

# AWS Fundamental



# EC2 Introduction

## What is EC2?

- EC2 is one of most popular AWS offering
- It mainly consists the capability of :
  - Renting virtual machines (EC2)
  - Storing data on virtual drives (EBS)
  - Distributing load across machines (ELB)
  - Scaling the services using an auto-scaling group (ASG)
- Knowing EC2 is fundamental to understand how the Cloud works



## **Hands-On: Launching an EC2 Instance running Linux**

- We'll be launching our first virtual server using the AWS Console
- We'll get a first high level approach to the various parameters
- We'll learn how to start / stop / terminate our instance.

AWS Management Console +

https://eu-west-3.console.aws.amazon.com/console/home?region=eu-west-3#

aws Services Resource Groups

## AWS services

ec2

EC2 Services in the Cloud

**Click Here**

Elastic Container Service  
Run and Manage Docker Containers

GuardDuty  
Intelligent Threat Detection to Protect Your AWS Accounts and Workloads

Get started with simple wizards and automated workflows.

 Launch a virtual machine  
With EC2  
~2-3 minutes

 Build a web app  
With Elastic Beanstalk  
~6 minutes

 Build using virtual servers  
With Lightsail  
~1-2 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

EC2 Management Console x +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#Home:

**aws** Services Resource Groups

**EC2 Dashboard**

- Events
- Tags
- Reports
- Limits

**INSTANCES**

- Instances
- Launch Templates
- Spot Requests
- Reserved Instances
- Dedicated Hosts

**IMAGES**

- AMIs
- Bundle Tasks

**ELASTIC BLOCK STORE**

- Volumes
- Snapshots

**NETWORK & SECURITY**

- Security Groups
- Elastic IPs
- Placement Groups

**Resources**

You are using the following Amazon EC2 resources in the EU (Paris) region:

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

Learn more about the latest in AWS Compute from AWS re:Invent 2017 by viewing the EC2 Videos.

**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 EU (Paris) region

**Service Health**

**Service Status:**

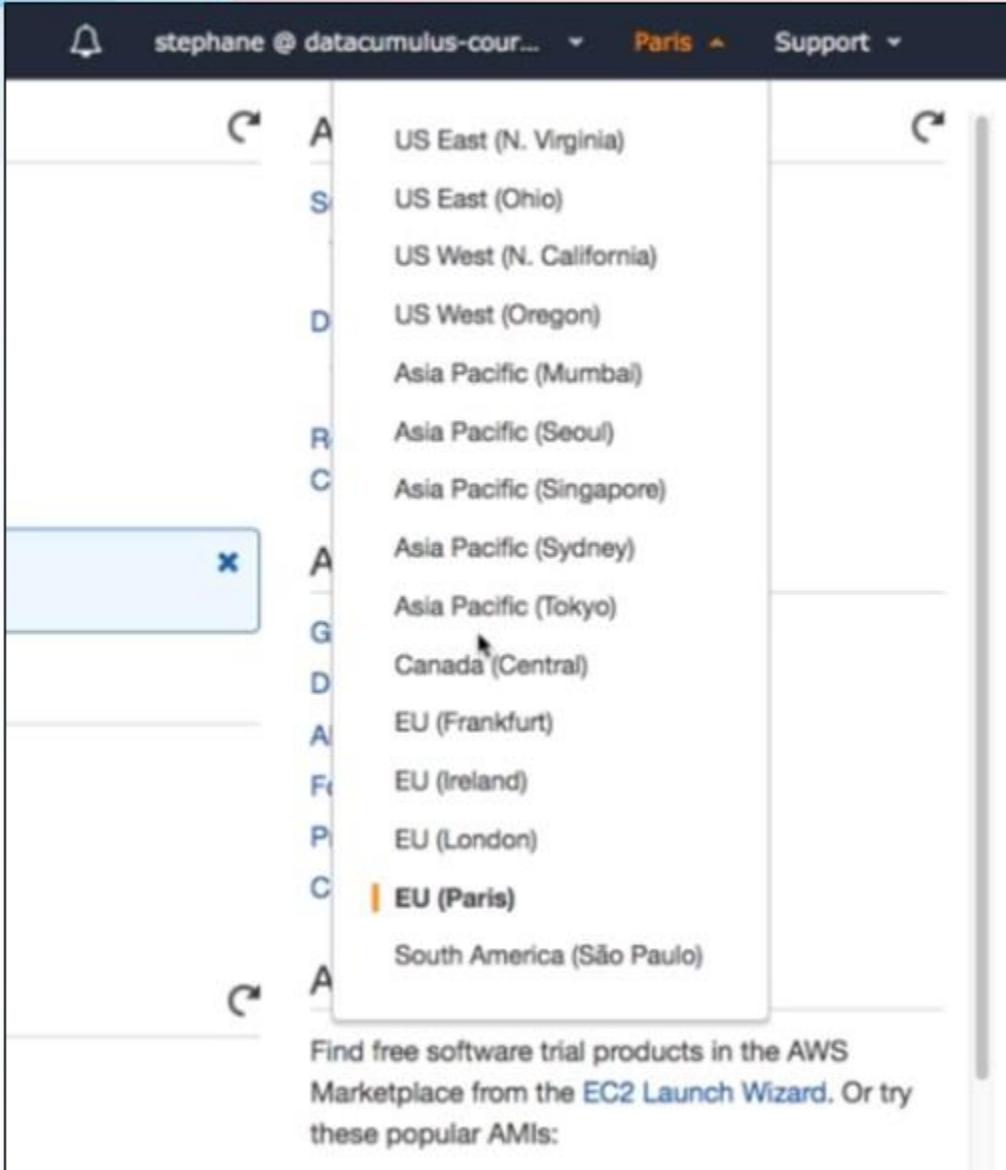
- EU (Paris): Green checkmark

**Availability Zone Status:**

**Scheduled Events**

**EU (Paris):**

No events



The screenshot shows a dropdown menu for selecting a region in the AWS Management Console. The user is currently in the 'Paris' region, as indicated by the orange selection bar. The menu lists 18 regions, each with a small icon and a label. The regions are: US East (N. Virginia), US East (Ohio), US West (N. California), US West (Oregon), Asia Pacific (Mumbai), Asia Pacific (Seoul), Asia Pacific (Singapore), Asia Pacific (Sydney), Asia Pacific (Tokyo), Canada (Central), EU (Frankfurt), EU (Ireland), EU (London), EU (Paris), and South America (São Paulo). The 'EU (Paris)' region is highlighted with an orange selection bar. The background of the dropdown menu is white, and the regions are listed in a vertical list.

stephane @ datacumulus-cour... ▾ Paris ▾ Support ▾

- A US East (N. Virginia)
- S US East (Ohio)
- US West (N. California)
- D US West (Oregon)
- Asia Pacific (Mumbai)
- R Asia Pacific (Seoul)
- C Asia Pacific (Singapore)
- A Asia Pacific (Sydney)
- G Asia Pacific (Tokyo)
- Canada (Central)
- D EU (Frankfurt)
- A EU (Ireland)
- P EU (London)
- C EU (Paris)
- A South America (São Paulo)

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

**For learning purpose,  
select a region which  
is cheapest.**

EC2 Management Console x +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#Home:

**aws** Services Resource Groups

**EC2 Dashboard**

- Events
- Tags
- Reports
- Limits

**INSTANCES**

- Instances
- Launch Templates
- Spot Requests
- Reserved Instances
- Dedicated Hosts

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- Security Groups
- Elastic IPs
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**Resources**

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0 Key Pairs	1 Security Groups
0 Placement Groups	

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**Create Instance**

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

**Launch Instance**

**Click Here** launch in the EU (Paris) region

**Service Health**

**Service Status:**

- EU (Paris): Green checkmark

**Availability Zone Status:**

**Scheduled Events**

**EU (Paris):**

No events

EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#LaunchInstanceWizard:

aws Services Resource Groups

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

stephane @ datacumulus-cour... Paris Support

Step 1: Choose an Amazon Machine Image (AMI)

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.

