



# Introduction to Cloud Computing and AWS

- Provides on-demand delivery of compute power, database storage, applications, and other IT resources via the Internet.
- Access as many resources as you need - almost instantly.
- Only pay for what you use: pay-as-you-go pricing.
- Simple way to access servers, storage, databases and a broad set of application services over the Internet.
- Amazon Web Services (AWS) is a cloud services platform that owns and maintains the network-connected hardware, while you provision and use what you need via a web

application.

Source: Adapted from AWS



# AWS Services & Terms

- **EC2:** Amazon Elastic Compute Cloud (EC2) provides resizable compute capacity in the cloud, includes server configuration and hosting.
  - **Service to provide a virtual machine**
- **Instance:** Virtual computing environments on EC2.
  - **a.k.a. virtual machine**
- **EBS:** Elastic Block Storage is block storage service that is used with EC2 instances.
- **S3:** Amazon Simple Storage Service (S3) can be used to store and retrieve any amount of data.
- **AMI:** Amazon Machine Image is a special feature that is used to create a virtual machine within the Amazon Elastic Compute Cloud ("EC2") used to deploy applications.
  - **a.k.a. pre-built virtual environment**

- Many, many more services and terms: <https://docs.aws.amazon.com/index.html>

Source: Adapted from AWS



# Using AWS EC2

**1) Launch Instance**

**2) Manage Instance**

**3) Access Instance**

**4) Do Science!**



- **Via AWS Console (web interface)**
- **Via AWS Command Line Interface (AWS CLI)**



# Using AWS EC2

- 1) Launch Instance
- 2) Manage Instance
- 3) Access Instance
- 4) Do Science!

- **Already done for this tutorial.**
- **But, will give brief overview using the AWS console (web interface).**

