E-Commerce Strategies

Scenarios for Commercial Web Applications Using the Windows Server System

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Abstract

This document explores two e-commerce scenarios, namely a retail (business to consumer) scenario and a supplier (business to business) scenario. These scenarios attempt to give a high level insight into the processes and considerations needed when producing a commercial web application.

1. Introduction

Project Magma involves the examination of the business processes involved in implementing a commercial web application. The project was divided into two distinct "systems" namely magmablue (retail application) and magma BizStream (supplier orchestration systems).

This document reviews each of these commercial scenarios using the Windows Server System, and attempts to provide an understanding of the process requirements needed for each approach.

2. Background and Motivation

2.1 Application Architecture

The commercial application world is divided primarily into two distinctive approaches to commerce:

- Business to Consumer (Retail); and
- Business to Business (supplier)

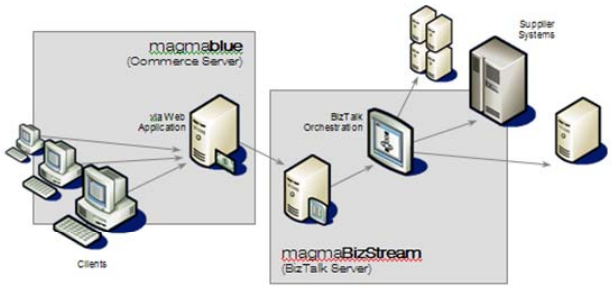

Figure 1 - Conceptual Application Architecture Model

The two models define the interaction in different ways and need to be addressed in different ways. The scenario's which follow address each of these approaches using hypothetical data based on the work undertaken in Project Magma.

2.2 Major Design Challenges for Commerce

According to the Shopping Services Architecture Pattern Summary [1], the initial rush for business to create shopping sites resulted in a number of issues being raised. This in turn resulted in a wide variety of approaches to such a project.

The biggest problem with designing and implementing shopping sites has been that many sites "failed to derive the expected business benefits." [1]

According to this architecture pattern summary [1] many unsuccessful designs shared the following important characteristics:

- Sites were not designed to be integrated with the rest of the business.
- Sites were too impersonal.
- Pilots that were inadequate became operational services.
- Sites were not sufficiently adaptable to changing business requirements.

- Online shopping services suffered from poor fulfilment.

From a more technical perspective, the major design challenges are the positioning and placing of services such as web services and the Windows Server System.

Other more important issues relate to orchestration and integration of services and modules. Other important challenges are: system security; practices employed; scalability and robustness; maintainability; usability and manageability.

2.3 Motivation for E-Commerce Strategies

As there are a number of issues raised when dealing with commercial systems, there is an industry requirement for enterprise and commercial patterns and practices that can be applied within certain contexts.

The scenario idea provides a real world view of a process that can be followed as guide to creating commercial web applications with both the retail and the supplier contexts.

3. Scenarios

This section provides an overview of the two main e-commerce scenarios: firstly a retail (business to consumer) scenario, and then a supplier (business to business).

Each of these scenarios uses principles and process models used in the production of the project magma systems.

3.1 Retail Scenario

3.1.1 Putting Together the MagmaBlue Team

Magma Communications itself is a thriving media company, currently investing time and effort in expanding its media stakes into the retail market. Having had success in starting a chain of retail stores (magma**media**) they now wish to leverage their newly found success within the retail market by expanding into the realm of e-commerce.

With this idea in mind, a panel of senior executives from Magma Communications put together an inter-disciplinary team that would plan, develop and deploy the retail web application. This application would allow users to purchase products, all available through the magma**media** chain, on the World Wide Web. The executives also specified that the system would need to be scalable and prepared for future growth, as the media chain expands and as customer needs change.

