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Web Engineering

Managing Diversity and Complexity
of Web Application Development



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Preface

In less than a decade of existence, the Web has reached a truly staggering stage, demonstrated by the scope, the reach, and the size of Web-based applications and activities. Concentrating initially on information dissemination, the scope of the applications is now limited only by our imagination. The reach is constantly expanding and so are the number and size of the applications, along with the underlying complexity, range of purposes, and the time needed to develop and maintain them. At the same time, the development and maintenance processes of Web applications have not progressed at a sufficiently rapid pace to meet these challenges and demands. Consequently, the likelihood is that Web application development will get into a crisis and it is not hard to imagine that this would dwarf the ‘software crisis’ identified long ago in the 1960s.

Web Engineering aims to avert this potential crisis by generating a proactive approach to the successful development of Web-based systems and applications. Web Engineering involves the use of scientific, engineering, and management principles and systematic approaches with the aim of successfully developing, deploying, and maintaining high quality Web-based systems and applications.

Web Engineering, in its current form, is an early attempt to identify the significant issues and problems, and their solutions, in developing Web-based applications. As we see it, Web Engineering is not yet established as a full discipline nor has it developed an identifiable or stable form, since everything connected with the Web is still in a state of flux. One only has to look at the number of varied activities that the World Wide Web Consortium is engaged in to realise that a stable Web environment, and hence proven methods for developmental activities based on the Web, is still some distance away.

Our early forays into the Web arena, with the constant excitement of new developments and challenges, forcefully brought to mind our entry into the computing field, almost three decades ago. At that time, compared to what the technology could do, our efforts in computerizing payroll and accounting applications in reality seemed puny and disappointing. The Web, on the other hand, did not seem shackled, in a way that early computing was, to these bureaucratic and unimaginative ways of conducting human and organizational affairs. It seemed that the organizational, spatial, and physical constraints were about to loosen, if not disappear, altogether.

And yet, when we looked around at the way Web sites and applications were being developed, it seemed to us that the early pattern of haphazard development, minimal testing, and lack of attention to the maintenance issues that characterised the ‘software crisis’ were still very much with us. It was as though the ‘new generation’ insisted on making the same mistakes as its parents!

This feeling of *déjà vu* led us to question the nature of Web-based and Web-related activities. Of course, we were not alone, as we soon discovered. The result is what is being called Web Engineering which had its first introduction in a workshop at the Seventh World Wide Web (WWW7) conference in Brisbane in 1998. It has now become a series with more workshops at WWW8 (Toronto,

1999) and WWW9 (Amsterdam, 2000), and also at the International Conference on Software Engineering (ICSE99) in 1999 in Los Angeles and ICSE2000 in Limerick, Ireland. Another workshop is scheduled for WWW10 in Hong Kong in May 2001.

The main purpose behind these workshops has been to share and pool the collective experience of people, both academics and practitioners, who are actively working on Web-based systems. The workshops have generally consisted of keynote addresses, peer-reviewed contributed papers, and sessions of open discussions.

About This Book

In this volume, we provide a consolidated view of recent work, highlighting developments and advances in the area of Web Engineering. This selection of papers draws mainly from the last three workshops, held in conjunction with ICSE1999, WWW9, and ICSE2000. We also present a list of additional, useful resources on Web Engineering such as books, special issues, articles, and Web sites. Our aim is to provide a book that will be a convenient and useful reference to all the researchers, practitioners, and students interested in Web application development.

Web Engineering takes its inspiration from Software Engineering. At the same time, it is also an explicit acknowledgement of the multi-dimensional nature of Web applications, encompassing technical computing, information structuring, navigation and management, network performance and security, legal and social issues, graphic design, multiplicity of user profiles, and the varied operational environments. Accordingly, the papers in this volume cover perspectives on Web Engineering, navigation and adaptivity, design aspects, acceptance criteria for Web-based systems, development and management of Web sites and Web-based applications, Web metrics, and case studies.

For convenience, the papers are organized in five sections: 1) Introduction and Perspectives, 2) Managing Information on the Web, 3) Web-Based Systems Development, 4) Design for Performance, Web Metrics, and Testing, and 5) Web Maintenance and Reuse. In their own ways, all the papers are forward-looking, trying to anticipate problems, creating tools, experimenting in novel ways, widening the areas of applications, and re-examining paradigms. In other words, the papers represent a shared attitude of being inclusive rather than focusing narrowly.

Web Engineering is a forward looking and collaborative discipline. The papers in this compendium, taken individually, represent only the tip of the iceberg of worldwide Web development. Together, they make a significant contribution to the evolution of a more systematic approach to Web development. The compendium has been made possible by the many people who share these views. We hope the readers will join us in these endeavors.

