



BY GUY C. YOST

# Application Serving Takes Shape

## Understanding WinFrame Servers

**WinFrame is a mainframe-like extension of Windows NT 3.51. It allows users to connect to a WinFrame server that presents its desktop to the clients in a terminal-like window. Unlike the one-to-one nature of traditional remote control software, a WinFrame server supports multiple user connections, each in their own memory space.**

**I**n past articles I've referred to Microsoft's misuse of the term, "application server," when selling the out-of-box capabilities of NT. What does application server really mean? An application server, one would surmise, is a server that hosts (actually runs) applications for multiple users. At the time of NT's initial popularity boost, media hype and marketing literature led even technically astute folks to believe that if you loaded a copy of Excel on an NT server and had several users access it simultaneously, then the NT server would run the application for the users.

By now, most of the world understands that generic NT is no more functional than any other established server operating system. It provides the requisite file and print sharing services and can also host client/server applications where the back-end service, or engine actually does run on the server. Because of NT Server's ability to run the "server" portion of client/server applications, Microsoft chose to use the term "application server." However, Novell (with their introduction of the NLM in 1987) and numerous UNIX and mainframe vendors since the 70s were more technically qualified to use the term years ago.

The term "application server" brings to mind mainframe characteristics of users logging into a central powerhouse computer from terminals that had no local disks or processing power. The advantages of centralized administration are strong enough to make today's CIOs wonder how distributed processing and Intel-based Windows machines became the computing norm — not only for office automation, but also for databases, manufacturing, human resources, etc.

Even though technology is changing more quickly now than ever, it's somehow comforting to see that recent efforts and trends in the IT world are actually retroactive. What goes around comes around, and now NT boxes all over this planet are putting on little dinosaur suits and trying their best to act mean and demonstrative. I'm specifically referring to the recent boom in Citrix WinFrame installations and Microsoft's functional equivalent, code named "Hydra."

### **WINFRAME**

Citrix Systems, Inc. (Fort Lauderdale, Fla.), has developed a mainframe-like extension of Windows NT 3.51 called WinFrame. The concept is simple. Like PC Anywhere (or other remote control software), users connect to a host computer that presents its desktop to the client in a terminal-like window. Unlike the one-to-one nature of traditional remote control software, a WinFrame server supports multiple user connections, each in their own memory space. The concept of WinFrame is shown in Figure 1. Like other popular client/server solutions, this technology requires both client and server software components.

The client software is similar to the remote client portion found in remote control packages and is commonly referred to as the "thin client." The data transferred between the WinFrame server and remote clients mainly consists of keystrokes, mouse actions, and video data (although file transfer is possible). The actual amount of data transferred between the WinFrame client and server is nominal, compared to the amount of traffic that would be generated in a standard client/server environment.

This characteristic allows even graphically-intensive 32-bit applications to be accessed over standard modem connections while delivering much more favorable performance as compared to remote-node applications. Citrix developed an efficient protocol called ICA (Independent Computing Architecture) to handle the traffic between the thin client portion and server. Its independence is demonstrated by the ability to connect Macintosh, UNIX, DOS, Windows 3.x, 95, and NT clients; this allows all platforms to access 32-bit Windows applications, even older 386- and 486-based

computers. Technically, the WinFrame technology can be categorized as client/server, but Citrix prefers to call it "thin-client/server."

Figure 2 shows the properties of a single WinFrame connection definition. The key elements to defining a session are a unique description (you can have several connection definitions to more than one server or perhaps to the same server), the network protocol (either TCP/IP, IPX, SPX, or NETBIOS), the server name, address or published application, domain login information, and screen settings. The published application option allows WinFrame servers to advertise specific applications so that the application is automatically launched when the client session starts and is terminated when the session ends.

Citrix offers a "load balancing" option that allows several servers to advertise the same application. When new sessions are started, the least busy server will take the connection. If no application is specified, the ICA client creates a desktop session allowing the users to navigate the Program Manager interface.

Figure 3 shows the connection manager interface after the properties in Figure 2 are saved. A double-click on the entry launches the ICA session, and when the client connects, the first WinFrame screen is shown in Figure 4. In this example, the WinFrame server has been configured with the IntranetWare client for Windows NT, which prompts the user for an NDS login, runs the NDS login script, and gives access to the NetWare network. Standard "out-of-the box" WinFrame supports NT domain authentication; however, as shown in Figure 4, WinFrame is not limited to domain environments. Users may connect to WinFrame servers as anonymous users if desired. This feature was designed to be used with the Web-access module to allow the "public" to access specific files and applications on the WinFrame server. The practical use of anonymous users goes beyond Web-only applications, however, and can be used to support generic access to the servers without requiring user setup and on-going user account maintenance.

