# High-Level

\* Recap

Quick Intro - Not an Expert!

What ... How ... HOW

Last Meeting - Deployments

Why AWS?

\* Ask group about AWS familiarity

\* Please jump in w/ any questions or clarifications!

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# \* Sign up w/ AWS

- Go to http://aws.amazon.com/

- Click "Sign Up Now" button

- Enter your email address

- Fill in the account form

- Enter your credit card info

- Can banking account and routing info work?

- Would an Amazon gift card work?

- Fill in identity verification form

- You should receive a text w/ a PIN... Type PIN in the browser

- Do you have to provide a phone #?

- Wait for your "Welcome" e-mail

# \* Explain First Components and Concepts

- Log into your console

- Virtualization

Allows isolated multiple programs/users to share physical HW resorces

- Regions and Availablity Zones

Physical regions where actual hardware is located

Pricing varies by region (not for availability zones)

Some service restrictions across regions (not for availability zones)

- EC2 (VPC)

Virtual Computing Power

- AMI

Image of an EC2 at a given point in time

- EBS

Permanent data store independent of an EC2's life

- IP Addresses (Elastic and Default) ... Security Groups

- SSH ... PuTTY ... Ports ... pem/ppk files … Ubuntu ... Nginx

# \* Launch EC2 Instance

- AMI Ubuntu 14.04 (Free; EBS-backed)

- Find CIC Wifi IP Address

My Home: 24.178.249.218/32

Chuck Berry: 65.254.97.40/32

- Security Group

- Do NOT Delete EBS on EC2 Termination

- Save .pem file location

- Note the EC2 IP Address

# \* Install PuTTY

- Ask group who is using Windows machines at home!

### - http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/putty.html

- Download PuTTY and PuTTYgen

- URL: PuTTY page

### http://www.putty.org/

### http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

Latest Release Version

putty.exe

puttygen.exe

- Did I need to do anything else?

- Convert .pem file to .ppk

Execute PuTTYgen First!

- Did I need to do anything else?

- Other PuTTY links:

### http://stackoverflow.com/questions/10287337/ssh-to-amazon-ec2-instance-using-putty-in-windows

# \* Failed Login Attempt #1

- Use the correct syntax (ubuntu... NOT ec2)!

Host Name => ubuntu@ec2-52-1-143-200.compute-1.amazonaws.com

Port => 22

Connection type => SSH

- No .ppk key

# \* Successful Login Attempt

- Added .ppk key

SSH >> Auth -> Private key file =>

C:\Users\bryan\Downloads\bjones-key-pair-east.ppk

- Remove IP Address from Security Group for Failed #2 (?)

# \* Ubuntu!

- ubuntu@ip-172-30-0-31

User Name: ubuntu

Host Name: ip-172-30-0-31

# \* Key Ubuntu Directories

- bin

core binaries used by admins and regular users

- sbin

sys binaries for recovery if boot not working - only used by admins

- boot

stores kernel images and other configuration files

- lib

core system binaries to complete the boot process

- mnt

generic location to mount a disk temp (to move files to/from the system)

- media

mount point for removable media (flopp disks, CD-ROMs, USBs)

- home

home dir's for all users on the system (mount to preserve user settings)

\*\* I used this to send files via FTP \*\*

- proc

virtual file system; not on disk - in RAM!!; live system info here (PIDs)

- root

home directory for the root user

- var

store files that can be variable in size (e.g. sys logs, web server docs)

[allows us to mount var as its own partition, maybe on faster disks?

If growth is too much the system won't crash]

- tmp

stores temporary state info

- sys

virtual file system; info about devices and drivers

- etc

config files for services; system start-up scripts

(etc/init, etc/init.d, etc/default)

\*\* Always at least backup this directory! \*\*

- usr

non-critical binaries and libraries

(allows main root partition to stay small)

# \* Basic Linux Commands

- EXPLAIN sudo!

- DEFN: sudo allows you to perform operations on files that only the

Root User would be allowed to change

- See your version of Ubuntu

lsb\_release -a

- Takes you to the top-level directory

cd /

\* Explain Absolute vs. Relative Paths!

- See the folders and files

ls

- Move up one level

cd ..

- Move up two levels

cd ../..

# \* Explain Web Server

- DEFN::

A program that uses HTTP to serve files that form web pages to users

User computers contain HTTP clients that forward their requests

Each computer on the Internet has a web server program

Ex: Apache, MS IIS, Node.js, and .... Nginx!