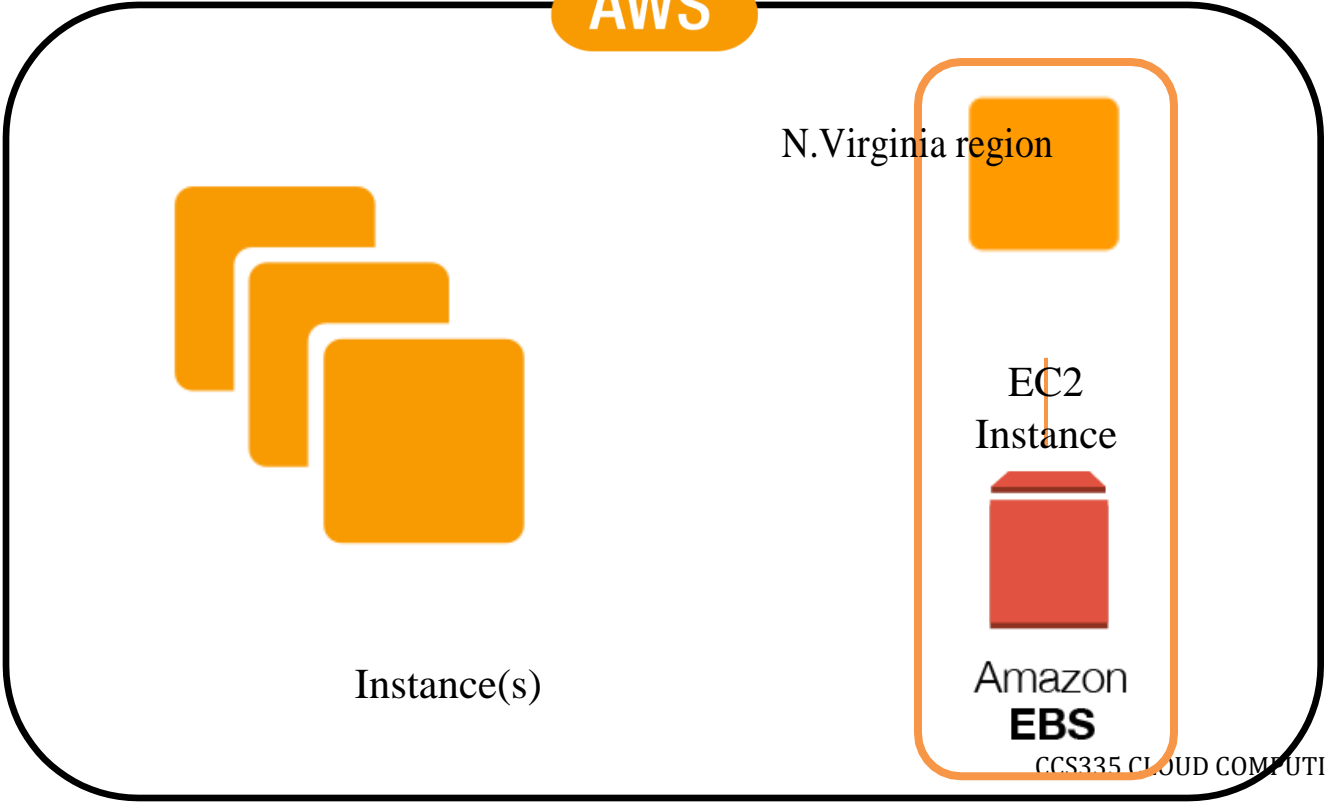
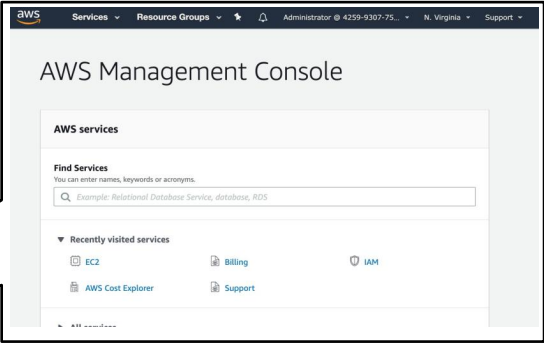
The screenshot shows the AWS website interface. At the top, there is a navigation bar with links for 'ABOUT', 'TESTING + EVALUATION', 'COMMUNITY CODE', 'VISITOR PROGRAM', 'NEWS', and 'EVENTS'. Below this is a header for 'TUTORIAL - VERSION 3 | INTRODUCTION > RUNNING IN THE CLOUD'. The main content area is titled 'Amazon Web Services (AWS)' and includes a sub-section 'CREATING AN INSTANCE ON AWS'. A step-by-step guide is provided, with the first step being 'Go to the main AWS webpage (https://aws.amazon.com/) in a browser window.' Below this, a browser window is shown with the URL 'https://aws.amazon.com'. The 'Create an AWS Account' button is highlighted with a red circle. To the right of the main content is a 'CONTENTS' sidebar with a list of links, including 'Introduction', 'How To Use This Tutorial', 'Running On A Local Machine', 'Running In The Cloud' (which is highlighted in yellow), 'AWS Tips', 'Docker Commands And Tips', 'Repository', 'Data Containers', 'Software Containers', 'Hurricane Sandy Case (27 Oct 2012)', 'Snow Case (23 Jan 2016)', 'Derecho Case (29 Jun 2012)', and 'Customization'.

**Procedures also available under the Introduction section of the Online Tutorial: “Running In The Cloud”**



# Set up & Launch your instance using AWS console

You!



Source: Adapted from AWS





# Set up & Launch your instance using AWS console

You!

N. Virginia region

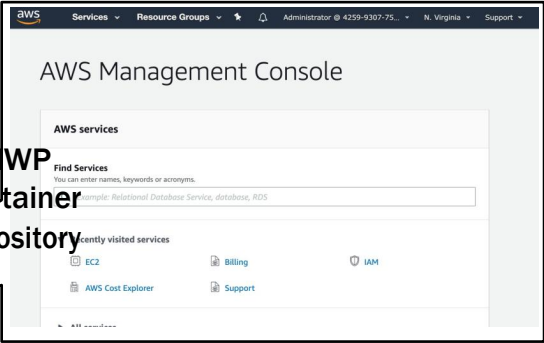
**AMI: container-dtc-nwp-AWS\_SC**

AWS Linux 2

EC2  
Instance

wgrib2

AMI



NWP  
container  
repository



Source: Adapted from AWS



git  
GCC  
docker  
Amazon EBS  
Image Magick



Amazon EBS



# Set up & Launch your instance using AWS console

You!

