



Microsoft

Site Server 3.0, Commerce Edition

White Paper

Abstract

Microsoft® Site Server 3.0, Commerce Edition is a comprehensive Internet commerce server, optimized for Microsoft Windows NT® Server operating system and designed to enable businesses to cost-effectively engage and transact with customers and partners online. Site Server Commerce helps businesses engage customers and partners with the creation of cost-effective commerce sites and applications, targeted online advertising and marketing, and personalized promotion. Based on its strong integration with Windows NT Server, Site Server Commerce enables a business to transact online with secure and scalable order capture, management, and routing while integrating more easily into existing systems, such as inventory, accounting, and Enterprise Resource Planning (ERP) applications. Site Server Commerce provides tools to help analyze customer and partner purchase and usage data to maximize the return on investment of an online business.

© 1998 Microsoft Corporation. All rights reserved.

The information contained in this document represents the current view of Microsoft Corporation on the issues discussed as of the date of publication. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information presented after the date of publication.

This White Paper is for informational purposes only. MICROSOFT MAKES NO WARRANTIES, EXPRESS OR IMPLIED, IN THIS DOCUMENT.

Companies, names, and/or data used in screens and sample output are fictitious, unless otherwise noted.

Microsoft, ActiveX, the BackOffice logo, NetShow, Visual Basic, Visual InterDev, and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Other product or company names mentioned herein may be the trademarks of their respective owners.

Microsoft Corporation • One Microsoft Way • Redmond, WA 98052-6399 • USA
0198

CONTENTS

INTRODUCTION	1
ADDRESSING THE COMMERCE LIFE CYCLE	2
ENGAGING CUSTOMERS AND PARTNERS	3
Site Authoring With Wizards	3
Building with sample sites	3
Extending sites with Visual InterDev	4
Advertising online	4
Embedded transactions with Buy Now	5
Managing Customers and Partners	5
Online promotions with Intelligent CrossSell	7
TRANSACTIONING SECURELY AND RELIABLY	8
Managing orders with pipelines	8
Order Processing Pipeline	8
Commerce Interchange Pipeline	9
Integration with Internet Information Server	11
Support for Microsoft Transaction Server	11
Managing Security on a commerce site	12
Server and administrative security	12
Customer security	12
ANALYZING COMMERCE SITES.....	14
Analyzing order activity	14
Analyzing usage, content, and customers	14
Usage analysis: measuring ROI	14
Content analysis: ensuring quality, consistency and conformance to site policy	16
Customer analysis: targeting a message	19
BUILDING AND MAINTAINING A SUCCESSFUL COMMERCE SITE	21
For More Information	21

INTRODUCTION

Internet commerce is growing at a rapid pace. Internet retailing, the sale of goods and services directly to consumers over the World Wide Web, has become a reliable and cost-effective channel for reaching consumers with around-the-clock sales and support. Recently, important new developments in business-to-business commerce have taken hold, enabling companies to extend their Web sites or applications to suppliers and distributors over the Internet. Together, these trends point to an expanding presence of Internet-based applications in enterprise-critical services and functions. Such applications can help businesses develop closer relationships with customers, suppliers, and distributors and gain significant economic efficiencies by taking advantage of the ubiquitous and cost-effective communication medium of the Internet.

Microsoft® Site Server 3.0, Commerce Edition uses the Internet to help businesses solve four distinct problems across business-to-consumer and business-to-business scenarios: first, by enabling an advanced corporate Web presence; second, by online selling; third, by streamlining corporate purchasing; and fourth, by establishing a virtual supply chain. These problems and how Site Server Commerce can solve them are explained in more detail in the Site Server Business White Paper at <http://www.microsoft.com/siteserver/>.

Site Server Commerce is a comprehensive Internet commerce server, optimized for Windows NT Server and designed to enable businesses to cost-effectively engage and transact with customers and partners online. Site Server Commerce helps businesses engage customers and partners with the creation of cost-effective commerce sites and applications, targeted online advertising and marketing, and personalized promotion. Based on its strong integration with Microsoft Windows NT® Server operating system, Site Server Commerce enables a business to transact online with secure and scalable order capture, management, and routing while integrating more easily into existing systems, such as inventory, accounting, and Enterprise Resource Planning (ERP) applications. Site Server Commerce provides tools to help analyze customer and partner purchase and usage data to maximize the return on investment of an online business.

ADDRESSING THE COMMERCE LIFE CYCLE

Microsoft Site Server Commerce focuses on three primary design areas addressing the life-cycle requirements of an electronic-commerce Web site to meet business-to-consumer or business-to-business needs.

Engage – Engage consumers, customers, and partners through the creation of cost-effective commerce sites and applications, targeted online advertising and marketing, and personalized promotion.

- Quickly and easily author fully functional, cost-effective, commerce Web applications with the help of sample sites and site-creation tools such as wizards.
- Host and manage targeted online advertising to generate revenues and leads with a comprehensive integrated Ad Server.
- Take advantage of features such as Intelligent CrossSell and Buy Now for promotions, cross-selling campaigns, discounts, and instant-purchase programs.
- Use personalization and membership capabilities to customize information to user needs.

Transact –Build on the strength of Windows NT Server with secure and scalable order capture, management, and routing. Integrate a commerce site easily into existing systems and applications.

