



# Xythos WebFile Server

## Emerging Technology for Intelligent Distributed File Access

*An IDC White Paper  
Sponsored by Xythos*

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### THE PROBLEM

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The pervasive adoption of networking has brought dramatic changes in the IT infrastructure of most organizations. Specifically, corporate information assets have spread throughout the organization and beyond. They can now be found almost anywhere — in an individual's PDA, the mobile computer, the desktop system, the workgroup server, the departmental server, the business unit server, or in the organization's mainframe. This can make it exceedingly difficult to determine what information is available and to maintain a balance between the needs for security and easy access.

### WEB-BASED COMPUTING

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The power of Web-based computing is its promise to provide a significant competitive advantage by putting information directly into the hands of business decision makers, wherever and whenever they need it. However, the growing volume of uncataloged, unstructured business information and the complexity of network computing environments continue to produce what amount to islands of information that are difficult to access and present a number of serious obstacles to delivering on this promise:

- **Proliferation of information.** There is more information in more places, and the volume is increasing at an astounding rate.
- **More types of information.** Beyond conventional data found in databases, organizations are collecting unstructured, uncataloged information of all types in files.
- **More complex network computing environments.** Organizations are wrestling with a diversity of topologies, platforms, and information architectures.
- **Delays and difficulties locating and using critical information.** Users struggle to find information and use it and even to know what information exists and is available for use.

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- **Security.** Unauthorized access or modification of information must be prevented in what is an inherently vulnerable environment; at the same time, authorized users must be efficiently granted access at the proper level.
- **Proliferation of copies of files.** Uncontrolled copies of files result in wasteful, inefficient use of storage capacity and potentially erroneous results.

Organizations will need to resolve these issues before they can experience the full benefits of Web-based information access. In the process, they will have to answer questions such as: What information is available? Where is it located? Who may access it? With what access privileges may it be shared?

## **VIRTUALIZING STORAGE**

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One possible solution is to standardize on uniform, centralized storage, as enterprises did in the mainframe-computing era. However, it is unlikely that organizations can return to a single, centralized, homogeneous pool of storage. The heterogeneous nature of enterprise systems today and the diverse types of data stored force organizations to deploy mixed storage environments. Furthermore, until high-speed access to information is available everywhere and at all times, centralized storage of all information is just not practical. Members of an organization's staff must be able to work from airplanes, client offices, hotel rooms, and home offices, as well as from their normal office desktops.

Organizations, however, can achieve many of the benefits of uniform, centralized storage through a virtual approach, which masks the complexity of the actual storage by making it all appear to be a single accessible pool of information. This entails virtualizing storage or, at the least, virtualizing access to stored information. This also permits the enterprise to leverage existing storage and network infrastructures to gain maximum return on investment (ROI) from these investments. Virtualizing storage and access represents two key pieces of the potential solution. A full solution will likely include the following:

- Store information in a standards-based, flexible format that makes it available to all applications. XML offers one approach to satisfying this requirement.
- Virtualize storage so that data can be accessed reliably from any system in the network regardless of its architecture or operating system. Network attached storage (NAS) and storage area networks (SANs), Distributed File System (DFS) software and low-cost storage and appliance servers are being used to consolidate storage, a requirement for effective virtualized storage.

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- Use sophisticated storage management and knowledge management software to identify what information assets are available, where they are located, and how they may be accessed.
- Virtualize access to files and applications through virtual user interface (VUI) software to combine the efficiency of centralized management with the flexibility and power of distributed systems.

The solution for any given organization is likely to entail several if not all of the above. XML, for example, promises to provide the universal information access and exchange format. Beyond that, the organization can opt for virtual storage or virtual access.

### **Virtual Storage**

Virtual storage makes different physical storage systems appear as one consolidated pool of storage. In the process, it delivers a number of benefits:

- Central management, which reduces staffing and lowers overhead costs
- Improved information reliability and availability, particularly if something happens to the original host
- Future proofing as new processor technology becomes available without forcing a change in storage technology

IDC expects virtual storage to become the standard for enterprise computing even though it alone doesn't resolve all of the issues. In addition, many organizations may opt for virtual access, either by itself or in conjunction with virtual storage.

### **Virtual Access**

VUI software provides a single method for accessing a wide range of system resources. This virtual access can enable organizations to flexibly store files and applications on the systems and devices most appropriate to their use. With virtual access, all the information (applications and files) may appear to reside in a specific location, such as the user's desktop or a mapped network drive, despite the fact that it may be stored across multiple, diverse systems in various locations.