**AMI: container-dtc-nwp-AWS\_SC**

AWS Linux 2

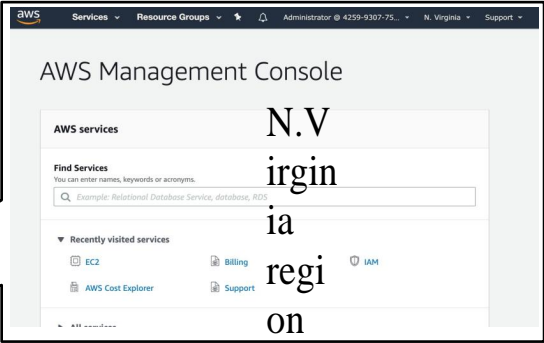
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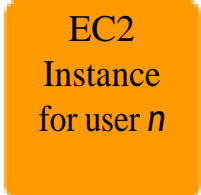
EC2 Instance for user 2



AMI



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AMI

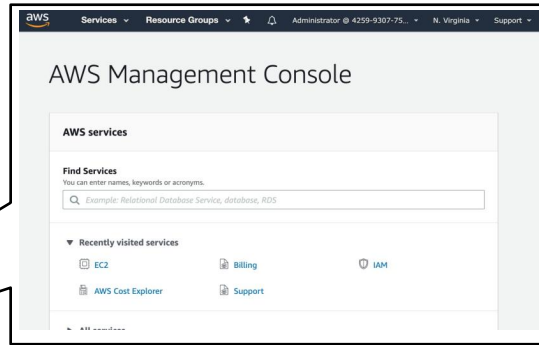


Source: Adapted from AWS



# Manage your Instance via AWS Console

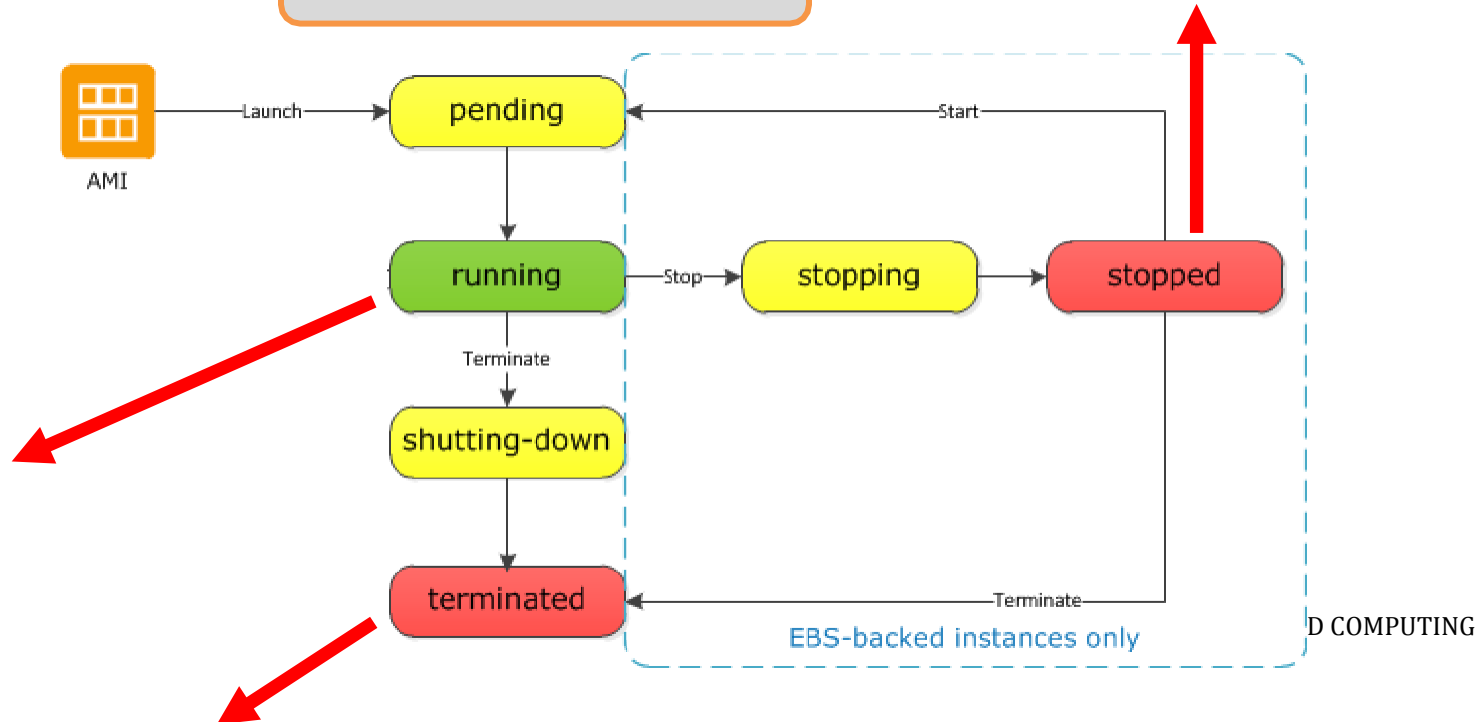
You!



