



Deep Learning - Recitation (1/19/2018)

What is Amazon Web Services (AWS)

Cloud Based Computational Resource



What does AWS offer?

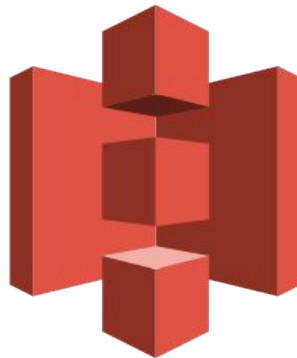
Many many things but here are the two main things to care about for DL...

EC2 - Compute Resources



Train the models

S3 - Data Storage



Store training data,
models, etc

EC2 - What kinds of machines are available?

Different types and different subtypes (you can mix and match what you want)...
Here are the ones you may care about

General Purpose:

T2 - Webservices

M3/M4 - Databases,
Fileservers, etc

Compute Optimized:

C2 - Multiplayer Gaming
Servers, scientific
computing

C3/C4 - Ad serving
machines, MMO servers,
etc

GPU Optimized:

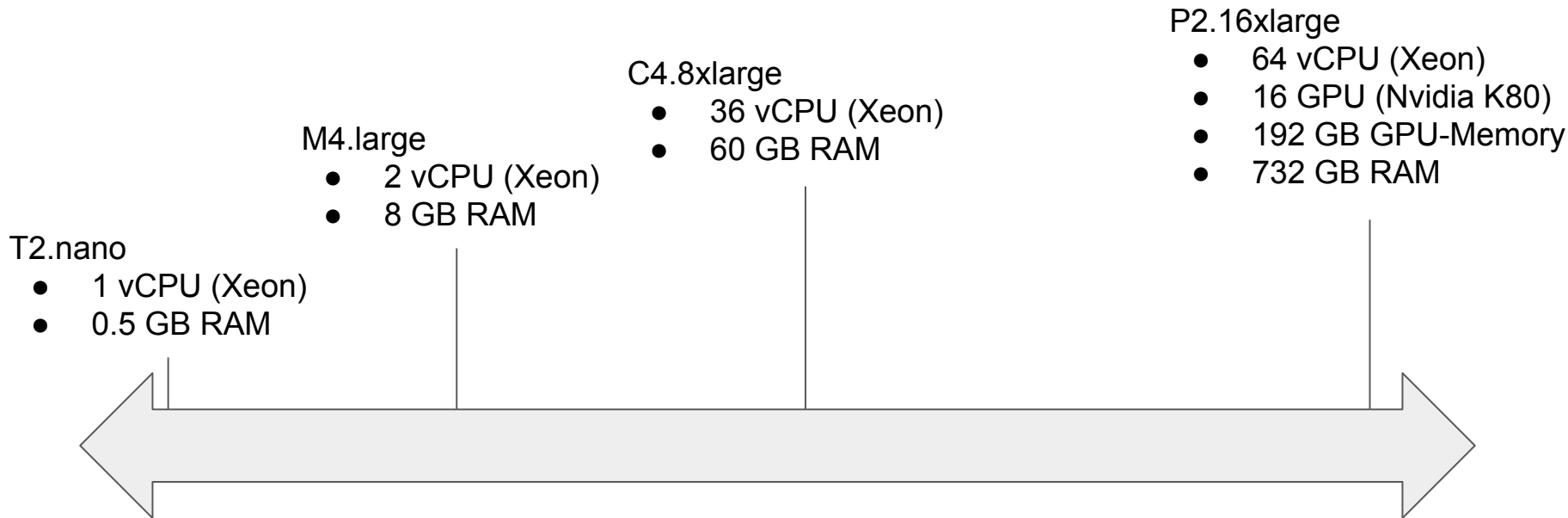
P3/P2 - Machine
Learning

G3 - Fluid dynamics,
graphics rendering, etc

Machine sizes - nano, micro, medium, large, xlarge, 2xlarge, ..., 16xlarge

EC2 - What kinds of machines are available?

Different types and different subtypes (you can mix and match what you want)...



EC2 - So what do we put on these machines?

Amazon Machine Instances (AMIs)

- Virtual images of existing machines
 - You can create an image of your machine
 - Transfer it to a different machine
 - Save it as a backup
- Use cases
 - Software packages that are incredibly difficult to install
 - Need to create multiple different machines with the exact same data for parameters servers
 - Load balancing - create a new machine with the same AMI to be used in a different region depending on load

Now you know what AWS is and what you
can do with it

Let's set up a basic machine

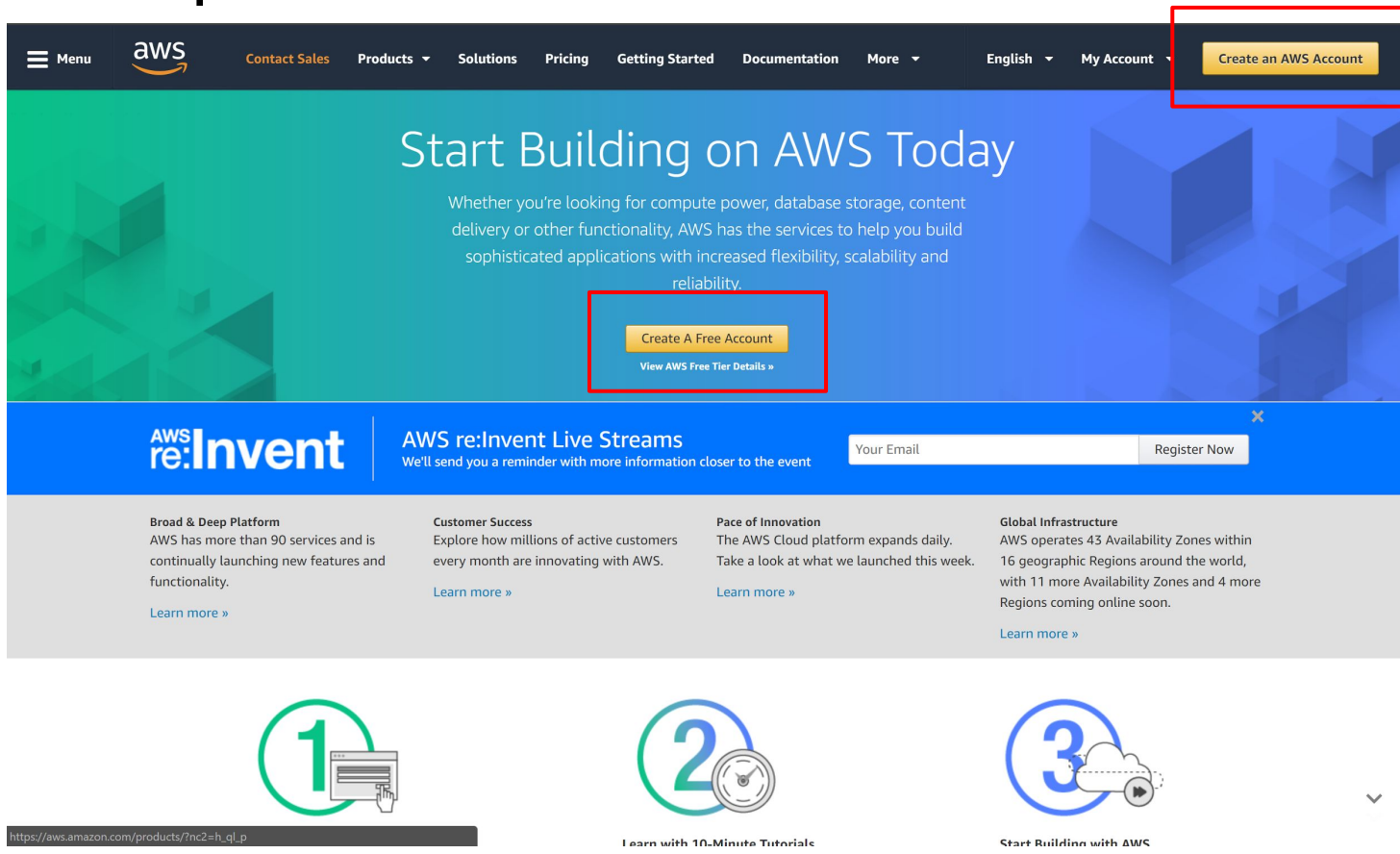
Create An Account:

<https://aws.amazon.com>


Click “Sign Up” in the top right and follow the instructions

(If you already have an account you can skip this step)

Let's set up a basic machine



The screenshot shows the AWS homepage. The top navigation bar is dark blue with the AWS logo and links for Menu, Contact Sales, Products, Solutions, Pricing, Getting Started, Documentation, More, English, My Account, and a button to Create an AWS Account. The main hero section has a blue and green geometric background with the text 'Start Building on AWS Today' and a paragraph about AWS services. A button to 'Create A Free Account' is highlighted with a red box. Below this is a section for 'AWS re:Invent' with a live stream sign-up form. The bottom section features three columns of content: 'Broad & Deep Platform', 'Customer Success', and 'Global Infrastructure', each with a 'Learn more' link. At the very bottom, there are three numbered steps: 1. 'Learn with 10-Minute Tutorials', 2. 'Start Building with AWS', and 3. 'Start Building with AWS'.

