



NCD Thin Client Xware Installation and Configuration Guide

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Document History

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About This Guide

This guide explains how to install NCD Thin Client Xware on a Microsoft Windows NT[®] Server 4.0, Terminal Server Edition or Citrix WinFrame platform.

Chapter 1: Before You Begin

Describes the Xware requirements, and explains how to prepare your system for installation.

Chapter 2: Installation and Configuration Concepts

Presents basic concepts that will help you perform installation and configuration tasks.

Chapter 3: Standard Installation

Explains how to install this product using standard installations.

Chapter 4: Configuration Procedures

Explains how to configure Xware installation to meet the needs at your site, including how to set defaults for [multi-user NT server](#) and how to set up fonts.

Appendix A: Appendix Product Support

Explains how to get technical support for Xware.

Appendix B: : Troubleshooting Xware

Explains how to locate the source of a problem, solve some common problems, and check network connections.

Appendix C: : Appendix Site Installation

Explains how to install Xware using the site installation method.

Text Conventions

This guide uses the following text conventions:

- Indicates the movement through menu options. For example, the sequence for renaming the existing file is:
Options → Preferences → Options
- bold** Indicates a directory or a file. For example:
c:\Program Files\NCD
- bold italic*** Indicates a program or utility. For example:
Windows Explorer is
- courier** Indicates information that displays on the screen. For example, the date command displays:
Monday May 18 03:05:12 PDT 1998
- courier italic*** Indicates a variable for which you can substitute one or more parameter values, group names, or file names.
IP_Address Host_Name #comment
- []** Square brackets indicate command options
- |** A vertical bar separates each option within square brackets. If you specify an option, choose only one value within the square brackets.

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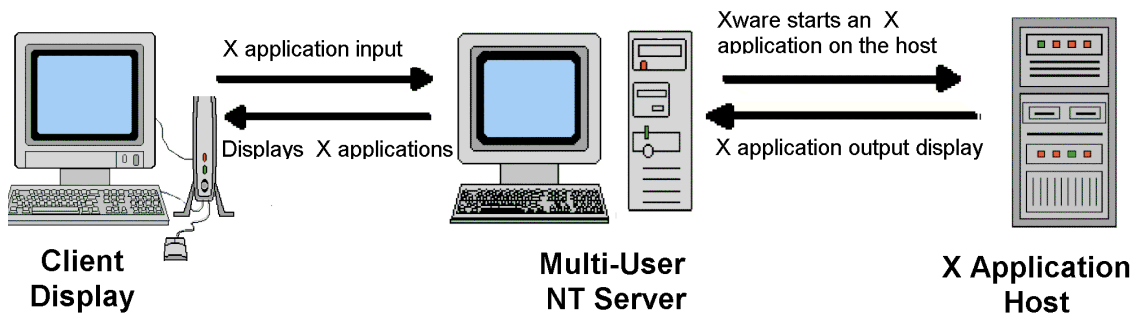
Chapter 1

Before You Begin

This chapter explains how to prepare for installing NCD Thin Client Xware.

The Xware Environment

Before you begin installation, you need to understand the three different layers involved in running Xware in a multi-user environment. These layers are shown in the figure below and described in the following subsections.



Client Display

This is the desktop where the user views the X [application](#) running from the [X application host](#). At the [client display](#), the user can:

- log into the multi-user NT [server](#),
- start Xware,
- use Xware to start an [X application](#), and
- use the mouse and keyboard to send input to the X application.

Note Xware is *not* installed on the client display.

The [client](#) device may be (but is not limited to) any of the following:

- A NCD Thin Client
- A NCD Windows-based terminal
- A PC running with an ICA client
- A PC running with a RDP client

Multi-User NT Server

This is the computer system on which Xware is installed. The multi-user NT server lets a user at the client display view and interact with an X application that is running from the [X application host](#).

The multi-user NT server can be running any of the following:

- Microsoft Windows NT Server 4.0, Terminal Server Edition
- Citrix WinFrame 1.6
- Citrix WinFrame 1.7

X Application Host

This is a computer system (typically UNIX) on which the X applications are located.

The X application host may be any of the following (but is not limited to this list):

- A Sun OS host running X applications
- A Sun Solaris host running X applications
- An IBM AIX host running X applications
- A Hewlett-Packard HP/UX workstation running X applications
- A DEC mainframe running VT applications or X applications

Requirements

This section describes the hardware, software, and X application host requirements for the Xware installation procedure.

Hardware Requirements

See your documentation for your operating system.

Software Requirements

Software	Requirements
Operating system	Microsoft Windows NT 4.0, Terminal Server Edition <i>or</i> Citrix WinFrame 1.6 or 1.7.
Network software	Installed and functional TCP/IP network software on the multi-user NT server.

Multi-User NT Server Requirements

Host Attribute	Requirements
Memory	At least 4MB per user.

X Application Host Requirements

Host Attribute	Requirements
Login account	A login account on a host machine in your network.
protocol setup	<i>rexec</i> , <i>telnet</i> , <i>rsh</i> , <i>rlogin</i> , or <i>XDM</i> protocol set up to support your multi-user NT server. You will select one of these when you create Xware connections.
TCP/IP setup	TCP/IP hardware and software, including an Internet address or node name for your multi-user NT server. The multi-user NT server's name or address must be included in the host's name data file
X applications	X Window System Version 11 applications, such as <i>xterm</i> , <i>xclock</i> , or <i>twm</i> .

Preparation

This section lists system and network information you must supply when installing and configuring Xware. (Examples are in brackets.)

Authorization Data

Product serial number

Product authorization code

Network Connections

X application host machine name or IP address

rexec, rsh, rlogin, telnet, or XDM
capability

Directory path to X applications

Multi-user NT server Internet address
[156.27.1.51]

Multi-user NT server name [server_10]



Chapter 2 Installation and Configuration Concepts

This chapter presents concepts that will help you install NCD Thin Client Xware efficiently and configure it optimally for your environment and objectives.

Installation Types

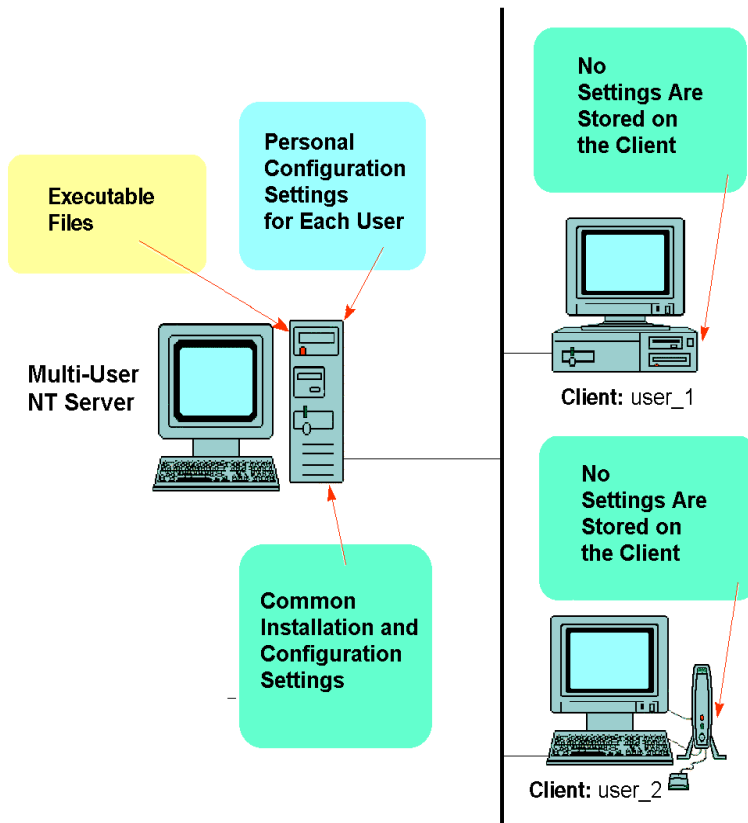
Note Since installation makes changes in a multi-user NT server's registry, Xware should be installed *only* by a system administrator.