Because VUI software masks the display and input/output mechanisms of an operating system, applications can be written without regard to whether the user interface is running locally or remotely on some client system. Furthermore, the application developer doesn't need to know what type of system (microprocessor) or operating environment is supporting the user interface.

In addition to the VUI, IDC sees a growing need for another form of virtualization — virtual file access — that will provide a transparent bridge from the multitude of LAN file servers now hosting enterprise data files to virtual storage networks. Such virtual file access will pave the way for seamless file sharing.

The transition to a virtualization strategy does not require the whole-sale overhaul of systems, storage, and information and data formats.

Rather, virtualization should be viewed as an evolutionary approach that reduces, and in some cases even eliminates, the need to change the underlying storage systems and technologies. Such virtualization benefits both the IT group that manages the systems, which gains greater control while reducing costs, and users, who get simplified access to more information.

## **IN SEARCH OF THE IDEAL SOLUTION**

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Although central to the solution, neither virtual storage nor virtual access completely solves the information access problem. For example, unless the organization is using some type of document or content management software tool to index the data files, it is likely these organizations don't know what information assets exist within their portfolios. Similarly, because the files and applications may be hosted on different systems and running in different operating environments, users are likely to find it quite difficult to integrate data from among the systems.

As envisioned by IDC, the ideal solution for facilitating access to all of the organization's stored files will include the following:

- **File sharing for unstructured data.** Encompasses information found in various documents, presentations, and other files in addition to structured data contained in databases.
- **Virtual access.** Masks the details of access, as well as the storage technology and location, making all the files appear as a single pool of information on the local system (only administrators would know the actual location).
- **XML.** An increasingly widely accepted standard data format for the exchange and integration of data from disparate systems.
- **Direct access from within applications.** Allows users to access and share information from within their desktop applications and allows authorized users to collaborate and make changes to information also from within their desktop applications.
- **Searchable metadata to describe the contents of the data portfolio.** Enables organizations to efficiently identify and locate the contents of their information portfolio, control who is allowed access, and with what access privileges.
- **Platform and operating environment independence.** Specifies standard, open approaches to make stored data accessible by all systems regardless of the operating environments or platforms involved.
- **Wide accessibility (wired, wireless, dial-up, LAN, WAN).** Allows users to access information through a range of connections, including telephone or LAN lines, wireless networks, or the Internet.
- **Security (access authentication, authorization) management.** Administrators must be able to control access to information and monitor and manage activity.

- **Efficiency.** Speeds access to stored and managed information, eliminating the need for users to store unauthorized/unnecessary copies of information, which waste storage capacity, increase the likelihood of errors, and increase administration overhead.
- **Offline usage.** Allows users to download and work with information offline (while unconnected to the virtual storage pool).

## EXISTING APPROACHES

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Traditionally, email systems have been used as de facto file management and sharing solutions. But this approach produces a substantial and unnecessary burden on these systems while wasting available storage and bandwidth, and it presents significant security risks due to the inherently insecure nature of email attachments and networks. IDC, however, has identified several solutions available that already incorporate some of the capabilities noted above. These include:

- **Novell iFolder.** Delivered as a Web service, it allows mobile users to access their stored files from multiple enterprise systems and anywhere on the Internet.
- **Oracle Internet File System (IFS).** Allows access to database files using familiar interfaces such as Windows, Web browsers, email, and FTP; permits viewing documents and media stored as files and folders in the Oracle database.
- **Microsoft SharePoint Portal Server.** A customizable Web portal enabling users to easily access information throughout the organization while performing basic management functions, such as check-in/check-out.
- **Xythos WebFile Server.** An Internet-enabled, standards-based file system for virtual, secure read/write access to information that resides on a wide range of backend systems and platforms.

## THE XYTHOS WEBFILE SERVER

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Xythos WebFile Server (WFS) adds an intelligent file management layer to an organization's file storage systems and incorporates many of the pieces of IDC's ideal solution described above. This layer enables virtual access and easy, secure file sharing over the Web, which translates directly into timesaving and increased productivity for users. It can also help to lower overall storage costs by reducing or eliminating the storage of wasteful, redundant copies of files and decreasing the amount of work required to manage the storage.