Menu  [Contact Sales](#) [Products](#) [Solutions](#) [Pricing](#) [Getting Started](#) [Documentation](#) [More](#) [English](#) [My Account](#) [Create an AWS Account](#)

Start Building on AWS Today

Whether you're looking for compute power, database storage, content delivery or other functionality, AWS has the services to help you build sophisticated applications with increased flexibility, scalability and reliability.

[Create A Free Account](#)
[View AWS Free Tier Details »](#)

AWS re:Invent [AWS re:Invent Live Streams](#)
We'll send you a reminder with more information closer to the event


[Register Now](#)


Broad & Deep Platform
AWS has more than 90 services and is continually launching new features and functionality.
[Learn more »](#)


Customer Success
Explore how millions of active customers every month are innovating with AWS.
[Learn more »](#)

Pace of Innovation
The AWS Cloud platform expands daily. Take a look at what we launched this week.
[Learn more »](#)

Global Infrastructure
AWS operates 43 Availability Zones within 16 geographic Regions around the world, with 11 more Availability Zones and 4 more Regions coming online soon.
[Learn more »](#)

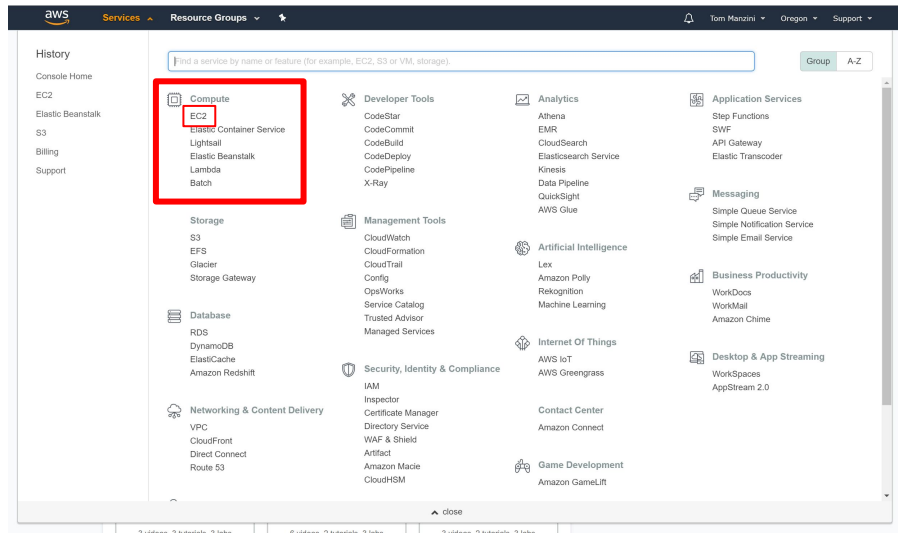
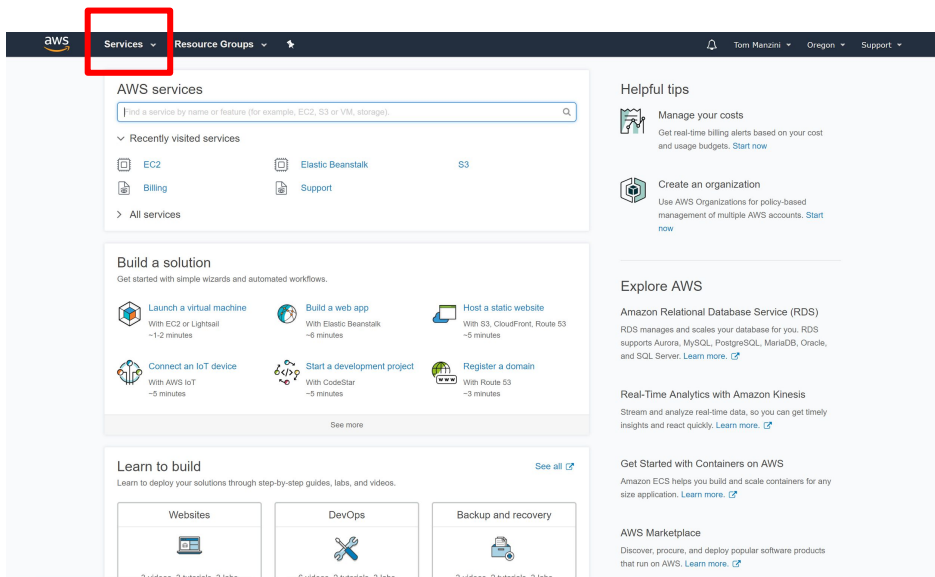
1 
[Learn with 10-Minute Tutorials](#)

2 
[Start Building with AWS](#)

3 
[Start Building with AWS](#)

https://aws.amazon.com/products/?nc2=h_ql_p

Let's set up a basic machine



Then, under “Compute”, select “EC2”

Click on “Services” in the top left

Let's set up a basic machine

Make sure you
are in the “US
West (Oregon)”
region

Then Click on
“Running
Instances”

The screenshot shows the AWS Management Console interface. In the top navigation bar, the 'Oregon' region is selected and highlighted with a red box. The main content area is titled 'Resources' and shows a list of resources in the US West (Oregon) region. The '0 Running Instances' link is highlighted with a red box. Below this, there is a 'Create Instance' section with a 'Launch Instance' button. The 'Service Health' section shows that the US West (Oregon) service is operating normally. The 'Scheduled Events' section shows no events. The right sidebar contains 'Account Attributes', 'Additional Information', and 'AWS Marketplace' sections.

Resources

You are using the following Amazon EC2 resources in the US West (Oregon) region:

- 0 Running Instances
- 0 Elastic IPs
- 0 Dedicated Hosts
- 4 Snapshots
- 1 Volumes
- 0 Load Balancers
- 2 Key Pairs
- 9 Security Groups
- 0 Placement Groups

EC2 Spot. Save up to 90% off On-Demand Prices. Turbo Boost your Workloads. [Get started with Amazon EC2 Spot Instances.](#)

Create Instance

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 Instance.

[Launch Instance](#)

Note: Your instances will launch in the US West (Oregon) region

Service Health

Service Status:

- US West (Oregon): This service is operating normally

Availability Zone Status:

- us-west-2a: Availability zone is operating normally
- us-west-2b: Availability zone is operating normally
- us-west-2c: Availability zone is operating normally

[Service Health Dashboard](#)

Scheduled Events

US West (Oregon):

- No events

Account Attributes

Supported Platforms

- VPC

Default VPC

vpc-f6d6a891

Resource ID length management

Additional Information

- [Getting Started Guide](#)
- [Documentation](#)
- [All EC2 Resources](#)
- [Forums](#)
- [Pricing](#)
- [Contact Us](#)

AWS Marketplace

Find free software trial products in the AWS Marketplace from the [EC2 Launch Wizard](#). Or try these popular AMIs:

[Barracuda NextGen Firewall F-Series - PAYG](#)

Provided by Barracuda Networks, Inc.
Rating ★★★★★
Starting from \$0.60/hr or from \$4,599/yr (12% savings) for software + AWS usage fees
[View all Software Infrastructure](#)

[Splunk Insights for AWS Cloud Monitoring](#)

Provided by Splunk Inc.
Rating ★★★★★
Bring Your Own License + AWS usage fees
[View all Developer Tools](#)

Let's set up a basic machine

The screenshot shows the AWS Management Console interface. On the left is a navigation sidebar with categories like INSTANCES, IMAGES, ELASTIC BLOCK STORE, NETWORK & SECURITY, and LOAD BALANCING. The main content area is titled 'Launch Instance' and shows a table of instances. A red box highlights the table, which contains one instance: i-02d40dd9b0a197529, t2.micro, us-west-2a, stopped. Below the table, another red box highlights the 'Details' view for the selected instance. The details are organized into two columns. The left column includes fields like Instance ID, Instance state, Instance type, Elastic IPs, Availability zone, Security groups, Scheduled events, AMI ID, Platform, IAM role, Key pair name, Owner, Launch time, Termination protection, Lifecycle, Monitoring, Alarm status, and Kernel ID. The right column includes fields like Public DNS (IPv4), IPv4 Public IP, IPv6 IPs, Private DNS, Private IPs, Secondary private IPs, VPC ID, Subnet ID, Network interfaces, Source/dest. check, EBS-optimized, Root device type, Root device, Block devices, Elastic GPU, Elastic GPU type, and Elastic GPU status.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
	i-02d40dd9b0a197529	t2.micro	us-west-2a	stopped		None	

