X11 Forwarding Tutorial

Our labs are based on RIPES, a RISC-V simulator. As written in the handout, RIPES is visual computer architecture simulator and assembly code editor that has a GUI with it. We have learnt how to access servers through `ssh` in a command line window. But how to run applications with a GUI on the server? We need X11 forwarding to do so.

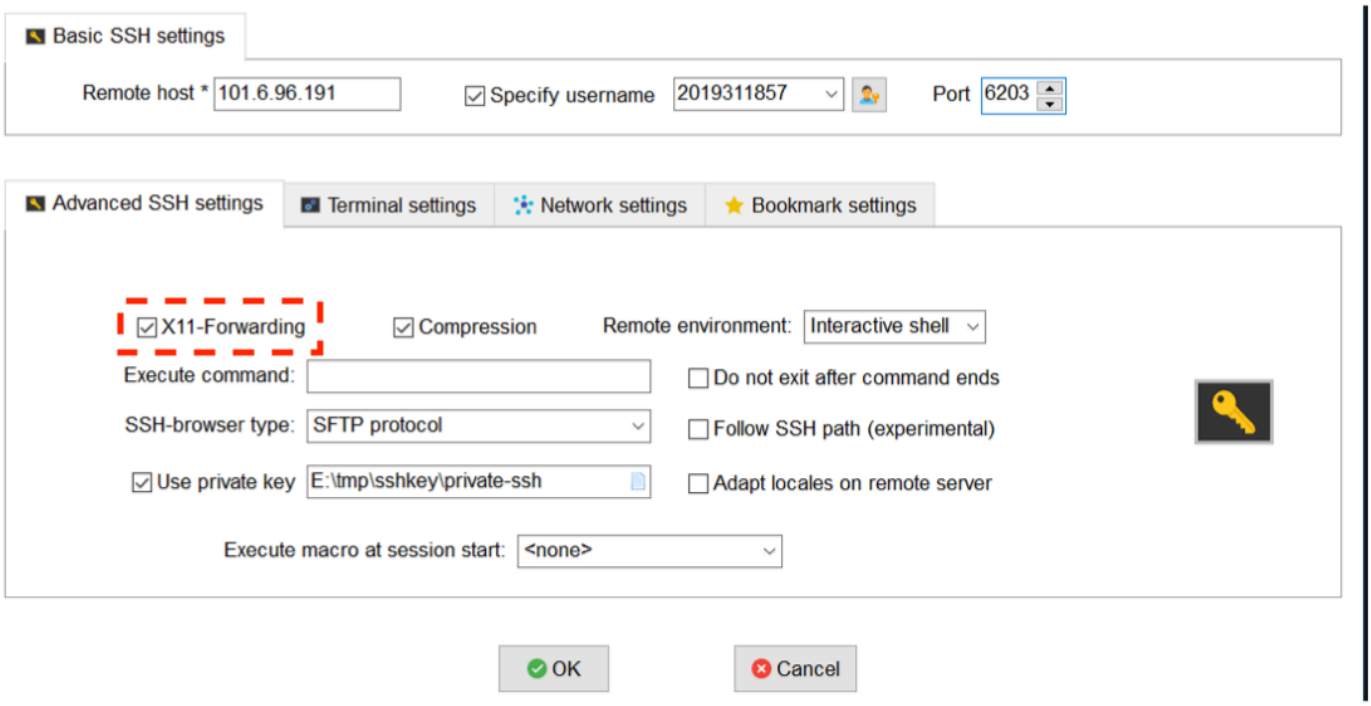
X11 Forwarding

X11 forwarding is a mechanism that allows a user to start up remote applications but forward the application display to your local machine.

Environment Building

Windows

The MobaXterm is built with X11 forwarding functions. You do not need to install other things on your local computer. Just remember to check the `X11-Forwarding` option in `Advanced SSH settings`.



OS X

On OS X, you need to install XQuartz on your **local computer (not the remote server)**. We recommend you to install XQuartz through Homebrew. The installing instruction is

```
$ brew install --cask xquartz
```

(or `brew cask install xquartz` if you are using OS X of earlier versions)

If you want to install XQuartz without Homebrew, you can download the installalation pacakge on the XQuartz official websit: https://www.xquartz.org.

Linux

On Linux platform, you need to install `openssh-client` on your **local computer (not the remote server)**

```
$ sudo apt-get install openssh-client
```

Usage

To access the server through `ssh` with X11 forwarding:

On Windows:

Access the server in MobaXterm the same as the way in Lab0.

On OS X:

First run xquartz. Open a terminal and type: (**Notice the -X option**)

```
$ export DISPLAY=:0
```

```
$ ssh -X [Username]@101.6.96.191 -p [Machine ID] -i [private key location]
```

On Linux:

Open a terminal and type: (**Notice the -X option**)

```
$ ssh -X [Username]@101.6.96.191 -p [Machine ID] -i [private key location]
```

Test

To test whether you have set up the X11 forwarding successfully, first access to the server by `ssh` with X11 forwarding as above. Then call a simple clock application with a GUI on the server:

```
$ xclock
```

If you can see a small clock, which looks like the picuture below, on your localhost, it shows that you have set up the X11 forwarding successfully. Congratulations!

Notice: When you need to run RIPES, remember to access your server with X11 forwarding.