Chapter 15

Characterising Web Systems: Merging Information and Functional Architectures

David Lowe and Brian Henderson-Sellers
University of Technology, Sydney

ABSTRACT

Expenditure on Web-based initiatives has grown rapidly over the last five years, with a growing trend towards integrating these systems into the core business of many organisations. The architecture of these systems, however, tends to be quite complex – merging both a complex information architecture with a sophisticated technical architecture, with both being contextualised within new business models. An important key in achieving more effective Web system development within this rapidly changing environment will be a design approach that facilitates the creation of architectures that actively encompass both functional and informational elements, and which links both to the business model in a way that creates strong cohesion. This, in turn, requires both an appropriate architectural modelling language (particularly one that links the technology to the business model) and a process for carrying out the architectural design. In this chapter, we discuss both these aspects, looking at a model of Web systems that emphasizes the links between the various architectural elements and process-level support for design activities.

INTRODUCTION

There has been recent phenomenal growth in investment in online systems. A recent International Data Corp. report predicted that U.S. expenditure on Web-based initiatives would grow from US$12 billion in 1999 to $43.6 billion in 2002. The systems being developed are becoming increasingly important to the core business practices of many organisations and, consequently, to their business success. Essentially, they leverage the rapidly evolving infrastructure of the Internet and the increasingly complex set of Web standards, protocols and technologies to provide sophisticated business applications, including but not restricted to: business-to-business (B2B) interactions; e-commerce and electronic retailing systems; business support and workflow management; and governmental services.

These systems are much more complex than simple Web sites containing only static pages. They typically utilise Web technologies to provide a complex distributed front-end (often, though not universally, accessible through Web browsers) combined with high-performance back-end software systems that integrate the systems with critical business processes.

The architecture of these systems tends to be quite complex – merging a multifaceted information architecture with a sophisticated functional architecture. The information architecture encompasses aspects such as content and interaction modelling, informational viewpoints, user adaptation, and navigational support The functional architecture typically has a structure composed of a diverse component-based middleware layer (Russell, 2000) with significant "glue" code, a highly customised thin front-end providing the interface and functionality to users of the system, and a highly customised back-end integrating the system with legacy and/or related systems. The component-based middleware layer usually makes extensive use of Commercial-Off-The-Shelf (COTS) subsystems with custom software created to integrate the various components.

The architecture (and in particular the technical aspects thereof) is usually highly constrained by the broader support infrastructure. For example, the requirements of having to work within the framework provided by existing Web browsers, data and document formats (such as HTML and XML), Internet limitations (such as bandwidth and security issues), etc., places tight constraints on the form that solutions may take. It also means that the solutions are much more directly related to the business needs being addressed and the resultant business models.

Figure 1: Typical Web development process
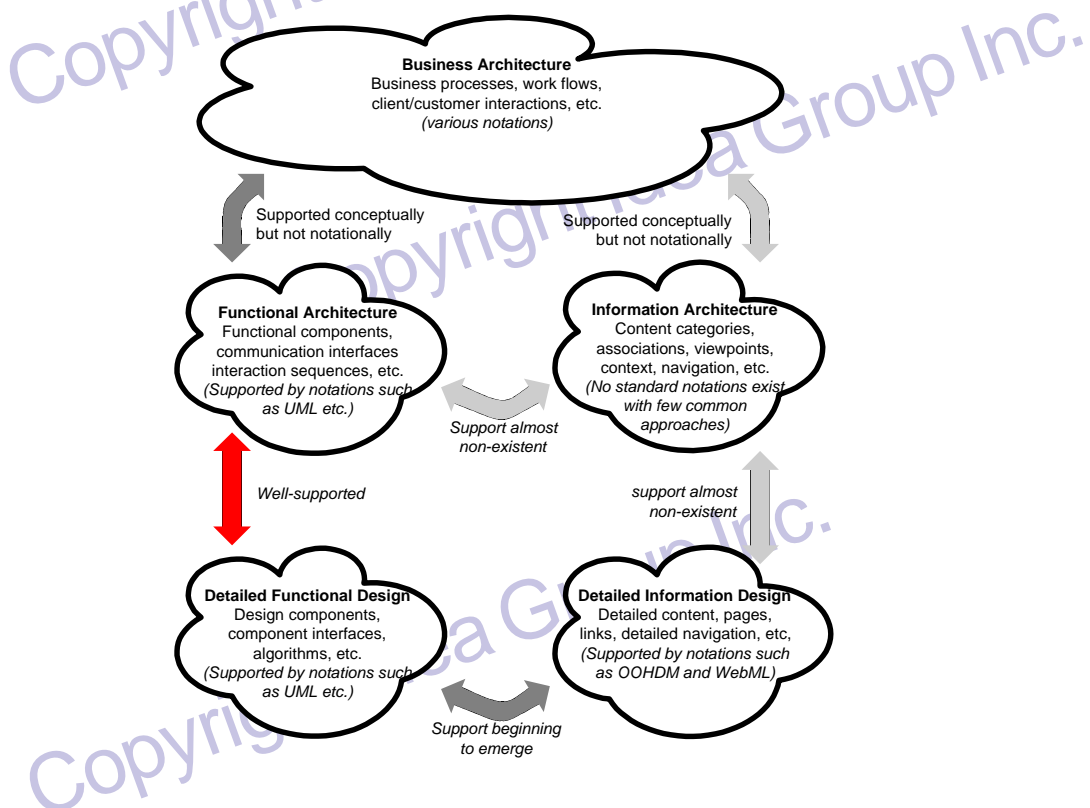
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