Search for an AMI by entering a search term e.g. "Windows"

Cancel and Exit

1 to 35 of 35 AMIs

Quick Start

My AMIs

Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-06340c8c12baa6a09

Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras.

Root device type: ebs Virtualization type: hvm

Select

Click Here

AWS Marketplace

Amazon Linux Free tier eligible

Amazon Linux AMI 2018.03.0 (HVM), SSD Volume Type - ami-0ebc281c20e89ba4b

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.

Root device type: ebs Virtualization type: hvm

Select

Community AMIs

Free tier only ?

SUSE Linux Enterprise Server 15 (HVM), SSD Volume Type - ami-01116bee807116ce

SUSE Linux Enterprise Server 15 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled.

Root device type: ebs Virtualization type: hvm

Select

Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-0370f4064dbc392b9

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

Select

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AWS Services Resource Groups

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

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**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
General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
General purpose	<b>t2.micro</b> <small>From \$0.028/hour</small>	1	1	EBS only	-	Low to Moderate	Yes
General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
General purpose	m5.large	2	8	EBS only	Yes	Up to 10 Gigabit	Yes
General purpose	m5.xlarge	4	16	EBS only	Yes	Up to 10 Gigabit	Yes

Cancel Previous Review and Launch Next: Configure Instance Details

Click Here

aws Services Resource Groups

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-d74714be (default) Create new VPC

Subnet: No preference (default subnet in any Availability Zone) Create new subnet

Auto-assign Public IP: Use subnet setting (Enable)

Placement group: Add instance to placement group.

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.

T2 Unlimited: Enable  
Additional charges may apply

Cancel Previous Review and Launch Next: Add Storage

Click Here

EC2 Management Console <https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#LaunchInstanceWizard>

Services Resource Groups

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/xvda	snap-06fbc87e36aa3b3ea	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.

Cancel Previous **Review and Launch** Next: Add Tags

Click Here

EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#LaunchInstanceWizard:

aws Services Resource Groups ?

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

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## 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 (i) Volumes (i)

*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)

**Click Here** 

Cancel Previous **Review and Launch** Next: Configure Security Group

AWS Services Resource Groups

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	
Name		My First Instance		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Add another tag (Up to 50 tags maximum)

Cancel Previous Review and Launch Next: Configure Security Group

AWS Services Resource Groups

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

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Key	(127 characters maximum)	Value	(255 characters maximum)	Instances	Volumes	
Name	I	My First Instance		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
another key		another value		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Add another tag (Up to 50 tags maximum)

Cancel Previous Review and Launch Next: Configure Security Group

Click Here

EC2 Management Console + | https://eu-west-3.console.aws.amazon.com/ec2/v2/home/?region=eu-west-3#LaunchInstanceWizard:

aws Services Resource Groups star

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

## 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:  remove

Description:  remove

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom <span>remove</span>	0.0.0.0/0 <span>remove</span>
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

AWS Services Resource Groups

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

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

Security group name: my-first-security-group

Description: Created with my first EC2 Instance

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom 0.0.0.0/0	SSH to the instance

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

Click Here

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#LaunchInstanceWizard:

Services Resource Groups

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 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, my-first-security-group, 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](#)

**Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-06340c8c12baa6a09**  
**Free tier eligible**  
Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras.  
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: my-first-security-group  
Description: Created with my first EC2 Instance

Type	Protocol	Port Range	Source	Description

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

Click Here

## Select an existing key pair or create a new key pair

X

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](#).

Choose an existing key pair

Select a key pair

No key pairs found



### No key pairs found

You don't have any key pairs. Please create a new key pair by selecting the [Create a new key pair](#) option above to continue.

Cancel

Launch Instances

## Select an existing key pair or create a new key pair

X

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.

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✓ Choose an existing key pair

Create a new key pair

Process: Create a key pair

Click Here



No key pairs found

You don't have any key pairs. Please create a new key pair by selecting the [Create a new key pair](#) option above to continue.

Cancel

Launch Instances

## 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.

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Create a new key pair

Key pair name

EC2 Tutorial

Download Key Pair

Click Here



You have to download the **private key file** (\*.pem file) before you can use it.

It is recommended to download it in a **secure and accessible location**. You will not be able to download the file again after it's created.

Cancel

Launch Instances

Click Here

aws Services Resource Groups

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## Launch Status



Initiating Instance Launches  
Please do not close your browser while this is loading  
Creating security groups...

## Launch Status

Your instances are now launching

The following instance launches have been initiated: i-6cf81776 [View launch log](#)

Get notified of estimated charges

[Create billing alerts](#) to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

### How to connect to your instances

Your instances are launching, and it may take a few minutes until they are in the running state, when they will be ready for you to use. Usage hours on your new instances will start immediately and continue to accrue until you stop or terminate your instances.

Click [View Instances](#) to monitor your instances' status. Once your instances are in the running state, you can connect to them from the Instances screen. Find out how to connect to your instances.

▼ Here are some helpful resources to get you started

- [How to connect to your Linux instance](#)
- [Amazon EC2: User Guide](#)
- [Learn about AWS Free Usage Tier](#)
- [Amazon EC2: Discussion Forum](#)

While your instances are launching you can also

[Create status check alarms](#) to be notified when these instances fail status checks. (Additional charges may apply)

[Create and attach additional EBS volumes](#) (Additional charges may apply)

[Manage security groups](#)

EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#Instances:

AWS Services Resource Groups Actions

EC2 Dashboard Events Tags Reports Limits Instances

Instances Launch Templates Spot Requests Reserved Instances Dedicated Hosts

Images AMIs Bundle Tasks Elastic Block Store

Volumes Snapshots Network & Security

Security Groups Elastic IPs Placement Groups Key Pairs Network Interfaces Feedback English (US)

**Launch Instance** Connect

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 IPs
My First Inst...	i-6cf81776	t2.micro	eu-west-3c	pending	Initializing	None	ec2-35-180-100-144.eu...	35.180.100.144	-

Instance: i-6cf81776 (My First Instance) Public DNS: ec2-35-180-100-144.eu-west-3.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags
Instance ID	i-6cf81776		
Instance state	pending		
Instance type	t2.micro		
Elastic IPs			
Availability zone	eu-west-3c		
Security groups	my-first-security-group, view inbound rules, view outbound rules		
Scheduled events	-		
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)		
Platform	-		
Public DNS (IPv4)	ec2-35-180-100-144.eu-west-3.compute.amazonaws.com		
IPv4 Public IP	35.180.100.144		
IPv6 IPs	-		
Private DNS	ip-172-31-34-100.eu-west-3.compute.internal		
Private IP	172.31.34.100		
Secondary private IPs			
VPC ID	vpc-d74714be		
Subnet ID	subnet-391dc774		
Network interfaces	eth0		

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Services ▾ Resource Groups ▾

Launch Instance Connect Actions ▾

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPs
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	Initializing	None	ec2-35-180-100-144.eu...	35.180.100.144	-

Right Click

Instance: i-6cf81776 (My First Instance) Public DNS: ec2-35-180-100-144.eu-west-3.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags
Instance ID	i-6cf81776		
Instance state	running		
Instance type	t2.micro		
Elastic IPs			
Availability zone	eu-west-3c		
Security groups	my-first-security-group, view inbound rules, view outbound rules		
Scheduled events	No scheduled events		
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)		
Platform	-		
		Network interfaces	eth0

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AWS Services Resource Groups

EC2 Dashboard Events Tags Reports Limits INSTANCES Instances Launch Templates Spot Requests Reserved Instances Dedicated Hosts IMAGES AMIs Bundle Tasks ELASTIC BLOCK STORE Volumes Snapshots NETWORK & SECURITY Security Groups Elastic IPs Placement Groups Key Pairs Network Interfaces

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 Public IP
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	None	None	ec2-35-180-100-144.eu-west-3.compute.amazonaws.com	35.180.100.144	-

Connect: Get Windows Password Launch More Like This

- Instance State: Start, Stop, Reboot, Terminate
- Instance Settings
- Image
- Networking
- CloudWatch Monitoring

