Connecting to Remote Desktops

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The Bigelow Physics Building (BPB) is mostly isolated from internet connections originating outside the building. Now only a limited number of Linux systems allow remote SSH connections from outside. In the future connections will only be available through a virtual private network (VPN). This note explains how to establish remote connections to office or laboratory computers.

SUMMARY: Set up Remote Desktop on the server computer by selecting users who can use Remote Desktop and opening ports on the firewall. Establish an SSH tunnel through our internet connected Linux systems. Use a client program to connect to the server desktop through the SSH tunnel. The first two items only need be done once. The latter two every time a connection is established.

Windows Remote Desktop Server Side

There are some idiosyncratic settings established on Windows systems set up by the Physics & Astronomy staff intended to improve the security of the systems but which need to adjusted in order to allow incoming connections. These settings will need to be modified by an administrative user.

Setup Remote Desktop

From Windows Explorer access *Local Security Policy*. Edit *Local Policies* and under that *User Rights Assignment*. Adjust *Allow log on through Remote Desktop Services*. Add a user name such as "lab" to the list. On Physics & Astronomy systems it is likely that only "admin" is listed.

```
Control Panel / System and Security / Administrative Tools / Local Security Policy
```

Figure 1: Windows Explorer path to Local Security Policy.

With Windows Explorer access the properties of the Computer either from the start menu or the desktop if there is a computer icon on the desktop or from the Control Panel.

```
Control Panel / System and Security / System
```

Figure 2: Windows Explorer path to System Properties.

Select the *Remote settings* tab. *Remote Assistance* should be disabled. Under *Remote Desktop* select the button for "Allow connections from

computer running any version of Remote Desktop (less secure)".
Then check the *Select Users* button. Make sure that your user chosen
above, e.g. "lab", is listed. If it is not again add it.

Adjust Windows Firewall

From the Control Panel, as an administrative user, navigate to *Allow
programs to communicate through Windows Firewall*. Find the settings
for *Remote Desktop* and *Remote Desktop - RemoteFX* and allow those
items to be accessed from the public network as connections will
likely be originating from a network other than the one the server
machine is on.

```
Control Panel / System and Security / Windows Firewall / Allowed Programs
```

Figure 3: Windows Explorer path to firewall allowed programs.

Adjust Netsh Firewall

On most Windows systems set up by Physics & Astronomy staff
additional old style Windows Firewall settings are established. As of
Windows 7 these settings still override settings in the visual interface
to the firewall adjusted in the previous section. So they must also be
adjusted. A sample batch file that adjusts the firewall correctly may
be found at the url:

```
http://uranus.physics.unlv.edu/sw/pub/unlv-physics/physics-rdp.bat
```

Figure 4: URL of a sample DOS batch file using netsh to adjust firewall settings.

Download the file and run it as an administrator.
At this point the Windows Remote Desktop server should be
ready to use. From within BPB you can test it out by connecting to
it with your Remote Desktop client application of choice.

Remote Desktop Client Side

Establish SSH Tunnel From Outside BPB

Whether on a Unix system (Linux, MacOS) or a Windows system
setting up an SSH tunnel is very much the same. Of course, you will
have to have a UNLV Physics & Astronomy Unix login to establish
such a tunnel.[1] In this example we will use a public internet facing
Linux computer e.g. carbon.physics.unlv.edu, argon.physics.unlv.edu,
zinc.physics.unlv.edu, or krypton.physics.unlv.edu, to connect to the
fictitious machine laser-drill.physics.unlv.edu internal to BPB. There
are two network ports listed on the command line. The first is the

[1] Non-UNLV personnel must still complete a Physics & Astronomy account form. Contact Natasa Korceba for the form.

port on the local client machine. The second is port on the internal server machine you'll be accessing. The first is an arbitrary non-reserved port number. Chose one larger than say 2048. The second is a very specific port, in this case for the Remote Desktop Protocol (RDP). It will most always be 3389 for RDP.

```
ssh -f -N -L 23457:laser-drill.physics.unlv.edu:3389 jay@krypton.physics.unlv.edu
```

Figure 5: Unix command line to establish an encrypted SSH tunnel.

When the command line is run, you'll be prompted for your UNLV Physics & Astronomy password unless you've already established a RSA key pair for SSH on the Physics & Astronomy systems. The `-f` command line option asks SSH to run in the background after the password is entered. This is desirable because you are really interested in establishing a secure tunnel rather than actually logging into krypton. `-N` indicates that no remote command is to be run.

FOR WINDOWS SYSTEMS the procedure is much the same, however a Windows SSH package must be installed on your system. PuTTY is a simple, free, reliable package. Download it from:

```
https://www.chiark.greenend.org.uk/~sgtatham/putty/
```

Figure 6: URL of the Windows SSH package PuTTY.

After installing PuTTY on your computer, use the plink command in Figure 7 in a manner similar to the above to establish a secure tunnel through one of the public facing Linux systems.

```
''C:\Program Files (x86)\PuTTY\plink'' -N -L 23457:laser-drill.physics.unlv.edu:3389 jay@krypton.physics.unlv.edu
```

Figure 7: Windows command line using plink to establish an encrypted SSH tunnel.

Connect to the Remote Desktop

Finally all the mechanism is in place to connect to the remote desktop server. On Unix systems an open source program called rdesktop is available. On Physics & Astronomy systems it can be accessed from our file servers as shown in Figure 8.

In the command line in Figure 8 `-g` indicates the size of window to create on your local display. `-u` is the user name on the remote system to connect as. Most importantly, note that we are connecting to localhost on port 23457 *rather than* laser-drill. That is because we have created a encrypted tunnel from our local machine to laser-drill *through* krypton.

On a remote Linux machine use your package manager of choice to install rdesktop. Or compile it by hand.

```
/local/rdesktop/bin/rdesktop -g 1024x768 -u lab localhost:23457
```

Figure 8: Unix command line to make a Remote Desktop connection through the SSH tunnel.

On MacOS I recommend using the *Homebrew* package manager to install rdesktop. All the cool kids are using Homebrew these days. A Microsoft built Remote Desktop client program for MacOS also is available from the Apple App Store. Folks who absolutely need pictures to run programs may appreciate this program.

On remote Windows systems from the Start Menu type `Remote...`, that is *Remote Desktop Connection*. A dialog box will appear. Again enter localhost:23457 as the host name port combination.

Review

In summary a few things need to be done to connect to Microsoft Windows machine in BPB from outside:

1. *Server side*: set up Remote Desktop users. Only done once.

2. *Server side*: adjust Windows Firewall settings. Done once.

3. *Client side*: establish SSH tunnel through public facing Linux systems. Done every time a new connection to the remote system is needed.

4. *Client side*: use a remote desktop client program to connect to the SSH tunnel through localhost. Done every time a new connection is needed.