The Xythos approach allows any user with a Web Distributed Authoring and Versioning (WebDAV)-enabled application or Web browser to access stored information through the WFS. This approach uses HTTP, the ubiquitous Internet transport protocol, as a file management protocol and takes advantage of WebDAV to permit the secure reading, writing, modification, and sharing of business information in the form of files. In short, WFS will provide secure file access to any device with a Web connection.

WebDAV itself consists of a set of extensions to HTTP intended to facilitate collaborative editing and file management between remote users via the Internet. It can be implemented to work from within authoring tools, such as word processors or presentation software, and gives users the ability to write and modify files, not just read them, as is the case with HTTP alone. Where legacy client applications are not yet WebDAV-compliant, Xythos offers a Xythos client that enables legacy Windows applications to speak WebDAV with any WebDAV-enabled server, permitting the WFS, in effect, to speak directly with any client application.

The Xythos file management layer masks the details of the underlying server and storage systems from the client. It supports a wide variety of server architectures and storage systems, including Sun Solaris, IBM AIX, Linux, BSD, Cobalt Linux, HP-UX, Mac OSX, and Windows 2000/NT, as well as many SAN or NAS implementations. This makes WFS particularly well suited in the mixed server and storage environments that are characteristic of enterprises today.

In addition, the Xythos approach to file management readily integrates into existing security and application standards. WFS also augments the existing capabilities with its own out-of-the-box functionality, such as a metadata layer, which identifies the information contained in a file; multilevel access controls, which let administrators control who sees the information; and bandwidth and capacity quotas, which are used to manage performance and client use of resources.

Finally, Xythos provides extensions and integration points to turn the Web into an application integration platform. The WFS bundled application programming interface (API), coupled with Xythos' standards-based WebDAV server implementation, allows corporate developers and systems integrators to create Web applications that can access and integrate information across a wide range of hardware and software platforms.