Instance: i-02d40dd9b0a197529 Private IP: 172.31.45.0

Description	
Instance ID	i-02d40dd9b0a197529
Instance state	stopped
Instance type	t2.micro
Elastic IPs	
Availability zone	us-west-2a
Security groups	launch-wizard-1. view inbound rules
Scheduled events	
AMI ID	Loading ami-92f420ea...
Platform	
IAM role	
Key pair name	tmanzini-personal
Owner	180942078756
Launch time	November 7, 2017 at 11:35:49 PM UTC-5 (448 hours)
Termination protection	
Lifecycle	normal
Monitoring	basic
Alarm status	None
Kernel ID	
Public DNS (IPv4)	
IPv4 Public IP	
IPv6 IPs	
Private DNS	ip-172-31-45-0.us-west-2.compute.internal
Private IPs	172.31.45.0
Secondary private IPs	
VPC ID	vpc-f6d6a891
Subnet ID	subnet-18ed4551
Network interfaces	eth0
Source/dest. check	True
EBS-optimized	False
Root device type	ebs
Root device	/dev/sda1
Block devices	/dev/sda1
Elastic GPU	
Elastic GPU type	
Elastic GPU status	

Here you see your current instances

(I have 1 that is stopped, you shouldn't have any)

Here are the details of that instance

Let's set up a basic machine

Click “Launch Instance”

The screenshot shows the AWS Management Console interface. The top navigation bar includes the AWS logo, 'Services', 'Resource Groups', and user information. A red box highlights the 'Launch Instance' button in the left-hand navigation pane. The main content area shows a table of EC2 instances with one instance listed: 'i-02d40dd9b0a197529' of type 't2.micro' in 'us-west-2a' availability zone, currently in a 'stopped' state. Below the table, the details for this instance are shown, including its ID, state, type, availability zone, security groups, and various configuration parameters like VPC ID, subnet ID, and network interfaces.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
	i-02d40dd9b0a197529	t2.micro	us-west-2a	stopped		None	

Instance: **i-02d40dd9b0a197529** Private IP: 172.31.45.0

Description		Status Checks	Monitoring	Tags
Instance ID	i-02d40dd9b0a197529	Public DNS (IPv4)	-	
Instance state	stopped	IPv4 Public IP	-	
Instance type	t2.micro	IPv6 IPs	-	
Elastic IPs	-	Private DNS	ip-172-31-45-0.us-west-2.compute.internal	
Availability zone	us-west-2a	Private IPs	172.31.45.0	
Security groups	launch-wizard-1 - view inbound rules	Secondary private IPs	-	
Scheduled events	-	VPC ID	vpc-f6d6a891	
AMI ID	Loading ami-92f420ea...	Subnet ID	subnet-18ed4551	
Platform	-	Network interfaces	eth0	
IAM role	-	Source/dest. check	True	
Key pair name	tmanzini-personal	EBS-optimized	False	
Owner	180942078756	Root device type	ebs	
Launch time	November 7, 2017 at 11:35:49 PM UTC-5 (448 hours)	Root device	/dev/sda1	
Termination protection	-	Block devices	/dev/sda1	
Lifecycle	normal	Elastic GPU	-	
Monitoring	basic	Elastic GPU type	-	
Alarm status	None	Elastic GPU status	-	
Kernel ID	-			

Let's set up a basic machine

aws

Services

Resource Groups

★

🔔

Tom Manzini

Oregon

Support

1. Choose AMI

2. Choose Instance Type

3. Configure Instance

4. Add Storage

5. Add Tags

6. Configure Security Group

7. Review

Step 1: Choose an Amazon Machine Image (AMI)

Cancel and Exit

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Quick Start

My AMIs

AWS Marketplace

Community AMIs

Operating system

Architecture

Root device type

🔍 ami-f1e73689

3137 results for "ami-f1e73689" on AWS Marketplace

Partner software pre-configured to run on AWS

Deep Learning AMI with Conda (Ubuntu) - ami-f1e73689

Deep Learning AMI with Conda (Ubuntu)

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

Select

64-bit

ami-f1e73689

Feedback English (US)

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Let's set up a basic machine

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about instance types and how they can meet your computing needs.

Filter by: All instance types Current generation Show/Hide Columns

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input checked="" type="checkbox"/>	General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	m4.large	2	8	EBS only	Yes	Moderate	Yes
<input type="checkbox"/>	General purpose	m4.xlarge	4	16	EBS only	Yes	High	Yes
<input type="checkbox"/>	General purpose	m4.2xlarge	8	32	EBS only	Yes	High	Yes
<input type="checkbox"/>	General purpose	m4.4xlarge	16	64	EBS only	Yes	High	Yes

Cancel

Previous

Review and Launch

Next: Configure Instance Details

Select the t2-micro because it is “free tier eligible”

Select Next

Let's set up a basic machine

aws

Services ▾ Resource Groups ▾ ☆

🔔 Tom Manzini ▾ Oregon ▾ Support ▾

[1. Choose AMI](#) [2. Choose Instance Type](#) [3. Configure Instance](#) [4. Add Storage](#) [5. Add Tags](#) [6. Configure Security Group](#) [7. Review](#)

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of Instances ⓘ

1

[Launch into Auto Scaling Group ⓘ](#)

Purchasing option ⓘ

☐ Request Spot instances

Network ⓘ

vpc-f6d6a891 (default) [Create new VPC](#)

Subnet ⓘ

No preference (default subnet in any Availability Zone) [Create new subnet](#)

Auto-assign Public IP ⓘ

Use subnet setting (Enable)

IAM role ⓘ

None [Create new IAM role](#)

Shutdown behavior ⓘ

Stop

Enable termination protection ⓘ

☐ Protect against accidental termination

Monitoring ⓘ

☐ Enable CloudWatch detailed monitoring
[Additional charges apply.](#)

Tenancy ⓘ

Shared - Run a shared hardware instance
[Additional charges will apply for dedicated tenancy.](#)

▶ Advanced Details

Cancel

Previous

Review and Launch

Next: Add Storage

Feedback

English (US)

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Just select next

Let's set up a basic machine

[1. Choose AMI](#) [2. Choose Instance Type](#) [3. Configure Instance](#) **[4. Add Storage](#)** [5. Add Tags](#) [6. Configure Security Group](#) [7. Review](#)

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more](#) about storage options in Amazon EC2.

Volume Type ⓘ	Device ⓘ	Snapshot ⓘ	Size (GiB) ⓘ	Volume Type ⓘ	IOPS ⓘ	Throughput (MB/s) ⓘ	Delete on Termination ⓘ	Encrypted ⓘ
Root	/dev/sda1	snap-0b9c16d670f4e2685	<input type="text" value="8"/>	General Purpose SSD (GP2) ▾	100 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted

[Add New Volume](#)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

Make sure you choose 8 GB of SSD Storage Space

[Cancel](#)

[Previous](#)

[Review and Launch](#)

[Next: Add Tags](#)

Select next

Let's set up a basic machine

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 5: Add Tags

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver.

A copy of a tag can be applied to volumes, instances or both.

Tags will be applied to all instances and volumes. [Learn more](#) about tagging your Amazon EC2 resources.

Key (127 characters maximum)	Value (255 characters maximum)	Instances ⓘ	Volumes ⓘ
------------------------------	--------------------------------	-------------	-----------

This resource currently has no tags

Choose the Add tag button or [click to add a Name tag](#).

Make sure your [IAM policy](#) includes permissions to create tags.

Add Tag (Up to 50 tags maximum)

Cancel

Previous

Review and Launch

Next: Configure Security Group

Select next

Let's set up a basic machine

Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#) about Amazon EC2 security groups.

Assign a security group: ☐ Create a new security group ☒ Select an existing security group

Security group name:

Description:

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop
Custom TCP	TCP	8888	Anywhere 0.0.0.0/0, ::/0	e.g. SSH for Admin Desktop

[Add Rule](#)

Warning
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

[Cancel](#) [Previous](#) [Review and Launch](#)

Make sure you have an SSH rule set (This should be default) & a TCP rule for 8888 so you can connect your Ipython Notebook

You can set HTTP or other rules here too if you want

Select Review and Launch

Let's set up a basic machine

aws

Services

Resource Groups

★

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Tom Manzini

Oregon

Support

1. Choose AMI

2. Choose Instance Type

3. Configure Instance

4. Add Storage

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6. Configure Security Group

7. Review

Step 7: Review Instance Launch

Please review your instance launch details. You can go back to edit changes for each section. Click **Launch** to assign a key pair to your instance and complete the launch process.

⚠️

Improve your instances' security. Your security group, launch-wizard-4, is open to the world.

