



**MAS 90<sup>®</sup>**

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**Technology White Paper**

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## MAS 90 Technology Overview

Which technology is appropriate for Windows®-based accounting software in the year 2000?

To answer this question, we must first understand how accounting software differs from other business applications, such as word processing or spreadsheet products, and what the unique requirements are for an accounting software application. These requirements must incorporate the specific accounting needs of a particular business, and the associated workflow.

In general, accounting systems place much higher demands on computer hardware, operating platforms and communications protocols. In addition, since companies rely on their accounting software to generate the invoices that bring in the cash flow, reliable systems are critical to business success.

This white paper discusses the capabilities of MAS 90 technology, addressing the vast majority of accounting requirements, from small to large businesses in virtually any industry. In discussing MAS 90 technology, this white paper focuses on the advanced capabilities of MAS 90 for Windows and MAS 90 Client/Server.

## Accounting Software Technology Requirements

A high-level view of the specialized requirements of accounting software platforms follows.

Compared to other business software, accounting systems place much higher demands on computer hardware, operating platforms and communications protocols.

Specialized capabilities are needed for accounting software platforms.

A method of limiting the tasks each user has access to is required. Therefore, security must be definable at the task level.

Accurate business logic and a secure database ensure data integrity.

Access to the data using the tool of choice to obtain precise, timely reports is required to run businesses successfully.

## Accounting is Transaction-Intensive

While it may take several hours to create a single document in Microsoft® Word® or Excel® software, accounting systems may create several documents a minute, and thousands of lines of detail may need to be posted to historical files several times a day.

## Many Users Need Access

A fully integrated accounting system removes the necessity of entering information twice, and can therefore contribute greatly to streamlining business processes. In order for accounting modules to be fully integrated (so that subsidiary modules can post to the General Ledger, for example), all users must have access to the database. A method of limiting the tasks each user has access to is required as well; therefore security must be definable at the task level (i.e., invoice data entry).

## Data Integrity and Auditability are Critical

Accounting data contains crucial information businesses need to analyze profitability and the cost of business processes. It has to be right for the company to succeed. Accurate business logic and a secure database ensure data integrity. Well-designed accounting applications also provide a full audit trail of the data and prevent improper transactions from being added to the database.

## Access to Data for Reporting is Essential

Pre-configured reports often do not present information in a way that is most meaningful and useful to corporate executives and business owners. Moreover, most companies prefer to standardize on a particular report writer for all of their applications to minimize the learning curve of staff members. Access to the data using the tool of choice to obtain precise, timely reporting from the accounting data is required to run businesses successfully.

## Customization is Often Required

Entering transactions into the accounting system is often one of the most time-consuming tasks of running a business. Optimizing the system so that data flows quickly and accurately can be a big money-saver. The ability to create modified screens that move or remove unused fields, change the tab sequence for data entry, and add lists of allowed entries to specific fields – without costly programming changes – can be an important strategic advantage. On the other hand, if a major modification or add-on module to automate business processes is needed, the availability of qualified developers and consultants and the ability to use the programming tools of choice are essential.

The ability to modify screens to fit your business process is an important strategic advantage.

## The System Must Run Reliably

Although a system crash while editing a spreadsheet is an inconvenience, chances are it won't result in the business losses that can occur when the accounting system goes down. In order to avoid database administration headaches and possible loss of data, the database that the accounting system uses should expand dynamically as more transactions are added.

The database should expand dynamically as more transactions are added.

## Consider Future Requirements

An accounting system is a major investment in both time and money for most companies. A system that can continue to meet corporate needs in the long term is required. With the increasing pace of technological change, an accounting system should be easily transportable to take advantage of new hardware, operating platforms and database environments as they become available.

An accounting system is a major investment for most companies. A system that can continue to meet needs in the long term is required.

## MAS 90 Appropriate Technology

Based on today's accounting software requirements, the appropriate technology should encompass the following:

### Number-Crunching Programs and Data Files

MAS 90 processes large numbers of transactions at top speed.

MAS 90 uses a programming language and database that have been specifically developed and optimized for handling business transactions. MAS 90 programs do an excellent job processing large numbers of transactions, and effectively handling the dynamic nature of those transactions (for example, item number and comment line types in an invoice). The B-tree file system used by MAS 90 is optimized to process transactions at top speed in a network environment.

