

X Forwarding on Windows

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November 24, 2019

This document discusses one method for using X forwarding on Windows. This allows you to display a program (such as Virtuoso) running on a remote Linux server (such as Tera) on your computer. There are many ways of accomplishing this, but this is the easiest and most reliable I could find. Another option that can work better especially if you have a bad internet connection or are very far from the server is briefly mentioned at the end if you care to explore that sort of thing.

Installing Xming

Xming is an X11 display server for Windows, and is a great way of displaying X applications on it. Versions up to 6.9.0.31 are free, and you can get the latest free version here:

<https://sourceforge.net/projects/xming/>

(I'm sure new versions are slightly better, but the free version seems totally fine, in general)

Xming must be running whenever you want to do x forwarding.

An easy way to check if it's running is seeing if its icon appears in the system tray, as seen in Figure 1.

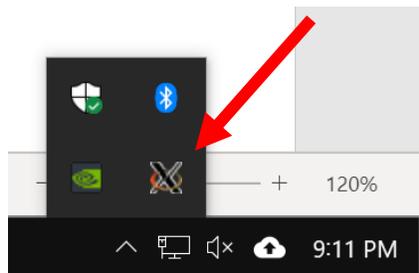


Figure 1: Xming icon in system tray

Installing a ssh client

Git Bash

Git Bash is a popular option for Linux utilities, such as ssh, on windows. You can download it from here: <https://git-scm.com/downloads> if you already have it installed.

Note: Bash on Windows works also, you can use it if you prefer: <https://docs.microsoft.com/en-us/windows/wsl/install-win10>

Something to *not* do

Although Windows 10 now has a native ssh client you can call from the command prompt, it doesn't interact with Xming very well, and attempting to follow the rest of these instructions with it will likely only cause frustration.

Configuring your Bash shell (only needs to be done once)

Open your bash shell (Git Bash) on your local machine (not on Tera).

Enter the command

```
echo "export DISPLAY=localhost:0.0" >> ~/.bashrc
```

and then

```
source ~/.bashrc
```

This causes the server to display on your screen.

From now on this will automatically run whenever you open your bash shell so you don't have to type it manually anymore.

Running a remote program (such as Cadence Virtuoso)

1. Start Xming if its not already running
2. Follow the instruction in the *Hitchhiker's Guide to Linux* document, using your bash shell of choice instead of Cygwin or PuTTY

Don't worry if you get the message

Warning: No xauth data; using fake authentication data for X11 forwarding.

When connecting to Tera, this error doesn't seem to actually cause any problems

Make sure to ssh with the -Y option, such as:

```
ssh -Y nboorman@tera.eng.hmc.edu
```

Alternate option: Xpra

Note: lab tutors won't help if this way doesn't work, it's only described here because I think it's kinda cool

Traditional X-forwarding has a lot of drawbacks, such as high latency, being at times incredibly slow especially if far away from the server or on a bad internet connection, and not being able to keep a program open if the user disconnects.

Xpra attempts to solve these problems. It can be downloaded for Windows from here:

<https://xpra.org/trac/wiki/Download>

My recommendations on using it are:

- Add its location to the PATH on Windows so you can call it easier from the command line
- Start a new session by ssh'ing to tera and running this command: `xpra start --start-child=cad-ncsu --exit-with-children=yes --resize-display=yes --exit-with-client=no`
- Connect to an existing xpra session with these arguments from command prompt, *not* bash (replacing my username with yours): `xpra.exe attach ssh://nboorman@tera.eng.hmc.edu --session-name=cad-ncsu --exit-with-client=no`
 - This command helpfully returns 1 if it failed to connect (for example, because there was no existing xpra session), so if you like making batch scripts you could throw together a quick script to try to connect to a session, and if that fails (`if %errorlevel%==1`), starts a new one.