Chapter XXV
Philosophy of Architecture
Design in Web Information Systems

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ABSTRACT

This article defines a comprehensive set of guiding principles, called philosophy of architecture design (PAD), as a means of coping with the architecture design complexity and managing the architectural assets of Web information systems in a service-oriented paradigm. This coherent model comprises a multidimensional collection of key guiding principles and criteria in system analysis, modeling, design, development, testing, deployment, operations, management, and governance. The systematic framework provides a multidisciplinary view of the design tenets, idioms, principles, and styles (TIPS) in the IT architecting practices for engineering process and quality assurance. There are 26 constituent elements defined in the scheme, the names of which form an array of A-Z using the first letter. The characteristics and applicability of all 26 dimensions in the PAD model are articulated in detail. Recommendations and future trends are also presented in the context. This overarching model has been extensively leveraged in one format or another to design a wide range of Web-based systems in various industry sectors.
INTRODUCTION

In today’s fast-paced global business landscape, Information Technology (IT) is facing an unprecedented challenge to do more with less. IT must keep creating and adding values to the business, while managing to lower the total cost of ownership (TCO) without sacrificing the quality and level of services. To satisfy the increasing and constantly-changing business demands, IT must build more flexible, complex, scalable, extensible, innovative, and forward-thinking technical solutions.

The enterprise computing environment in large organizations has grown exponentially in the past few years, with hundreds, if not thousands, of information systems applications developed, purchased, or acquired to provide electronic services to both external customers and internal employees. It is not uncommon nowadays that heterogeneous architectures and technologies are all over the place, in order to meet diverse functional and non-functional requirements from different lines of business. The financial service industry, for example, is no exception. The banking business process is normally composed of various business sectors in consumer, commercial, wealth management, corporate investment, and capital markets. Services can be accessed by means of a broad range of delivery channels such as branches, Automated Teller Machines (ATMs), Web browsers, interactive voice response, call centers, emails, mobile devices, instant messaging, snail mails, and so on. To effectively manage the architecture assets and optimize the design practices in such a diverse paradigm, a multidisciplinary design approach is critical to abstract concerns, separate duties, mitigate risks, and encapsulate complexity.

BACKGROUND

Extensive investigations have been conducted in the past two decades to establish practical approaches to dealing with the issue of architecture complexity that has grown drastically as the computing space has evolved from a monolithic to a service-oriented paradigm. A logical structure was designed in the Zachman Framework (Zachman, 1987) as a piece of pioneer work to classify and organize the descriptive representations of an enterprise IT environment that are significant to the management and the development of information systems in an organization. In the form of a two-dimensional matrix mainly used as a planning or problem-solving tool, the framework has successfully achieved a level of penetration in the domain of business and information systems architecture and modeling. Due to historical reasons, however, it tends to implicitly align with the data-driven approach and process-decomposition methods, and it operates above and across the individual project level. Similar to the Zachman Framework, Extended Enterprise Architecture Framework (E2AF) (IEAD, 2004) also uses a 2-D matrix covering business, information, system, and infrastructure, but it is designed in a more technology-oriented fashion. The Open Group Architectural Framework (TOGAF) (The Open Group, 2007) describes a detailed framework with a set of supporting tools for developing enterprise architecture to meet the business and information technology needs of an organization. Architecture Development Method (ADM), Enterprise Architecture Continuum, and TOGAF Resource Base constitute the core parts of TOGAF. The scope of TOGAF includes Business Process Architecture, Applications Architecture, Data Architecture, and Technology Architecture. Instead of focusing on the level of individual application architecture, TOGAF is targeted towards the enterprise architecture level.