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Sage MAS 90 and MAS 200  
Microsoft Terminal Services  
and Citrix MetaFrame

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White Paper

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## Introduction

**With the release of Sage MAS 90 and MAS 200 level 3.50, Sage has introduced expanded support for Microsoft Windows 2000 Terminal Services and Citrix MetaFrame. Microsoft Terminal Services and Citrix MetaFrame have become the industry standards for providing thin client access to local area network (LAN) based applications. Sage recognizes the necessity for supporting industry standards, and has responded to market demand by expanding support for this application delivery technology with our current release of MAS 90 and MAS 200. This white paper outlines Sage's position on support of Terminal Services and Citrix MetaFrame and examines the supported configurations.**

## Background

**Sage responded to demand for an architecture that would allow MAS 90 to function over a wide area network (WAN) by releasing the Client Server version of MAS 90 in 1997 (now MAS 200). Citrix WinFrame, which had been available for some time when Sage released MAS 90 Client Server in 1997, did not gain the level of popularity it now possesses until Citrix MetaFrame for Windows NT 4.0 Terminal Server Edition was released in the middle of 1998. Sage chose to develop and release MAS 90 Client Server using our own thin client TCP/IP technology rather than relying upon proprietary technology controlled by a third party. It is important to note that MAS 200 provides benefits over and above the ability to deploy MAS 90 in a WAN environment. These are discussed in more detail below. One of the primary reasons that Citrix gained the level of acceptance that it currently enjoys was the technology cross-licensing agreement that Citrix and Microsoft entered into in 1997; Citrix's net revenue has grown from \$44 million in 1996 to over \$400 million in 1999.**

Sage recognizes the necessity for supporting industry standards, and has responded to market demand by expanding support for this application delivery technology.

Citrix and Microsoft entered into a technology cross-licensing agreement in 1997; Citrix's net revenue has grown from \$44 million in 1996 to over \$400 million in 1999.

MetaFrame adds many valuable benefits to Microsoft Terminal Services; for example, the ability of the application to utilize local printers and other resources of the client machine.

The ability to print reports and forms is essential to the operations of a business management system.

Sage recommends that anyone considering the implementation of a Terminal Services solution should evaluate the benefits of MetaFrame before proceeding.

## Citrix MetaFrame vs. Microsoft Terminal Services

**Microsoft Terminal Services for Windows 2000 provides a basic remote access capability for system administration and application delivery. The addition of MetaFrame to Terminal Services does not change the basic network configuration, however, MetaFrame adds many valuable benefits to Terminal Services. The following are just some of the capabilities that differentiate Terminal Services and MetaFrame.**

- **The ability of the application (i.e. MAS 200) to utilize local printers, COM ports, clipboard and other resources of the client machine. The ability to print reports and forms is essential to the operations of a business management system.**
- **The availability of enhanced levels of security including 128 bit encryption and pass-through authentication. This allows operation over the Internet without the need for virtual private networking (VPN) or point-to-point tunneling protocol (PPTP).**
- **Enhanced performance - Citrix ICA (Independent Computing Architecture) is optimized for connections as low as 14.4 Kbps, and reduces the bandwidth consumption of thin-client connections. On average, Only 20 Kbps of bandwidth is required to yield excellent performance.**
- **Expanded support for various client types. Citrix ICA is inherently platform independent and has already been incorporated into UNIX, OS/2, Macintosh, and other non-DOS devices. This allows Windows applications to be delivered to non-Windows devices.**

Please visit [www.citrix.com](http://www.citrix.com) for more details regarding the benefits of adding Citrix MetaFrame to Microsoft Terminal Services.

