

# **Choosing a Thin-Client Management Tool for an Enterprise Network**

By Christa Anderson  
*Isinglass Consulting Research*

## Overview

Thin-clients can be an excellent replacement for personal computers. They have no moving parts, making them considerably less subject to mechanical failures than PCs. If a thin-client does break down, fixing the problem is easy: most thin-clients store no data locally, so replacing a broken workstation means unplugging one box and plugging in another one. Thin-clients have a much smaller footprint than PCs do—the devices may be built into their own monitors or are small enough to fit on top of a monitor. Even the larger thin-clients—ones the size of a small toaster—are light enough to be easily wall-mountable. Thin-client devices also help save on power bills, too, using a tiny percentage of the power required by a PC. Even those who need locally installed applications can use thin-clients: in addition to the more common Windows CE (WinCE)-based thin-clients, Windows NT Embedded (NTE) and Linux-based thin-clients that can both connect to a terminal server and run locally installed applications are available. The list of advantages to thin-clients over PCs goes on, but the general idea remains the same: those who have made the move to server-based computing should seriously consider using thin-client devices to access the terminal servers.

However, there is a catch to thin-clients: managing them. Setting up a thin-client isn't difficult, and it's much easier than setting up a PC as a workstation, but the process of configuring network, display, and other settings does take a minute or two. Once a thin-client is configured, it needs at least one connection configured, which means setting up an RDP or ICA connection—or possibly a terminal emulation session, since many Windows thin-clients support terminal emulation. Again, setting up a connection is not difficult, but it does take a couple of minutes.

Even when it's completely set up, a thin-client still requires some upkeep. Thin-clients will last long enough to see new generations of RDP or ICA clients (typically over five years), so there must be a simple way to update the client connection software on the devices. Vendors also update thin-client internal software regularly. In addition, NTE and Linux-based thin-clients can also run locally-installed applications—but you must get those applications to the terminals.

Spending a couple of minutes per thin-client to configure or update a few thin-clients is no big deal, but most organizations that use thin-client devices use a lot of thin-clients. For just one example, 60% of Wyse Technology's business comes from 8% of its customers, who have 500 or more terminals. 85% of their business comes from customers with 100 or more terminals. Some customers have more than 25,000 terminals! Enterprises with thin-clients numbering in the tens of thousands know that five minutes per workstation becomes a lot less manageable when each of 5000 workstations requires that five minutes. Because of the sheer volume involved, for thin-clients to most effectively reduce Total Cost of Ownership (TCO), they need to be easy to set up and update as needed. Additionally, because large organizations rolling out thin-clients often do so in stages, it must be simple to find out what changes have—or haven't—been made to the thin-clients on the network.

Obviously, the more thin-clients an organization has, the more stringent its requirements are. Enterprise-class thin-client management tools have several features:

**Ease of use.** Any tool should be easy to figure out—and, if you get into trouble, it should be documented well enough that you should be able to figure out what you’re doing. In addition to being easy to use, the tool should allow you to automate common tasks, so that you can easily schedule management for times when the network isn’t busy.

**Extensive remote access to thin-clients.** Since the point of thin-client management software is to reduce the amount of time you spend having to “touch” thin-clients, you should be able to perform most or all management without having to go out and touch individual thin-clients, or those clients having to explicitly connect to a management server for updates. Therefore, some kind of Wake-On-LAN capability in the management tools and the thin-clients is helpful, so that you can manage thin-clients without either having to leave them on or manually turn them on. Since you may be performing some management at night or at a remote location, you can’t count on being able to turn on thin-clients to manage them.

**Platform independence.** Some thin-client manufacturers make thin-clients with more than one platform (e.g., in addition to the more common WinCE, they’ll also support NTE, or Linux). A management tool should be able to interact with every type of thin-client that the manufacturer has available. PC management is helpful too, particularly for those using Windows 2000 terminal services and thus without access to the client update tools available with Citrix’s MetaFrame.