- Capture and process orders online according to specific business rules using a built-in order-processing infrastructure.
- Route purchase orders, invoices, and other business data securely between companies over the Internet, e-mail, or existing EDI Value Added Networks through a COM-based interface for application-to-application interchange of structured business data objects.
- Create a secure environment for customers, partners, and site or application administrators based on strong integration with Windows NT security.
- Provide robust authentication, log-in security, and user management for high volumes of Web site registrants or members—for example, in the case of a subscription-based commerce site—using Site Server membership capabilities.
- Build a scalable, business-critical solution based on strong integration with Microsoft Transaction Server and Internet Information Server.
- Improve the security and convenience of online purchases with integrated support for the Microsoft Wallet.

Analyze –Understand consumer, customer, and partner purchase and usage data to improve an online business.

- Use built-in tools for accessing and mining site data to enable business-decision support. Such support includes generating reports on sales activity and purchase trends, evaluating these reports against specific marketing campaigns, managing inventory through inquiry about product sell-through, and providing access to customer-purchase history for follow-up on customer-service requests.

ENGAGING CUSTOMERS AND PARTNERS

Site Server Commerce supports the creation of compelling commerce Web sites through a set of sophisticated site-authoring Wizards and sample sites. These authoring tools integrate with other Web site creation and management technologies such as the Microsoft Visual InterDev™ Web development system, Internet Information Server Service Manager, and Microsoft SQL Server™ Enterprise Manager. Together, these technologies facilitate the creation and management of site virtual directories, site structure, database schema, product representation, and order-processing configuration.

Site Server Commerce provides facilities to actively engage customers or partners. Businesses can target customers based on profile information with online advertisements and compelling promotions. Purchasing history can also be used to cross-sell visitors during their visit to a site. A site can be extended to other locations on the Web, bringing transactions to where the traffic is.

Site Authoring With Wizards

The Site Foundation and Site Builder wizards, introduced in the previous version, Site Server, Enterprise Edition 2.0, are enhanced in Site Server Commerce to facilitate a step-by-step approach to designing a commerce site. These site-authoring Wizards support the following activities:

- construction of a complete database schema,
- scripting and HTML coding of the storefront,
- cross-selling and price promotions,
- creation of sites with multilevel departments and a variable number of attributes,
- multiple customer-registration models,
- presentation of products with varied attributes, access to multiple databases, and
- built-in support for the Microsoft Wallet.

The Wizards also can help produce a site that is readily edited with Microsoft Visual InterDev.

Building with sample sites

Five templates based on Active Server Pages (ASP) technology are included in Site Server Commerce to provide working examples of database schema and ASP source, and to recommended best practices for developing commerce sites. These sample sites, which demonstrate how Site Server Commerce can serve the needs of different businesses, are as follows:

- *ClockTower*, a simple commerce site for selling goods;
- *Microsoft Market*, a business-to-business corporate-purchasing example including workflow and approvals;
- *Microsoft Press*, a demonstration of integration with Intelligent CrossSell and Usage Analysis;
- *Volcano Coffee*, which includes promotions, customer management, Microsoft Wallet, and customer registration; and
- *Trey Research*, a sample using Site Server membership capabilities for the sale

of online subscriptions.
Each of these sites demonstrates recommended coding practices for integration with Internet Information Server 4.0 and Microsoft Transaction Server.

Extending sites with Visual InterDev

Developers working with Site Server Commerce can use the Microsoft Visual InterDev site development environment for building dynamic Web applications and Active Server applications. With visual development features and powerful database tools, Visual InterDev provides developers the industry's most complete and technically advanced system for building Internet applications. Visual InterDev is bundled with the Site Server Commerce product.

Advertising online

A significant new addition to Site Server Commerce is a complete Ad Server that provides for the management of online advertising campaigns, ad scheduling, and industry-standard reporting. Ad Server enables a site to target advertising based on a visitor's interest, the time of day or week that he or she ordinarily visits, his or her browser, and the content he or she accesses. Ad Server supports "need of delivery" by serving the most appropriate ad based on target, exposure limit, and remaining ad schedule. It also provides a management interface for ad schedules, customers, and campaigns.

Ad Server supports all MIME-type ads, including .gif, .jpg, splash, .wav, Buy Now, and HTML. With Ad Server, a site can serve ads on a standalone server or across multiple content servers. Ad Server works with Site Server Commerce to serve transaction-enabled ads using Buy Now (see more in the following section) and Site Server Analysis to provide detailed reports to site advertisers showing frequency, reach, and effectiveness of an ad campaign. The Ad Server makes it easy for merchants to do the following:

- Sell by ad requests or clicks. Ad Server manages campaign goals for an advertiser whether it is paying for ad requests or for clicks.
- Target ads by time of day and day of week. By passing tags to the Ad Server, it can target any user or page attributes.
- Perform standard ad reporting. Site Server Commerce uses the Web server and Ad Server logs to produce advertiser-campaign reports on Ad Request and Click performance.

Because Ad Server is built on the Active Server Pages technology in the Windows NT Server with Internet Information Server platform, customers can control how ads are targeted and reported by scripting Active Server Pages with standard Microsoft Visual Basic® Scripting Edition or JavaScript. This scripting support and use of the platform's dynamic page-generation technology can dramatically lower the barrier to deploying online advertising. The alternative is custom programming at a higher time and financial cost.

Embedded transactions with Buy Now

Buy Now is an online direct-marketing tool enabling a site to present product information and order forms and to capture customer-profile information within any online context (such as an online ad banner), without requiring that a customer visit the site. Based on JavaScript, Buy Now works across all popular browsers and can be customized to meet the needs of any online campaign. Buy Now enables customers to submit profile information, make purchases, and participate in direct-response campaigns without having to leave the Web site they're visiting.

