Lab: Amazon EC2

INF 551

Wensheng Wu

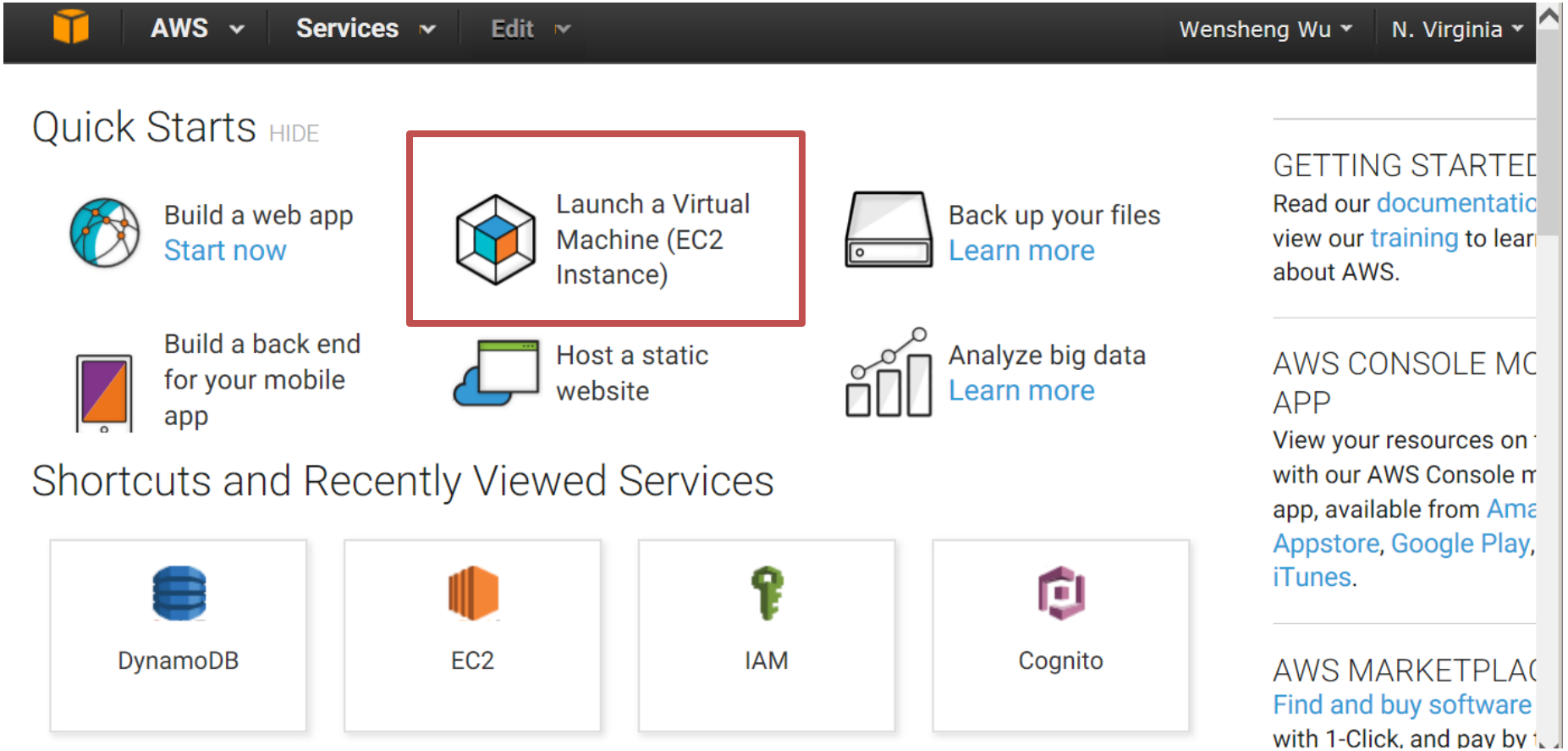
Sign up for AWS

Use credit card

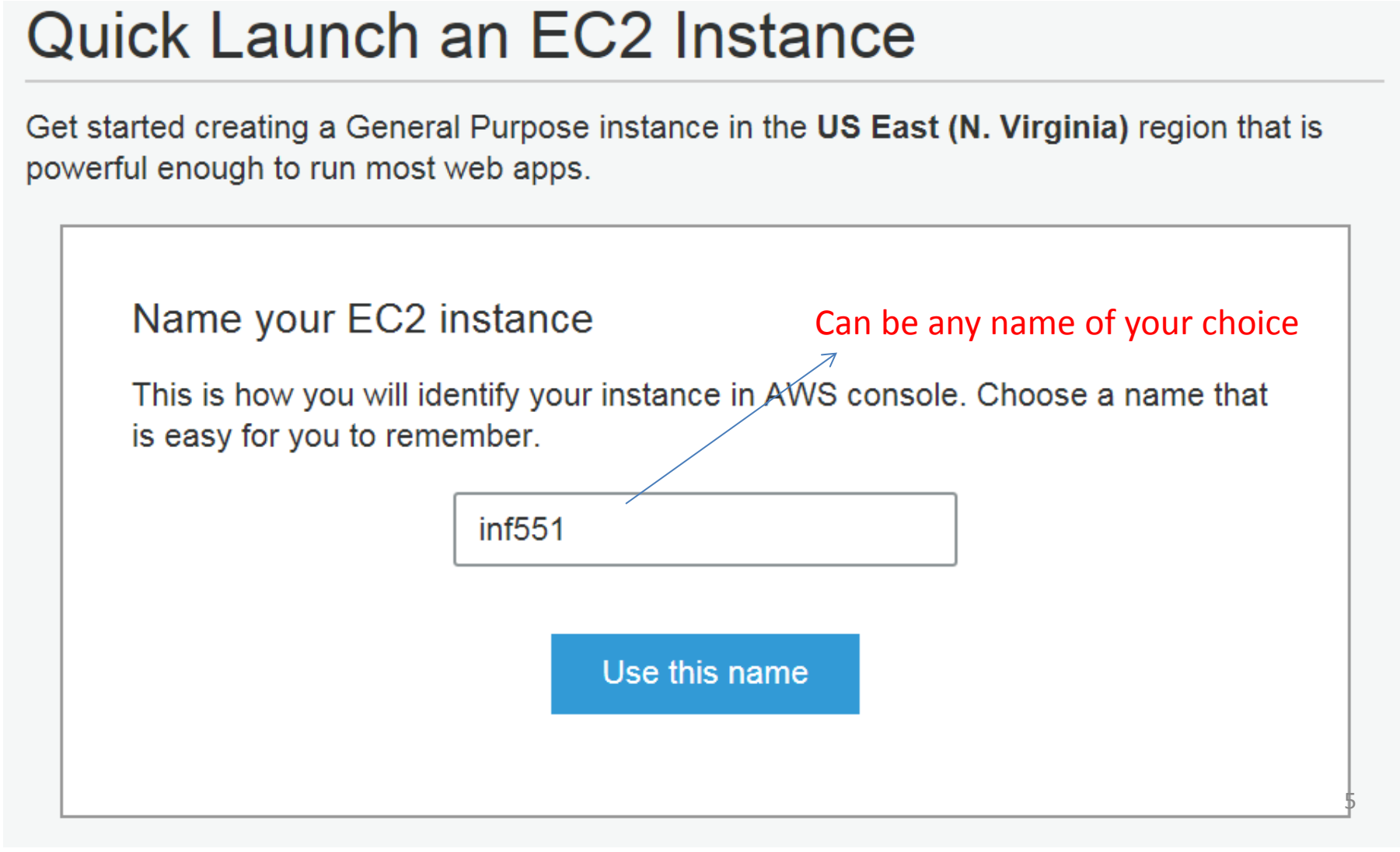
- Make sure you use a credit card

- Do not use a debit card
  - Seems that Amazon requires additional approval for using debit card