**Intelligent use of network resources.** Management tools should not contribute to network traffic jams, particularly over slow links. Terminal sessions depend on the network, and the more advanced features of the latest versions of RDP and ICA (such as high color density, sound, and mapped client drives) are bandwidth-intensive. Therefore, a management tool should cause network traffic only when you tell it to do so. Discovery (the process of populating the management tool with the known thin-clients) and updates to thin-clients should happen only as needed, not constantly.

**Scalability.** An enterprise-class management tool must make it easy to work well with all thin-clients or with some subclass of them. That is, the tool should be able to discover the thin-clients on the network quickly, but also allow you to group thin-clients according to some criteria such as location or OS type so that you can deal with discrete groups of devices easily, instead of trying to hunt down the devices you want to manage..

This paper looks at thin-client management software from three manufacturers: Wyse Technology, Neoware Systems, and Network Computing Devices (NCD). We will see how each of their client management tools fare based on these five criteria. I’ll explain the criteria and then summarize each section with an “at-a-glance.”

## Summary

Enterprise networks are increasingly looking to thin-client devices to reduce TCO, but the choice of management tool for those client devices is even more important than the choice of devices themselves. The three thin-client management tools taht we'll discuss here each have their points, as you can see in this table evaluating them in terms of suitability for an enterprise environment.

	Wyse Technology's Rapport	Neoware's ezRemote Manager	NCD's ThinPath Manager
Scalability	😊	😐	😐
Intelligent Use of Network Resources	😊	😊	😞
Platform Independence	😊	😊	😊
Extensive Remote Access to thin-clients	😊	😐	😐
Ease of Use	😐	😊	😐

NCD's Thin Path is perhaps better seen as part of a larger management suite. As a member of the ThinPath total suite, you can get ThinPath tools that have capabilities such as terminal server load balancing and PC management that the other tools here don't have. Neoware's ezRemote Manager is probably the simplest tool to use, and I like its RDP- and ICA-independent shadowing feature that allows you to get to client configurations without moving from the console, but it seems most suited to medium-sized networks where you've got a greater degree of manual control over the terminals themselves—the lack of support for scripted WOL could be an issue. Although Rapport takes longer to install and become accustomed to than the other two tools we've discussed here, at this point it's the more enterprise-class management tool. ThinPath has a good grouping system and ezRemote Manager has a scripted management system, but Rapport has an even better (because it requires less user intervention) grouping system and an automated deployment system that includes WOL. Add those features to its support for a distributed installation for managing many distributed locations from a single source, and you've got a good enterprise management tool.

## **WYSE TECHNOLOGY'S RAPPORT**

Wyse has two management tools, WyseWorks Remote Administrator, a simple tool for smaller sites and Rapport, the enterprise-level tool that I'll cover here. While Rapport has a steeper learning curve than its predecessor, it's a good piece of work, suitable for an enterprise environment and for people who want a lot of control over their thin-client pool.

### **Platform Independence**

Rapport supports all Wyse clients, whether they're running NTE, Linux, WinCE, or the BlazerOS used in Winterm 1000 series.

### **Extensive Remote Access to Thin-Clients**

Rapport allows you to configure NTE-based clients from the console, but does not support remote configuration of WinCE-based terminals at this time. To create a template configuration to push out to other WinCE clients, you'll need to sit at a terminal, configure it as you'd like it to be, and then (back at the Rapport console) upload it to a Rapport server for distribution to selected clients. To make this process easier, many thin-client administrators keep a WinCE terminal near their own desk and load the Rapport console on their own computer, since the Enterprise version of Rapport supports a distributed installation. They can edit the terminal's configuration while sitting at their own desk, then use the console to upload the template configuration to a Rapport server for distribution. Having to configure client templates from a thin-client console instead of remotely is a minor inconvenience, but does ensure that the client configuration is consistent with the generation of software that's on the clients.

### **Intelligent Network Use**

Several features of Rapport make it cooperate well with other network traffic. First, it supports both UDP and TCP discovery. Most of the time, you'll prefer to use UDP discovery, which is faster and uses less bandwidth than the connection-oriented TCP protocol, but if UDP forwarding is turned off to avoid broadcast storms, then TCP offers an alternate discovery method. Having an alternative is useful in large subnetted networks where the person managing the thin-clients does not necessarily have any control over router configuration.

