

TIPS & TECHNIQUES

ADDING A TCP/IP PRINTER TO A NEXTSTEP COMPUTER NETWORK

Have you ever wanted to send a report or drawing directly to a powerhouse printerDone with camera-ready resolution, a speed-demon engine, and maybe even multiple paper trays? This article explains how to install a standalone printer on a NEXTSTEP network via TCP/IP.

Before you start...

To use this procedure, you must be using a NEXTSTEP Release 3.1 or later system. Also, the stand-alone printer you install must use the lpd protocol. Some TCP/IP printers don't use this protocol, and therefore won't work with this setup.

Is it a printer or a host?

A standalone printerDone that doesn't hang off a specific machineDis special in that it has a host name. When you configure a new printer in NetInfoManager, you usually set the **rm** property to be the host name of the remote print server computer, the computer the printer is attached to.

In setting up a standalone printer, though, you define the printer to be its own print server computer. Therefore, you set the host name of the remote print server (the **rm** property of the **printers** directory) to be the same as the name of the printer (the **name** property in **machines**).

Four steps to a hookup

Here is how to add a TCP/IP printer, using the example of a NewGen TurboPS/1200T printer:

1. Set up your printer and Ethernet interface according to the printer's documentation. Then, connect the printer to the network.

2. Find or set the Internet address for the printer. Some printers require you to set the Internet address, while other are preset. Either way, make sure the Internet address doesn't conflict with that of other computers and devices.
3. Using NetInfoManager, add a new **machines** entry in the **root** domain. It should have two properties, **name** and **ip_address**. The value of **name** should consist only of alphanumeric characters. In our example, **name** is set to **newgen**, and **ip_address** is set to 192.42.172.200.

new_machines_entry2.tiff ↵

Figure 1: *Use NetInfoManager to add a new machines entry for the standalone printer.*

4. Also using NetInfoManager, add a **printers** entry in the **root** domain. Set these properties:
 - **name** is the printer name that's displayed in the Print panel. It must contain only alphanumeric characters.
 - **lp** needs to be present in the directory, but doesn't need a value.
 - **lo** gives the printer a resource lock. Its value must be `lock`.
 - **rm** is the name of the remote printer's server. Set it to be the same as the **name** property in Step 3.
 - **rp** is the remote printer's name.
 - **sd** is the directory that print jobs spool in. Set it to `/usr/spool/NeXT/printername`.
 - **ty** is the printer's type, usually the manufacturer's brand name, with underscores (`_`) substituted for spaces and percent signs (`%`) for slashes (`/`). See `Get the right printer description` to find out more about this property.
 - **_nxfinalform** causes PostScript comments to be interpreted correctly. It needs to be present in the directory, but doesn't need a value.
 - **note** is optional. Its value is displayed in the Print panel, and is useful for comments.

For example, here are the settings for the NewGen TurboPS/1200T printer:

```
name = TurboPS1200T
lp =
```

```
lo = lock
rm = newgen
rp = TurboPS1200T
sd = /usr/spool/NeXT/TurboPS1200T
ty = NewGen_TurboPS1200T
_nxfinalform =
note = This is a NewGen printer.
```

F0.tiff ,

Figure 2: *Also use NetInfoManager to set the printer properties.*

Making sure it works

Now that you've set up your TCP/IP printer, you need to check that it works properly.

Check that it's accessible

The first test is to confirm that the computers on the network can see the printer. For this, use the **ping** command. For example:

```
ping newgen 56 5
```

This example sends five information packets of 56 bytes each to the host **newgen**.

Look at the output of the **ping** command. The important information is ^a% Packet Loss^o in the summary line. On a local network, this number should be 0.

Try to print

If the **ping** is successful, try sending a file to the printer using either **enscript** or **lpr**. The command **enscript** converts text files to PostScript format and sends them to the specified printer. For example, ^a**enscript -Pnewgen hope.txt**^o prints a copy of the file **hope.txt** on the printer **newgen**.

The command **lpr** works similarly, but only for PostScript files. For example, ^a**lpr -Pnewgen hope.ps**^o.

Specify the right paper size

Some printers, such as the NewGen of our example, require a separate paper tray for each size

of paper. The printer may have an auto-sensing device to detect the type of paper tray. If you select a paper size in the Print panel when the proper tray isn't there, the printer may begin the job and jam. The workaround for this is to select manual feed for non-standard paper sizes.