### Open Architecture

The database must be accessible to the reporting tool of choice, and allow data to be shared with outside applications.

Open architecture has two key components. First, the database must be accessible to the reporting tool of choice, as well as allow data to be shared with outside applications. MAS 90 data is available to these applications through Open Database Connectivity (ODBC). Users accessing MAS 90 data through ODBC are required to enter their MAS 90 user ID and password, protecting the accounting information from unauthorized access. To protect the integrity of your accounting data, this connectivity is read-only.

Providing write-back access to accounting data files bypasses audit trails and business rules. If data goes into the system through the standard interface (a general journal entry for example), all of the business logic protecting the data files from out-of-balance entries is enforced. As an alternative to write-back ODBC access, robust import and export capabilities are available through the Visual Integrator module, supporting integration with other ODBC-compliant data sources and many other file types (see Import/Export Features).

Another important component of open architecture is the ability to interface the accounting software with external applications. MAS 90 offers multiple ways to achieve this integration.

Visual Integrator (VI) facilitates integration with other applications through a combination of import/export, scheduling, and scripting capabilities. This module excels at bringing two disparate data-driven applications together and synchronizing their data on a predetermined schedule. For example, you can create a tight integration with a Microsoft® Access® application whereby every night VI automatically imports the Access data into MAS 90, performs MAS 90 tasks and exports the data back into Access.

Further integration can be achieved with the Customizer module (a component of the Custom Office module). In addition to standard interface modification, Customizer allows buttons that launch other programs to be added to screens. Buttons can be set to run dynamic data exchange (DDE) scripts that link MAS 90 data to productivity tools such as Microsoft Word®. For example, a sample script that ships with the Customizer module launches Word, opens a template dunning letter, and populates the letter with the customer information on the screen, including name, address, telephone number and balance due. MAS 90 programs can also interface with programs written in other languages. For more information, see the section on Developer Options.

## Secure, Reliable, Easy-to-Administer Database

Most companies prefer to focus expense budgets and resources on successfully selling more products or services. The computer system and accounting software should run with a minimum of attention and staff. The MAS 90 database offers a secure container that is not readily accessible from the outside without the ODBC data access kit. The database installs automatically, and requires no specialized knowledge to maintain or run. Therefore, no database administrator is

Another important component of open architecture is the ability to interface the accounting software with external applications.

The computer system and accounting software should run with a minimum of attention and staff.

Complete customization is available, ranging from setting an option flag to adding a custom module.

needed to run the software. The data files inside the database expand dynamically, so there is no need to worry about running out of space — this is limited only by the capacity of the hard drive.

If your network does go down, which can happen when there is a power failure or faulty hardware component, MAS 90 contains automatic restart logic for continuing interrupted postings without loss of data. In addition, a full set of data repair utilities is available to use if the need arises.

## Customization Capabilities

Extensive customization is available through the core product line in three major areas.

- Preferences and Options flags are set within each module to control how data is entered and stored by the system.
- The MAS 90 toolbar is customizable. Buttons may be added to launch either MAS 90 tasks or external programs that are used frequently, such as Microsoft Outlook® or Excel.
- Three custom reporting tools ship with MAS 90. Report Master provides a quick method of creating and running analysis reports. Crystal Reports™ software, which accesses MAS 90 data using the ODBC drivers provided, is the tool for building presentation-quality reports and graphs from your accounting data, and distributing them via e-mail to any one of 15 different file formats, including HTML for Internet/intranet publishing purposes. FRx® Financial Reporting Extender software comes with the MAS 90 General Ledger module and provides graphical custom financial reports. FRx uses a visual “reporting tree” to segment financial data by division, department or location.

The Customizer module provides a method to change the accounting application interface without needing source code or a programmer. Unused fields on screens may be hidden; fields may be reorganized to reflect the way a company prefers to enter data; tab sequences may be modified to skip fields

that rarely require input; and lists of allowed entries for certain fields may even be added. In combination, these features can significantly improve the accuracy and speed with which data is entered into the system.

If programming changes are required, these can readily be implemented by one of the more than 100 Master Developers nationwide who are authorized to modify MAS 90 code. See the section titled “Developer Options” for more information regarding the programming options available for MAS 90.