Another aspect of enterprise network use is Rapport support for a distributed installation. The Workgroup version of Rapport included with Wyse thin-clients requires that every part of Rapport be installed on a single computer. The paid Enterprise version, however, allows you to install the UI and main database on one computer, but then make other computers on separate subnets the staging areas for updates and package installs (or terminal edits, as mentioned previously). This distributed design makes it possible to centralize thin-client management in a distributed environment—think branch offices that may only be connected to the main office by a dial-up connection. By keeping the update servers on the remote sites and scheduling any updates from the main site, it's possible to both minimize the amount of traffic that needs to

travel over the slow links (since the updates are stored on the servers on the remote sites and only travel over the slow links when they're being updated from the main site) and manage all the thin-clients from a single location. Without distributed installation, you'd need to either install separate thin-client management servers at each location or send all the traffic—including image distribution—over slow network connections.

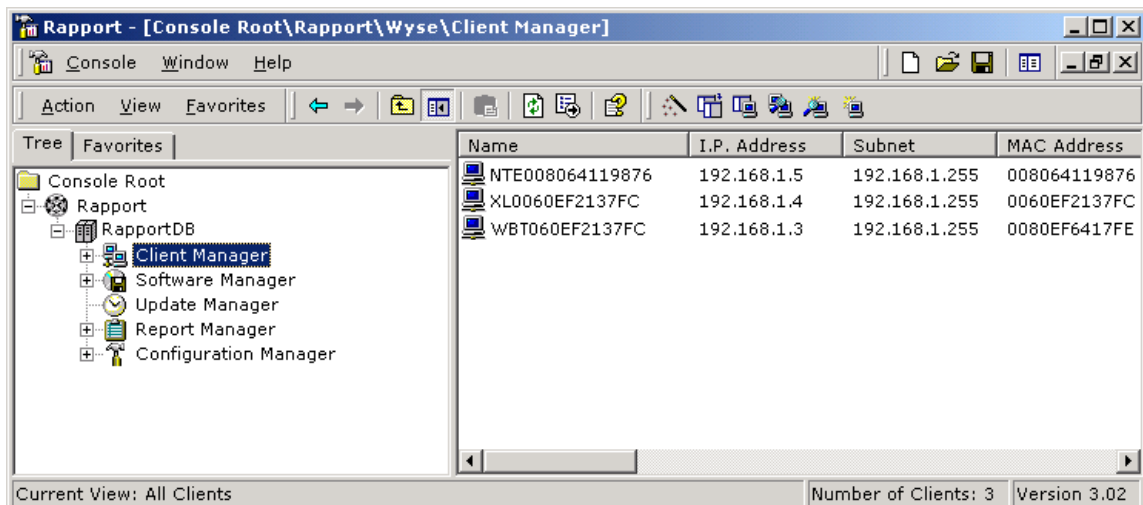
## Scalability

Rapport's design makes it easy to manage large numbers of clients. The software has an elaborate grouping system you can use to organize thin-clients based on their network location, their operating system, their image version, or user-defined criteria such as the building they're in—or some combination of the above. What's best about this grouping method for enterprise networks is that it's automatic. You don't put the thin-clients in groups—difficult to do when you're managing tens of thousands of devices. Instead, Rapport puts the clients in groups, using the aa combination of user-defined criteria such as site name and thin-client characteristics such as OS type or image version. These organizational units, called views, work like filters. Therefore, the same thin-client can be in one view based on its operating system and another based on its location, or even a third based on its operating system and its location. By choosing a particular view, you filter the list of discovered thin-clients to only display the ones that meet the criteria of that filter, making it easier to choose the clients who need a particular update. In an enterprise environment, this means that you don't need to know which group you put a thin-client into, you just have to know what criteria you'd like to sort for (site, IP address, client OS, client disk size) and the grouping will take care of itself.

In addition to filtering, Rapport's support for scripted WOL allows you to run scripts without having to worry about whether all client devices being managed are already turned on.