Your instances may be accessible from any IP address. We recommend that you update your security group rules to allow access from known IP addresses only. You can also open additional ports in your security group to facilitate access to the application or service you're running, e.g., HTTP (80) for web servers. [Edit security groups](#)

▼ AMI Details

Edit AMI

🔄

Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-0a00ce72

Free tier eligible

Ubuntu Server 16.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).
Root Device Type: ebs Virtualization type: hvm

▼ Instance Type

Edit instance type

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
t2.micro	Variable	1	1	EBS only	-	Low to Moderate

▼ Security Groups

Edit security groups

Security group name

launch-wizard-4

Description

launch-wizard-4 created 2017-11-26T17:20:35.221-05:00

Type ⓘ	Protocol ⓘ	Port Range ⓘ	Source ⓘ	Description ⓘ
SSH	TCP	22	0.0.0.0/0	

▶ Instance Details

Edit instance details

Cancel

Previous

Launch

Take one last look to make sure you are happy with everything...

Select Launch

Let's set up a basic machine

This window allows you to create a private key to access your machine... when you ssh you will need it

Download your key and save it

Make sure it's in a place where it won't get lost - this key is the only way to connect to this specific instance!

Enter a name for your private key

Select an existing key pair or create a new key pair

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Create a new key pair

Key pair name

Demo_key

Download Key Pair

You have to download the **private key file** (*.pem file) before you can continue. **Store it in a secure and accessible location.** You will not be able to download the file again after it's created.

Cancel

Launch Instances

Now you have a basic AWS machine up
and running

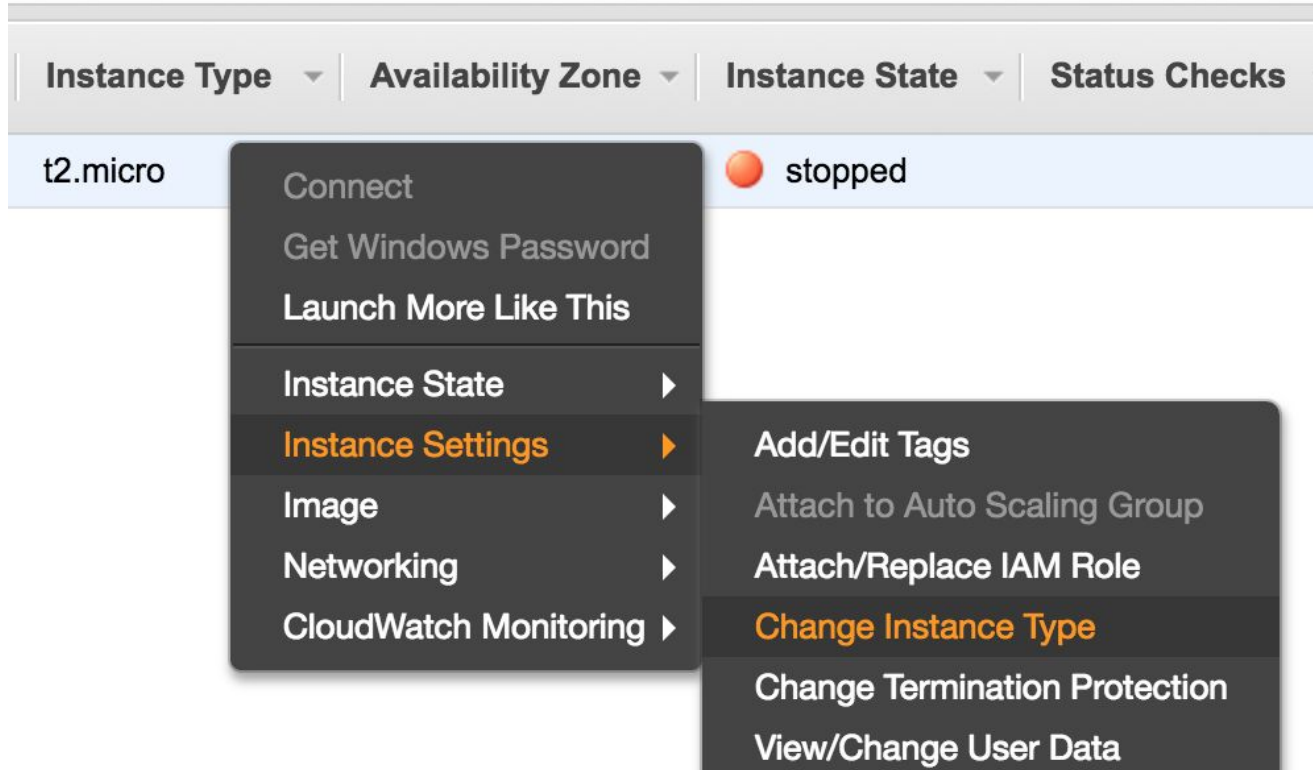
Now let's connect to it

Your instance is now identified by its IP address. You can ssh to your instance by using this public IP address and your address key.

Let's start by changing the instance type. For student accounts, t2.micro is free-tier eligible, but let's still start on a t2.nano instance.

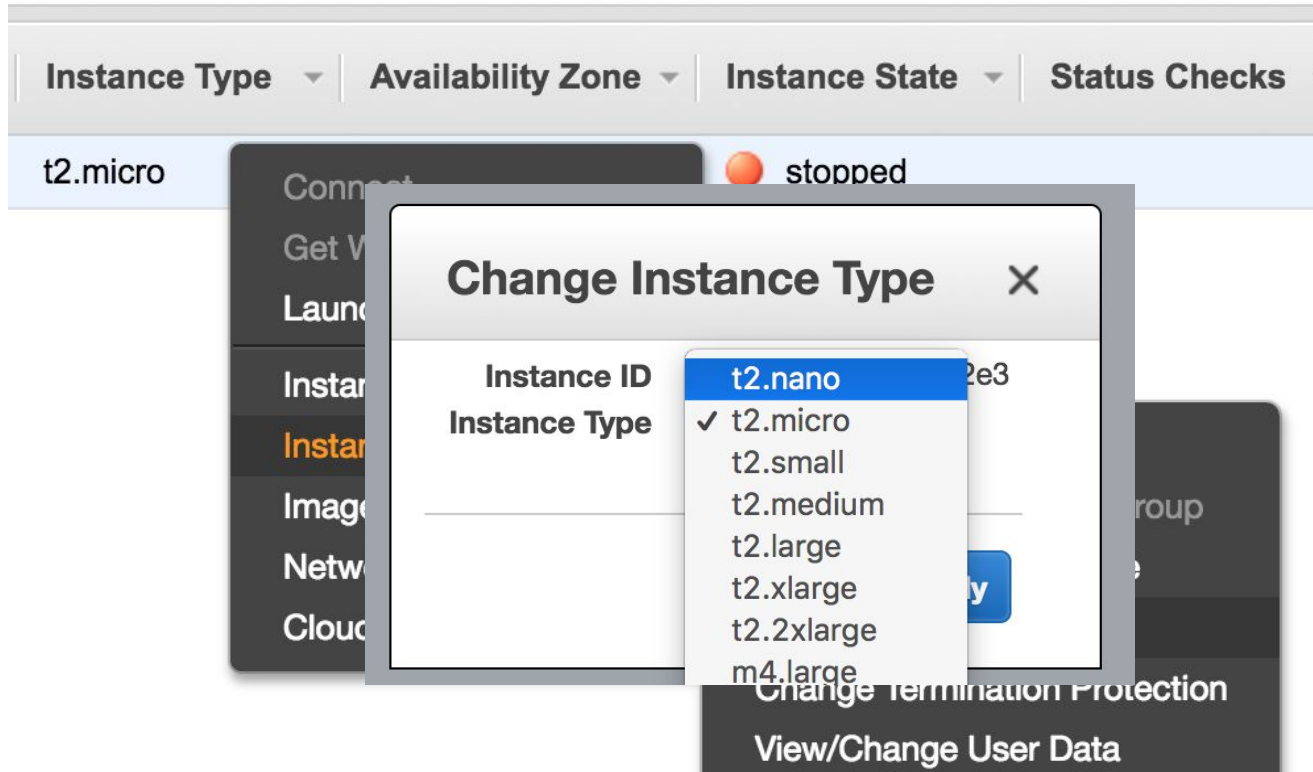
Remember your instance's IP address changes every time you restart it

Set instance type



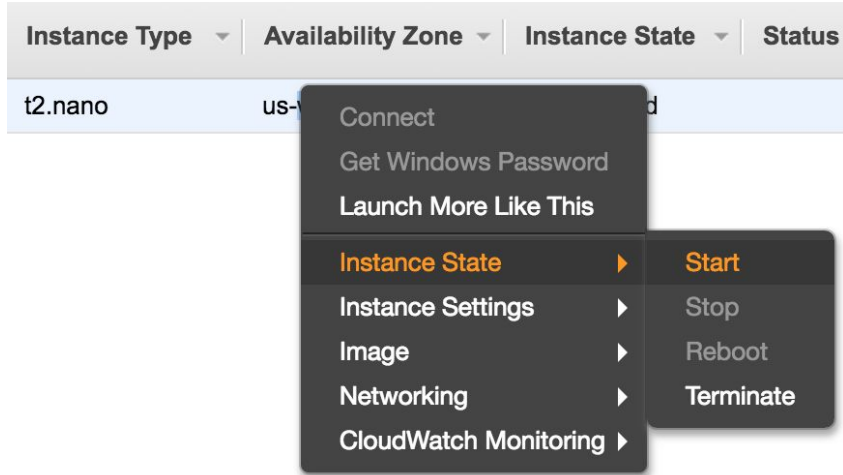
Right-click on your instance under the instance tab, go to instance settings and change instance type to t2.nano