Buy Now integrates directly into the Site Server Commerce Order Processing Pipeline (detailed later in this document) and supports virtually any type of ad, including Java applets, Microsoft NetShow™ server, GIF, JPEG, and others. Buy Now ads are supported by Ad Server, allowing for single management of ad banners for both traditional online click-through ads and Buy Now-enabled ads.

Managing Customers and Partners

To operate a successful commerce Web site, businesses must engage the customers and partners who are visiting and purchasing through the site. To do this, businesses must carefully manage every step of the customer-relationship cycle. The first step is gathering feedback to learn about customer interests and which products they buy. Sites can use such information along with the inherent one-to-one nature of the Web to help build better products and to market their products directly to customers. The next step is maintaining that information, including customer profile, purchase history, and even contents of customers' shopping baskets.

The final step of the cycle is to support customers after they've already bought a product, providing receipts, answering questions, and providing tips or product improvements. The business that addresses this cycle successfully can create a closer connection to its customers with each successive visit. Doing this is especially important when a business is deploying a content subscription site requiring "members only" logon and real-time access control to online subscriptions. The Site Server Commerce sample site *Trey Research* demonstrates some of the capabilities supporting customer-relationship management as applied to a subscription Web site.

Site Server Commerce enables sites to successfully manage the customer-relationship cycle by providing components and services tailored to address each step of the cycle. For gathering customer feedback, Site Server Commerce provides a method of collection, a place of storage, a means of integrating new feedback with existing customer information, and a mechanism to analyze it. Central to the activity of gathering customer feedback is identifying those customers. To do this, Site Server Commerce provides anonymous access; forms-based logon; and basic, NTLM, and certificate-based authentication. Site Server Commerce sites also can be configured so as to not require cookies and rely instead on URLs to maintain per-session or user state.

Secondly, Site Server Commerce offers a variety of ways to store customer information: in cookies, in the file system, or in an ODBC database. Alternatively,

with the personalization and membership capabilities of the product, the information can be stored in a membership directory and accessed using the Active User Object (AUO). This alternative enables site developers to manage extremely high volumes of registered users and members and to track and manipulate user-profile information extensively.

Because it is designed to use the Internet-standard LDAP protocol, the membership directory provides extensible storage for millions of user profiles. The AUO enables a script author to store and retrieve properties for the current user without having to worry about how the user is identified, whether the user's profile is actually stored, or whether the user has visited the site before.

AUO also can help integrate existing customer data with new-profile data that is stored in the membership directory. AUO can map multiple sources of information into a single name space so that script authors can just use the information without having to worry about how to interact with the multiple sources. The administrator configures AUO once, and then script authors can simply use the data. AUO also makes available rich schema information so that the various personalization and membership authoring tools can provide script authors with a point-and-click way to select user properties from any one of the various providers. Site Server Commerce includes support for user profiles stored in either ODBC databases or LDAP directories.

Site Server Commerce also uses AUO to export user information into its analysis tools. By integrating user information with site-usage information, a business can generate extensive reports analyzing how the site is being used—that is, which pages are being hit and by which kinds of users.

The second and third parts of the customer relationship cycle, the pre-sales (marketing) stage and the post-sales (support) stage, are assisted by both personalization and membership technologies. To help sites deliver the right message to the right users, personalization provides a rule-builder tool. With this, nonprogrammers can use plain English to author sophisticated content-targeting rules determining which users can access which content.

Site Server also includes a direct mailer that can be used to deliver an organization's personalized messages directly to customers proactively. By supporting arbitrary message attachments, the mailer enables sites, for example, to deliver product updates proactively without waiting for users to complain. This tool can be used to help reduce support costs or maintain the customer relationship by delivering product tips or new-product notifications.

For sites that must provide secure, member-only areas, Site Server provides membership capabilities can be used to replace the default Internet Information Server security with a more advanced set of authentication mechanisms. These include a branded HTML forms-based logon screen and an automatic cookie-based login. Both mechanisms enable sites to secure content by group using file-level permissions and without having to resort to Basic authentication dialogs. In its membership capabilities, Site Server Commerce also supports more advanced

features such as membership expiration and a full set of membership-directory permissions to secure user profiles even more soundly.

Online promotions with Intelligent CrossSell

The Intelligent CrossSell feature of Site Server Commerce can enhance a customer's shopping experience by recommending products in which that customer is likely to be interested. Intelligent CrossSell expands personalization functionality provided by the Site Server personalization and membership capabilities (mentioned in the preceding section). Intelligent CrossSell correlates what a given customer has done with its model of the history of products purchased by other customers to predict other items likely to be of interest to that customer. Intelligent CrossSell bases its information on the items in a customer's current shopping basket, in his or her history, or on product pages the customer has browsed in a particular session.

To ensure that Intelligent CrossSell makes predictions with a high level of confidence, the store manager can customize the way Intelligent CrossSell recommends items. Intelligent CrossSell offers the following benefits:

- Cross-sell suggestions that are derived from a combination of items purchased, selected, or browsed by the customer, not on a single item, as with traditional cross-selling methods;
- Statistical pattern-recognition techniques that find combinations a store manager may have overlooked;
- Suggestions that are created automatically, enabling merchants to avoid the tedious job of creating and maintaining cross-sell tables manually;
- Predictions that adapt automatically to changes in products and buying trends;
- A unique "popularity filtering" feature that enables a store to suppress recommendations of items that are very popular in favor of strongly matching yet not-so-popular items; and
- Cross-sell recommendations that serve as an adaptive advertising strategy to drive sales in the store by targeting customers with customizable recommendations.