Dashboard after logging on

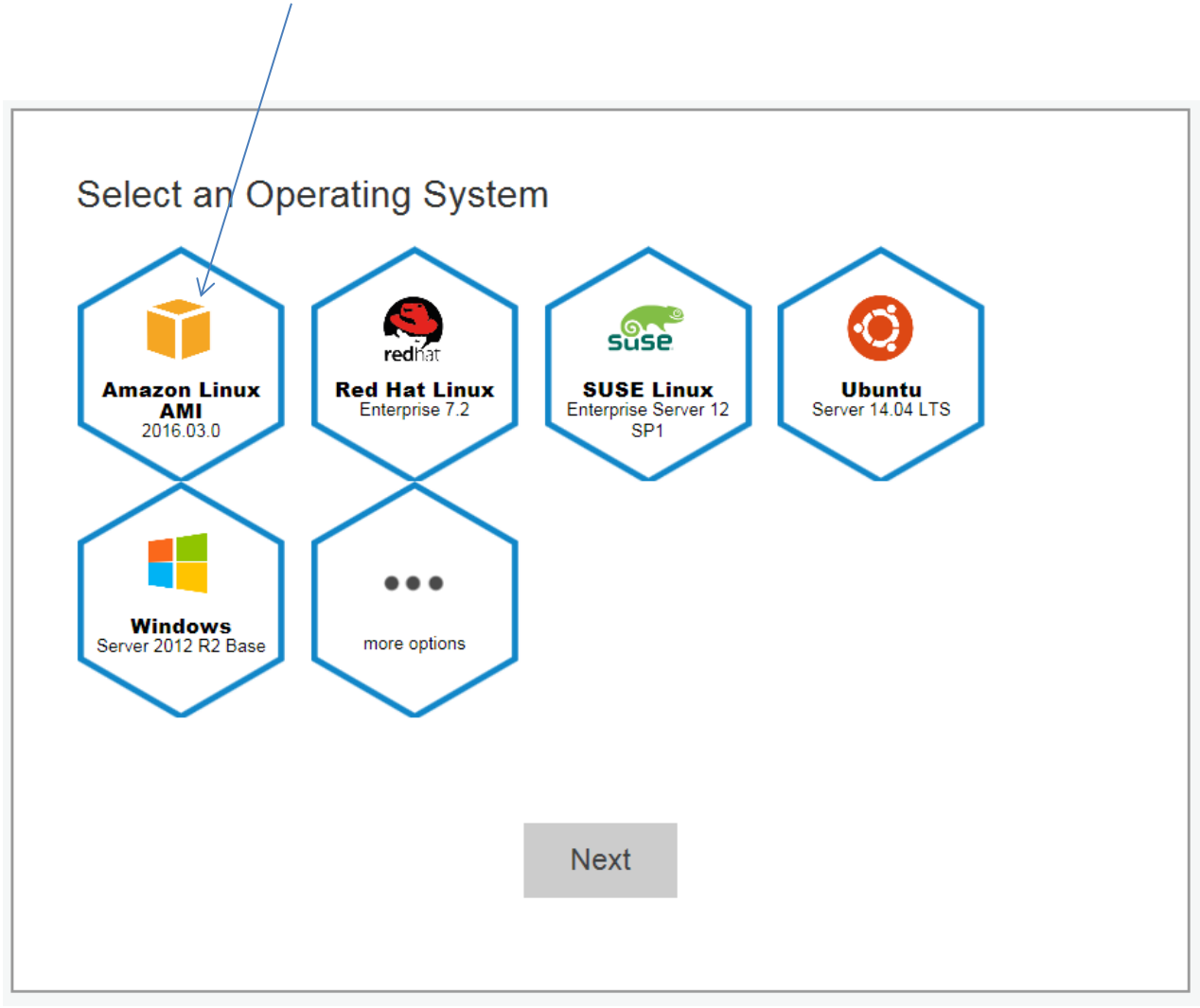


Name the instance



Choose Amazon Linux

- It includes:
  - Java
  - Python
  - MySQL
  - PostgreSQL
  - PHP
  - Ruby
  - Perl



Select t2.micro (free tier)