## Ease of Use

Rapport can be more than a little intimidating for those new to the software. Setting up the software requires walking through a long checklist of pre-installation requirements. (There is a



no-checklist version of Setup on the product CD, but running the main Setup tool will always run the checklist.) Second, the tool itself seems more feature-oriented than task-oriented. Although a small icon on the MMC taskbar (since Rapport is an MMC snap-in) connects you to a list of task wizards to run, this icon isn't obvious and the wizards are organized by feature. Heaven help me, I am not suggesting some form of the Paper Clip, but some optional guidance would be useful for those who've newly installed Rapport and may not be sure where to begin.

Other areas of the GUI could also use some work. The GUI designers don't seem to realize that it is hard on the eyes to read a lot of text from a small dialog box, as in the wizard for creating a default client configuration. And you have to read longer dialog boxes, since the way that options are presented is not consistent. For example, when distributing software to client machines you need to select all the clients you want to distribute the software to. For another task, you need to deselect the client machines that you don't want to affect. Checking or unchecking a box isn't rocket science, but a little consistency would make it easier to use the tool. On a related note, some of the Help could also use some work. When you're learning how to use a new tool, good help files are, well, helpful, and Rapport's aren't all they could be. One complicated dialog box's Help file explains how to check boxes—but does not explain any of the dozen options in the dialog box.

However, once you get accustomed to using Rapport it's very powerful. I already mentioned the filtering system backing groups, which makes working with groups much simpler than it would normally be in a large environment. I also liked Rapport's support for scripted updates. The software comes with a library of scripts to reinstall or reconfigure parts of a terminal, or install software, without having to replace the entire image. You can also use these scripts as a template to build your own scripts. The use of the MMC environment is a good choice, too, since it allows you to integrate Rapport with other tools. For example, you could save a console containing both Computer Management and Rapport.

<b>Criteria</b>	<b>Summary</b>
Scalability	Intelligent grouping makes it easier to support large numbers of clients without having to keep track of manually applied groups. Scripted WOL makes it possible to “wake up” clients to run automated management jobs.
Intelligent Use of Network Resources	User-initiated discovery avoids excessive network traffic. Also, support for both UDP and TCP-based discovery permits client discovery in networks with UDP forwarding disabled.
Platform Independence	Supports all Wyse Winterms, although the type of management available may vary slightly with the client OS.

Extensive Remote Access to thin-clients

Full remote access is available for NTE-based thin-clients. To edit CE-based configuration settings, you'll need to work from the console.

Ease of Use

The Setup routine and the way that the management tools are organized are a little complex for new users, but once you're used to the tool (and can find the task wizards) Rapport makes it easy to create and schedule management jobs.

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Wyse Technology

[www.wyse.com](http://www.wyse.com)

## **NEOWARE SYSTEMS**

Neoware Systems' ezRemote Manager is a simple yet powerful SNMP-based remote management system. It supports all types of Neoware clients (and may at some point support the ThinStar line, since in March 2002 Neoware announced the purchase of the 332, 500, and Voyager lines from NCD), is easy to use, and provides excellent remote management access to thin-clients. Customers not currently covered under a software update program may license the new version along with a complete software update for \$50 per seat; those covered under Neoware's Full Advantage programs can get ezRemote Manager at no additional charge.

### **Platform Independence**

The new release of ezRemote Manager that came out in January 2002 performs well here, having no problem discovering any of the Neoware clients (WinCE, NTE, and Linux) I had on the network. The only possible catch could be that you'll need to make sure that you've got the most recent Linux build on the clients, since the version 2.1 that I had did not support remote management. Later builds for Linux and other client types are available from the Neoware Web site, although I for one would find it enormously helpful if ezRemote Manager would poll for (and display) device serial numbers. To download a client update, you must supply a current device serial number for one of that type of client, and it's inconvenient to copy a serial number off the back of an awkwardly positioned device. This could be a real problem for large enterprises that want to do asset tracking.

### **Extensive Remote Access to Thin-Clients**

I really liked ezRemote Manager's way of tuning remote clients. The software has a desktop shadowing feature independent of RDP or ICA, so that you can attach to a specific client and view its configuration settings as though you were sitting at its console. This way, you can reconfigure the terminal properties or edit connection settings as though you were sitting in front of

the terminal—all from the console. (That said, Neoware recommends editing settings from the terminal and testing them carefully before cloning changes and distributing them across the network, so that you can be sure that settings work before inflicting them on dozens or hundreds of client devices.) Once you've tuned a client to the way you want it, you can copy its settings from the console and apply the complete set of configuration information to selected clients.

