AWS Tutorial

CS224D Spring 2016

April 17, 2016

1 Introduction

This tutorial explains how to set up your EC2 instance using our provided AMI which has TensorFlow installed. Our AMI is cs224d_tensorflow (ami-d8433cb8). We've installed on it:

- CUDA 7.0
- cuDNN 4.0
- $\bullet~$ TensorFlow 0.7

2 Create an AWS account and apply for AWS Educate Program

2.1 Create an AWS account

Go to AWS homepage http://www.aws.amazon.com. Click the Sign In to Console or Create an AWS account button on the top right corner. This will bring you to the sign in/sign up page. Create your account there with your email and password.

2.2 Apply for AWS Educate Program

AWS Educate Program gives \$35 AWS credits per student. You can apply for it here: https://aws.amazon.com/education/awseducate/.

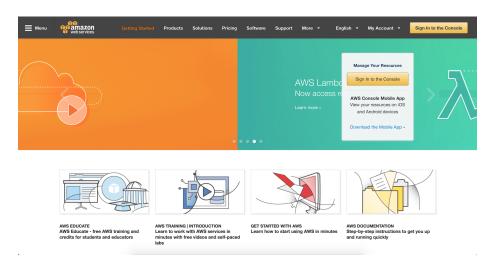


Figure 1: AWS homepage

3 Launch an EC2 instance using existing AMI

Note: You may need to wait for 2 hours after sign-up before you can launch instances.

Go to AWS homepage and sign in to your console. After you sign in, you should be able to see a page like this

Amazon Web Services			Resource Groups Learn more
Compute EC2 What servers in the Cloud EC2 Container Service Run and Manage Docker Containers	Developer Tools CodeCommit Store Code In Prate Git Repositories CodeDeploy CodeDeploy Automate Code Deployments	Internet of Things WS IoT Connect Devices to the Cloud Game Development	A resource group is a collection of resources that share one or more tags. Create a group for each project, application, or environment in your account.
Elastic Beanstalk Run and Manage Web Apps Lambda Run Code in Response to Events	CodePipeline Release Software using Continuous Delivery Management Tools	GameLift Deploy and Scale Session-based Multiplayer Games Mobile Services	Create a Group Tag Editor
Storage & Content Delivery	CloudWatch Monitor Resources and Applications CloudFormation	 Mobile Hub Build, Test, and Monitor Mobile Apps Cognito 	Additional Resources
Scalable Storage in the Cloud CloudFront Global Content Delivery Network Elastic File System PREVIEW	Create and Manage Resources with Templates CloudTrail Track User Activity and API Usage Config	Loss identity and App Data Synchronization Device Farm Test Android, FireOS, and IOS Apps on Real Devices in the Cloud	Getting Started C [#] Read our documentation or view our training to learn more about AWS. AWS Console Mobile App C [#]
Fully Managed File System for EC2 Glacier Archive Storage in the Cloud Import/Export Snowball	Track Resource Inventory and Changes OpsWorks Automate Operations with Chef Service Catalog	Mobile Analytics Collect, View and Export App Analytics SNS Push Notification Service	View your resources on the go with our AWS Console mobile app, available from Amazon Appstore, Google Play, or iTunes.
Large Scale Data Transport Storage Gateway Hybrid Storage Integration	Create and Use Standardized Products Trusted Advisor Optimize Performance and Security	Application Services # API Gateway Bulld, Deploy and Manage APIs	AWS Marketplace C [*] Find and buy software, launch with 1-Click and pay by the hour.
Database RDS Managed Relational Database Service DynamoDB	Security & Identity Platentity & Access Management Manage User Access and Encryption Keys Directory Service	AppStream Low Latercy Application Streaming CouldSearch Managed Search Service	AWS re:Invent Announcements C Explore the next generation of AWS cloud capabilities. See what's new
Managed NoSQL Database ElastiCache In-Memory Cache	 Host and Manage Active Directory Inspector PREVIEW Analyze Application Security 	Elastic Transcoder Easy-to-Use Scalable Media Transcoding SES Email Sending and Receiving Service	Service Health
Redshift Fast, Simple, Cost-Effective Data Warehousing DMS Manapad Database Migration Service	WAF Fiber Malicious Web Traffic Certificate Manager Provision, Manage, and Deploy SSL/TLS Certificates	SQS Message Queue Service	Updated: Apr 13 2016 10:20:00 GMT-0700

Figure 2: Console Home

You can see your region on the top right. Make sure it is N. California. On the left you can find EC2 under Compute category. Click EC2, which will bring to the EC2 dashboard:

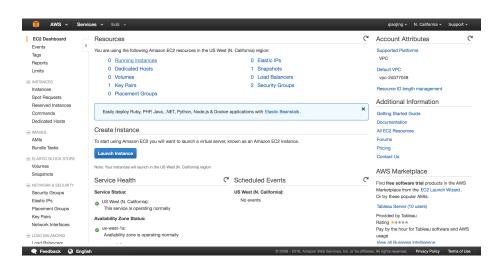


Figure 3: EC2 dashboard

We can find a blue *Launch Instance* button. Click it and we will see lists of AMIs that we can use. An AMI (Amazon Machine Image) is a pack of data which provides the information required to launch an instance. We can modify existing AMIs, such as installing softwares on it, and then save it as our own AMI. Here we will use the AMI created for CS224D which has TensorFlow installed.

