

# Flexibility

Microsoft Dynamics AX

## Flexible Solutions with Microsoft Dynamics AX Application Object Server Technology

White Paper

How businesses can use Microsoft Dynamics AX Application Object Server technology to develop and implement flexible and scalable solutions that use standard PC and network technology and standard Microsoft operating systems for both clients and servers.

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<http://www.microsoft.com/dynamics/>



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## *Client/Server Technology: Some Background*

Client/Server technology has become available as a result of the development and successful implementations of distributed computing environments that use personal computers in Local Area Networks (LANs) and/or Wide Area Networks (WANs) together with separate database engines.

In the past three decades, companies had few options when it came to implementing, running, and maintaining a software solution. With complex infrastructures and limited access to public networks, the only solution was to implement software on a mainframe computer and use "dumb terminals" as the user interface.

In the 1990s a new technology came to life: client/server architecture that was based on intelligent terminals and central servers. Intelligent terminals were the answer to the growing need for Graphical User Interfaces (GUIs) and integration with software (like Microsoft® Office tools, e-mail, and other applications) created by various vendors. The new client/server technology had one major problem, however: it demanded a lot more bandwidth on the network. Terminal Server software became very popular as a means of overcoming this problem.

The first wave of client/server solutions was based on two tiers: the database ran on a central server and the software ran on the client (often called fat clients). Two-tier client/server technology had an advantage, because it meant that companies could run centralized databases. However, there was also a disadvantage: data had to go over the network – from the database server to the client. This configuration demanded a lot of bandwidth on the network. Such bandwidth was too expensive on public networks so the two-tier client/server technology left companies with the same option as before: a mainframe solution with dumb terminals.

The second wave of client/server solutions is based on three tiers: the database still runs on a central server, but now the software also runs on a central server, leaving the client (intelligent terminals) to handle the user interface and whatever program logic is needed. The three-tier client/server solution is today's answer for companies because:

- It demands much less bandwidth on the network.
- Software and databases can run on central servers.
- The terminals are intelligent.

The growth of this trend in multi-tiered computing has been made possible because of reductions in the cost of hardware and software components and the availability of high performance database engines.

Microsoft Dynamics has embraced this technology with its newest software, Microsoft Dynamics AX. Through its advanced three-tier client/server technology, flexibility and scalability, Microsoft Dynamics AX helps companies keep pace with changing markets. To achieve that goal, Microsoft Dynamics has adopted two key strategies:

- We provide enterprise resource planning (ERP) solutions that you can access through networks, even those that have limited bandwidth.
- We provide a choice of centralizing or decentralizing the ERP solution, depending upon network infrastructure.

## *Microsoft Dynamics AX Application Object Server*

Microsoft Dynamics AX offers companies a unique three-tier client/server technology with the Microsoft Dynamics Application Object Server. Microsoft Dynamics AX Application Object Server (AOS) technology offers companies a very flexible solution that uses standard PC and network technology and standard Microsoft operating systems for both clients and servers. Compared to mainframe solutions, AOS technology reduces the demand for maintenance because it runs in a standard Microsoft environment and uses standard TCP/IP protocols.

### **Application Object Server Technology**

Microsoft Dynamics AX Application Object Server is based on well-established industry standards. This keeps technical requirements to a minimum. Network communication is based on TCP/IP and, as with Microsoft Dynamics AX in general, database support is provided by a SQL Server™ database. All system-related tasks are based on facilities that are provided by the operating system (logging and performance monitoring, for example).

For communication between clients and server, Remote Procedure Call (RPC) serves as a robust and easily administered protocol and is standard Microsoft Windows technology. RPC is based on TCP/IP, which means that it runs in virtually any environment—LAN and/or WAN. By using TCP/IP, you can implement Web-based WAN environments for communication with the provider. The strict implementation of RPC also supports the use of Virtual Private Networks (VPN), which are recommended for private traffic implementation on public networks like the Internet.

The database engine features have been extended. They now have the ability to share resources with all connected clients. To optimize performance, these new features include the sharing of record caching, SQL Server connections, and cursors.

The fairly unique concept of the Microsoft Dynamics AX standard Windows client makes it possible to build a setup where clients that have different hardware potential (such as clock speed, network, and memory) can each obtain maximum benefit from the AOS architecture.

