

# A Comparative Overview of NetWare 5.1 Web Services Features



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NetWare® 5.1, the newest upgrade of Novell's most successful version of NetWare, allows you to combine the power of intranets, extranets, and the Internet -- and integrate your resources using cross-platform management tools. With NetWare 5.1, you can deploy new applications throughout your extended enterprise and gear up your company for the growing digital economy. We offer here a comprehensive assessment of the Web service features of NetWare 5.1 compared to those in Windows 2000, and provide compelling business reasons why NetWare 5.1 is the best platform available today for bringing your business into the Net economy.

NetWare 5.1 features a comprehensive suite of Web services, including IBM® WebSphere™ Studio, WebSphere SE, and the most reliable server-based Java™ Virtual Machine available -- so you can create a fast, flexible environment for developing, deploying, and managing next generation Web-based applications. With NetWare 5.1, you can quickly establish a secure, enterprise-wide, computing network.

Novell NDS® eDirectory™, a key feature of NetWare 5.1, empowers IT administrators to manage every aspect of their networks, on any server, from any browser. NetWare 5.1 also supports a wide range of industry-standard protocols and gives you the tools to ensure 100 percent Java compliance and CORBA compliant ORB. Additionally, you get the connectivity you need to work with the most popular databases, such as Oracle8i™ and Microsoft® SQL Server in an open, compile-free environment.

With these compelling advantages for IT administration, NetWare 5.1 provides a viable alternative to Microsoft Windows NT®. Built on well-established, proven technology, it avoids many of the weaknesses inherent in newer products. Companies waiting for the launch of Microsoft Windows® 2000 Server should consider whether this solution offers the stability and maturity needed to run business-critical applications.

NetWare 5.1 offers the reliability, security, maturity, and performance that companies need to compete in the new digital economy. Compare the services and features of NetWare 5.1 to Microsoft Windows NT or Windows 2000. The NetWare suite of management tools and Web services provide the ideal solution to your enterprise computing needs.

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NetWare 5.1 includes support for the following web services, each described in further detail below, which enable collaborative Internet-based solutions. Windows 2000 also offers features substantially similar to those listed below.

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NetWare 5.1 currently implements the following web services feature not found in Windows 2000:

- Server-side Cache Control Directives (See page 11 for more detail.)

Windows 2000 currently implements the following web services features worth noting that are not presently found in NetWare 5.1. A discussion on page 12 provides a perspective on each of the features listed below to help you decide whether they are important enough to influence your purchasing decision.

- FrontPage Server Extensions
- HTTP Compression
- PICS Rating Support
- FTP Restart
- Kerberos Authentication
- Digest Authentication
- Server-Gated Cryptography
- Fortezza

## Web Services Review

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NetWare 5.1 includes support for the following web services which enable collaborative Internet-based solutions. These features are substantially similar to features also found in Windows 2000.

### Collaborative Services Features

#### HTTP 1.1

Both systems fully support the latest HTTP 1.1 protocol specification. HTTP is a request-response protocol for retrieving data items from web servers and for interacting with web-based applications. Web browsing of HTML pages and several other web functions are built upon the HTTP protocol.

Customer Value: Compatibility with the latest HTTP specification ensures that web services using the protocol will can take advantage of new features, and will be fully compatible with HTTP-enabled applications such as web browsers, other web servers and web-enabled applications.

#### WebDAV

Both systems fully support WebDAV, a new open standard that enables file sharing using the HTTP protocol. WebDAV enables users of applications such as Microsoft Office 2000 to directly store and retrieve web server-based files.

Customer Value: WebDAV will enable web-based applications to implement enhanced collaboration functions.

Novell's implementation allows WebDAV access rights to be managed via NDS, delivering simplified administration and therefore lower cost of ownership.

#### Web Folders

Both systems fully support Windows Web Folders. Web Folders allow Windows users to manipulate files on web servers just as if they were part of the user's local file system. Users can move, copy, delete and modify files through normal Windows drag-and-drop operations. Web Folder operations are communicated via HTTP-based protocols to the web server, and therefore no special client components need to be installed at the workstation.