Select an instance type

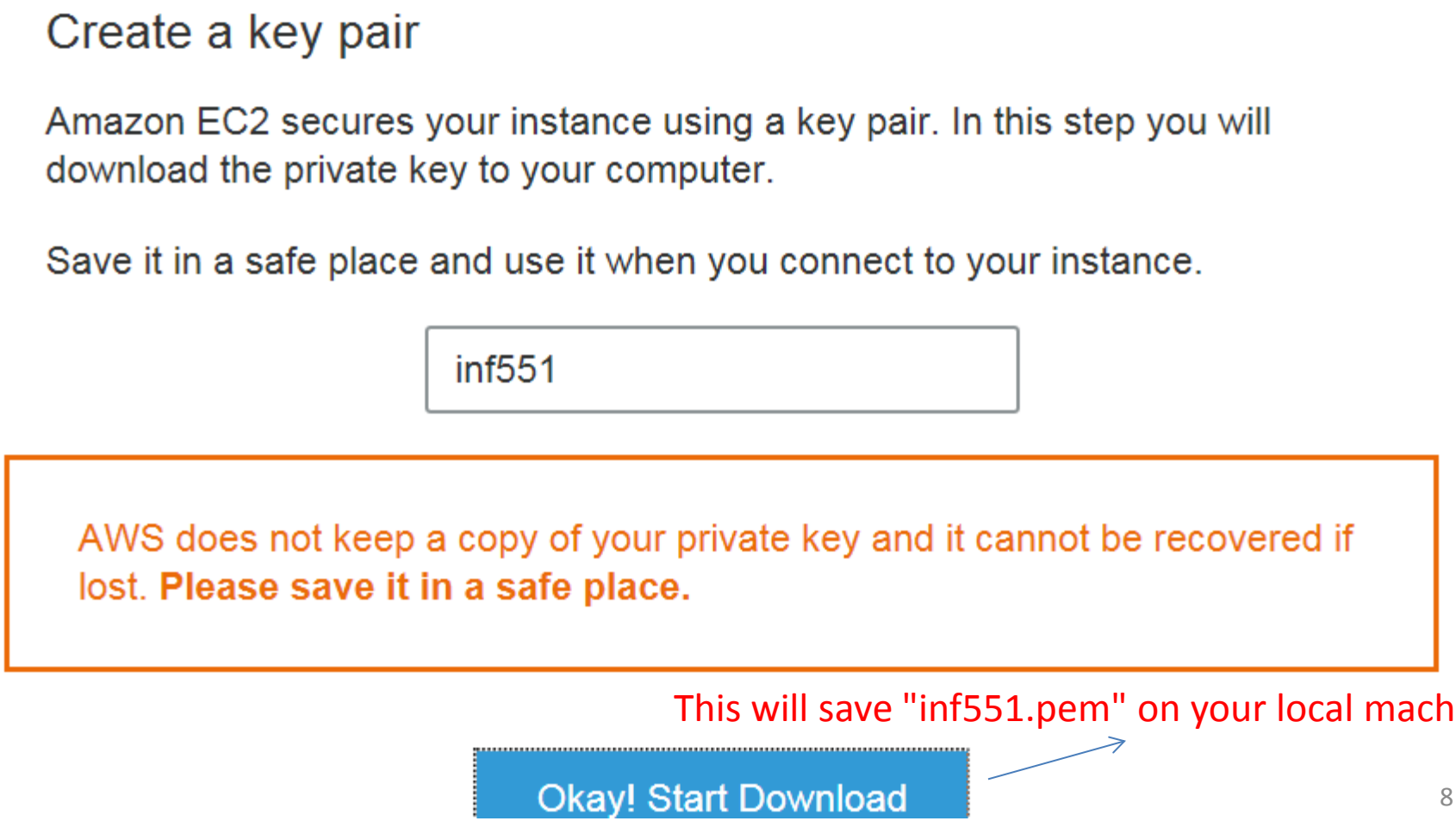
t2.micro

1 Core vCPU (up to 3.3 GHz), 1 GiB Memory RAM, 8 GB Storage

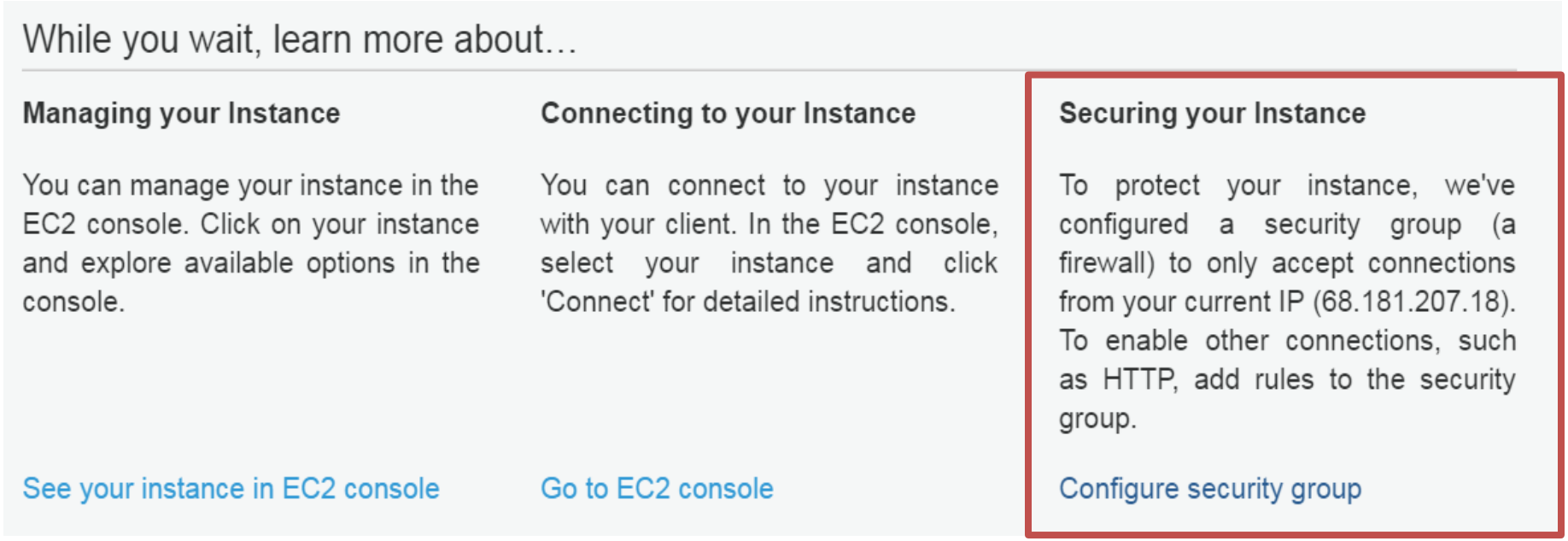
FREE TIER ELIGIBLE

Need a different instance type? AWS offers additional options through the advanced EC2 Launch Instance wizard.

