

NetVista Thin Client Express Service Utility



Technical Overview

July 2000



What is the Express Service Utility?



● The IBM NetVista Thin Client Express Service Utility

- A Windows-based program
- Provides software update services for the NetVista N2200e Thin Client Express
 - Update the software components on the Thin Client Express flash card
- Provide NFS support for the client to access the server
- There are no direct programs that the user needs to start
- Services are started automatically
- There is no GUI interface



Notes



The NetVista Thin Client Express Service Utility provides the functions required to update the software present on the flash card of a Thin Client Express.

Essentially, it is simply an NFS server that downloads a set of files to a flash card, based on a Bill of Materials (BOM) file that lists the components that are present on the flash card.

It is a set of background services that do not need or require a user interface.

After installation of the utility, the installed services (NFS server and RPC Portmapper) are automatically started, waiting for requests from clients to download files.

This utility is totally independent and does not require any other components or utilities to function.



How to Obtain the Utility?



- **Orderable on CD**

- See Order Instructions at URL:
<http://service.boulder.ibm.com/nc>

- **Web Delivery**

- URL: <http://service.boulder.ibm.com/nc>
- Follow link to NetVista Utilities in the NetVista download section
- The Utility is a single file (tceServiceUtil.exe) of about 16 MB
- Download to a temporary directory and run it to start the installation
- Current README file is on this page also

Downloads	
→	Thin Client Express Service Utility V1R1 Product ID 5648-D83 File name: tceServiceUtil.exe size: ~16MB - Readme
→	Thin Client Manager Operations Utility V1R1 Product ID 5648-D84 File name: tcmOpUtil.exe, size: ~13MB - Readme
CD Order Information	
→	Ordering Thin Client Utilities on CD

- **Documentation**

- The "NetVista N2200e, Thin Client Express Reference" publication is at <http://www.ibm.com/nc/pubs>



Notes



This utility can be obtained either on a CD or downloaded from the Web.

Instructions are found on the <http://service.boulder.ibm.com/nc> web site by following the links to NetVista Utilities. Instructions for ordering a CD are also found on the same Web site.

The utility is very simple to install. it is a single self-extracting executable that only needs to be downloaded and launched.

After installation, the server does not require to be rebooted. the utility is operational immediately.



What are the Prerequisites?



- **Supported Operating systems**

- Microsoft Windows NT Server 4.0 (Service Pack 4)
- Microsoft Windows NT Workstation 4.0 (Service Pack 4)
- Microsoft Windows NT Terminal Server Edition 4.0 (Service Pack 4)
- Microsoft Windows 2000 Professional (Beta Test Only)
- Microsoft Windows 2000 Server/Advanced Server (Beta Test Only)

- **Does not require NSM V1R3 or V2R1**

- Can be installed standalone
- Has all the required files and eNOD services
- But can coexist with Windows NT NSM V1R3 and V2R1



Notes



The only prerequisite for the Service Utility is a Windows NT system at Service Pack 4 or later, or a Windows 2000 system.

Note that NSM V1R3 or V2R1 are not required. The Service Utility can be installed standalone and has all the eNOD services required to operate independently.

However, if it is installed on an existing NSM V1R3 or V2R1 system, it will coexist with NSM (but it does not require it). When it coexists, it shares some of the NFS services but the set of files that the Utility manages to be downloaded to the flash card are separate from the similar set of files that is managed by NSM and which can be downloaded to a flash card of a full NSM client.



Coexistence with NSM/TCM



- **The Service Utility uses a subset of the eNOD product used in Windows NT NSM V1R3 and V2R1**
 - Only one eNOD can be in control at a time
- **The TCE Service Utility will coexist with V2R1 but V2R1 must be at Service Update 6 level.**
- **The TCE Service Utility will only coexist with V1R3 if V2R1 is already installed on the same server**
- **Windows NT NSM V2R1 (PTF 6) is aware of the presence of the TCE Service Utility's version of eNOD**
 - NSM V2R1 will install/uninstall correctly
 - NSM V1R3 however is not aware of the TCE Service Utility



Notes



Why are we talking about coexistence? It is because the Express Service Utility makes use of the same eNOD services (such as the eNOD NFS server) as those that are installed with NSM V1R3 or NSM V2R1.

