Abstract:

One of the fundamental problems with not-so-attractive IT Return of Investment (ROI) is that most enterprise systems and applications have been built in an ad hoc way for the past several decades, and that is also why those systems are very difficult and expensive to enhance or integrate so they could never adapt to the ever-changing business requirements. The proposed MS in Service Computing will make a conscientious effort to introduce “architecture” as the cornerstone for the program that aims at helping students and practitioners fully understand the importance of establishing a sound architectural foundation for enterprise systems and applications, how to address concerns of various key stakeholders of their specific perspectives or interests using various architecture views, how Services Computing would become an effective mechanism to facilitate an architecture-centric process for the whole lifecycle of system development. This tutorial will overview what is enterprise architecture, its scope and addressed issues, the foundation, and several prevailing EA framework, the evolving standardization and language to formalize EA, EA consulting best of practice and some case studies.

About the speaker:

Dr. Min Luo is currently an Executive Architect, Strategy and Technology, IBM SWG. He served as Chief Architect of the Global Business Solution Center -GCG, IBM IGS, and also Executive Architect in IBM SWG’s Industry solution group. For more than 6 years as a Senior Certified Architect of the Center of Excellence – Enterprise Architecture and also of SOA, he had led several large scale projects in social services and retail with budget over $100 Million with over 100 technical and business team members. He contributed to the development and adoption of SOA as one of the coauthors for an IBM book published in 2004, led the design and development of one of the first operational Enterprise Service Bus, and conducted many IT/business consulting and alignment with SOA and Enterprise Architecture. Before IBM, he worked as Senior Operations Research Analyst, Manager, Sr. Manager and Director of several fortune 500 transportation companies. He has 18+ years of industry experience with 12+ years of managing the whole life cycle of software application design, development and deployment.

As a senior member of IEEE, he has been serving on the organizing committee for IEEE’s ICWS, SCC, and CLOUD Conferences, chaired sessions, presented several tutorials on SOA and its best practice and gave lectures at the Service University. He has served as adjunct professors in several US and Chinese universities since 1996.
Advanced Transaction Models for e-Services

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Abstract:
The concept of transactions has been fundamental for providing fault tolerance, reliability and robustness for database applications. The idea then is to extend the same transactional guarantees to new and evolving paradigms. A transaction is an execution of a program. It is committed when the execution is complete and successful. Otherwise, it is aborted and partial execution, if any, is rolled back. Thus, a transaction is an atomic unit. Each transaction, when executed alone, is assumed to be correct. A concurrent execution of several transactions is taken to be correct when the execution is equivalent to some serial execution of the same transactions.

The advancements in database systems impacted transaction executions in various ways. Some examples are the following.

(i) In distributed database systems, the data and hence operations on them are distributed among different sites and both site and network failures need to be taken into account.
(ii) In heterogeneous distributed database systems, the sites are autonomous and so the rollback mechanism needs to be changed from undo to compensation.
(iii) In mobile database systems, sites are disconnected from the network often and hence the execution and commitment strategies need to be changed.
(iv) Some transactions tend to be long-running and the correctness criteria for concurrent executions need to be refined allowing increased interleaving of the transaction operations.

Advanced transaction models were designed to accommodate these requirements.

Services Computing paradigm has different execution characteristics.

(i) The (atomic database) operations are replaced by (not necessarily atomic) activities and services.
(ii) Interdependencies develop among the executions of the activities and they affect the commitment of the transactions.
(iii) The activities and services span multiple autonomous and heterogeneous organizations and they need cross-organizational transaction support.
(iv) Very much like nested transactions, multi-level hierarchical compositions of activities and services come into picture.

These characteristics necessitate new transaction models that relax the transactional properties differently.

This tutorial covers the necessary background on advanced transaction models and Services Computing paradigm that includes Web services, e-contracts and cloud computing. Various aspects of e-services such as loose coupling, interaction, commitment and closure, composability, orchestration, interoperability, and business objectives and their influence on the design of transaction models will be discussed.

About the presenters

Kamal Karlapalem is a Professor at International Institute of Information Technology (IIIT), Hyderabad, India. He received his PhD from College of Computing, Georgia Tech in 1992. Prior to joining IIIT, he was an Associate Professor at Department of Computer Science, Hong Kong University of Science and Technology. He has been working in the area
of workflow management systems (WFMS), dealing with frameworks for building WFMSs, meta-modeling issues, support for handling exceptions in WFMSs, and security aspects of WFMSs. Currently, his research interest is to model and deploy electronic contracts derived from contract documents.