Set instance type



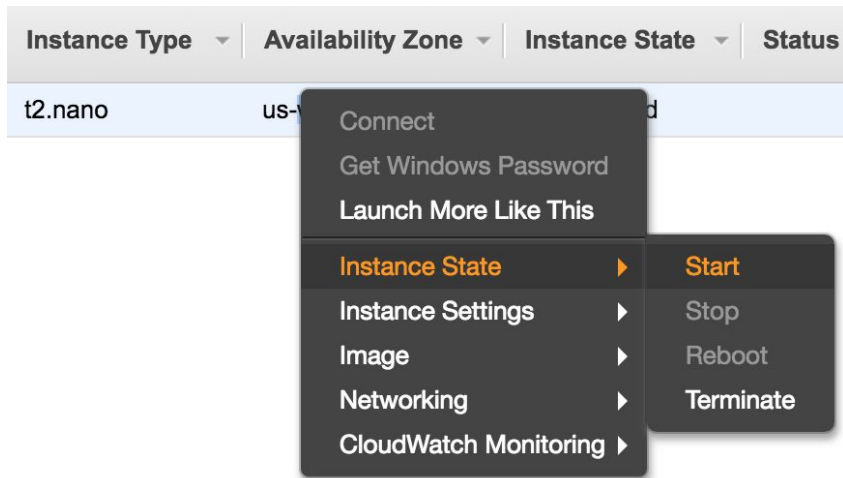
Right-click on your instance under the instance tab, go to instance settings and change instance type to t2.nano

Launch instance



Right-click and Start your instance.

Launch instance



Instance Type	Availability Zone	Instance State
t2.nano	us-west-2a	 pending

Right-click and Start your instance.

This will start the process of allocating resources to your instance. Once this is completed, your instance will be running and you can connect to it.

Stopping this instance removes the compute associated with the current session.

Do NOT terminate! This will wipe the slate clean. Terminate ONLY when you are sure of 'throwing away' the data.

Connect to launched instance

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 (hw1.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 hw1.pem
```

4. Connect to your instance using its Public DNS:

```
ec2-54-186-97-0.us-west-2.compute.amazonaws.com
```

Example:

```
ssh -i "hw1.pem" root@ec2-54-186-97-0.us-west-2.compute.amazonaws.com
```

Please note that in most cases the username above will be correct, however please ensure that you read your AMI usage instructions to ensure that the AMI owner has not changed the default AMI username.

If you need any assistance connecting to your instance, please see our [connection documentation](#).

Right-click and click connect

The ssh command shown includes the currently assigned IP address.

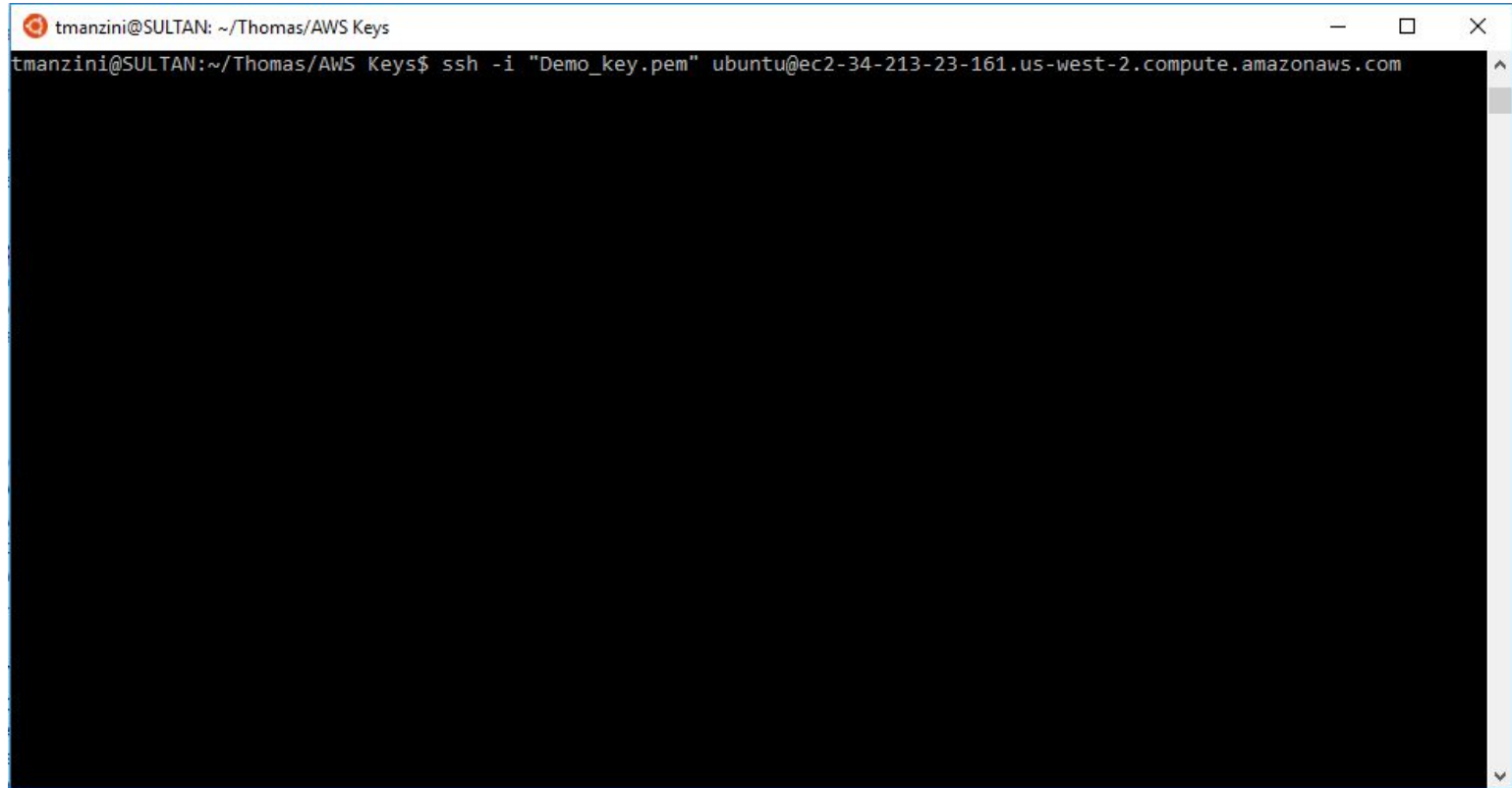
This will change at each launch!

Usually we won't have root privileges - use `ubuntu@IP` instead. (Depending on the AMI you would use "root", "ec2-user", etc)

Note - the ssh command will use the path to the key associated with this instance.

Now you have a running AWS machine
and you can connect

Now let's set up a Jupyter Notebook



```
tmanzini@SULTAN: ~/Thomas/AWS Keys
tmanzini@SULTAN:~/Thomas/AWS Keys$ ssh -i "Demo_key.pem" ubuntu@ec2-34-213-23-161.us-west-2.compute.amazonaws.com
```

A terminal window titled "tmanzini@SULTAN: ~/Thomas/AWS Keys" with standard window controls. The command prompt shows the user has entered the command to SSH into an AWS EC2 instance using a private key named "Demo_key.pem". The terminal area is currently black, indicating the connection is either in progress or has not yet started displaying output.

Now let's set up a Jupyter Notebook

```
ubuntu@ip-172-31-20-189: ~
┌───┴───┐ Deep Learning AMI (Ubuntu)
└───┴───┘

Welcome to Ubuntu 16.04.3 LTS (GNU/Linux 4.4.0-1039-aws x86_64v)

Please use one of the following commands to start the required environment with the framework of your choice:
For MXNet(+Keras1) with Python3 (CUDA 9) _____ source activate mxnet_p36
For MXNet(+Keras1) with Python2 (CUDA 9) _____ source activate mxnet_p27
For TensorFlow(+Keras2) with Python3 (CUDA 8) _____ source activate tensorflow_p36
For TensorFlow(+Keras2) with Python2 (CUDA 8) _____ source activate tensorflow_p27
For Theano(+Keras2) with Python3 (CUDA 9) _____ source activate theano_p36
For Theano(+Keras2) with Python2 (CUDA 9) _____ source activate theano_p27
For PyTorch with Python3 (CUDA 8) _____ source activate pytorch_p36
For PyTorch with Python2 (CUDA 8) _____ source activate pytorch_p27
For CNTK(+Keras2) with Python3 (CUDA 8) _____ source activate cntk_p36
For CNTK(+Keras2) with Python2 (CUDA 8) _____ source activate cntk_p27
For Caffe2 with Python2 (CUDA 9) _____ source activate caffe2_p27
For base Python2 (CUDA 9) _____ source activate python2
For base Python3 (CUDA 9) _____ source activate python3