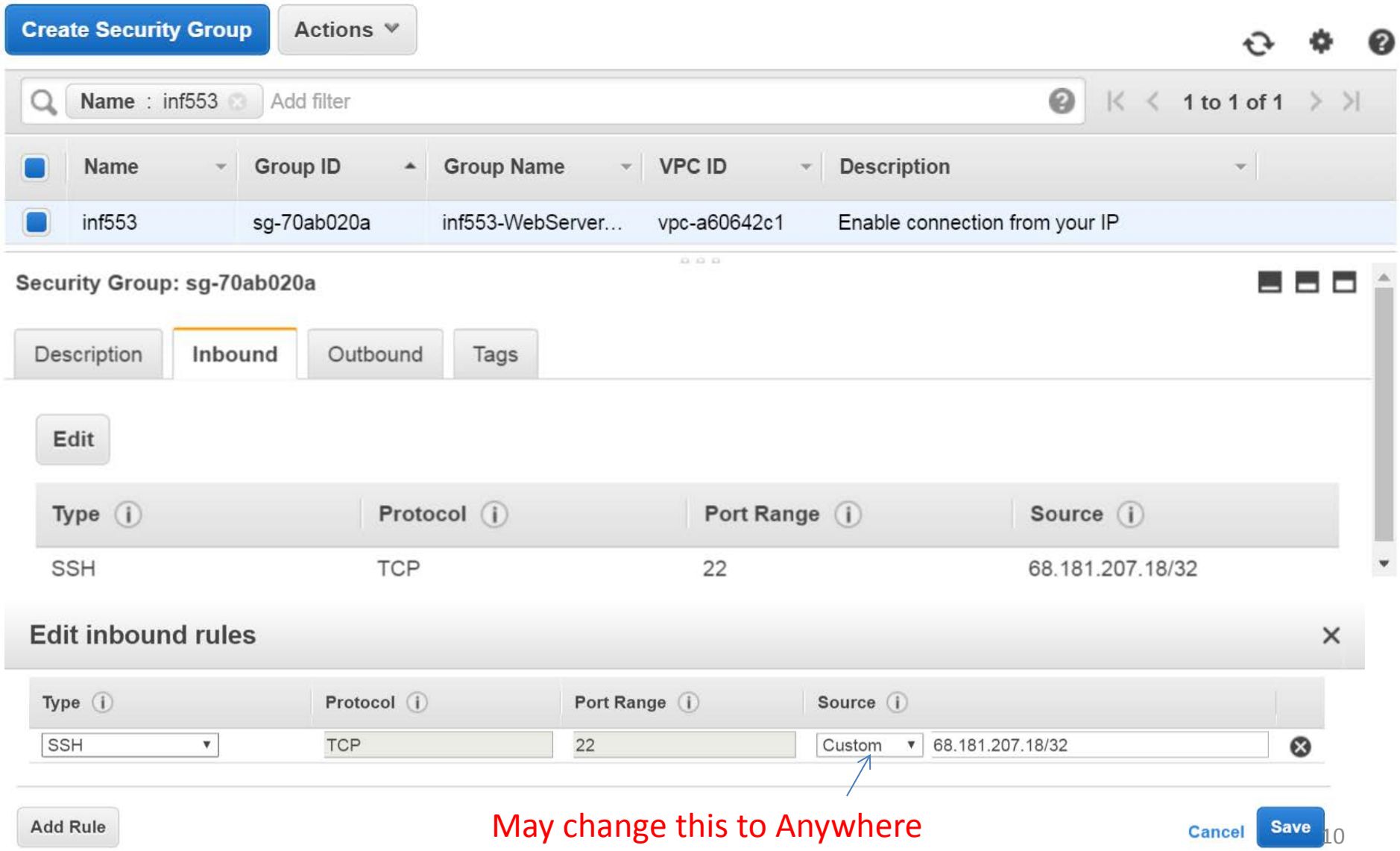
Create an access key pair



Check out security group settings



Default: access permitted from your IP



Connect To Your Instance

I would like to connect with

- (•) A standalone SSH client
- ( ) A Java SSH Client directly from my browser (Java required)

To access your instance:

1. Open an SSH client. (find out how to connect using PuTTY)
2. Locate your private key file (inf551.pem). The wizard automatically detects the key you used to launch the instance.
3. Your key must not be publicly viewable for SSH to work. Use this command if needed:

```
chmod 400 inf551.pem
```

4. Connect to your instance using its Public DNS:

```
ec2-54-224-125-6.compute-1.amazonaws.com
```

Example:

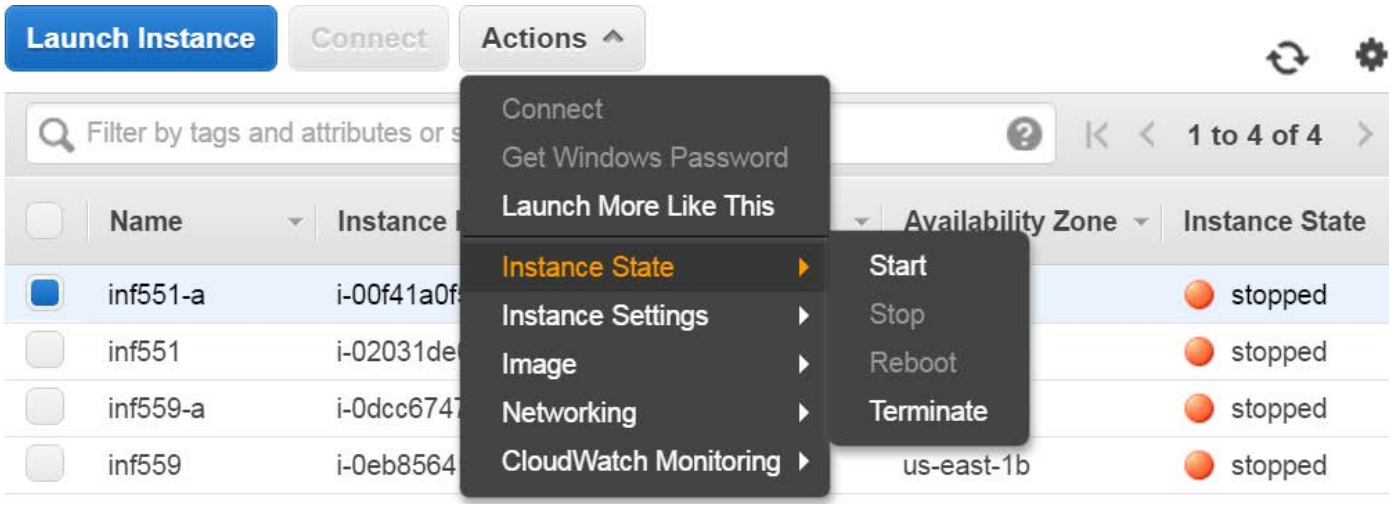
```
ssh -i "inf551.pem" ec2-user@ec2-54-224-125-6.compute-1.amazonaws.com
```

Host address

Start and stop instance

- Remember to stop the instance
  - When you are not using it

- Save energy and avoid bills



Host address

- Host address of your instance may change
  - When you stop and restart the instance
- You need to ssh to the new host address

Permission

- You may not be able to log in anymore
  - When your laptop id address changes
  - And you allow access from a specific IP
- By default, your instance allows access
  - only from the IP address where you log in the first time

Install SSH client

- Windows:
  - Option 1: Install Cygwin and choose openssh
  - Option 2: Install putty package
    - http://tartarus.org/~simon/putty-snapshots/x86/putty-installer.msi
- iOS
  - Mac OS comes with ssh client preinstalled

Cygwin

Cygwin

Get that Linux feeling - on Windows

- First install Cygwin (www.cygwin.com)

What...

...is it?
Cygwin is:

- a large collection of GNU and Open Source tools which provide functionality similar to a Linux distribution on Windows.
- a DLL (cygwin1.dll) which provides substantial POSIX API functionality.