## Instance Life Cycle

**Running:** Instance is running and accessible.

**Stopped:** The instance is shut down and cannot be used. But can be restarted at any time. No charges for EC2 Instance.



Account charged.

**Terminated:** Instance has been permanently deleted and cannot be restarted. All data gone. No charges.

Source: Adapted from AWS

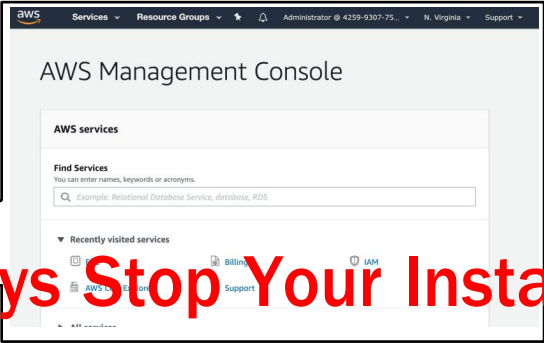
**Manage**  
**your Instance via**  
**AWS Console**

**You!**



**Instance Life Cycle**

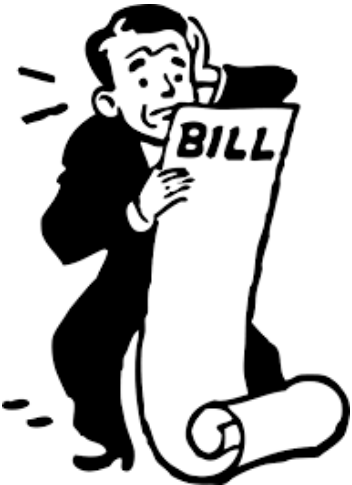
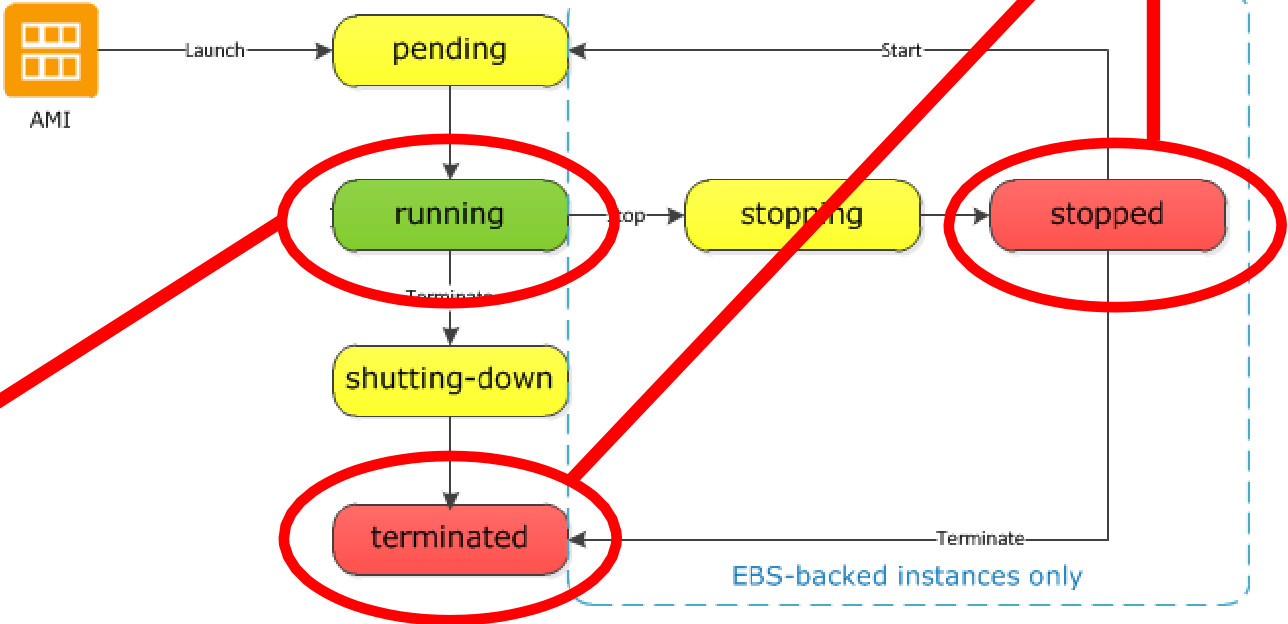
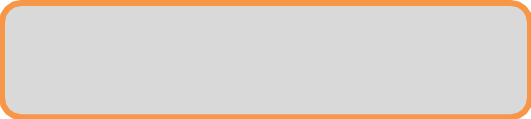