The ideal team consists of:

The team primarily consisted of the following members [2]:

- **System administrator**
- **Site designers**
- **Interface designers**
- **Site developers**
- **Testers**
- **Marketing staff**
- **Technical writers**
- **Accounting staff**
- **Security staff**
- **Third party systems integrator**

3.1.2 Planning

The team has two main goals: [2]

- To deploy the retail application as soon as possible; and
- To ensure that the application effectively integrates with other business systems.

The team can then divide into a series of planning groups:

Commerce Server Installation Planning – aim to choose which features of commerce server features that would be used and installed.

Site Architecture and Security Planning – plan how to integrate with existing systems and to identify any custom code, including web pages (ASP.net pages) that could need to be developed.

Deployment Planning – develop checklists to ensure that all systems are ready for deployment.

3.1.3 Development

The first step in developing the retail application was to assess the level of component reuse. Would the team reuse existing components provided in the Commerce Server SDK or would they start the retail application from scratch? This assessment involved reviewing the Retail Solution Site and experimenting with the features and capabilities of this largely pre-built retail application. A blank site was also reviewed so that the team could effectively determine which development route/cycle was most appropriate.

Realising that one of the original requirements was "to deploy the retail web application as soon as possible" (§3.1.2) and for this reason the team decided that the Retail Solution Site provided a better foundation that could more easily satisfy this primary project requirement. So with the retail solution site as the foundation of the magmablue system the team identified the key areas that needed to be addressed to take advantage of the extensible nature of Commerce Server [2]:

- Importing the magma**media** product catalogues
- Modifying the site look and feel, and some of the site design

- Adjusting the application settings in the web.config file as well as the application configuration resources.

3.1.4 Deployment

By the end of the development process the magmablue team had successfully integrated and developed the retail web application in an environment that correctly corresponded to the system specified for production.

Site Architecture

The site required a physical architecture with the following platforms and systems installed:

- Windows Server 2003 Enterprise Edition

  (Both servers make use of Active Directory, one of the servers being the primary magmablue.local domain controller)
- IIS 6.0
- Microsoft Internet Explorer 6 (SP1)
- Commerce Server 2002 Enterprise Edition (server: Magma)
- BizTalk Server 2004 Release Candidate (server: Zipp)
- Windows Server 2003 Terminal Services
- Microsoft SQL Server 2000 (SP3)
- Microsoft SQL Server 2000 Analysis Services (OLAP)

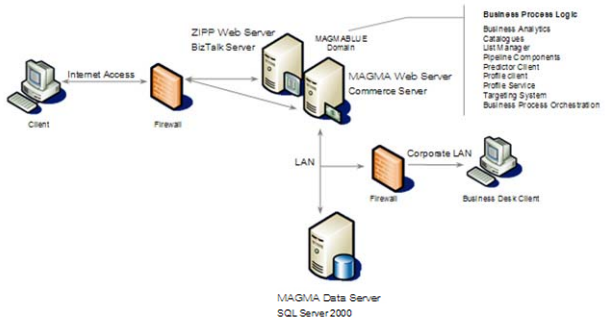

Figure 2 - Site Architecture

Final Testing

Site testing is a continual developmental process, and the final testing phase falls under the MSF notion of stabilization. This phase is done once the site has been deployed to the production environment. Its purpose is to verify that the system works under production circumstances and on the production environment.

3.1.5 Beyond Deployment

Deployment is by no means the final stage to any project, and especially in the case of the magmablue application, what comes beyond deployment is often more important within the context of business application value.

It is the continual management, analysis and enhancement that fall beyond the deployment curtain, which is vital to the success, and therefore business value, of the retail application.

Post-deployment responsibilities can be classified into three areas [2]:

- Collection and storing customer data – this process follows customer visits. Primarily focussing on: specific profile data; click history, and transaction history. Data is collected from web server log files as well as the Commerce Server databases.

- Analysing customer data – this process involves information gathered from the Data Warehouse and provides valuable information to the management team. It identifies types of customers that visit the site, what products are selling well, and which of the advertising campaigns are successful.