Therefore, if these eNOD services are already installed on the machine, they must be properly shared between NSM and the Express Utility.

For proper coexistence, NSM V2R1 must be at the PTF 6 level so that NSM can be aware of the presence of the Express Service Utility. This also means that the Service Utility will coexist with V1R3 only if NSM V2R1 (PTF 6) is also installed.

Therefore, if NSM V2R1 was installed and is uninstalled, it will uninstall correctly and leave the services required by the Express Utility in tact.

The Express Service Utility will not function properly if:

- You install V1R3 AFTER installing the utility (without presence of V2R1)
- You had both V1R3 and V2R1, and you uninstall V2R1 first and then V1R3

In this case, the Utility installation can be "repaired" by executing the following command:

- `x:\NetVista\enod\bin\NVNetConfig -create`



Directories/Services Installed

NetVista

The screenshot shows a file explorer window with the address bar set to `C:\NetVista\NS\flashbase\x86`. The left pane shows a tree view with folders: NetVista, eNOD, Ns, flashbase, and Tce. The 'flashbase' folder is expanded to show subfolders: bin, compress, dev, etc, local, mnt, nls, proms, sbin, termbase, tmp, userbase, and usr. The right pane shows the contents of the selected folder, including subfolders and files like `.profile`, `kernel.2200`, and three BOM files.

Overlaid on the file explorer is a 'Services' console window. It contains a table with the following data:

Service	Status	Startup
IBM NFS Server	Started	Automatic
IBM RPC Portmapper	Started	Automatic
IBM Time Protocol Server	Started	Automatic

Buttons for 'Close' and 'Start' are visible in the console window.

- It is not necessary to reboot the server after an installing or uninstalling this product



Notes



This page illustrates the directories installed by the Express Service Utility when installed by itself, that is without the presence already of an existing NSM V1R3 or V2R1 system.

The Express Service Utility installs two main directories:

- One for the eNOD services
- One for the Express files that are used to download components to a flash card and three Windows NT Services that are scheduled to start automatically:
 - NFS server
 - RPC Portmapper
 - Time server

Notice the three BOM (Bill of Material) files in the x86 directory that are used to compare with the BOM file on a client that requests an update of its flash card contents.

Once these files and services are installed, the utility is operational and it is not necessary to reboot the server.



Three Ways to Use the Utility



1. Flash update via the client's Configuration Tool

- This update is initiated at the client
- Someone triggers the flash update via the local configuration tool

2. Remote flash update via TCM Operations Utility

- The actual update is also initiated at the client
- But the update is triggered remotely via the Operations Utility
 - No action necessary at the client's physical location

3. Complete flash recovery using NSBOOT

- This method is used to flash a blank CompactFlash card or recover a corrupted flash one.
- Note: This reformats the flash card and does not save any configuration information!



Notes



There are three ways to use the Express Service Utility:

- A flash update request is initiated by the client. The request is initiated via the configuration tool on the client. We will see on the next page how this is done.
- Instead of having someone at the client physically initiating an update request, the TCM Operations Utility can remotely trigger the Flash update request. So this is the same as using the configuration tool on the client except that it is done remotely.
- Instead of updating existing components on the flash card, the whole flash card can be rewritten. This is used mainly in cases where the contents of the card were corrupted in some fashion, or there is a need to create a brand new (blank) flash card. This process is destructive and does not save any information that might have been present on the flash card.

Let's take a look at each of these individual processes.



Immediate Flash Update Request



The screenshot shows the Configuration Tool interface with three overlapping windows:

- Configuration Tool (Main):** Contains buttons for "Configure Workstation", "View Network Information", and "Software Update".
- Software Update (Dialog):** A list of update options with radio buttons:
 - Configure Remote Access Authorization....
 - Wait for Network Delivered Update....
 - Configure Software Update Server Access....
 - Request Immediate Update
 - Allow remote access for FTP or Telnet updates
- Flash Update confirmation (Dialog):** A confirmation box with the text "Do you want to proceed with the flash update?" and "OK" and "Cancel" buttons.