You can install Xware in the following ways:

- Standard (single-system) installation
- Site installation

Standard Installation

This involves installing and configuring Xware entirely on one multi-user NT server at a time, with no dependencies on other machines in your network, as shown in the following figure.



Standard installation lets multi-user NT servers perform network operations more quickly. If you need to run Xware on several multi-user NT servers, however, standard installation requires significantly more storage space on each server than a site installation.

Site Installation

Site installation involves using one computer as a file server for other multi-user NT servers in your network. Xware may reside on the file server, and some or all of the installation and [configuration](#) settings may be controlled by the file server. The system administrator decides whether users on multi-user NT servers that use the file server are allowed to modify some of the installation and configuration settings, or none of those settings.

Site installation is discussed in more detail in Appendix C.

Font Options in Xware

Xware is based on X 11 release 6. Because of this, Xware supports and supplies a series of standard [PCF](#) (portable compiled format) X server fonts.

Xware can also use several other font types including ASCII bitmap distribution format (BDF) and native Microsoft Windows fonts. Xware can add fonts or substitute fonts automatically when an application requests a missing font.

During site installations and standard installations, you can modify the set of fonts Xware will use. This procedure is covered in "Customizing Xware Fonts" on page 4-1.

If applications you run on your host machines use fonts that are not provided by Xware, you can copy the needed fonts to your multi-user NT server and use Xware's *Font Tool* to compile them into a format Xware can read. For more information on the *Font Tool*, see the *NCD Thin Client Xware User's Guide*.

Multi-User Configuration

Note Before you use Xware, you should note that Xware requires that each user have a home directory, and that the path to this directory must be specified in the User Manager for Domains utility on the server.

Display Number and Multi-User Support

Xware supports multiple concurrent users by providing a different display number for each instance of Xware. The display numbers are referenced by:

```
display:n
```

where `display` is the name or [IP address](#) of the multi-user NT server that is to receive the X application's output, and `:n` is the display number associated with the user's client display.

Note The display number *must* be preceded by a colon.

Xware begins assigning numbers with `display:1`. Each new instance of Xware gets the next available display number.

While most users will not have to set the display number, it can be set on a per-user basis by setting the following environment variable in a user's environment:

```
set XWARE_DISPLAY=:n
```

This forces `n` to be used as the display number if `n` is not already in use. `n` can be any number from 0 to 127.

Note If the display number you choose is already in use, you will not be able to make any X connections.

Configuration and Connection Files

Xware maintains configuration and [connection](#) files on a per-user basis. Connection files contain login, X application, and X application host information. Each user must have a home directory. The first time a configuration change or new connection is made, Xware automatically creates an Xware directory under the user's home directory and sets up the appropriate registry entries. Each subsequent time a configuration change or new connection is made, that information is stored in the *home\Xware* directory. The files in a user's *home\Xware* directory are then used each time that user invokes Xware.

Common Configuration and Connection Files

Xware lets the administrator set up common configurations and connections that can be accessed by all users. These common files can be created and maintained only by using the **/common** command-line switch with **cfgui.exe** and **conwiz.exe**.

Creating Common Configurations and Connections

Common configurations and connections can be created only by someone with administrator privileges.

- To create a generic configuration file that is shared by all Xware users, run the Xware configuration program with the **/common** switch:

```
cfgui.exe /common
```

This stores a **changes.usr** file in the common Xware directory. They can then be modified or deleted only by someone with administrator privileges. See the *NCD Thin Client Xware User's Guide* for more information.

Note Running the configuration program with the **/common** switch is the only way to change the serial number and authorization for a copy of Xware.

Configurations in a common configuration file are applied to all users before each user's personal configuration is applied. Personal configurations can override common configurations.

- To create connections that can be used by all users, run the Xware **Connection Wizard** with the **/common** switch:

```
conwiz.exe /common
```

This stores the connections in the common Xware connections directory. Connections created in this way will appear to all users.

Modifying Common Connections

Common connections can be modified only by someone with system administrator privileges. See the documentation for your operating system for instructions.

Personal Configuration and Connection Files

Xware lets individual users set up personal configurations and connections. Personal configurations and connections are available to a single user only. They can override common connections and configurations.

Note Any time that a user runs Xware Configuration or the Connection Wizard without the **/common** switch, the configuration changes and connections are created for that user only.

- When a user changes Xware's configuration, an **Xware** folder is created in that user's home directory. The configuration file (changes usr) is then stored in this *home***Xware** folder and used for that user only.
- When a user creates a connection, an **Xware\Connects** folder is created in that user's home directory. The connection file is then stored in this *home***Xware\Connects** folder and used for that user only.

Custom Configurations and Connections for Groups of Users

System administrators can create configurations and connections that will be available to specific groups of users. See your operating system's documentation for more information about how to create groups of users with common privileges and profiles.



Chapter 3

Standard Installation

This chapter gives step-by-step instructions for a standard installation of NCD Thin Client Xware. See Appendix C for information on site installation.

Starting the Installation Program

To start the installation program:

1. Log on as administrator at the multi-user NT server's console.
2. Insert your Xware CD-ROM into the CD drive. If you are installing for the first time on the Windows NT Terminal Server platform, the installation starts automatically. Otherwise, continue with step 3.
3. Start the *setup* program:

- On a Windows Terminal Server platform, select **Start** → **Run** from the taskbar. Then enter:

```
<drive_letter>:\setup.exe
```

- On a WinFrame platform, go to File Manager and navigate to the drive that contains the Xware CD-ROM. Double-click on the **setup** file.

The Installation background screen appears. The *setup* program displays its various dialogs against this background, stepping you through the installation process.

4. The buttons shown below are always displayed, so you can click them any time during the process.



Displays online help for the currently displayed dialog.



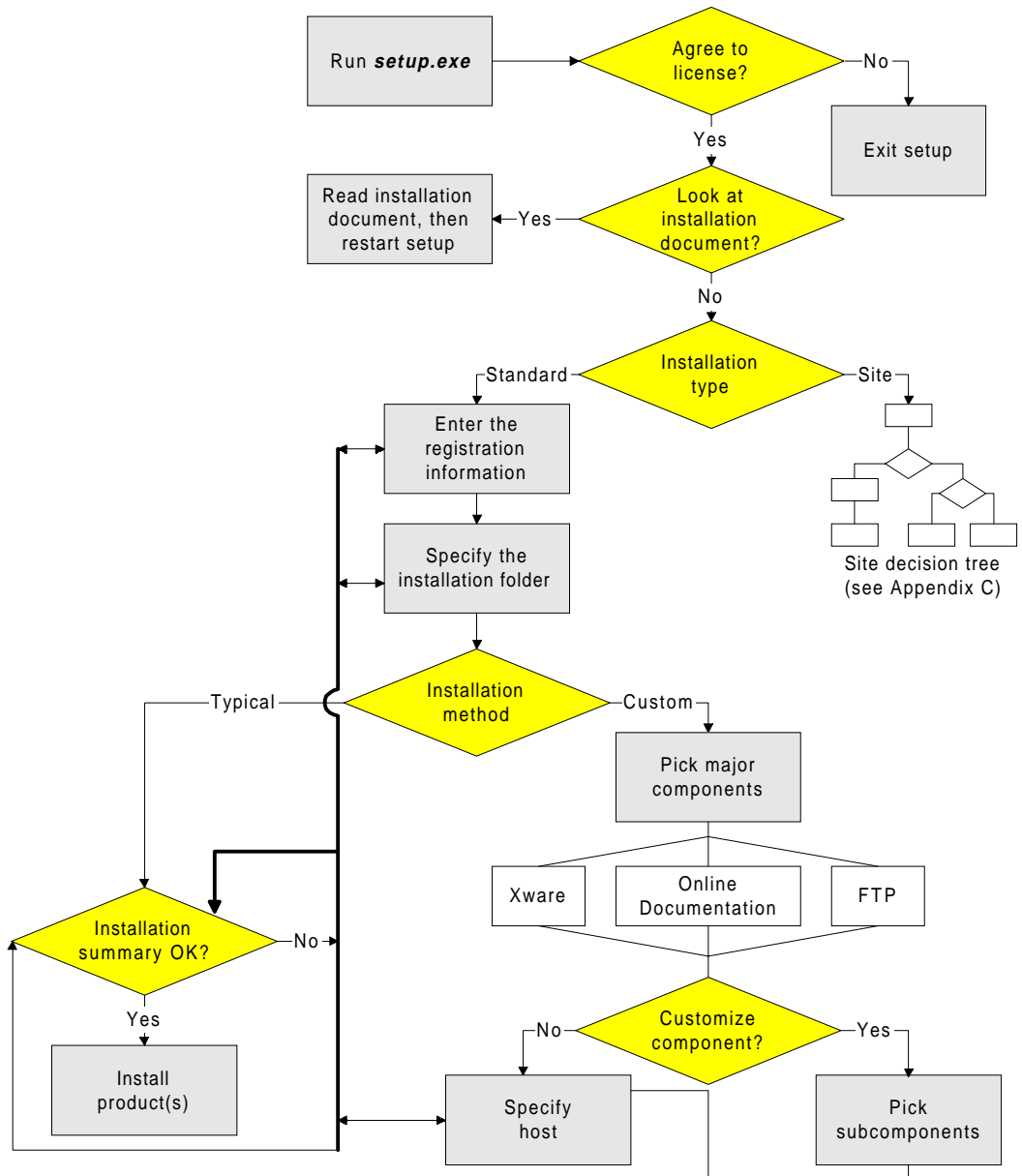
Suspends the installation program and iconifies the *setup* program. To resume installation, click the setup icon in the taskbar.