- Implementing the site management cycle – this process is by far one of the most important processes during post-deployment. This process can be highly effective and should receive as much attention, within the business process, as solution production. Refer to the chapter on the Microsoft Operations Framework for more detailed information on approaches to post-deployment management.

3.2 Supplier Scenario

3.2.1 Introduction

This part of the paper describes how a company would go about implementing a supplier integration or business-to-business (b2b) web site. In order to effectively illustrate the methodology involved a fictitious book distribution company called "Tiger Wholesale Books" will be used. Tiger Wholesale Books is a legacy system implemented in Project BizStream.

Tiger Wholesale Books serve as a mediator between publishing houses and retail book outlets. This b2b site will use Commerce Server and BizTalk Server to exchange catalogues and purchase orders between Tiger Wholesale Books and the Magma Communications retail site, Magma**blue**.

The implementation will be conducted in four phases [2]:

- Planning

- Development
- Deployment and Testing
- Configuration

3.2.2 Planning

Firstly, Tiger Wholesale Books established a competent and experienced development team. The product documentation was also reviewed to decide on the necessary Commerce and BizTalk Server features to be used. These following were decided upon [2]:

- **Organisation Profile Tracking**
- **Integrated Windows Authentication**.
- **Microsoft Active Directory Integration**
- **Product Catalogue and Purchase-Order Transmission**

3.2.3 Profile Tracking

This tool tracks a set of properties that describe a trading partner. Such properties include name, account number, spending limits etc. The Commerce Server Business Desk is used to set this tool up.

The organisation profile of the retail site to be included with the Tiger Wholesale Books Supplier Site consists of the following properties [2]:

- Name
- Organisation ID
- Trading Partner Number
- Administrative Contact
- Receiver
- Organisation Catalogue Set
- Purchasing Manager

3.2.4 Authentication

This tool verifies the identity of a trading partner communicating with Tiger Wholesale Books over a network. Each of their trading partners has a separate account on their Windows Server.

The authentication System implemented allows for [2]:

- **Identification of users** – This tracks the customers between visits and during a session.
- **Delegate administration** – Administration is delegated for each customer account separately. When a user from one organisation logs on they can manage accounts of members in their organisation
- **Customised Login Page**

3.2.5 Active Directory Integration

This is an administrative tool designed to perform day-to-day tasks. These tasks include creating, deleting, modifying, moving, and setting permissions on objects stored in a directory.

The Trading Partner profile as well as all the users in an organisation will be stored in active directory. Tiger Wholesale Books handle about 100000 purchase orders per month which will be stored in a secure SQL Server 2000 Database.

3.2.6 Integrating with BizTalk

The files exchanged between Tiger Wholesale Books and the Magma**blue** retail site are transmitted using BizTalk and Commerce Server. The necessary catalogue files are converted to XML format by the BizTalk Mapper Tool. Tiger also configured their BizTalk Server to receive purchase orders from Magma**blue**.

Capacity, Performance and Growth requirements were also examined as well as integration with existing systems already in place.

3.2.7 Development

Once planning was complete, Tiger Wholesale Books downloaded the Supplier Solution site. Because this site provided an integrated set of tools for building a b2b site and functionality for "personalisation, merchandising, catalogue searching, customer service and business analytics [2]" were also built-in, Tiger decided that it provided an excellent foundation to build upon.

Five key areas were identified for primary development [2]:

- Converting and importing the catalogue files
- Developing COM (Component Object Model) components
- Modifying the look and feel of the site
- Modifying the _recvpo.asp file

3.2.8 Converting and Importing the Catalogue

The BizTalk Server Mapper tool and the Looping Function were used to convert Tigers catalogue into the appropriate format.

An initial mapping of their catalogue data was performed. Tiger then requested that Magma**blue** confirm that the catalogues could be successfully imported.

3.2.9 Developing COM Components

Once the catalogue had been successfully imported the COM **CatalogUpdate** component was used to automate the process for future imports. A similar **OrderUpdate** component was also developed.