Arrows indicate the flow: from the "Software Update" button in the main window to the "Software Update" dialog, and from the "Request Immediate Update" option to the "Flash Update confirmation" dialog.

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Notes



To cause an immediate update of the flash card from the client:

- Start the configuration tool (using either the left Ctrl-Alt-Shift key sequence or using the configuration tool icon on the launchbar if one has been configured)
- On the main Configuration Tool panel, click on Software update and enter a password if one is required
- On the next panel, click on Request Immediate Update
- And click on OK to proceed with the flash update

Note that an actual update occurs only if the contents of the flash card are different from those on the server (after the client's BOM file is compared to the server's BOM file), otherwise nothing actually happens.

How do we identify the server that should be used for the update?



Which Flash Update Server to use?



Software Update

- Configure Remote Access Authorization....
- Wait for Network Delivered Update....
- Configure Software Update Server Access....
- Request Immediate Update
- Allow remote access for FTP or Telnet updates

Configure Software Update Server Access

Enter the Software Update Server IP address

Change the following two fields if the Update Server is not a Windows(TM) system

Firmware Update Server File System Type

Directory Path for the update file

Change the following field if a different model type or version is required

Software update file list name:

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Notes



The server that should be used for a flash update, when the user clicks on **Request Immediate Update**, is configured by clicking on the entry above the **Request Immediate Update** labeled **Configure Software Update Server Access**.

There are four entries required;

- The IP address of the server
- The file system to use (preset to NFS)
- The directory path (preset to /NS/flashbase/x86)
- The BOM file to use on the server to compare with the local BOM file. This is preset to whatever the current local BOM file is.

This information is normally configured once and does not need to be changed.

Can this information also be changed remotely? Yes, using the TCM Operations Utility.



Remotely Triggering Flash Update



The screenshot shows the 'IBM NetVista Thin Client Manager Operations Utility' application. The 'Tasks' menu is open, and the 'Flash Update...' option is selected. A dialog box titled 'Flash Update' is displayed in the foreground. The dialog box contains the following fields:

- Flash update
- Server address: 9.67.239.49
- Server type: IBM NetVista Thin Client Express Service Utility (NT)
- Flash file name: NS-x86-2200-e-032-010-01.BOM

At the bottom of the dialog box, there are two buttons: 'Finish' and 'Cancel'.

This action updates the client software update configuration



Notes



Just like the fact that the Flash Update can be triggered remotely from the Operation Utility, the Update Server Access configuration information can also be changed remotely, from the Operations Utility, when triggering a Flash Update.

Illustrated here are the panels used on the Operations Utility to perform that task.

The information in the bottom panel changes the information configured on the client prior to triggering the flash update.

A different server type can be chosen (Windows NT is the only choice at the moment) as well as the BOM file which is selectable from a dropdown list.

What are the actual steps that take place when a flash update is requested?



Flash Update Flow



- **What happens when a flash update is requested (either locally or remotely)?**
 - The request causes the setting of a bit in NVRAM that is checked by the BOMSYNC module
 - Then a reboot is triggered
 - On reboot, the BOMSYNC module checks to see if an update is required (checks the NVRAM bit)
 - If the bit is on, BOMSYNC compare the local BOM file against the server BOM file
 - If there are differences in the components or the dates of the components, files are downloaded to update the flash card
 - Then the station is rebooted