...isn't it?
Cygwin is not:

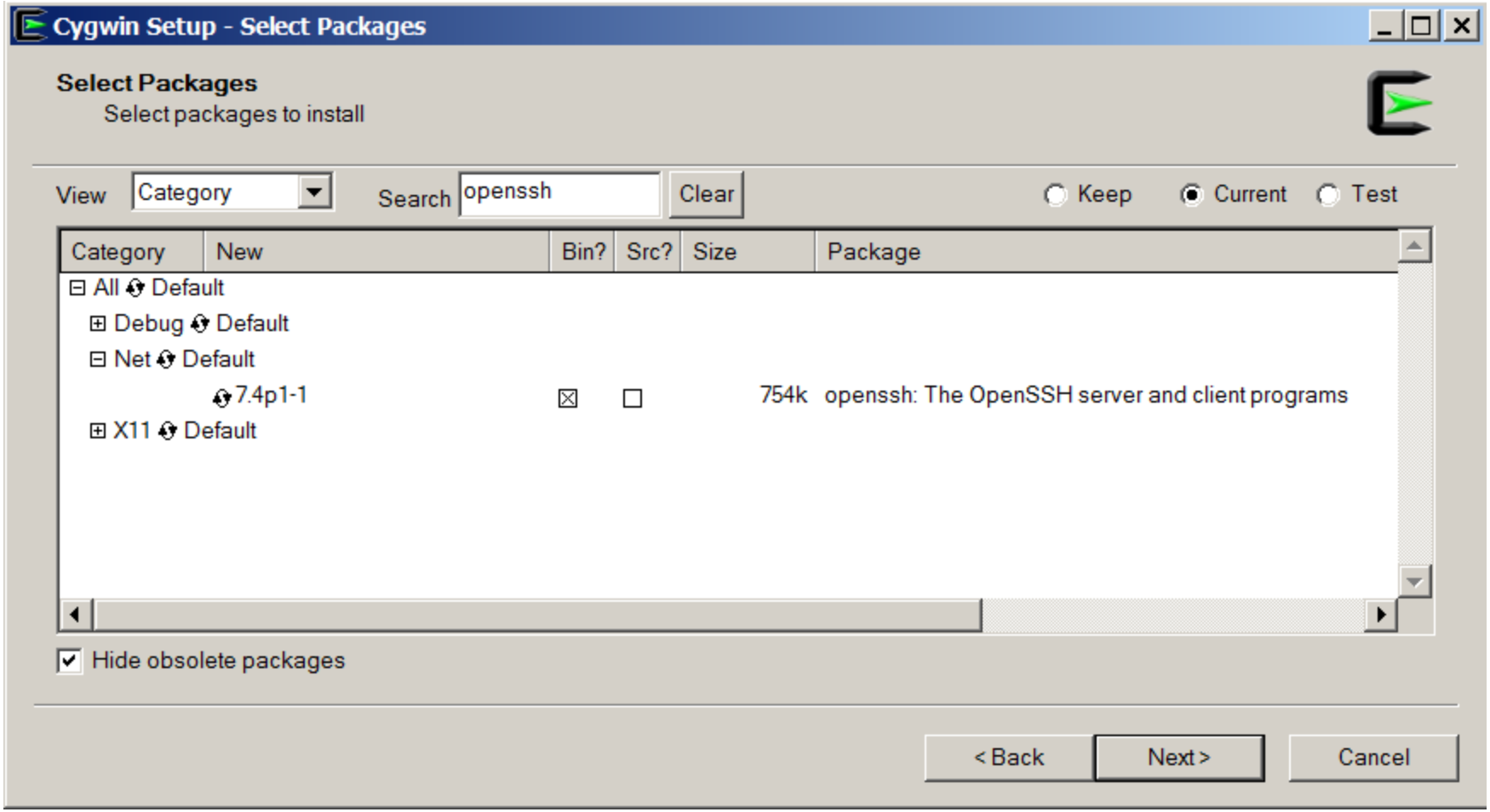
- a way to run native Linux apps on Windows. You must rebuild your application *from source* if you want it to run on Windows.
- a way to magically make native Windows apps aware of UNIX® functionality like signals, ptys, etc. Again, you need to build your apps *from source* if you want to take advantage of Cygwin functionality.

Choose either this (if your OS is 64bit) or this

Current Cygwin DLL version

The most recent version of the Cygwin DLL is 2.6.1. Install it by running setup-x86.exe (32-bit installation) or setup-x86_64.exe (64-bit installation).

Make sure you select "openssh"



Start Cygwin

- Once installed, look for Cygwin program folder in your list of programs

- Select "Cygwin64 Terminal"
  - This starts a bash command line window like below
  - Note by default your home directory ~ is located in c:\cygwin64\home\<your user id>

