Software Reuse in the Emerging Cloud Computing Era

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Section 1
Reuse Assets

Chapter 1
Software Asset Re-Use: Migration of Data-Intensive Legacy System to the Cloud Computing Paradigm ........................................................................................................................................................................ 1

Richard Millham, University of Bahamas, Bahamas & Durban University of Technology, South Africa

This chapter examines the migration process of a legacy system, as a software-as-a-service model, to the Web and looks at some of the reasons that drive this legacy system migration. As migration is often a multi-step process, depending on the legacy system being migrated, the author outlines several techniques and transformations for each step of the migration process in order to enable legacy systems, of different types, to be migrated to the cloud.

Chapter 2
Model Expansion in Model-Driven Architectures........................................................................ 28

Tsung Lee, National Sun Yat-Sen University, Taiwan
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This chapter introduces a model expansion method that is used in a new methodology of model composition and evolution for broad design domains. In the methodology, hierarchical model compositional relationships are captured in a model composition graph (MCG) as a schema of designs. An MCG schema can be used as a blueprint for systematic and flexible evolution of designs with three hierarchical model refinement operations: expansion, synthesis, and configuration.
Chapter 3
Components and Frameworks in the Cloud Era ........................................................................... 51
Dino Konstantopoulos, The MITRE Corporation, USA
Mike Pinkerton, Northrop Grumman Corporation, USA
Eric Braude, Boston University, USA

This chapter describes some of the most popular and innovative software reuse in the Cloud. By categorizing software in these dual categories, the authors glimpse the practices of source code, binary code, components, and frameworks that prime them for massive reuse and establish them as building blocks of software innovation.

Chapter 4
Service-Oriented Architecture: Adoption Challenges ................................................................. 70
Qusay F. Hassan, Mansoura University, Egypt

This chapter lists the most important challenges that might prevent adopters from successfully implementing SOA in their organizations, with the help of some recommended solutions. Furthermore, it presents a step-by-step implementation case study in order to teach beginners the best ways to apply SOA to their organizations.

Section 2
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Indika Kumara, WSO2 Inc, Sri Lanka
Chandana Gamage, University of Moratuwa, Sri Lanka

This chapter describes the development of software systems having different architectures reusing most of the implementations of the required functionalities as-is. It presents a systematic process for crafting multi-architecture reusable components and for using those components in formulating software systems. Furthermore, the chapter highlights the significance of the strategic reuse across systems in three contemporary research spheres.

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Vishav Vir Singh, Intersil Corporation, USA

This chapter follows the contours of evolution from object orientation to Cloud Computing and Service-oriented Architecture (SOA) to understand reusability in the context of service syndication based on the API handshake approach between diverse systems.
Chapter 7
Reuse across ESB Systems

Indika Kumara, WSO2 Inc, Sri Lanka
Chandana Gamage, University of Moratuwa, Sri Lanka

To produce several ESB variations successfully, a systematic reuse across ESB systems is crucial. Therefore, the commonality in ESB products, which is comprised mainly of ESB services, should be strategically exploited, and this chapter discusses an approach to realize it. The authors present a platform that can derive architecturally heterogeneous ESB products from reusable ESB services. Their approach for building the platform leverages aspect oriented programming.

Chapter 8
Information Feedback Based Architecture for Handling the Scalability Issues in the
Reusable Cloud Components

Manjunath Ramachandra, Philips Innovation Campus, India
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Although it is transparent to the user through virtualization, that is also a strength of cloud computing, the runtime scalability of resources to cater for a variety of services is to be addressed to meet the critical factor of the agreed quality of service. In this work, an architecture based on information feed-back is presented to address this issue. The findings have been supported by the simulation results.

Section 3
Reuse in Cloud Applications

Chapter 9
Understanding Cloud Computing

Qusay F. Hassan, Mansoura University, Egypt
Alaa M. Riad, Mansoura University, Egypt
Ahmed E. Hassan, Mansoura University, Egypt

This chapter tries to demystify cloud computing by means of introducing and simplifying its terms to readers with different IT interests.

Chapter 10
Social CRM: Platforms, Applications, and Tools

Anteneh Ayanso, Brock University, Canada

This chapter provides an overview of social customer relationship management (CRM) and explores the Web-based platforms that provide social CRM solution in software as a service (SaaS) model as well as the applications and tools that complement traditional CRM systems. Based on a review of current practices, the chapter also outlines the potential benefits social CRM provides to organizations in their sales, service, and marketing efforts.
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   Barbara Gallina, Mälardalen University, Sweden
   Nicolas Guelfi, University of Luxembourg, Luxembourg

In the literature, several transaction models exist. Choosing (reusing entirely) or introducing (reusing partially) transaction models for cloud computing is not an easy task. The difficulty of this task is due to the fact that it requires a deep understanding of the properties that characterize transaction models to be able to discriminate reusable from non-reusable properties with respect to cloud computing characteristics.

Chapter 12
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   Lin Liu, Tsinghua University, China

This chapter formulates the service-oriented requirements analysis as an automated feedback control process, in which the classical once for all philosophy is replaced with a continuous learning, negotiation, and adaptation process. Based on the existing requirements model and new service requests, the proposed service requirements elicitation framework ASREGL aims to achieve an optimal service supply and demand relationship. The current control variable is the similarity of the service requirements and capabilities.

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