Krishnamurthy Vidyasankar is a Professor in the Department of Computer Science, Memorial University, St. John's, Newfoundland, Canada. His research areas include (i) transactional aspects in database and information systems including services computing and e-contracts, (ii) transactional memory, and (iii) shared variable constructions and mutual and group mutual exclusion algorithms in distributed computing. Dr. Vidyasankar has published several articles in reputed journals and conferences. He serves in the program committees of several conferences and reviews journal and conference submissions regularly.

Radha Krishna is a Principal Research Scientist at Software Engineering and Technology Labs, Infosys Technologies Limited, Hyderabad, India. He received his Ph.D. from Osmania University in 1996. He is currently associated with research projects leading to futuristic information management and knowledge engineering solutions. Prior to joining Infosys, he was a faculty member at Institute for Development and Research in Banking Technology (IDRBT) and a scientist at National Informatics Centre, India. His research interests include data warehousing, data mining, and electronic contracts and services.
Tutorial 3

Risk Analysis on Service Outsourcing

Yudistira Asnar, Fabio Massacci, Wendy Hui, and Patrick C. K. Hung

Abstract:

Risk is a well-known security concept in any business activity, and is considered a critical component in making business decisions. In recent years, the trend of service outsourcing introduces a new class of risk modeling and requirements. This tutorial presents basic notions of risk and explains how they are related to business-oriented Web services. Risk issues related to service outsourcing are becoming the major focus of this tutorial. This tutorial introduces the SI* Framework to analyze IT risks in an outsourcing environment. Essentially, the framework is composed of a modeling framework, analysis techniques and methodology. SI* is developed to analyze security and trust issues in an organizational setting. This tutorial presents how SI* assists business analysts in analyzing service outsourcing initiatives. The tutorial begins by capturing business objectives from each stakeholder (actor) in the organization, and relating uncertain events that might compromise them. Relevant regulatory compliance and trust among actors are critical aspects that need to be captured and analyzed. This tutorial continues by analyzing the business objectives and services to be outsourced using automated reasoner in the SI* tool. Business analysts can assess the risk level and evaluate whether they need to employ more countermeasures in such an environment. This tutorial also covers several industry-specific scenarios to illustrate the usage of the framework using SI* tools, and open to the possibility to work on the case study proposed by attendees.

About the speakers:

Yudistira Asnar (http://yudis.asnar.net) received B. Eng. from Bandung Institute of Technology (ITB) in 2002 and PhD in Computer Science and Information Engineering at University of Trento, Italy in 2009. His research interests include the areas of requirement engineering, agent systems, security-dependability risk management, and information assurance. The main focus of his research is on modeling and analyzing governance, risk and compliance of IT services.

Fabio Massacci (http://www.massacci.org) received a M. Eng. in 1993 and Ph.D. in Computer Science and Engineering at University of Rome La Sapienza in 1998. He joined University of Siena as an Assistant Professor in 1999, was a visiting researcher at IRIT Toulouse in 2000, and joined Trento in 2001 where he is now a fulltime professor. His research interests are in security requirements engineering, formal methods and computer security. He is currently a scientific coordinator of multimillion Euros industry R&D European projects on security and compliance.

Wendy Hui (http://www.nottingham.edu.cn/staff.php?s=131) holds a Ph.D. in Information Systems from the Hong Kong University of Science and Technology (HKUST). She is currently a Lecturer at University of Nottingham Ningbo China. Her research interests include Economics of Information Systems, Information Security, and Technology-Assisted Learning. Her work has been accepted by the Journal of Management Information Systems (JMIS), Decision Support Systems (DSS), IEEE Transactions on Systems, Man and Cybernetics, Part A (IEEE SMCA), and Communication of the AIS (CAIS).