Cygwin64 Terminal

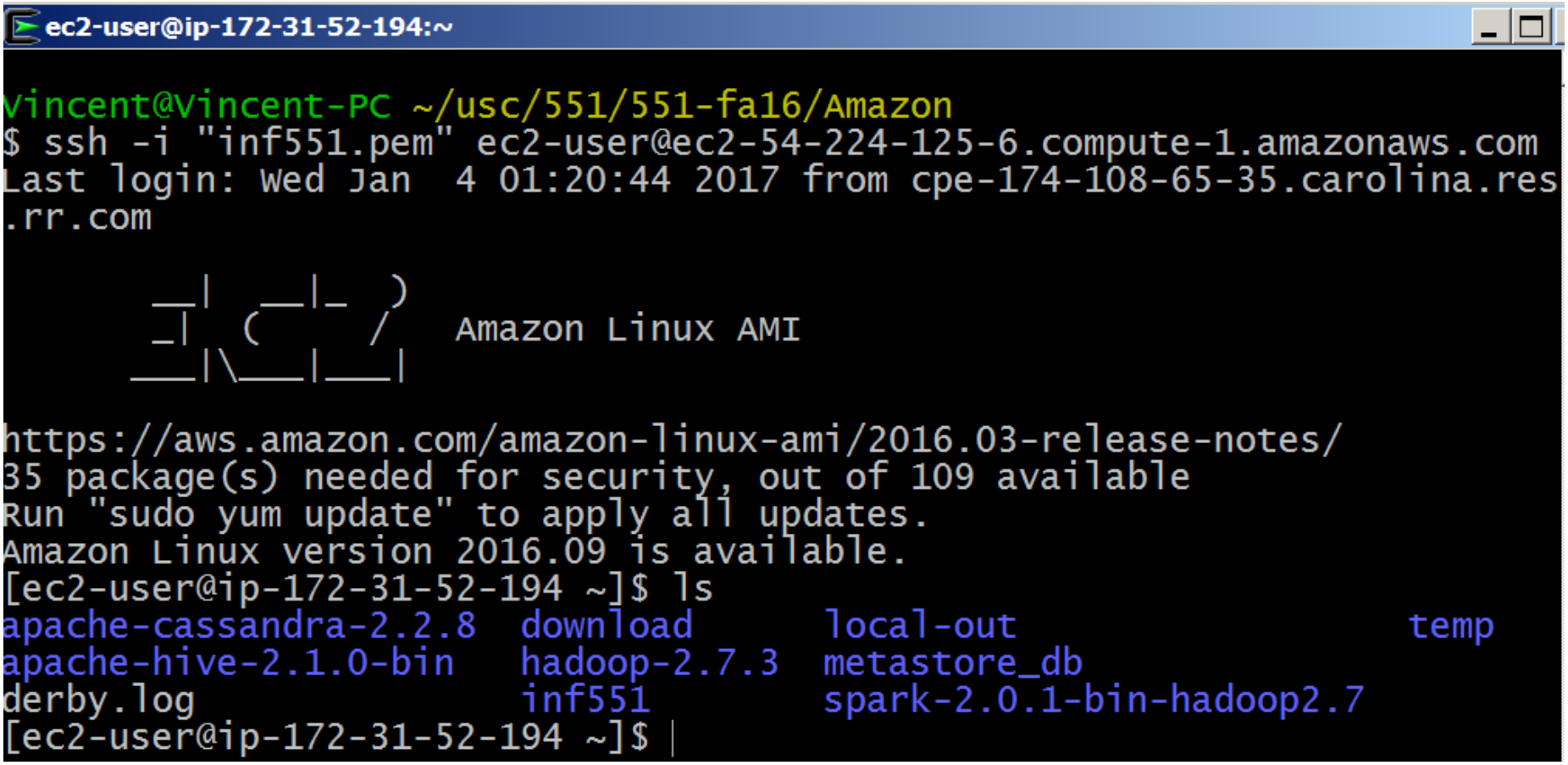
- A Linux bash shell
  - Note it uses forward slashes
  - E.g., cd usc/551/551-sp17
- But it accepts Windows style path (if quoted)
  - E.g., cd "c:\cygwin64"

Log onto EC2 from Cygwin

- ssh -i <your identify file.pem> ec2-user@ec2-[your ec2 instance ip].compute-1.amazonaws.com
  - Replace ssh above with sftp for file transfer

- Note: pem file is used here, no need to convert it to ppk file as in Putty

Log into EC2 instance via Cygwin



First time log in…

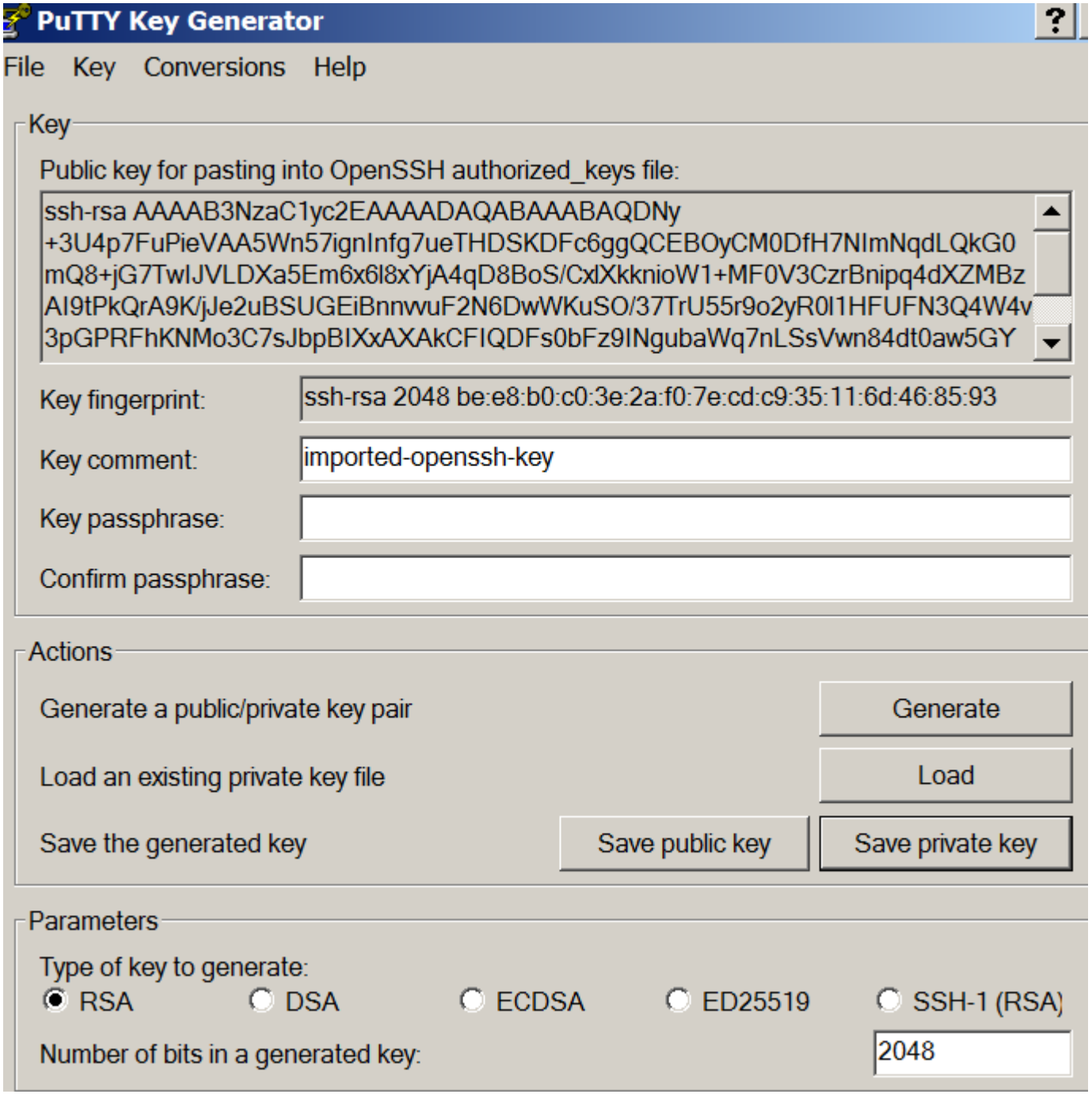
```
Vincent@Vincent-PC ~/usc/551/551-fa16/Amazon
$ ssh -i "inf551.pem" ec2-user@ec2-54-173-96-53.compute-1.amazonaws.com
The authenticity of host 'ec2-54-173-96-53.compute-1.amazonaws.com (54.1
73.96.53)' can't be established.
ECDSA key fingerprint is SHA256:jY9qPXiec94tsH/A2pVN0vlPb9qkyUGlb9hCbHtc
Mfo.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-54-173-96-53.compute-1.amazonaws.com,54.
173.96.53' (ECDSA) to the list of known hosts.
Last login: Thu Jan  5 01:34:30 2017 from cpe-174-108-65-35.carolina.res
.rr.com

       __|  __|_  )
       _|  (     /   Amazon Linux AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-ami/2016.03-release-notes/
38 package(s) needed for security, out of 112 available
Run "sudo yum update" to apply all updates.
Amazon Linux version 2016.09 is available.
[ec2-user@ip-172-31-52-194 ~]$
```

