

# Chapter VI

## Comprehensive Architecture Rationalization and Engineering

**Tony C. Shan**

*Bank of America, USA*

**Winnie W. Hua**

*CTS, Inc, USA*

### ABSTRACT

*This chapter defines a methodical approach, named Comprehensive Architecture Rationalization and Engineering (CARE), to effectively manage the complexity in architecture design and rationalize the architectural assets of IT application portfolios in a service-oriented paradigm. This comprehensive model comprises a prescriptive method to perform a systematic assessment of information systems applications in an application/project portfolio. The process is broken down to 5 interrelated steps: Data Collection, Reverse Engineering, Technology Assessment, Technical Recommendations, and Action Plan for Rationalization. The details and key artifacts are specified for each step in the overarching process. The outcome of the comprehensive analysis consists of a range of technical recommendations and a course of action, which are characterized along three dimensions: refactoring, reengineering, and rearchitecting. The holistic framework provides a multidisciplinary approach of portfolio analysis and service-oriented architecture planning. Practice guidelines and future trends are also articulated in the context. A case study in the finance industry is presented, to illustrate the use of this framework in real-world scenarios.*

## INTRODCUTION

In today's on-demand business world, the electronic business models demand increasingly higher performance of information technology (IT) systems. We must provide a higher level of services at a lower cost, for the business to compete and succeed. This means that IT has to build more complex, flexible, scalable, extensible, and forward-thinking technical solutions, to meet the ever-growing business needs.

Many large organizations like worldwide financial institutions typically have very large portfolios consisting of a vast number of IT applications and systems built, acquired, or purchased in the past years to provide electronic services for external customers and internal employees, leveraging mixed technologies and platforms to meet diverse functional and nonfunctional requirements from distinct lines of business. In the finance industry, the business operations generally encompass different business divisions in consumer, commercial, small business, wealth management, capital markets, brokerage, and investment. Products and services are delivered via different channels such as Automated Teller Machines (ATMs), Web browsers, interactive voice response, live agents, emails, pervasive devices, and so forth. For the sake of effective management of architecture assets and rationalization of architecture designs in such a heterogeneous environment, an discipline-driven engineering approach is of critical importance to abstract concerns, divide duties, mitigate risks, simplify the complexity, reverse-engineer established systems, discover revamping opportunities, overhaul old systems, and measure technology maturity, which leads to well-contemplated program recommendations and action plans for rationalization.

## BACKGROUND

Prior work on the IT architecture has strived to address the complexity issue in architecture design, which has grown exponentially as the computing paradigm has evolved from a monolithic structure to a service-oriented architecture. John Zachman (1987) pioneered a framework consisting of a logical structure for classifying and organizing the descriptive representations of an enterprise IT environment's artifacts that are significant to the management of the organization as well as to the development of the enterprise's information systems. Zachman Framework takes the form of a two-dimensional matrix, and has achieved a level of penetration in the business and information systems architecture domains. Its primary usage is for planning and problem solving, but it tends to implicitly gear towards the data-driven and process-decomposition approach. It operates above and across the level of individual projects. Likewise, Extended Enterprise Architecture Framework (E2AF) (IEAD, 2004) uses a similar a 2-D matrix structure. Its scope contains business, information, system, and infrastructure. E2AF is more technology-oriented than Zachman Framework.

To overcome the deficiencies in the preceding two methods, Rational Unified Process (RUP) (Kruchten, 2003) attempted a use-case driven, object-oriented and component-based approach by means of Unified Modeling Language (UML). In the concept of 4+1 views, the overall system structure is interpreted from multiple perspectives. RUP tends to be more process-oriented, originated in a waterfall-like approach. It pays little attention to either system operations or software maintenance, and lacks a broad coverage on runtime topology and testing capabilities. Its main focus is on the individual project level. RUP has recently been expanded to Enterprise Unified Process (EUP) (Nalbone, Vizados &

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