## Support of Terminal Services Prior to Level 3.50

Beginning with MAS 90 Client Server level 3.31, Sage introduced support for Windows NT 4.0 Terminal Server Edition. On 3.3X and 3.4X, only the Client Server version of MAS 90 was supported under Terminal Server; MAS 90 for Windows was not supported. The only supported configuration was a single server solution, with the MAS 90 Client Server application installed on the Windows NT 4.0 Terminal Server. It should be noted that this differs significantly from the supported configuration of MAS 90 and MAS 200 level 3.50 and higher, which is discussed below.

## Supported Versions

The following are the various combinations of supported levels of MAS 90, MAS 200, Windows 2000 Terminal Services and MetaFrame:

### *MAS 90 Client Server levels 3.31 through 3.41*

- Either Windows NT 4.0 Terminal Server Edition *or* Windows 2000 Terminal Services are supported.
- Citrix MetaFrame is not supported.
- MAS 90 for Windows is not supported.

### *MAS 90 and MAS 200 level 3.50 and above*

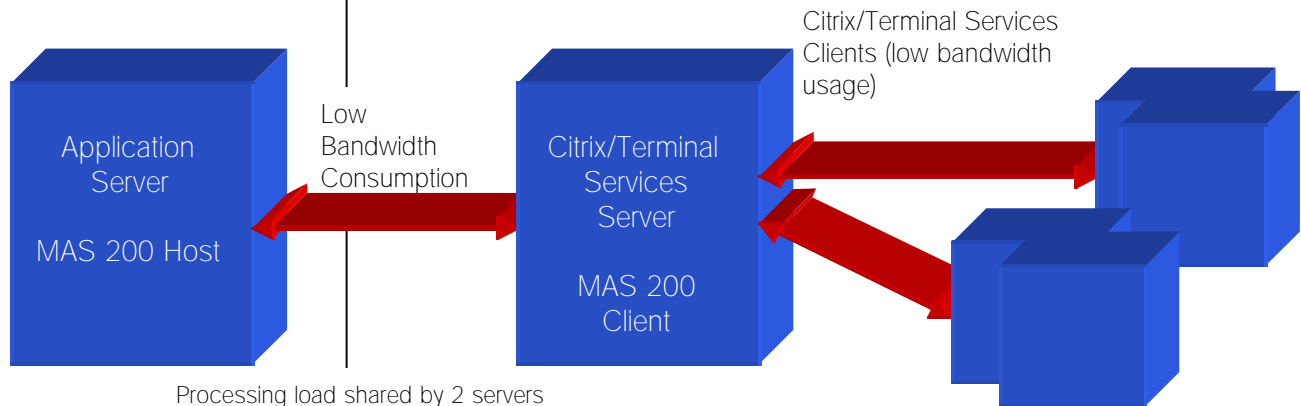
- Only Windows 2000 Terminal Services and Citrix MetaFrame for Windows 2000 are supported.
- Windows NT 4.0 Terminal Server Edition is not supported because of the more robust Terminal Services in Windows 2000.

Please refer to the current Operating System Platform and Compatibility Matrix (OSPCM), which can be found at <http://www.us.sage.com/mas90w/support>.

## MAS 200 Support of Terminal Services

Placing MAS 200 on a separate application server will maintain the server-based computing architecture of MAS 200.

The MAS 200 Host application must reside on a separate server from the terminal server, while the MAS 200 client must be installed on the terminal server. This application server may be either Windows NT Server 4.0 or Windows 2000 Server. Placing MAS 200 on a separate application server will maintain the server-based computing architecture of MAS 200, allowing the application server to allocate resources to the MAS 200 application, while leaving resources free on the terminal server to run the client sessions and handle the overhead of Terminal Services and MetaFrame. Sharing of the processing load in this manner also greatly reduces the likelihood that MAS 200 will degrade the performance of other applications utilizing the terminal server.