Patrick C. K. Hung (http://www.hrl.uoit.ca/~ckphung) is an Associate Professor at the Faculty of Business and Information Technology from the University of Ontario Institute of Technology and an Adjunct Faculty Member at the Department of Electrical and Computer Engineering in University of Waterloo, Canada. He is also a Guest Professor at the Institute of Computer Science in University of Innsbruck, Austria. Recently Patrick Hung has founded a startup company BeaconWall Limited located at Hong Kong Science and Technology Park with Prof. Jay Tashirot from Wolfsongs Informatics, USA.
Tutorial 4

Services Computing in Biomedical Science

Wei Tan and Ravi Madduri

Abstract:
Service-oriented Science (SOS) represents a SOA approach to federating data access and analysis across different institutional and disciplinary sources, thus facilitating large scale scientific collaboration. The US National Cancer Institute’s Biomedical Information Grid (a.k.a., caBIG) program seeks to create both a service computing infrastructure (caGrid) and a suite of data and analytical services. Workflow tools in caGrid facilitate both the use and creation of services by accelerating service discovery, composition and orchestration tasks.

This tutorial uses caGrid as a case of service computing in biomedical science and includes a combination of research and engineering effort made by our team. The following aspects are to be covered: 1) the motivation of SOS and an overview of state-of-the-art; we will highlight some examples in biomedical and bioinformatics field; 2) caGrid architecture, the service creation and management tools it offers and the services it hosts; 3) Taverna workbench as the workflow solution of caGrid, and how we enhance it to fulfill the requirements from caGrid community; 4) the challenges we are facing and the research opportunities.

About the speakers:

Dr. Wei Tan is a research professional associate at the Computation Institute, University of Chicago and Argonne National Laboratory. He is the core developer of caBIG workflow system, and has received Teamwork Award and Outstanding Poster Award from US National Institute of Health in recognition of his contribution in this effort. His research interests include business and scientific workflows, grid and service-oriented computing (especially the applications in health-informatics), and Petri nets. He is now involved in multiple health-informatics-related projects, providing scientific workflow solutions for domain users. In 2007 he was a graduate Co-op at IBM T. J. Watson Research Center, NY, USA. He has published more than 20 papers in journals, conferences and book chapters. He also serves as program committee member in multiple international conferences and external reviewer for many international journals. Find more from his homepage at http://www.mcs.anl.gov/~wtan/.

Ravi Madduri is a fellow at the Computation Institute, University of Chicago. Ravi is one of three key contributors to the National Institutes of Health $100M Cancer Bio-Informatics Grid (caBIG), which links 60 NIH-funded cancer centers and clinical sites engaged in cancer research. For his efforts in project management, tool development, and collaboration, Ravi received several Outstanding Achievement Awards from NIH in recognition of his work on caBIG project management, tool development, and collaboration. Ravi is a lead architect on the scientific workflow design and implementation project under the caGrid toolkit.
Tutorial 5

Security in Web Services: State-of-the-art and Research Opportunities

Júlio Cezar Estrella¹, Kalinka Castelo Branco¹, Marco Vieira²

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Abstract:

Web services are the cornerstone of Service Oriented Architectures (SOA). As business critical components, web services must provide high security. However, deploying secure web services is a difficult task. In fact, several studies show that a large number of web services are deployed with security flaws that range from code vulnerabilities (e.g., code injection vulnerabilities) to the incorrect use of security standards and protocols. In this tutorial we will present different techniques and tools for the deployment of secure web services, including:

- Standards and protocols to deploy secure services: standards such as XML, SOAP, UDDI, WSDL approach the basic concepts of interoperable services, but for secure web services other rules must be added. In this sense it is essential to study the main security specifications for Web Services, which include cryptographic algorithms and techniques that implement digital signatures. In the tutorial we will identify and map the main security requirements in Web Services aiming at defining ways to apply security specifications such as: WS-Security, WS-Conversation, XML-Signature, XML-Encryption, XACML, SAML, and others.

- Security assessment techniques and tools: software defects are a major source of vulnerabilities. Interface and communication faults, related to problems in the interaction among software components/modules, are particularly relevant in service-oriented environments, as services must provide a secure interface to the client applications, even in the presence of malicious inputs. In the tutorial we will overview different security assessment approaches and experiment several tools for vulnerability detection.

The tutorial will address both current research topics and industry practice. Several case studies will be presented and used to demonstrate the effectiveness of existing tools and techniques. Future research opportunities will be identified and discussed.

