, Walter Aerts and Jan Verelst
  Abstract:

In this paper we build a prototype of an evolvable Account- ing Information System (AIS) that supports multiple Generally Accepted Accounting Standards (GAAP) reporting. Reporting in multiple GAAP can have different origins: differences in local and tax GAAP, belonging to an economic group or additional regulations. Regulations change fre- quently: additional GAAP are imposed on companies and GAAP them- selves are updated to changing economic conditions. AIS need to sup- port multiple GAAP and evolvability is important because of the chang- ing nature of these GAAP. Normalized Systems Theory (NST) proposes theorems for building evolvable information systems, but lacks specific guidance in business domains (e.g. accounting). Therefore we contribute to literature by showing the feasibility of using NST to design and build an AIS. We use design principles from literature to start building our pro- totype. The resulting prototype shows into more detail how the design principles are used into an actual software design.

- *On the Evolvable and Traceable Design of (Under)graduate Education Programs*
  Gilles Oorts, Herwig Mannaert, Peter De Bruyn and Ilke Franquet
  Abstract:

Over the past decades, universities have been required to offer increasingly exible study programs. Furthermore, study program designs exhibit by their nature large amounts of dependencies due to constraints of prerequisite courses, courses being taught in several study programs, etcetera. These characteristics make managing and changing study programs very complex, on occasion even preventing study pro- gram changes. In this paper we present solutions to these challenges based on the concept of modular and evolvable system design. Basic en- gineering concepts such as modularity, coupling and cohesion are used to explain and illustrate the evolvability and traceability of study programs.