

# **Cygwin/X User's Guide**

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by Harold L. Hunt, II

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# Table of Contents

<b>1. Cygwin/X Overview .....</b>	<b>1</b>
<b>2. Setting Up Cygwin/X .....</b>	<b>2</b>
Cygwin/X Contents .....	2
Installing Cygwin/X .....	2
<b>3. Configuring Cygwin/X.....</b>	<b>13</b>
Configuration Overview .....	13
Command Line Parameters .....	13
<b>4. Using Cygwin/X .....</b>	<b>14</b>
Starting Cygwin/X .....	14
startxwin .....	14
startx .....	14
Other startup methods.....	15
Switching Out of Cygwin/X .....	15
Stopping Cygwin/X.....	15
Window Managers .....	15
Windows Clipboard Integration .....	16
Shared Memory Support .....	16
Remote Sessions via XDMCP .....	16
Displaying Remote Clients .....	17
Secure ssh .....	17
Unsecure Telnet .....	17
<b>A. GNU Free Documentation License.....</b>	<b>19</b>
0. PREAMBLE .....	19
1. APPLICABILITY AND DEFINITIONS .....	19
2. VERBATIM COPYING.....	20
3. COPYING IN QUANTITY .....	20
4. MODIFICATIONS.....	21
5. COMBINING DOCUMENTS.....	22
6. COLLECTIONS OF DOCUMENTS .....	22
7. AGGREGATION WITH INDEPENDENT WORKS.....	23
8. TRANSLATION .....	23
9. TERMINATION.....	23
10. FUTURE REVISIONS OF THIS LICENSE.....	23
How to use this License for your documents .....	24

# Chapter 1. Cygwin/X Overview

Cygwin/X is a port of the X Window System to Cygwin; Cygwin provides a UNIX-like API on the Win32 platform.

# Chapter 2. Setting Up Cygwin/X

## Cygwin/X Contents

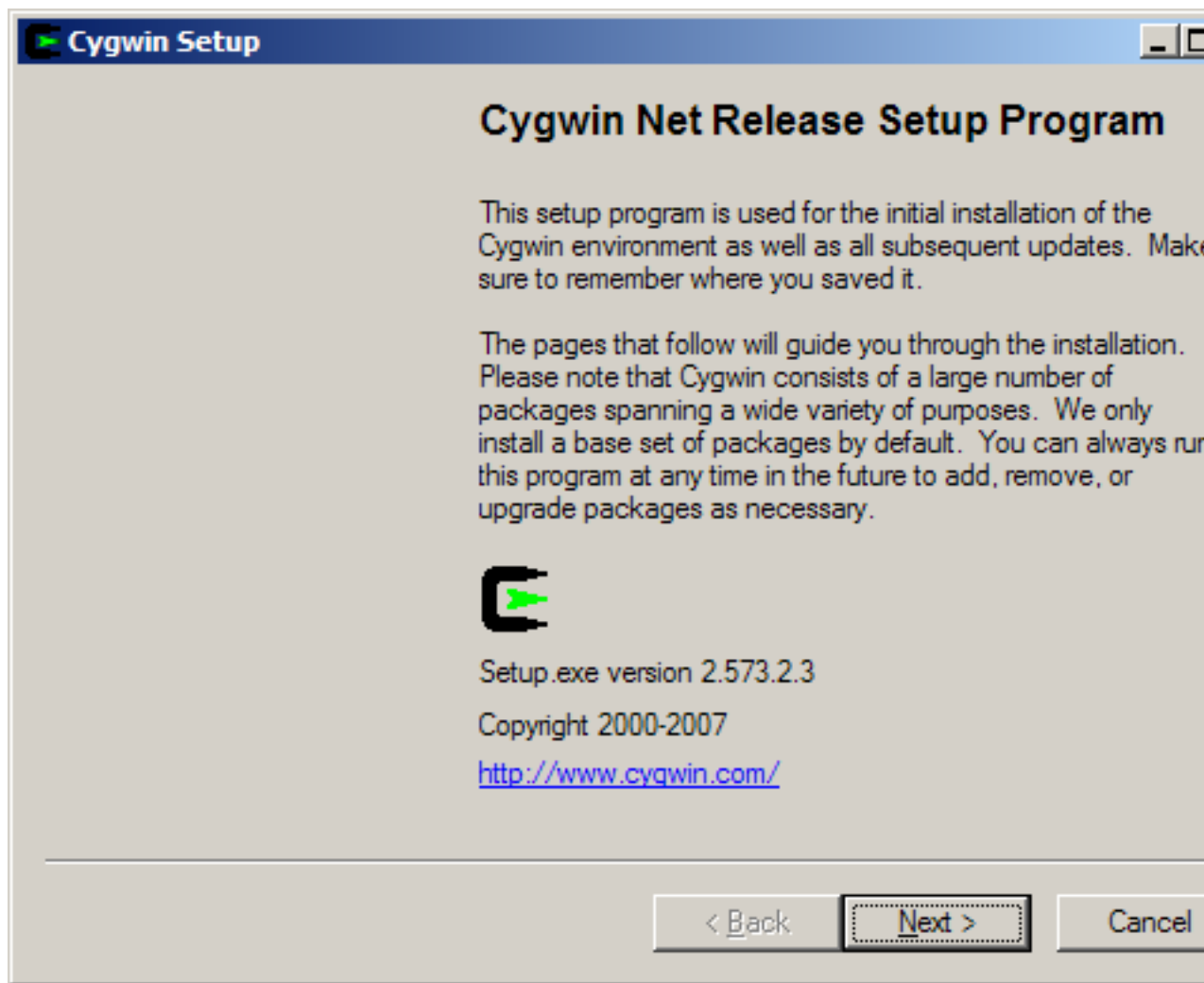
Cygwin/X consists of two parts: Cygwin, a port of the GNU tools to Win32, and Cygwin/X, a port of the X Window System to Win32. Both parts of Cygwin/X are needed to successfully run an X Server on a Win32 platform.