3.2.10 Modifying Look and Feel

Tiger went about modifying the Supplier Solution Site in the same way as Magma**blue**. The following changes were made:

- The site name was modified
- New site styles were created
- The page layout was modified

3.2.11 Deployment and Testing

By the end of development a satisfactory system was in place, which consisted of a number of servers and software components [2]:

- Windows 2003 Server with Network Load Balancing and Active Directory
- IIS 6.0
- Commerce Server
- Windows Terminal Services so as to allow remote access to the Commerce Server **Business Desk**

The diagram below illustrates the architecture required by Tiger Wholesale Books [2]:

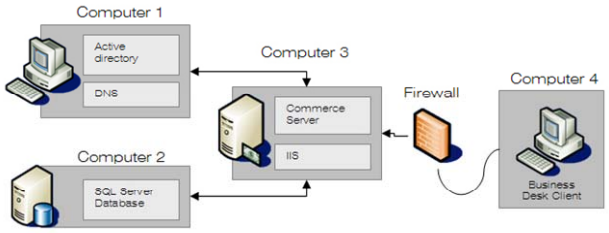

Figure 3 - Theoretical Supplier Computer Architecture

All systems were carefully tested to ensure that all software components operated properly. The security versification procedures were identical to the Magma**blue** tests.

4. Conclusions

These scenarios provide process insight into the production of real world commercial applications. Overall they provide good advice to project teams, developers and managers on how commercial web application should be produced.

More importantly they provide a mechanism of reference for other e-commerce endeavours. They can in many ways be thought of as reference architecture patterns for e-commerce strategy.

One final point is that these scenario's are high level and do not explore the entire plethora of scenario details that would normally be considered. They intend only to provide high level process information.

5. References

[1] **Shopping Services Architect Patterns Summary.** Microsoft Patterns and Practices. MSDN Library. (Obtained from the Patterns and Practices Distribution CD) **http://www.msdn.microsoft.com/library/default.asp?url=/library/en-us/dnrac/html/ssps.asp**

[2] **Microsoft® Commerce Server Resource Kit.** Microsoft Corporation. Copyright © 2001 Microsoft Corporation. **http://www.microsoft.com/mspress/books/4659.asp** (A digital copy of this resource book was obtained through the MSDN)

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"The Microsoft Reference Architecture for Commerce consists of code and documentation designed to accelerate the development of e-commerce solutions for medium to large businesses. The Reference Architecture for Commerce includes a Developer's Guide divided into 4 parts, targeted by audience.

The Reference Architecture for Commerce allows you to jumpstart your commerce site development by providing a working Web site with typical features and functionality. The Reference Architecture demonstrates best practices in designing a site built on Commerce Server 2000. The code and guidance allow you to focus time and resources on extending and customizing the site for your specific requirements." – Patterns and Practices Guide

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"This guide provides architecture-level and design-level guidance for application architects and developers that need to build

distributed solutions with the Microsoft® .NET Framework. This guide assumes you are familiar with .NET component development and the basic principles of a layered distributed application design. This guide is most critical to those that architect and design applications or services; recommend appropriate technologies and products for applications or services; make design decisions to meet functional and non-functional requirements; or choose appropriate communications mechanisms for applications and services." – Patterns and Practices Guide

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"Dramatic opportunities exist today on the Internet for forward-thinking businesses. Businesses have an opportunity to create close working relationships with business partners on the Internet, automating and increasing the efficiencies of trade. Businesses can take advantage of a growing Internet channel for marketing directly to consumers, allowing development of closer relationships with consumers. The Microsoft Internet Commerce Strategy—a comprehensive offering of server and tools, payment, and partners—provides a commerce platform upon which businesses can take advantage of these opportunities." - Document summary