TRANSACTIONING SECURELY AND RELIABLY

For mission-critical electronic commerce applications on the Internet, businesses need a mature software infrastructure—across both client and server—for secure and scalable online order capture, management, and routing. This infrastructure allows for easy integration with existing systems and applications. Site Server Commerce supports orders between a business and its customers, suppliers, and partners through the Order Processing Pipeline, the Commerce Interchange Pipeline, integration with Internet Information Server 4.0, support for Microsoft Transaction Server, integration of Windows NT Security, Site Server membership capabilities, and support for Microsoft Wallet.

Managing orders with pipelines

Order Processing Pipeline

In order to make electronic commerce cost-effective, a commerce site must take advantage of existing business rules and existing systems. The process by which a commerce site executes an order integrates easily into the way a business currently handles orders. Site Server Commerce enables such integration and improvement through the Order Processing Pipeline. The OPP provides a series of processing stages defining the method in which orders are managed through the commerce site. Multiple pipelines can be created for each site or application; and each pipeline can have a flexible number of stages. Each stage of order processing can handle the following functions:

- Product Information
- Merchant Information
- Shopper Information
- Order Initialization
- Order Check
- Item Price
- Item Adjust Price
- Order Price
- Order Adjust Price
- Order Subtotal
- Shipping
- Handling
- Tax
- Order Total
- Inventory
- Purchase Check
- Payment
- Accept

Each OPP stage consists of one or more pipeline components, which are COM in-process objects designed to perform some operation on the business object. Each component receives data from a previous component, performs its own process on the order, and then makes the results available to the next component. Developers can add, move, and reconfigure the OPP components in the order suited for their

commerce application.

The OPP gives a commerce site the flexibility to build a business process with an extensible architecture and tools. This means the site is free to add software components supporting processes such as credit-card authorization or tax calculation. The OPP also provides a software infrastructure into which third-party software applications or internal developers can connect through Component Object Model (COM)-based API interfaces at each stage of the ordering and purchasing process. These open interfaces are documented in the Site Server Commerce Software Development Kit (SDK), which explains how to create custom OPP components using the Pipeline Component Wizard and includes sample component code and documentation. More than 50 independent software vendors have built components that work with Site Server Commerce to support functions such as real-time payment processing, tax calculation, EDI transport, ERP integration, and many more. (For a listing of some of these partners, visit <http://www.microsoft.com/siteserver/commerce/partners>.)

Commerce Interchange Pipeline

One of the greatest obstacles to extending Internet Commerce to trading partners has been the lack of tools enabling integration of business data interchange functions into Web sites and applications. Through the Site Server Commerce Interchange Pipeline (CIP), applications residing in different enterprises can exchange business data in object or EDI form over the Internet. The CIP provides the infrastructure for the secure routing of business data (such as purchase orders, invoices, forecast information, and so on) from one application to another over public networks such as the Internet, e-mail, or third-party EDI Value Added Networks (VANs).

Architecture

The Commerce Interchange Pipeline is data-format independent. It supports XML, XML-wrapped COM binary objects, and EDI to enable the transfer of data objects between applications. Mapper add-ons are required to support EDI formats. The CIP is transport-protocol independent, supporting SMTP, HTTP, DCOM, and EDI VANs. In addition to this transport compatibility, future versions of CIP will include support for the Microsoft Message Queue (MSMQ). MSMQ is a distributed messaging system providing guaranteed message delivery over diverse networks such as the Internet. See www.microsoft.com/msmq for more information about MSMQ.

Using the Windows NT Public Key Crypto System (PKCS) security infrastructure, the CIP supports object encryption, digital signatures on transmitted data, and nonrepudiation of origin and receipt so that trading partners can validate the authenticity of transactions and transaction auditing.

The CIP also provides COM interfaces for custom development and third-party applications. Developers building enterprise applications for such activities as accounting, customer service, and ERP can use the CIP simply by creating and executing an instance of it. Because the CIP provides a common interface for third-party components, it supports a wide variety of components, including those that

come with it and those that are provided by third-party vendors, to conform to the data formats and protocols required by business partners.

Site Server Commerce is supported by the efforts of more than 100 industry-leading software vendors committed to ensuring interoperability in their applications based upon the CIP. This group of companies, organized under the Microsoft Value Chain Initiative, enables customers to begin implementing true virtual supply chains among their trading partners (see <http://www.microsoft.com/industry/trans> for more information). To view some of the third-party components that are currently available for Site Server Commerce, please see the Commerce Application Partner Directory.

Scenario

A typical business-to-business scenario often involves two CIP pipelines running on separate servers. One of these pipelines, the transmit pipeline, packages business data and transmits it over a network. The second pipeline, a receive pipeline, reads data from a network and performs various unpacking operations, such as verifying the digital signature on the data, decrypting it, and mapping it to a format that can be read by an application.

The configuration of a particular pipeline is saved in a pipeline configuration file (.pcf) containing the following component types:

- A transport connector, which is designed and configured to transmit or receive a business data object (see more detail following);
- An encryption/decryption component, which uses certificates to determine how to encrypt or decrypt the contents of the business data object;
- A verify-digital-signature component, which determines the type of digital signature used (if any) to sign a business data object or verify its signature;
- Mapping components, which determine how to map the contents of a business data object to a transmissible format or how to map transmitted data to the object in which it was originally stored;
- Audit components, which write various sections of the business data object to database storage; and
- An application-integration component, which determines how to translate the contents of a business data object into a format that can be read by a given target application.

