

Special issue on

## Web Services Practices

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Web services -- a new breed of self-contained, self-describing, modular applications published, located, and invoked across the Web - handle functions, from simple requests to complicated business processes. They are defined as network-based application components with a services-oriented architecture (SOA) using standard interface description languages and uniform communication protocols. SOA enables organizations to grasp and respond to changing trends and to adapt their business processes rapidly without major changes to the IT infrastructure.

The Inaugural International Conference on Next-Generation Web Services Practices (NWeSP'05) attracted researchers who are also the world's most respected authorities on the semantic Web, Web-based services, and Web applications and services. NWeSP'05 was held in cooperation with the IEEE Computer Society Task Force on Electronic Commerce, the Technical Committee on Internet, and the Technical Committee on Scalable Computing.

This special issue presents eight papers focused on different aspects of Web services and their applications. Papers were selected based on fundamental ideas and concepts rather than the thoroughness of techniques employed. Papers are organized as follows:

*Basha et al.* present the first paper, on a Quality of Service Information and Computational framework (QoS-IC) supporting QoS-based service selection for SOA. The framework's functionality is expanded using a QoS constraints model that establishes an association relationship between different QoS properties and is used to govern QoS-based service selection in the underlying algorithm. Using a prototype implementation, the authors demonstrate how QoS constraints improve QoS-based service selection and save consumers valuable time.

Due to the complex infrastructure of web applications, response times perceived by clients may be significantly longer than desired. To overcome some of the current problems, *Vilas et al.*, in the second paper, propose a cache-based extension of the architecture that enhances the current web services architecture, which is mainly based on program-logic or protocol-dependent optimization.

In the third paper, *Jo and Yoo* present authorization for securing XML sources on the Web. One of the disadvantages of existing access control is that the DOM tree must be loaded into memory while all XML

documents are parsed to generate the DOM tree, such that a lot of memory is used in repetitive search for tree to authorize access to all nodes in the DOM tree. The complex authorization evaluation process required thus lowers system performance. Existing access control fails to consider information structure and semantics sufficiently due to basic HTML limitations. The authors overcome some of these limitations in the proposed model.

In the fourth paper, *Jung and Cho* propose a novel behavior-network-based method for Web service composition. The behavior network selects services automatically through internal and external links with environmental information from sensors and goals. An optimal service is selected at each step, resulting in a globally optimal service sequence for achieving preset goals. The authors detail experimental results for the proposed model by comparing them with rule-based system and user tests.

*Kong et al.* present an efficient method in the fifth paper for merging heterogeneous ontologies -- no ontology building standard currently exists -- and the many ontology-building tools available are based on different ontology languages, mostly focusing on how to create, edit and infer the ontology efficiently. Even ontologies about the same domain differ because ontology experts hold different view points. For these reasons, interoperability between ontologies is very low. The authors propose merging heterogeneous domain ontologies by overcoming some of the above limitations.

In the sixth paper, *Chen and Che* provide polynomial-time tree pattern query minimization algorithm whose efficiency stems from two key observations: (i) Inherent redundant "components" usually exist inside the rudimentary query provided by the user, and (ii) nonredundant nodes may become redundant when constraints such as co-occurrence and required child/descendant are given. They show that the algorithm obtained by first augmenting the input tree pattern using constraints, then applying minimization, invariably finds a unique minimal equivalent to the original query.

*Chen and Che* present a polynomial-time algorithm for tree pattern query (TPQ) minimization without XML constraints in the seventh paper. The two-part algorithm is a dynamic programming strategy for finding all matching subtrees within a TPQ. The algorithm consists of one for subtree recognition and a second for subtree deletion.

In the last paper, *Bagchi et al.* present the mobile distributed virtual memory (MDVM) concept and architecture for cellular networks containing server-groups (SG). They detail a two-round randomized distributed algorithm to elect a unique leader and co-leader of the SG that is free of any assumption about network topology, and buffer space limitations and is based on dynamically elected coordinators eliminating single points of failure.

As guest editors, we thank all authors featured in this special issue for their contributions and the referees for critically evaluating the papers within the short time allotted. We sincerely believe that readers will share our enjoyment of this special issue and find the information it presents both timely and useful.

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**Sung-Bae Cho** received the B.S. degree in computer science from Yonsei University, Seoul, Korea, in 1988 and the M.S. and Ph.D. degrees in computer science from KAIST (Korea Advanced Institute of Science and Technology), Taejeon, Korea, in 1990 and 1993, respectively. He was an Invited Researcher of Human Information Processing Research Laboratories at ATR (Advanced Telecommunications Research) Institute, Kyoto, Japan from 1993 to 1995, and a Visiting Scholar at University of New South Wales, Canberra, Australia in 1998. Since 1995, he has been a Professor in the Department of Computer Science, Yonsei University. His research interests include neural networks, pattern recognition, intelligent man-machine interfaces, evolutionary computation, and artificial life. He was the recipient of the Richard E. Merwin prize from the IEEE Computer Society in 1993. He received the best paper awards at International Conference on Soft Computing in 1996 and 1998. Also, he received the best paper award at World Automation Congress in 1998, and listed in Marquis Who's Who in Science and Engineering and in Marquis Who's Who in the World. He is a Member of the Korea Information Science Society, INNS, the IEEE Computer Society, and the IEEE Systems, Man, and Cybernetics Society.

**Thomas Hite:** As Chief Technology Officer of US based Metalect, Tom Hite is responsible for the company's technology strategy and research. He brings 17 years of executive experience in both early-stage and publicly traded companies. Prior to co-founding Metalect, Tom was Chief Technical Officer of AMX Corporation (Nasdaq: AMXC), where he led the development of a sophisticated software platform for home and business automation. Previously, Tom was VP of Software Development at AnswerSoft, Inc. prior to its acquisition by Concerto Software (Nasdaq: CRTO). Hite's experience also includes technical management positions at Micrografx, R&TH, Inc., and CADSI. Hite holds BS and MS degrees in Mechanical Engineering from the University of Iowa.

**Sang-yong Han** graduated with a BS degree from the Seoul National University and PhD degree from the Computer Engineering Department at the University of Minnesota in June 1984. He is a Professor of the Department of Computer Science and Engineering at the Chung-Ang University in Korea, where he founded and directs the Electronic Commerce and Internet Application Laboratory. Previously, he was the advisory engineer of the IBM Poughkeepsie Lab. and Watson Research Center. He was also a visiting researcher at the University of California, Berkeley. His areas of expertise are software agents technology, Electronic Commerce, CMS, and Information Retrieval. He has published many articles in professional journals and conference proceedings. He has also filed many domestic and USA patents. He is also a founder and CEO of Systech Information Technology, Inc., a solution provider of process automation. He has been active in consulting a few other venture companies. He was the General Co-Chair of the Inaugural International Conference on Next Generation Web Services Practices (NWeSP'05) and is the Editor-in-Chief of International Journal of Web Services Practices (IJWSP).