Special Issue Editorial

Web services are a new breed of Web applications which are self-contained, self-describing, modular applications that can be published, located, and invoked across the Web. Web services perform functions, from simple requests to complicated business processes. Once a Web service is deployed, other applications (and other Web services) can discover and invoke the deployed service. In a nutshell, web services can be defined as network-based application components with services-oriented architecture (SOA) using standard interface description languages and uniform communication protocols. Key SOA principles include modularity, encapsulation, composability, loose coupling, separation of concerns, and single implementation. SOA allows organizations to sense and respond and adapt their business processes rapidly without major changes to the IT infrastructure.

Despite the advances made, progress across the board has been moderate. The Inaugural International Conference on Next Generation Web Services Practices (NWeSP'05) gathered individual researchers who are also the world's most respected authorities on semantic Web; Web based services, Web applications and services. This special issue comprising of eleven papers is focused on the various aspects of Web services and its applications. Papers were selected on the basis of fundamental ideas/concepts rather than the thoroughness of techniques deployed. The papers are organized as follows.

In the first paper, Ghedini Ralha and Loureiro Ralha [1] present the HyperMap system which dynamically structures information on the Web. The system is based on a framework resulting from multi-disciplinary research to develop a new generation of computational tools able to support the extraction and the discovery of useful information on the Web, becoming agents of innovation and development.

The historical links of a web site include the URLs invalidated due to web site reorganization, document removal, renaming or relocation, or links to document snapshots, which are defined as the document's contents as of a specific point in time. Tracking historical links will allow users to use out-of-date URLs, retrieve removed documents and document snapshots. *Chao and Gill* [2] in the second paper presents a logging and archiving scheme to track a source document's history of changes, and designs web services to deliver the source document associated with a historical link.

Dependability is a major concern in software development, deployment, and operation. A commonly accepted solution for providing fault tolerant services on the Internet is to create replica of the services and to deploy them to several hosts. Whenever the service or the underlying node or network fails, another service is ready to take over. In the third paper, *Hillenbrand et al.* [3] combine several techniques to create a dependable framework for deploying and managing distributed services using replica on several distinct network nodes.

Lu et al. [4] in the fourth paper present a practical application of Semantic Web and Web services concepts where a flexible and automatic matching procedure in e-learning is illustrated. Authors illustrate how the web services and domain knowledge are described in machine-understandable form to support the automatic and flexible discovery of web services using a matchmaking algorithm.

In the fifth paper, *Kim et al. [5]* analyze the appropriate quality factor for the quality level where differentiated service is provided and suggests a method for assigning priorities to web service message processing processes based on these quality factors. The suggested method assigns the priority dynamically in order to satisfy the service level agreement as much as possible.

Kim [6] in the sixth paper proposes a hybrid storage approach for RDF data management. The proposed approach aims to provide good query performance, scalability, manageability, and flexibility. To achieve these goals, the author distinguishes some frequently appeared properties in RDF data. A set of RDF data with a distinguished property is independently treated and stored together in a corresponding property-based table. For processing a query having a specific property, a full scanning of the whole data could be avoided and only have to access a corresponding table.

Hmida et al. [7] in the seventh paper, improves the Aspect Oriented Programming (AOP) paradigm, to increase the adaptability of Web Services. AOP suffers from some deficiencies such as dependency for both the programming language (Java) and the SOAP engine (AXIS). Authors propose to increase the adaptability of Web Services by using the main AOP agreed semantics - advices, pointcuts and joinpoints- to change the original Web Service behavior. In the new approach, authors consider that advices are themselves Web Services and they use an XML Language to describe Pointcuts, Joinpoints and for referencing advices. The invocation of advices (Web Services) is accomplished by an XQuery engine to ensure SOAP Engine independency and advices are implemented as Web Services to promote programming language independency.

In the eighth paper, *Jaeger and Ladner* [8] discuss the case how already identified candidates, which a selection process originally has separated out, can improve a composition with respect to particular QoS categories. To realise this improvement, redundant arrangements involve the alternative candidates in order to supplement the originally assigned service. The contribution of this work is a computational model that allows the aggregation of the QoS for the composition when these arrangements are applied.