Instance: i-6cf81776 (My First Instance) Public DNS: ec2-35-180-100-144.eu-west-3.compute.amazonaws.com

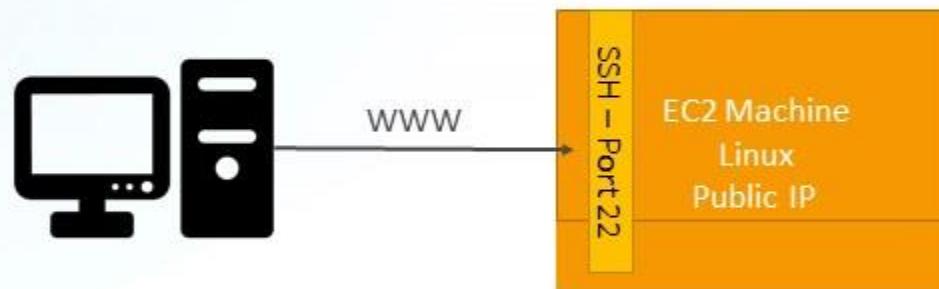
Description	Status Checks	Monitoring	Tags
Instance ID: i-6cf81776			
Instance state: running			
Instance type: t2.micro			
Elastic IPs			
Availability zone: eu-west-3c			
Security groups: my-first-security-group, view inbound rules, view outbound rules			
Scheduled events: No scheduled events			
AMI ID: amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)			
Platform: -			
			Network interfaces: eth0
			Public DNS (IPv4): ec2-35-180-100-144.eu-west-3.compute.amazonaws.com
			IPv4 Public IP: 35.180.100.144
			IPv6 IPs: -
			Private DNS: ip-172-31-34-100.eu-west-3.compute.internal
			Private IP: 172.31.34.100
			Secondary private IPs: -
			VPC ID: vpc-d74714be
			Subnet ID: subnet-391dc774

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# How to SSH into your EC2 Instance Linux or Mac

# How to SSH into your EC2 Instance Linux / Mac OS X

- We'll learn how to SSH into your EC2 instance using [Linux / Mac](#)
- SSH is one of the most important function. It allows you to control a remote machine, all using the command line.



- We will see how we can configure OpenSSH `~/.ssh/config` to facilitate the SSH into our EC2 instances

EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:

**aws** Services Resource Groups Actions

EC2 Dashboard Events Tags Reports Limits INSTANCES Instances Launch Templates Spot Requests Reserved Instances Dedicated Hosts IMAGES AMIs Bundle Tasks ELASTIC BLOCK STORE Volumes Snapshots NETWORK & SECURITY Security Groups Elastic IPs Placement Groups Key Pairs Network Interfaces

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 Public IP
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-100-144.eu...	35.180.100.144	-

1 to 1 of 1

Instance: i-6cf81776 (My First Instance) Public DNS: ec2-35-180-100-144.eu-west-3.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-6cf81776	Public DNS (IPv4)	ec2-35-180-100-144.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.100.144
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c	Private IPs	172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	
Scheduled events	No scheduled events	VP	
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa8a09)	Subn	
Platform	-	Network interfaces	eth0

Copy It

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Launch Instance ▾ Connect Actions ▾

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 IPs
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-100-144.eu...	35.180.100.144	-

Description Status Checks Monitoring Tags

Instance ID	i-6cf81776	Public DNS (IPv4)	ec2-35-180-100-144.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.100.144
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c	Private IPs	172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	
Scheduled events	No scheduled events		
AMI ID	amzn2-ami-hvm-2.0.20106340c8c12baa6a09		
Platform	-		
IAM role	-		

Security Groups associated with i-6cf81776

Ports	Protocol	Source	my-first-security-group
22	tcp	0.0.0.0/0	✓

ssh ec2-user@35.180.100.144

yes

```
~/aws-course ➔ ssh ec2-user@35.180.100.144
The authenticity of host '35.180.100.144 (35.180.100.144)' can't be established.
ECDSA key fingerprint is SHA256:gLqFnUlIDsBNQZFkmzJLGNRTry2CbQ8L2N3ZUU0DTYQ.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '35.180.100.144' (ECDSA) to the list of known hosts.
ec2-user@35.180.100.144: Permission denied (publickey,gssapi-keyex,gssapi-with-mic).
✖ ➔ ~/aws-course ➔ █
```

Launch Instance ▾ Connect Actions ▾

Filter by tags and attributes or search by keyword

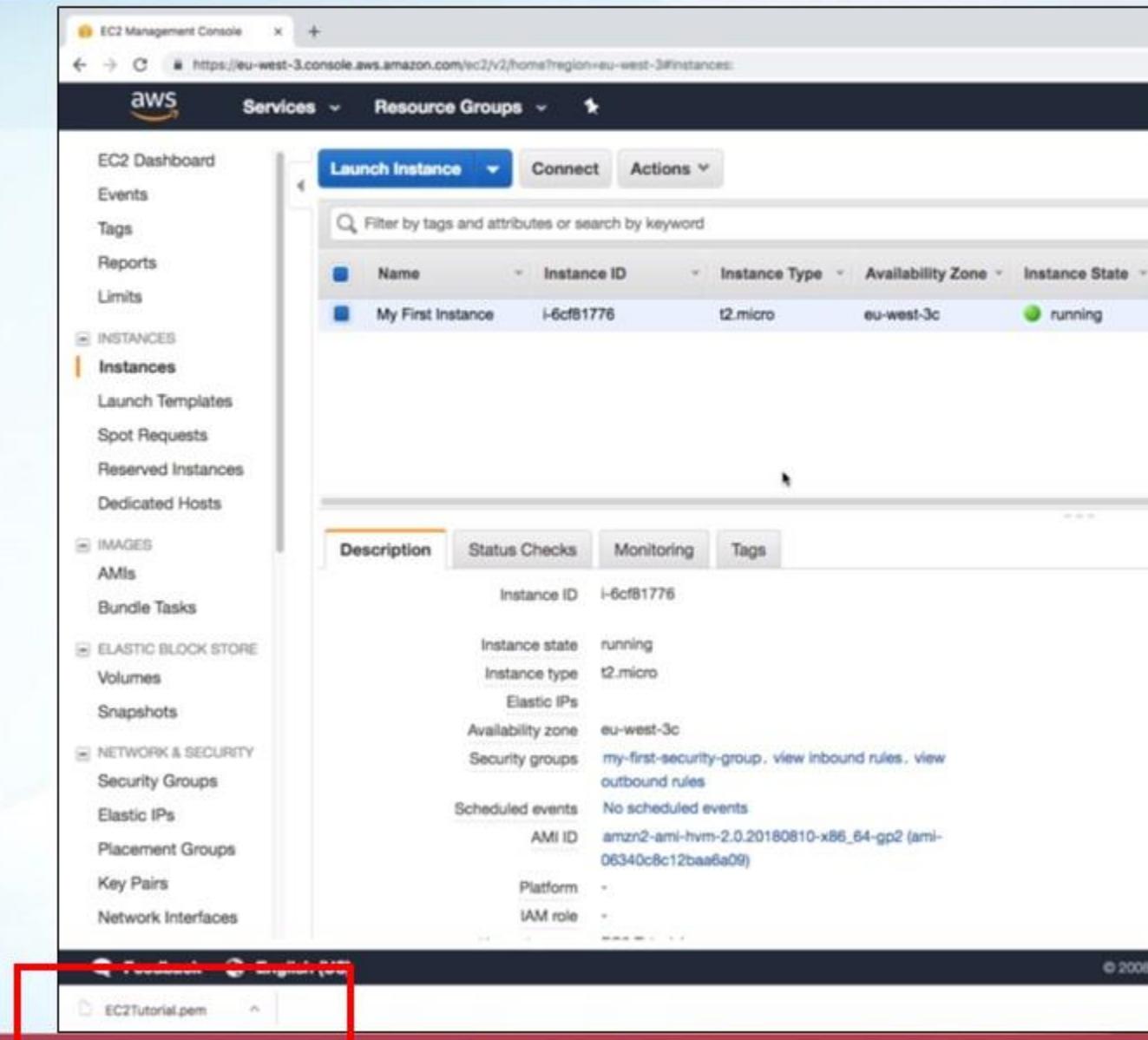
Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 IPs
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-100-144.eu...	35.180.100.144	-