## Installing Cygwin/X

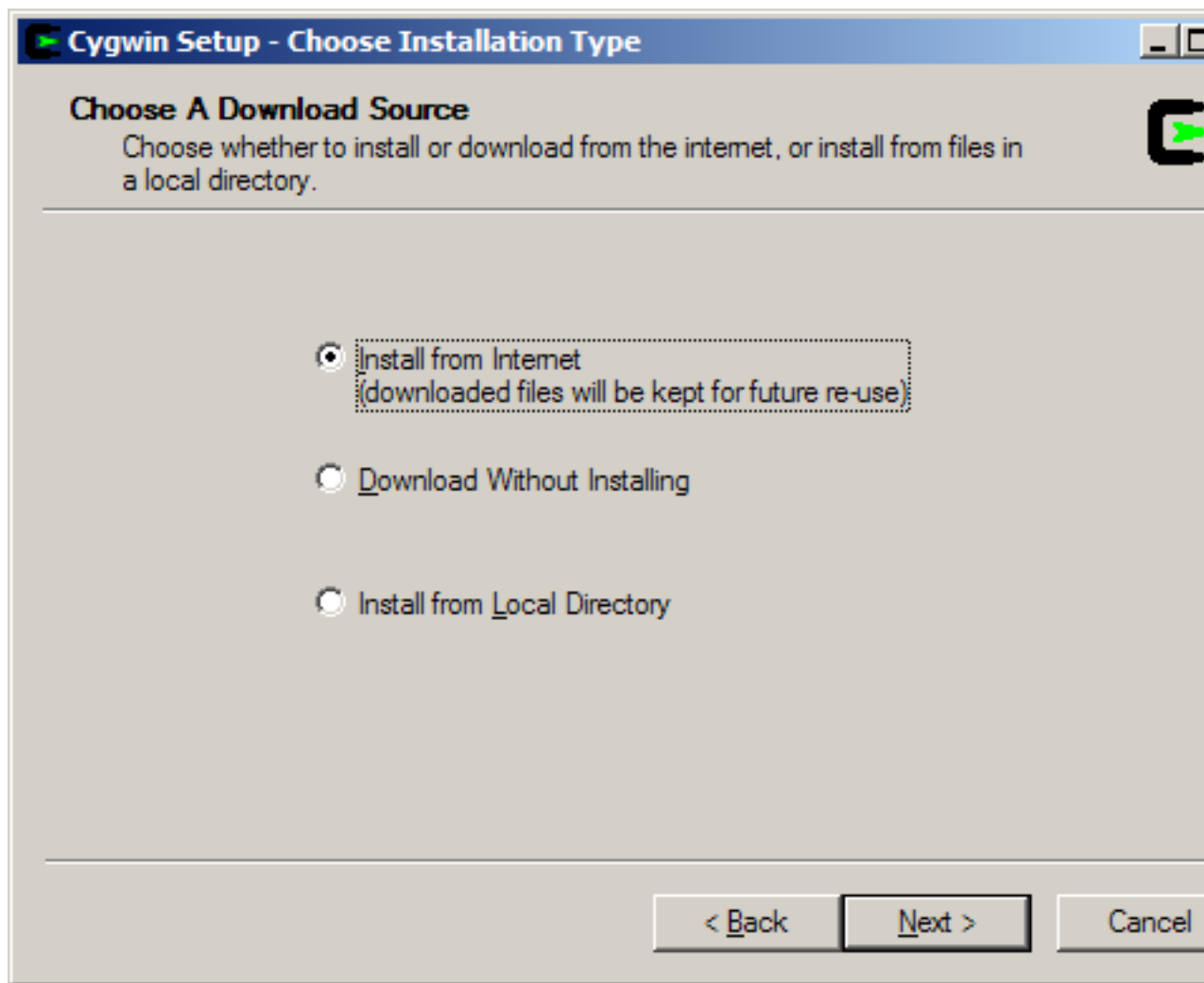
Cygwin tools are, in the words of the Cygwin development homepage, <http://cygwin.com/>, “ports of the popular GNU development tools and utilities for Windows 95, 98, and NT. They function by using the Cygwin library which provides a UNIX-like API on top of the Win32 API.” Cygwin allows the compilation of the X Window System source on Win32; several patches were made to the X Window System source to make it actually compile and run under Cygwin.

Cygwin has a nice setup program that downloads and installs the necessary Cygwin packages for you.

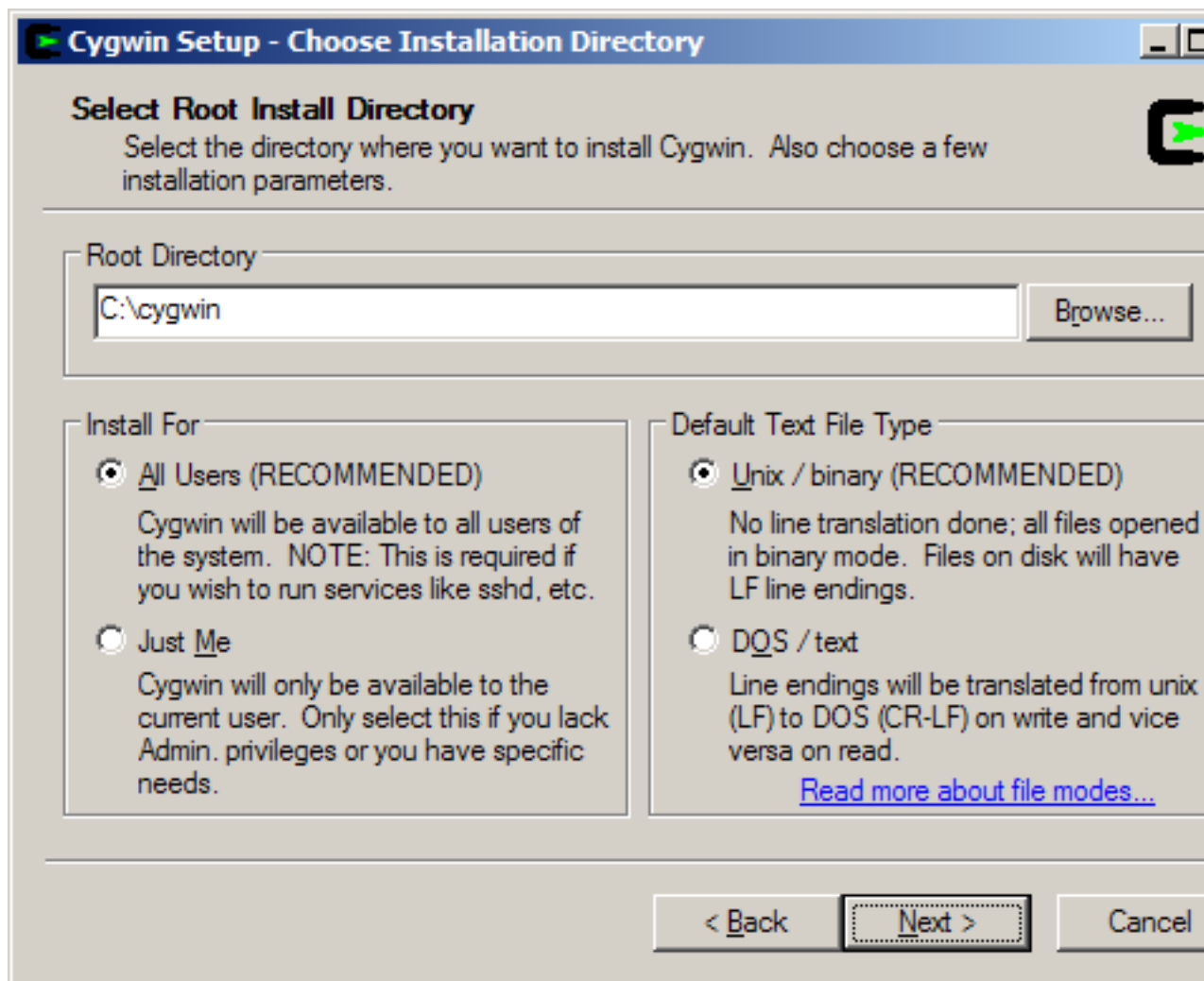
1. Open the Cygwin, <http://cygwin.com/> page in your web browser
2. Click the “Install Cygwin Now” (<http://cygwin.com/setup.exe>) link in the upper-right hand corner of the page. This link downloads `setup.exe` from the primary Cygwin server; save `setup.exe` to the directory that you would like to store the downloaded packages in (e.g. `c:\download`); do not save `setup.exe` to `c:\cygwin`, as that is the default directory for the extraction and installation of the downloaded packages.
3. Run `setup.exe`, you will see the welcome screen:



4. Click **Next** to proceed to the next screen.
5. Choose, **Install from Internet**, this will still save the package files to your download directory so that you can install Cygwin on any number of machines:

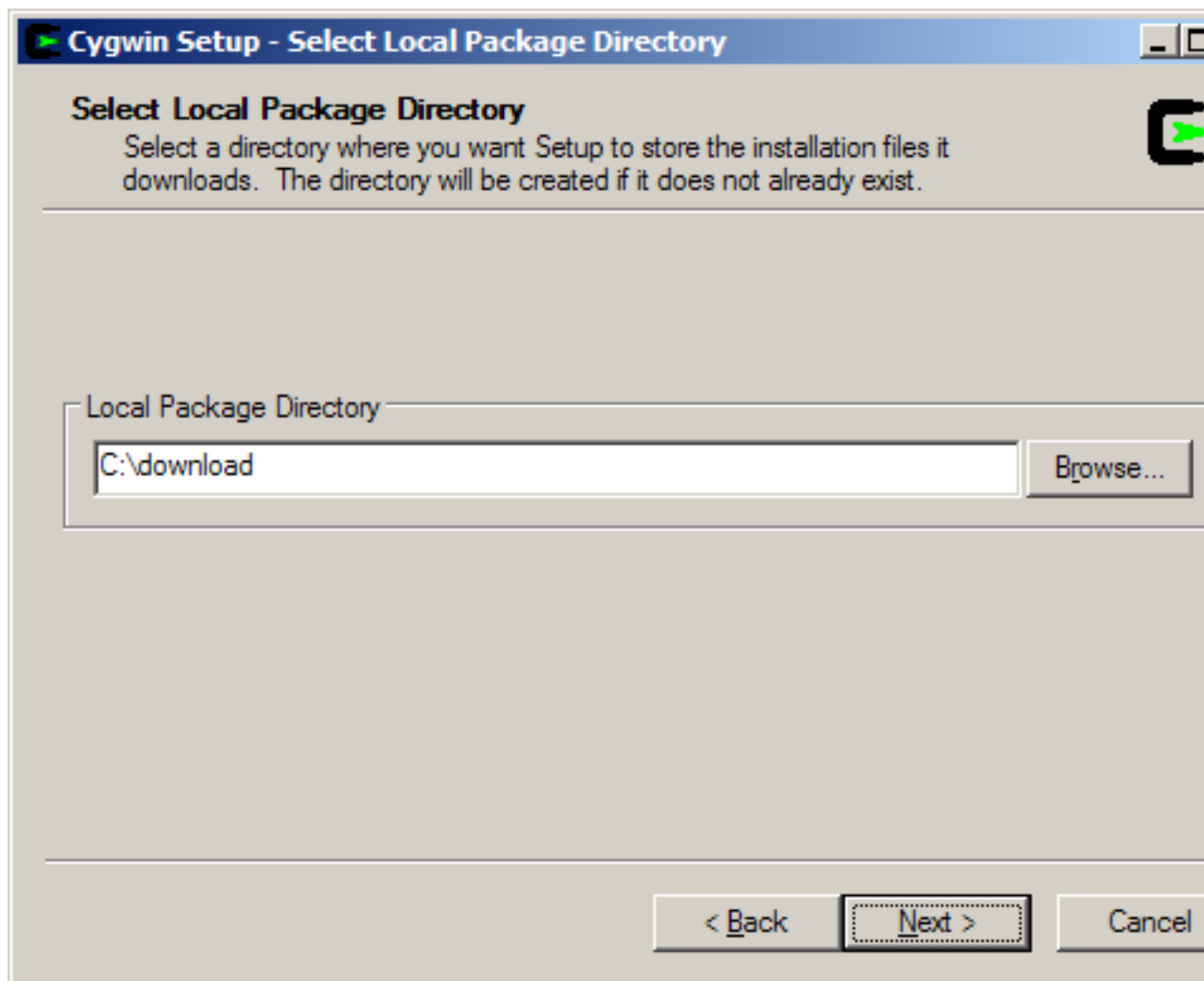


6. Click Next to proceed to the next screen.
7. The default Install Root is `c:\cygwin` which should be fine for most installations. Leave Default Text File Type as UNIX. Leave Install For set to All unless you lack local administrative privileges.