In addition to the shadowing feature, there's also a Properties option you can use to view—but not edit—current configuration information for a specific terminal.

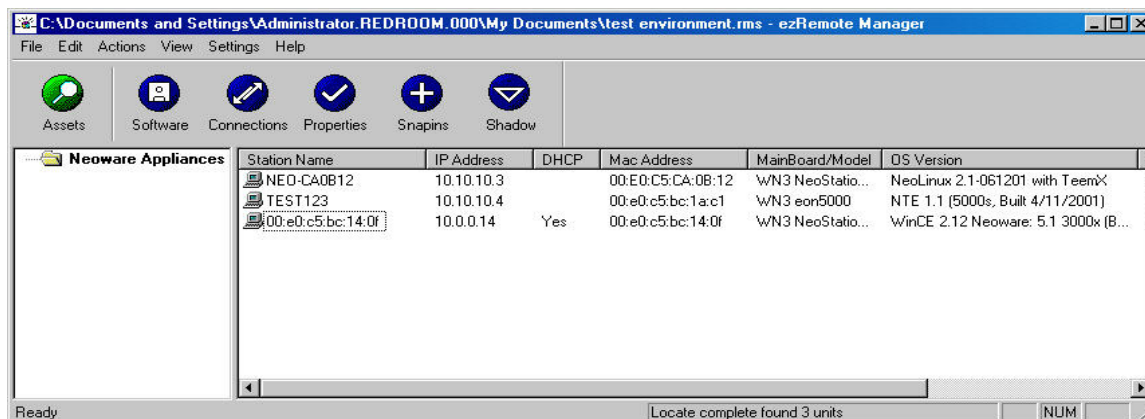
If you don't want to copy over an existing client configuration, just tune it slightly, you can enumerate and copy connection settings from selected terminals and apply them to other terminals. Snap-ins could be especially helpful for saving bandwidth for large deployments of new software. For making small changes to NTE or Linux-based thin-clients (for example, adding support for Adobe Acrobat) you can download snap-ins from the Support section of the Neoware Web site, or use existing snap-ins as models to create your own. These snap-ins are not available for the Windows CE platform.

## Ease of Use

ezRemote Manager is very simple to use. Installation was a snap—using the familiar Windows Installer Setup routine, I provided the license number, agreed to the EULA, provided my name and organization, an installation location, and let Setup copy files to the disk. Reboot when prompted, and you're in.

The UI for the software is simple, too. As you can see here, ezRemote Manager doesn't make you spend a whole lot of time guessing about what you should be doing next—what you see here is what you get. That bright green Assets button on the left side was also a good design choice, too, since that's the button you'll need to click to discover the thin-clients on the network.

Although ezRemote Manager's graphical design is good, it isn't perfect when it comes to ease of use.. Documentation is available from the Support section of Neoware's Web site, but the tool doesn't have any Help files. Additionally, while the step-by-step instructions were excellent, the documentation wasn't very helpful when it came to troubleshooting—in addition to telling me



how something should work, I always appreciate advice about what might be wrong when something doesn't work.

Automation support in ezRemote Manager could also use some improvement. Although the latest version of ezRemote Manager Neoware has introduced Wake On LAN, you must initiate the WOL command from the console. You cannot include this support in a script, and the tool does not issue the command automatically before initiating a scripted management job. Therefore, if a user turns the terminal off at night you can't manage that terminal in an overnight upgrade without physically turning the terminal back on or manually running the WOL command from the console before initiating the automated management process.

### **Intelligent Network Use**

ezRemote Manager doesn't poll the network unless you ask it to. You'll need to explicitly discover thin-clients to work with, and can save discovered clients for later management tasks. Being able to control the discovery time helps reduce the impact of the discovery process on busy networks, and makes it easier to work with saved groups of thin-clients—once you've saved them, you can reload the saved collection without having to rediscover or reorganize the group.