Halts setup and closes the Installation screen without installing the product.

Standard Installation Procedure

The following figure shows the sequence of choices you make when installing Xware on a multi-user NT server.



Standard Installation

1. Log on as administrator and run the *setup* program, as explained in "Starting the Installation Program" on page 3-1. Answer the licensing questions, when prompted to do so.
2. The first dialog prompts you to choose an installation type:
 - *Standard*
Choose this if you are installing on a system that will be a multi-user NT server.
 - *Site*
Choose this if you are performing a site installation, and are installing to a machine that will function as a file server for other multi-user NT servers in your network.

Standard installation is described in the following steps. For information on file server installation, see "Site Installation Procedure" on page C-4.

3. On the next dialog, choose *Standard Installation*.
4. Fill out the Registration dialog to authenticate your copy of Xware. You can find the serial number and authorization code on the Xware Support card.
5. On the NCD Installation Folder dialog, enter the path to the directory on the multi-user NT server where you want to install Xware. If you are changing an existing installation, this location can be different from the existing location.

Note If you specify a nonexistent directory, the *setup* program will create it.

Note From this and successive dialogs, you can back up and change information by clicking the *Previous* button.

6. On the Installation Method dialog, select one of these options:
 - *Typical*
Installs an optimized selection of product components and subcomponents.
 - *Custom*
Lets you pick specific components or subcomponents to install. Then you continue with Step 7.
7. If you selected *Custom* in Step 6, the NCD Components dialog appears. It lists the products available for installation, each with its own check box. Check the boxes of products you want to install; uncheck the rest.
To install particular subcomponents of these products, do the following:
 - a. Click the check box of the product you want to affect (for example, Xware). The check box is then highlighted.
 - b. Click the *Customize Component* button to see a list of the subcomponents of the selected product. Each subcomponent has its own check box.
 - c. Click the check box of each subcomponent you want to install; uncheck the rest. (Click on the subcomponent names to see brief descriptions.)
 - d. If you want to install the currently selected (highlighted) component in a location other than the installation folder you specified earlier, click the *Change Folder* button and enter the path to the desired location.

Note If you change the installation location for the currently selected component, that change affects the location *for that component only*. To change the location for the entire installation, you must go back to the NCD Installation Folder dialog.
8. On the [default](#) Host dialog, enter the IP address of an X application host with which you want to define a *telnet* connection. This connection will be presented when each user starts Xware.

If you prefer to define connections explicitly after you start Xware, leave this entry blank to create a generic *telnet* connection instead. You will then be asked for the name of an X application host each time you use this *telnet* connection.

9. The Installation Summary dialog appears, displaying the settings you made in the preceding dialogs. Click on any setting you want to change, and the dialog affecting that setting appears.

When you are satisfied with the settings, click *Install*. *Setup* performs the installation as specified, and displays a text file containing brief descriptions of the other installation tasks you can perform.

Removing an Installation

This section explains how to remove user-specific information or a standard Xware installation from a multi-user NT server.

Note No instances of Xware can be running during an uninstall.

Removing User-Specific Configuration Information

Follow these steps to remove user-specific configuration information:

1. At the multi-user NT server's console, log on as the user whose configuration you want to remove
2. Run **xwunuser.exe**.

Note There is no feedback from this utility. It will silently remove the user-specific directories and registry entries.

xwunuser.exe can be included in login scripts. See your operating system for information about creating login scripts.

Removing a Standard Installation

Note You must remove all user-specific configuration information *before* you remove the Xware installation.

Follow these steps to remove a standard installation:

1. Log on as administrator at the multi-user NT server's console.
2. Start the uninstall program:
 - On a Windows Terminal Server platform, select **My Computer** → **Control Panel** → **Add/Remove Programs**.
Click on Xware, and then on the *Add/Remove* button.
 - On a WinFrame platform, run *xwuninst.exe*, which is in the administrator's **Windows** directory (**m:\users\default\Windows**).
3. The uninstall program will ask whether you want to continue. Click *Yes*.

Chapter 4

Configuration Procedures

This chapter gives step-by-step instructions on configuring installation options for NCD Thin Client Xware.

Customizing Xware Fonts

Standard Fonts

Xware includes most of the freely distributed fonts known to NCD at the time of product release. When you select the default (typical) installation components, the font directories contain the components shown in the following table.

Component	Directory	Contents	
Misc fonts	misc	Contains a variety of critical and obscure fonts. The most notable fonts in this directory are:	
		cursor	Fonts used by Xware and many X applications for cursors.
		6x13	The default fixed-width font. The fonts.ali file in the misc directory sets the “fixed” alias to this font when you install Xware.

Component	Directory	Contents
Misc fonts	misc	7x14 8x16 12x24 fonts.ali
75 DPI fonts	75dpi	Contains lower-resolution fonts required by most X applications.
Windows fonts	mswin	Accesses Microsoft Windows fonts.

Optional Fonts

The next table shows optional fonts you can install through the *setup* program, via a custom installation.

Component	Directory	Contents
100 DPI fonts	100dpi	Fonts for higher resolution displays
Open Look fonts	xol	Fonts commonly used by OpenLook X applications
DEC 75 DPI fonts	dec75	75 dpi fonts used by DECWindows applications
DEC 100 DPI fonts	dec100	100 dpi fonts used by DECWindows applications
HP fonts	hp	Fonts used by HP VUE applications
Kanji	kanji	Japanese-language fonts
Hungul	hangul	Korean-language fonts
Hanzi Guobiao	hanzi	Chinese-language fonts

To modify the set of fonts available to Xware through the installation program, follow these steps:

1. Run the *setup* program, as described in "Starting the Installation Program" on page 3-1.
2. When you reach the Installation Summary dialog, click on Xware to display the NCD Components dialog.
3. Click the *Customize Component* button.

4. The Xware Components dialog lists all the fonts you can choose, each with its own check box. Check the boxes of the fonts you want to add. Uncheck those that you don't need.

Multi-user Configuration

Restricting Configuration and Connections

Users can be restricted from making changes to configurations or connections by using Windows security to restrict access to **cfgui.exe** and **conwiz.exe**. See your operating system's documentation for more information.

Restricting Connections with Shared Passwords

You can insert passwords into certain *rexec*, *rlogin*, and *telnet* connections at the time you create the connection. Anyone can use such a connection, since they don't need to supply the password.