Description Status Checks Monitoring Tags

Instance ID	i-6cf81776	Public DNS (IPv4)	ec2-35-180-100-144.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.100.144
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c	Private IPs	172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	
Scheduled events	No scheduled events		
AMI ID	amzn2-ami-hvm-2.0.20106340c8c12baa6a09		
Platform	-		
IAM role	-		

Security Groups associated with i-6cf81776

Ports	Protocol	Source	my-first-security-group
22	tcp	0.0.0.0/0	✓



The screenshot shows the AWS EC2 Management Console interface. The left sidebar contains a navigation menu with the following items:

- EC2 Dashboard
- Events
- Tags
- Reports
- Limits
- INSTANCES
  - Instances
  - Launch Templates
  - Spot Requests
  - Reserved Instances
  - Dedicated Hosts
- IMAGES
  - AMIs
  - Bundle Tasks
- ELASTIC BLOCK STORE
  - Volumes
  - Snapshots
- NETWORK & SECURITY
  - Security Groups
  - Elastic IPs
  - Placement Groups
  - Key Pairs
  - Network Interfaces

The main content area displays a table of instances. The table has columns for Name, Instance ID, Instance Type, Availability Zone, and Instance State. One instance is listed:

Name	Instance ID	Instance Type	Availability Zone	Instance State
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running

Below the table, there is a detailed view of the instance's configuration, showing fields like Instance ID, Instance state, Instance type, and Security groups.

A red box highlights the bottom navigation bar, which includes links for "EC2Tutorial.pem", "AWS CLI", "AWS Lambda", and "AWS Lambda Functions".

## ls

```
~/aws-course ➤ ssh ec2-user@35.180.100.144
The authenticity of host '35.180.100.144 (35.180.100.144)' can't be established.
ECDSA key fingerprint is SHA256:gLqFnULIDsBNQZFKmzJLGNRTry2CbQ8L2N3ZUU0DTYQ.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '35.180.100.144' (ECDSA) to the list of known hosts.
ec2-user@35.180.100.144: Permission denied (publickey,gssapi-keyex,gssapi-with-mic).
x ➤ ~/aws-course ➤ ls
EC2Tutorial.pem
~/aws-course ➤
```

```
ssh -i EC2Tutorial.pem ec2-user@35.180.100.144
```

```
~/aws-course ➔ ssh -i EC2Tutorial.pem ec2-user@35.180.100.144
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@WARNING: UNPROTECTED PRIVATE KEY FILE!@@@@@@
Permissions 0644 for 'EC2Tutorial.pem' are too open.
It is required that your private key files are NOT accessible by others.
This private key will be ignored.
Load key "EC2Tutorial.pem": bad permissions
ec2-user@35.180.100.144: Permission denied (publickey,gssapi-keyex,gssapi-with-mic).
X ➔ ~/aws-course ➔
```

chmod 0400 EC2Tutorial.pem

ssh -i EC2Tutorial.pem ec2-user@35.180.100.144

```
x ~aws-course chmod 0400 EC2Tutorial.pem
~/aws-course ssh -i EC2Tutorial.pem ec2-user@35.180.100.144
```

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

<https://aws.amazon.com/amazon-linux-2/>

2 package(s) needed for security, out of 9 available

Run "sudo yum update" to apply all updates.

[ec2-user@ip-172-31-34-100 ~]\$

**whoami**  
**ping google.com**  
**logout**

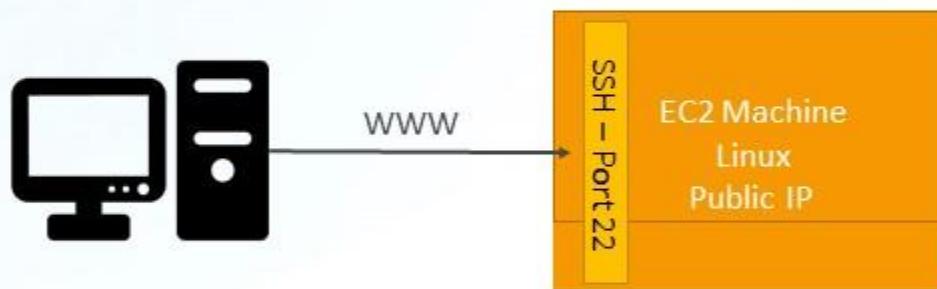
```
[ec2-user@ip-172-31-34-100 ~]$ whoami
ec2-user
[ec2-user@ip-172-31-34-100 ~]$ ping google.com
PING google.com (172.217.22.142) 56(84) bytes of data.
64 bytes from par21s12-in-f14.1e100.net (172.217.22.142): icmp_seq=1 ttl=42 time=18.1 ms
64 bytes from par21s12-in-f14.1e100.net (172.217.22.142): icmp_seq=2 ttl=42 time=18.2 ms
64 bytes from par21s12-in-f14.1e100.net (172.217.22.142): icmp_seq=3 ttl=42 time=18.2 ms
64 bytes from par21s12-in-f14.1e100.net (172.217.22.142): icmp_seq=4 ttl=42 time=18.1 ms
64 bytes from par21s12-in-f14.1e100.net (172.217.22.142): icmp_seq=5 ttl=42 time=18.2 ms
^C
--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 18.154/18.206/18.252/0.175 ms
[ec2-user@ip-172-31-34-100 ~]$ ^C
[ec2-user@ip-172-31-34-100 ~]$ logout
Connection to 35.180.100.144 closed.
```

✖ ➔ ~/aws-course ➔ █

# How to SSH using Windows

## How to SSH into your EC2 Instance Windows

- We'll learn how to SSH into your EC2 instance using [Windows](#)
- SSH is one of the most important function. It allows you to control a remote machine, all using the command line.



- We will configure all the required parameters necessary for doing SSH on Windows using the free tool [Putty](#).

putty - Google Search

putty

All Images Maps Videos News More Settings Tools

About 41,000,000 results (0.34 seconds)