Check that fonts are listed

The NEXTSTEP spooling filter supports automatic font downloading and printer feature inclusion, such as paper tray switching. For standalone PostScript printers, fonts are included at the beginning of the PostScript stream if they are needed. The print job uses `%DocumentFonts:` and `%DocumentNeededFonts:` PostScript comments to declare which fonts are needed.

If you have problems with fonts, make sure that there's a `%DocumentFonts` or `%DocumentNeededFonts:` PostScript comment in the header or trailer of the file you're printing. Then try using **fontloader**. (See the UNIX manual page.)

Get the right printer description

The **ty** property for the printer serves two purposes:

- It indicates the printer's type in the Print panel.
- It tells NEXTSTEP which **.ppd** file to use.

`ppd` stands for `PostScript Printer Description`. This file knows about the special features of your particular printer, such as extra paper trays or the ability to switch among various printing resolutions. After putting this file in the proper place, you can access your printer's capabilities directly from the Print panel. NEXTSTEP uses standard version 4.0 Adobe **.ppd** files. The **ty** property setting for the printer is the same as the **.ppd** file name with blanks instead of underscores and percents (%) instead of slashes (/), and without a `.ppd` extension.

.ppd files are the same for NEXTSTEP, Macintosh, and DOS systems. If there's no NEXTSTEP **.ppd** file for your printer, copy one from another platform. Be sure it's version 4.0 format—the version number is listed at the top of the file. (**.ppd** files are plain ASCII text files, so you can look at them with Edit.) Put **.ppd** files in **/LocalLibrary/PrinterTypes**, **/NextLibrary/PrinterTypes/your_language.lproj**, **/HostLibrary/PrinterTypes**, or **~/Library/PrinterTypes**.

Incidentally, the reason TCP/IP printers can't be properly installed in pre-3.1 systems is that in those systems the **.ppd** files are ignored. As a result, fonts aren't downloaded automatically, paper trays aren't selected correctly, and so on.

For more info...

That's it! Your standalone printer should be up and running. For more information on topics covered in this article or related areas, such as modifying **.ppd** files, check out the following sources:

Adobe Systems Incorporated. *Programming the Display Postscript System with NeXTSTEP*. Menlo Park, CA: Addison-Wesley, 1992.

McGilton, Henry. *PostScript by Example*. Reading, MA: Addison-Wesley, 1992.

NeXT Computer, Inc. ^aPrinters and Printer Troubleshooting,^o *NEXTSTEP Network and System Administration*. Menlo Park, CA: Addison-Wesley, 1992.

NeXT Computer, Inc. ^aPrinting,^o *NEXTSTEP 3.0 Release Notes*. Redwood City, CA: NeXT Computer, Inc., 1992.

Also see the UNIX manual pages for **printcap**, **lpr**, **enscript**, and **fontloader**.

*Special thanks to Bob O'Connor for this great tip! Bob is an independent NEXTSTEP and Macintosh consultant in Washington, DC. He can be reached by e-mail at **justbob@andi.org** and by telephone at (703) 207-9438.*

GETTING NEXTANSWERS BY FTP

In addition to fax and e-mail, there's a new way to get information from NeXTanswersÐ**ftp**. **ftp** is a program that lets you transfer files using File Transfer Protocol. Nearly all of the same NeXTanswers files are available by **ftp**, e-mail, and fax. (The only exceptions to this rule are the entries in the directory **Software_&_Examples**, which are available by e-mail and **ftp**, but not by fax.)

To use **ftp** to get files from NeXTanswers, your network must be connected to the Internet, or you must log into a computer that's on the Internet.

If you've never used **ftp** before, here's a quick primer on how to use it to get NeXTanswers files. However, **ftp** has many more commands and features than those described here. To find

out more about it, see the **ftp**(1) UNIX manual page.

Starting a session

To get NeXTanswers files by **ftp**, type the following command at a Terminal prompt:

```
ftp ftp.next.com
```

This starts an **ftp** session connected to the computer **ftp.next.com**, here at NeXT.

When you're asked for an account name, type "anonymous". In place of a password, type your e-mail address.

Here's a sample session, with the user input in bold:

```
bang> ftp ftp.next.com
Connected to ftp.
220 ftp FTP server (Version 5.1 (NeXT 1.0) Thu Apr 29, 1993) ready.
Name (ftp.blues.com:jstarr): anonymous
331 Guest login ok, send ident as password.
Password:
230 Guest login ok, access restrictions apply.
ftp>
```

The password isn't echoed on the screen; in this example, it was "jstarr@blues.com".