For enhanced security, WinFrame also supports an "auto-log on" feature that requires the user-name and password to be specified for client connections at the server. Even if a user knows the Administrator's password he will only be able to connect using the predefined auto-user ID. Such security measures prevent unauthorized remote access.

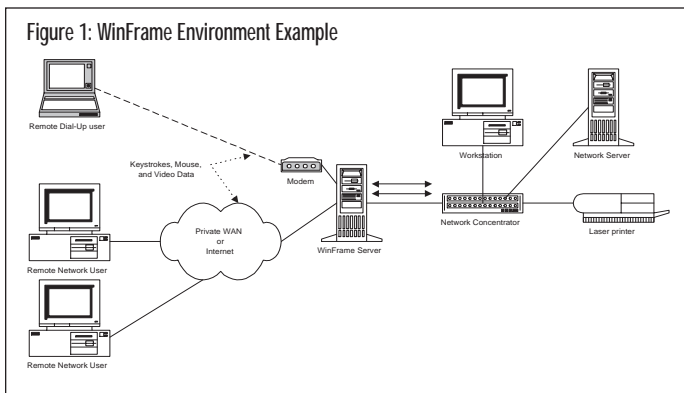


Figure 1: WinFrame Environment Example

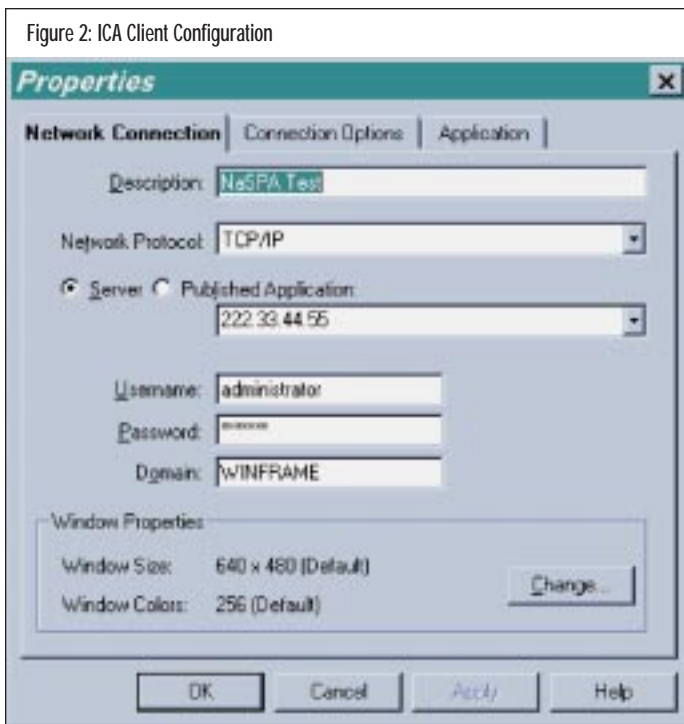


Figure 2: ICA Client Configuration

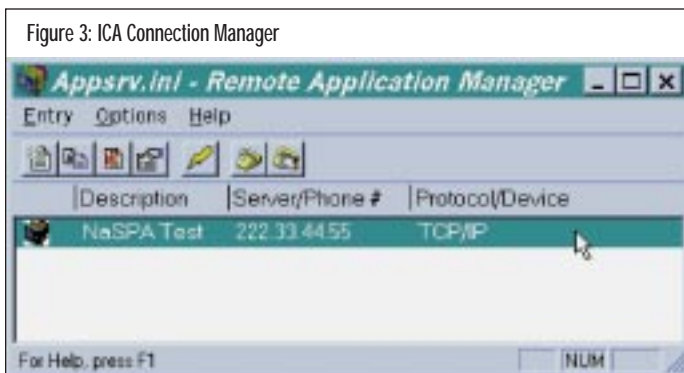


Figure 3: ICA Connection Manager



Figure 4: Logging Into NDS Through a WinFrame Session

## TERMINAL SERVER

Microsoft is working to release a production version of their functional equivalent thin-client/server solution that is based on NT version 4. This will be released as Microsoft Terminal Server (formerly code-named "Hydra" in its development phase). "pICAsso" is the code-name for Citrix's thin-client/server system software for Microsoft's Terminal Server. Like WinFrame, Microsoft's Terminal Server consists of three components — the multi-user Terminal Server, "T Share" the Remote Desktop Protocol (like ICA), and the thin Terminal Server Client. The T Share protocol is based on the ITU (International Telecommunications Union) T.120 protocol suite, a protocol designed for multi-channel conferencing.

