



Chapter 6

Integration of Database and Internet Technologies for Scalable End-to-End E-commerce Systems

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ABSTRACT

The content of many Web sites changes frequently. Especially in most e-commerce sites, Web content is created on request, based on the current state of business processes represented in application servers and databases. In fact, currently 25% of all Web content consists of such dynamically generated pages, and this ratio is likely to be higher in e-commerce sites. Web site performance, including system up-time and user response time, is a key differentiation point among companies that are eager to reach, attract, and keep customers. Slowdowns can be devastating for these sites, as shown by recent studies. Therefore, most commercial content-providers pay premium prices for services, such as content delivery networks (CDNs), that promise high scalability, reduced network delays, and lower risk of failure. Unfortunately, for e-commerce sites, whose main source of content is dynamically generated on demand, most existing static content-based services are not applicable. In fact, dynamically generated content poses many new challenges for the design of end-to-end (client-to-server-to-client) e-commerce systems. In this chapter, we discuss these challenges and provide solutions for integrating Internet services, business logic, and database technologies, and for improving end-to-end scalability of e-commerce systems.

INTRODUCTION

The content of many Web sites change frequently: (1) entire sites can be updated during a company restructuring or during new product releases; (2) new pages can be created or existing pages can be removed as incremental changes in the business data or logic, such as inventory changes, occur; (3) media contents of the pages can be changed while HTML contents are left intact, for instance when advertisements are updated; and (4) (sub)content of pages can be dynamically updated, for instance when product prices change. Some of these changes are administered manually by Webmasters, but most are initiated automatically by the changes in the underlying data or application logic. Especially in most e-commerce sites, Web content is created on-request, based on the current state of business processes represented in application servers and databases. This requires close collaboration between various software modules, such as Web servers, application servers, and database servers (Figure 1), as well as Internet entities, such as proxy servers.

Figure 1: Database-driven dynamic content delivery versus static content delivery.

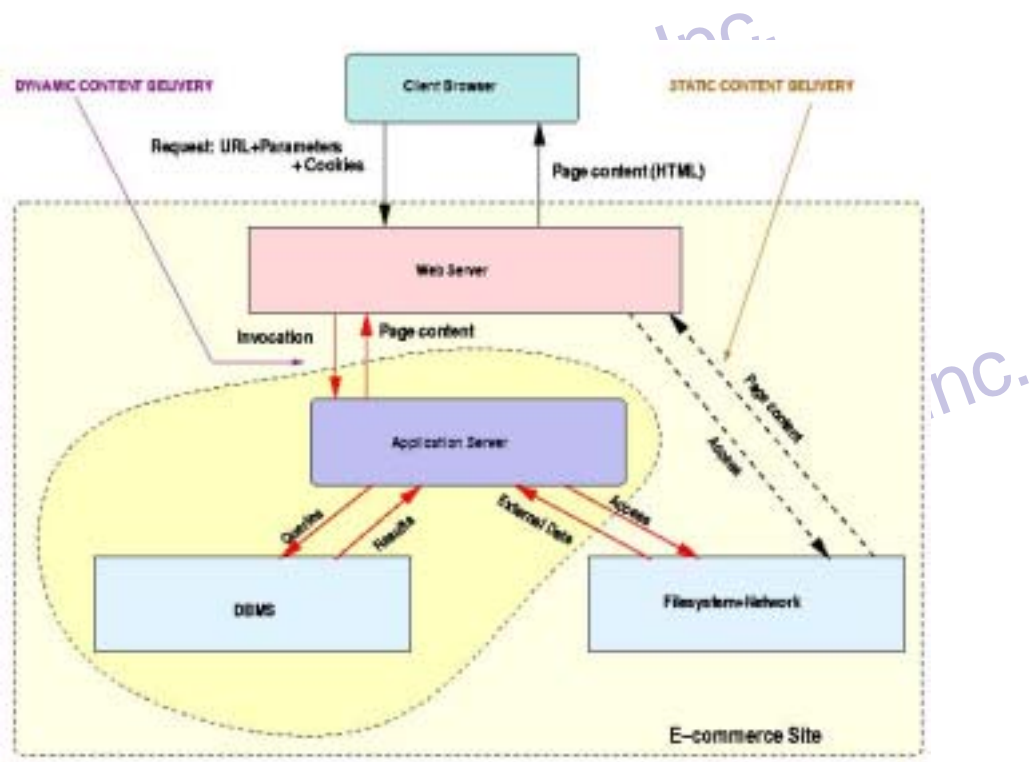


Table 1: Relationship between the time required to download a page and the user abandonment rate.

Download time	Abandonment rate
< 7 seconds	7%
8 seconds	30%
12 seconds	70%

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