Customer Value: Web Folders simplify end user access to web-based data files by exposing them through existing Windows user interface paradigms, thereby reducing system administration and training costs and increasing end user productivity.

NetWare 5.1 further enhances the Web Folders experience by automatically creating a personal Web Folder for each defined user that can be used as a personal repository for posting web pages and collaborating with others.

<b>NNTP</b>	<p>Both systems fully support the standards-based Network News Transport Protocol (NNTP) which allows customers to implement collaborative threaded discussion servers. NNTP is also widely deployed as the mechanism enabling participation in USENET news groups.</p> <p>Customer Value: NNTP enables end users to engage in open, extended discussions without having to get together at an appointed time.</p> <p>NetWare 5.1 includes a robust NNTP server accessible via a full featured HTML interface. Novell's NNTP server is fully integrated with NDS, delivering simplified administration and therefore lower cost of ownership.</p>
<b>IPP</b>	<p>Both systems fully support the Internet Printing Protocol (IPP) which enables end users to send print jobs to printers using the HTTP protocol.</p> <p>Customer Value: Instead of the costly and arduous process of printing, then faxing documents to branch offices, hotels and other remote locations, users are able to print documents directly to printers anywhere on the Internet reliably and quickly using common Internet connections.</p> <p>Novell's support for IPP is tightly integrated with its advanced Novell Distributed Print Services. Due to NDPS' complete integration with NDS, Novell's support for IPP delivers simplified administration and therefore lower cost of ownership.</p>
<b>FTP</b>	<p>Both systems fully support the standards-based File Transfer Protocol (FTP) enabling file access (browse, copy, rename, delete, etc.) to web servers and other TCP/IP-based systems.</p> <p>Customer Value: FTP enables end users to collaborate through web server file sharing, as well as to post web content.</p> <p>NetWare 5.1 includes an FTP server integrated with NDS authentication and access controls. Once authenticated, user's can also browse other NetWare files servers in the NDS tree to which they have access rights, including servers not running FTP.</p>
<b>FTP Restart</b>	<p>Both systems include support the FTP Restart feature in their FTP server. If an FTP file transfer is interrupted, restart enables it to resume from the point of interruption.</p> <p>Customer Value: FTP restart speeds completion of interrupted FTP downloads, thereby increasing end user satisfaction and productivity.</p>
<b>Web Site Indexing and Searching</b>	<p>Both systems include content indexing and searching functions that enable customers to create customized search interfaces allowing web site visitors to find information across all of the pages and content of the site. These systems enable searching of the local site as well as searches across multiple sites.</p> <p>Customer Value: Customized search interfaces make web site content more accessible to site visitors, thereby increasing the likelihood they will read it, thereby increasing the effectiveness of the site. Multi-site searches enable site visitors to quickly locate distributed information, thereby increasing their productivity.</p>

## Application Development Features

### ASP

Both systems fully support Active Server Pages (ASP) which enable web developers to create web pages whose content is dynamically generated at the time that the page is requested. Active Server Pages embed program scripts which execute on the server and can call out to server-side functions to retrieve, manipulate and format data as desired.

Customer Value: ASP technology simplifies development of dynamically generated web pages, thus reducing site development costs and speeding implementation.

NetWare 5.1 includes full support for ASP, as well as a collection of server side components enabling programmatic access to databases, NLMs, ActiveX and JavaBeans components, NetWare-based information, and NDS. NetWare also includes a variety of FrontPage-compatible server side components enabling advanced web page features.

### CGI

Both systems fully support the development and implementation of custom web solutions in the form of CGI applications.

Customer Value: CGI web applications can perform any function desired, and CGI does not define a complex API set - thereby simplifying and speeding development and lowering cost.

Novell's Enterprise Web Server fully supports CGI applications written in Java, PERL, C, and Novell Script for NetWare (a VBScript syntax-compatible scripting language).

### Web Server Extensions

Both systems fully support the development and implementation of custom applications which run as native, high performance extensions of the web server. These extensions provide an alternative to the various limitations of CGI.