Notes

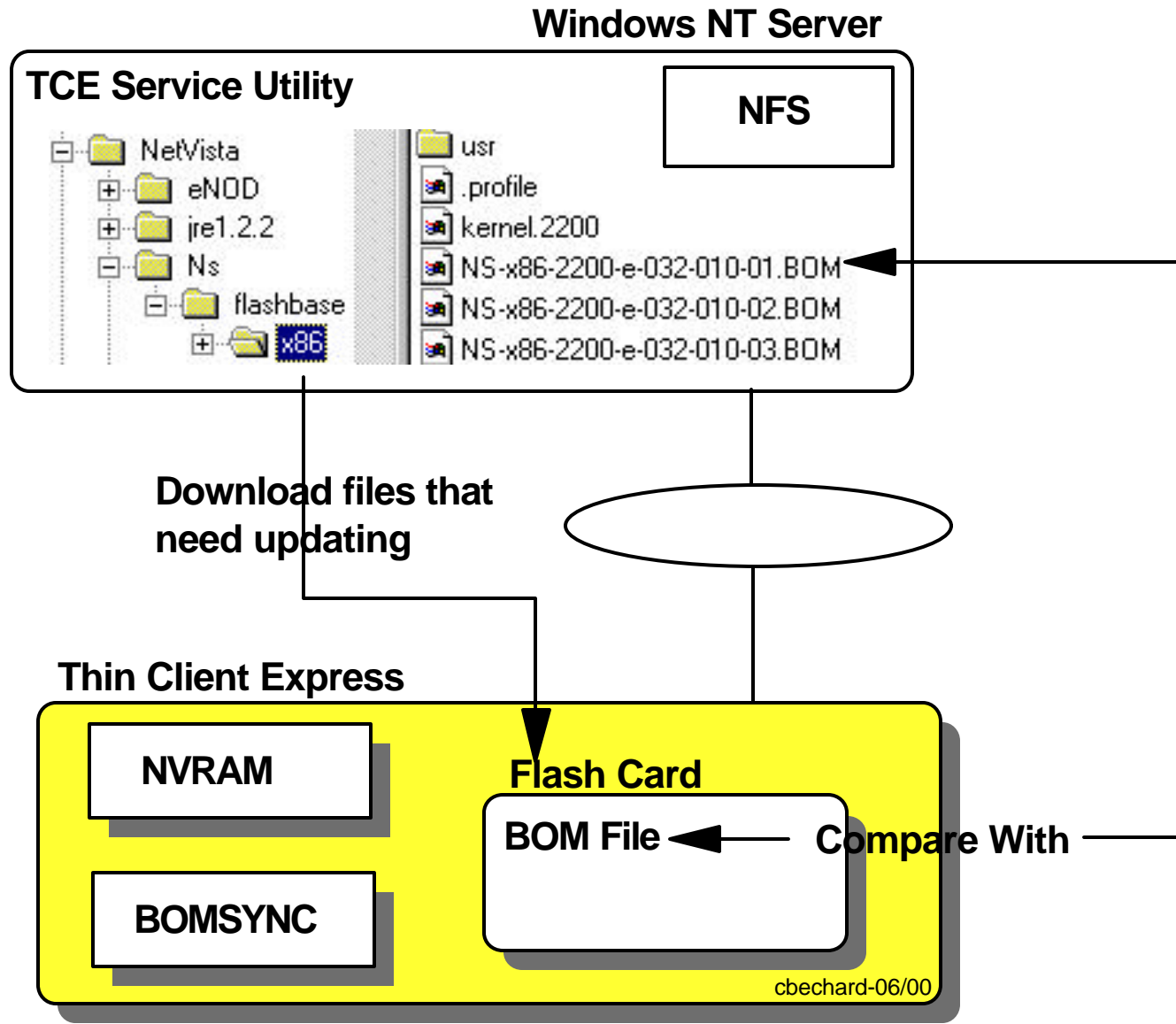


Here is a brief description of the flow, to gain a better understanding of the actual steps taking place when an update occurs:

- When the user requests an immediate update at the client (or if the request is triggered remotely), the request actually causes the setting of a particular bit in NVRAM
 - If the request was triggered remotely from the Operations Utility, the Update Server Access configuration information would also be changed on the client
- The client is rebooted
 - Automatically if the request was an immediate update at the client
 - Remotely by the administrator via the Operations Utility Reboot task. Indeed, clicking Finish on the Flash Update task does not cause a reboot, but only causes the update of the Update Server Configuration Information as well as the setting of the NVRAM bit.
- During a reboot, a module called BOMSYNC is always given control to verify the setting of the NVRAM bit.
- If the NVRAM bit is on, the BOMSYNC module then contacts the configured update server and compares (Synchronizes the BOM files, that's where the name BOMSYNC comes from) the BOM file on the client with the BOM file on the server.
- If the BOM files are identical (no difference in the list of files or in the dates of the components listed) the NVRAM bit is reset and the reboot completes normally
- If there is a difference in the BOM files, the more recent files on the server are downloaded to replace those on the flash card. After the update completes, the station is rebooted in order for the new components to take effect.



