

Chapter 9

Business Intelligence– as–a–Service: Studying the Functional and the Technical Architectures

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ABSTRACT

In recent years, the data warehousing infrastructures have undergone many changes in various aspects. This is usually due to many factors: the emergence of Software-as-a-Service (SaaS) architecture model; the success of agile and iterative Data Warehouse (DW) development approaches; the introduction of new approaches based on the Model Driven Architecture (MDA); the changing needs of organizations and the extension of the DW into new application areas; and the evolving of standards and open-source technologies. This chapter explores several aspects that may influence the next-generation of data warehousing platforms: the architectural aspects for business intelligence-as-a-service deployment, the promising open industry standards and technologies recommended for use, and the emerging methodological aspects for DW components engineering.

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1. INTRODUCTION

Software-as-a-Service (SaaS) is a model for software delivery that allows lower total cost of ownership and better return on investment for subscribers (Software & Information Industry Association, 2006). Recently, several Business Intelligence (BI) platforms including some well known names have embraced this new model of architecture. These solutions present many advantages derived in general from the advantages of the SaaS concept. However, few solutions offer integrated platforms that cover all functional and technical aspects of the data warehousing architecture. Indeed, these tools focus only on the problem of the business intelligence services deployment. They provide a partial on-demand solution to the problem of data warehousing design. Furthermore, none of these solutions offers an integrated model-driven Data Warehouse (DW) development approach and a web-based environment that supports this approach. Finally, there are few studies on open standards and open-source business intelligence tools integration in this context.

This chapter deals with two important aspects of BI-as-a-service architectures: (i) the functional aspects to deliver business intelligence services covering the Model-Driven Data Warehousing (MDDW) services; and (ii) the technical aspects covering the recommended open industry standards and open-source tools. The chapter provides several recommendations for data warehousing standards and development technologies. It, mainly, helps project managers and organizations involved in developing web-based business intelligence solutions.

We study the advantages of SaaS deployment model. Some industry experiences (BusinessObjects, MicroStrategy, etc.) are, also, presented. Then, a proposal for a common functional business intelligence as-a-service architecture is described. We focus on the data warehousing projects management and components design services. We discuss the model-driven DW approaches integra-

tion. Indeed, such approaches of DW engineering provide several advantages and their integration in a SaaS environment seem more promising. So, we introduce the model-driven DW development in the cloud using our approach (Essaidi & Osmani, 2009) based on the Model Driven Architecture (MDA) and the 2 Track Unified Process (2TUP). The MDA/2TUP based process for DW engineering and its advantages are thus presented.

Moreover, we study the data warehousing standards and open-source business intelligence and web-applications development tools integration. Indeed, only a few solutions propose a standard and integrated DW design framework like the Common Warehouse Metamodel (CWM). Other MDA-compliant metamodels are useful, but they are not yet integrated as the Ontology Definition Metamodel (ODM). In addition, little information is available on the technical architecture of data warehousing platforms. Consequently, we give several recommendations concerning the standard industry tools, languages, and business intelligence APIs which can be integrated. Then, a technical architecture for the business intelligence-as-a-service based on the most popular open-source frameworks is described. The proposed technical architecture is based on Java Enterprise Edition (JEE) technologies using spring framework.

The chapter is organized as follows: the next section gives a review of the literature and an overview of main concepts related to our proposal. Section 3 describes the proposed architectures (functional and technical) for Business Intelligence-as-a-Service including our approach for the MDDW-as-a-Service. In section 4, we discuss the main future research directions related to the BI-as-a-Service. Finally, section 5 depicts our conclusions and future work.

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