Official conda user guide: https://conda.io/docs/user-guide/index.html
AMI details: https://aws.amazon.com/amazon-ai/amis/details/
Release Notes: https://aws.amazon.com/documentation/dlami/latest/devguide/appendix-ami-release-notes.html

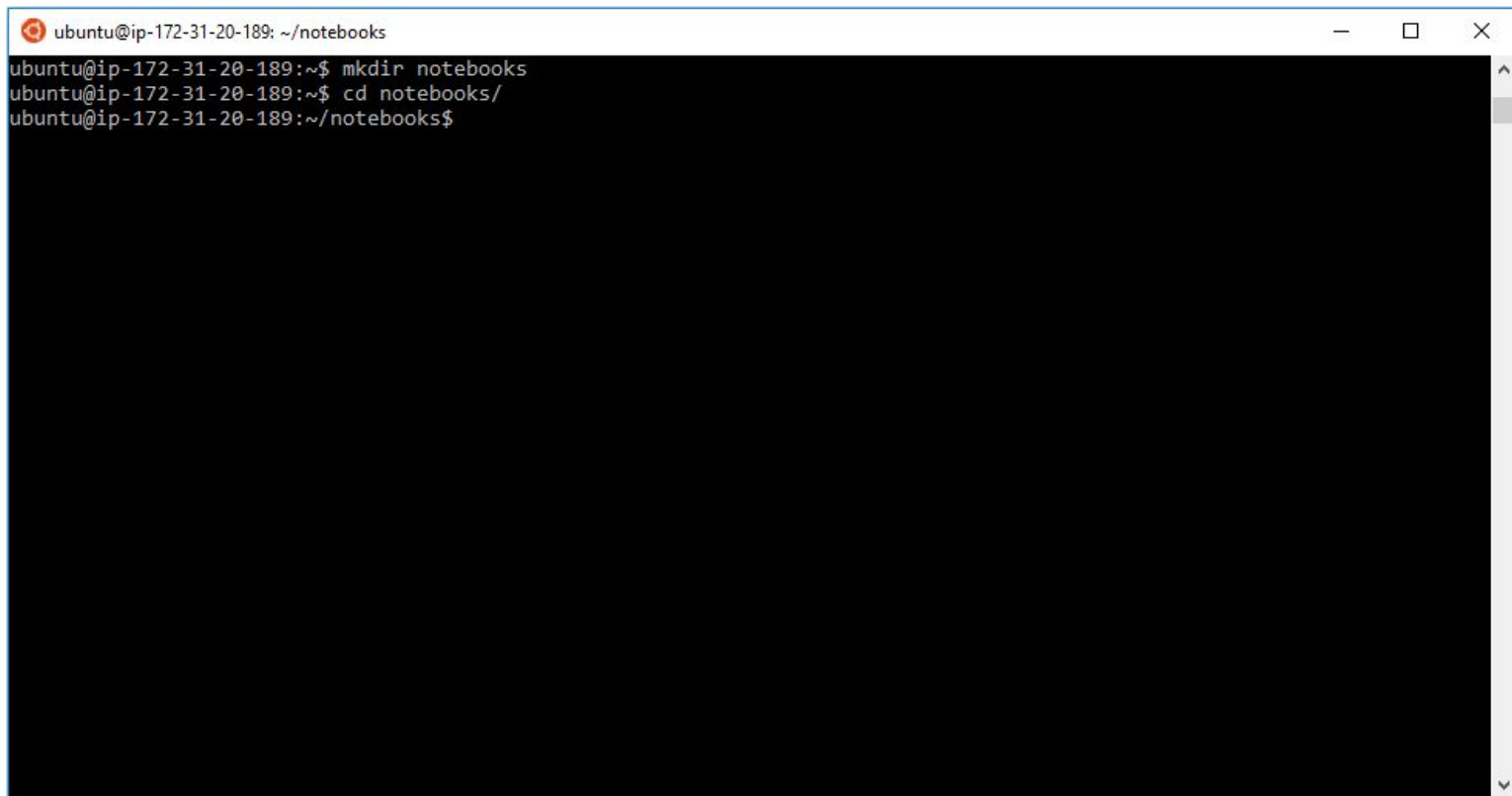
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage

Get cloud support with Ubuntu Advantage Cloud Guest:
http://www.ubuntu.com/business/services/cloud

66 packages can be updated.
31 updates are security updates.

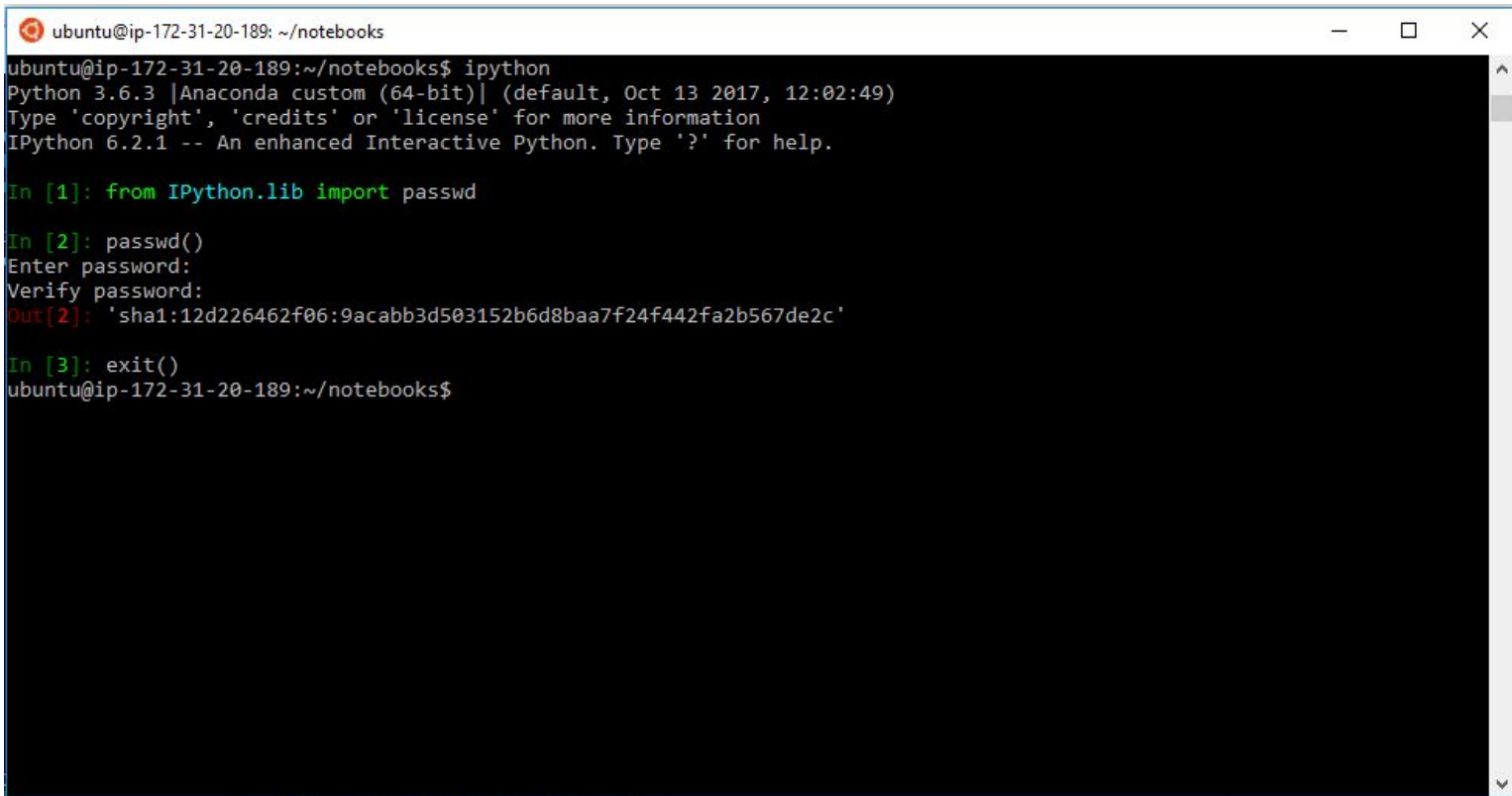
*** System restart required ***
ubuntu@ip-172-31-20-189:~$ ls
awsconadsl Nvidia_Cloud_EULA.pdf sfx tutorials
ubuntu@ip-172-31-20-189:~$
```

Now let's set up a Jupyter Notebook

A terminal window with a blue title bar. The title bar contains an orange terminal icon, the text 'ubuntu@ip-172-31-20-189: ~/notebooks', and standard window controls (minimize, maximize, close). The terminal area has a black background with white text. It shows three lines of commands and their outputs: 'mkdir notebooks', 'cd notebooks/', and the current directory path '~ /notebooks\$'.