Summary





Notes



This chart attempts to summarize the few simple components of the Express Service Utility.

Essentially, the Service Utility uses an **NFS server** function to download to a client a series of files, located in the **x86** directory, based on the contents of a **BOM** file.

This download is triggered by the presence of a bit in **NVRAM** that is checked by the **BOMSYNC** module on the client every time the station is booted.

The flag to cause a flash update can be set by the configuration utility on the client or remotely by the Operations Utility.



Operations vs Service Utility



Windows NT Server

TCE Service Utility

Windows NT Server

TCM Operations Utility

Perform
Flash Update

Remotely Trigger
Flash Update

Thin Client Express

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Notes



So what is the difference between the Express Service Utility and the TCM Operations utility when it comes to a Flash Update function?

The difference is illustrated here very simply by showing that the flash update is actually performed by the Express Service Utility and the Operations Utility is only a tool that can remotely trigger the flash update to occur.

When the flash update is requested on the client by the user doing an Immediate Flash Update, the Operations Utility is not even involved, and is not required to perform a flash update.



BOM Files



- **On the client**

- x86/NS-x86-2200-e-032-010-01.BOM is in the root directory
- /termbase/profiles/update.conf contains the string
nfs://9.67.239.52/NS/Flashbase/x86/NS-x86-2200-e-032-010-01.BOM
- /termbase/profiles/update.info contains the string
NS-x86-2200-e-032-010-01.BOM

- **On the server**

usr	File Folder	6/6/00 4:08 PM
.profile	5KB PROFILE File	4/18/00 3:58 PM
kernel.2200	1,337... 2200 File	4/25/00 8:42 AM
NS-x86-2200-e-032-010-01.BOM	115KB BOM File	5/16/00 8:47 AM
NS-x86-2200-e-032-010-02.BOM	127KB BOM File	5/16/00 8:47 AM
NS-x86-2200-e-032-010-03.BOM	127KB BOM File	5/16/00 8:47 AM



Notes



So, what are these BOM files? They are 'bill of material' files that list all the files that the flash card contains.

On the client, the actual BOM file is located in the root directory.

There is also an update.conf file located in /termbase/profiles that contains a string, as illustrated here, that identifies the file system, the update server IP address, the directory on the server and the BOM file name that should be used when doing a flash update. You will recognize this as the update server configuration data that can be updated through the local configuration tool or remotely via the Operations Utility.

On the server, there are three BOM files located in the ../flashbase/x86 directory. What's the difference between the three BOM files? It is only the locales used by each. Notice that US English is present in all three BOM files.

- NS-x86-2200-e-032-010-01.BOM: Brazilian Portuguese, Canadian French, LA Spanish, US English
- NS-x86-2200-e-032-010-02.BOM: Danish, Dutch, Finnish, French, German, Norwegian, Swedish, UK English, US English
- NS-x86-2200-e-032-010-03.BOM: Belgian (Dutch and French), Italian, Portuguese, Spanish, Swiss (French, German, and Italian), US English