Connections with shared passwords may create a security concern on some systems. In this case, the system administrator may want to run **nopasswd.exe** to prevent users from creating these connections.

Note The changes made by **nopasswd.exe** are permanent. If you want to allow connections with shared passwords again, you must reinstall Xware.

Restricting *rsh* Connections to X Application Hosts

By default, users are allowed to create connections that use the *rsh* protocol. If the fact that *rsh* connections do not require passwords is viewed as a security concern, the system administrator can turn off *rsh* connections by running **norsh.exe**.

Note The changes made by **norsh.exe** are permanent. If you want to allow *rsh* connections again, you must reinstall Xware.

Manually Started X Applications

To manually start an X application on the X application host (for example, when you use a [terminal emulator](#) such as *telnet* or *rlogin* to reach the X application host), you must do the following:

1. Go to the Xware Configuration dialog and look on the Information tab.
2. Look for your multi-user NT server's name and/or IP address and its display number. Set the DISPLAY environment variable in your *telnet* or *rlogin* window to point to these values.

If your multi-user NT server is server_1 and your display number is 4, for example, you would type the following to manually set your display:

```
setenv DISPLAY server_1:4 (C shell)
```

or

```
DISPLAY=server_1:4;export DISPLAY (K or Bourne shell)
```

3. Type the path and name of the X application. For example:
`/usr/bin/x11/xterm`

Note If you use a terminal emulator (such as *telnet* or *rlogin*) to reach the X application host, you might want to create a login script to perform the steps above. See Chapter 7 in the *NCD Thin Client Xware User's Guide* for more instructions.



Appendix A

Product Support

This appendix explains how to contact NCD Product Support staff. Before you request product support for an NCD product, you need to return your product registration card.

Note If you purchased your NCD product from an NCD distributor or a value-added reseller (VAR), ask that distributor or reseller whether they provide product support before you contact NCD directly.

Support for NCD Thin Client Xware is free during regular business hours for 30 days, beginning with your first call. After this period, please contact NCD at one of the following numbers for information about support contracts:

503-641-2200

1-800-800-9599 (U.S. and Canada only)

If you prefer, you can get the latest information on Xware FTP support on the World Wide Web at this address:

<http://www.ncd.com/support>

When you encounter a technical problem or have a question, consult Xware's online documentation and online help. For late-breaking updates and technical information, see the product *Release Notes*. If you cannot find an answer or a solution in the documentation, contact NCD Product Support as described below.

Contacting Product Support

International Product Support

If you are outside the U.S. and Canada, contact the distributor that sold you the NCD product. If this is not possible, or if you need direct technical assistance, do one of the following:

- Follow the international dialing instructions appropriate for your location to call the numbers. Then call one of the following numbers and ask for Product Support:

503-641-2200

1-800-800-9599 (U.S. and Canada only)

See "Telephone Support" on page A-4 for further instructions.

- Send your support request via e-mail to:

`support@ncd.com`

See "Electronic Mail Support" below for further instructions.

Electronic Mail Support

To contact NCD via e-mail, send a mail message to:

`support@ncd.com`

Product support will automatically return an electronic problem template in response to your message. The template includes the same information listed in "Information Required by Product Support" on page A-4.

Product Support's reply to your e-mail will contain an NCD Support Incident ID number. Please include this number when you send e-mail messages to Product Support about this issue. You do not need to include the problem template information in subsequent messages.

World Wide Web Support

NCD's World Wide Web site provides updates, product information, technical notes, and the NCD Knowledgebase. The Knowledgebase contains most technical information for Xware. You may also submit a support request or comment.

The NCD web site is located at:

`http://www.ncd.com`

FTP Support

The NCD FTP site provides product updates. To access NCD's FTP site, log into the following host:

ftp.ncd.com

When prompted for a user name, enter **anonymous**. When prompted for a password, enter your e-mail address. After logging in, go to this directory to find updates for Xware:

/pub/pcx/Archive/xware

Note Since most files are binary, remember to execute a binary command before getting a file.

Fax Support

Before you send a fax to Product Support, make sure that it contains all of the information listed in "Information Required by Product Support" on page A-4. Then fax it to:

503-641-2959

Faxes help the support engineer analyze your question and prepare a solution before contacting you. When the support engineer is prepared, it takes less of your time to resolve the problem.

Telephone Support

Before calling NCD, obtain the information listed in “Information Required by Product Support” on page A-4. Then call one of the following numbers and ask for Product Support:

503-641-2200

1-800-800-9599 (U.S. and Canada only)

When you call, be at your multi-user NT server’s console. Often the support engineer needs data from the server or asks you to perform tasks at the console.

During your call, you will receive an NCD Support Incident ID number. Please mention the number in subsequent calls concerning the same issue.

Information Required by Product Support

When you call NCD Product Support, they will need the following information:

- Personal information
 - Support Incident ID (if you’ve contacted Product Support before)
 - Company ID and Customer ID (if you’ve contacted Product Support before)
 - Your name, title, and company
 - Your telephone number, fax number, e-mail address, and mailing address
- Multi-user NT server hardware information
 - Server manufacturer/CPU type
 - Number of CPUs
 - CPU clock speed
 - Storage device

- Network card(s)
- Bus architecture
- RAM
- CD-ROM drive type
- Manufacturer/model
- Product version and serial numbers
- Operating environment
 - Client protocols and devices in use
 - Xware version and patch level
 - Terminal server operating system (Windows NT Server or WinFrame)
 - Service packs/hotfixes
 - Number of configured concurrent users
 - Applications in use
- X application host information
 - X application host operating system and version level
 - Window manager and version
 - Language
 - Other application information
- A description of the problem or symptom
- Step-by-step instructions that will allow NCD Product Support to reproduce the problem



Appendix B

Troubleshooting Xware

This chapter contains information that will help you troubleshoot problems with NCD Thin Client Xware. Topics include:

- How to determine where your problem is located.
- Solutions for some common problems.
- How to troubleshoot connections.

Determining Where Your Problem Is Located

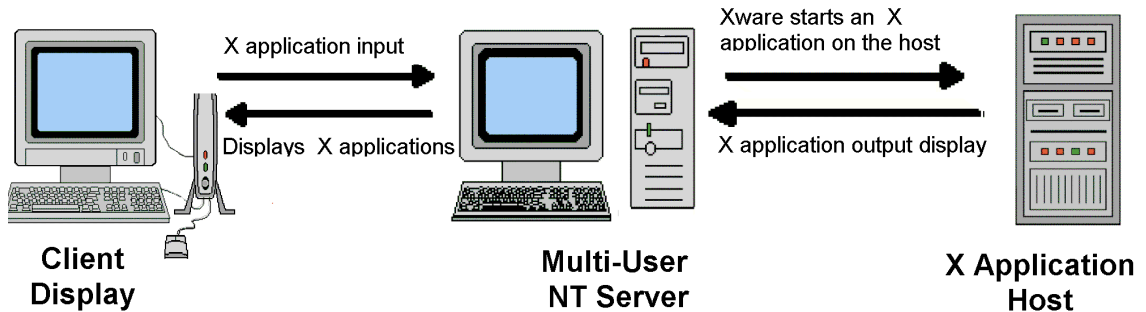
When you encounter a problem with Xware, your first step should be to determine where in the Xware environment the problem is located.

The Nature of an Xware Connection

As discussed in “The Xware Environment” on page 1-1, there are three layers that compose an Xware connection:

- The client display
- The multi-user NT server
- The X application host

These layers are shown in the figure below:



To diagnose a problem, you need to determine which device or which of the connections between the layers is the source of the problem. The connections are:

- The connection between the X application host and the multi-user NT server.
- The connection between the multi-user NT server and the client display.

Starting the Diagnosis

To determine which of these connections is involved in the problem, try to duplicate the problem at the multi-user NT server's console.

- *If you can't duplicate the problem at the console*, the trouble is probably with the client device—the computer system where you view the client display—or with the connection between the client display and the multi-user NT server.
- *If you can duplicate the problem on the console*, the trouble is not with the client device, but probably is somewhere in the multi-user NT server's configuration or on the X application host.