**Always Stop Your Instance!!**



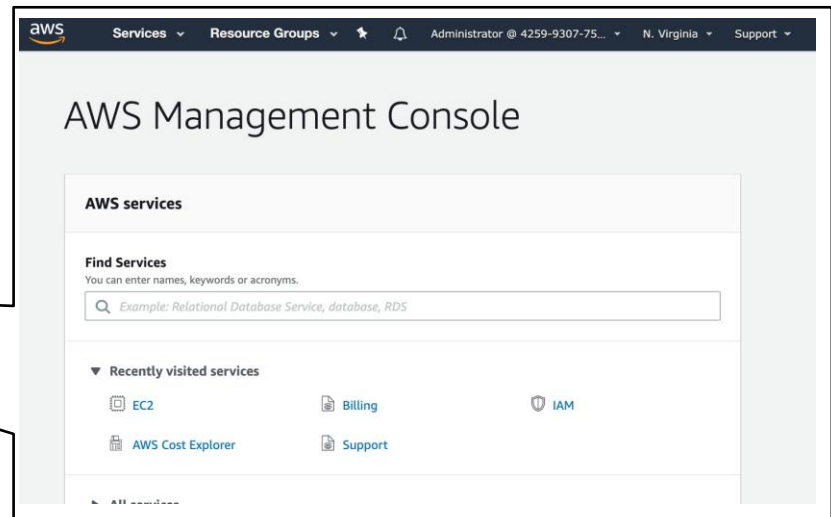
Source: Adapted from AWS





# AWS Console Tour

You!