As an alternative to the standard Windows clients, different front ends can be used. Microsoft Dynamics AX provides out-of-the-box integration with Windows SharePoint Services, which enables access as a Web client. Web users can access data and business logic according to the same security setup that characterizes standard Windows clients. The Microsoft Dynamics AX .NET Business Connector provides the interface needed to access functionality and data from other software products, such as Microsoft® BizTalk® Server, (a former COM-based version of the Business Connector is still available for backward compatibility). A Web service wrapper is also included, making it possible to enable any desired functionality within Microsoft Dynamics AX as a Web Service and to make it available to the business internally, externally, or both.

The AOS itself is built as a true Windows service. One of its advantages is that it works similarly to, and has the same features as, other Windows services, decreasing the workload and training requirements for systems administrators.

### **How AOS Differs from Microsoft Terminal Server**

Windows Terminal Server (WTS) and Citrix MetaFrame architecture are terminal systems. Terminal systems can be compared to the architecture of UNIX-based terminal systems in which ANSI or VT-terminals front a 100% host-based application. WTS technology brings these capabilities into the Windows environment, making it possible to run Windows programs on a central server through terminal emulation. This offers a number of advantages like remote access, Net PCs, and centralized server-centric application management and deployment. The AOS environment, on the other hand, is based on an Intelligent, full-featured Windows 32-type client (such as Microsoft Dynamics AX standard Windows client and Business Connector). These clients offer full integration at the desktop level, direct access to local client resources, and easy, effective integration with several types of client-related hardware such as readers, scanners, printers, and mechanical devices.

An important difference between AOS and WTS technology is the network load pattern. WTS technology results in sustained traffic between the client and the server at any time when interaction with the program occurs. Each mouse movement or key press results in network traffic. The AOS, on the other hand, does not generate network traffic unless the server is actually involved in the current operation. Browsing through

customer lists, for example, results in only a few network transmissions when data is loaded from the server to the client. This data is collected in larger chunks, too, to reduce the number of network communications. When the client has obtained the required information from the server, no further network traffic is generated. This frees up the available bandwidth for other clients to use, thereby improving the number of concurrent users on a given amount of bandwidth. Other ways of saving network bandwidth include on-the-wire compression and aggressive method loading.

## **AOS and Windows Network Load Balancing**

Microsoft Dynamics AX Application Object Server can be combined with Windows Network Load Balancing — a standard Windows network component that uses a distributed algorithm to load-balance access across a number of AOSs, enhancing scalability and reducing the hardware requirements of the system.

## **Sizing, Performance, and Scalability**

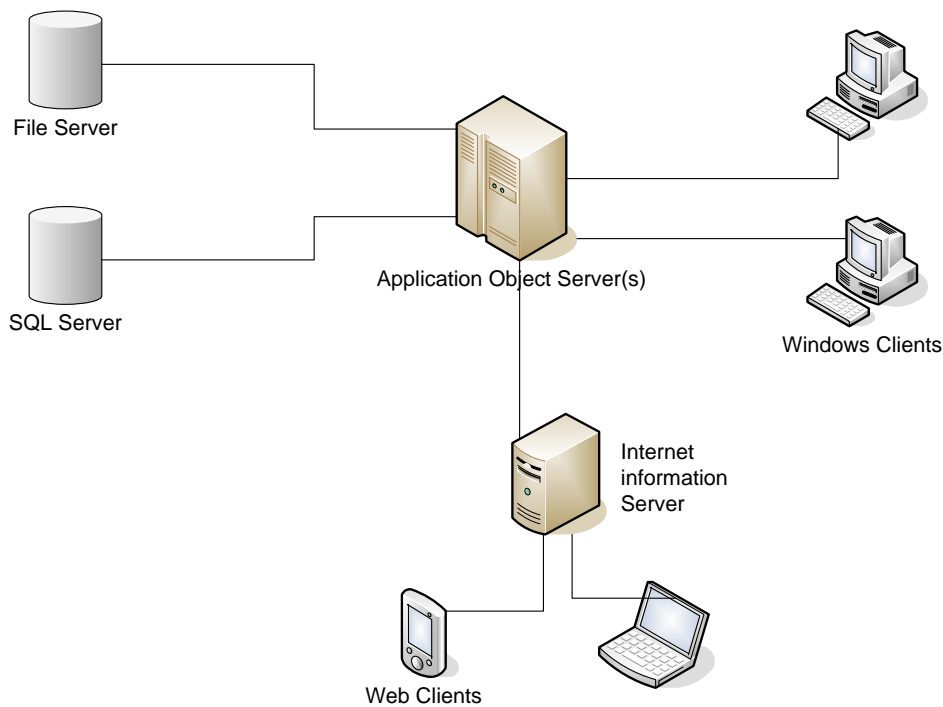
It is a fact that sizing, performance and scalability are of the highest interest when they really address the customer's situation, load pattern, needs, and environment. For this reason, Microsoft Dynamics offers a wide range of assistance, calculations, and measurements to the business partner, and to Microsoft Dynamics AX customers.