For information on solving problems with specific connections, see “Checking the Network Connection” on page B-4

Solutions for Common Problems

X Application Doesn't Appear on Your Client Display

Check the Configuration Information tab to see if you are using the correct display number. To see this tab, click on the Configuration icon in the Xware program group, and then click on the Information tab.

You'll see your display number about halfway down the Information window. The window also shows the name and/or IP address for your unit.

For example, the Display environment variable or *-display X* application command could be:

```
win-server : 2
```

Someone Else's X Application Appears on Your Client Display

When you start an Xware session, Xware automatically assigns a display number to your client display. This number identifies your instance of Xware to X applications and tells these applications where they should display themselves.

If another user's X application appears on your screen, that user has set their display number to 0 or set it to the same value that is assigned to your client display. In either case, try to identify the person who started the application that you are seeing on your screen, and ask them to confirm that they have set their display number correctly.

Troubleshooting Connections

Checking the Network Connection

Xware and the UNIX host require two separate connections to communicate. You must configure your network software to allow both the multi-user NT server and the host to initiate connections.

Client Display-to-Multi-user NT Server Connection

To identify the source of a connection difficulty, try using different protocols to connect to the multi-user NT server. For example, if other client devices on your network run a different client protocol from the client device with the problem, see if the client displays on the other client devices are behaving the same way. If one protocol exhibits the problem and the others don't, then see that protocol's documentation for troubleshooting information.

Multi-user NT Server-to-X Application Host Connection

If you have a problem with an X application that shows up at the multi-user NT server's console, try to run the X application on an X terminal or PC that is running PC-Xware or a similar X server product.

- If the problem shows up on the X terminal or PC, the trouble is probably an X application host issue that's unrelated to the instance of Xware running on the multi-user NT server.
- If the problem *does not* show up on the X terminal or PC, the trouble may be with the connection to the X application host.

Network software products usually include utilities that test the connection from the multi-user NT server to the host (although not all products contain the same utilities). The utilities listed in the table below are probably included in your network software. The descriptions are specific to Microsoft TCP/IP on Windows.

Utility	Microsoft TCP/IP Description
<i>ping</i>	Sends and receives data packets to verify the connection on ICMP networks. Run <i>ping</i> from the Windows directory via the Start → Run dialog. Example: <code>ping <machine name></code>
<i>telnet</i>	Opens a terminal emulation window to a host. Run <i>telnet</i> from the Windows directory via the Start → Run dialog. Example: <code>telnet <machine name></code>

To test the multi-user NT server-to-X application host connection, run ***ping*** to the X application host, connect to the X application host with Windows ***telnet***, and verify that the respective daemon for the connection method desired is running. If you cannot run ***ping*** or connect with ***telnet***, check your network stack and protocol settings.

If the problem persists at the multi-user NT server, confirm that the display listed on the Xware Configuration Information tab is the same display you are using to make the X connection. See “X Application Doesn’t Appear on Your Client Display” on page B-3 for more information.

X Application Host-to-Multi-user NT Server Connection

Every X application uses an X application host-to-multi-user NT server connection. This connection is the path that the X Window System protocol uses to reach Xware, and it exists while the X application is open. The X application host-to-multi-user NT server connection is harder to check than the multi-user NT server-to-X application host connection because the X application host initiates the connection and the multi-user NT server accepts it.

To test the X application host-to-multi-user NT server connection, use the network server utilities (for example, *tftpd* or *ftpd*) that came with your multi-user NT server's network software package.

XDM Connections

Verify that Xware knows the correct name or address for your multi-user NT server in the Xware **Configuration** → **Information** tab.

Reconfiguring Microsoft TCP/IP

Microsoft TCP/IP is a Winsock-compatible TCP/IP network. By default, Microsoft TCP/IP gets the multi-user NT server's IP address automatically from the network via DHCP or PPP. You must reconfigure Microsoft TCP/IP if your environment does not use DHCP or PPP, or if it allocates unchangeable (static) IP addresses for machines.

Specifying a Static IP Address

The procedure for specifying a static IP address is different for Windows NT Server and WinFrame.

- On the Windows NT Server platform:
 1. Select **Start** → **Settings** → **Control Panel** → **Network**. Click the Protocols tab.
 2. Select *TCP/IP Protocol* from the installed network components list.
 3. Click *Properties*. The TCP/IP Properties dialog displays.
 4. Click the IP Address tab.

- e. Choose *Specify an IP address*, and enter the IP address. The subnet mask address is filled in automatically.
 - f. Enter the IP address of the default gateway.
 - g. Click *OK*.
- On the WinFrame platform:
 1. In the Main program group, select **Control Panel → Network**.
 2. In the Installed Network Software list, select *TCP/IP Protocol*. Click *Configure*.
 3. When the TCP/IP Configuration window appears, uncheck *Enable Automatic DHCP Configuration* (if it is checked).
 4. Enter the IP address in the field provided. The subnet mask is entered automatically.
 5. Enter the IP address of the default gateway.
 6. Click *OK* to exit the TCP/IP Configuration window. Then click *OK* again to exit the Network Settings window.

Name Resolution

Microsoft TCP/IP can handle name resolution using Domain Name Service (DNS), automatic IP addressing, or a hosts file.

Domain Name Service (DNS)

The procedure for setting DNS information is different for Windows NT Server and WinFrame.

When DNS is used to resolve names, Xware gets the name of the multi-user NT server from the Host Name field on the DNS tab. (This is true whether DNS is used alone or with an automatic IP addressing method such as DHCP or PPP.) This name replaces the \$DISPLAY variable used in *rsh* and *rexec* application command lines. For example:

```
/usr/bin/X11/xterm -display $DISPLAY
```

- To set DNS information on the Windows NT Server platform:
 1. Select **Start → Settings → Control Panel → Network**. Click the Protocols tab.
 2. Select *TCP/IP Protocol* from the installed network components list.

- c. Click *Properties*. The TCP/IP Properties dialog displays.
 - d. Click the DNS tab.
 - e. Enter the name of the multi-user NT server in the Host Name field.
 - f. Enter the name of the TCP/IP domain in the Domain field.
 - g. Enter the IP address of your network's DNS server in the DNS Search Order field.
 - h. Click *Add*.
 - i. Click *OK*.
- To set DNS information on the WinFrame platform:
1. In the Main program group, select **Control Panel** → **Network**.
 - b. In the Installed Network Software list, select *TCP/IP Protocol*. Click *Configure*
 - c. On the TCP/IP Configuration window, click *DNS*.
 - d. When the DNS Configuration window appears, enter the host-name and domain name.
 - e. Enter the IP address of the DNS server into Domain Name Server (DNS) Search Order dialog
 - f. Click *OK* to exit the DNS window.
 - g. Click *OK* to exit the TCP/IP Configuration window. Then click *OK* again to return to exit the Network Settings window.

Automatic IP Addressing or Hosts File

Microsoft TCP/IP can be configured to get the multi-user NT server's IP address automatically from the network via DHCP or PPP.

Alternatively, you can set up your multi-user NT server to use a hosts file to resolve names into IP addresses. In this case, that file is named **HOSTS** and is located in the **Windows** directory.

Whether you use automatic IP addressing or a hosts file, Xware gets the multi-user NT server's name from the Computer Name field of the Identification tab in **Start** → **Settings** → **Control Panel** → **Network**. This name and the display number replace the \$DISPLAY variable used in *rsh* and *rexec* application command lines. For example:

```
/usr/bin/X11/xterm -display $DISPLAY
```

Troubleshooting

If you have difficulty using Xware with Microsoft TCP/IP:

1. Check the Network Software line on the Xware **Configuration** → **Information** tab. Verify that the Winsock listed has the correct vendor name and version number.
2. If you have multiple **winsock.dll** files on your multi-user NT server, rename all of these files except for the one you intend to use.



