

# **Cygwin/XFree86 User's Guide**

**Harold L Hunt, II**

## **Cygwin/XFree86 User's Guide**

by Harold L Hunt, II

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Add information about each command line parameter.

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Bumped the revision number to 1.0.0 to indicate that all planned content is now present.

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# Chapter 1. Cygwin/XFree86 Overview

Cygwin/XFree86 is a port of XFree86 to Cygwin; Cygwin provides a UNIX-like API on the Win32 platform. As of 2001-07-01 the supported Win32 platforms are Windows 95, Windows 98, Windows Me, Windows NT 4.0, and Windows 2000.

# Chapter 2. Setting Up Cygwin/XFree86

## Cygwin/XFree86 Contents

Cygwin/XFree86 consists of two parts: Cygwin, a port of the GNU tools to Win32, and Cygwin/XFree86, a port of XFree86 to Win32. Both parts of Cygwin/XFree86 are needed to successfully run an X Server on a Win32 platform.

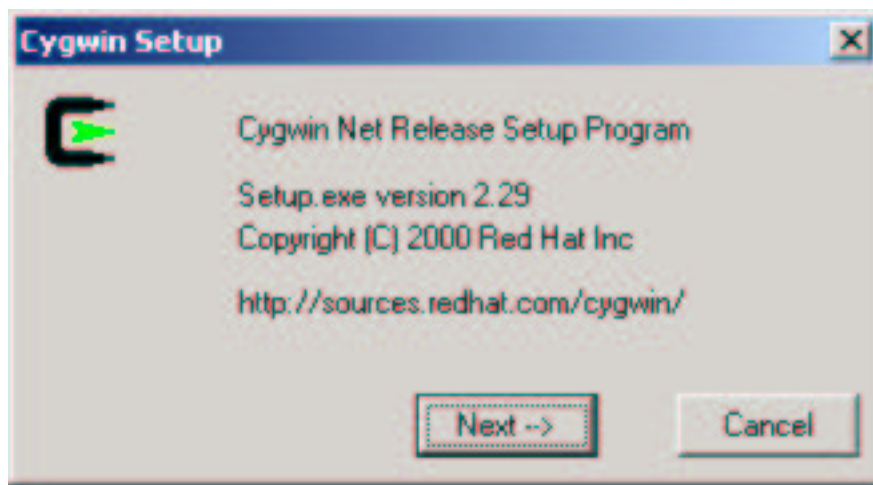
## Downloading Cygwin

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 XFree86 source on Win32; several patches were made to the XFree86 source to make XFree86 actually compile and run under Cygwin; those patches have been merged into the XFree86 4.0 source tree.

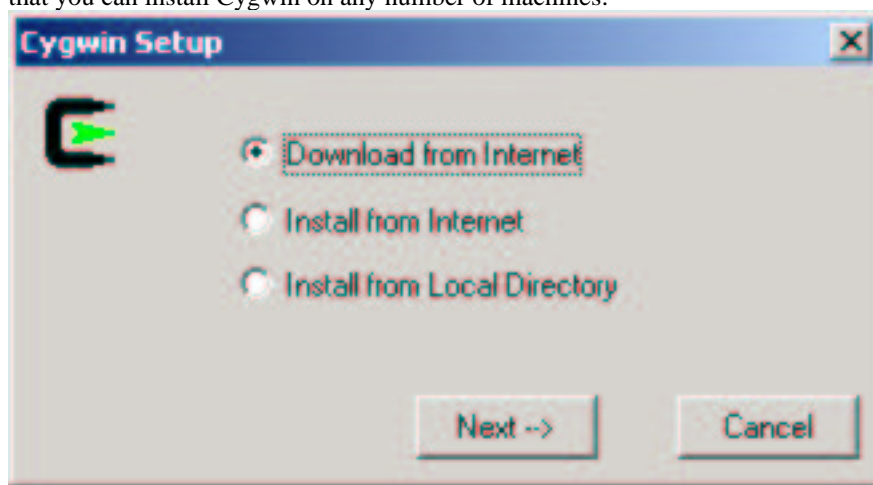
Cygwin has a nice setup program that downloads and installs the necessary Cygwin packages for you.

**Tip:** Be sure to use `setup.exe` version 2.13 or greater if you intend to save the downloaded packages to a Samba share; some versions of Samba have a problem with prior versions of `setup.exe`.

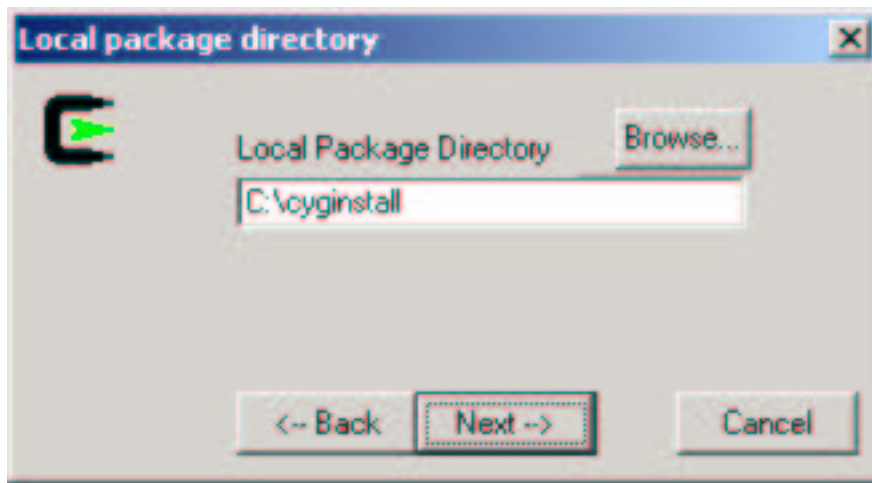
1. Open the Cygwin, <http://cygwin.com/> page in your web browser
2. Click the “Install Cygwin Now” link in the upper-right hand corner of the page; or, click the “Install” link next to “Latest net release:”, which should be near the top of the page in the main content area. This link downloads `setup.exe` from the primary Cygwin server; save `setup.exe` to the directory that you would like to store the downloaded packages in (e.g. `c:\cyginstall`); do not save `setup.exe` to `c:\cygwin`, as that is the default directory for the extraction and installation of the downloaded packages. At the time of writing, a full download of all Cygwin packages takes 25 MiB of disk space.
3. Run `setup.exe`, you will see the welcome screen:



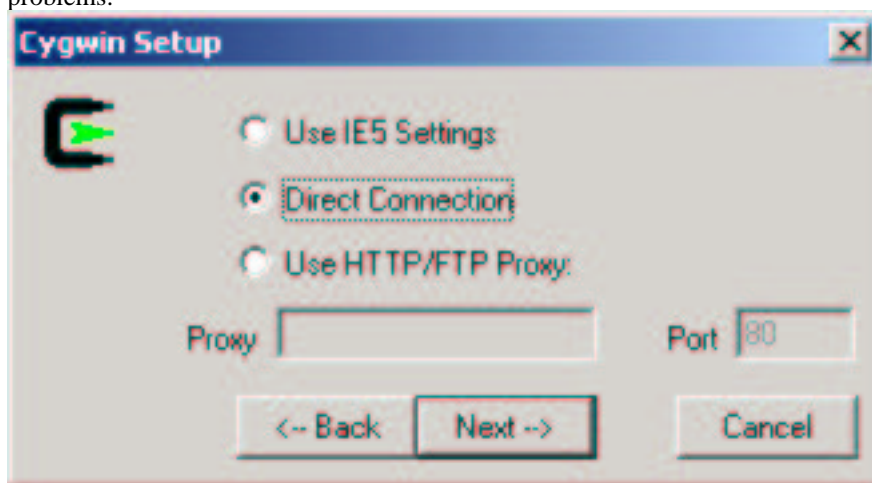
4. Click Next to proceed to the next screen
5. Choose, Download from Internet, this will save the package files to your download directory so that you can install Cygwin on any number of machines:



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

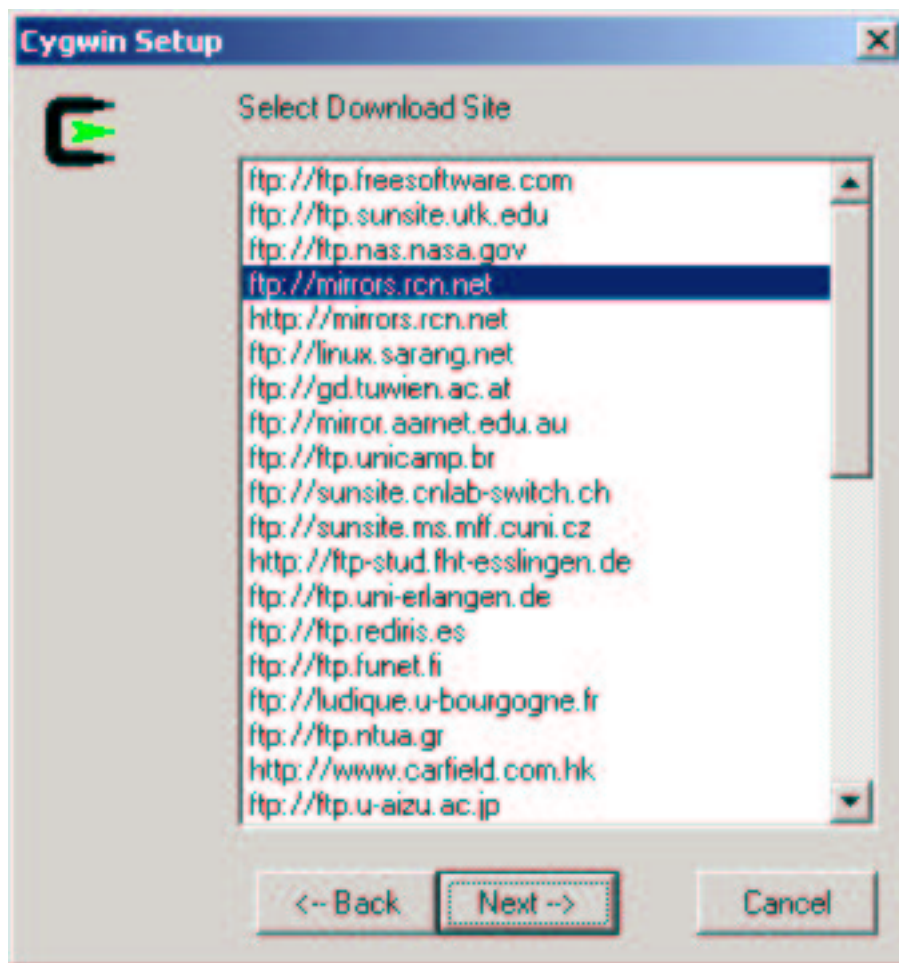


8. Click **Next** to proceed to the next screen
9. Choose your proxy setup, or, just choose **Direct Connection** to limit the scope of download problems:

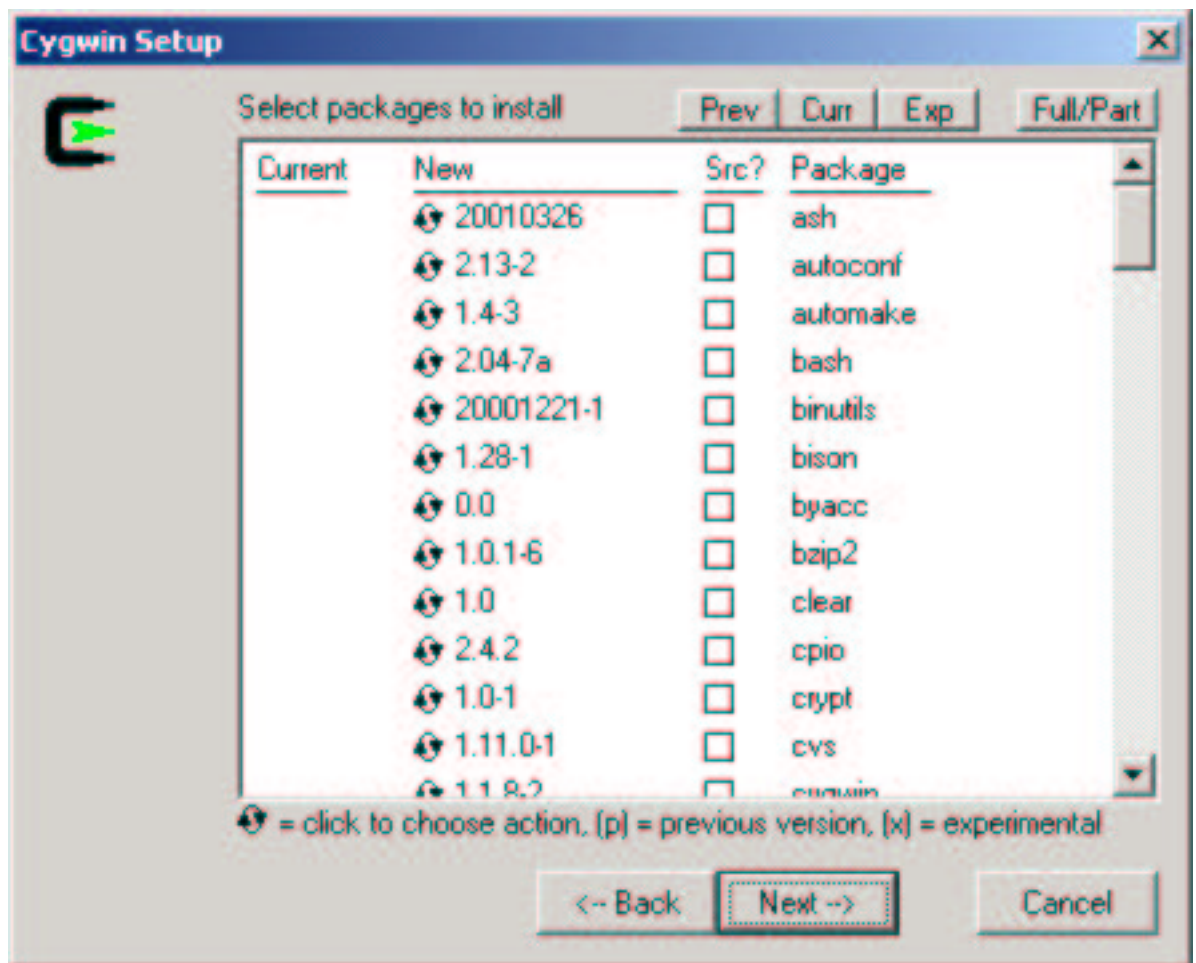


10. Click **Next** to proceed to the next screen
11. Select your nearest mirror for downloading:

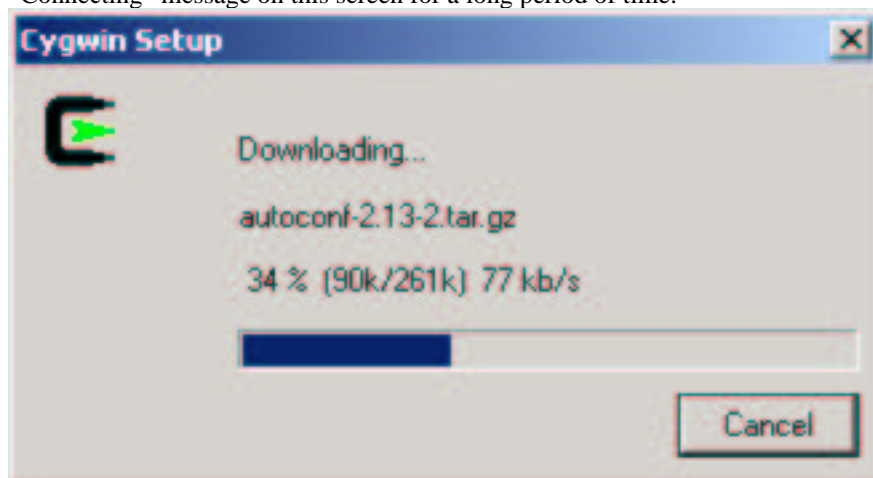




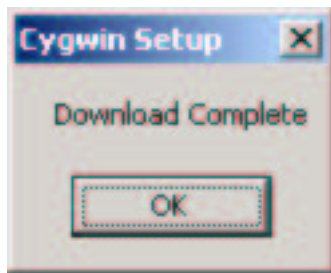
12. Click **Next** to proceed to the next screen; setup will download a list of available packages as it moves to the next screen
13. The default selection of packages should be okay for most users. However, you may wish to ensure that the `inetutils` and `openssh` packages are selected if you wish to use **telnet** and **ssh** to connect to remote machines.