```
ubuntu@ip-172-31-20-189: ~/notebooks
ubuntu@ip-172-31-20-189:~$ mkdir notebooks
ubuntu@ip-172-31-20-189:~$ cd notebooks/
ubuntu@ip-172-31-20-189:~/notebooks$
```

Now let's set up a Jupyter Notebook

A terminal window with a black background and white text. The window title bar shows 'ubuntu@ip-172-31-20-189: ~/notebooks' and standard window controls. The terminal output shows the execution of 'ipython', which starts the IPython shell. The user enters 'from IPython.lib import passwd', then 'passwd()', which prompts for a password and returns a SHA1 hash. Finally, the user enters 'exit()' to return to the shell prompt.

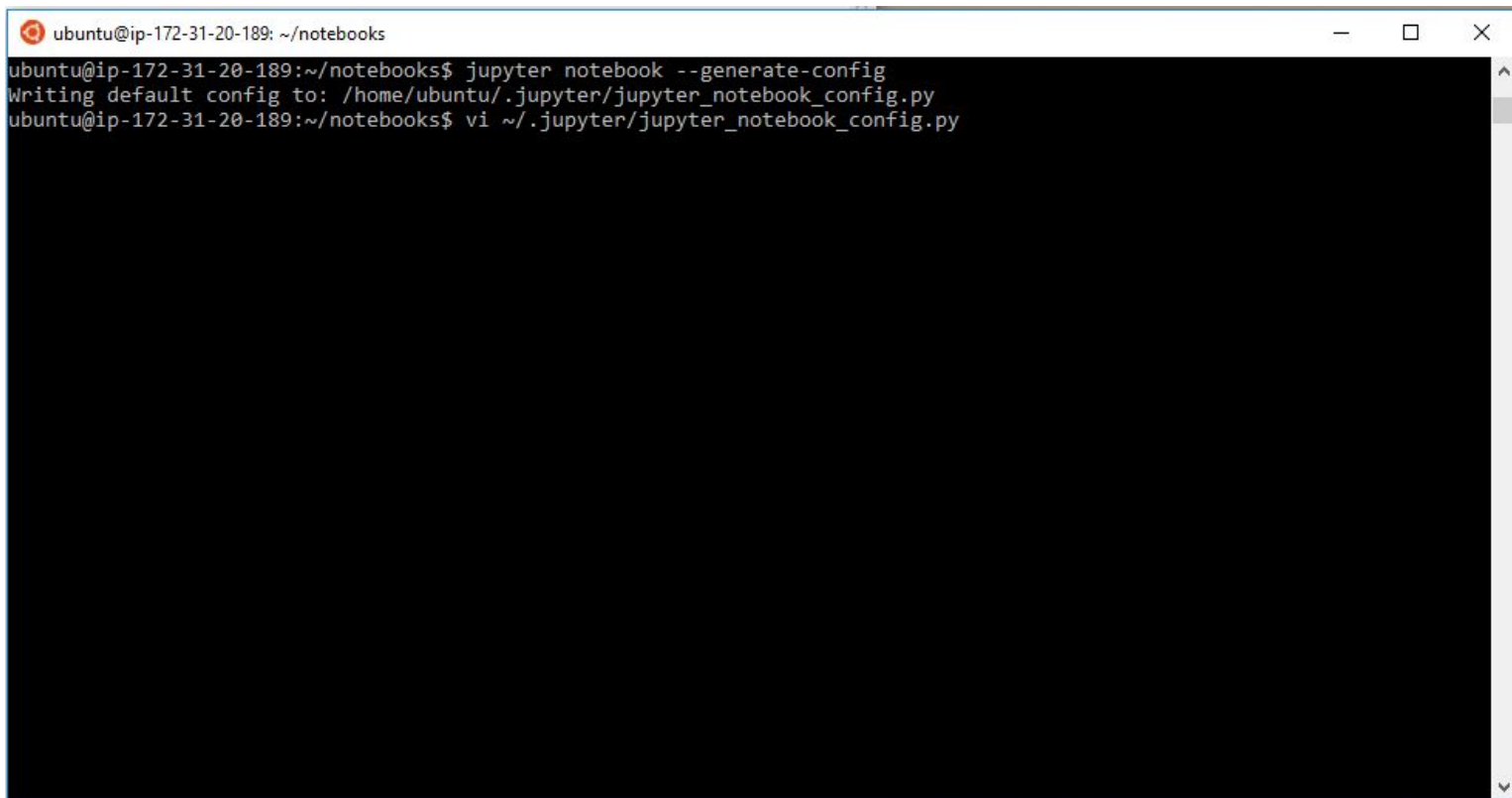
```
ubuntu@ip-172-31-20-189: ~/notebooks
ubuntu@ip-172-31-20-189:~/notebooks$ ipython
Python 3.6.3 |Anaconda custom (64-bit)| (default, Oct 13 2017, 12:02:49)
Type 'copyright', 'credits' or 'license' for more information
IPython 6.2.1 -- An enhanced Interactive Python. Type '?' for help.

In [1]: from IPython.lib import passwd

In [2]: passwd()
Enter password:
Verify password:
Out[2]: 'sha1:12d226462f06:9acabb3d503152b6d8baa7f24f442fa2b567de2c'

In [3]: exit()
ubuntu@ip-172-31-20-189:~/notebooks$
```

Now let's set up a Jupyter Notebook

A terminal window with a title bar showing 'ubuntu@ip-172-31-20-189: ~/notebooks'. The terminal has a black background with white text. It shows the execution of 'jupyter notebook --generate-config' which outputs 'Writing default config to: /home/ubuntu/.jupyter/jupyter_notebook_config.py'. This is followed by the command 'vi ~/.jupyter/jupyter_notebook_config.py'.

```
ubuntu@ip-172-31-20-189: ~/notebooks
ubuntu@ip-172-31-20-189:~/notebooks$ jupyter notebook --generate-config
Writing default config to: /home/ubuntu/.jupyter/jupyter_notebook_config.py
ubuntu@ip-172-31-20-189:~/notebooks$ vi ~/.jupyter/jupyter_notebook_config.py
```

Now let's set up a Jupyter Notebook

```
c = get_config() # Get the config object.
c.IPKernelApp.pylab = 'inline' # in-line figure when using Matplotlib
c.NotebookApp.ip = '*' # Serve notebooks locally.
c.NotebookApp.open_browser = False # Do not open a browser window by default when using notebooks.
c.NotebookApp.password = 'sha1:12d226462f06:9acabb3d503152b6d8baa7f24f442fa2b567de2c'