Appendix C

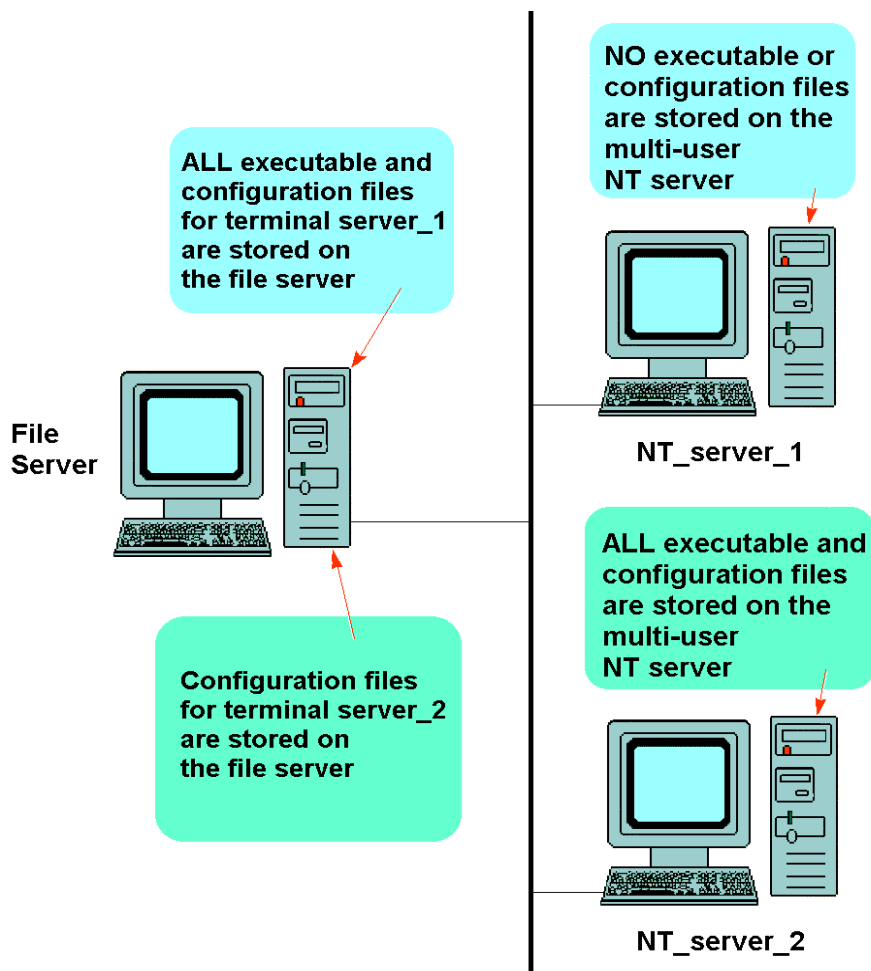
Site Installation

Site installation involves using one computer as a file server for other multi-user NT servers in your network. Xware may reside on the file server, and some or all of the installation and configuration settings may be controlled by the file server. Users on the multi-user NT servers may be able to modify some of the installation and configuration settings or none of those settings, at the discretion of the file server's administrator.

Site installation involves these tasks:

1. **File Server installation.**
You install Xware on a computer that will be a file server in your network.
2. **Setting installation defaults for multi-user NT servers (optional)**
You specify the installation settings you want used by default whenever you perform a multi-user NT server installation.
3. **Multi-user NT Server installation**
You install Xware and/or establish configuration settings on the multi-user NT servers in your network.

These tasks and the kinds of choices they make possible are illustrated in the following example, which shows one way to store the executable files and settings data.



These choices have been made in the preceding example:

- The executable files and configuration files reside on the file server, and are accessed by the multi-user NT servers over the network.
- The executable files and configuration files can be copied onto the multi-user NT server and accessed there.

There are advantages and disadvantages to keeping the executable files and settings data on the file server.

- Advantages:
 - Frees considerable storage on the servers.
 - Can streamline installation and configuration tasks.
 - Provides means to standardize and control installation and configuration on the servers in a network.
- Disadvantages:
 - Installation and configuration actions are slower.
 - Configurations of multi-user NT servers are vulnerable to problems on the file server.

Configuration Concepts

Several options and utilities let you install and configure Xware to suit your needs. This section covers only the options that apply to site installations. Options that apply to site installations and to other types of installations are discussed in "Font Options in Xware" on page 2-3.

TSDefaults

TSDefaults is a Windows-based utility that makes it easy for you to specify default installation settings to be used for multi-user NT servers.

When you run *TSDefaults*, it presents a series of dialogs that include every option that is offered during a standard installation. Instead of installing anything, however, the utility saves these settings in a file residing on the file server. Then, each time you initiate a multi-user NT server installation, a summary dialog displays the default settings you specified using *TSDefaults*. To perform the multi-user NT server installation with these defaults, click *Install*. If you enabled user choice during file server installation, you can also modify any of the default settings during the multi-user NT server installation.

For instructions on setting the defaults for multi-user NT server installations, see the online help for *TSDefaults*.

Site Installation Procedure

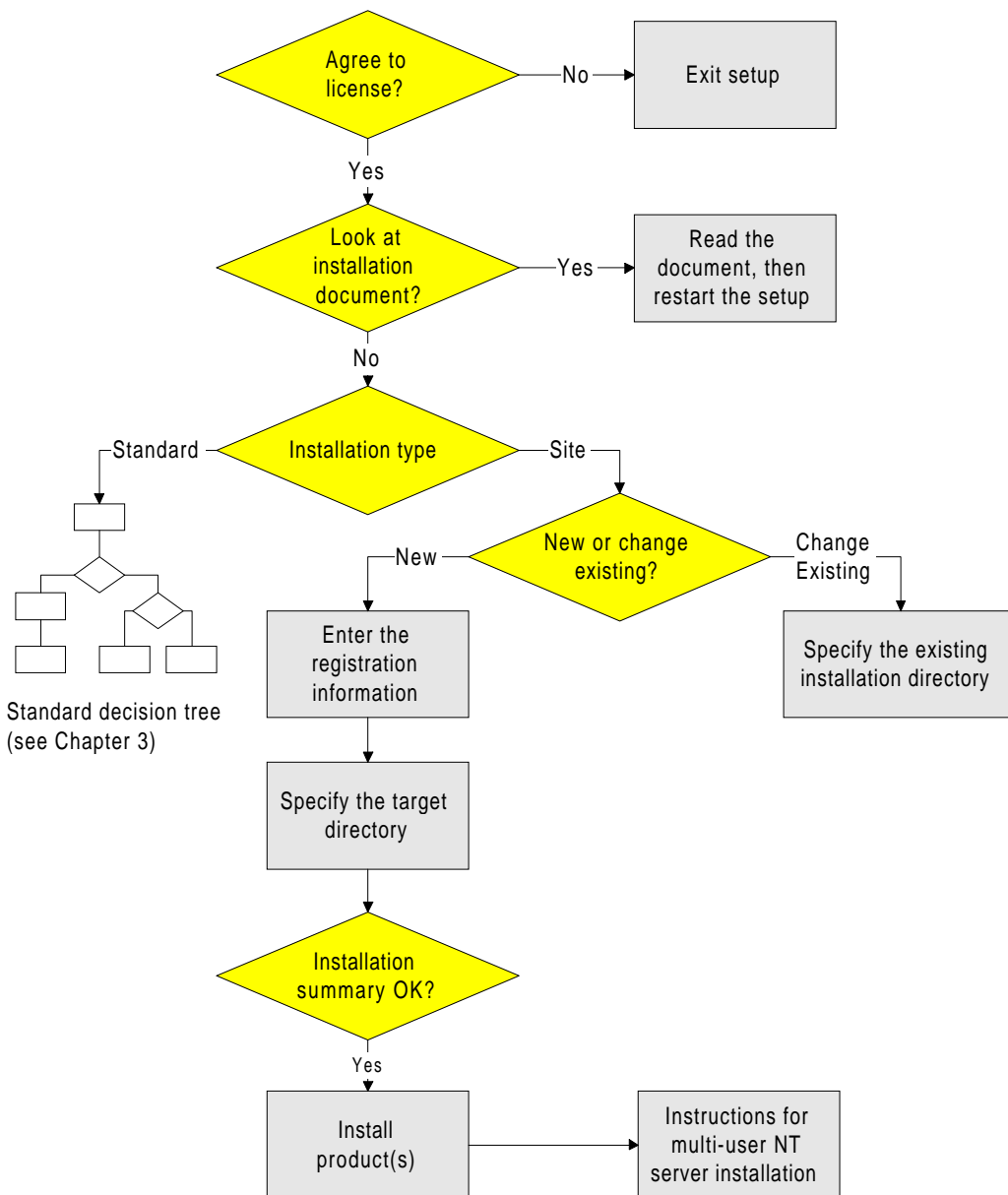
A site installation has two phases, which must be performed in the following order:

1. File server installation
2. Multi-user NT server installation

The next two subsections walk you through the installation process for each phase.