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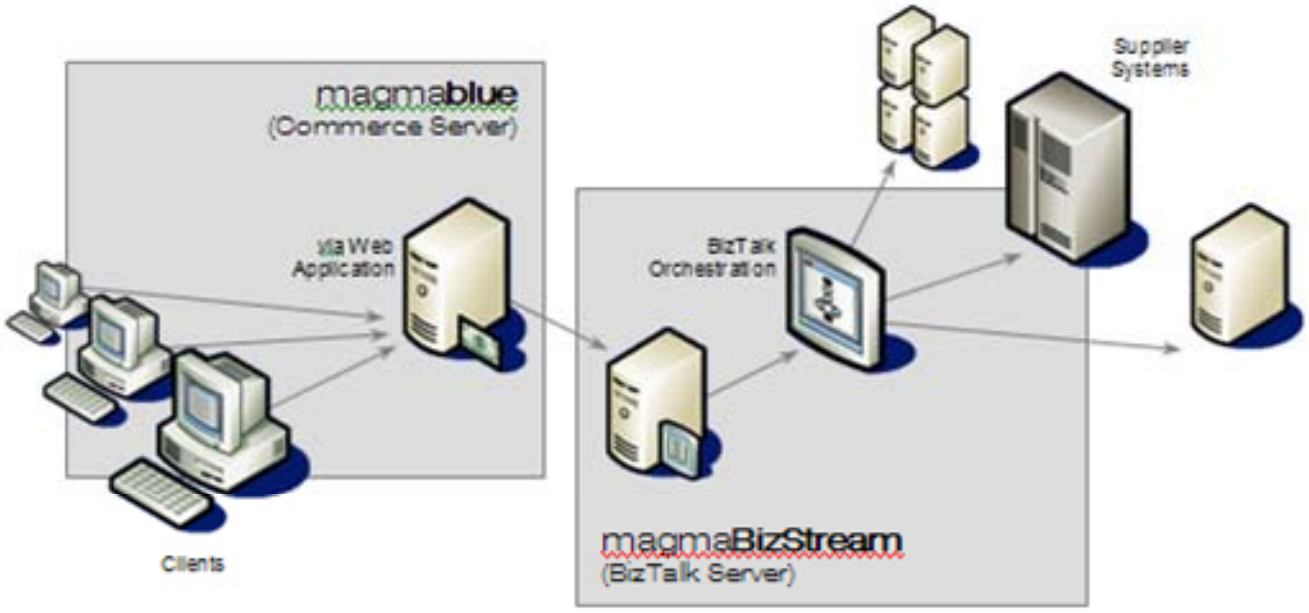
7. Appendices