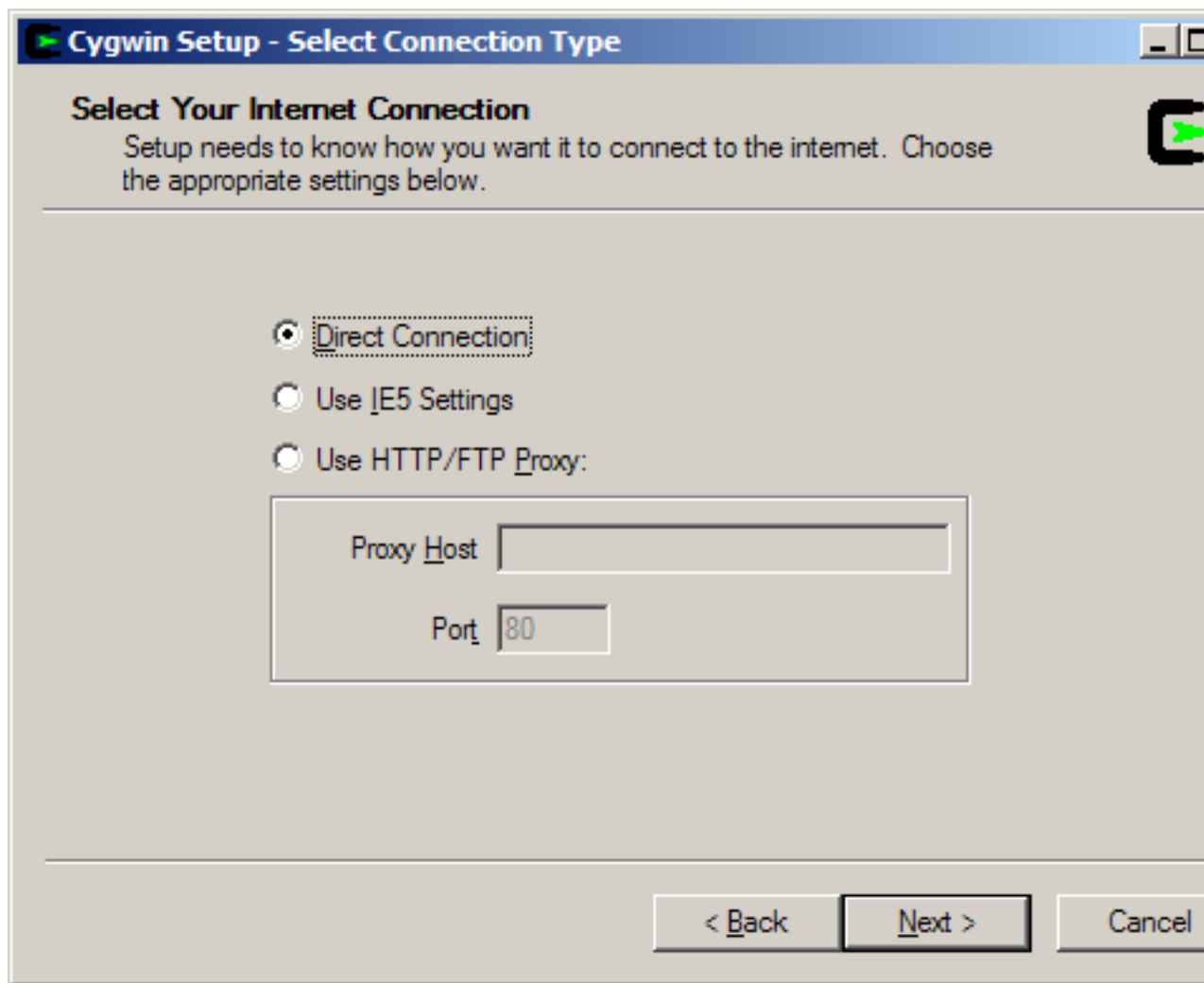


8. Click Next to proceed to the next screen.
9. Local Package Directory should default to the directory that you ran `setup.exe` from:

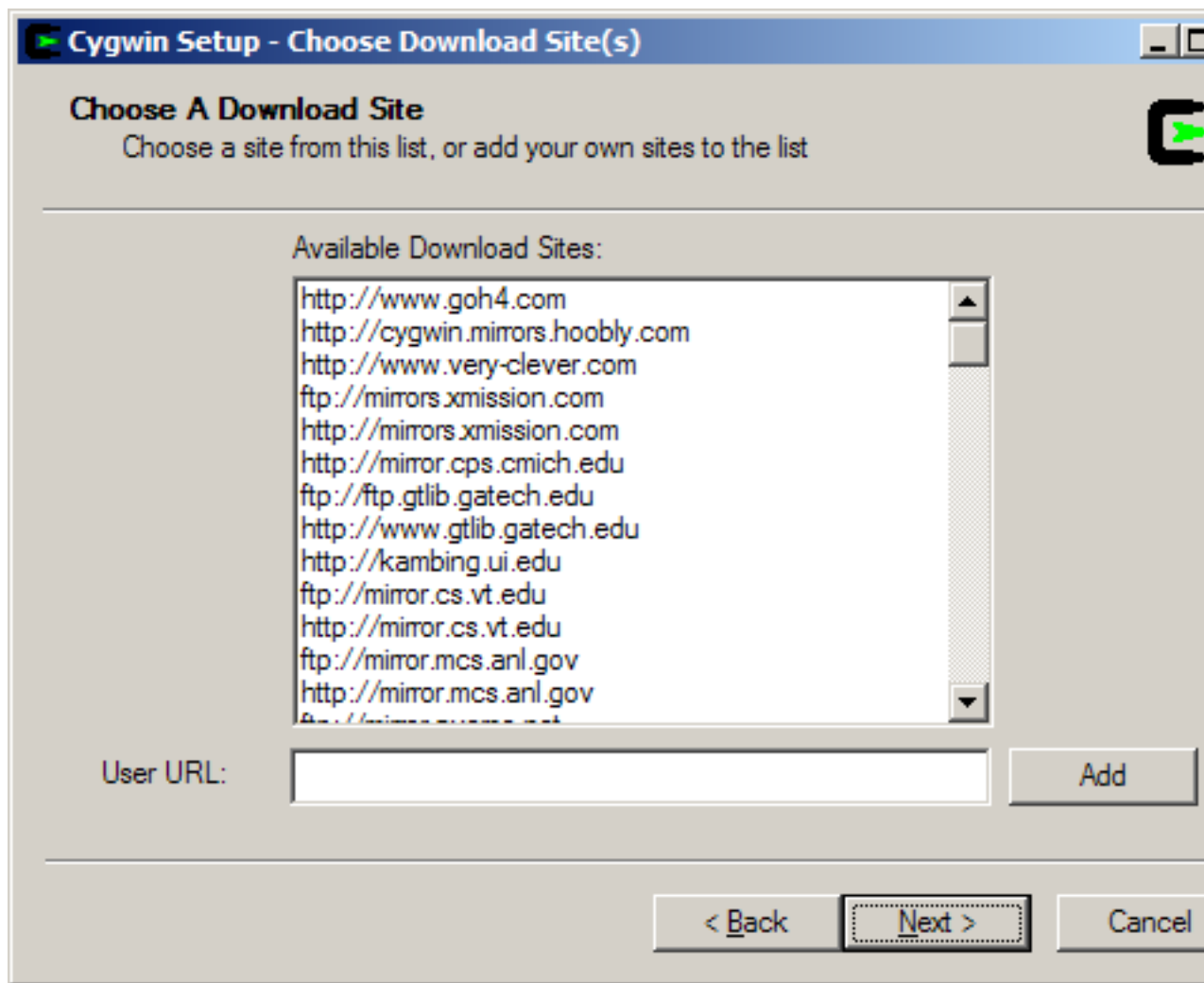




10. Click **Next** to proceed to the next screen.
11. Choose your proxy setup, or, just choose **Direct Connection** if no proxy is needed:



12. Click **Next** to proceed to the next screen.
13. Select your nearest mirror for downloading:

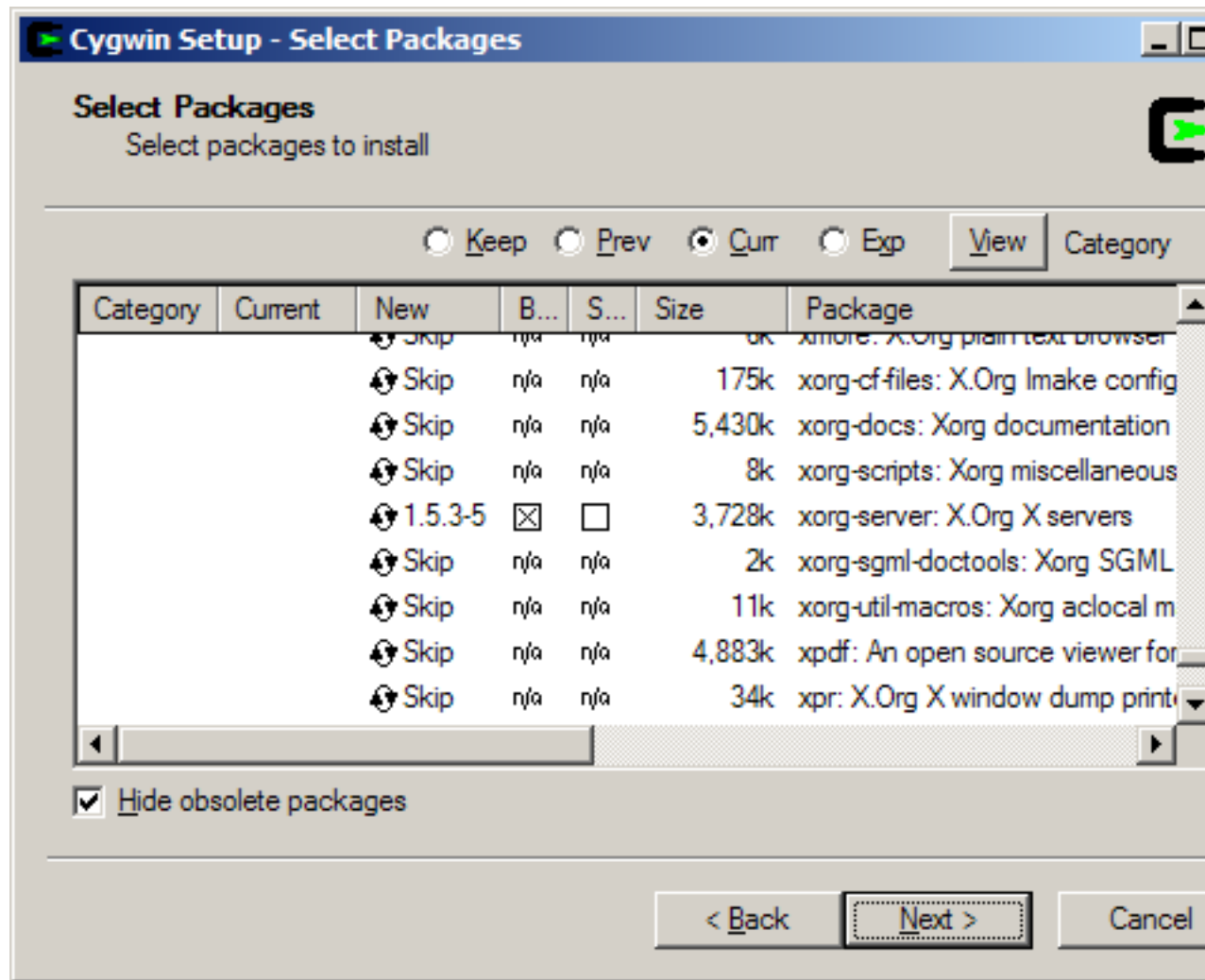


14. Click **Next** to proceed to the next screen; setup will download a list of available packages as it moves to the next screen.
15. On the next screen you will select the packages that will be downloaded and installed. A listing of the Cygwin/X packages is given below; a listing of the general Cygwin packages would be beyond the scope of this document.

