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 recognization 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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