**This is the only supported configuration of MAS 200 3.50 or higher on Windows Terminal Services, with or without Citrix MetaFrame.**

Since the Terminal Server is running multiple copies of the MAS 200 client as well as Terminal Services and MetaFrame, it is important to ensure that the terminal server has enough resources to perform at an acceptable level. In addition to the resources required to run the

operating system, Terminal Services and MetaFrame, the minimum system requirements for the MAS 200 client will need to be added for each concurrent MAS 200 client session that will be run on the Terminal Server. Each MAS 200 task launched will use approximately 5 MB of RAM, therefore Sage recommends that 24 additional MB of RAM should be installed in the server for each concurrent MAS 200 user.

Following these guidelines, it is reasonable to expect that a single terminal server should be able to support 50 to 75 concurrent MAS 200 clients. Of course, this will vary based upon system architecture, number of processors and processor speed, and additional applications that utilize the terminal server.

As mentioned above, this configuration is different from the supported configuration of MAS 90 Client Server levels 3.31 through 3.41 on Windows NT 4.0 Terminal Server. The previously supported configuration did not maintain the client server architecture of the application.

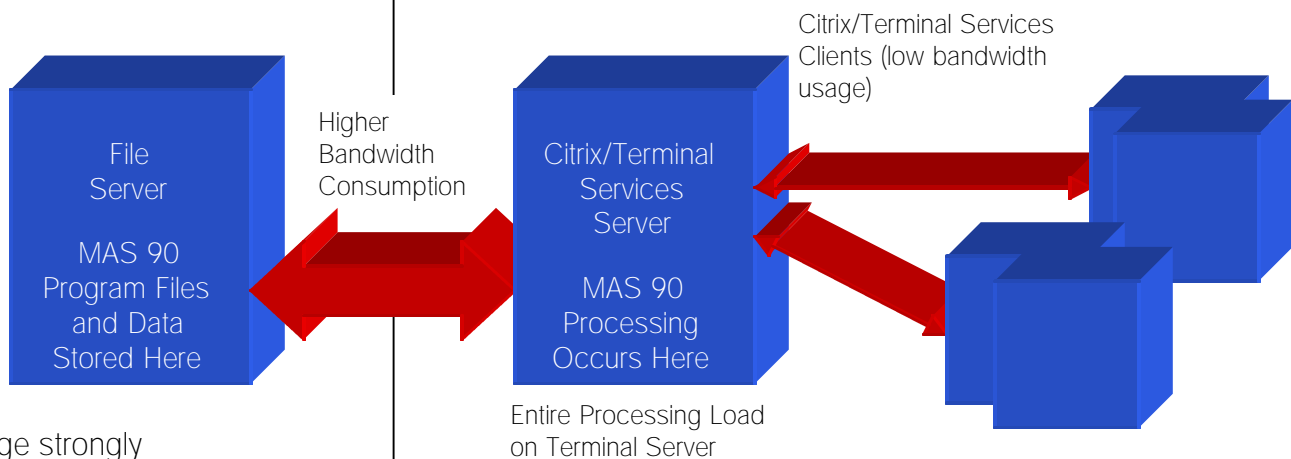
## MAS 90 Support of Terminal Services

Unlike MAS 200, MAS 90 uses a network-computing architecture. A network computing application is typically loaded from a network file server and executed on the client workstation. Because the MAS 90 application runs on the terminal server, it makes greater demands than does MAS 200, and therefore requires more resources on the terminal server. It is very important to make sure that the terminal server has enough resources to perform at an acceptable level. MAS 90, running under Terminal Services, has a much greater potential than does MAS 200 to degrade the performance of other applications that utilize the terminal server, and therefore will require a more robust machine.

In addition to the resources required to run the operating system, Terminal Services and MetaFrame, the minimum system requirements for the MAS 200 client will need to be added for each concurrent MAS 200 client session that will be run on the Terminal Server.

MAS 90 running under Terminal Services has a much greater potential than does MAS 200 to degrade the performance of other applications that utilize the terminal server.