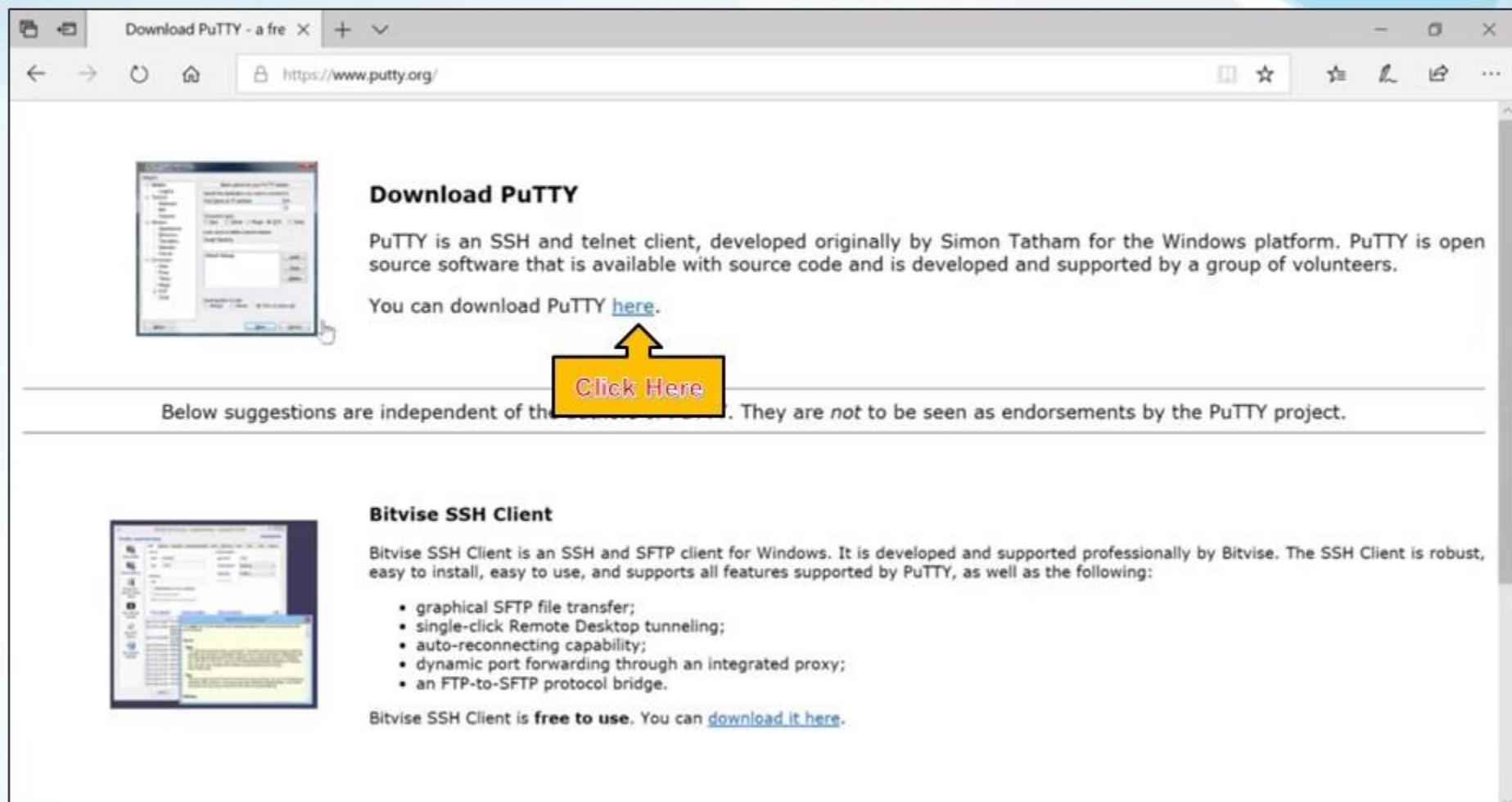
**Download PuTTY - a free SSH and telnet client for Windows**  
<https://www.chiark.greenend.org.uk/~sgtatham/putty/>  
PuTTY is a free implementation of SSH and Telnet for Windows and Unix platforms, along with an xterm terminal emulator. It is written and maintained primarily ...

**PuTTY: a free SSH and Telnet client - Chiark**  
<https://www.chiark.greenend.org.uk/~sgtatham/putty/>  
PuTTY is a free implementation of SSH and Telnet for Windows and Unix platforms, along with an xterm terminal emulator. It is written and maintained primarily ...

**Download PuTTY: latest release (0.70) - Chiark**  
<https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html>  
Jul 19, 2018 - Release versions of PuTTY are versions we think are reasonably likely to work well. However, they are often not the most up-to-date version of ...

Download PutTY - a free X + ▾

https://www.putty.org/ □ ☆ ★ ↲ ↴ ...



**Download PutTY**

PutTY is an SSH and telnet client, developed originally by Simon Tatham for the Windows platform. PutTY is open source software that is available with source code and is developed and supported by a group of volunteers.

You can download PutTY [here](#).

Below suggestions are independent of the PutTY project. They are *not* to be seen as endorsements by the PutTY project.

---

**Bitvise SSH Client**

Bitvise SSH Client is an SSH and SFTP client for Windows. It is developed and supported professionally by Bitvise. The SSH Client is robust, easy to install, easy to use, and supports all features supported by PutTY, as well as the following:

- graphical SFTP file transfer;
- single-click Remote Desktop tunneling;
- auto-reconnecting capability;
- dynamic port forwarding through an integrated proxy;
- an FTP-to-SFTP protocol bridge.

Bitvise SSH Client is **free to use**. You can [download it here](#).

Download PuTTY: latest X + ↻ https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html

## Download PuTTY: latest release (0.70)

[Home](#) | [FAQ](#) | [Feedback](#) | [Licence](#) | [Updates](#) | [Mirrors](#) | [Keys](#) | [Links](#) | [Team](#)  
Download: **Stable** · [Snapshot](#) | [Docs](#) | [Changes](#) | [Wishlist](#)

This page contains download links for the latest released version of PuTTY. Currently this is 0.70, released on 2017-07-08.

When new releases come out, this page will update to contain the latest, so this is a good page to bookmark or link to. Alternatively, here is a [permanent link to the 0.70 release](#).

Release versions of PuTTY are versions we think are reasonably likely to work well. However, they are often not the most up-to-date version of the code available. If you have a problem with this release, then it might be worth trying out the [development snapshots](#), to see if the problem has already been fixed in those versions.

### Package files

You probably want one of these. They include all the PuTTY utilities.

(Not sure whether you want the 32-bit or the 64-bit version? Read the [FAQ entry](#).)

**MSI ("Windows Installer")**

32-bit:	<a href="#">putty-0.70-installer.msi</a>	<a href="#">(or by FTP)</a>	<a href="#">(signature)</a>
64-bit:	<a href="#">putty-64bit-0.70-installer.msi</a>	<a href="#">(or by FTP)</a>	<a href="#">(signature)</a>

**Unix source archive**

.tar.gz:	<a href="#">putty</a>	 <a href="#">Click Here</a>	<a href="#">(or by FTP)</a>	<a href="#">(signature)</a>
----------	-----------------------	--	-----------------------------	-----------------------------

Download PuTTY: latest X + 

https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html

Download PuTTY: latest release (0.70)

[Home](#) | [FAQ](#) | [Feedback](#) | [Licence](#) | [Updates](#) | [Mirrors](#) | [Kevs](#) | [Links](#) | [Team](#)  
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**Unix source archive**

.tar.gz:	<a href="#">putty-0.70.tar.gz</a>	(or by <a href="#">FTP</a> )	<a href="#">(signature)</a>
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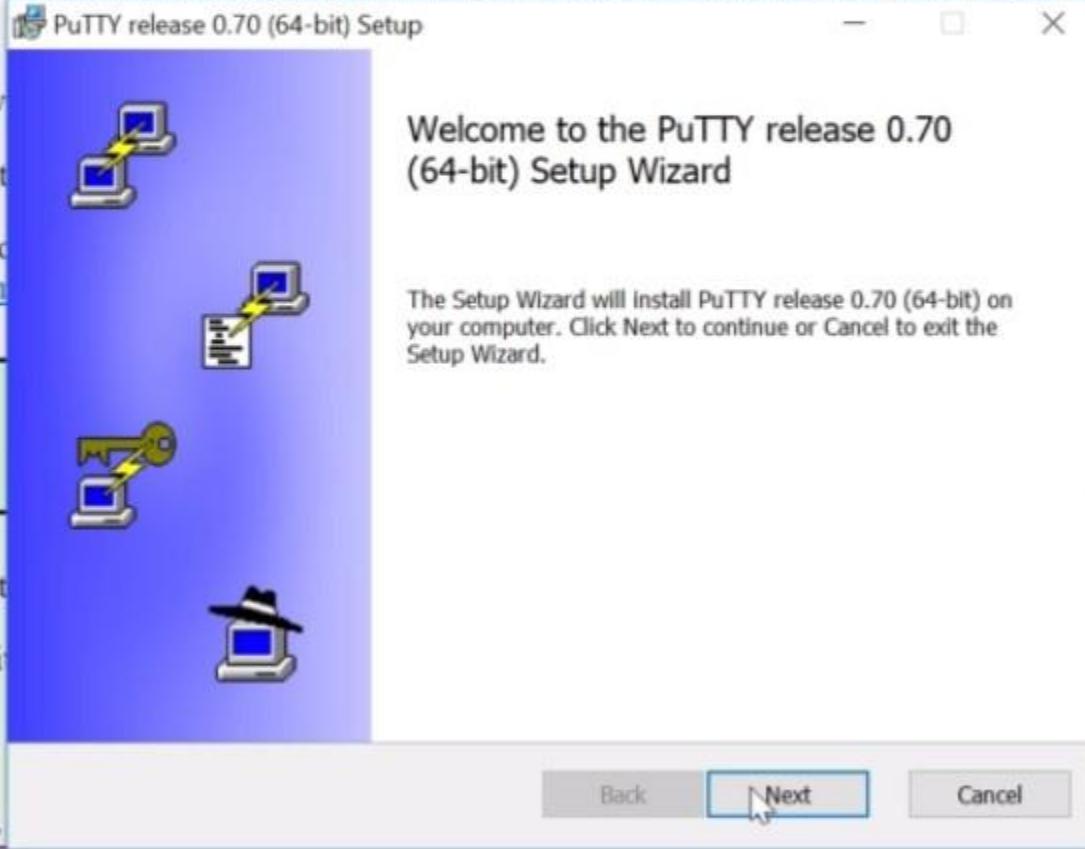
What do you want to do with **putty-64bit-0.70-installer.msi** (2.9 MB)?  
From: the.earth.li