- Find your EC2's ip address (cmd vs. console)

curl http://icanhazip.com

# \* Failed URL - Home Attempt #1

- No Web Server

# \* Install Nginx

- Find a file (or folder?) by name

find / -name "nginx\*" 2> /dev/null

- See latest available version (per Ubuntu)

apt-cache policy nginx [postgresql | php5 | php5-fpm]

- Get latest updates

sudo apt-get update

- Install latest package (per Ubuntu)

sudo apt-install nginx [postgresql | php5 | php5-fpm]

- Relevant Nginx directories

Nginx is installed in folder:

\* etc/nginx

Nginx config file:

\* etc/nginx/nginx.conf

Default site served from:

\* usr/share/html

Default site config info:

\* etc/nginx/sites-available/default

# \* Successful URL - Home Attempt

- Added Web Server

# \* Show HTML

- DEFN: HTML defines web page structure and components

- Modify Home Page

cd /usr/share/html

sudo nano index.html

- Show Modified Home Page

# \* Failed URL - About US Attempt #1

- No About Us Page

# \* Successful URL - About Us Attempt

- Created About Us Page

cd /usr/share/html

sudo cp index.html about.html

sudo nano about.html

[Todo?] Include link to S3 image (?)

[Todo?] Added CSS to change background color (?)

# \* Extra Nginx Commands:

- Stop service

sudo service nginx stop

- Start service

sudo service nginx start

- Restart sevice

sudo service nginx restart

- Make sure web server restarts automatically at boot time

sudo update-rc.d nginx defaults

# \* Elastic IP Addresses

- 2 Things Wrong With Our Site's Address

(1) Not catchy (e.g. google.com, amazon.com)

(2) Is only temporary

- Solutions!

(1) DNS (Amazon Route 53)

- Next Meeting We Will Discuss This Service!

(2) Elastic IP Addresses

- Create and Associate New Elastic IP Address!

DEFN::

You get 2 IP addresses at launch: Private and Public (which is mapped to the private IP address via a Network Address Translation (NAT). Your public IP is associated with your instance, not your account.

Your EIP is associated with your AWS account, not a particular instance, and it remains associated with your account until you choose to explicitly release it.

AWS imposes a small hourly charge if an EIP is not associated with a running instance

# \* PRICING: So What's This Gonna Cost You?

URL: http://aws.amazon.com/ec2/pricing/

- Free 1st Year

\* 750 hours EC2 Linux, MS Windows Server (t2.micro instance usage)

\* 750 hours ELB plus 15 GB data processing

\* 30 GB of EBS (Gen Purpose SSDs or Magnetic)

2 Million I/Os

1 GB of snapshot storage

\* 15 GB of bandwidth out across all AWS services

\* 1 GB of Regional Data Transfer

- EC2 (VPC)

URL: http://aws.amazon.com/ec2/pricing/

\* On Demand vs. Reserved Pricing

On Demand - No long term commitments

Reserved - Discounted, but upfront pricing... reserved capacity

Spot - Bid for unused EC2 capacity

Instance Type; AZ; # of Inst's; Max. Price per Inst/hour

m3.medium : $0.07/hr ($52.50/mo) vs. $0.0081/hour ($6.075)

Deals not as good for smaller instances

I'm not sure how missed bids are handled

\* No additonal charge for VPCs (unless you use hardware VPN)

\* Data Transfer

IN:

Usually free b/w AWS services (esp. within the same region)

Private IP transfers usu. Free; Public $0.01/GB

OUT:

First 1GB = FREE

1GB - 10TB (Terabytes) = $0.09/GB

Pricing declines as your data usage increases

- EBS

\* Regular:

General Purpose (SSD) : $0.10/GB-month

Provisioned IOPS (SSD) : $0.125/GB-month

: $0.065 per provisioned IOPS-month

a. I provision 1000 IOPS

b. I use for 15 days (out of 30)

c. Region charges $0.10 per provisioned IOPS-month

d. I'm charged $50 ($0.10 X 1000 X 15/30)

\* EBS-Optimized:

Deliver dedicated throughput b/w EC2 and EBS

Pricier than Regular ($0.02 per hour? and up)

- Elastic IP Addresses

1st EIP attached to running instance = FREE!

2nd EIP attached to running instance = $0.005 per hour ($3.75/mo)

Any EIP not attachted = $0.005 per hour ($3.75/mo)

0 - 100 Remaps = FREE!

101 and up Remaps = $0.10 per remap

- S3 (?)

# \* Resources By The Weekend!

- AWS signup

- EC2 Launch

- Putty (Windows -> Linux)

- Linux SSH Instructions (Linux -> Linux)

\* Let me know of any others (Mac?)

# \* Next Meeting

- Elastic IP's ... Domains ... Route 53

- Nginx config stuff

- PHP5 ... PHP-FPM

- Postgresql 9.4

- pg&php connectors

- Images from S3 (?)

- Alerts for Usage Monitoring (?)

- Text Editor (?) (Sublime ... Eclipse)

- CSS (?)

- jQuery (?)

- FTP FileZilla (?)

- Better Security Practices (?)

# \* Launch EC2 Instance from EBS-Backed AMI(?)

- Save as snapshot

- Launch a non-snapshot EC2 Instance

Find nginx (It should not exist!)

- Launch a snapshot EC2 Instance

Find nginx (It should exist!)