Sample Partial BOM File



```
.HDR RNAME="NS-x86-2200-e-032-010-01"  VERSION="02-01-AF-06-0172"
F - P -rwxr-xr-x 0 0          4628 Apr 18 15:58:01 2000 .profile
F - P drwxr-xr-x 0 0          1024 Aug 15 05:48:22 1999 bin/
F - P drwxr-xr-x 0 0          1024 Aug 15 05:48:22 1999 compress/
F - P drwxr-xr-x 0 0          1024 Aug 15 05:48:22 1999 compress/bin/
F T P -r-xr-xr-x 0 0         70400 Aug 14 18:23:45 1999 bin/[
F T P -r-xr-xr-x 0 0         34186 Apr 25 10:17:58 2000 compress/bin/cat
F T P -r-xr-xr-x 0 0        82432 Mar 29 11:46:17 2000 compress/bin/chmod
F T P -r-xr-xr-x 0 0        86528 Mar 29 11:46:22 2000 compress/bin/cp
F T P -r-xr-xr-x 0 0        44368 Apr 25 10:17:59 2000 compress/bin/date
F T P -r-xr-sr-x 0 0        36313 Apr 25 10:17:59 2000 compress/bin/df
```





Notes



Interested in knowing what a BOM file looks like?

This shows the first few lines of a BOM file.

The most important information here is of course the time/date information that determines, when two BOM files are compared, the update activity that needs to take place.



Procedure for a Complete Flash Recovery



- **Set the station to boot from NVRAM, set the client IP address, gateway, etc.**
- **Set the Boot File Source to Network**
- **Set the Boot File Server IP address to the Service Utility Server's IP address**
- **Set the Boot File Server Directory to /NS/flashbase/x86/kernel.2200**
- **Reboot the client**
- **After the kernel loads, select the desired BOM image from the menu**
 - NS-x86-2200-e-032-010-01.BOM: Brazilian Portuguese, Canadian French, LA Spanish, US English
 - NS-x86-2200-e-032-010-02.BOM: Danish, Dutch, Finnish, French, German, Norwegian, Swedish, UK English, US English
 - NS-x86-2200-e-032-010-03.BOM: Belgian (Dutch and French), Italian, Portuguese, Spanish, Swiss (French, German, and Italian), US English
- **After the flash rewrite is complete, the system reconfigures itself to boot from the flash card and then reboots**
- **If the client was originally booting using DHCP, you will need to reconfigure NSBOOT to use DHCP**



Notes



We have been talking up to now about updating the flash card, but what about the procedure to do a complete rewrite of the flash card, whether it is written for the first time or rewritten?

The required steps on the workstation are listed here:

- First set the NVRAM parameters to boot from the Express Utility Update Server
 - Set station to boot from NVRAM (instead of DHCP)
 - Set station IP address, gateway. etc. if required or different from current settings
 - Set boot file server IP address to the Update server IP address
 - Set the Boot file directory and file name to /NS/flashbase/x86/kernel.2200
- Reboot the client
- After the kernel loads, it presents a selection of BOM files to choose from. Select the BOM file required
- The Flash rewrite takes place as the files are downloaded to the station and written on the flash card
- The station reboots
- If DHCP was used, interrupt the reboot to get the NS Boot menu and reconfigure to boot from DHCP instead of NVRAM

Can this procedure be done remotely from the Operations Utility?

Actually no, because there are two actions that are physically required at the workstation:

- The first is the selection of a BOM file from the displayed list
- The second is the initial configuration of the configuration tool

An administrator does have the capability to remotely make the station to boot from the update server, but he would need a person to at least select a BOM file, and when the flash card rewrite is completed, that person would have to choose an initial configuration. However, these task being simple, they could be performed by anyone if an administrator told them on the phone what to choose an to enter.



Flash Recovery - Messages



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Doing BOMSYNC recovery...

Using /termbase/profiles/update.conf values for update

Flash image server: 9.67.239.52

Flash image root: /NS/flashbase/x86

Server protocol: NFS/Default

Server BOM:

Server file system reached

Choose one of the available BOM files

1. NS-x86-2200-e-032-010-01.BOM

2. NS-x86-2200-e-032-010-02.BOM

3. NS-x86-2200-e-032-010-03.BOM

Enter the number of the BOM file: 1

.....

.....

making directory /tmp/.....

.....

Rebooting



Notes



This page illustrates the messages that are displayed on the workstation when a flash recovery is in process.

After the user has made the BOM file selection, there are a few other messages, then a series of making directory /xxx/xxxx messages as each directory is created on the flash card.