## Other MAS 90 Technology Features

### Easily Transportable to Your Platform of Choice

MAS 90 programs are decoded for the operating system by an interpreter. This means that as new operating system versions and improved hardware platforms become available, the software can readily be transported to the new system. This paper focuses on the capabilities and features of the Windows versions of MAS 90, including MAS 90 for Windows and MAS 90 Client/Server for Windows NT. UNIX versions of MAS 90 Client/Server Level 3.2 for SCO® OpenServer®, SCO UNIXWare® and IBM® RS/6000 AIX® are also available. MAS 90 for Windows is supported on network operating system platforms such as Windows NT 4.0, Windows 2000, and Novell® NetWare® 3.2, 4.11 and 5.0. Features supported vary with platform. Please review the latest MAS 90 Operating System and Compatibility Matrix (OSPCM) for the platform of your choice to obtain detailed system configurations and recommendations. These can be found at <http://www.sota.com/mas90w/support>.

More than 100 authorized Master Developers nationwide make this service readily accessible.

Sage chose C++ as the foundation for the MAS 90 Application Studio to take advantage of the speed and stability of 32-bit applications compiled for multiple programs.

## Developer Options

Sage has found that if significant additions to functionality or entire vertical modules are required, most companies choose to contract with an outside consultant. More than 100 authorized Master Developers nationwide make this service readily accessible. In fact, since thousands of enhancements have already been created, the specific solution a company needs may already be available.

MAS 90 uses the ProvideX<sup>®</sup> development language, database and tool set which is part of the MAS 90 Application Studio for Windows. ProvideX is a fourth-generation, 32-bit graphical platform that is written in C++, the most popular object-oriented language in the industry. Microsoft has designated C++ as the tool of choice for creating mission-critical applications such as SQL Server and Windows 2000. The C++ language yields programs that are extremely fast and efficient. C++ programs can be compiled with industry-standard compilers from Microsoft and other providers, and can operate on multiple platforms such as Windows and UNIX. Sage chose C++ as the foundation for the MAS 90 Application Studio to take advantage of the speed and stability of 32-bit applications compiled for multiple platforms.

Like Visual Basic<sup>®</sup>, the ProvideX development language has its roots in the original BASIC language. Unlike many "BASIC" languages, Provide X was specifically developed and optimized for efficient handling of business transactions.

Because the interpreted programs are semi-compiled into tokenized object code, and the data files are self-contained and self-referencing, MAS 90 applications are completely portable to the platform of your choice. MAS 90 can run equally reliably on Windows NT, Novell NetWare or UNIX server platforms.

The graphical design component of ProvideX, known as NOMADS, is a programming tool for designing Windows user interfaces for MAS 90 applications. This tool, which functions in a manner similar to Microsoft Visual Basic, is used by Master Developers to quickly and easily add or modify the MAS 90 interface.

For developers who prefer to use other tools to create additional modules and functions for the software, MAS 90 programs are accessible to all popular programming tools. ProvideX provides a direct interface to major programming languages such as Visual Basic, C++ and Delphi. Programmers are able to create seamless links between MAS 90 programs and vertical applications using this interface. Programmers can also take advantage of popular add-ins such as VBXs, dlls, OCXs, and ActiveX controls. Using these ready-made objects saves programmers time and expands the functionality available for custom applications.

## Import/Export Features

MAS 90 offers several avenues for non-Sage applications to use MAS 90 accounting data. The most flexible method is to let a Master Developer create a custom program to directly access other databases from within MAS 90 or to export MAS 90 data directly into another application.

Report Master (RM) may be used to create custom reports on MAS 90 data which may optionally be “printed” to file for use with other applications. Visual Integrator (VI) is a robust tool for integrating with other applications and converting data from other applications to MAS 90 data. Visual Integrator imports can include scripting logic to launch program tasks, and they can be scheduled to run in unattended mode. Listings may be printed showing the required fields and field validations the system uses to assure complete records are imported into a file. Required fields in MAS 90 that are not present in the data to be imported can be defaulted to a specific setting or to a value found in a MAS 90 file. RM and VI are MAS 90 modules that appear in MAS 90’s menus and work with a variety of file formats including:

- ODBC data sources (MS SQL Server, MS Access, etc.).
- Formatted text file (the file includes titles just like the printed report).
- Formatted detail lines (without titles; fixed length text records).