Customer Value: Web server extensions enable development of full featured, highest performance web applications of any type.

Novell's Enterprise Web Server supports the popular Netscape Server API (NSAPI) for development of web server extensions. Microsoft supports ISAPI, a similar API offering similar capabilities.

<b>Java Technologies</b>	<p>Both systems include a full featured Java Virtual Machine to enable implementation of server-based applications written in the Java programming language. The JVM is capable of executing Java applications, servlets, JavaBeans and Java Server pages.</p> <p>Customer Value: Java enables developers to create applications which can run unmodified on different underlying platforms, thus reducing development costs by reducing or eliminating porting costs. The portable nature of Java applications also provides customers with freedom to switch underlying platforms while still running the same applications.</p> <p>In addition to its high performance JVM, NetWare 5.1 also includes the IBM WebSphere Application Server 3.0, Standard Edition as a native application environment. Based on the highly popular J2EE standard for web application servers, WebSphere enables customers to create, manage, deploy and execute advanced web-based applications, and includes everything needed to implement business-critical web sites based upon Java servlets, Java Server Pages, and HTML. WebSphere Application Server 3.0 for NetWare authentication is fully integrated with NDS and therefore provides the many benefits afforded by directory-based management.</p>
<b>Scripting</b>	<p>Both systems support scripting of Active Server Pages, GCI applications and other system functions through use of JavaScript and VBScript. Scripts can consist of complex functions which access and manipulate external programs, RAD components, operating system parameters, directory services, application data, etc., and generate web content or perform other functions of any type.</p> <p>Customer Value: Scripting generally requires less time and expertise than traditional application development, and requires fewer (or no) development tools. As a result, scripting provides a lower cost method for developing minor applications.</p>
<b>Web Development Tools Independence</b>	<p>Both systems accommodate the creation of web applications using the standards-compliant development tools of the customer's choice. Web pages can be created using any of the dozens of page authoring tools available, Java applications and components can be created using any Java IDE or component builder, ASPs can be created using popular Microsoft and third party authoring environments, etc.</p> <p>Customer Value: Customers are free, in general, to use the standards-compliant development tools of their choice to create web applications for both Novell and Microsoft systems.</p> <p>For customers that have not yet invested in a web application development tool, NetWare 5.1 includes the IBM WebSphere Studio developer's workbench that enables the creation of advanced web applications for the WebSphere Application Server for NetWare. WebSphere Studio includes a page designer for creating and editing Java Server Pages, JavaScript, XSL style sheets, XML and HTML pages. WebSphere also includes an advanced applet designer for easily creating JavaBeans.</p>

## Administration Features

<b>Delegation</b>	<p>Both systems fully support delegation of administration responsibilities over a selected web site to selected individuals.</p> <p>Customer Value: Delegation enables scalability of management by spreading responsibility for performing management tasks across multiple administrators.</p> <p>Novell's delegation functions are a fundamental feature of NDS-based administration, and apply equally to all administrative tasks as well as to web services administration.</p>
<b>Integrated Setup &amp; Upgrade</b>	<p>Both systems provide installation and upgrade of web services as an integrated component of the installation and upgrade of the underlying platform.</p> <p>Customer Value: Integrated installation and upgrade simplifies and speeds deployment, and therefore lowers deployment costs.</p>
<b>Centralized Management</b>	<p>Both systems provide centralized management of web services through an extensible management console.</p> <p>Customer Value: Centralized Management reduces administration costs by simplifying management tasks and reducing the effort necessary to learn how to perform them.</p> <p>Unlike Microsoft's MMC, Novell doesn't just provide a central utility for launching other separate management utilities for each Web Service. Instead, Novell truly centralizes and globalizes administration by integrating web services administration with NDS. NDS-based administration reduces administrator training, simplifies task execution, and integrates with other NDS mechanisms such as access control management and delegation.</p>
<b>Restart Without Reboot</b>	<p>Both systems support stopping and restarting web services without requiring the server to be rebooted.</p> <p>Customer Value: By not requiring the underlying system to be rebooted, end users accessing other functions of the system will not experience interruptions in service availability while a particular web service is being restarted.</p>
<b>Configuration Backup And Restore</b>	<p>Both systems fully support simple functions enabling backup and restore of web server configuration. This capability ensures that administrators can make experimental or temporary changes to the configuration while reserving the ability to subsequently restore the system to a known state.</p> <p>Customer Value: Configuration backup and restore increases service availability by ensuring that administrators can quickly restore a web server to a known state of stable operation.</p>