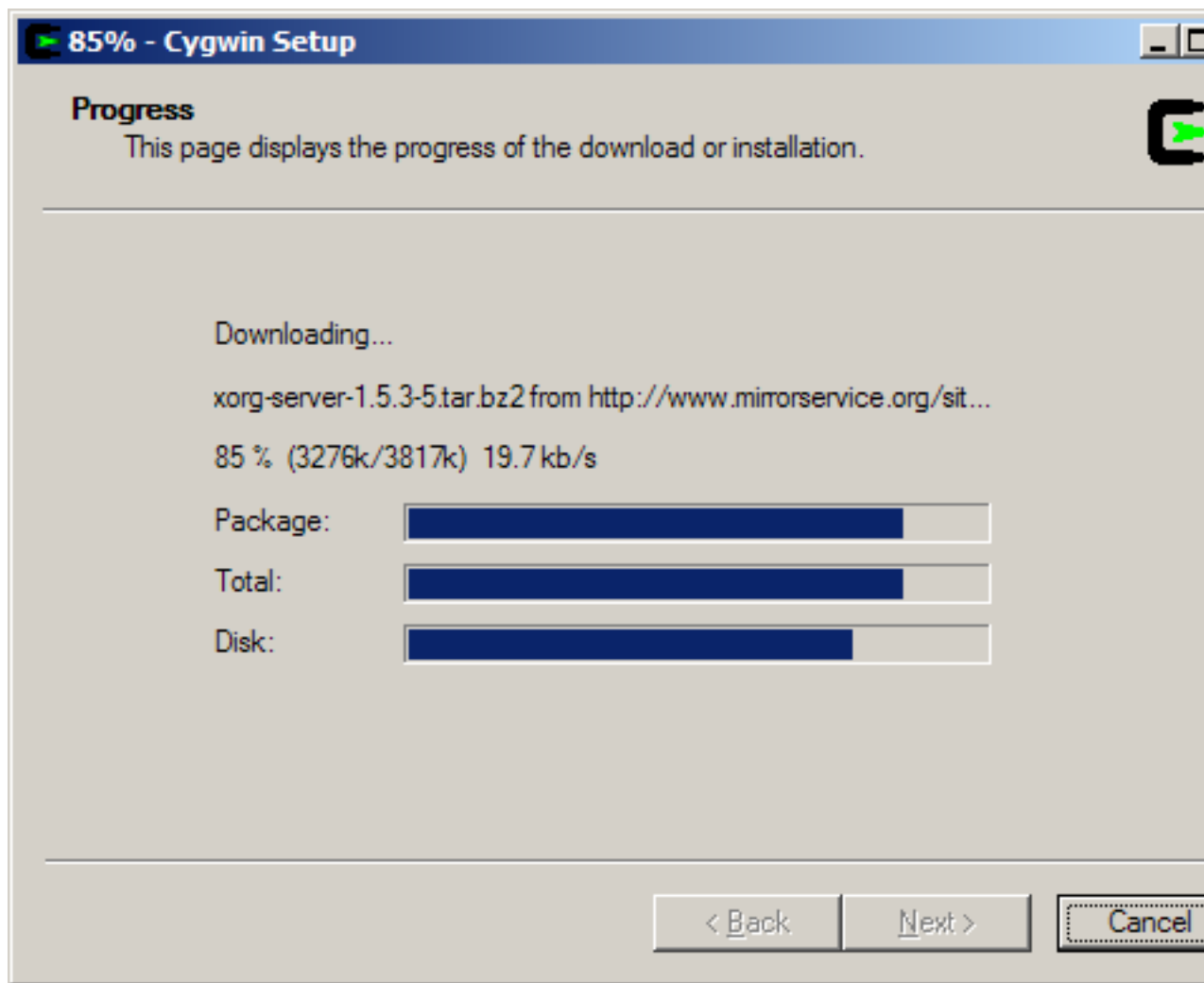
Cygwin/X packages are located in the `x11` category.

- `xorg-server` (required, the Cygwin/X X Server)
- `xinit` (required, scripts for starting the X server: **`xinit`**, **`startx`**, **`startwin.sh`**, **`startxwin.bat`** (and a shortcut on the Start Menu to run it), **`startxdmcp.bat`** )
- `xorg-docs` (optional, **`man`** pages)
- `X-start-menu-icons` (optional, adds icons for X Clients to the Start menu)
- You may also select any X client programs you want to use, and any fonts you would like to have available.

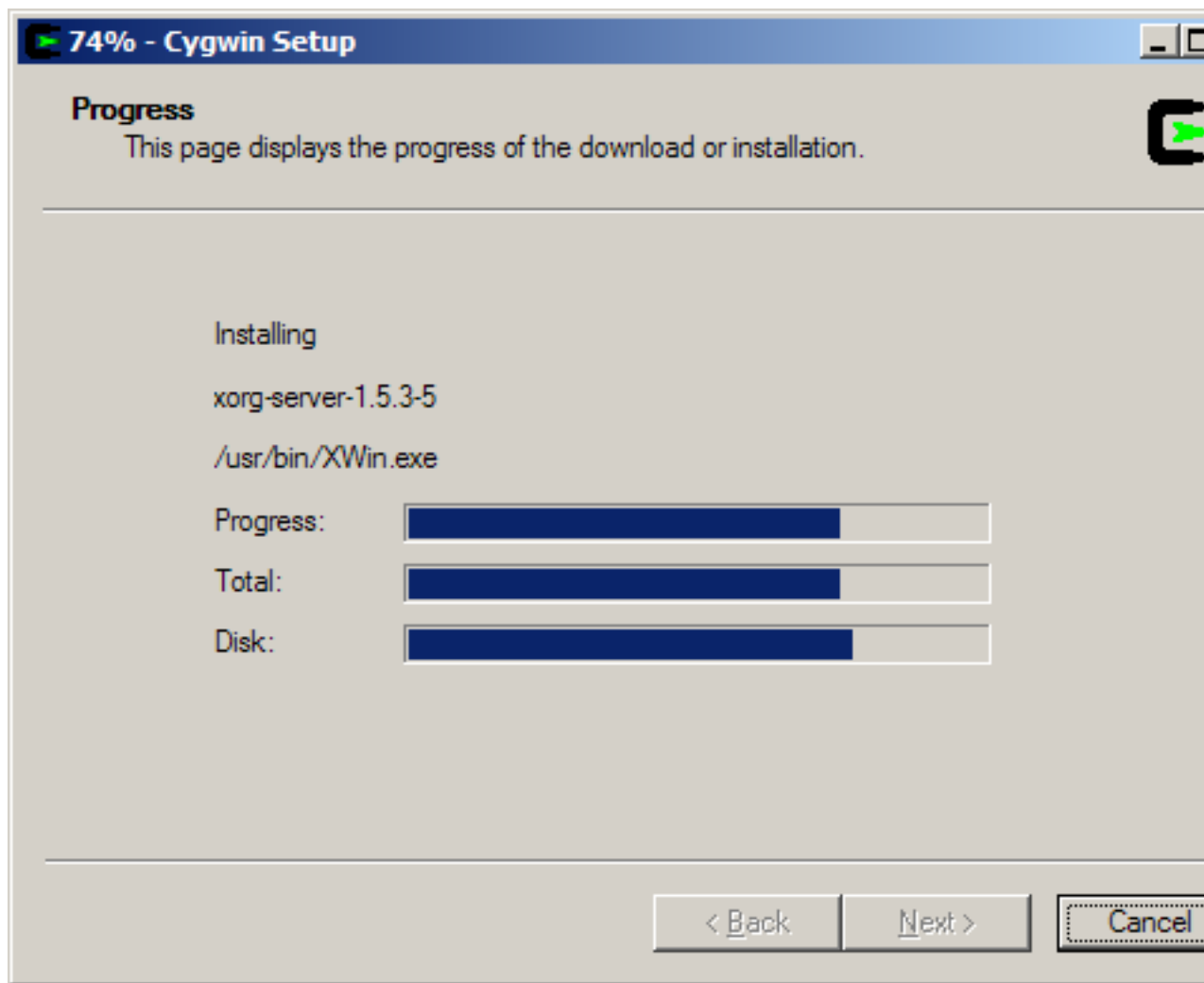
- You may also want to ensure that the `inetutils` or `openssh` packages are selected if you wish to use **telnet** or **ssh** connections to run remote X clients.