Accessing other databases and exporting MAS 90 data is easy.

- Delimited text records (sometimes called “Comma Separated Values” or CSV).
- Lotus® .WKS (1-2-3® software version 2.x) and .WK1 (1-2-3 version 3) spreadsheet.
- Microsoft .XLS (Excel software) spreadsheet.
- dBASE III+™ database.
- Data Interchange Format (.DIF).
- Business BASIC data files (KEYED or INDEXED) (VI only).

Other options include printing any MAS 90 report to file. The file will be fully formatted, including titles, just like the paper report. Most reports in the General Ledger may be printed to the same file types as Report Master reports (see the list above).

Crystal Reports™ software for MAS 90 is an OEM version of Crystal Reports, Standard version, from Crystal Computer Services, a Seagate Software company. Crystal Reports (CRW) uses ODBC and specially defined interface files to create reports from most MAS 90 applications and format them with the variety of fonts and graphical embellishments we have come to expect from Windows applications. CRW, like Report Master, can “print” reports to a variety of file formats including 1-2-3, Excel, DIF, and CSV.

If a MAS 90 user already has Crystal Reports Professional version (CRW-Pro), installing the “MAS 90 Data Access for Crystal Reports” disks will provide the ODBC link needed for CRW-Pro to use MAS 90 accounting data. Master Developers can add custom applications to the ODBC interface files and the MAS 90 ODBC driver can be used with non-CRW applications.

# MAS 90 Client/Server Technology

## Addressing Expanding Accounting Technology Requirements

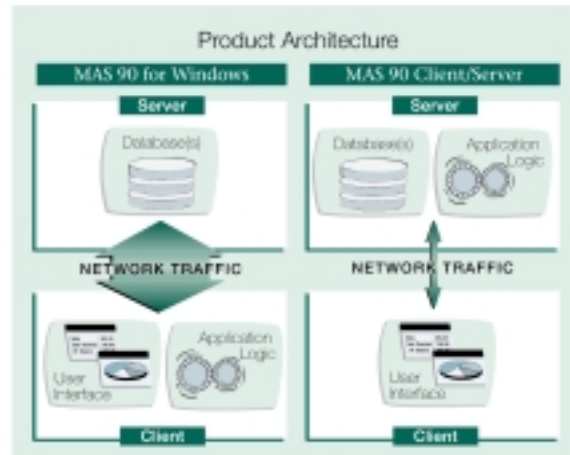
For larger companies with expanding accounting needs, the following key accounting system requirements become critical:

- Supporting large numbers of concurrent accounting network users.
- Functioning effectively in remote access environments.
- Harnessing Internet technologies.
- Processing large transaction volumes efficiently.
- Maintaining security, data integrity and reliability.
- Leveraging the power and scalability of the server.

## MAS 90 Client/Server Overview

MAS 90 Client/Server technology superbly addresses each of the above system requirements, making it an excellent solution for clients requiring a high-performance accounting system. Let's examine in detail how MAS 90 Client/Server technology addresses each of the key accounting system requirements.

MAS 90 Client/Server meets the expanding accounting needs of today's businesses.



MAS 90 Client/Server technology separates the program logic, processing and data management tasks from user-interface processing tasks. All program logic, processing and data management tasks are performed on the application server, and all user interface tasks are performed using a thin client installed on the workstation.

MAS 90 Client/Server leverages the power of the server to deliver superior performance.

Data transmission across the network is minimized; only the commands used to display the current screen and data are sent across it. Reduced network data transmission per user means that more concurrent network users can be supported using the same network bandwidth and, equally importantly, that MAS 90 Client/Server can be run in low bandwidth environments like modem and WAN connections.

All data processing and data management tasks are performed on the server, rather than across the network, providing from 300% to 1000% increase in data processing throughput when using a dedicated application server. Data files are stored centrally on the server and are not transmitted across the network, enhancing the data integrity and reliability.