<b>Remote Administration</b>	<p>Both systems support administration of web servers via an HTML-based interface that is compatible with most web browsers. This interface allows an administrator to configure the server from any desktop system in the enterprise, and simplifies maintenance of the server because it removes the need to install an administration console on the workstation.</p> <p>Customer Value: By enabling remote management of web servers without requiring installation of a special administration utility, customers will eliminate the costs of installing and configuring a management utility. This will increase the convenience of managing the web server, thereby increasing the productivity of management staff.</p>
<b>DNS Services and Administration</b>	<p>Both systems include integrated Domain Name Services (DNS) which enable DNS clients such as web browsers to resolve user friendly domain names into associated IP addresses.</p> <p>Customer Value: DNS simplifies management of Domain Names and their associated IP addresses by providing centralized name resolution services as well as replication of DNS configuration between hierarchical DNS servers.</p> <p>Novell enables DNS to be fully managed via NDS as objects in the directory tree, thus making DNS information available to name servers throughout the enterprise. DNS zones, name servers and resource records are all centrally managed as NDS objects from anywhere on the network. Novell's directory-enabled DNS also supports Dynamic DNS, as well as easy importing of existing DNS configuration information in BIND master file format. Novell's implementation also integrates with existing DNS primary and secondary servers through zone transfer capabilities.</p>



## ISP Features

<b>Host Headers</b>	<p>Both systems fully support host headers. Host headers enable customers such as Internet Service Providers (ISPs) to host multiple web sites on a single server having only one IP address.</p> <p>Customer Value: The capability to host multiple sites on a single system reduces the costs associated with purchasing, installing, configuring and maintaining multiple web hosts.</p>
<b>Multi-site Hosting</b>	<p>Both systems fully support hosting multiple distinct web sites on a single server. Customers can either:</p> <ul style="list-style-type: none"><li>• assign a unique IP address to each local site (Novell refers to this as “hardware virtual servers”)</li><li>• associate a unique port number for each site, but still use only one IP address for all local sites (Novell refers to this as “software virtual servers”)</li><li>• utilize host headers to uniquely identify each local site</li></ul> <p>Multi-site hosting will appeal to ISPs hosting third party web sites, as well as corporations hosting multiple internal departmental sites.</p> <p>Customer Value: Hosting multiple web sites from a single server allows customers such as ISPs to achieve economies of scale in their ability to host third-party sites. Multi-site hosting decreases hardware costs and also eliminates the installation, configuration and maintenance effort associated with each additional web server.</p>
<b>Protected Execution</b>	<p>Both systems support the execution of web server applications (NSAPI or ISAPI extensions) in protected memory spaces to prevent application crashes from bringing down the entire server. The following protection options are available to choose from:</p> <ul style="list-style-type: none"><li>• Individual extensions can be protected by themselves. If the extension crashes, all other applications on the server continue to run. This option consumes the greatest amount of system resources and impacts application performance the most, but provides the highest level of protection.</li><li>• Selected extensions can be pooled together such that if any extension in the pool crashes, all other extensions in the pool could discontinue operation, but all other applications on the server continue to run. This option consumes less resources and impacts application performance to a lesser extent, and provides an intermediate level of protection.</li><li>• All extensions can run unprotected. This option provides the highest application performance, but if any extension crashes, the entire server could discontinue operation.</li></ul> <p>Customer Value: Protected execution allows other server functions to continue operation in the event that the web server application crashes, thus increasing worker productivity due to continued service availability.</p>