### **Scalability**

ezRemote Manager falls down a bit on scalability. While its UI is admirably simple, that simplicity has a price: fewer features than a more complex tool might present. You can group thin-clients easily, arranging them in the main display according to OS, IP address, station name, or any other available criteria. You can also easily create folders and drag clients into them to work with only a small set of thin-clients at a time. However, thin-clients can be in only one group at a time, complicating things if sometimes you'd like to organize clients by OS and sometimes by IP address. One way to get around this lack is to discover thin-clients according to OS (which is an option—you don't have to find all the CE clients if, say, Linux is what interests you) and then group thin-clients according to some other criteria, saving that grouping as a file. Any time that you want to work only with clients of one OS, grouped according to some other criteria, just load the relevant file.

That said, this grouping method appears to work best in smaller environments. Neoware recommends that you use ezRemote Manager to run only one job at a time, since running multiple jobs could corrupt the terminal firmware. Therefore, someone wanting to run an automated job on all terminals, divided into 20 groups, will need to create 20 jobs and run them sequentially. Additionally, recall that you can't script the WOL command to make sure that all terminals in a group are "awake" before running a job, and that, when dealing with saved consoles, ezRemote Manager does not distinguish between thin-clients that are definitely on and those that were on when it saved the console. Therefore, a job could stall if a thin-client in the group being managed was turned off, since ezRemote Manager would be waiting for the thin-client to be available again so it could finish. The job wouldn't finish, and any additional jobs scheduled to run

after the stalled job had completed could run while the stalled job was still running. Because a thin-client can be in only one group at a time, it seems unlikely that this scenario would lead to terminal corruption (since the stalled job and other jobs running later would not be writing to the same terminals) but the stalled job would be inconvenient, to say the least.

<b>Criteria</b>	<b>Summary</b>
Scalability	Fair. Although ezRemote Manager supports groups, its lack of support for scripted WOL makes it possible to stall jobs due to turned-off thin-clients. Also limited by permitting clients to be in only one group at a time.
Intelligent Use of Network Resources	This is fine. The tool can “remember” previous inventories and will only re-discover clients on demand.
Platform Independence to	This is fine. The tool works with all Neoware thin-clients, although Linux clients may need be updated to the latest version of the software.
Extensive Remote Access to thin-clients	Good. Remote shadowing makes it possible to view current client settings outside of an ICA or RDP channel. Very simple to copy one client’s configuration and apply it to other thin-clients.
Ease of Use	A good simple UI makes the tool easy to use with little help, but the tool has no online Help files and the documentation is not as helpful for troubleshooting as I could like.

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Neoware Systems  
www.neoware.com

## **NETWORK COMPUTING DEVICES’ THINPATH MANAGER**

NCD’s ThinPath Manager is part of a larger suite of ThinPath software tools extending Windows Terminal Services. As such, it has a more “suite-like” feel than either Neoware’s or Wyse’s management tools. Although Neoware Systems has bought part of the NCD ThinStar line, the ThinPath suite will continue to be an NCD product.