## Supporting Large Numbers of Concurrent Accounting Network Users

The first step many businesses take to address growing accounting needs is to move from a single PC to multiple PCs connected via a local area network (LAN), with the accounting application running across the LAN. Typically, a central server is used to store the data files and the application files. PC workstations are connected to the server, thus allowing multiple users to access the same accounting data files. Network users launch MAS 90 from their workstations, causing the MAS 90 application to be transferred across the network from the server to the workstations, and loaded into the workstations' memory space. Once loaded, MAS 90 applications access MAS 90 data files from the central server.

This type of MAS 90 LAN configuration is inexpensive, simple to install and maintain, and works very effectively in modest LAN environments of two to 10 users. Since there are relatively few concurrent accounting users, network performance is good, resulting in a responsive system that's easy to install and maintain. Users can work effectively because they gain the benefits of Windows, the ease of use and workflow of MAS 90 for Windows, and the convenience of a central server for administration and backup of data.

As the number of concurrent network users increases beyond 10, performance begins to degrade due to network saturation – the amount of data that must be transferred across the network begins to exceed the capacity of the network. Network saturation manifests itself in a number of symptoms, one of which is slower application performance. With most LAN-based accounting systems, the upper limit on the number of network users is determined by network capacity. It is possible to upgrade network capacity to be able to support larger numbers of concurrent users. However, such an upgrade would be costly, as it would require more expensive network cards installed into each workstation.

The optimal solution, therefore, is to use MAS 90 Client/Server, which minimizes network traffic between the workstation and the server and requires less network

MAS 90's thin-client architecture alleviates network saturation.

bandwidth. MAS 90 Client/Server can operate with a minimum bandwidth of 28.8 Kbps per workstation (56 Kbps per workstation is recommended). This is a fraction of the network bandwidth required to run LAN-based accounting packages. Note that increased bandwidth is required to run additional server-based networking services or applications. As a result of its thin-client architecture, MAS 90 Client/Server can be operated effectively using a simple modem connection.

## Functioning Effectively in Remote Environments

Growing businesses often have a need to expand to multiple locations, or employ traveling salespeople in order to service customers more effectively. Remote locations have a requirement to access the accounting system for functions such as entering orders or updating inventory. Typically, remote locations such as warehouses or retail outlets are linked to the main office using an ISDN line, or dedicated lines such as frame-relay or DSL, creating a Wide Area Network (WAN). The emergence of Virtual Private Networks (VPN) has given companies the option of doing away with the WAN architecture and utilizing the Internet as their network backbone. A modern accounting solution must work effectively in both of these environments.

High performance dial-in access is another thin-client benefit.

A salesperson on the road may need to dial in with a modem to the office, access the accounting system, enter orders or check the status of a pending order. To achieve dial-in remote access capabilities, many accounting systems require the purchase and installation of additional hardware and/or software, such as PC Anywhere<sup>®</sup>, Carbon Copy<sup>™</sup> or Citrix<sup>®</sup> WinFrame<sup>®</sup> software. A modern accounting solution should not need to rely upon additional hardware or software for remote access configuration – it should work effectively with standard remote access software provided with Windows 95/98 and Windows NT.

The cost of communications is another important consideration in choosing a network accounting solution. In recent years, the Internet explosion has resulted in the

availability of a very low cost wide area network — “the Internet” — which can be accessed from millions of locations worldwide at a fraction of the cost of a long distance phone line connection. The global span of the Internet, based on TCP/IP, has dictated the future standard of networking. Businesses and corporations are migrating to TCP/IP networking due to its robustness, connectivity flexibility, and of course, its widespread use as the fundamental networking architecture of the Internet. Today, the TCP/IP protocol is used both for the public Internet and on private corporate networks, referred to as intranets. It is clear that in the future, the requirement will be for all network applications to run on TCP/IP.

An accounting system must be able to work effectively in both WAN and remote access environments, and have the capability to operate effectively in TCP/IP networking configurations in order to take advantage of the communications cost savings. In short, it must be able to run efficiently in an intranet (internal corporate TCP/IP network) environment or over the public Internet (public TCP/IP network).

The communications between the MAS 90 Client/Server server and a MAS 90 Client/Server workstation is performed using TCP/IP sessions. The MAS 90 Client/Server server host is responsible for handling all application and data processing, and the MAS 90 Client/Server workstation is responsible for presenting the user interface. Once a connection has been established, the MAS 90 Client/Server server and workstation communicate with each other by sending commands across the network.