14. 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:



15. You should receive a message that the download has completed; you now have all of the packages necessary for installation of Cygwin:

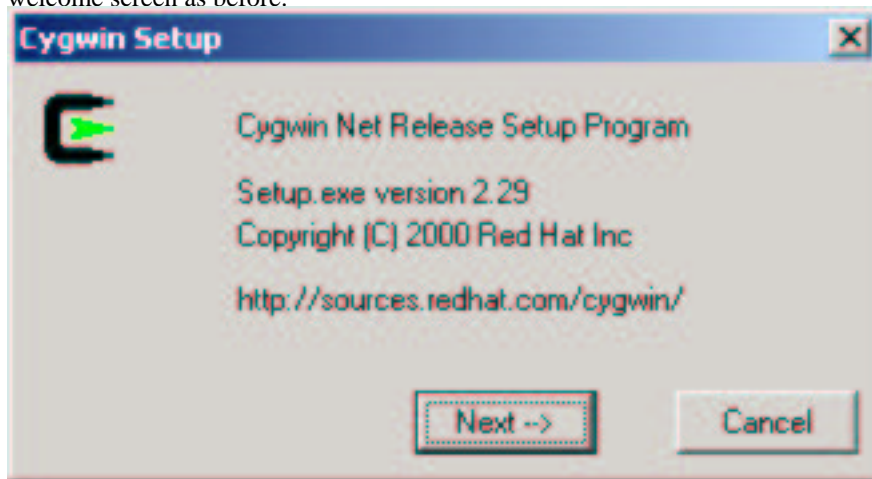


## Installing Cygwin

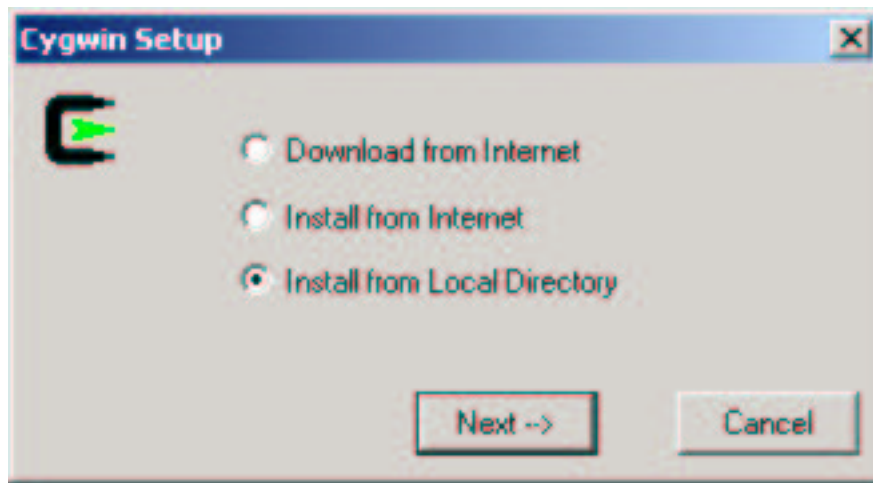
You may install the downloaded Cygwin packages on any number of the machines by simply copying your download directory to that machine, or making the download directory accessible via a network share, and following the installation steps below. The following installation steps assume that you are installing Cygwin on the same machine that you used to download the Cygwin packages.

Follow these steps to install Cygwin:

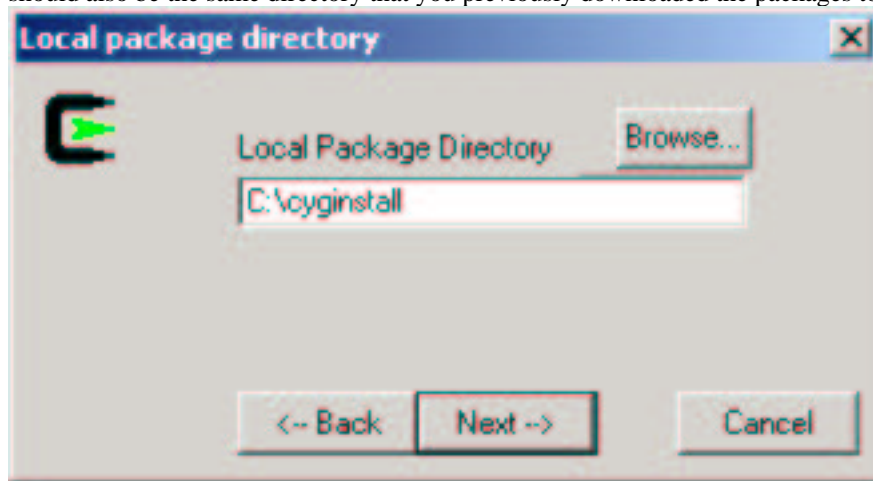
1. Run `setup.exe` from your download directory (e.g. `c:\cyginstall`), you will get the same welcome screen as before:



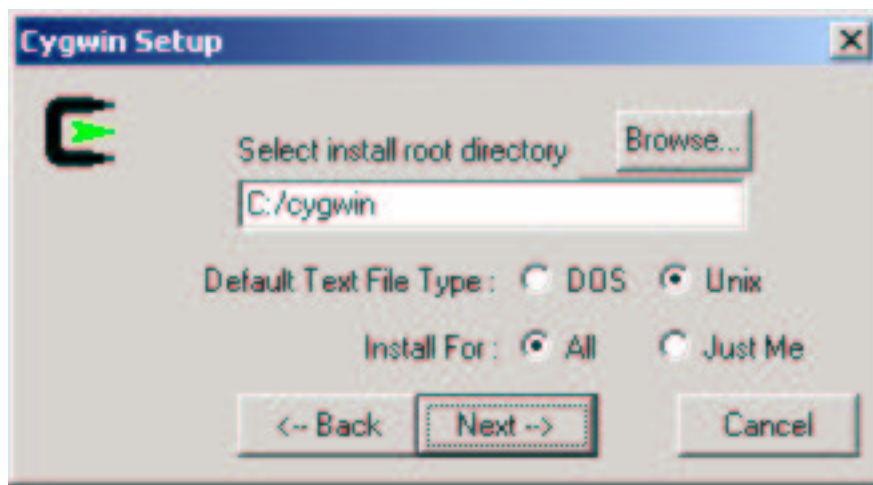
2. Click **Next** to proceed to the next screen
3. Choose **Install from Local Directory**:



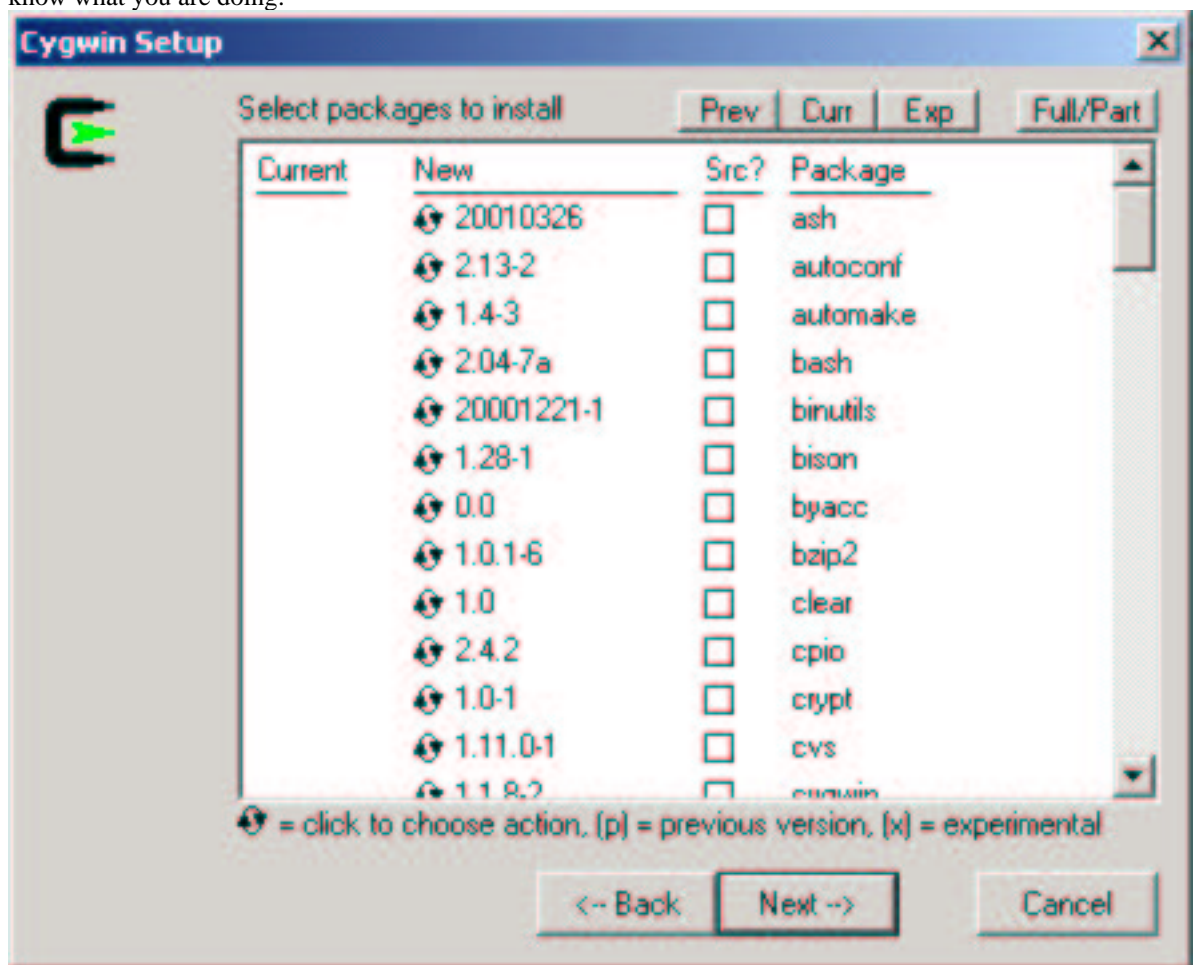
4. Click **Next** to proceed to the next screen
5. Local Package Directory should default to the directory that you ran `setup.exe` from, which should also be the same directory that you previously downloaded the packages to:



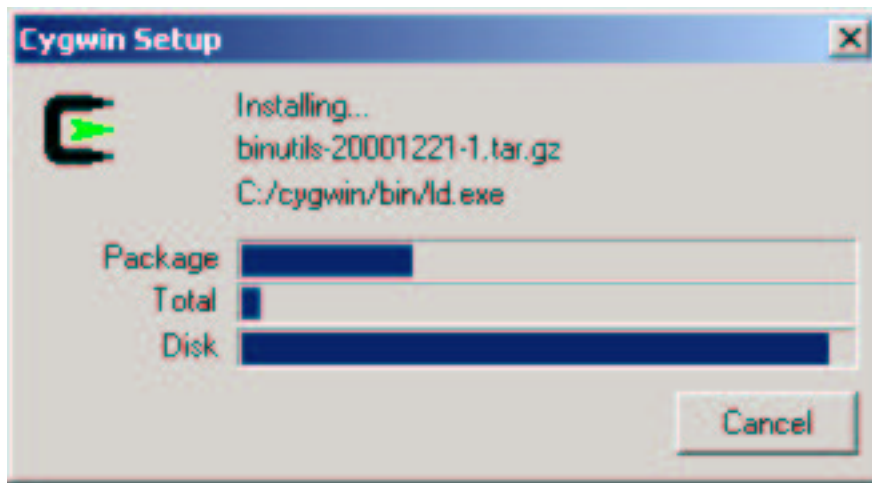
6. Click **Next** to proceed to the next screen
7. The default **Install Root** is `c:\cygwin`; this should be fine for most installations. Leave **Default Text File Type** as **UNIX**. If you have several users on your NT machine, and you are logged in with local administrative privileges, you may wish to set **Install For** to **All**, but the default of **Just Me** will work fine for single user machines.



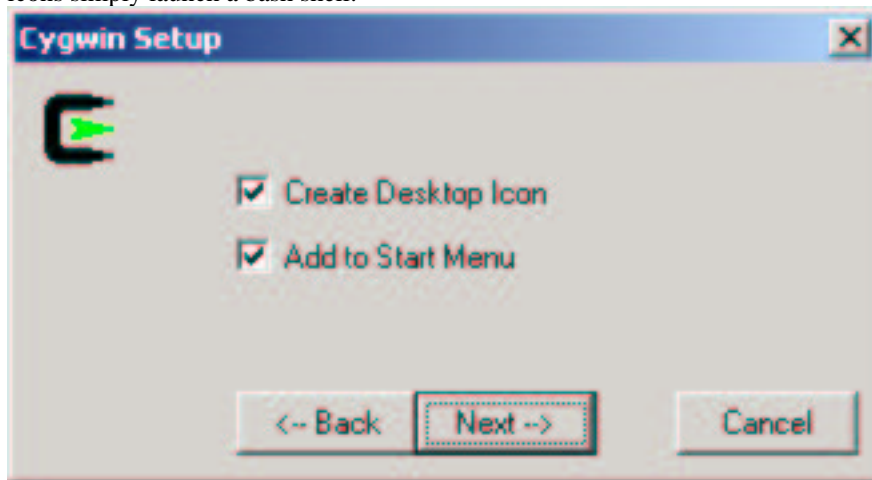
8. Click **Next** to proceed to the next screen
9. All downloaded packages, with an installed size of 175 MiB as of 2001-04-19, are selected for installation by default; I do not recommend changing the list of packages to install unless you really know what you are doing:



10. Click **Next** to proceed with the installation



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



12. Click Next to finish Cygwin Setup:



## Downloading Cygwin/XFree86

Cygwin/XFree86 is comprised of several binary tarballs.

Follow these steps to download Cygwin/XFree86 binaries:

1. Visit the Cygwin mirrors page (<http://cygwin.com/mirrors.html>) to find your closest mirror
2. The ftp url for your mirror site should take you to the `cygwin/` directory on the mirror
3. Download the following files from `xfree/binaries/4.2.0`, saving them to the `tmp` directory in the root of your Cygwin installation directory (e.g. `c:\cygwin`). The full path that you save the files to will look like `c:\cygwin\tmp`. The compressed file size appears after each file; as of 2002-01-23 you will need approximately 29.2 MiB of disk space to download the required files, your download size will vary if you choose to download any optional files.

**Downloading with a Web Browser:** Some web browsers automatically decompress saved files when you use the left mouse button to follow the link to a file; gunzip will report, "gunzip: extract.exe.gz: not in gzip format", when attempting to decompress a file that has been decompressed by your web browser. Prevent your files from being automatically decompressed by clicking the right mouse button on a file link and choosing a command such as Save Target As... or Save Link As... from the context sensitive menu. Better yet, download your files with a stand alone ftp client.

- `extract.exe.gz` (61.9 KiB; required, used by the installation script)
- `startup-scripts.tgz` (1.99 KiB; required, example X Server and client startup scripts)
- `Xbin.tgz` (10.6 MiB; required, executables for xterm, twm, etc.)
- `Xdoc.tgz` (1.51 MiB; required, formatted documentation)
- `Xetc.tgz` (542 KiB; required, configuration files for the X Server and programs in Xbin.tgz)
- `Xf100.tgz` (11.6 MiB; optional, 100 dpi fonts (75 dpi fonts are used by default))
- `Xfcyr.tgz` (360 KiB; optional, Cyrillic fonts)
- `Xfenc.tgz` (330 KiB; required, font encodings)
- `Xfnts.tgz` (15.4 MiB; required, 75 dpi fonts)
- `Xfsc1.tgz` (2.16 MiB; optional, Speedo and Type1 scalable fonts)
- `Xfsrv.tgz` (212 KiB; optional, X Font Server)
- `Xhtml.tgz` (1.17 MiB; optional, documentation html format)
- `Xinstall.sh` (35.3 KiB; required, XFree86 installation script)
- `Xjdoc.tgz` (104 KiB; optional, XFree86 Japanese documentation)
- `Xlib.tgz` (107 KiB; required, `X11R6/lib/` files)
- `Xman.tgz` (761 KiB; required, **man** pages)
- `Xnest.tgz` (1.11 MiB; optional, **Xnest** nested X Server)
- `Xprog.tgz` (761 KiB; optional, additional files needed to compile programs for Cygwin/XFree86)
- `Xprt.tgz` (845 KiB; optional, X Print (Xprt) server)
- `Xps.tgz` (5.65 MiB; optional, documentation in Postscript format)