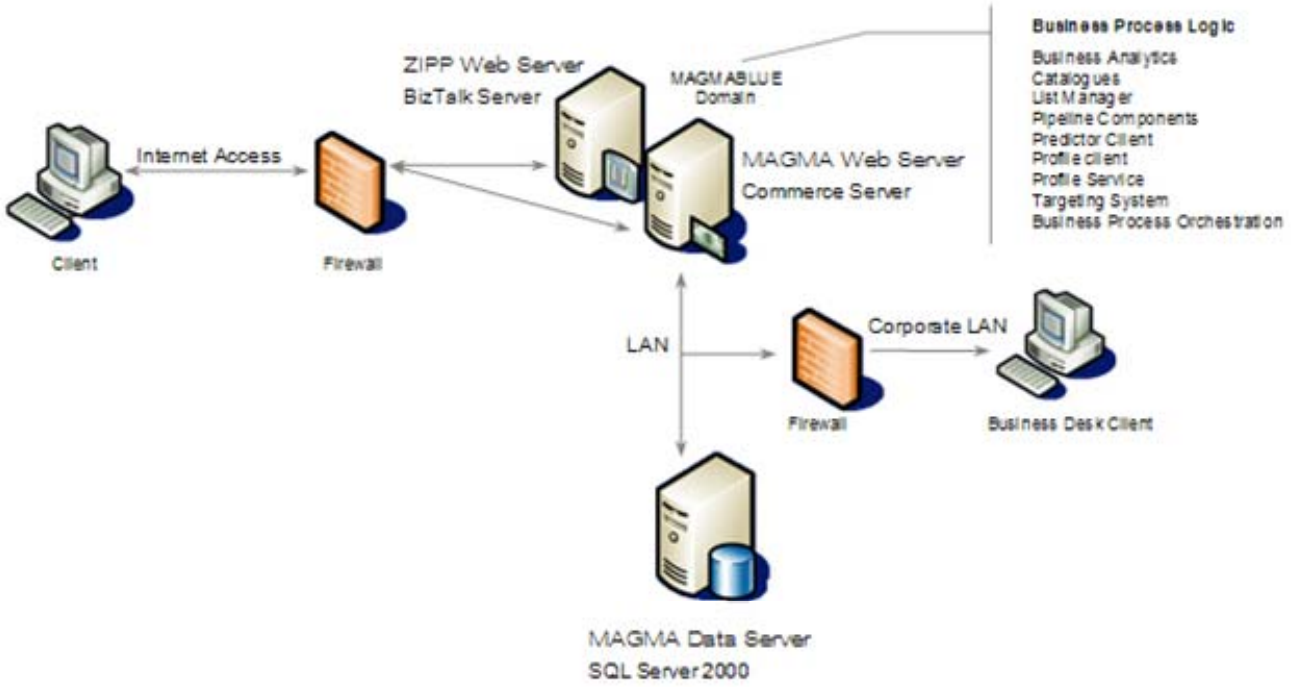
The following appendices provide additional information.

Appendix A - Full size diagrams

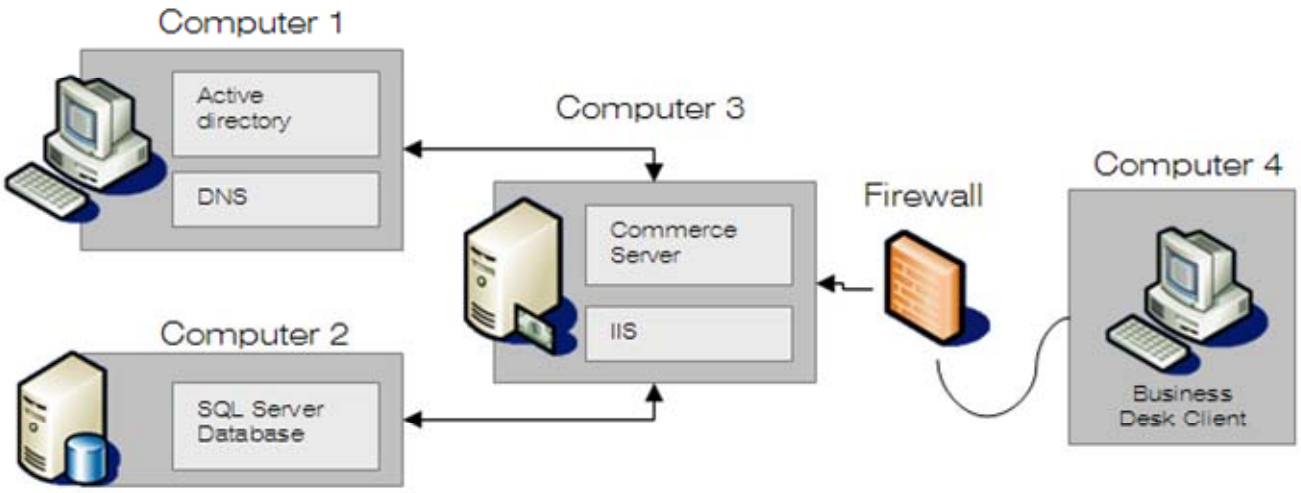
5.1 Appendix A – Diagrams



Conceptual Solution Model (Fig 1)



Project Magma Site Architecture (Fig 2)



Theoretical Supplier Computer Architecture (Fig 3)