For each stage and component in the transmit pipeline, there is usually a counterpart in the receive pipeline (in reverse order). The CIP transmit and receive pipelines can run on the same server or on separate servers and sites. In fact, the transmit pipeline does not necessarily have to transmit its data to a receive pipeline, nor does a receive pipeline necessarily have to receive its data from a transmit pipeline. A transmit pipeline needs only to transmit to some software component that is designed to interpret the data sent, and the receive pipeline needs only to know how to interpret the data it receives.

Integration with Internet Information Server

For optimal performance and services on an electronic-commerce Web site, its applications must be able to fully take advantage of the underlying operating system and middleware infrastructure. Only then can such applications provide the efficiency, high performance, and cost-effectiveness that is required by such sites. For this purpose, Site Server Commerce integrates fully with Internet Information Server 4.0 and takes advantage of Microsoft ActiveX® Data Objects 1.5 to facilitate database access and process isolation and to improve security for files and directories. Site Server Commerce also uses the Microsoft Management Console to facilitate site administration.

Other Internet Information Server capabilities available to Site Server Commerce include the following:

- Application isolation. This means that if a business has multiple commerce sites and one of them crashes, the others remain active. Support for application isolation makes Site Server Commerce ideal for Internet Service Providers, online shopping malls, and other “hosted” environments.
- Bandwidth throttling. This enables performance tuning on a per-store basis, ensuring that a single Web site on a given server cannot consume all the network bandwidth. It also enables the server to limit number of simultaneous connections to a single site.
- Support for the Integrated Certificate Server. This enables a business to establish security and to issue standard X.509 digital certificates for user authentication. Such authentication is a secure alternative to the traditional practice of user IDs and passwords or cookies.
- Support for multiple virtual Web servers. This enables multiple Web sites to have their own logging and IP addresses.

Support for Microsoft Transaction Server

Site Server Commerce fully supports Microsoft Transaction Server (MTS), a distributed transaction-processing system included in the Windows NT 4.0 Option Pack. Integration with MTS helps Site Server Commerce provide end-to-end transaction integrity for mission-critical applications. With its resource-utilization services as well as ACID or two-phase commit-type transaction properties over a distributed set of operations, MTS can ensure that a transaction succeeds or fails as a whole, even if the transaction involves many operations. For example, if a transaction comprising ordering, checking inventory, and payment processing should fail before completion of all these states, MTS rolls the entire operation back to its previous state.

The COM components of Site Server Commerce follow the MTS programming and deployment model. This model provides site developers with two levels of control over transactions: page-level, in which the entire page is transacted, or pipe-level, in which the CIP, for instance, holds a transaction across all CIP components. Both control levels are designed to ensure that if a transaction processed by Site Server

Commerce should fail, it will provide appropriate notification and will not end up in an unknown state.

Managing Security on a commerce site

Site Server Commerce takes advantage of the built-in security capabilities of Windows NT Server and Internet Information Server to provide both server and administrative security as well as customer security.

The following section, which describes how Site Server Commerce manages security, assumes a basic understanding of Windows NT Security and the Windows NT Option Pack security tools such as Microsoft Certificate Server. For more information on Windows NT Security and security-related issues, please visit <http://www.microsoft.com/security/>.

Server and administrative security

Site Server Commerce has a delegated security model with three levels of permissions: customers, managers, and administrators. By default, customers can view pages but not modify them. Managers can view and update pages and change pipeline configurations. Commerce-server administrators must also be Windows NT administrators, since they must be able to define the set of managers and to modify site properties that require Windows NT administrator privileges.

Site Server Commerce implements its security policy using Windows NT accounts and Access Control Lists. Administrators can use standard Windows NT security tools to modify the permissions assigned each group to suit the needs of diverse customers and selling situations. Administrators can further restrict access to commerce sites by using security features of the Internet Information Server, such as IP filtering.

Recommendations for enhancing security of the server running Site Server Commerce depend on the need to manage strict account policies, to choose difficult passwords, to limit membership to the administrator's group, and to locate the Site Server Commerce machine behind a firewall. For additional recommendations, see the *Commerce Server Managing Security* section of the product documentation.

Customer security

In order for Site Server Commerce to provide a secure environment for customers to purchase goods and services, it must be able to assure them that passwords, credit-card numbers, and other such information is protected from unwanted access. For this, Site Server Commerce provides three protection strategies: Secure Sockets Layer, Secure Electronic Transaction, and the Microsoft Wallet.

Secure Sockets Layer

Secure Sockets Layer (SSL) is a method of data encryption that resides between the transport and the socket layer of the TCP/IP protocol stack and is used to secure transactions between the client and the server. When a customer submits personal information (such as a credit card number) using a form or Microsoft Wallet, the ASP

file that receives the form-post data is secured by SSL. To execute this process, the client (the Web browser) and server (the Site Server Commerce site) use an encrypted session key that is generated by the browser. This key is transferred to the server using the server's public key.

Secure Electronic Transaction

When using a payment provider that is compliant with the industry-standard secure-payment specification known as Secure Electronic Transaction (SET), credit card payment transactions can be encrypted between a Site Server Commerce site and the acquiring financial institution. Numerous payment software providers are developing SET-compliant components that work with Microsoft Wallet and Site Server Commerce. For the most up-to-date listing, see the Microsoft Site Server Partners Web site at <http://www.microsoft.com/siteserver>.

Microsoft Wallet

Microsoft Wallet is a set of two controls designed to facilitate address and payment selection for customers using either Microsoft Internet Explorer or Netscape Navigator. The Wallet can be integrated into any commerce site, even sites that are not based on Site Server Commerce. The Microsoft Wallet provides security by encrypting any payment data that is stored on a customer's computer, requiring a password for accessing the credit card information stored on the customer's computer, and requiring the customer's approval before transmitting any address data.