The evolution of the Semantic Web has accelerated the need for ontologies. Becker et al. [9] in the ninth paper, describe software to develop a protocol for collaborative ontology editing based on RDF and using a Peer-to-Peer (P2P) networking architecture. The protocol allows for the implementation of a voting mechanism embedded into the RDF data itself, using a mixed initiative design for notification. This is implemented as extensions to an ontology browser. The P2P approach is compared to the classic ontology editing approaches and the special requirements of the ontology editing environment are discussed. The protocol, design, implementation and architecture for ontology update are also elaborated.

In the tenth paper, Hrastnik and *Winiwarter* [10] introduce TWSO (Transactional Web Service Orchestrations), a new approach to integrate transactional processing with Web service orchestrations. TWSO concepts may appear in different manifestations, like an XML vocabulary (TWSOL) or an API for Java (TWSO4J). Constructs of TWSO manifestations are intended to be directly incorporated in Web service orchestration definitions. The usage pattern of TWSO is designed to resemble the programming pattern used when application programmers use transaction-enabled components like databases or application servers. Moreover, arbitrary advanced transaction models can be synthesized by using a basic set of transaction primitives without the demand for system-updates.

In the last paper, Basili et al. [11] propose 'RitroveRAI' a system which addresses the general problem of enriching multimedia news stream with semantic metadata. News metadata are explicitly derived from transcribed sentences or implicitly expressed into a topical category which is automatically detected. The enrichment process is accomplished by aligning individual audio-visual segments with news or journal articles reachable through the Web. This distributed process designed for RitroveRAI enables several extensions in the light of large scale and public access performance as evident from the discussions in the discussion of the evaluation results of our current system.

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Editor Biographies

Ajith Abraham currently works as a Professor under the South Korean Government's Institute of Information Technology Assessment (IITA) Professorship program at Chung-Ang University, Korea. His primary research interests are in computational intelligence with a focus on using evolutionary computation techniques for designing intelligent paradigms. Application areas include Web services, Web intelligence, information security, financial modeling, multi criteria decision-making etc. He has authored/co-authored over 200 research publications in peer reviewed reputed journals, book chapters and conference proceedings of which three have won 'best paper' awards. He is an associate editor of the Journal of Digital Information Management (JDIM) and is also serving the editorial board of over a dozen International Journals and has also guest edited 15 special issues for reputed International Journals. Since 2001, he is actively involved in the Hybrid Intelligent Systems (HIS) and the Intelligent Systems Design and Applications (ISDA) series of International conferences. He was the Program co-chair of the First IEEE Conference on Next Generation Web Services Practices (NWeSP'05), Seoul, Korea. During the last five years, he has also served the technical committee of over 70 International conferences and has also given a number of conference tutorials/plenary lectures. He is a member of IEEE, IEEE (CS), ACM, IEE (UK), IEAust and also works closely with several academic working groups like EvoNet, EUSFLAT, WFSC, etc. He received PhD degree from Monash University, Australia. More information at: http://www.softcomputing.net

Jen-Yao Chung received the M.S. and Ph.D. degrees in computer science from the University of Illinois at Urbana-Champaign. Currently, he is the senior manager for Engineering & Technology Services Innovation, where he was responsible for identifying and creating emergent solutions. He was Chief Technology Officer for IBM Global Electronics Industry. Before that, he was senior manager of the electronic commerce and supply chain department, and program director for the IBM Institute for Advanced Commerce Technology office. Dr. Chung is the co-founder and co-chair of IEEE technical committee on e-Commerce (TCEC). He has served as general chair and program chair for many international conferences, most recently he served as the steering committee chair for the IEEE International Conference on e-Commerce Technology (CEC05) and general chair for the IEEE International Conference on e-Business Engineering (ICEBE05). He has authored or coauthored over 150 technical papers in published journals or conference proceedings. He is a senior member of the IEEE and a member of ACM.

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