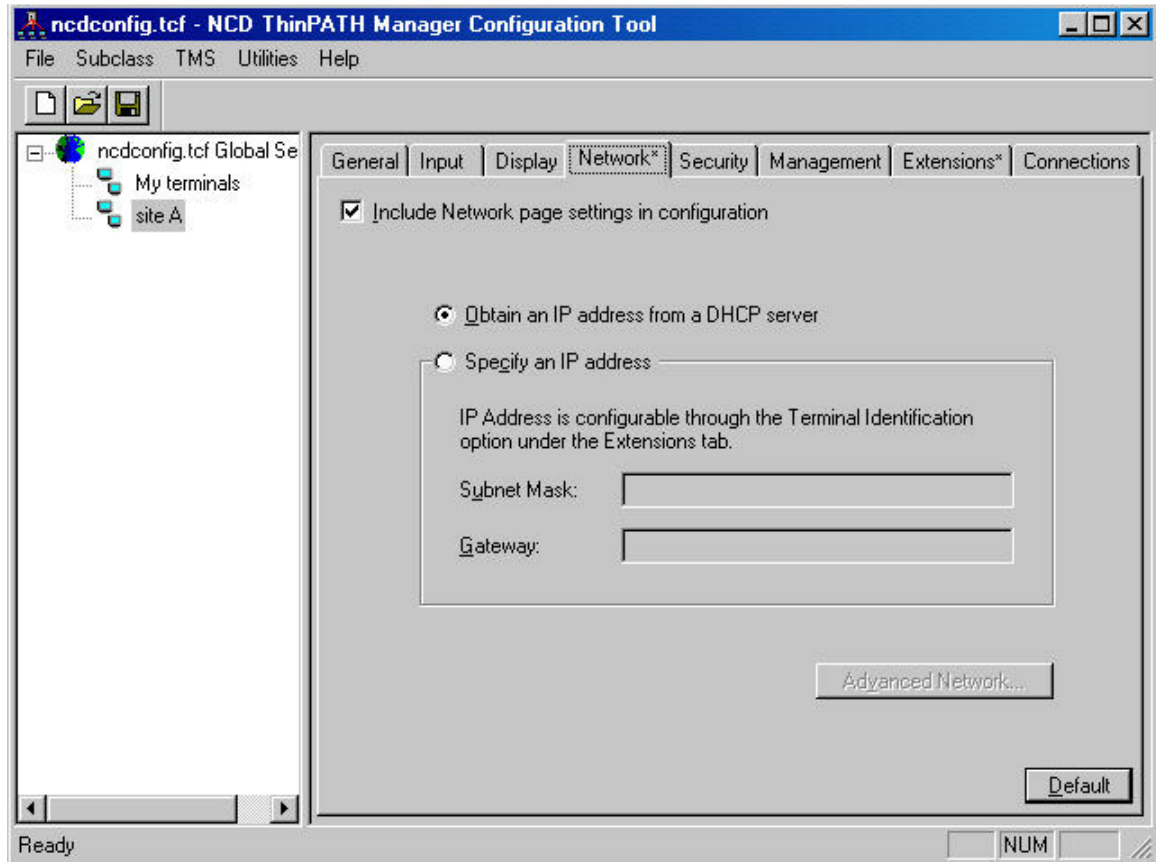
### **Platform Independence**

Since ThinStar terminals only run WinCE, platform independence is not a major issue for

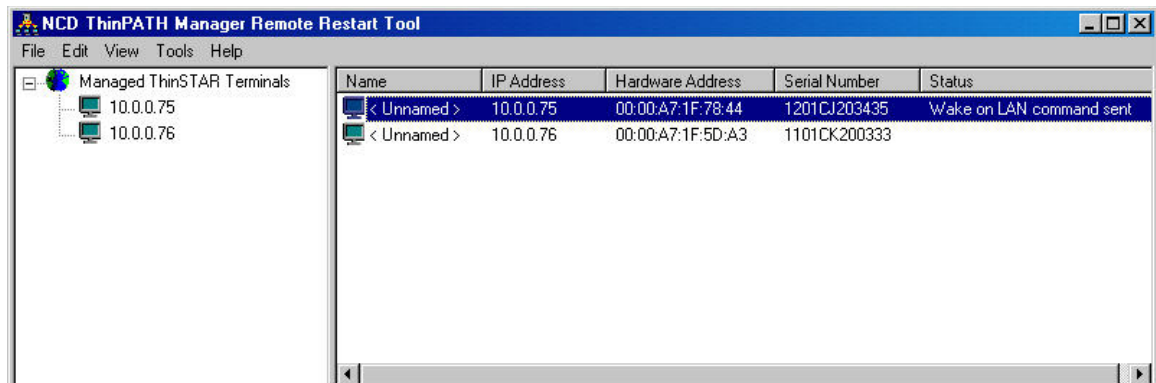
ThinPath Manager choosers. NCD has recently announced a new tool for managing PC clients like thin-clients, but this tool is not part of Thin Path Manager.

### Extensive Remote Access to Thin-Clients

ThinPath Manager provides two ways of touching thin-clients. You can configure the devices with the Configuration tool, not having to touch the client consoles at all. This tool can be somewhat deceiving, since (as here) you can't apply the same static IP address to more than one thin-client, but the configuration options here are the same as those on the ThinStar terminals.