	ins the software conf	actine in tage (Aivit) iguration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user	Cancel and Exit r community, or the A
uick Start		< < 1 to	22 of 22 AMIs > >
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AWS Marketplace	Amazon Linux Free tier eligible	The Amazon Linux AMI is an EBS-backed, AWS-supported image. The default image includes AWS command line tools, Python, Ruby, Perl, and Java. The repositories include Docker, PHP, MySQL, PostgreSQL, and other packages.	64-bit
Community AMIs		Root device type: ebs Virtualization type: hvm	
Free tier only (j)	Red Hat Free tier eligible	Red Hat Enterprise Linux 7.2 (HVM), SSD Volume Type - ami-d1315/b1 Red Hat Enterprise Linux version 7.2 (HVM), EBS General Purpose (SSD) Volume Type Root device type etes Vrtualization type thm	Select 64-bit
	3	SUSE Linux Enterprise Server 12 SP 1 (HVM), SSD Volume Type - ami-6d701b0d	Select
	SUSE Linux Free tier eligible	SISE Luxus Entropoles Server 12 Service Pack 1 PMM, EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Largacy modules enabled.	64-bit
	0	Ubuntu Server 14.04 LTS (HVM), SSD Volume Type - ami-06116566	Select

Figure 4: Lists of available AMIs

Click *Community AMIs* on the sidebar. Search for "cs224d". You will find an AMI named cs224d_tensorflow (ami-d8433cb8).

AMI is a template that			Cancel and Ext one) required to launch your instance. You can select an AMI provided by AWS, our user community, or t
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 Debian 	Ó		
 Fedora 	B		
Gentoo	9		
OpenSUSE	et 1		
Other Linux			
Red Hat	. 🧑		
SUSE Linux	3		
 Ubuntu 	0		

Figure 5: Select an AMI

Select the cs224d_tensorflow AMI. It then asks you to select an instance type. We need to select a GPU instance. Scroll down and find g2.2xlarge and click *Next*:

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Figure 6: Choose instance type

After that, it asks you to configure instance details. We don't need to modify things here, simply click *Next*. Then we reach step 4: Add Storage. Make sure the size of Root is at least 16GB.

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							Cancel Pr	revious Review and L	aunch Next:	Tag Inst

Figure 7: Add Storage

Click next and in Step 5: Tag Instance, we also click Next.

Now we are at Step 6: Configure Security Group. If you hadn't created a security group before, choose *Create a new security group*. Otherwise, choose *Select an existing security group* and then choose the security group that you had created. Make sure SSH is included in the type column. After you've done this, click *Review and Launch*.

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Step 6: Configure Security Grr A security group is a set of firewall rules that control Internet traffic to reach your instance, add rules the groups.	ol the traffic for your instance. On						
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Figure 8: Configure Security Group

In Step 7: Review Instance Launch, click *Launch* and we reach the final step: *Select an existing key pair or create a new key pair*. This key pair would be needed when you SSH into your instance. If you hadn't created a key pair before, select *create a new key pair* and give the key pair a name, such as cs224d. Then click *Download Key Pair* and save it as a .pem file. Make sure to store it at somewhere you can find. We will need it later.

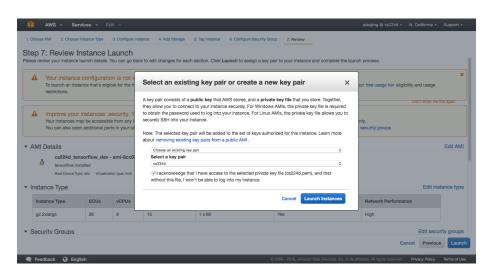


Figure 9: Select an existing key pair or create a new key pair

The last step is to click *Launch Instance*. Congratulations! You now have a running EC2 instance! (Note: Be sure to read section 4 to learn how to close an instance. Amazon would charge you for every running instance.) You can view status of instances in the EC2 dashboard when you click instances. You will see the *Instance State* goes from pending to running. You can also see the *Public IP* of your instance, as shown in figure 10.

EC2 Dashboard Events	Launch Instance	Connect Actions ~								
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Volumes										
Snapshots										
NETWORK & SECURITY										
Security Groups										
Elastic IPs										
Placement Groups										

Figure 10: Inspect the status of your EC2 instance

After the instance is running, we can now ssh into our instance to do our programming assignments and projects. But first, we need to change the permission of the previous .pem that you've downloaded. Open terminal and type the command:

\$ chmod 400 path-to-pem-file

Now we ssh into our instance use:

\$ ssh -i path-to-pem-file ubuntu@ip-address

We can check that TensorFlow is working by following the steps here: https://www.tensorflow.org/versions/r0.8/get_started/os_setup.html# test-the-tensorflow-installation

4 Close a running instance

Amazon charges you for each running instance, so make sure to close them when you've finished. In the page where you inspect your instance, right click your instance and in *Instance State*, select *Terminate* or *Stop*. For information on their differences, you can look at

http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ec2-instance-lifecycle. html#lifecycle-differences.

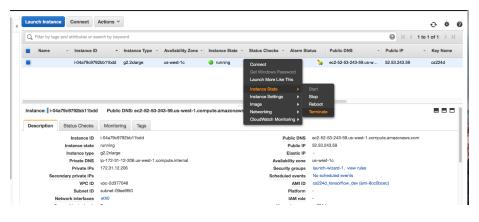


Figure 11: Close a running instance

5 Other topics

Here are some topics and related links that you may need for doing your assignments/project:

- 1. Amazon Machine Image: http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/AMIs.html
- 2. AWS Identity and Access Management (IAM): http://docs.aws.amazon.com/IAM/latest/UserGuide/introduction. html This is very useful when you do project in group.
- 3. Exchange file between EC2 and S3: http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/AmazonS3.html