Three Wallet features facilitate secure online purchasing for consumers: the Payment Selector, the Address Selector, and the Wallet Payment Module.

- With the Payment Selector, consumers can enter credit card or other payment information once to encrypt and store it securely on their client machine. The Payment Selector is password-protected to prevent unauthorized access to payment information.
- With the Address Selector, consumers can enter address information once in order to store it on their local machine and make it available to sites requesting shipping information. Such payment information can then be made available to sites to complete a purchase.
- The Wallet Payment Module uses industry-standard, SSL-based security and provides an interface for third-party plug-in modules to support additional payment methods such as digital cash, private-label cards, check (EFT/ACH) payment, and the SET protocol.
- Microsoft Wallet, which is included in most of the Site Server Commerce sample sites, is available for Microsoft Internet Explorer 3.02a and later and Netscape Navigator 3.x or later. (See further discussion of the Microsoft Wallet in a subsequent section.)

ANALYZING COMMERCE SITES

Web site administrators and business managers are finding their jobs increasingly difficult as sites grow in complexity with new content, links, and transactions. To operate a commerce site cost-effectively, administrators need a robust and comprehensive set of analysis tools that can help them translate customer and partner usage of the site into improved service.

Analyzing order activity

Commerce site administrators and business managers need immediate access to sales data, typically by product, by individual shopper, by month, or by year-to-date. Each Site Server Commerce site includes an order-manager tool for producing reports on product sales. Order-activity information is also available within the Order Manager, which is built with Active Server Pages and can be accessed with any browser, presuming appropriate security is established. By using Active Server Pages, site administrators can easily customize these pages further based on the needs of the business.

The Order Manager provides the following standard reports:

- **All Orders**, a comprehensive list of products sold, associated to individual shoppers
- **Orders by Month and Year**, in addition to average orders purchased, maximum and minimum.
- **Orders by Product**, to provide necessary data for product inventory management and fulfillment.
- **Orders by Shopper**, enabling detailed reporting by customer, which is essential when integrating Web-based orders and customer-service applications so that order information is quickly accessible.

Because purchasing data is stored in any ODBC database, standard third-party reporting tools can be used to generate reports as needed.

Analyzing usage, content, and customers

Site Server analysis features provide the critical information required to make Web sites more enticing, informative, and ultimately beneficial by providing three types of Web analysis: usage, content, and user.

Usage analysis: measuring ROI

Visitors to a commerce site leave trails filled with information about where they came from, what they saw, how much time they spent visiting certain spots, and what they saw last. Moreover, each time a visitor interacts with a site, a "hit" is recorded in a server's log file. Site Server analysis features transform mountains of log-file data into digestible amounts of clear information. Analysis can be configured in a number of ways to provide insights into hit volumes, repeat visitors, click-through rates on advertisements, visit duration, number of pages requested in a visit, attraction of target audience, and other vital statistics. A site administrator can use any of these measures to quantify and qualify the success of a site.

Importing and managing server logs and other data files

Site Server Commerce analysis features provide two tools for importing data: Usage Import and Custom Import. Usage Import imports log files from diverse Web servers and applies several inference algorithms to reconstruct the actual requests, visits, and users interacting with the Web site before storing the information in a database from which reports can be produced. Custom Import augments Web-server log-file data by importing user attributes (self-describing attributes recorded in personalization), content attributes (such as topic, author, and type for each entity), Ad Server campaign details, and custom data files (such as lifestyle categories or registration data gleaned from forms on a site). Site Server is the first product to support the integration of usage data from a variety of sources.

The analysis features of Site Server Commerce go beyond traditional ways of compiling site-usage information. Hit-count comparisons, for example, can be inaccurate because hits include errors and server overhead as well as information about site visits. Site Server Commerce counts hits in order to calculate summary hit counts and bandwidth data and uses sophisticated methods to ensure an accurate count. For example, when a user requests a Web page with three graphics, the log file records it as four hits (or more, counting overhead), but Site Server Commerce interprets the activity (accurately) as a single request. Site Server Commerce defines a visit as a series of requests by a user and determines that a visit is over when a user does not request any more content for a specified period. To identify a user, Site Server looks first for cookies, second for registered user names, and third for host names. Site Server identifies an organization as a group of related users from a business, government agency, or other group.

Usage Import automatically detects more than 25 commercial log-file formats including those from Microsoft, Netscape, Lotus Notes (including separate referrer and user-agent logs), and Apache. Additionally for Internet Information Server 4.0 users, Analysis automatically installs the User Identification Filter to generate unique cookies for each user and configures Internet Information Server to extend the standard logging (W3C extended format) to include referrer, user agent, cookie data, and query strings.

The Site Server Commerce analysis database enables the cross-site sharing of content attributes, user attributes, and commerce data. The database, either Microsoft Access or Microsoft SQL Server, is organized into four categories: organizations, users, visits, and requests. These categories are related in that users belong to organizations, users generate visits, and visits generate requests.

Special tables in the analysis database contain request attributes that enhance the reporting capability for commerce sites. For each product page in a commerce site, the product's name, category and SKU can be recorded in the Web server log file. Usage Import automatically recognizes those parameter names and values and stores them in the Analysis database for later reporting. These elements can be seen in the Commerce Report found in the Site Server folder in the Report Writer catalog of standard reports.