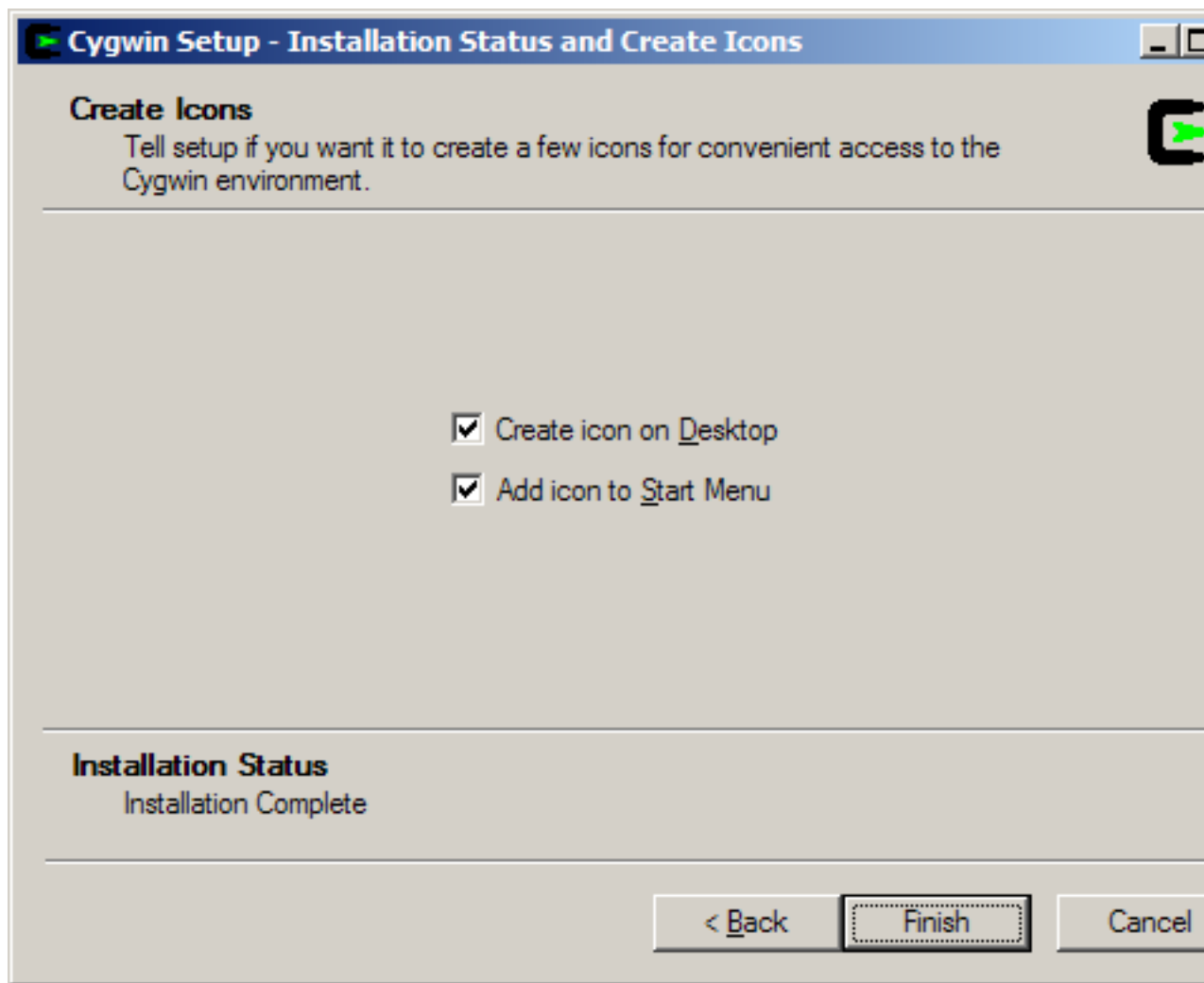
- Click Next to begin the download process, you may want to try another mirror if you see a “Connecting” message on this screen for a long period of time:



17. After the packages are downloaded, setup will automatically begin to install them:



18. I highly recommend allowing Cygwin Setup to create Desktop and Start Menu icons for you; these icons simply launch a bash shell:



19. Click **Finish** to close the setup program.

You have now successfully installed Cygwin/X. Proceed to Chapter 4 for instructions on how to use Cygwin/X.

# Chapter 3. Configuring Cygwin/X

## Configuration Overview

Cygwin/X settings are configured primarily through command-line parameters passed to `XWin.exe`. Cygwin/X comes with a file called `startxwin.bat` that launches an X Server, a terminal, and a window manager.

## Command Line Parameters

Cygwin/X, by default, runs in windowed mode with the largest window that will fit on your Windows desktop, using the best performing engine that is installed on your system; you do not need to pass any parameters to **XWin.exe** to use the default behavior.

Up to date documentation of **XWin.exe** options can be read with **man XWin** (<http://x.cygwin.com/docs/man1/XWin.1.html>).

Below is an example command line for **XWin.exe**.

```
XWin.exe -screen 0 800 600 -fullscreen -depth 32 -refresh 85 -emulate3buttons  
100 -nowinkill -unixkill
```



# Chapter 4. Using Cygwin/X

## Starting Cygwin/X

Described below are several methods of starting up the Cygwin/X X Server with a startup utility that optionally starts initial clients and performs X server configuration (for example, loading a keyboard modifier map).

### startxwin

Use the custom XWin startup utility **startxwin**

**startxwin** is included in the `xinit` package (installed by following the instructions in the Section called *Installing Cygwin/X* in Chapter 2), which starts the X server in multiwindow mode along with a single X terminal. Run **startxwin** by:

- using the "XWin Server" shortcut under "Cygwin-X" on the Start Menu
- starting it from a MS-DOS shell
- Starting `/usr/bin/startxwin` in a Cygwin shell:  

```
$ startxwin
```
- double-clicking it in Windows Explorer

Full documentation for **startxwin** can be read with **man startxwin**

(<http://x.cygwin.com/docs/man1/startxwin.1.html>). Note that the special argument `--` is used to mark the end of client arguments and the beginning of server options, so, for example, if you wish to start the X server with the `-noclipboard` option, as described in the Section called *Command Line Parameters* in Chapter 3, use the following command:

```
$ startxwin -- -noclipboard
```

You may create a `~/startxwinrc` script to customize the client programs started, rather than a single `xterm`.

**Note:** The MS-DOS batch file `startxwin.bat` and bash shell script `startxwin.sh` previously used to start the X server are no longer provided. Implemented as a script made it difficult to reliably wait until the the X server had started before starting any clients. Use `startxwin` instead.