File Server Installation

The figure below shows the choices you make during a File Server installation.



File Server Installation

1. Log on as administrator at the multi-user NT server's console. Then run the **setup** program, as explained in "Starting the Installation Program" on page 3-1.
2. On the Installation Type setup dialog, choose *File Server Installation*.
3. On the next dialog (Welcome to NCD Site Installation), click one of the following buttons:
 - *Create a New Installation*
Use if Xware has never been installed on this file server before. Continue with step 5.
 - *Change an Existing Installation*
Use if Xware has already been installed, and you want to update the software or install it with different settings.
4. If you chose to change an existing installation, the Existing File Server Installation dialog appears. Enter the path to the directory where the existing Xware installation resides.
5. Fill out the Registration dialog to authenticate your copy Xware. You can find the serial number and registration code for Xware on the Product Support card.
6. On the File Server Installation Folder dialog, enter the path to the directory on your file server where you want to install Xware. If you are changing an existing installation, this can be different than the location of the existing installation.

Note If you specify a non-existent directory; the **setup** program will create it.

Note To back up from this and succeeding dialogs and change information, click the *Previous* button.

7. On the File Server Installation Summary dialog, review the settings you have made. Click on any information you want to change, and *setup* displays the appropriate dialog.

Note It's a good idea to avoid creating connections with shared passwords. The system administrator may want to run **nopasswd.exe** to prevent users from creating such connections. *This change is permanent.* If you want to allow connections with shared passwords again, you must reinstall Xware.

Note By default, users are allowed to create connections that use the **rsh** protocol. If the fact that **rsh** connections do not require passwords is viewed as a security concern, the system administrator can turn off **rsh** connections by running **norsh.exe**. *This change is permanent.* If you want to allow **rsh** connections again, you must reinstall Xware.

8. When you are satisfied with the settings shown on the File Server Installation Summary dialog, click the *Install* button.

Setup installs Xware as you have specified, and displays a text file containing basic information about the other installation tasks you can perform after File Server installation.

Explanations of the other File Server installation procedures follow.

Multi-user NT Server Installation

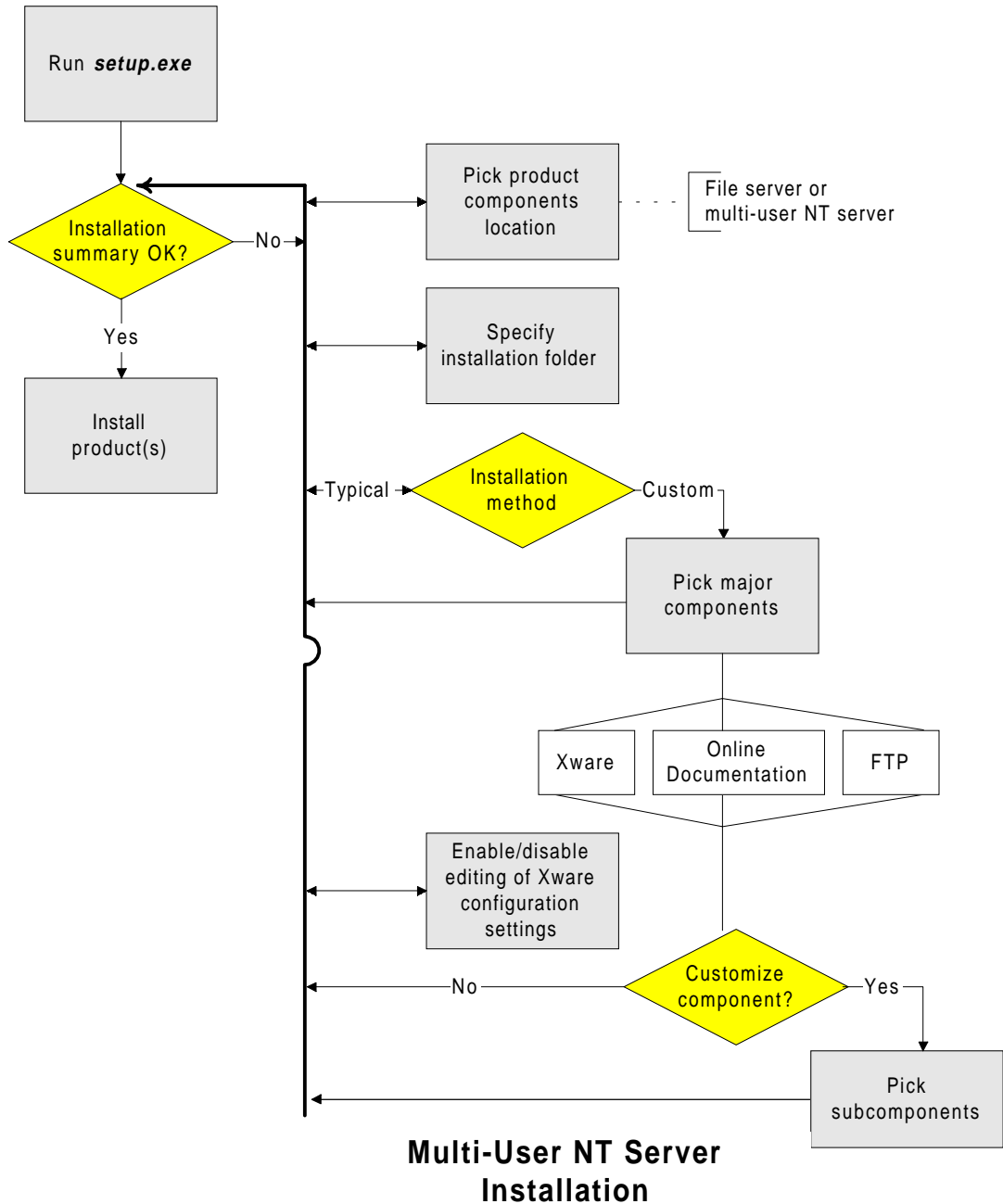
Setting Multi-user NT Server Defaults

For procedures on setting the defaults for multi-user NT server installations, see the online help for *TSDefaults*.

To run *TSDefaults*, navigate to your file server installation directory and double-click **tsdeflts.exe**.

Installation Procedure

To run Xware from individual multi-user NT servers, perform a Multi-user NT Server installation. The following diagram illustrates this process, followed by step-by-step instructions.



1. On the multi-user NT server, navigate across your network to the installation directory created on the file server during File Server installation (Step 6 on page C-6) and run **setup.exe**.
2. The Multi-user NT Server Installation Summary dialog appears. Click on any setting you want to change, and a dialog affecting that setting appears. Since you can display the settings in any order, they are described in the following table, rather than in sequential steps.