## WINFRAME AND LAN COMPARISON

When evaluating the benefits of a WinFrame environment, it helps to compare characteristics with a standard LAN as we know it. Like file servers, the applications are stored on the WinFrame server hard drive and can be accessed by many users simultaneously. Standard file servers serve shared applications by allowing multiple clients to pull a copy of the application off of the server which is loaded into the PC client memory, and the processing is then done at the client. In contrast, each WinFrame session requires a separate memory space on the server and applications actually run on the server, using the WinFrame server's RAM and CPU.

The LAN client has a "true-presence" on the LAN, whereas the WinFrame client is once removed. This presents interesting changes in traditional LAN topology and design. The network traffic generated between the clients and WinFrame server is nominal, but between the server and the rest of the network may be immense, depending on the applications and what network resources are accessed. It is therefore recommended that 100Mbps switched Ethernet technology be used so that the server traffic (on the right side of Figure 1) is isolated from the rest of the network. WAN, dial-up, and LAN connections to the remote clients can utilize lower bandwidth connections — as may be required by budget constraints.

The hardware requirements for the WinFrame server tend to be a magnitude higher than that of a standard file server. For example, the project I'm currently involved with calls for supporting a minimum of 600 concurrent users (one-half of the total users) running a rather fat PeopleSoft 32-bit application on a WinFrame server "farm" (utilizing the load balancing option). We estimate that each user will require a server session of 32MB of RAM (that's what the application recommends in a standalone installation), and we expect to support up to 30 concurrent users per server each configured with quad 200MHz Pentium Pro CPUs. Not including the RAM needed for the OS and cache, the memory requirements to support the user sessions come to 1.12GB of RAM per server, so the servers will come configured with 2GB RAM.

The appropriateness of de-ploying this technology greatly depends on the type of application and environment. For our current project it makes sense to use WinFrame because the client base will be

accessing the server farm from all over the state using a mix of WAN, LAN, and dial-up connections. It's advantageous to tell our customers that they can run the 32-bit applications from a variety of existing hardware, rather than mandating that each customer dedicate a 95 or NT capable machine to the task. We can also manage the clients by managing our centralized server farm — a far less labor-intensive endeavor compared to supporting at least 1,200 individual installations throughout the state. However, there are remote access applications where the WinFrame approach may not be as suitable.

## THE DOWNSIDE

Every new and exciting technology has a downside, and ICA is no exception. Remember that this technology is remote control, not remote node, and hence has some limitations. For example, many people see this technology as being ideal for remote users to gain access to the network for email and general remote access. One advantage to using WinFrame is that remote computers and roaming notebook computers need only a small client package to gain

access to the enterprise network, and can run 32-bit applications even on older Windows 3.x computers. However, the downside is that the remote user's inability to run apps not installed on the local drive when not connected. This leads to another drawback: the connection cost. Although the telco's love connection-oriented

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technology, it can be expensive to own. Remote users will need to be connected the entire time they're productive in a WinFrame environment. Therefore, the long connection costs can add up quickly when supporting a large number of users.


From an administrative standpoint both the WinFrame environment and the normal desktop environment will need to be maintained, rather than just the user's desktop as with standard LAN connectivity. For remote dial-in users, there may possibly be three desktop environments that need to be maintained: the "local" PC desktop, the WinFrame user environment, and the laptop itself (if it's not the same machine as used at the desktop). The total cost of ownership can be high if careful consideration is not given to how each of the user's computing environments are going to be supported.

Another possible downside to the current offerings is that the latest version of WinFrame (1.7) is still based on NT 3.51, which is arguably more stable than NT 4, but lacks the ability to leverage multiple processor servers. NT 3.51 will recognize up to four CPUs, but the amount of processing power gained is compromised due to overhead required for the OS to keep track of which processors get what processes. The high multi-processor management overhead found in NT 3.51 is due to that particular OS's design and maturity. Of course, this anomaly will be alleviated as SMP architecture in NT 4 and 5 evolves. However, currently it's an important consideration when planning your hardware requirements and the number of total users supported per server.

## CONCLUSION

Citrix has made a big impact on the application server market, capitalizing on the commercial success of both NT and Windows 32-bit

applications. Network design issues, security, user environment management, and application configuration rules change when running a WinFrame environment.

This article introduced some of the issues that IS professionals will encounter when deploying a WinFrame network. Future articles will examine using load balancing, installing applications, tricks for configuring the ICA client, using WinFrame in an NDS environment, and more. As always, thanks for reading. 



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