Run Save Cancel X

**Click Here**

## Download PuTTY: latest release (0.70)

[Home](#) | [FAQ](#) | [Feedback](#) | [Licence](#) | [Updates](#) | [Mirrors](#) | [Keys](#) | [Links](#) | [Team](#)



the latest released version. You will update to continue to use the features we think are reasonable without the [development](#)

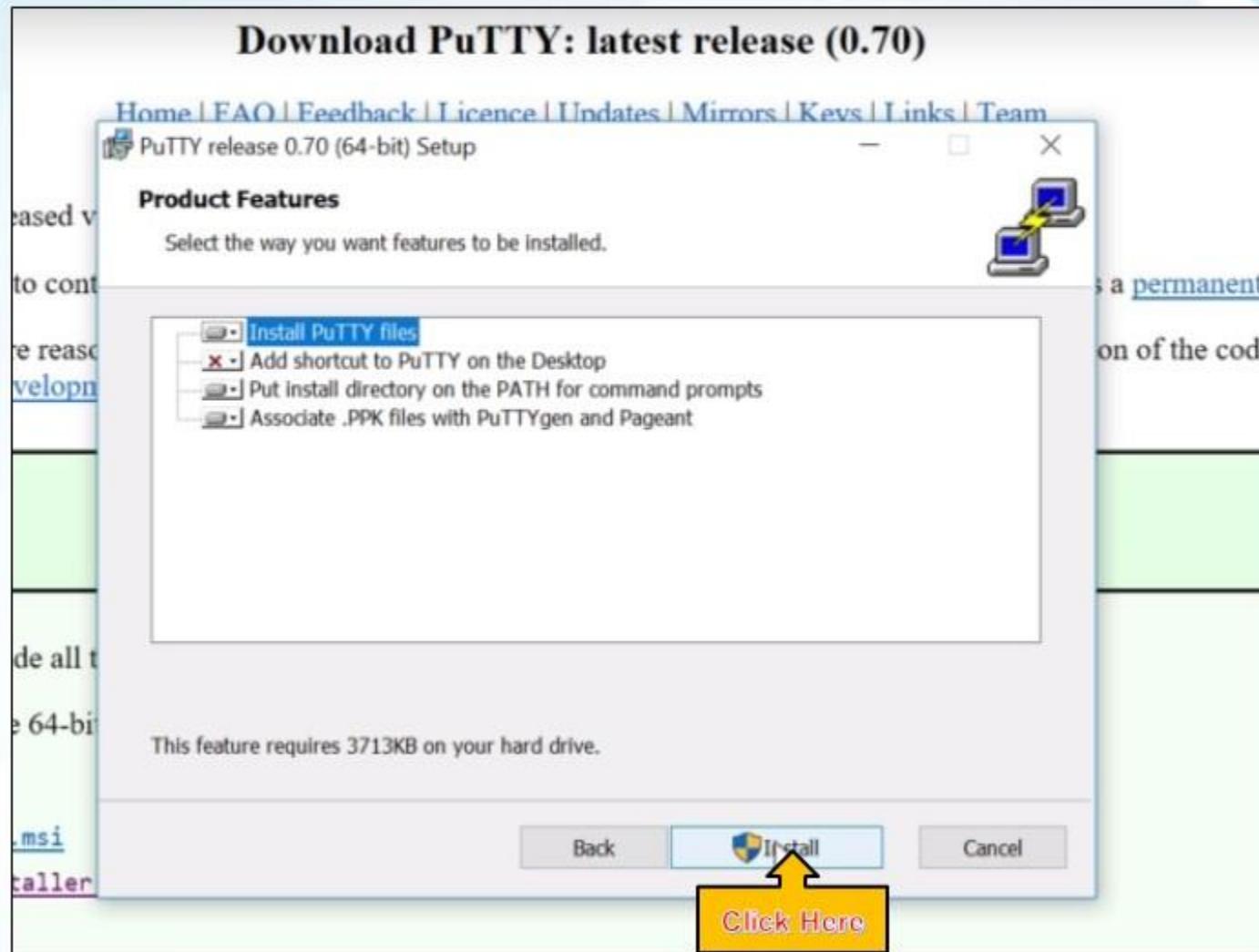
They include all the 32-bit or the 64-bit

[installer.msi](#)  
[-0.70-installer](#)

[tar.gz](#)

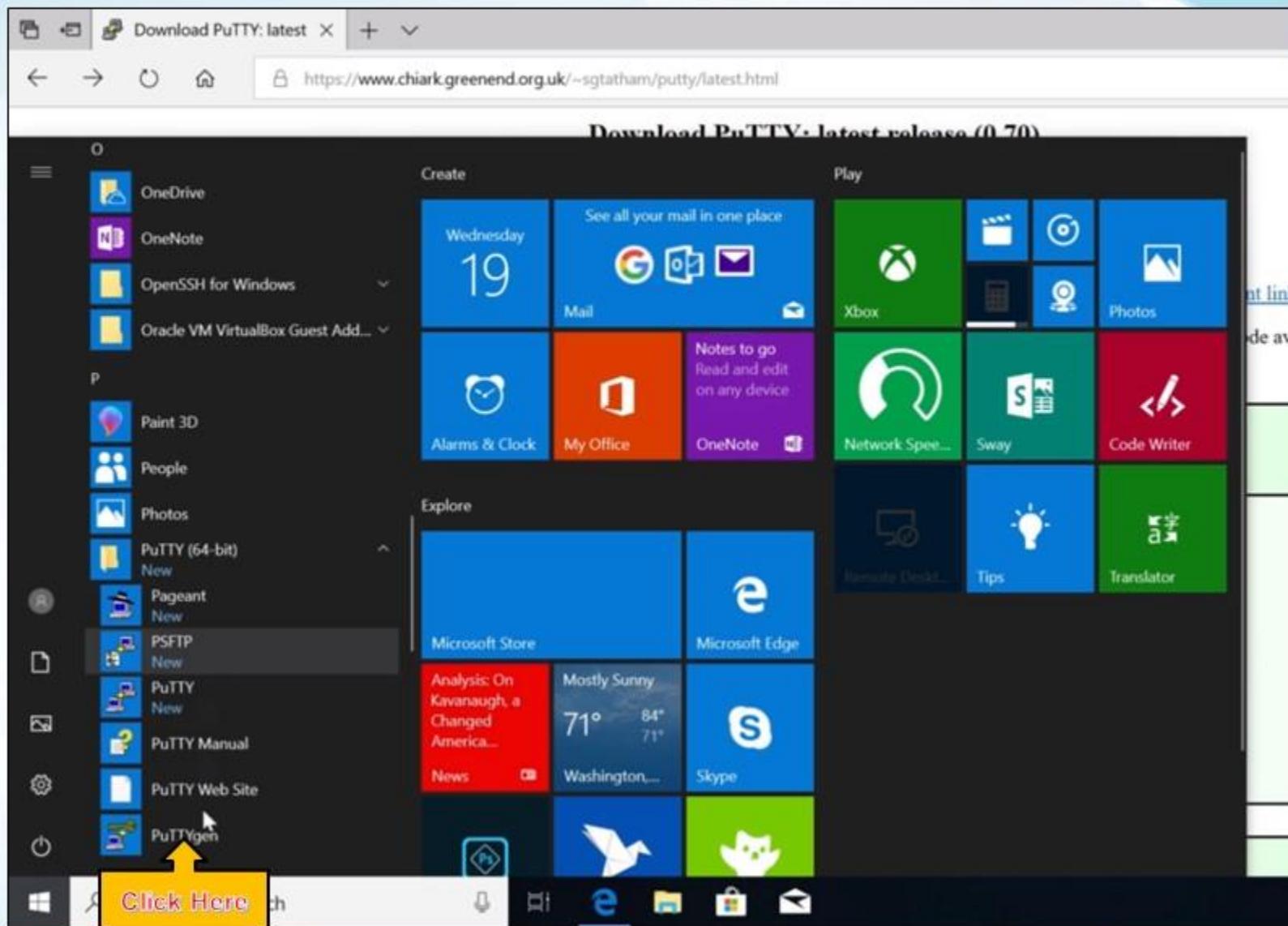
[\(or by FTP\)](#)