## Security Features

<b>Secure Communication</b>	<p>Both systems fully support Secure Sockets Layer (SSL) 3.0 as a mechanism for secure authentication of web-based clients. SSL is also used to secure the exchange of confidential information transported over HTTP.</p>
	<p>Customer Value: SSL ensures that information exchanged over the network cannot be utilized of unintended purposes. Implementation of SSL v3.0 standards ensures interoperability with other SSL-enabled products.</p>
	<p>Novell's implementation of SSL v3.0 is fully integrated with the Novell Certificate Server, which is fully integrated with NDS and the Novell International Cryptographic Infrastructure (NICI). NDS integration enables scalable, directory-based storage and management of digital certificates used in conjunction with SSL and other services. NICI enables easy implementation of short or long key lengths in conjunction with SSL and other cryptography consumers, and therefore easily accommodates customer key length requirements.</p>
<b>Access Restrictions</b>	<p>Both systems allow administrators to restrict access to web content to specific IP addresses, groups of IP addresses, or entire IP domains.</p>
	<p>Customer Value: The ability to control access to web site content enables customers to safely implement web sites containing private information intended for a limited set of individuals only.</p>
	<p>Novell's NetWare Enterprise Web Server enables three methods for restricting access to selected web content:</p> <ul style="list-style-type: none"><li>• "User-Group": This method uses LDAP for authentication (with or without encryption) and NDS for authorization.</li><li>• "Client certificate": This method uses a browser-based certificate for authentication, and NDS for authorization.</li><li>• "Host IP": This method enables the administrator to specify wildcard patterns to match an IP address or host name, multiple IP addresses, or entire IP domains. Only matching computers are authenticated.</li></ul>
<b>Certificate Storage</b>	<p>Both systems provide storage for client and server certificates used in conjunction with web services security.</p>
	<p>Customer Value: Customers can implement their own Certificate Authority rather than purchase certificates (typically at significant cost) from a trusted third party, thus reducing costs and increasing productivity.</p>
	<p>The Novell Certificate Server is fully integrated with NDS whereby certificates are securely stored in the directory as an actual attribute of the object to which they are assigned. This greatly simplifies certificate storage and management, and increases security. Microsoft stores its certificates in a separate data store and therefore customers do not enjoy the benefits provided by directory-enabled certificate management.</p>

NetWare 5.1 currently implements the following web services feature not found in Windows 2000:

Administration Features	
<b>Server-Specified Cache Control Directives</b>	<p>Novell's NetWare Enterprise Web Server allows web server administrators to control, through server-side cache directives, what information is cached by a proxy server, and how it is cached. This capability allows the administrator to override cache directives specified in web content as well as the default behavior of the proxy server.</p> <p>Customer Value: Novell's support for server-specified cache control directives allows administrators to take control of content caching behavior rather than relying upon accurate specification of such behavior by content authors and cache administrators. This capability simplifies administration of how site content is cached, and therefore reduces cost and increases content security.</p>

Windows 2000 currently implements the following web services features worth noting that not currently found in NetWare 5.1:

Windows 2000-Specific Features	
<b>FrontPage Server Extensions</b>	<p>Microsoft includes support for FrontPage Server Extensions. These extensions are installed on the web server and enable users of the FrontPage authoring program to view and manage the contents of a web site through the FrontPage interface.</p> <p>Customer Value: FrontPage Server Extensions allow web content authors using FrontPage to directly post content, therefore relieving the webmaster of this task and making content available to site visitors sooner.</p> <p>However, it should be noted that FrontPage Server Extensions are proprietary to FrontPage, and should be replaced in the future by FrontPage's support for WebDAV, an open standard for directly updating web site content. NetWare 5.1 fully supports WebDAV.</p>
<b>HTTP Compression</b>	<p>Microsoft supports HTTP compression, a feature that can speed retrieval of large files from web servers by compressing the files prior to delivery to reduce the amount of information to be transferred.</p> <p>Customer Value: Faster delivery of web content increases customer satisfaction and end user productivity.</p> <p>HTTP compression may be limited in its usefulness to many customers. Customers should consider the following when evaluating potential use of this feature:</p> <ul style="list-style-type: none"> <li>• HTTP compression reduces the size of content to speed its delivery. This applies most to situations where bandwidth is constrained, such as extended web browsing sessions over dial-up lines. HTTP compression may not be applicable to internal network environments consisting of fast interconnects.</li> </ul>