Reporting usage data

The Site Server Commerce Report Writer queries the analysis database and generates reports about usage and site activity. With Report Writer, managers, developers, and administrators can create their own reports or choose from among 46 predefined reports. They can base their reports on data from a wide variety of sources, including other Site Server Commerce components and external databases, and produce them in HTML, Microsoft Word, or Microsoft Excel formats. These reports can include summary information (or provide detail on specific users) on request trends and visit trends, navigational patterns, and server-load patterns, among other areas of interest.

A site administrator can easily create his or her own reports by modifying existing predefined reports or building new ones from scratch. For power users, more than 200 report-building dimensions provide the flexibility to slice and dice data to answer the most-pressing questions about a site. To jump start the creation of a new report, the calculation inventory offers more than 60 predefined calculations that can be dragged and dropped into a new report definition. (A report definition consists of one or more calculations.)

Users can also remotely execute and/or view the results of any predefined report (including their own creations) from a Web browser. Flexible filtering options enable them to focus analysis activities by defining date ranges and selecting specific sites among other options.

Site Server Commerce also enables administrators and others to take their Web site usage analysis to an even deeper level with innovative usage-data visualizations. With the Hyperbolic View found in Content Analyzer, individuals can animate their site structure with usage data. In an easy and intuitive interface, administrators can identify how traffic moves through their site, in the process targeting high- and low-traffic zones and finding the top path through a site. Administrators also can learn how their traffic changes during the course of a day or throughout the week. Combined with a site's detailed usage reports, administrators can make decisions about restructuring the site to bring content into more heavily trafficked zones or rearrange entire sections to improve navigability.

Content analysis: ensuring quality, consistency and conformance to site policy

Web masters, producers, editors, and authors for Internet, intranet, or extranet sites must be concerned about their customers' experiences while visiting the site, the site's conformance to company policy, and efficient use of site resources. A good user experience is a function not only of valuable content but also of easy navigability, well-positioned and fresh content, and a uniform look throughout the site. In monitoring conformance to site policy, administrators must verify the address of offsite links, confirm accuracy of e-mail addresses listed on the site, and ensure proper use of copyright statements. To maximize server capacity, they must identify

and remove duplicate content and pages that are no longer referenced.

Uncovering valuable content and site information

Content Analyzer maps Web sites, extracting vital content attribute information and creating Web maps from the results. Content Analyzer uses a “spider” to record the links on a page and then follow those links to locate new pages and new links, storing all the information in a Web map. Each map is an information base that provides a catalog of the Web objects in a site (HTML pages, Java and PDF files, graphics, links, and so on) and properties associated with those objects. Once created, a Web map provides a visual representation of a site that can be used for navigation, site analysis, and site maintenance.

The Content Analyzer spider minimizes the effects of its activity on the sites that it maps. The spider does not attempt queries, avoids looping and repetition, and does not access any page more than once, even if that page is pointed to from several other locations. The spider can be paused or halted by the user at any time during the mapping process, and the mapping functions of the spider come with default settings that do not overload Web servers.

When creating a Web map, site administrators can map all or part of their site. They can map just the portions of the site that are of interest to them. The parts of the site not explored are listed in an “Unexplored” report. They also can build maps that have information from multiple sites. With Content Analyzer, they can control exactly what resources are and are not included in their analysis.

If a site has secure portions or a secure proxy, an administrator can still take full advantage of Content Analyzer by first specifying user names and passwords. This capability can also be used to test a site’s authentication settings. Also available in Site Server Commerce is support for mapping sites requesting cookies and requiring form completion. Finally, administrators can keep Web maps current with a scheduler enabling them to automate crawls of the site.

Visualizing site structure

Content Analyzer provides several “views” providing various insights into the structure of a site. The Hyperbolic View provides a dynamic site overview that clarifies resource relationships and interconnections, and helps administrators and others immediately grasp the overall structure of a site by simply dragging the mouse to zoom in for details or move around for a site survey. The Outline View displays the site’s object hierarchy, giving a familiar, detailed view of the files in a site.

Administrators have complete control over which tree hierarchy is displayed. The views available in Outline and Hyperbolic View are linked so that the object of focus remains selected in either view. Also, in either view administrators can choose to hide or show particular types of resources, such as images or gateways, and further customize their view to show only what they want to see. Finally, the Browser View enables administrators to learn what a page looks like on the Web or to view its HTML source.

Reporting on content and site quality and consistency

Site Server Commerce Content Analyzer provides site administrators with detailed content information from 20 content-analysis reports. Administrators can use such information to monitor content and maintain site consistency and quality. They also have the flexibility to select exactly what properties are shown on customized reports (with more 70 to choose from), and in exactly what order. Reports can be viewed and run from the browser, printed or exported to spreadsheets or databases, and scheduled to be ready each morning, for example, with the latest information about a site.

Several especially useful reports include the following:

- **Site Summary Report.** This report gives a detailed site overview, including object statistics; a status summary; map statistics; and server information. From this report, an administrator can jump to other detailed reports for each aspect of a site and the objects in it.
- **Detailed Resource Reports.** These reports provide detailed information about individual pages or images. It enables administrators to learn which mail addresses and newsgroups are being used as well as which files are being made available for FTP download.
- **Site Integrity Reports.** These reports show each duplicate object with its full URL and an icon indicating the type of object in the Duplicates Report. Site resources that no longer have references to them are listed in the Unreferenced Objects Report.
- **Site Comparison and Update Reports.** These reports—Comparison Summary, What's New, and What's Changed—enable administrators to compare Web maps to see what has changed and to obtain detailed information about the changes.
- **Create a Table of Contents.** This report shows an entire site structure in hyperlinked HTML format with the Hierarchy report that shows the basic structure of a site in a tree-like, outline form. Each resource is shown with its URL and a graphical representation. With this report information, administrators can quickly generate and publish items that enhance site usability, such as a fully customizable table of contents and linked indexes.

