SSH

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Colorado School of Mines Linux Users Group

Getting Started

What is SSH?

- **S**ecure **SH**ell.
- Invented in 1995.
- A cryptographic network protocol for operating network services securely over an unsecured network.
- Uses public-key cryptography for authentication.
- SSH clients allow you to access any SSH server remotely and securely.
- Common uses are logging into remote servers and accessing GitHub/GitLab repos.

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Using a SSH client

How do I get a SSH client?

- Linux: `openssh` (or similar) package in your package manager. It's probably already installed.
- macOS: SSH is already installed, but it may be an old version. Use Homebrew (a package manager for macOS) if you want the latest version.
- Windows: You can use PuTTY (`https://www.putty.org/`) or you can use PowerShell on Windows 10.
- Your web browser: there's an SSH plugin for all the modern browsers.
- Your phone: Android and iOS apps exist.

The basics

- `ssh [user@]server[:port]`
  `user` is defaulted to your local username
  `port` defaults to 22 (you can specify a different one with `-p`)
- Enable X-Forwarding: use `-X` flag
- Exiting an SSH session: Ctrl + D or type `logout` or `exit` if your remote session is still running
- If you want to just run one command on the remote server: `ssh [flags] user@server[:port] command`

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SSH Keys

“I hate entering my password all the time.”

When logging into a server, you can authenticate using your password, or you can set up an SSH key to authenticate you without entering your password.

Configuring a SSH key for “normal” SSH

How to:

1. `ssh-keygen`[1] and follow the steps. Definitely set a password!
2. `ssh-copy-id servername` and enter your password on the server.
3. `ssh servername` should now authenticate you without having to use a password.

[1] more in-depth walkthrough:
`https://gitlab.com/help/ssh/README#generating-a-new-ssh-key-pair`

Configuring a SSH key for GitLab/GitHub

Whenever you do operations involving `git@gitlab.com:...` it will authenticate with your SSH key if you configure one.

How to:

1. `ssh-keygen`, if you haven't already done so.
2. Go to "SSH keys" in your GitLab/GitHub account page's Settings and find the option to add a new key.
3. Copy/paste your public key (likely `~/.ssh/id_rsa.pub`) into the box.
4. Give it a title. The hostname of the machine where you did the keygen is a good choice.

“But now I have to enter my SSH Key password all the time.”

If you don’t like entering your SSH key password all the time, you can use `ssh-agent` and `ssh-add`.

The following in one’s `.bashrc` will set this up automatically.

```
if [ ! -S ~/.ssh/ssh_auth_sock ]; then
    eval `ssh-agent`
    ln -sf "$SSH_AUTH_SOCK" ~/.ssh/ssh_auth_sock
fi
export SSH_AUTH_SOCK=~/.ssh/ssh_auth_sock
ssh-add -l | grep "The agent has no identities" && ssh-add
```

SSH aliases

You can use aliases so you don't have to type your full username and hostname every time you SSH.

(And we don't mean aliasing `isengard` to `jnunez@isengard.mines.edu -p 42` in your `.bashrc`!)

You add them to `~/.ssh/config` like so...

```
Host isengard
    HostName isengard.mines.edu
    User jnunez
    Port 42
    ...
```

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Setting up a SSH Server

How do I install a SSH server?

- Arch Linux: `openssh` package.
- Other Linux: you may need to install `openssh-server` or similar.
- macOS: You can enable Remote Login[2] in System Settings.
- Windows: Read this ServerFault article. Good luck. `https://serverfault.com/questions/8411/what-is-a-good-ssh-server-to-use-on-windows`

[2] `https://www.techwalla.com/articles/how-to-use-ssh-on-mac-os-x`

Enabling SSH to your computer

On Arch, just start an enable `sshd` via `systemctl`.

You can configure your SSH daemon via the `/etc/ssh/sshd_config` file (note the `d`).

Here are some of the things you can configure:

- `AllowUsers` - allows you to set which users can log in
- `PermitRootLogin` - if `yes`, you can SSH into the computer as root. Not a great idea.
- `AllowGroups` - allows you to set which groups can log in
- `PasswordAuthentication` - set to `no` if you want to force authentication using SSH key
- `X11Forwarding` - `yes` enables this. `xauth` must be installed.

What can I do with SSH?

What can I do with SSH?

- SSH from your laptop into a powerful server is really nice for running/compiling code.
- At Mines, SSH is how you access Isengard and the supercomputers
- Jumpbox is a server who allows you to SSH servers on the Mines network from off-campus, without a VPN.
  `ssh yourmultipass@jumpbox.mines.edu` and then from Jumpbox, you can SSH Isengard, etc.
- `scp` allows you to `cp` between computers like so:
  From A to B as A:
  `scp path/to/file username@b:path/to/destination`
  From A to B as B:
  `scp username@a:path/to/file path/to/destination`
  (Good luck trying this on Windows, just use WinSCP instead.)

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Questions?

References

- Wikipedia: `https://en.wikipedia.org/wiki/Secure_Shell`
- The Arch Wiki: `https://wiki.archlinux.org/index.php/Secure_Shell`
- The SSH manpage
- `https://medium.com/@shazow/ssh-how-does-it-even-9e43586e4ffc#.uwmcu64az`
- `https://tychoish.com/post/9-awesome-ssh-tricks/`
- `https://lani78.com/2008/08/08/generate-a-ssh-key-and-disable-password-authentication-on-ubuntu-server/`

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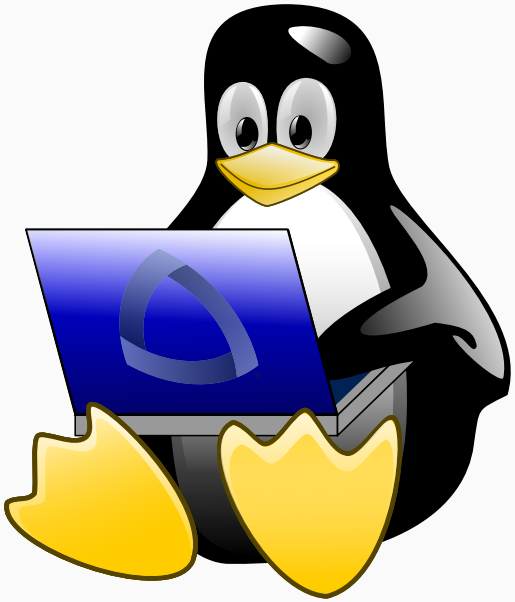

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