Connect to instance using Putty

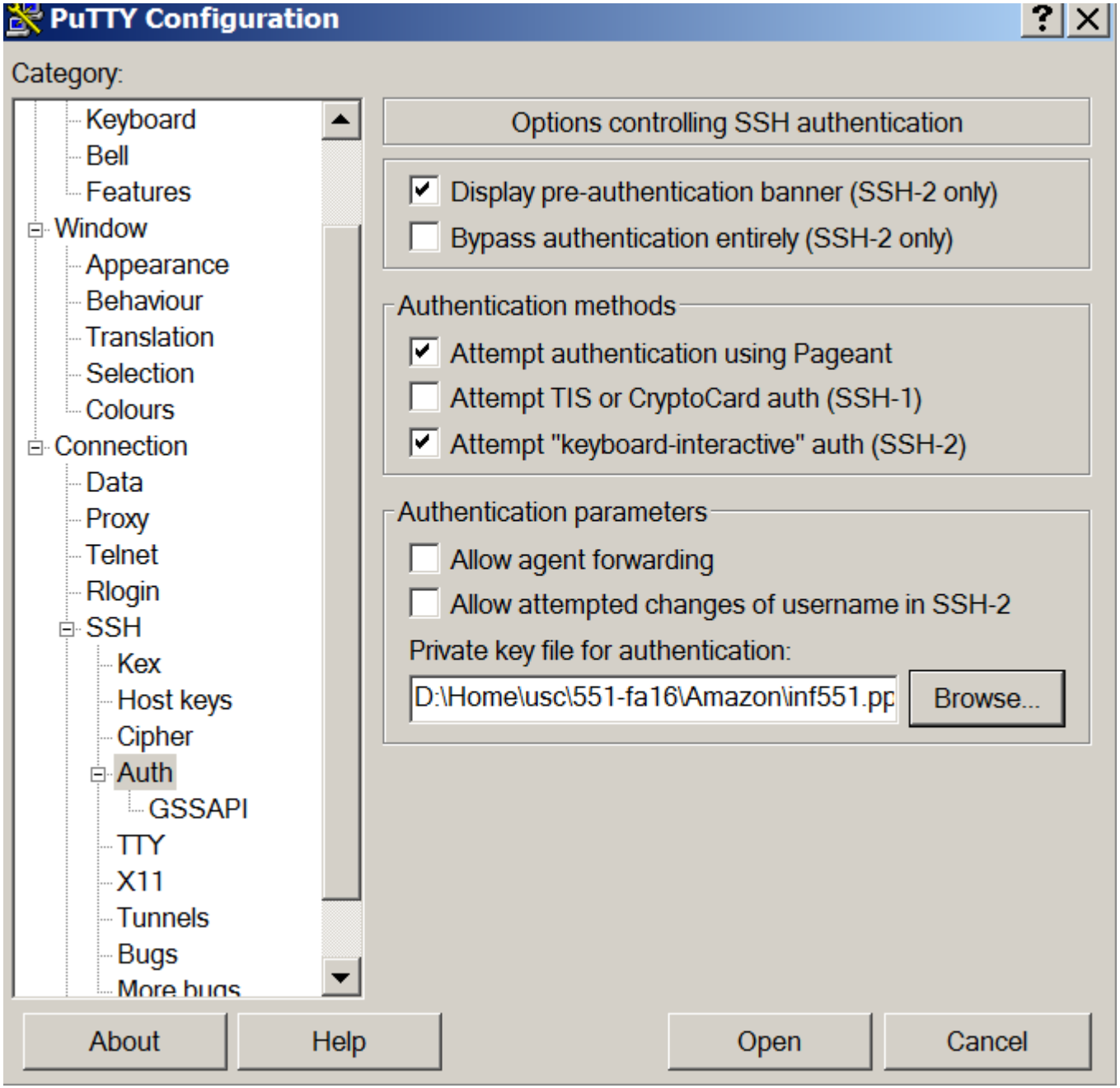
- Instructions on how to connect from Windows using PuTTY
  - https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/putty.html?icmpid=docs_ec2_console

Convert key to Putty format

- Converting Your Private Key Using PuTTYgen
  - https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/putty.html?icmpid=docs_ec2_console


PuTTY Key Generator
File Key Conversions Help
Key
Public key for pasting into OpenSSH authorized_keys file:
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDNy
+3U4p7FuPieVAA5Wn57ignInfg7ueTHDSKDFc6ggQCEBOyCM0DfH7NImNqdLQkG0
mQ8+jG7TwIJVLDXa5Em6x6l8xYjA4qD8BoS/CxlXkknioW1+MF0V3CzrBnipq4dXZMBz
AI9tPkQrA9K/jJe2uBSUGEiBnnvuF2N6DwWKuSO/37TrU55r9o2yR0l1HFUFN3Q4W4v
3pGPRFhKNMo3C7sJbpBIXxAXAkCFIQDFs0bFz9INgubaWq7nLSsVwn84dt0aw5GY
Key fingerprint:
ssh-rsa 2048 be:e8:b0:c0:3e:2a:f0:7e:cd:c9:35:11:6d:46:85:93
Key comment:
imported-openssh-key
Key passphrase:
Confirm passphrase:
Actions
Generate a public/private key pair
Generate
Load an existing private key file
Load
Save the generated key
Save public key
Save private key
Parameters
Type of key to generate:
RSA
DSA
ECDSA
ED25519
SSH-1 (RSA)
Number of bits in a generated key:
2048


PuTTY Configuration
Category:
Session
Logging
Terminal
Keyboard
Bell
Features
Window
Appearance
Behaviour
Translation
Selection
Colours
Connection
Data
Proxy
Telnet
Rlogin
SSH
Kex
Host keys
Cipher
Auth
GSSAPI
TTY
X11
Basic options for your PuTTY session
Specify the destination you want to connect to
Host Name (or IP address)
Port
ec2-user@ec2-54-174-27-183.compute-1
22
Connection type:
Raw
Telnet
Rlogin
SSH
Serial
Load, save or delete a stored session
Saved Sessions
Default Settings
Load
Save
Delete
Close window on exit:
Always
Never
Only on clean exit
About
Help
Open
Cancel