For example, to display a window filled with data, the MAS 90 Client/Server server will send commands to the MAS 90 Client/Server workstation instructing it to draw a window and fill it with appropriate data. The MAS 90 Client/Server workstation processes the instructions and draws a window containing the data received — only the data necessary to fill the current screen is transmitted to the workstation. This thin-client architecture results in exceptional performance in low bandwidth TCP/IP networks, such as intranets and the Internet.

MAS 90 Client/Server uses TCP/IP, the communications protocol of the Internet.

Encryption functions of Windows NT, Windows 95/98 and UNIX Systems allow secure MAS 90 Client/ Server sessions on the Internet.

MAS 90 has the ability to process thousands of transactions in minutes.

An additional consideration for operating across the Internet is security. Encryption of the TCP/IP session is desirable to ensure that anyone on the Internet who may be capturing data transmitted during the MAS 90 Client/Server session would be unable to decipher the sensitive accounting data. Additional encryption functions, such as point-to-point tunneling protocol (PPTP), are already embedded in Windows NT remote access software, and are available as a standard component of the dial-up networking communications software provided with Windows 95/98 and most UNIX systems. Security of the MAS 90 Client/Server host server is provided exclusively through the MAS 90 Client/Server application.

## Processing Large Transaction Volumes

Businesses just starting out typically have modest daily transaction volumes. MAS 90 in a LAN environment can easily handle the posting of hundreds of transactions per day. In order to post transactions, MAS 90 retrieves accounting data files from the server, updates the files in the memory of the workstation, and then writes the data files back to the server. Complex update transactions, such as daily sales order posting operations, require updating sales order data files, inventory data files, accounts receivable data files, and finally, General Ledger data files, all of which must be done across the network. The speed at which MAS 90 can perform complex update transactions is limited by the speed at which data files can be transferred across the network. Update transactions can be performed more quickly if the business data and the business logic can be kept together in the same memory space.

MAS 90 Client/Server keeps the business logic and the business data in the memory space of the server. As a result, MAS 90 Client/Server can perform complex update operations in a fraction of the time required by MAS 90 on a LAN — from 300% to 1000% faster. As a result, MAS 90 Client/Server can handle thousands of transactions in minutes. Thus, for transaction volumes of hundreds of transactions per day, MAS 90 for Windows on a LAN is a good solution. As transaction volumes increase to the thousands and tens of thousands per

day, MAS 90 Client/Server provides a solution that can handle high transaction volumes quickly and effectively, minimizing the duration of daily processing activities.

## Security, Data Integrity and Reliability

Security, data integrity and reliability are critical requirements of any accounting system. For larger businesses, these requirements become even more important, as any compromise of data integrity, security or reliability creates serious disruption to business activities.

As a business grows, and more concurrent accounting users are added to the accounting system, network traffic may increase to the point where network capacity is filled, resulting in network saturation. Networks with multiple network nodes that are functioning at or above network capacity are subject to increasing numbers of network transmission errors. Network transmission errors may result in corrupted files. In accounting applications, this can have serious implications; key accounting information may be permanently lost or damaged. In another example, if power should be lost while the accounting system is in the process of writing an updated accounting data file across the network back to the server, the accounting data file could be damaged. Finally, there is also the risk that a workstation may corrupt the data due to faulty hardware (e.g., a bad memory chip, an intermittent hard disk failure, etc.). In the above configuration, the more workstations that reach across the network to touch (update) the data, the greater the risk of file corruption. Moreover, as the network grows in complexity, and the number of network nodes increases, the risk of data corruption grows.

MAS 90 Client/Server addresses this issue through the innovative use of a client/server architecture that keeps accounting data and applications on the server, and minimizes network traffic. Since the accounting data files are never transferred across the network, they are never exposed to the risk of network data corruption or workstation data corruption. Also, by minimizing network traffic, more concurrent users can be supported on the same network bandwidth.

Security, data integrity and reliability are critical requirements of any accounting system.

Servers permit cost-effective performance upgrades.

## Leveraging the Power and Scalability of the Server

The client/server architecture of MAS 90 Client/Server takes advantage of the power and scalability of the server to permit cost-effective performance upgrades. In the case of most LAN-based accounting systems, in order to provide a performance upgrade to all users on the network, it would be necessary to upgrade not only the file server, but every workstation on the network. This can be a very expensive project if there is a large number of workstations on the network.