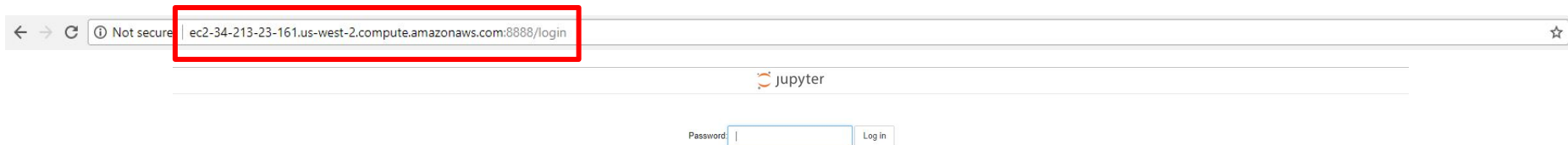
```

<https://pastebin.com/artPNii0>

Now let's set up a Jupyter Notebook

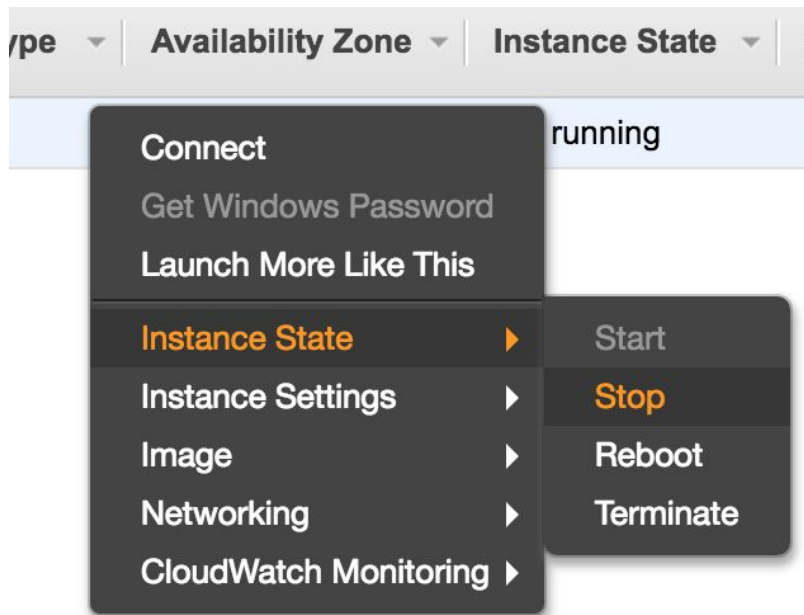
```
ubuntu@ip-172-31-20-189: ~/notebooks
ubuntu@ip-172-31-20-189:~/notebooks$ jupyter notebook
[I 18:45:08.932 NotebookApp] [nb_conda_kernels] enabled, 15 kernels found
[W 18:45:09.345 NotebookApp] WARNING: The notebook server is listening on all IP addresses and not using encryption. This is not recommended.
[I 18:45:09.467 NotebookApp] [nb_anacondacloud] enabled
[I 18:45:09.470 NotebookApp] [nb_conda] enabled
[I 18:45:09.506 NotebookApp] [nbpresent HTML export] ENABLED
[W 18:45:09.506 NotebookApp] [nbpresent PDF export] DISABLED: No module named 'nbbrowserpdf'
[I 18:45:09.723 NotebookApp] sparkmagic extension enabled!
[I 18:45:09.725 NotebookApp] Serving notebooks from local directory: /home/ubuntu/notebooks
[I 18:45:09.725 NotebookApp] 0 active kernels
[I 18:45:09.725 NotebookApp] The Jupyter Notebook is running at:
[I 18:45:09.726 NotebookApp] http://[all ip addresses on your system]:8888/
[I 18:45:09.726 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
```

Now let's set up a Jupyter Notebook



Now you have a running AWS machine
and you can connect and you can test code
using Jupyter Notebooks!

Now lets shut it down so you don't get billed



Finish and save your progress, exit from session

From ec2-console on your browser, stop the instance

You can just start the instance and resume whenever you want.

Now you know how to use machines on
EC2

Now lets redeem some AWS credits

The screenshot displays the AWS Management Console interface. At the top, the navigation bar includes the AWS logo, 'Services', 'Resource Groups', and a user profile section for 'Tom Manzini'. The user profile dropdown menu is open, showing options: 'My Account', 'My Organization', 'My Billing Dashboard' (highlighted with a red box), 'My Security Credentials', and 'Sign Out'. The main content area is divided into three sections: 'AWS services' with a search bar and 'Recently visited services' (EC2, IAM, Billing, Support, Elastic Beanstalk); 'Build a solution' with various guided workflows like 'Launch a virtual machine', 'Build a web app', 'Host a static website', 'Connect an IoT device', 'Start a development project', and 'Register a domain'; and 'Learn to build' with categories like 'Websites', 'DevOps', 'Backup and recovery', 'Big data', 'Databases', and 'Mobile'. On the right sidebar, there are sections for 'Helpful tips' (Manage your costs, Create an organization), 'Explore AWS' (Amazon RDS, Amazon Kinesis), 'Get Started with Containers on AWS', and 'AWS Marketplace'.

aws Services Resource Groups Tom Manzini Oregon Support

AWS services
Find a service by name or feature (for example, EC2, S3 or VM, storage).
Recently visited services
EC2 IAM Billing Support Elastic Beanstalk
All services

Build a solution
Get started with simple wizards and automated workflows.
Launch a virtual machine
With EC2 or Lightsail
~1-2 minutes
Build a web app
With Elastic Beanstalk
~6 minutes
Host a static website
With S3, CloudFront, Route 53
~5 minutes
Connect an IoT device
With AWS IoT
~5 minutes
Start a development project
With CodeStar
~5 minutes
Register a domain
With Route 53
~3 minutes
See more

Learn to build
See all
Learn to deploy your solutions through step-by-step guides, labs, and videos.
Websites
3 videos, 3 tutorials, 3 labs
DevOps
6 videos, 2 tutorials, 3 labs
Backup and recovery
3 videos, 2 tutorials, 3 labs
Big data
Databases
Mobile

Helpful tips
Manage your costs
Get real-time billing alerts based on your costs and usage budgets. [Start now](#)
Create an organization
Use AWS Organizations for policy-based management of multiple AWS accounts. [Start now](#)

Explore AWS
Amazon Relational Database Service (RDS)
RDS manages and scales your database for you. RDS supports Aurora, MySQL, PostgreSQL, MariaDB, Oracle, and SQL Server. [Learn more](#)
Real-Time Analytics with Amazon Kinesis
Stream and analyze real-time data, so you can get timely insights and react quickly. [Learn more](#)
Get Started with Containers on AWS
Amazon ECS helps you build and scale containers for any size application. [Learn more](#)
AWS Marketplace
Discover, procure, and deploy popular software products that run on AWS. [Learn more](#)
Have feedback?

My Account
My Organization
My Billing Dashboard
My Security Credentials
Sign Out

Now lets redeem some AWS credits

The screenshot displays the AWS Billing & Cost Management Dashboard. On the left, a navigation menu includes links to Dashboard, Bills, Cost Explorer, Budgets, Reports, Cost Allocation Tags, Payment Methods, Payment History, Consolidated Billing, Credits (highlighted with a red box), and DevPay. The main content area is titled "Billing & Cost Management Dashboard" and features a "What's New in AWS Billing and Cost Management?" section with links to Manage your spend with AWS Budgets, Visualize your costs and usage with the newly-optimized Cost Explorer, and Easily upload your Cost and Usage Reports into Redshift and QuickSight. Below this is a "Spend Summary" section with a "Cost Explorer" button. A large circular gauge shows a balance of \$0.00. To the right, a "Month-to-Date Spend by Service" section includes a "Bill Details" button and a table showing a total of \$0.00. At the bottom, there are sections for "Important Information about these Costs" and "Alerts & Notifications".

Billing & Cost Management Dashboard

What's New in AWS Billing and Cost Management?

- Manage your spend with [AWS Budgets](#)
- Visualize your costs and usage with the newly-optimized [Cost Explorer](#)
- Easily upload your [Cost and Usage Reports](#) into Redshift and QuickSight

Spend Summary [Cost Explorer](#)

Welcome to the AWS Account Billing console. Your last month, month-to-date, and month-end forecasted costs appear below.

Current month-to-date balance for December 2017

\$0.00

Graph showing costs for Last Month (November 2017), Month-to-Date (December 2017), and Forecast (December 2017). All values are \$0.

Month-to-Date Spend by Service [Bill Details](#)

The chart below shows the proportion of costs spent for each service you use.

\$0

No Amount Due	\$0.00
Tax	\$0.00
Total	\$0.00

Important Information about these Costs ☒ Include Subscription Charges

Alerts & Notifications

- You are eligible for the [AWS Free Usage Tier](#). See the [Getting Started Guide AWS Free Usage Tier](#) to learn how to get started with the free usage tier.
- Monitor your estimated charges. [Enable Now](#) to begin setting billing alerts that automatically e-mail you when charges reach a threshold you define.
- [IAM](#) access to your account's billing information is not enabled. You can enable it on the [Account](#)

Now lets redeem some AWS credits

aws

Services

Resource Groups

Dashboard

Bills

Cost Explorer

Budgets

Reports

Cost Allocation Tags

Payment Methods

Payment History

Consolidated Billing

Preferences

Credits

Tax Settings

DevPay

Credits

Please enter your code below to redeem your credits.

Promo Code

Security Check

y b 8 n d 5

Refresh Image

Please type the characters as shown above

By clicking "Redeem" you indicate that you have read and agree to the terms of the AWS Promotional Credit Terms & Conditions located [here](#).

Redeem

Below are all the credits you have redeemed with AWS. Credits will automatically be applied to your bill. Only credits that apply to a specific service can be used.

Expiration Date	Credit Name	Credits Used	Credits Remaining	Applicable Products
2018-03-31	EDU_ENG_FY2017_Q1_1_CMU_50USD	\$44.22	\$5.78	See complete list
2018-03-31	EDU_ENG_FY2017_Q1_1_CMU_50USD	\$45.05	\$4.95	See complete list

Total Amount of Credits Remaining: \$10.73

Now you know how to use machines on
EC2 and you can afford to use the
expensive ones

Parting thoughts

- Remember to shut down your machines
 - Just because you don't have an open ssh connection doesn't mean your machine is off
 - You will still get billed, and you will run out of credits
- Check to see if the code you need exists as an AMI
 - Don't waste time trying to build crazy versions of libraries, or installing some obscure runtime
 - You can probably find what you need in an existing AMI

Parting thoughts

- If you are working in a group, consider making a group AWS account
 - You can share credits on the account
 - You don't have to wait for someone to turn on the machine if you want to work
 - Everyone learns how to use AWS
- You need permission to launch a GPU instance
 - You will need to create a support ticket to launch GPU Machines
 - If you attempt to launch on you will be guided through the process
 - You are typically only allowed to launch 1 GPU machine at a time
- Only launch an expensive instance when it is time to train, not develop
 - Launch a basic instance with everything you need to develop and test your code
 - When it comes time to train your system for real, then launch a decked out instance
 - Saves you money