PuTTY Configuration
Category:
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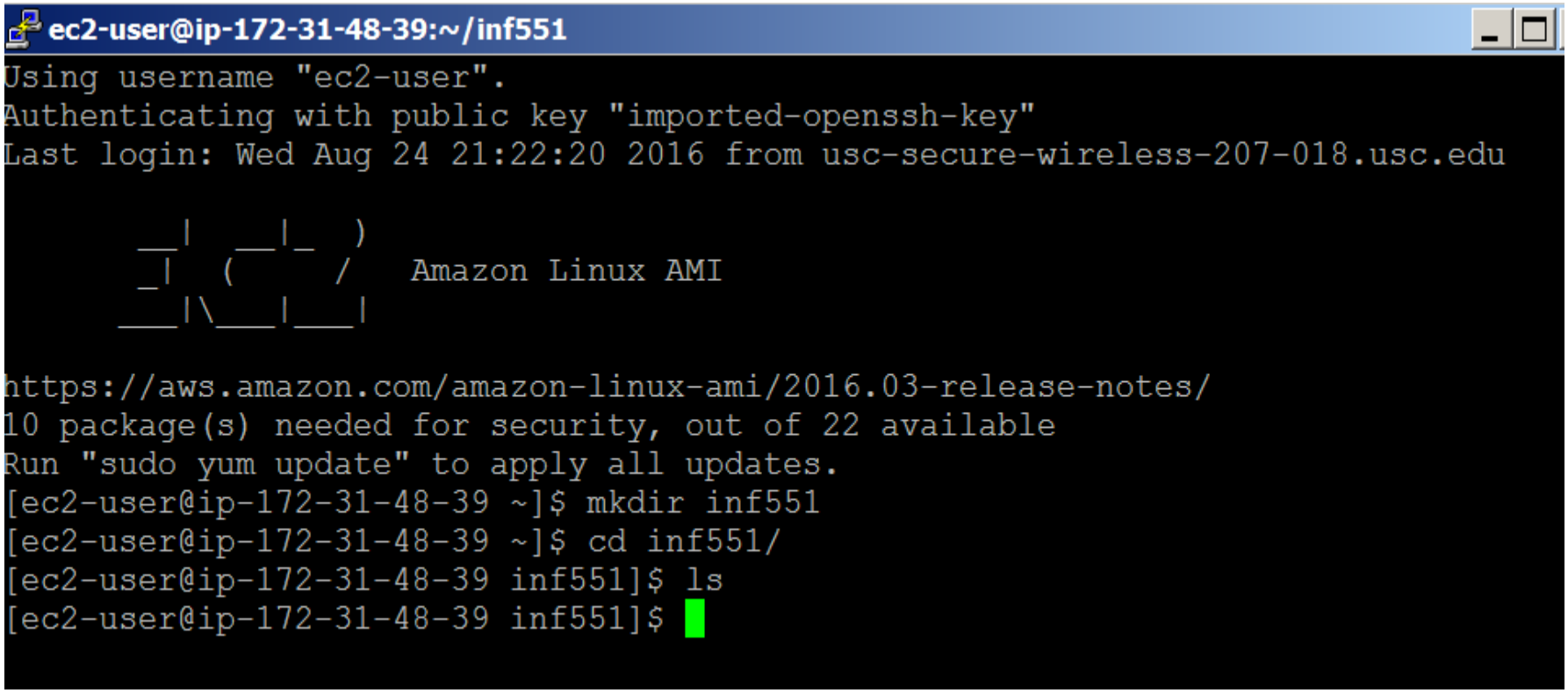
Data
Proxy
Telnet
Rlogin
SSH
Kex
Host keys
Cipher
Auth
GSSAPI
TTY
X11
Tunnels
Bugs
More bugs
Options controlling SSH authentication
Display pre-authentication banner (SSH-2 only)
Bypass authentication entirely (SSH-2 only)
Authentication methods
Attempt authentication using Pageant
Attempt TIS or CryptoCard auth (SSH-1)
Attempt "keyboard-interactive" auth (SSH-2)
Authentication parameters
Allow agent forwarding
Allow attempted changes of username in SSH-2
Private key file for authentication:
D:\Home\usc\551-fa16\Amazon\inf551.pp
Browse...
About
Help
Open
Cancel

Connected

- Create a directory called inf551



Submission to blackboard

- A screenshot like previous slide, showing
  - You are successfully connected
  - You have created a directory called inf551

Extra

- Update pre-installed packages
  - sudo yum update

```
  curl.x86_64 0:7.40.0-8.59.amzn1
  dracut.noarch 0:004-409.31.amzn1
  kernel-tools.x86_64 0:4.4.16-27.56.amzn1
  libcurl.x86_64 0:7.40.0-8.59.amzn1
  libevent.x86_64 0:2.0.21-4.19.amzn1
  ntp.x86_64 0:4.2.6p5-41.32.amzn1
  ntpdate.x86_64 0:4.2.6p5-41.32.amzn1
  openssl.x86_64 1:1.0.1k-15.93.amzn1
  python27.x86_64 0:2.7.10-4.122.amzn1
  python27-boto.noarch 0:2.42.0-1.1.amzn1
  python27-botocore.noarch 0:1.4.46-1.58.amzn1
  python27-devel.x86_64 0:2.7.10-4.122.amzn1
  python27-libs.x86_64 0:2.7.10-4.122.amzn1
  tzdata.noarch 0:2016f-1.63.amzn1
  tzdata-java.noarch 0:2016f-1.63.amzn1
  vim-common.x86_64 2:7.4.1967-1.42.amzn1
  vim-enhanced.x86_64 2:7.4.1967-1.42.amzn1
  vim-filesystem.x86_64 2:7.4.1967-1.42.amzn1
  vim-minimal.x86_64 2:7.4.1967-1.42.amzn1
  wget.x86_64 0:1.18-1.18.amzn1

Complete!
```

Get familiar with the instance

- It has the following preinstalled
  - nano (text editor)
  - vi
  - python
  - curl
  - perl
  - ssh
  - wget
  - java

Install java sdk

- sudo yum install java-devel

Trouble shooting

- If you see error: "xxx.pem" permission is too open, change its mode to read only by owner
  - chmod 400 xxx.pem

sftp/psftp

- sftp: secure file transfer
  - psftp: putty version of sftp

- Tutorials that may be useful
  - https://kb.iu.edu/d/akqg
  - https://www.digitalocean.com/community/tutorials/how-to-use-sftp-to-securely-transfer-files-with-a-remote-server

Python tutorials

- Learn Python - Free Interactive Python Tutorial
  - http://www.learnpython.org/
- The Python Tutorial — Python 3.5.2 documentation
- Google's Python Class | Python Education | Google Developers