Two configurations are supported with Terminal Services and MetaFrame; MAS 90 on a separate application server, and MAS 90 loaded directly on the terminal server. The MAS 90 application executes on the terminal server in both configurations. The benefit of loading MAS 90 applications and data files on a separate file server is the off-loading of disk input/output (I/O) to that server. This will alleviate some of the load on the terminal server. While this will also increase network traffic, this can be mitigated by using higher speed 100 Mbps network components and switching hubs. This is the recommended configuration.



Sage strongly recommends, as a general rule when using MAS 90, that no more than fifteen concurrent users be supported on a single terminal server.

**In order to ensure that acceptable performance can be obtained when using MAS 90 with Terminal Services, the number of concurrent users in this environment should be limited. Sage strongly recommends, as a general rule, that no more than fifteen concurrent users be supported on a single terminal server.**

Another issue regarding MAS 90 in a terminal server environment is that when utilizing a separate file server, that server must be either Windows NT or Windows 2000. This issue is not specific to the terminal server



environment; utilizing any Windows NT 4.0 or Windows 2000 based system as a client for a Novell server is not supported at this time due to data corruption caused by the Novell client software encountered during testing. Please refer to the current OSPCM for information regarding this issue.

## Conclusion

Microsoft Windows 2000 Terminal Services and Citrix MetaFrame are important additions to the supported platforms for MAS 90 and MAS 200. Sage's support of these platforms will allow our customers the flexibility of additional choices when designing their implementation and will offer new opportunities to our partners.

When making the decision to include Terminal Services as part of the business management software implementation, care must be given to selecting the appropriate software and hardware components that comprise the implementation. The following are important points to consider when deciding to implement Terminal Services and MetaFrame.

### *Hardware*

Keep in mind that the terminal server will be performing multiple tasks simultaneously:

- Multiple concurrent sessions of either the MAS 200 client or MAS 90 application
- Generating the screen images and tracking the user input for each active client connection

It is important to make sure that the terminal server has enough memory and processor power to perform at an acceptable level. This is especially true if you choose MAS 90 and/or use the terminal server to provide access to other applications. Running MAS 90 or MAS 200 on a machine operating as an Active Directory Domain Controller can lead to severe stability and performance problems due to the resource requirements demanded by

Sage's support of these platforms will allow our customers the flexibility of additional choices when designing their implementation, and will offer new opportunities to our partners.

MetaFrame offers many benefits to the accounting and business management software user, and should be evaluated before moving forward with Terminal Services alone.

MAS 200 is the best solution for any terminal server implementation

the Active Directory Services. Therefore, this configuration is neither recommended, nor supported.

#### *Server Software*

As outlined earlier in this document, Citrix MetaFrame is an add-on to Microsoft Windows 2000 Terminal Services. MetaFrame offers many benefits to the accounting and business management software user, and it should be evaluated before moving forward with Terminal Services alone.

#### *Application Software*

Sage supports both MAS 90 and MAS 200 in the terminal server environment, however, MAS 200 offers many benefits beyond those offered by MAS 90. This is due to the client server architecture of the MAS 200 product. MAS 200 leverages the power and scalability of an application server, allowing the terminal server to allocate resources to maintaining the client sessions, and running other client applications. This enables the system to support more concurrent users, and maintain the performance expected from MAS 200. In addition, the client server architecture of MAS 200 enhances data integrity by keeping all of the data processing on the application server. For these reasons, MAS 200 is the best solution for any terminal server implementation.

## Recommended Resources

Citrix MetaFrame Product and Pricing:

<http://www.citrix.com/products/metaframe/>

Microsoft Terminal Services Product and Pricing:

<http://www.microsoft.com/windows2000/guide/server/features/terminalsvcs.asp>

MAS 90 and MAS 200 Technology White Paper:

<http://www.us.sage.com/partner/filecenter>

See Product Information -> White Papers

**Operating System Platform and Compatibility Matrix  
(OSPCM):**

<http://www.us.sage.com/mas90w/support>.



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