January 2001

San Murugesan
Yogesh Deshpande

Table of Contents

Web Engineering: Introduction and Perspectives

Web Engineering: Introduction and Perspectives – Overview	1
Web Engineering: A New Discipline for Development of Web-Based Systems	3
<i>San Murugesan, Yogesh Deshpande, Steve Hansen and Athula Ginige</i>	
Web Engineering: Beyond CS, IS and SE Evolutionary and Non-engineering Perspectives	14
<i>Yogesh Deshpande, San Murugesan and Steve Hansen</i>	
Web Engineering in Action	24
<i>Athula Ginige</i>	

Web-Based Systems Development: Process and Methodology

Web-Based Systems Development: Process and Methodology – Overview ...	33
Corporate Web Development: From Process Infancy to Maturity – A Case Study	36
<i>Yogesh Deshpande and Athula Ginige</i>	
Applying Cross-Functional Evolutionary Methodologies to Web Development	48
<i>Kenneth S. Norton</i>	
Development and Evolution of Web-Applications Using the WebComposition Process Model	58
<i>Martin Gaedke and Guntram Gräf</i>	
Engineering the Web for Multimedia	77
<i>Savitha Srinivasan, Dulce Ponceleon, Arnon Amir, Brian Blanchard and Dragutin Petkovic</i>	
Modelling Security Policies in Hypermedia and Web-Based Applications	90
<i>Paloma Díaz, Ignacio Aedo and Fivos Panetsos</i>	
Web-Based Information Systems Development – A User Centered Engineering Approach	105
<i>Christophe Gnaho</i>	
Rapid Service Development: An Integral Approach to e-Business Engineering	119
<i>Wil Janssen and Maarten Steen</i>	

Managing Information on the Web

Managing Information on the Web – Overview	133
Layout, Content and Logic Separation in Web Engineering	135
<i>Clemens Kerer and Engin Kirda</i>	
Restraining Content Explosion vs. Constraining Content Growth	148
<i>Francisco J. Monaco, Adilson Gonzaga and Leonardo B. Guerreiro</i>	
A Classification of Web Adaptivity: Tailoring Content and Navigational Systems of Advanced Web Applications	156
<i>Arno Scharl</i>	
Web Engineering: The Developers' View and a Practitioner's Approach ...	170
<i>Sotiris P. Christodoulou, Paris A. Zafiris and Theodore S. Papatheodorou</i>	

Development Tools, Skills and Case Studies

Development Tools, Skills and Case Studies – Overview	188
Synthesis of Web Sites from High Level Descriptions	190
<i>João M. B. Cavalcanti and David Robertson</i>	
Meta-XML Specification	204
<i>Stephen C. Arnold and Leo Mark</i>	
Engineering of Two Web-Enabled Commercial Software Services	213
<i>Siddhartha R. Dalal, Ashish Jain, Nachimuthu Karunanithi, Gardner Patton and Manish Rath</i>	
A Skills Hierarchy for Web-Based Systems Development	223
<i>Steve Hansen, Yogesh Deshpande and San Murugusan</i>	
A Case Study of a Web-Based Timetabling System	236
<i>Shu Wing Chan and Weigang Zhao</i>	

Performance, Testing and Web Metrics

Performance, Testing and Web Metrics – Overview	245
Engineering Highly Accessed Web Sites for Performance	247
<i>Jim Challenger, Arun Iyengar, Paul Dantzig, Daniel Dias and Nathaniel Mills</i>	
Specifying Quality Characteristics and Attributes for Websites	266
<i>Luis Olsina, Guillermo Lafuente and Gustavo Rossi</i>	
A Framework for Defining Acceptance Criteria for Web Development Projects	279
<i>David Lowe</i>	

Measurement and Effort Prediction for Web Applications	295
<i>Emilia Mendes, Steve Counsell and Nile Mosley</i>	
Web Navigability Testing with Remote Agents	311
<i>Martín González Rodríguez, José Emilio Labra Gayo and Juan Manuel Cueva Lovelle</i>	
 Web Maintenance and Reuse	
Web Maintenance and Reuse – Overview	324
Improving Web-Site Maintenance with TANGOW by Making Page Structure and Contents Independent	325
<i>Rosa María Carro, Estrella Pulido and Pilar Rodríguez</i>	
Web Design Frameworks: An Approach to Improve Reuse in Web Applications	335
<i>Daniel Schwabe, Gustavo Rossi, Luiselena Esmeraldo and Fernando Lyardet</i>	
 Web Engineering Resources	 353
 Author Index	 357