To ensure that clients get their updates, ThinPath Manager also supports Wake-On-LAN, which automatically reboots the clients using SNMP.



## **Ease of Use**

ThinPath Manager is simple to install, using the familiar Windows Installer UI, but the tool itself could use a little redesigning. The complete ThinPath Management suite includes five interrelated—but separate—tools. One tool specifies the way that updates should be rolled out to particular types of clients, a printing tool lists printers by manufacturer and model number, a licensing tool allows you to add more licenses as needed, a remote restart tool controls client reboots, and a configuration tool allows you to create configuration settings to apply to clients. Add the other parts of the suite, and you have even more separate tools. Although there is some communication between the various tools (for example, you can open the remote restart tool from the configuration tool) I think it would be helpful to roll all the tools into one. If a more modular approach is desired, then how about MMC snap-ins for each tool, so that people can create a customized “ThinPath Management” tool collection?

## **Intelligent Use of Network Resources**

About the only aspect of ThinPath Manager that I didn't like from a network traffic point of view is its method of discovery. Every time you start up the management tools, it discovers the NCD clients all over again. On the one hand, constant discovery means that the inventory is accurate: if you see a client in the management tools, then it's there. This isn't necessarily true with other thin-client management tools, which can remember previous inventories and will assume that those inventories are good unless you tell them to discover clients again. You can still create and edit client configurations with the ThinPath Manager Configuration tool, however.

Apart from its discovery method, ThinPath Manager has a scheduling system you can use to reboot thin-clients either at scheduled times or immediately, so you don't have to worry about unexpected network traffic from that source.

## **Scalability**

ThinPath's design is good in most ways for scalability. The group structure allows you to assign thin-clients to individual groups (giving them customized names, in other words), or groups consisting of multiple thin-clients—and more groups. A thin-client can belong to more than one subgroup, so you can apply configuration settings at both the macro and the micro level. If a setting is applied differently to different subgroups, then the lowest-level group controls. The only catch is that client groupings are completely administrator-controlled. That is, you can visually sort the clients in the Remote Restart tool according to IP address, MAC address, name, or any other inventory criteria available, but if a client's IP address changes after you've moved it to a new subnet it won't change groups.

However, this grouping system works well only for initiating jobs according to ThinPath's schedule. ThinPath Manager does not support any kind of scripting system to allow you to

schedule updates to thin-clients. That is, it will automatically update the client software during discovery using the rules you set up in ThinStar Management, or you can run the management yourself, but you can't schedule the updates for a specific time. Not having the ability to schedule the management tasks could prove inconvenient in a very large and busy network environment—it's handy to be able to schedule routine management tasks for times when bandwidth is less in demand.

<b>Criteria</b>	<b>Summary</b>
Scalability	The tool's nested group structure allows thin clients to be in more than one group at a time (the rules applied to the innermost group apply to the client) but the tool lacks scheduling tools appropriate for performing offline updates—although you can schedule client reboots.
Intelligent Use of Network Resources	For a large network, ThinPath's network usage is poor because it rediscovers the thin-client population each time the tool starts. This is acceptable in a small network (or if you leave the tool up all the time to avoid rediscoveries), but not a large one.
Platform Independence	This isn't really an issue, since ThinStar thin clients run only WinCE, but the tool does support all NCD ThinStar terminals.
Extensive Remote Access to thin-clients	You can configure ThinStar terminals from the console, but there is no guarantee that the configuration you apply from ThinPath will match the software installed on the ThinStar terminals. Make sure that you keep your client and server updates synchronized.
Ease of Use	Although the tool is simple to install and the individual pieces aren't hard to figure out, there are too many pieces to work with. ThinStar management alone has five separate tools.

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Network Computing Devices  
www.ncd.com

Christa Anderson is an internationally known technical journalist and independent consultant specializing in server-based computing. Author of *The Definitive Guide to MetaFrame XP* (RealTime Publishers), she is presently writing a book on Windows Terminal Services to be published by Sybex in 2002.