What's happening is that you're logging into a guest account, **anonymous**. Because lots of people use this account, you enter your e-mail address at the "Password:" prompt to voluntarily identify yourself. We use this information to gather statistics on NeXTanswers usage. This style of using **ftp** is called *anonymous ftp*.

Once you've logged in, **ftp** prompts you to enter commands. The **ftp** prompt is "ftp>".

Tip: You can set up a **.netrc** file in your home directory to make using **ftp** easier. The **.netrc** file can supply your name and password to the remote **ftp** server automatically, and you can define macros in it for steps you perform often. See the UNIX manual page for **ftp**(1) for more information.

Getting help

While you're using **ftp**, you can get a list of commands by typing "help" or "?" at the **ftp** prompt. To get help on a specific ftp command, type "help command" or "? command".

Working with the NeXTAnswers directories

The NeXTAnswers files are organized in several directories. The current directory hierarchy is shown in Figure 3. When you first connect, you're in the / (root) directory. The NeXTAnswers files are in directories in **/pub**.

NeXTAnswers.eps ↵

Figure 3: *The current NeXTAnswers directory hierarchy*

What's in the directories

The files are stored several ways:

- **Files** contains the files in their original formats, such as Rich Text and PostScript.
- **AsciiFiles** contains plain text versions of the files. You might want to use these versions if you aren't using NEXTSTEP.
- **CompressedFiles** contains the original files, compressed with the same kind of compression used by Workspace Manager. These files are smaller and faster to transfer.
- **ByNumber** contains numbered links to the compressed files. The numbers match the numbers in the NeXTAnswers index, so you can select files to transfer by index number.

The **pub** directory also contains three special files. **README** gives instructions for using **ftp**, **1000_Help** gives instructions for using NeXTAnswers in general, and **1001_Master_Index** is an index to the NeXTAnswers files.

Changing remote directories

To change your current directory on the NeXTAnswers computer, use **cd**. For example:

```
cd NEXTSTEP_In_Focus
```

To see the path of the current remote directory, use the command **pwd**.

Displaying remote directory contents

To list the contents of a directory, use **dir** or **ls**. **ls** displays an abbreviated list.

Changing local directories

When you transfer a file, it's put in the current directory on your local computer. To change your current local directory so that you're putting files in the right place, use the **lcd** command, which works just like **cd** does locally. For example:

```
lcd Library/NeXTanswers_files
```

Transferring files

To get a file, change to the directory that contains the file, then transfer the file. The file is copied to the current directory on your local computer.

Setting transfer mode

ftp has several modes of transferring files. You set the transfer mode to make sure that **ftp** translates files correctly between character sets, file systems, and so on.

The two transfer modes you need for NeXTanswers files are ASCII and binary. ASCII is for transferring plain text files, while binary is for non-ASCII files like **.rtfd** and compressed files. The default transfer mode is ASCII. Select the mode you want with the commands **ascii** and **binary**. Binary mode can actually transfer ASCII files correctly, so it's easiest to just transfer everything in binary mode.

Making the transfer

To transfer a single file, use the command **get remote-file [local-file]**^o. For example:

```
get Dell_DGX.rtf
```

The local file name is optional. If you don't specify it, **ftp** gives your copy of the file the same name as the NeXTanswers file.

You get the numbered files from the ByNumber directory in the same way:

```
get 1154.compressed
```

Important: Remember to transfer **.rtfd** and compressed files in binary mode.

To transfer several files at once, use the command **mget remotefiles**^o. **ftp** expands *remotefiles* on the remote computer and transfers each file whose name matches. For example:

```
mget Adaptec*
```

This example transfers all files in the current NeXTanswers directory that start with ^aAdaptec^o.

Note: Don't use **mget** to transfer entire directories. Because **.rtfd** files are actually directories, you shouldn't use **mget** to transfer them.

Aborting a file transfer

If you start transferring a file and want to stop before the transfer completes, press the terminal interrupt key or key sequence. Usually **CTRL-C**. **ftp** stops sending files as soon as possible. This doesn't end the **ftp** session.

Ending the session

When you finish getting files from NeXTanswers, type **^bye** or **^quit** to end the session and exit **ftp**.

Staying up to date

NeXTanswers sometimes changes as we respond to your feedback. To keep informed of changes and additions to the system, get updated versions of the **README**, **NeXTanswers_News**, help, and index files occasionally. In particular, **README** and **NeXTanswers_News** describe important changes to the directory structure and other features that you should know about.

If you have trouble...

If you have problems using NeXTanswers by **ftp** or any other means, send e-mail explaining the problem to **NeXTanswers-request@next.com**.