About the presenters

Júlio Cezar Estrella, MSc in Computer Sciences, holds a PhD student position at the Computer Systems Department of the University of São Paulo, and is about to defend a thesis on QoS-Aware Service-Oriented Architectures. He has a strong background on web services implementation and practitioner experience in performance evaluation of SOA frameworks and tools and also has been working in the following areas: distributed systems, service oriented architectures, computer networks, security, performance evaluation and processes scheduling. He is member of IEEE, ACM and Brazilian Computer Society.

Kalinka Regina Lucas Jaquie Castelo Branco is an Assistant Professor of the Institute of Mathematics and Computer Science - ICMC - USP, working in the department of Computer Systems. She has experience in Computer Science, with emphasis on Distributed Computing Systems and Parallel Computer, working mainly in the following areas: distributed systems, computer networks, security, performance evaluation and processes scheduling. She is member of Brazilian Computer Society.

Marco Vieira is an Assistant Professor at the University of Coimbra, Portugal, and an Adjunct Associate Teaching Professor at the Carnegie Mellon University, USA. His research interests include dependability benchmarking, security assessment, robustness assessment and improvement, fault injection, and software quality assurance, subjects in which he has authored or co-authored tens of papers in refereed conferences and journals. Marco Vieira has served on program committees of the major conferences of the dependability and databases areas and acted as referee for many international conferences and journals.
Abstract:

Accountability in Service Oriented Architecture (SOA) is a capability of making business processes across all participants (services, applications and people) accountable in terms of both business logic and Quality of Services (QoS). While accountability is a critical mechanism to enhance trust between collaborative services, there is the lack of standard accountability support in the current SOA infrastructure. For example, it is difficult with the existing technologies/infrastructure to resolve a dispute between two (web) services if some interactions between the two services go wrong; there is also little existing accountability support for a service consumer to collect quantity evidences to complain a service provider, who fails to meet its Service Level Agreement (SLA). As the increasing real-world activities are performed through the Internet connected services, we envision that there will be growing requirements for making the behaviors of both service providers and consumers accountable.

In the business world, one may be reluctant to transact directly with a stranger. But a mutually trusted middleman can be used to facilitate transactions and resolve possible disputes. In this tutorial, we will share our observations and research results on building accountability into SOA. First, we will review related work on accountability in traditional distributed systems, ranging from Internet protocols and network file systems to outsourced database management systems. We will examine what methods embodied in these work can fit service computing in Internet scale and what cannot. Then we will present our research work on middleman-based approach to delivering accountability as a service, including our recent research results. This tutorial will focus on the major technical challenges of enabling SOA accountable and our solutions to these challenges. Finally, we will demonstrate our solutions using a collaborative services scenario deployed in Amazon EC2 cloud.

The goal of this tutorial is to provide detailed understanding of accountability issues and related technologies in SOA with in-depth related work discussions, recent research outcomes and a deployed accountability service prototype.

About the presenters:

Dr. Shiping Chen is a senior research scientist of CSIRO ICT Centre, Australia. He received his PhD in Computer Science from University of New South Wales, Master in Computer System Engineering from Chinese Academy of Sciences, and Bachelor in Electrical Engineering from Harbin University of Technology China. From 1985 to 1999, he worked on real-time control, parallel computing and CORBA-based Internet gaming systems in research institutes and IT industry. Since joining in CSIRO in 1999, he has worked on a number of middleware-related research and consultant projects. He published over 30 research papers in the above research areas, and co-authored a numbers of middleware-related technical reports. He has been actively involved in research community services as an organizer and/or PC member (Middleware, ICSOC, ICWS, SCC, WWW etc.). His current research interests include web services and SOA, data storage and trust computing. His details can be found at www.ict.csiro.au/staff/shiping.chen

Dr Chen Wang received his PhD from Nanjing University. He is a research scientist in CSIRO (The Commonwealth Scientific and Industrial Research Organisation) ICT Centre, Australia. His research interest is primarily in distributed, parallel and trustworthy systems. His current work focuses on accountable distributed systems and smart grids. He publishes extensively in his area, including top journals and conferences. Dr. Chen Wang spent a few years in industry. He ever developed a high-throughput event system and a medical image archive system, which are used by many hospitals and medical centres. He also holds an honorary position in the University of Sydney, Australia. His details can be found at www.ict.csiro.au/staff/chen.wang