### startx

Use the standard X Window System **startx** command with its attendant `~/xinitrc` configuration file.

Run **startx** in a Cygwin shell:

```
$ startx
```

Full documentation for **startx** can be read with **man startx** (<http://www.x.org/releases/X11R7.5/doc/man/man1/startx.1.html>). Note that the special argument **--** is used to mark the end of client arguments and the beginning of server options, so, for example, if you wish to start the X server with the **-emulate3buttons** option, as described in the Section called *Command Line Parameters* in Chapter 3, use the following command:

```
$ startx -- -emulate3buttons
```

You may create a **~/.xinitrc** from the template in **/etc/X11/xinit/xinitrc** and then customize **~/.xinitrc** as required

```
$ cp /etc/X11/xinit/xinitrc ~/.xinitrc
[edit ~/.xinitrc as desired]
```

## Other startup methods

Advanced users may wish to start the X server by invoking **X** directly

## Switching Out of Cygwin/X

Press **Alt-Tab** to switch from Cygwin/X to your Windows desktop or other running Windows applications.

## Stopping Cygwin/X

When you are done using Cygwin/X, press **Alt-F4** to shutdown the X Server; this is the default key combination to shutdown the X Server. The **-[no]winkill** and **-[no]unixkill** parameters can change the set of key combinations that will shutdown the X Server. Using the **-unixkill** allows the **Ctrl-Alt-Backspace** key combination to shutdown the X Server, in addition to the default **Alt-F4** key combination.

## Window Managers

Cygwin/X works with window managers in a couple of different ways:

- Internal window manager (a.k.a. MultiWindow Mode) that creates a Windows window for each top-level X window. The internal window manager is launched using the **-multiwindow** command-line parameter to **XWin.exe**. See the Section called *Command Line Parameters* in Chapter 3 for more information on the **-multiwindow** command-line parameter.

- External local window managers (e.g. **twm**, **mwm** (part of the lesstif package)). These local window managers must be installed on Cygwin; they are run locally and cannot be used together with the internal window manager.
- Remote window managers via an XDMCP session, which you can read more about in the Section called *Remote Sessions via XDMCP*.
- Remote window manager launched through an **ssh** tunnel. This is not Cygwin/X-specific, so you should be able to find information about launching remote window managers from other sources. See the Section called *Secure ssh* for more information on using **ssh**.

## Windows Clipboard Integration

The X Window System, and thus Cygwin/X, uses its own internal clipboard system that is distinct from the clipboard system used by Windows. Copying and pasting text between these two clipboard systems requires a clipboard integration program that watches for updates to either clipboard and copies data between them when either one is updated.

Cygwin/X has an internal clipboard integration system that is invoked via the `-clipboard` command-line parameter. See the Section called *Command Line Parameters* in Chapter 3 for more information on the `-clipboard` command-line parameter.

## Shared Memory Support

Shared memory support is needed by the MIT-SHM and XFree86-BigFont extensions.

Shared memory is provided by the **cygserver** service. On Windows NT, Windows 2000 and Windows XP cygserver can be installed as a windows service.

To install cygserver run the **cygserver-config** script. It will install the service.

**XWin.exe** will not use Shared Memory if the **CYGWIN** does not contain the *server* keyword. Starting **XWin.exe** with

```
CYGWIN=server XWin.exe
```

will enable Shared Memory support if the cygserver service is running.

## Remote Sessions via XDMCP

Cygwin/X can be used login to one or several remote sessions using XDMCP (X Display Manager Control Protocol).

Start Cygwin/X with a command similar to the following to login to a single remote session using XDMCP:

```
XWin.exe -query remote_hostname_or_ip_address
```

You may login to several remote sessions with a single or multiple hosts using XDMCP. Each session will need a separate display number, specified by the `:display_number` parameter, such as `:0`. A display number is not the same as a screen number, as a single display can have multiple screens associated with it. Each display listens on a different network port number, so each display can connect to multiple machines. Start Cygwin/X with command lines similar to the following to login to several remote sessions using XDMCP:

```
XWin.exe :0 -query remote_hostname_or_ip_address_0
```

```
XWin.exe :1 -query remote_hostname_or_ip_address_1
```

Note that the `:display_number` parameter is a general X Server parameter, not specific to Cygwin/X. Further documentation of the `:display_number` parameter can be found in the X Server manual page (<http://www.x.org/archive/X11R6.8.1/doc/Xserver.1.html>). XDMCP is a complex system that is not specific to Cygwin/X; further discussion of XDMCP is beyond the scope of this document. You may wish to read the Linux XDMCP HOWTO (<http://en.tldp.org/HOWTO/XDMCP-HOWTO/>) or the X Server XDMCP Options (<http://www.x.org/archive/X11R6.8.1/doc/Xserver.1.html#toc6>) for more information.

## Displaying Remote Clients

Displaying remote X clients with Cygwin/X is nearly identical to displaying remote X clients with any other X Server. You may use the secure **ssh** method, or the unsecure **telnet** method (not recommended).

### Secure ssh

On your Windows machine:

1. Make sure you have the **openssh** package installed.
2. Launch Cygwin/X
3. Run the following in an X terminal:  

```
$ ssh -Y username@remote_hostname_or_ip_address
```
4. Enter your password when prompted by **ssh**.
5. Your **ssh** session should now show you a shell prompt for your remote machine.
6. You can now launch remote X clients in your **ssh** session, for example, **xterm&** will launch an **xterm** running on your remote host that will display on your Cygwin/X screen.
7. Launch other remote clients in the same manner. I recommend starting the remote clients in the background, by appending **&** to the command name, so that you don't have to open several **ssh** sessions.

### Unsecure Telnet

On your Windows machine:

1. Make sure you have the `inetutils` package installed.
2. Launch Cygwin/X
3. In an X terminal type `/usr/bin/xhost remote_hostname_or_ip_address`
4. In an X terminal type `/usr/bin/telnet remote_hostname_or_ip_address`. Use the explicit path to ensure that Cygwin's **telnet** is run instead of Microsoft's **telnet**; Microsoft's **telnet** will crash on startup when run from Cygwin/X.
5. Login to your remote machine via your **telnet** session
6. In your **telnet** session type, `DISPLAY=windows_hostname_or_ip_address:0.0`
7. In your **telnet** session type, `export DISPLAY`
8. You can now launch remote X clients in your **telnet** session, for example, `xterm&` will launch an xterm running on your remote host that will display on your Cygwin/X screen.
9. Launch other remote clients in the same manner; I recommend starting the remote clients in the background, by appending `&` to the command name, so that you don't have to open several **telnet** sessions.

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