- `xvfb.tgz` (1.22 MiB; optional, X Virtual Frame Buffer (Xvfb) server)
- `xxserv.tgz` (1.22 MiB; required, the Cygwin/XFree86 X Server)

4. Download of Cygwin/XFree86 binaries is now complete

## Installing Cygwin/XFree86

Cygwin/XFree86 binaries are installed by the `xinstall.sh` script.

Follow these steps to install Cygwin/XFree86 binaries:

1. Launch your Cygwin environment, using either the icon on your Desktop, the icon in your Start Menu, or by running `cygwin.bat` from your Cygwin directory (e.g. `c:\cygwin`); you should see a window like the following:

```
Username@CygwinHost ~
$
```

2. Change the current directory to the `tmp` directory in your Cygwin root directory:

```
Username@CygwinHost ~
$ cd /tmp

Username@CygwinHost /tmp
$
```

3. Extract the `extract.exe.gz` archive:

```
Username@CygwinHost /tmp
$ gunzip extract.exe.gz

Username@CygwinHost /tmp
$
```

4. Copy the `extract.exe` file to `/bin`:

```
Username@CygwinHost /tmp
$ cp extract.exe /bin

Username@CygwinHost /tmp
$
```

5. Run the `Xinstall.sh` script. Follow the step-by-step instructions that the script provides:

```
Username@CygwinHost /tmp
$ ./Xinstall.sh
```

```
Welcome to the XFree86 4.2.0 installer
```



You are strongly advised to backup your existing XFree86 installation before proceeding. This includes the /usr/X11R6 and /etc/X11 directories. The installation process will overwrite existing files in those directories, and this may include some configuration files that may have been customised.

If you are installing a version different from 4.2.0, you may need an updated version of this installer script.

Do you wish to continue? (y/n) [n] y

...

```
Username@CygwinHost /tmp
$
```

#### 6. Copy startup-scripts.tgz to /usr/X11R6/bin:

```
Username@CygwinHost /tmp
$ cp startup-scripts.tgz /usr/X11R6/bin
```

```
Username@CygwinHost /tmp
$
```

#### 7. Change the current directory to /usr/X11R6/bin:

```
Username@CygwinHost /tmp
$ cd /usr/X11R6/bin
```

```
Username@CygwinHost /usr/X11R6/bin
$
```

#### 8. Extract startup-scripts.tgz:

```
Username@CygwinHost /usr/X11R6/bin
$ tar -xzf startup-scripts.tgz
```

```
Username@CygwinHost /usr/X11R6/bin
$
```

#### 9. Installation of Cygwin/XFree86 binaries is now complete.

# Chapter 3. Configuring Cygwin/XFree86

## Configuration Overview

Cygwin/XFree86 settings are configured primarily through command-line parameters passed to `XWin.exe`. Cygwin/XFree86 comes with a file called `startxwin.bat` that launches an X Server, a terminal, and a window manager.

## Command Line Parameters

Cygwin/XFree86, 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. Below is the syntax for **XWin.exe** parameters.

### **XWin.exe**

```
[-screen screen_number width height ...]  
[-engine engine_number ]  
[-fullscreen [-depth depth_in_bits_per_pixel] [-refresh refresh_rate_in_hertz ]]  
[-emulate3buttons timeout_in_milliseconds ]  
[-[no]winkill]  
[-[no]unixkill]
```

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

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

**Table 3-1. Parameter Descriptions**

Parameter	Description
-----------	-------------

Parameter	Description
<code>[-screen <i>screen_number width height ...</i>]</code>	<p>This parameter does not have to be specified. Cygwin/XFree86's default behavior is to create a single screen that is roughly the size of the current Windows display area.</p> <p>This parameter may be used to specify the screen number, height, and width of one or several Cygwin/XFree86 screens; each Cygwin/XFree86 screen will be opened in its own window. When using multiple screens, be sure not to duplicate any screen numbers. Do note that, as of 2002-01-08, using multiple screens is not fully implemented; there are several bugs that must be fixed by someone that uses the multiple screens feature.</p> <p>Screen specific parameters, such as <i>-fullscreen</i>, can be applied as a default to all screens by placing those screen specific parameters before any <i>-screen</i> parameter. Screen specific parameters placed after the first <i>-screen</i> parameter will apply only to the immediately preceeding <i>-screen</i> parameter.</p>
<code>[-engine <i>engine_number</i> ]</code>	<p>Do not use this parameter unless you are a Cygwin/XFree86 developer or are instructed by a Cygwin/XFree86 developer to do so.</p> <p>Cygwin/XFree86's default behavior is to determine if DirectDraw or DirectDraw4 are present, then to examine the <i>-depth</i> and <i>-fullscreen</i> parameters to determine the engine with optimum performance that supports the specified depth and window configuration.</p>
<code>[-fullscreen]</code>	This parameter tells Cygwin/XFree86 to open a given screen in fullscreen mode.
<code>[-depth <i>depth_in_bits_per_pixel</i> ]</code>	This parameter can only be used with <i>-fullscreen</i> and a DirectDraw based engine to specify the display depth that should be used for the fullscreen Cygwin/XFree86 screen.
<code>[-refresh <i>refresh_rate_in_hertz</i> ]</code>	This parameter can only be used with <i>-fullscreen</i> and a DirectDraw based engine to specify the refresh rate that should be used for the fullscreen Cygwin/XFree86 screen.

