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Using an SSH Control Master to LxPlus

When accessing LxPlus with SSH it is possible to enable a **ControlMaster**. Once a **ControlMaster** is enabled all subsequent connections to LxPlus will reuse the first SSH connection transparently.

Consequences of using a ControlMaster

- Authentication only needs to happen once for the first session.
- Subsequent sessions will start faster due to lack of authentication.
- Subsequent sessions to lxplus.cern.ch will all land on the same node as the first one.

Using a **ControlMaster** is particularly useful when Multi Factor Authentication is in place but it can make sense to use anyway.

Setting up a ControlMaster to LxPlus

Assuming you are starting on a linux client your SSH client configuration should contain at a minimum

```
Match Host lxplus*.cern.ch
    ControlPath /run/user/%i/%r@%h:%p
    ControlMaster auto
```

with a more realistic `~/.ssh/config` being

```

Match Host lxplus*.cern.ch
    # Specify your username to save having to type it.
    User <username>
    # Never use a jump host for lxplus - just connect direct
    ProxyJump none
    # Do Kerberos authentication and delegation
    GSSAPIAuthentication yes
    GSSAPIDelegateCredentials yes
    # Public key authentication to lxplus is almost always useless - avoid
    PubkeyAuthentication no
    # Forwarding public keys may make sense however to login to other hosts.
    ForwardAgent yes
    # IP addresses move around too much at CERN so ignore them.
    CheckHostIP no
    # Normally a good idea always to keep things alive.
    ServerAliveInterval 100
    # Finally configure the ControlMaster
    ControlPath /run/user/%i/%r@%h:%p
    ControlMaster auto
    # Persist the socket after the first session is destroyed.
    ControlPersist 1m

```

With this configuration:

- The first **ssh lxplus.cern.ch** will login after authentication and create the **ControlMaster**
- Subsequent **ssh lxplus.cern.ch** will reuse the existing **ControlMaster** and skip authentication.

Starting a Dedicated Control Master

Starting a **ControlMaster** on demand with the first SSH session as above is perfectly possible but may be sub-optimal.

If three ssh sessions are opened and then the first is killed for whatever reason all sessions will be lost. To avoid start the control master session first in the background and then forget about it.

```

laptop> ssh -fN lxplus.cern.ch
password: *****
laptop> ssh lxplus.cern.ch

```

- The **-N** option instructs SSH to background.
- The **-f** option instructs SSH to delay background until authentication is complete.

The first ssh will set up the control port following authentication and then background returning you to your laptop's prompt. The second SSH will then run unimpeded . You must specify a **ControlPersist 1m** so that the control port does not immediately close.

You may want to never start up a **ControlMaster** automatically. To achieve this use:

```
ControlMaster autoask
```

and then a simple **ssh lxplus.cern.ch** will fail unless the **ControlMaster** has been created up front. Create the master with an explicit **-M**

```
laptop> ssh lxplus.cern.ch
Failed to connect to new control master
laptop> ssh -fNM lxplus.cern.ch
password: *****
laptop> ssh lxplus.cern.ch
```

The first connection failed since no **ControlMaster** was in place.

Killing or Querying a Control Master

- To query if a control master is in place **ssh -O check lxplus.cern.ch**
- To kill a control master that is running **ssh -O exit lxplus.cern.ch**

You may want to kill a control master if it needs to be recreated with X11 forwarding or compression for instance. This cannot be added afterwards to an existing control master.

MacOS Specific

The path **/run/user/<uid>** is not available on a Mac. Use

```
ControlPath ~/.ssh/%r@%h:%p
```

PuTTY on Windows

Within PuTTY there is a checkbox **Share SSH connections if possible** which is equivalent to the OpenSSH settings above.

Links

- When using Lxtunnel to reach nodes other than lxplus ControlMasters may make sense | KB - KB0008504
- Harvard page from which this was inspired - <https://docs.rc.fas.harvard.edu/kb/using-ssh-controlmaster-for-single-sign-on/>
- ssh configuration options for the ssh_config file - https://linux.die.net/man/5/ssh_config
- Detailed description of ControlMasters <https://en.wikibooks.org/wiki/OpenSSH/Cookbook/Multiplexing>