	<ul style="list-style-type: none"> <li>• HTTP compression requires CPU cycles at the web server, and is most suitable for web servers that are lightly loaded and do not process applications or other network services. For web servers that experience spikes in activity or heavy CPU loading, HTTP compression may actually reduce the performance of web page access, dynamic web applications, ecommerce applications, etc. running on the web server.</li> </ul>
<b>PICS Rating Support</b>	<p>Microsoft includes support for PICS, allowing administrators to specify a PICS rating (suitability of the site's content for mature audiences) for each site hosted by IIS.</p> <p>Customer Value: PICS provides a method for end users to avoid browsing content of sites that they might find objectionable.</p> <p>PICS is most useful to customers hosting public Internet sites containing potentially objectionable content. PICS does not apply to business customers hosting internal sites or a corporate Internet presence.</p>
<b>Kerberos v5 Authentication</b>	<p>Microsoft supports the user of Kerberos as an authentication protocol to Windows 2000 Server.</p> <p>Customer Value: This secure authentication protocol replaces Microsoft's less secure NTLM protocol used in previous version of NT as the primary authentication mechanism for login to Windows 2000 resources.</p> <p>Alternatively, Novell has implemented a public-key authentication mechanism based upon technology licensed from RSA Security. This extremely secure and popular authentication algorithm has undergone industry scrutiny for over 20 years, and has shipped as the foundation for NDS authentication since 1994. Novell's choice of RSA-based public key security is no less secure than Kerberos, and in fact may be argued as superior in many ways.</p> <p>Novell also supports SSL encrypted LDAP authentication as well as highly secure certificate-based authentication.</p>
<b>Digest Authentication</b>	<p>Microsoft supports Digest Authentication as a step up from NT Basic Authentication. This mechanism is an improvement over NT Basic Authentication in that the client and server exchange a hash of the user's password during login instead of sending it in clear text over the network.</p> <p>Customer Value: This feature provides increased password security during Windows 2000 login due to elimination of clear text passwords on the network. This feature is also very easy for system administrators to enable.</p> <p>Novell's NetWare and NDS authentication mechanisms are built upon extremely secure public-key encryption technology licensed from RSA Security. This login technology is operational by default and requires no extra work by administrators to implement. Novell never sends passwords over the network in clear text, therefore Digest Authentication is not needed in Novell environments.</p>

<b>Server-Gated Cryptography (SGC)</b>	<p>Microsoft supports SGC as a mechanism to accommodate the optional use of 128-bit encryption keys in conjunction with international versions of its SSL technologies. Past U.S. export restrictions have disallowed general support for 128-bit keys in export products except under approved, controlled conditions.</p> <p>Customer Value: International customers can utilize stronger keys with Microsoft SSL in approved situations, and therefore can increase the security of their information exchange.</p> <p>The Novell International Cryptographic Infrastructure (NICI) built into NetWare 5.1 supports the use of various encryption algorithms and key lengths (including 128-bit keys) throughout all Novell products based upon the customer's ability to gain approval for such use in international markets. NICI has gained export approval from the U.S. government. Note that recent changes in U.S. government policy may relax export restrictions relating to encryption key lengths.</p>
<b>Fortezza</b>	<p>Fortezza, which includes the DSA and SKIPJACK security algorithms, defines a set of security standards mandated for use within some US government installations. Fortezza is a components of the U.S. government's Defense Messaging System (DMS) requirements.</p> <p>Customer Value: Support for Fortezza standards is required for Microsoft to sell products to some U.S. government agencies. However, popular alternative security algorithms are widely available to meet the stringent needs of business customers, and Fortezza is therefore not applicable to most business customers.</p> <p>While Novell does not currently provide support for Fortezza standards, the Novell International Cryptographic Infrastructure (NICI) that provides the underpinning for Novell's security products is capable of supporting Fortezza, and Novell will be delivering Fortezza compatibility in the future.</p>

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