Products Affected	Setting	Action to Take in Dialog
All Products	Component Location	Choose whether to install the product components on the multi-user NT servers, or to access them from their location on the file server.
	NCD Installation Folder	Enter the path to the location on the multi-user NT servers where you want to install product components. (Relevant only if you install on the multi-user NT server.)
	Installation Method	Choose <i>Typical</i> to install all product components and subcomponents. Choose <i>Custom</i> to pick specific components or subcomponents to install.
	Products Selected	<p>This setting appears only if you pick Custom installation. Beneath it appear the products currently selected to be installed.</p> <p>Click this setting or any of the listed products to display the NCD Components dialog, which lists the products available for installation. Check the box next to the name of each product you want to install; uncheck the rest.</p> <p>To install particular subcomponents:</p> <ol style="list-style-type: none"> 1. Click the check box of the product you want to affect (for example, Xware). 2. Click the <i>Customize Component</i> button. A dialog appears, listing the subcomponents of the selected product, each with its own check box. 3. Click the check box of the subcomponents you want to install; uncheck the rest. (Click on the subcomponent names to get brief descriptions in the dialog.)
Xware	Configuration Changes	Choose whether to allow users of the multi-user NT server to change configuration settings for Xware.

3. When you are satisfied with the settings, click **Install. Setup** performs the installation according to the settings shown in the Multi-user NT Server Installation Summary dialog, and displays a text file containing brief descriptions of other installation tasks you can perform.

Removing a File Server Installation

This section explains how to remove user-specific information or an entire Xware installation from a file server.

Note No instances of Xware can be running during an uninstall.

Removing User-Specific Configuration Information

Follow these steps to remove user-specific configuration information from a file server:

1. At the file server's console, log on as the user whose configuration you want to remove
2. Run *xwunuser.exe*.

Note There is no feedback from this utility. It will silently remove the user-specific directories and registry entries.

Removing a File Server Installation

Note You must remove all user-specific configuration information *before* you remove the Xware installation.

Follow these steps to remove an entire Xware installation from a file server:

1. Log on as administrator at the multi-user NT server's console.
2. Uninstall Xware:
 - On a Windows Terminal Server platform, select **My Computer** → **Control Panel** → **Add/Remove Programs**. Click on Xware, and then on the *Add/Remove* button.
 - On a WinFrame platform, run *xwuninst.exe*, which is in the administrator's **Windows** directory (**m:\users\default\Windows**).
3. The uninstall program starts and asks whether you want to continue. Click *Yes*.
4. Delete Xware from the file server.



Glossary

application	A program for a specific purpose, such as accounting or word processing. (See also <i>X application</i> .)
client	A program that depends to some extent on the services of another program or system, termed a <i>server</i> . (See also <i>X client</i> .)
client display	In the context of Xware, a display on a client device (such as a Windows-based terminal or workstation) that displays an X application running on an X application host. See also <i>X application host</i> and <i>multi-user NT server</i> .
configuration	In the context of Xware, the ability to customize the way Xware looks and performs network communications tasks. Accomplished through Xware's Configuration dialog.
connection	A named set of instructions that automatically establish connectivity between your multi-user NT server and a host machine. Some connection types can be defined to perform additional initialization tasks and to start X applications. See <i>Connection Wizard</i> .
Connection Wizard	A sequence of dialogs that step you through the process of creating new connections. See <i>connection</i> .

Glossary

daemon	A system process that acts without the user requesting it. Certain connection protocols require their own daemons running on the host computer. Meeting this requirement is typically a system administrator's responsibility.
default	A function dependent parameter assigned when you do not "specify" a value.
display manager	A client used to start and manage X sessions. (See also <i>X display manager</i> .)
DNS	Domain Name Server. An optional network utility serving as a centralized name-to-IP address mapping device.
Ethernet	An industry standard for specifying non-serial network communications.
font server	A program that provides X fonts and scalable X fonts to X servers on the network.
graphical user interface	Software that facilitates the interaction between the computer and the user. Often abbreviated as "GUI."
GUI	See <i>graphical user interface</i> .
host	A computer system which provides a set of services for a remote system.
IP address	Internet protocol address. The address identifying a module on a network using TCP/IP protocol.
local terminal emulator	See <i>terminal emulator</i> .
local window manager	A program that runs on the multi-user NT server, providing window manipulation services, such as positioning and resizing.
multi-user NT server	In the context of Xware, the computer system on which Xware is installed, and which makes it possible for a user on a client display to view an X application running on an X application host. See also <i>client display</i> and <i>X application host</i> .
NCDware	NCD's software for network computers.

<i>ncdwm</i>	NCD's local window manager program. (See also <i>local window manager</i> .)
network	In the most general sense, any system of computers connected in a way that enables communication between them. Often used to refer to non-serially connected systems. (See also <i>Ethernet</i> .)
OPEN LOOK	A graphical user interface specification developed by Sun Microsystems and licensed exclusively through X/Open Company Limited.
PCF	Portable compiled format. An X server font format supported by Xware.
PPP	Point-to-Point Protocol; a communication protocol for transmitting information over standard telephone lines.
protocol	A set of rules used in the exchange of information between computer systems.
remote configuration	A method of configuring Xware, such as changing operational parameters from another machine.
<i>rexec</i>	Remote execution. A UNIX protocol which runs on networked computers and permits response to a request containing a valid user name, password, and command from another machine. It requires a remote execution server (often called an <i>rexec</i> daemon) to be running on the target computer.
<i>rlogin</i>	Remote login. A UNIX protocol that establishes a remote login session on a host from a terminal. In the case of a multi-user NT server running Xware, the login prompt is displayed on Xware's terminal emulator. The .rhosts directory in your home directory on the multi-user NT server contains a list of hostnames to which you can connect without using a password.

<i>rsh</i>	Remote shell. A UNIX protocol which runs on networked computers and permits response to a request containing a valid user name and command from another machine. It differs from <i>rexec</i> protocol in that no password is required. It requires a remote execution server (often called an <i>rsh</i> daemon) to be running on the target computer.
server	A system that provides a specific set of services (such as input or display) to a client program or system. Also a device on a network providing a service, such as a boot server or a print server. (See also <i>X server</i> .)
session	See <i>X session</i> .
Session Manager	The DECwindows client used to control DECwindows sessions.
TCP/IP	See <i>Transmission Control Protocol/Internet Protocol</i> .
<i>telnet</i>	The Internet standard protocol for remote terminal connection services.
taskbar	The region on a Microsoft Windows desktop that shows the Start menu and any iconified processes. When Xware is running on the Windows NT Server platform, the Xware Services icon is displayed in the status area of the taskbar.
terminal emulator	A client used to emulate the function of a terminal. <i>Xterm</i> , the standard X terminal emulator, emulates a VT102 terminal. Xware's local client terminal emulators (<i>telnet</i> and <i>rlogin</i>), emulate a VT320 terminal.
Transmission Control Protocol/Internet Protocol (TCP/IP)	Two networking protocols commonly used for communication over local area networks.
What's This? help	A form of online help you can get about items in dialogs that have a ? icon at the right end of the dialog banner. Click on the ? . The cursor becomes a ? shape. Move the cursor to the item of interest in the dialog and click.

window manager	An application that allows you to manipulate the cosmetic features of the windows displayed on the screen, and the mechanisms for moving, sizing, and iconifying them. (See also <i>X Window window manager</i> .)
X	See <i>X Window</i> .
X application	An application or other program implementing X Window protocol. In most cases, interchangeable with X client. (See also <i>X server</i> .)
X application host	A computer system on which an X application is running. See also <i>client display</i> and <i>multi-user NT server</i> .
X client	An X Window System application program that is dependent on the services of an X server program. In most cases, interchangeable with X application. (See also <i>X server</i> .)
X 11 release 6 (X11R6)	The release of the X Window system that is implemented by NCD in Xware.
X display manager	A protocol that provides automatic X protocol connection to a specified host when an X server starts or restarts. Also called XDM.
X server	The software that provides display services for clients and handles keyboard and pointer input. (See also <i>X client</i> .)
X session	All the processing that goes on from the time you log in to use the X Window System until you log out.
X terminal	A display monitor, keyboard, base containing processors, and a mouse. The X terminal processors are dedicated to running the X server.
X Window	A network-based graphical window system that lets you interact with applications running on multiple hosts.
X Window window manager	A special X application that provides window management capabilities. Unlike other X applications, you can run only one window manager at a time on a given display. (See also <i>window manager</i> .)
XDM	See <i>X display manager</i> .

xterm

The standard X terminal emulator. (See also *terminal emulator*.)

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