Then, a reboot from flash is initiated, and the user is then taken into the configuration tool setup wizard for the initial configuration.



Reflashing from a Peer Station



- **A workstation can be reflashed from a peer Express station**
- **Procedure is identical to peer booting**
 - NS Boot used to configure boot from network and point to peer station with the good flash card
- **What triggers the kernel to do a rewrite of the flash card instead of normal boot is the presence of a file called update.rcov in the /termbase/profiles directory on the master station**
 - First create the update.rcov file on the master
 - `echo " " > /termbase/profiles/update.rcov`
 - Boot the peer station
 - Do basic configuration using the local configuration tool
 - Reboot, Esc and Use NS Boot Setup to restore settings to flash boot
 - Delete the update.rcov file on the master
 - `rm /termbase/profiles/update.rcov`
 - Reboot the peer station



Notes



This procedure can be used when an update server is not accessible for some reason.

A station can rewrite its flash card from the flash card of a peer unit.

This requires the user to issue a command in a Diagnostic window to create an update.rcov file in the /termbase/profiles directory on the unit that will be used to copy from.

The peer unit must then be configured to boot from the network and point it to the master unit, as if it was doing a peer boot.

When the kernel gets control, it is triggered to rewrite the flash card by the presence of the update.rcov file.

When the rewrite process completes, the unit can be reconfigured locally and the NS Boot settings reset to boot from flash.

Then the update.rcov file must be deleted from the master unit.



Problem Determination



- **If the client is having problems contacting the server, verify that the following Windows Services are running through Control Panel->Services. Start them if they are not running.**
 - IBM NFS Server
 - IBM RPC Portmapper
 - IBM Time Protocol Server
- **If a service fails to start, check the Windows application event log for errors.**
- **Windows NT NSM V1R3 is not aware of the TCE Service Utility. You will break the TCE Service Utility in the following situations:**
 - Install Windows NT NSM V1R3 (V2R1 is not installed) after TCE Service Utility
 - On an Windows NT NSM system with both V2R1 and V1R3, and you uninstall V2R1, then V1R3 (leaving TCE Service Utility). In this situation, you can repair the Service Utility by running the following tool:
 - `x:\NetVista\enod\bin\NVNetConfig -create`



Notes



This being a fairly simple service, there isn't a whole lot to verify, but there are a few items to verify if the update server cannot be contacted by a client.

- Check that the Windows NT services are running.
- If they are not showing a status of started, verify that they are set to start automatically and try starting them manually
- If they do not start manually, check the Windows NT Applications event log for errors.
- If this system was a V1R3 and V2R1 system, and these were uninstalled, try running the NVNetconfig command

Actually, as this utility is very simple to install, when in doubt, simply reinstall the utility.



Wait for Network Update



Software Update

- Configure Remote Access Authorization....
- Wait for Network Delivered Update....
- Configure Software Update Server Access....
- Request Immediate Update
- Allow remote access for FTP or Telnet updates

Wait For Network Update

Your Thin Client is waiting for a server to begin transferring updated firmware.

External network access for update is enabled.



Notes



This particular function is designed to cause the station to go into a quiesced mode in preparation for receiving updates.

In other words, when a user is active and has applications up and running, and files opened, etc., it might not be appropriate to initiate an update before all applications are stopped.

An administrator at a central site, preparing to send an update, might therefore call the user and ask him to set the terminal into wait mode to ensure that all activities are quiesced before the update is triggered.



Documentation



- **The Product Publication, titled "NetVista N2200e Thin Client Express Reference" (SA23-2803-00) is available from the [HTTP://www.ibm.com/nc/pubs](http://www.ibm.com/nc/pubs) web site**
 - It contains detailed steps for the installation and use of the Service Utility
- **The Operations Utility also contains online Help that can be consulted online or printed for reference**



Notes



It is recommended to get the product publication from the <http://www.ibm.com/nc/pubs> because it contains the detailed steps required to install the product and to operate the Utility.

Note that there is also online Help available from the Operations Utility that can either be consulted or printed.