### *Providing Connectivity in the AOS Environment*

Because network communication in the AOS environment is based exclusively on TCP/IP, a very broad mass of connectivity is available. Connections based on ISDN, frame relay, leased lines, cellular data communication, or modems are all possible solutions for providing connectivity for situations ranging from a single remote user, to a few users at a small subsidiary, to a large number of users at remote production plants. Because of the different characteristics of the individual communication methods, it is very important to select the proper communication means for each specific installation. You need to take into account figures like guaranteed bandwidth, latency, and quality of service (QOS) when you are planning connectivity.

### *What to Choose*

By offering this broad variety of connectivity and client/server models, Microsoft Dynamics AX becomes the obvious choice for every installation—from a one-site system to multi-site systems, e-commerce, and setups involving integration with other vendors' software. Although the following figure shows one type of AOS setup, your own situation is likely to vary from that. Review the brief guidelines that follow the figure; they will help you decide upon the type of solution that is best for you.



**Microsoft Dynamics AX Application Object Server Setup**

### **Small to medium-sized company, single and multi-site**

Use a centrally placed AOS. This setup allows local clients, and remote thin clients. The latter must use Terminal Server connections. You can use all Business Connectors and clients in this setup.

### **Medium to large-sized company, multi-site**

Base your setup on the AOS and combine it with Dual Object Server capability. This setup enhances both basic performance and reliability. As in the other configurations, you can use all Business Connectors and clients in this setup. You ensure remote access capabilities by using Terminal Server.

### **Large to very large-sized company, multi-site**

Use parallel Application Object Servers. With this configuration, you can set up virtually as many parallel Application Object Servers as you want. You can use all sorts of Microsoft Dynamics AX clients and Business Connectors in this setup, making it possible to handle almost any situation, whether remote connectivity (using Terminal Server), Web integration, or e-business.

### *Benefits of The Microsoft Dynamics AX Application Object Server*

- AOS offers three-tier thin client technology and low bandwidth demand, which minimizes the cost of data communication, and enables the use of LAN technologies that need no additional connections and/or WAN technologies that use Terminal Server.
- AOS runs in a standard Windows Server 2003 environment, which can handle hundreds of clients. By using standard Windows Server 2003 technology, you can be assured of minimum maintenance and administration costs.
- TCP/IP, a widely used standard, is the communication protocol between the Application Object Server and the client, thus ensuring minimum administration expense.
- Centralized maintenance and administration, assuring you of the lowest possible cost of ownership on an ERP system.

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## *Summary*

Microsoft Dynamics AX is unique because it offers companies a very flexible and scalable solution that uses standard PC and network technology and standard Microsoft operating systems for both clients and servers. This reduces the demand for maintenance required by mainframe solutions because it runs in a standard Microsoft environment that uses standard TCP/IP protocols.

## *Contact your Partner*

To learn more about Microsoft Dynamics AX, contact your local Microsoft subsidiary. They have the expertise necessary to meet your specific business needs. You can find your local Microsoft subsidiary on the Microsoft Dynamics Worldwide Locations Web site: <http://www.microsoft.com/dynamics/worldwide.mspx>.

## *About Microsoft Dynamics*

Microsoft Dynamics, a division of Microsoft, offers a wide range of integrated, end-to-end business applications and services that are designed to help small, mid-market, and corporate businesses become more connected with customers, employees, partners and suppliers. Microsoft Dynamics applications optimize strategic business processes across financial management, analytics, human resources management, project management, customer relationship management, field service management, supply chain management, e-commerce, manufacturing and retail management. The applications are designed to provide insight to help customers achieve business success. More information about Microsoft Dynamics can be found at <http://www.microsoft.com/dynamics/>.

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