

Linking Businesses to Deliver Value: A Data Management Challenge

Anand Deshpande

Persistent Systems Private Limited
Panini, 2A Senapati Bapat Road
Pune
India
anand@pspl.co.in

Abstract

Internet based eCommerce is expected to grow at a phenomenal rate. As businesses rapidly move to deploy business-to-business eCommerce solutions, systems designers are likely to face new challenges while integrating and managing data.

In this presentation, I propose to discuss some of the new business models and the impact on data management in the context of these evolving eCommerce scenarios.

1. Introduction

As enterprises start to conduct serious business on the Internet, business practices and models as we know today will dramatically change and newer business models will replace existing ones.

In this presentation we discuss different business models that are likely to evolve as enterprises figure out innovative ways of transacting business in the Internet Economy. We discuss technologies that will evolve to enable these transactions to happen seamlessly. We believe that with the growth of broadband and wireless capabilities and the standardization offered by XML, Internet infrastructure will evolve to a data-oriented network offering services where businesses would plug-in for data access. Falling costs of appliances and cost of

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communicating data will enable new appliances to be part of this plug-and-play Internet economy.

With changes in business processes and technologies, it is quite clear that challenges for managing data are only likely to grow. The amount of data being managed by organizations is growing exponentially and this trend is likely to continue. Data is no more stored in any one database but enterprises deal with data scattered all over the Internet. Businesses will want to be far more flexible about sharing data with others at different times. While making all these changes, investments in existing systems will have to be protected

The deployment of Internet e-Commerce is likely to happen very rapidly over the next three to five years. As businesses start to deploy business-to-business e-commerce over the next few years, application developers will have to address these challenges as they come. In this dynamic world, it is appropriate for the database research community to anticipate the evolution of new business practices in the Internet economy and work on finding solutions to these problems. In this talk we will identify some of data management challenges that must be addressed for a smooth transition to the new economy.

2. Data Management Challenges

In this section, we list some areas that database researchers could help enable business-to-business eCommerce.

2.1 Security

The notion of “insiders” and “outsiders” has changed. Companies have limited duration partnerships of where they are interested in sharing information on a need basis. Defining policies and other mechanisms that allow businesses to share precise information for a specified period is essential. At the same time, adequate access

control mechanisms would have to ensure that the privacy of data is not compromised.

2.2 Document-based Data Model

The granularity of objects in a relational database system is typically tables, attributes etc. The granularity of data exchange in the B2B eCommerce scenario is likely to be at the level of business objects such as a Purchase Order or an Invoice. While it is possible, to map data from such documents into base tables, we need better abstractions in the data management layer that permit interaction that is consistent with the requirements of the business.

2.3 XML: getting beyond the hype

XML is evolving as the de-facto standard for data interchange. While efforts to standardize XML are important, the real value of b2b eCommerce is possible only if business interchange documents are standardized. While document exchange systems hold promise, metadata repositories and other associated infrastructure would have to evolve before XML can have serious impact.

2.4 Data Extraction

Businesses already have data in multiple diverse data sources. Extracting data from these diverse sources to allow interoperability would be essential for the success of the new eCommerce infrastructure. These data sources are likely to be databases, documents on the web and various legacy systems. The problem is significantly complicated because raw data as stored in databases is not entirely useful and one needs to have the necessary wrappers to extract information from these applications.

2.5 Wireless and Mobile Devices

Wireless devices are getting popular. Wireless devices such as cell phones typically have very small screens and very small caches. The transfer speeds are also quite low. A model with caches distributed with service providers at various locations on the network make it possible to design interesting applications that include mobile devices as part of the eCommerce systems. Voice activated eCommerce through cell-phones and other mobile devices is also likely to create interesting challenges.

2.6 Distributed Data

Data is already distributed all over the network. It is a challenge to present to the user an appropriately unified view of data despite the distribution of the data over distant geographic locations.

2.7 Caching and Performance

As more and more business is transacted over these networks, performance will be a primary concern. Research in replication and caching would be essential to improve performance in these distributed data framework. As there is far too much data to cache and innovative application sensitive caching will be necessary to provide improved performance.

2.8 Data Overload

We are already living in a world of data overload; marketplaces and other eCommerce environments are going to enable us to get access to more data than we would want to. Significant opportunities exist in terms of creating tools and services to sift through large volumes of data would be an important challenge. Data mining tools and other visualization tools that make it easier for end-users to make sense out of their data would be essential.

2.9 More forgiving data models

Database models are based on fairly rigid assumptions. Business models in the real world are more forgiving and account for certain delays and permit retries in the business processes. It is not essential at the macro level to have the same level of transaction support as is common in relational databases. Models that use redundancy and can handle failure gracefully need to evolve.

2.10 Zero Administration and Reduced Deployment Resources

Most businesses have had very high IT spending over the last five years due to Year 2000 and ERP implementations. Companies do realize that they need to adopt new technologies but are uncomfortable with systems that require very high customization and deployment resources. There is an acute shortage of programmers and businesses are looking for solutions that do not require large armies of programmers.

3. Conclusion

These are interesting times for both the business and the software community. E-Commerce solutions will have significant impact on how we do business and business models will evolve to suit the evolution of technology.

It is quite clear that data management will remain an important challenge and it is up to the database community to evolve to suit these new requirements.