Parameter	Description
<code>[-emulate3buttons timeout_in_milliseconds]</code>	<p>Note: scroll wheel mice often allow you to click the scroll wheel for middle mouse button functionality. Thus, most users with a scroll wheel mouse will not need to use this parameter.</p> <p>This option allows users with a two-button mouse to emulate a third mouse button by pressing both mouse buttons within the optional timeout specified in milliseconds. The default timeout is 50 milliseconds.</p>
<code>[-[no]winkill]</code>	Enable or disable the <b>Alt-F4</b> key combo as a signal to exit Cygwin/XFree86. The <b>Alt-F4</b> key combo is enabled by default.
<code>[-[no]unixkill]</code>	Enable or disable the <b>Ctrl-Alt-Backspace</b> key combo as a signal to exit Cygwin/XFree86. The <b>Ctrl-Alt-Backspace</b> key combo is disabled by default.

# Chapter 4. Using Cygwin/XFree86

## Starting Cygwin/XFree86

There are several methods of starting the Cygwin/XFree86 X Server with a startup script that optionally starts initial clients and loads keyboard modifier maps. Several startup methods are described below.

### startxwin.bat

`startxwin.bat` - Use a MS-DOS batch file as the startup script. An example `startxwin.bat` is included in `startup-scripts.tgz`, which is extracted according to the instructions in the Section called *Installing Cygwin/XFree86* in Chapter 2. Run `/usr/X11R6/bin/startxwin.bat` by double-clicking it in Windows Explorer.

### startxwin.sh

`startxwin.sh` - Use an **sh** shell script as the startup script. An example `startxwin.sh` is included in `startup-scripts.tgz`, which is extracted according to the instructions in the Section called *Installing Cygwin/XFree86* in Chapter 2. Run `/usr/X11R6/bin/startxwin.sh` in a Cygwin shell:

```
Username@CygwinHost ~  
$ sh /usr/X11R6/bin/startxwin.sh
```

### startx

`startx` - Use the standard XFree86 `startx` script with its attendant `~/.xinitrc` configuration file. First you need to create `~/.xinitrc` from the template in `/etc/X11/xinit/`:

```
Username@CygwinHost ~  
$ cp /etc/X11/xinit/xinitrc ~/.xinitrc
```

Now you may customize `~/.xinitrc` and start Cygwin/XFree86 with:

```
Username@CygwinHost ~  
$ cd /usr/X11R6/bin && startx
```

Or, you can run **startx** by first adding `/usr/X11R6/bin/` to the search path:

```
Username@CygwinHost ~  
$ PATH=%PATH:/usr/X11R6/bin
```

```
Username@CygwinHost ~  
$ startx
```

Or, you can run **startx** by first changing directories to `/usr/X11R6/bin/`:

```

Username@CygwinHost ~
$ cd /usr/X11R6/bin

Username@CygwinHost /usr/X11R6/bin
$ startx

```

## Switching Out of Cygwin/XFree86

Press **Alt-Tab** to switch from Cygwin/XFree86 to your Windows desktop or other running Windows applications.

## Stopping Cygwin/XFree86

When you are done using Cygwin/XFree86, 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.

## Remote Sessions via XDMCP

Cygwin/XFree86 can be used login to one or several remote sessions using XDMCP (X Display Manager Control Protocol).

Start Cygwin/XFree86 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/XFree86 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/XFree86. Further documentation of the `:display_number` parameter can be found in the X Server documentation (<http://www.xfree86.org/current/Xserver.1.html>). XDMCP is a complex system that is not specific to Cygwin/XFree86; further discussion of XDMCP is beyond the scope of this document. You may wish to read the Linux XDMCP HOWTO

(<http://www.linuxdoc.org/HOWTO/XDMCP-HOWTO/>) or the X Server XDMCP Options (<http://www.xfree86.org/current/Xserver.1.html#sect6>) for more information.

## Displaying Remote Clients

Displaying remote X clients with Cygwin/XFree86 is nearly identical to displaying remote X clients with any other X Server. You may use the unsecure **telnet** session, or the secure **ssh** method.

### Unsecure Telnet

On your Windows machine:

1. Launch Cygwin/XFree86
2. In an X terminal type `/usr/X11R6/bin/xhost remote_hostname_or_ip_address`
3. 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/XFree86.
4. Login to your remote machine via your **telnet** session
5. In your **telnet** session type, `DISPLAY=windows_hostname_or_ip_address:0.0`
6. In your **telnet** session type, `export DISPLAY`
7. 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/XFree86 screen.
8. 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.

### Secure ssh

On your Windows machine:

1. Launch Cygwin/XFree86
2. Run the following in an X terminal:
 

```
Username@CygwinHost ~
$ ssh -X -l username remote_hostname_or_ip_address
```
3. Enter your password when prompted by **ssh**.
4. Your **ssh** session should now show you a shell prompt for your remote machine.
5. 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/XFree86 screen.

6. 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.



# Appendix A. GNU Free Documentation License

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