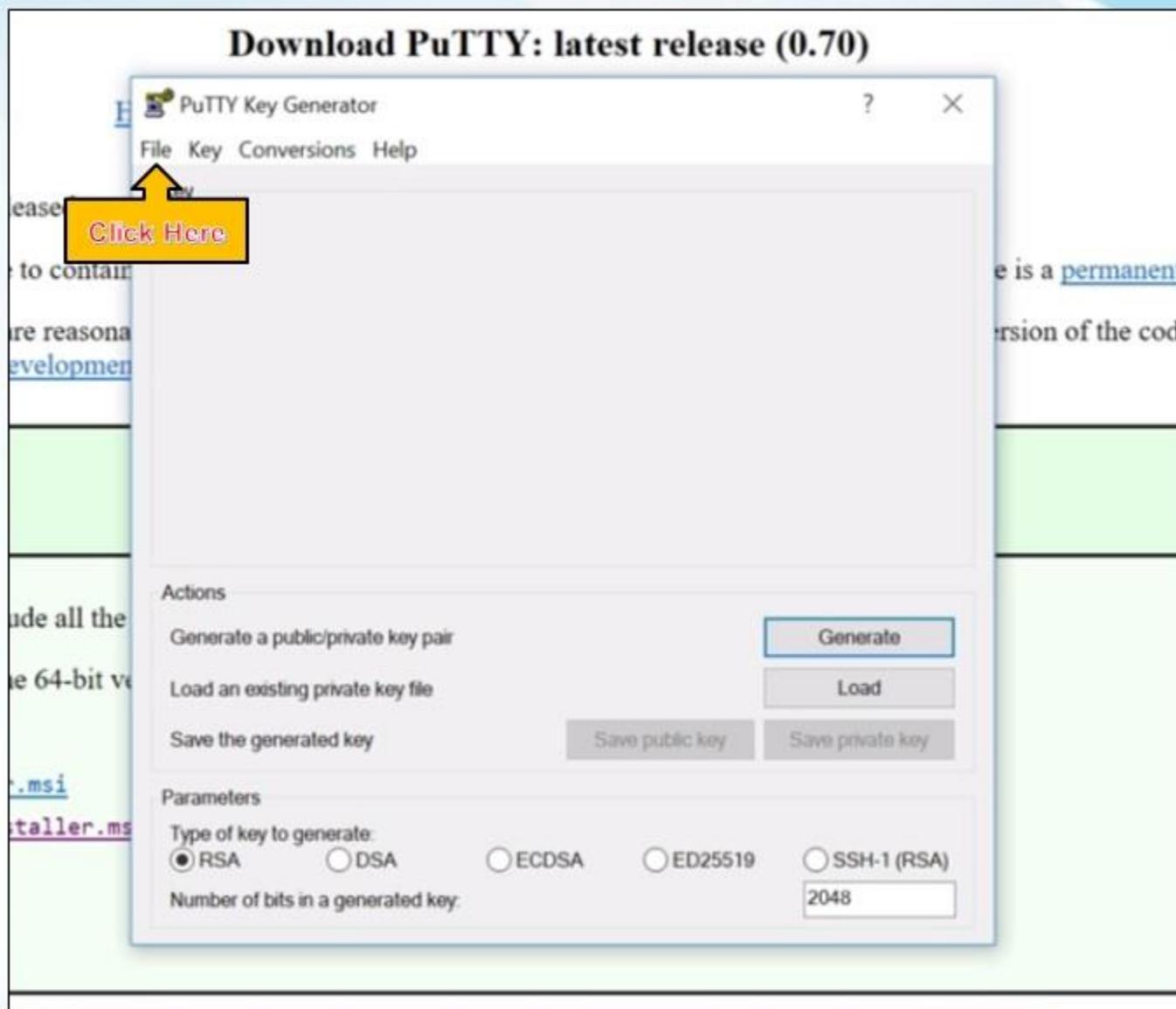
[\(signature\)](#)



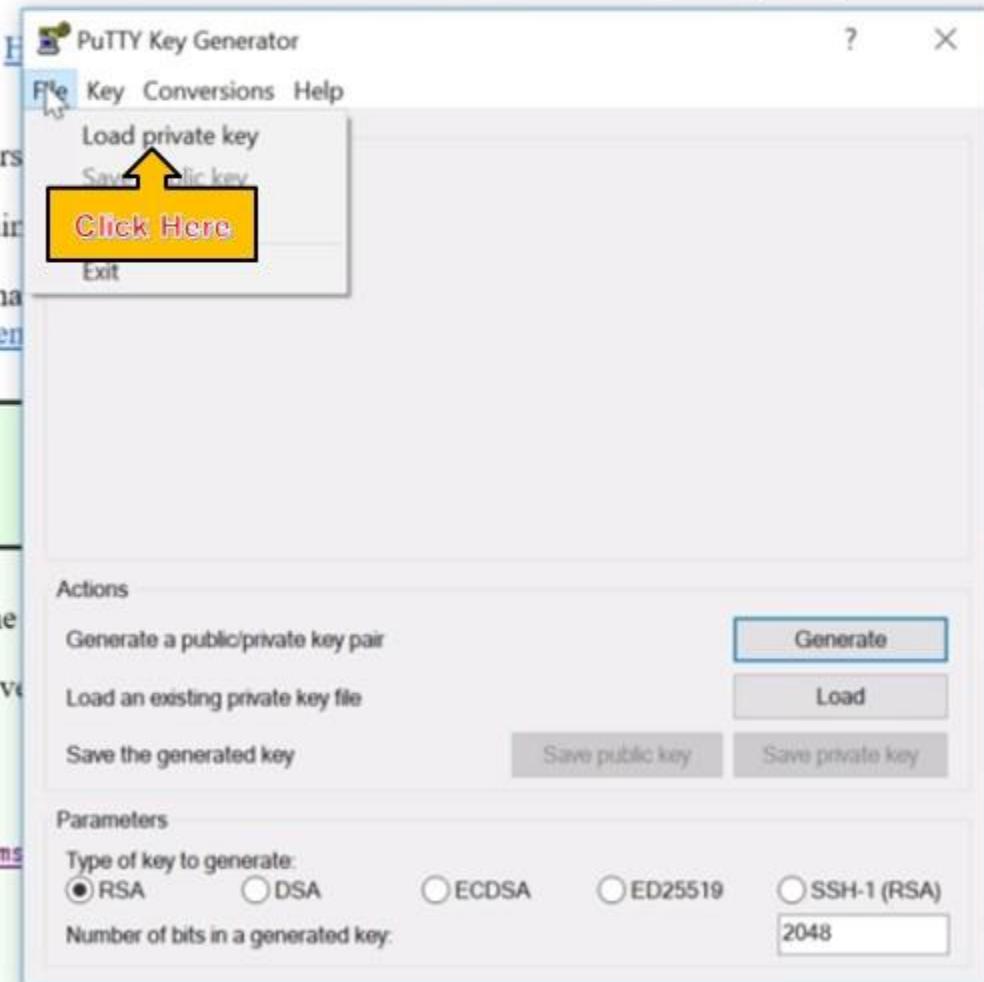
## Download PuTTY: latest release (0.70)