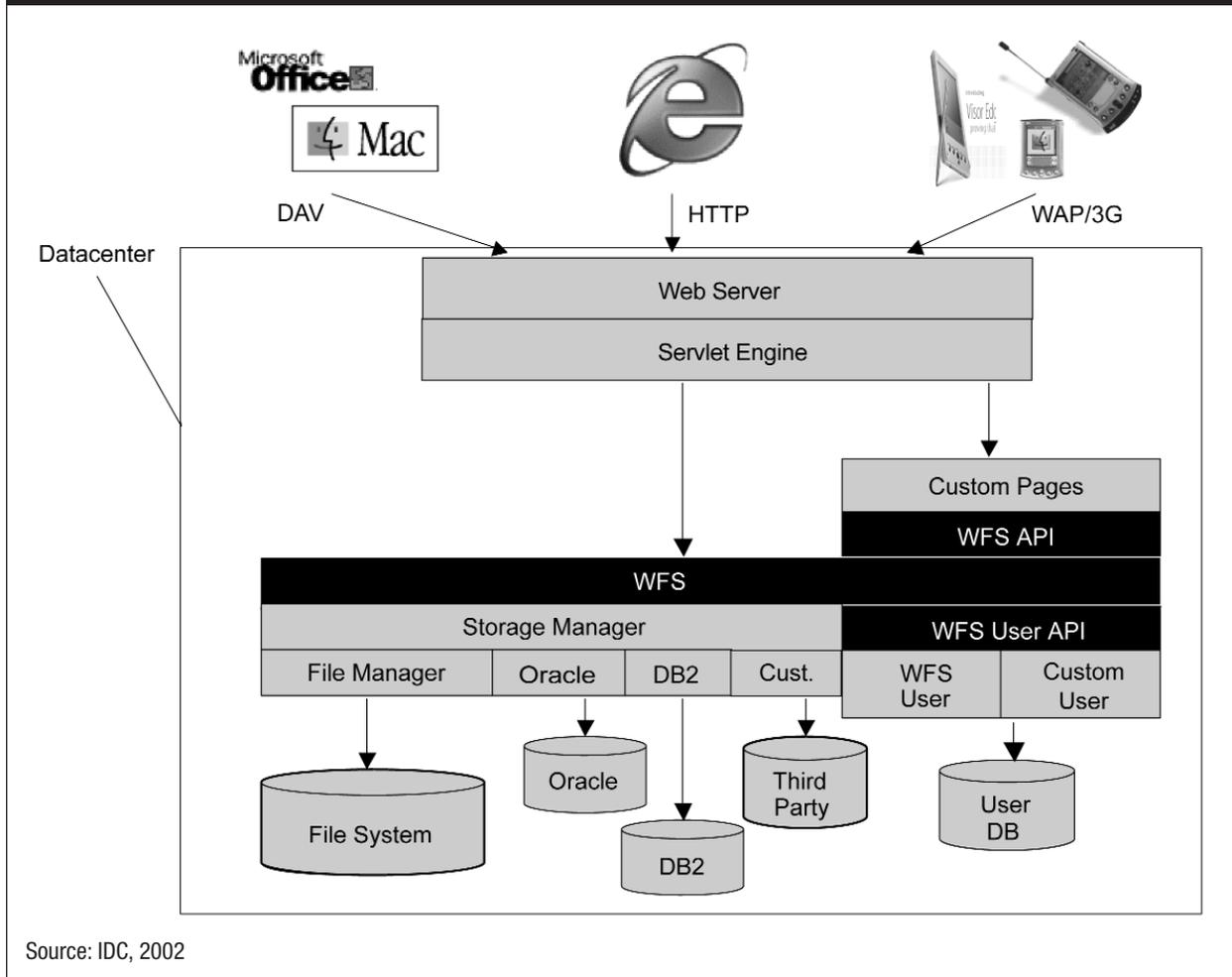
## WFS Architecture

WFS is designed to be open, scalable, secure, and manageable. The architecture is based on a three-tier concept:

- **Client.** Any device that runs HTTP, wired or wireless.
- **Middle tier.** 100% Java, runs on any platform that offers Java. Multiple middle tiers can run on different hardware. Scalability is achieved through multiple middle tiers with calls distributed through a load balancer.
- **Back-end tier.** Information can be stored on any NFS-mounted device accessible by the middle tier (from inexpensive RAID devices to high-end NAS/SAN from leading vendors). Accesses any JDBC-compliant relational database (open source to DB2 and Oracle).

The Xythos WebFile application layer sits atop the file system, hardware controller, and disk storage layers (see Figure 1).

**Figure 1**  
**Xythos WebFile Server Architecture**



Source: IDC, 2002

Xythos gives administrators full control. They can create, delete, move, and copy resources; change permissions; enable versioning, logging, and locking; manage metadata; allocate bandwidth; and perform custom logging. They can also manage storage groups, global settings, and storage subsystems and databases, as well as create virtual servers, directories, and users.

In terms of security, administrators can create custom user objects, perform custom address book management and session management, deploy encryption, and implement security policies.

### Benefits of WFS

IDC identifies two primary benefits from WFS: the ability to fully leverage corporate information assets efficiently and easy, secure file access across the Web.

For cost efficiency, WFS can reduce or eliminate the redundant storage of files. For convenience, users often store copies of workgroup

or enterprise files — email attachments, PowerPoint presentations, Word documents — on local servers. This unnecessary storage can consume a substantial amount of capacity, forcing the organization into costly, frequent storage upgrades. With WFS, the organization can store the file in one place where everyone can access it as if it were local. By making use of centralized storage resources, WFS also enables fewer administrators to manage more information, which provides significant cost savings.

WFS provides secure, universal access to file-oriented information, making it easy for workers everywhere to find and use corporate information when they need it. In fact, once the file system becomes Internet-enabled, it helps people work together more effectively without changing the tools they are already familiar with, such as Internet Explorer and MS Office. The organization, however, retains complete control of these information assets, determining who is able to view which information.

The most recent version of WebDAV includes a number of useful features not implemented in today's common applications. These capabilities include version control, logging, check-in/check-out, and advanced permissions. These features have already been incorporated into WFS 3.1, making them readily available for use by new or upgraded applications as they are released.

## **WEBIFY YOUR ORGANIZATION**

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Xythos WFS introduces a new option for organizations that want to capitalize on the value of unstructured information stored as files. WFS makes it possible to "Webify" the organization's files for easy access across the Web, regardless of where the files are actually stored. Organizations can take advantage of the ubiquitous nature of the Internet, HTTP, and WebDAV to ensure that their workers have ready access to information files without compromising data security. At the same time, the organization can reduce its storage overhead through improved administrator efficiency and the elimination of wasteful storage redundancy.

Organizations struggling with the need to share volumes of unstructured, file-oriented information or wrestling with information spread across diverse and disparate servers and storage subsystems should consider making this kind of virtual file access — Webifying their storage — an integral part of their storage infrastructure strategy.







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02C3221SOFTWA3221  
February 2002

  
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