ssh Authentication Forwarding (xbio)

Access `xbio` and cluster nodes

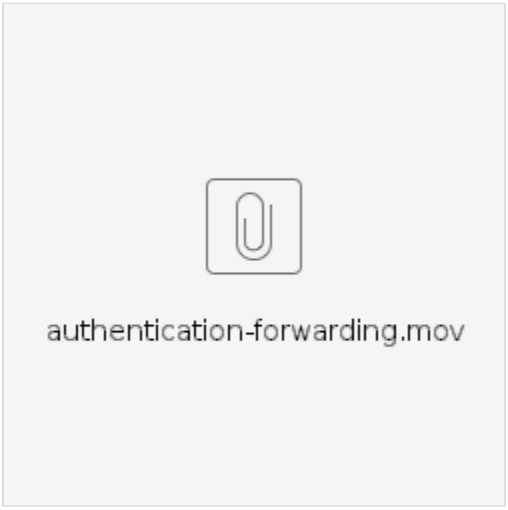
Explanation

`ssh` uses paired private and public keys for access control. You keep your private key, called `id_rsa` by default, and never share it. You distribute your public key, typically `id_rsa.pub`, to people such as HPC admins who need to give you access to `ssh` servers. Because your private key functions like a password, it should always be encrypted, and never put into an unsafe environment, such as an email attachment or a shared server. Specifically your private key should not be on `xbio.mskcc.org`, which is under constant attack from the Internet.

The obvious problem this raises is: How can you authenticate from your Mac at home to `lilac` or `juno`, when your Mac can't talk directly to `lilac` or `juno` through the MSKCC firewalls? The answer is `ssh` authentication forwarding.

These instructions are for Macs. OpenSSH works the same on Linux and Windows, but they don't have the Apple Keychain, which stores decryption passwords for private keys. PuTTY on Windows includes the Pageant `ssh` agent instead. The HPC admins don't support Windows or Linux clients. If you're not using a Mac you'll probably need to start `ssh-agent` manually and load your private key, probably once per login session. The Mac handles this mostly invisibly behind the scenes.

Procedure



Watch a screencast of the steps.

Let's start by loading your private key's passphrase into the Apple Keychain, making it available for authentication:

On your Mac, execute:

```
ssh-add -K ~/.ssh/id_rsa
```

This tells OpenSSH to load your private key and decrypt it in memory. If you haven't already saved your passphrase to the Apple Keychain, macOS will prompt for the passphrase used to encrypt your private key when you created it. Once it has your passphrase, macOS will automatically decrypt and load your private key as needed.

Next confirm your private key is available:

```
ssh-add -L
```

This should show a long public key, which typically starts with `ssh-rsa`. If it doesn't show a key, your `ssh-agent` doesn't have your private key, and Agent Forwading will not work.

Assuming your private key is now loaded, you can log into `xbio` with authentication forwarding active:

```
ssh -p2222 -A pepper@xbio.mskcc.org
```

If your HPC username is different than on your Mac, you need to specify it on the `ssh` command line.

If this is your first time logging into `xbio`, or a new Mac, you'll need to accept the `xbio` host fingerprint.

Once you're logged into `xbio`, confirm your private key is available there as well:

```
ssh-add -L
```

Again, you need to see your public key in the output. If you don't, `xbio` doesn't have access to your key through `ssh-agent` back on your Mac, and you cannot `ssh` into `lilac` or `juno`.

`ssh lilac` `ssh juno`

Notes

The error "Permission denied (publickey)." means you tried to connect to an `ssh` server which requires public key authentication (such as an MSKCC HPC system), but your `ssh` program doesn't have an authorized private key available. This is typically because your `ssh-agent` isn't working (doesn't have your private key) or the server doesn't trust your public key.

Assuming your key is available, at this point you should be able to use either `ssh lilac` or `ssh juno` from `xbio` to log into whichever cluster you have access to. If you see your key available on `xbio` but you cannot log in, there may be a problem with your `~/.ssh/authorized_keys` file (missing your public key or incorrect permissions) on the server.

For assistance, you can email hpc-request@cbio.mskcc.org. If you do this, please execute the following commands and include the **complete** transcript in your email. See below for the details we need to investage.

Note that on campus `xbio` has a different name and `ssh` port (`playa.mskcc.org`, port 22/tcp). But on campus (or via VPN) you don't need to use `xbio` -- you can `ssh` directly into `lilac` or `juno`.

The authentication forwarding procedure is very similar to `ssh` through `juno` or `lilac` into a `juno` or `lilac` compute node, although `lilac` nodes only allow `ssh` access from users currently running jobs on the node.

Warning: If your home directory, `.ssh` directory, or `~/.ssh/authorized_keys` file is group or world writable, `ssh` considers it insecure and will not let you authenticate. You'll need an admin to fix permissions.

IdentityFile and IdentitiesOnly prevent use of ssh-agent.

Troubleshooting

On your Mac, execute:

- `ssh-add -K ~/.ssh/id_rsa`
- `ssh-add -L`
- `ls ~/.ssh`
- `md5 ~/.ssh/id_rsa.pub`
- `cat ~/.ssh/id_rsa.pub`
- `cat ~/.ssh/config`
- `ssh -p2222 -A xbio.mskcc.org`

Then on `xbio`, execute:

- `ssh-add -L`
- `ssh -v lilac`

Email your whole session to: hpc-request@cbio.mskcc.org.