Searching content

Powerful search capabilities enable administrators to locate any information contained in their site by searching for resources such as text strings, author, expiration date, or other user-defined parameters. They can search the entire map or only what's currently displayed. They have the flexibility to search for a specific object type, property (such as its size or URL), or text string. Content Analyzer also provides easy access to a set of common searches, including pages with load size over 32K, top-entry pages, and pages with external referrers.

To simplify the process whereby content authors insert their names and last edit date directly into the page, Site Server Commerce provides the Server Tag Tool. With this tool, authors can incorporate META tags in their pages. They can then search and

sort on the META tag data and quickly identify their own pages and when the page was last changed.

The results of search queries can be sorted, printed, exported to HTML, and exported as tab-delimited text for importing into spreadsheets or databases for further analysis. A built-in e-mail interface also facilitates the sending of results from quick or custom searches to the appropriate members of a team, for example, so they can take immediate action. Administrators can better manage Web site maintenance and improvement efforts by creating checklists of site fixes such as out-of-date pages, duplicates, orphans, images without ALT tags, and so on.

Customer analysis: targeting a message

A great promise of the Internet is the ability to communicate on a one-to-one basis with customers. Whether an administrator or Web master is seeking one-to-one communication or wants simply to target specific customer segments, he or she must establish strong relationships with customers in order to maximize a business's Web investment. The Site Server Commerce personalization capabilities enable administrators to deliver targeted messages over personalized Web pages, e-mail, or channels. The analysis capabilities support these relationship-building services by detailing the effectiveness of targeting efforts and creating targeted user lists for e-mail campaigns based on users' online behavior.

Whether a business is selling goods on the Web or providing high-value content, it can use targeted e-mail campaigns to keep customers informed of the availability of new versions, new products, special offers, or new content that may interest them. Such a message has a good chance of being well-received and appreciated.

Additionally, administrators can enhance their customers' online experience by personalizing content and navigation. For example, they can associate online users with target audiences to deliver messages that produce strong responses to a call to action. Using business rules designed in the Site Server Commerce Direct Mailer, the product's analysis features create a user list based on users' online behavior. For example, the Direct Mailer could request that the analysis features provide a list of all users that have visited the sports section of a site at least three times in the prior month. In order for the analysis feature to process such a request from the Direct Mailer, an administrator must first import a Web map from Content Analyzer into the analysis database using Custom Import. Content attributes from Web maps are used to associate each request from log files with an author, content type (for example, white paper) and content topic (for example, sports). The analysis features would then process the request by identifying users that had requested at least one page with content type equal to sports during at least three different visits over the prior month. This user list is then returned to Direct Mailer for preparation of e-mail distribution.

Site Server Commerce analysis features also enable administrators to measure the effectiveness of the business rules designed in the Site Server Commerce personalization Rule Builder feature. Such business rules are used to generate personalized Web pages. Administrators can identify which rules are most often

used to determine content displayed along with the content that is typically displayed for each rule. The Site Server Commerce analysis capabilities automatically detect and store query strings generated from personalization-driven ASPs. These query strings include the business-rule ID and the content ID. Administrators can use this feedback mechanism to fine-tune rules in order to deliver even better targeted content to customers.

Administrators also can improve their content-creation process with a strong insight into the interests of customers. Reports can detail top user interests (for example, baseball, European news, ballet) and correlate user interests with content topic (for example, news, sports, arts) and type (for example, white papers, FAQs, and so on). Administrators must import user profiles from the personalization capabilities and their Web map from Content Analyzer using the Custom Import model prior to running these reports.

The Site Server Commerce analysis capabilities also can help administrators better serve customers and the bottom line by gathering information about customers' geographic locations. They can use such knowledge to locate mirrored sites in heavily trafficked locations for improved user experience. For a site that sells advertisements, they can identify which regions have higher viewership levels or customer bases and the particular interests that might attract certain advertisers and support premium rates. Again, prior to generating a user geography report, administrators can use Custom Import to import user profiles containing geographic information from the Site Server Commerce personalization capabilities into the analysis database.

BUILDING AND MAINTAINING A SUCCESSFUL COMMERCE SITE

Site Server Commerce provides a wide selection of technologies and capabilities for organizations considering using the Web to create and manage electronic commerce sites and applications—across business-to-consumer and business-to-business scenarios.

Site Server Commerce provides a comprehensive set of capabilities to allow businesses to actively engage consumer customers and business partners. It helps businesses create cost-effective sites and applications and establish highly dynamic and targeted advertising, marketing, and promotion campaigns.

Once customers are engaged, Site Server applications are ready to conduct high volumes of transactions reliably and securely, based on strong integration with Windows NT Server and Windows NT Server extensions. Site Server Commerce provides the facilities for capturing, managing, and routing orders and other forms of structured business data and easily integrating such data with legacy systems.

Users are provided all the facilities they need to analyze their online business. This includes support for order analysis and site activity analysis. Intelligent modifications can then be made to increase the bottom line or improve customer service.

In sum, Site Server Commerce is designed to enable organizations to get their transaction-enabled Web sites started quickly and easily and keep them running efficiently and effectively.

For More Information

For the latest information on Site Server, check out our World Wide Web site at <http://www.microsoft.com/siteserver>.