In contrast, with MAS 90 Client/Server, upgrading the server to more powerful hardware – such as multiple processors, more memory and faster hard disks – can result in dramatic improvements in MAS 90 Client/Server performance. Furthermore, these performance benefits are enjoyed by every MAS 90 Client/Server workstation on the network, resulting in a lower total cost to achieve a significant performance boost.

As mentioned earlier, MAS 90 program code runs through the use of an interpreter optimized for each platform – allowing MAS 90 to take full advantage of the server environment. MAS 90 Client/Server runs using an interpreter that has been optimized for the 32-bit environment – both the server and the client component are 32-bit applications, providing enhanced performance and stability.

## Advantages of MAS 90 for CPAs

MAS 90 technology helps CPAs deliver better client service.

MAS 90 technology allows today's CPA to work more efficiently and effectively. This translates to increased productivity and profitability for the CPA, and a higher level of client satisfaction. For example, with MAS 90 Client/Server, a CPA can dial into a client site, assist in period-end closing, adjust entries as necessary, and access accounting information to perform client write-up services. All of these tasks may be performed online, minimizing the requirement for client site

visits. MAS 90 Client/Server' remote access flexibility provides CPAs with a new level of convenience and efficiency, and allows them to be more responsive to client needs and provide better service, all from the comfort of their own office.

## Conclusion

MAS 90 technology provides the best possible basis for an accounting system that may be quickly implemented, is low-cost, provides for efficient processing of accounting transactions, and runs on the platform of choice. For larger organizations, MAS 90 Client/Server provides high performance accounting (with an easy upgrade path from MAS 90), with a two-tiered TCP/IP-based client/server technology that is Internet-enabled. MAS 90 Client/Server takes advantage of a thin-client application server model for exceptional performance on standard modem connections and across wide-area TCP/IP networks. MAS 90 technology delivers excellent price/performance value – high performance and top-notch accounting functionality in a competitively-priced package.

MAS 90 technology delivers high performance and top-notch accounting functionality.

## Suggested Reading and Training Material

Windows NT is a new and challenging network operating system environment that requires a significant investment in terms of education and training. Although the basics of setting up Windows NT are very straightforward, the numerous permutations of parameters, configurations and protocols supported by Windows NT can be confusing. Sage Software cannot support the various operating system issues that users may encounter when installing and running MAS 90 Client/Server. As a first step, you will find below a number of resources that may be useful in trouble-shooting Windows NT configuration issues.

## Microsoft Resource Kits

Microsoft Press provides a number of reference materials on Windows NT Server, Windows NT Workstation, and Windows 95/98. Each of these “resource kits” is available directly through Microsoft Press and can be found at most bookstores. The Windows NT Server Resource Kit is invaluable for both learning and trouble-shooting NT Server issues. The Windows 95 Resource Kit and Windows NT Workstation Resource Kit are also very valuable references for trouble-shooting workstation configuration issues.

- Microsoft Windows NT Server Resource Kit for Version 4.0, Microsoft Press, 1996. Three-volume set with CD-ROM.
- Microsoft Windows 95 Resource Kit, Microsoft Press, 1995.
- Microsoft Windows 98 Resource Kit, Microsoft Press, 1998.
- Microsoft Windows NT Workstation 4.0 Resource Kit, Microsoft Press, 1996.

In addition to the operating system resource kits, Microsoft Press also offers resource kits for the Back Office<sup>®</sup> suite of products. If you are planning to integrate an Exchange<sup>®</sup> Server, Internet Information Server<sup>™</sup>, SQL Server<sup>™</sup>, or any other Microsoft BackOffice<sup>™</sup> product, you may want to purchase these resource kits, as well.

## UNIX Training

UNIX certification is required for the various UNIX platforms that Sage supports. Along with the certification of your specified UNIX platform, Network File Sharing (NFS) training is strongly recommended.

## Recommended Minimum System Configurations

System configurations vary widely depending on the operating system and platform on which you would like to run MAS 90.

Please review the latest MAS 90 OSPCM for the platform of your choice to obtain detailed system configurations and recommendations. These can be found at <http://www.sota.com/mas90w/support>.



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