Information Integration Challenges for Electronic Campus: Roles of Metadata

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Abstract - This paper describes the challenges of information Integration for an electronic campus, and the roles of Metadata in the process of Information Integration in the higher learning institutions. The use of e-transaction, e-learning and e-management has become part of campus life and increasingly becoming a determinant for prospective student in selecting which university to enrol. However, the main challenge of electronic campus systems today is on how to integrate all these different applications. This paper tries to elaborate the information integration challenges, and describes the roles of Metadata that can be used to provide an end-to-end solution for transparently managing the volume and diversity of data in electronic campus.

Keywords: Information integration, electronic campus, metadata, enterprise information integration, data accessibility.

1 Introduction

‘Information integration’ is a technology approach that combines core elements from data management systems, content management systems, data warehouses, and other enterprise applications into a common platform [2].

Metadata is information that describes another set of data. A simple example is a library catalog card, which contains data about the contents and location of a book: It is data about the data in the book referred to by the card. Other common contents of metadata include the source or author of the described dataset, how it should be accessed, and its limitations. In other words, metadata provides information about the content, quality, condition, and other characteristics of data. Metadata has become important on the electronic campus because of the need to find useful information from the information available. Metadata is more properly called ontology or schema when it is structured into a hierarchical arrangement. Both terms describe “what exists” for some purpose or to enable some action [9].

‘Electronic campus’ refers to learning and teaching environment that desires sophisticated infrastructure and electronic-based transactions with latest and appropriate technology. Supported by advanced technologies, an electronic campus is designed to optimize efficiencies of management, education, and research productivity of the campus, through systematic management of campus information flows. Many electronic campus today have various types of applications deployed that consists of many integrated information. Information Integration can be considered as a software process that combines heterogeneous data sources in order to support applications that present or analyze the data in new ways. In a university campus environment, Information Integration provides a service that allows administrators, developers, and end-users to treat a broad array of data sources as if they were one large database or data service. According to [1], before Information Integration, most applications created their own links to back-end data sources, without coordination. Information Integration provides a common infrastructure on which all links can be built. This common infrastructure enables more rapid development, more cost effective centralized administration of data from multiple data sources, and more flexible presentation and analysis of more data sources.

The evolution of software technology for higher education institutions is almost similar to enterprises’ evolution. According to [2], for the past 30 years, data management systems have been at the core of enterprise software infrastructure. Figure 1 captures their evolution. Over the next two decades, with outstanding leadership from IBM’s research and development teams, the relational database has been