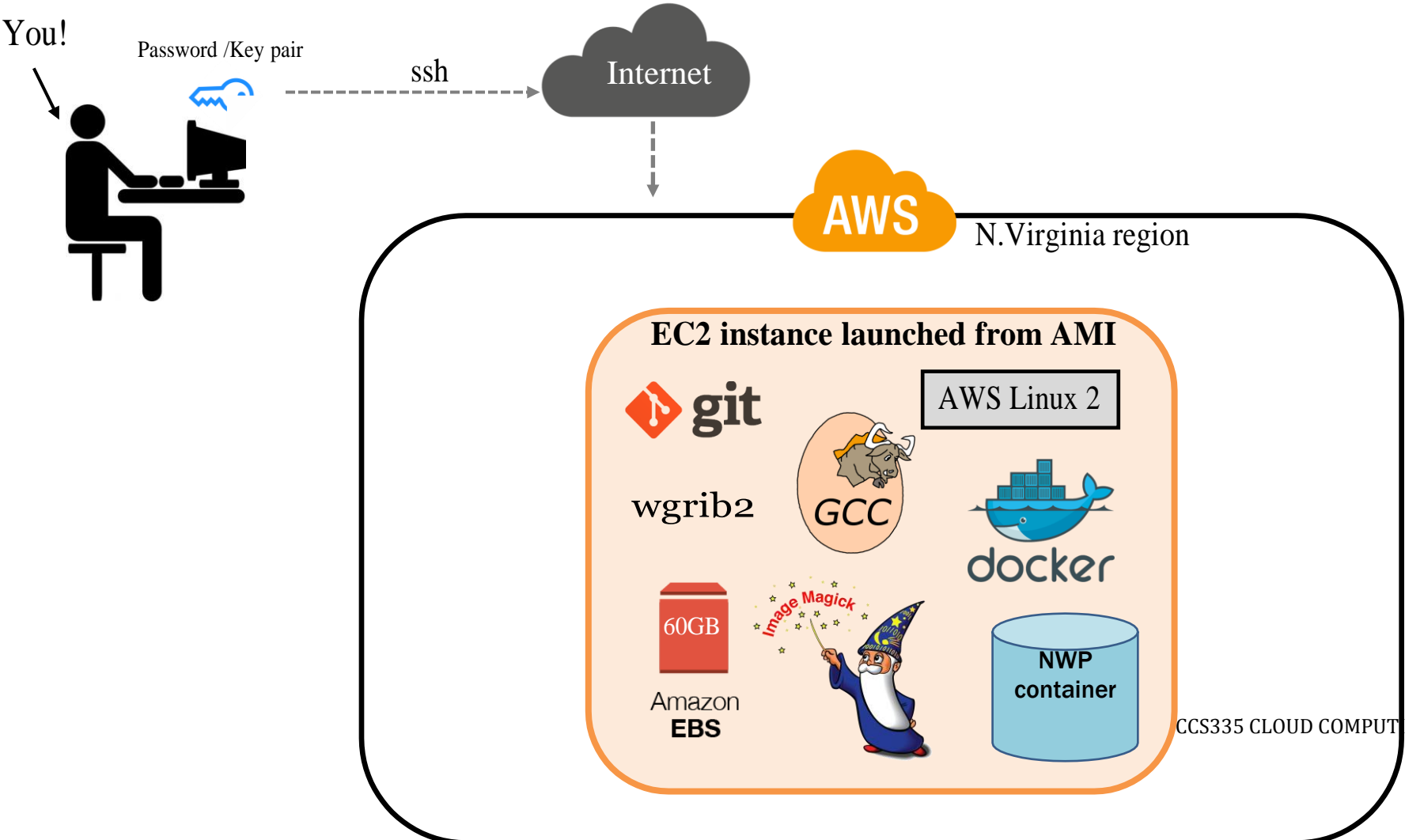


Let's take a look....

<https://aws.amazon.com/>



# Access & Do Science with your Instance via ssh



**repository**

Source: Adapted from AWS



# Login to your EC2 Instance

- Open a Terminal Window
- Navigate to a working directory
- Use the login credentials provided
  - All participants use username: “**ec2-user**”
  - Each participant has a **unique IP** address and **password**

## Mac Users:

```
>> ssh -Y ec2-user@yourIPAddress
[enter password]
```

## Other Users:

```
>> ssh -X ec2-user@yourIPAddress
[enter password]
```

You!



```
falkor.local:/Users/fossell/AWS>
falkor.local:/Users/fossell/AWS>ssh -Y ec2-user@3.93.181.64
ec2-user@3.93.181.64's password:
Warning: No xauth data; using fake authentication data for X11 forwarding.
Last login: Sun Jan  5 04:32:17 2020 from 75-163-180-95.clsp.qwest.net
```

```
  _|  ( _|_ )
  _|  ( _|_ /  Amazon Linux 2 AMI
  _|\_|_|_|_|
```

```
https://aws.amazon.com/amazon-linux-2/
[[ec2-user@ip-172-31-30-2 ~]$
```

- **Logged into EC2 Instance**
- **Bash Shell**