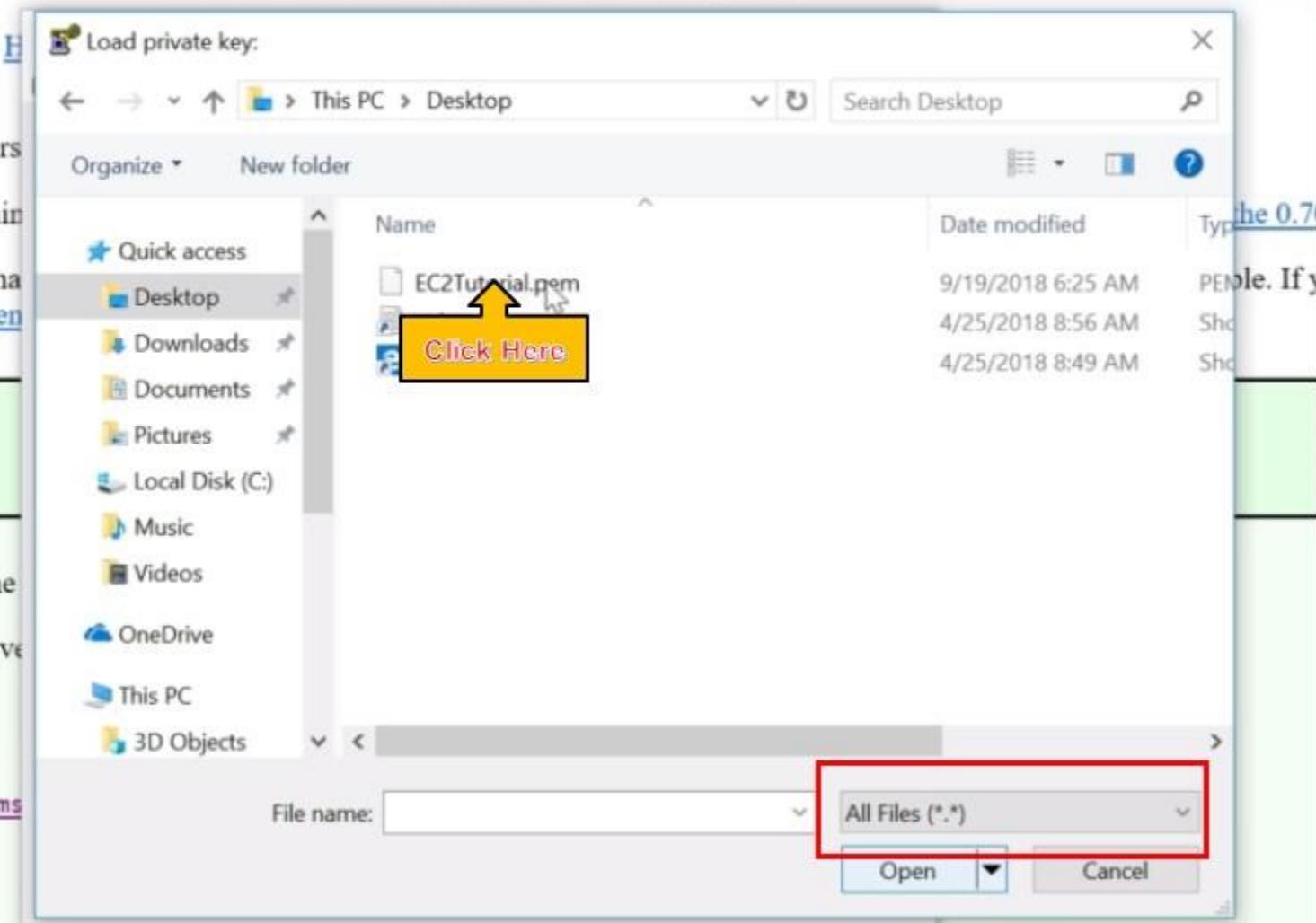




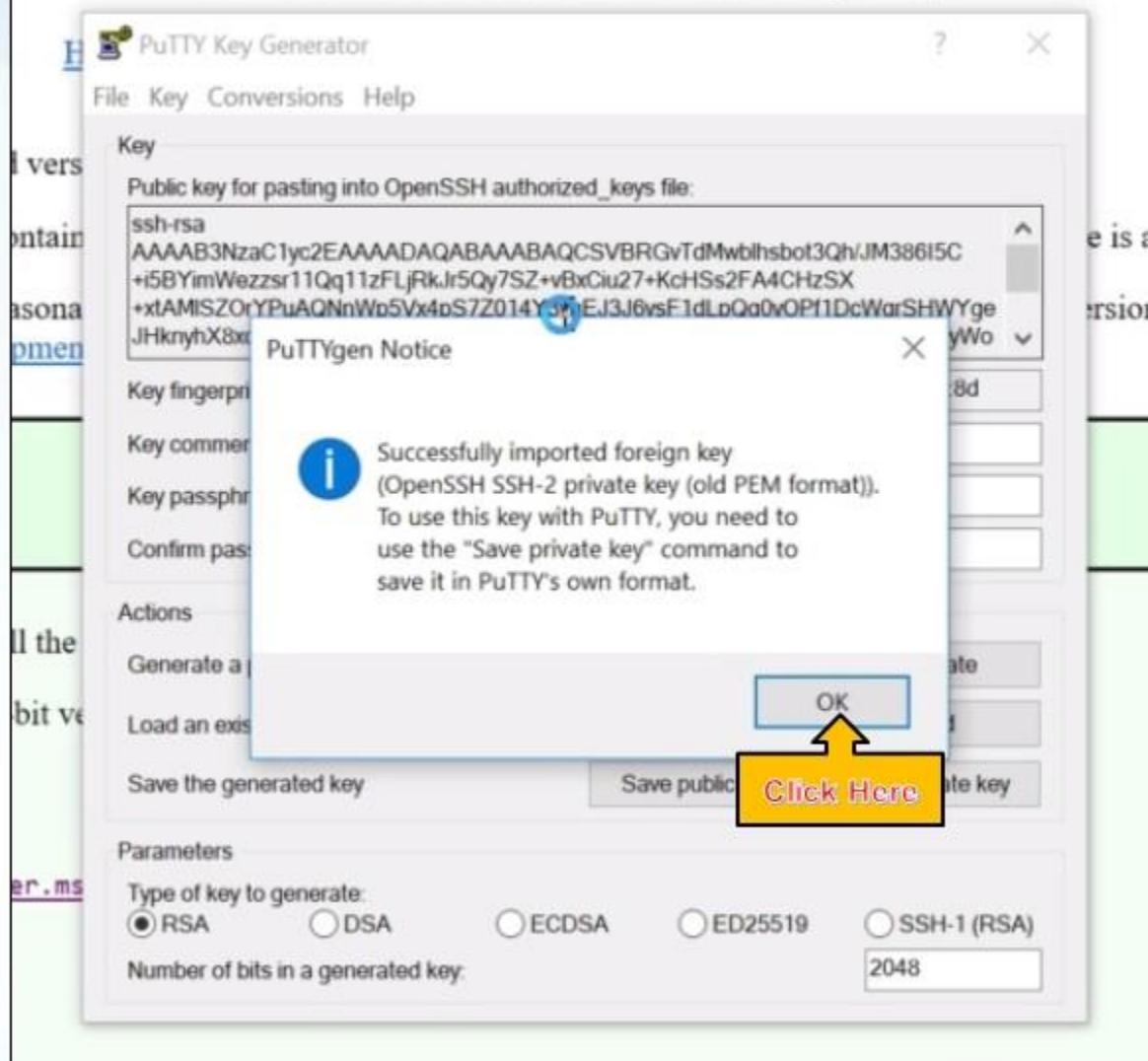
## Download PuTTY: latest release (0.70)

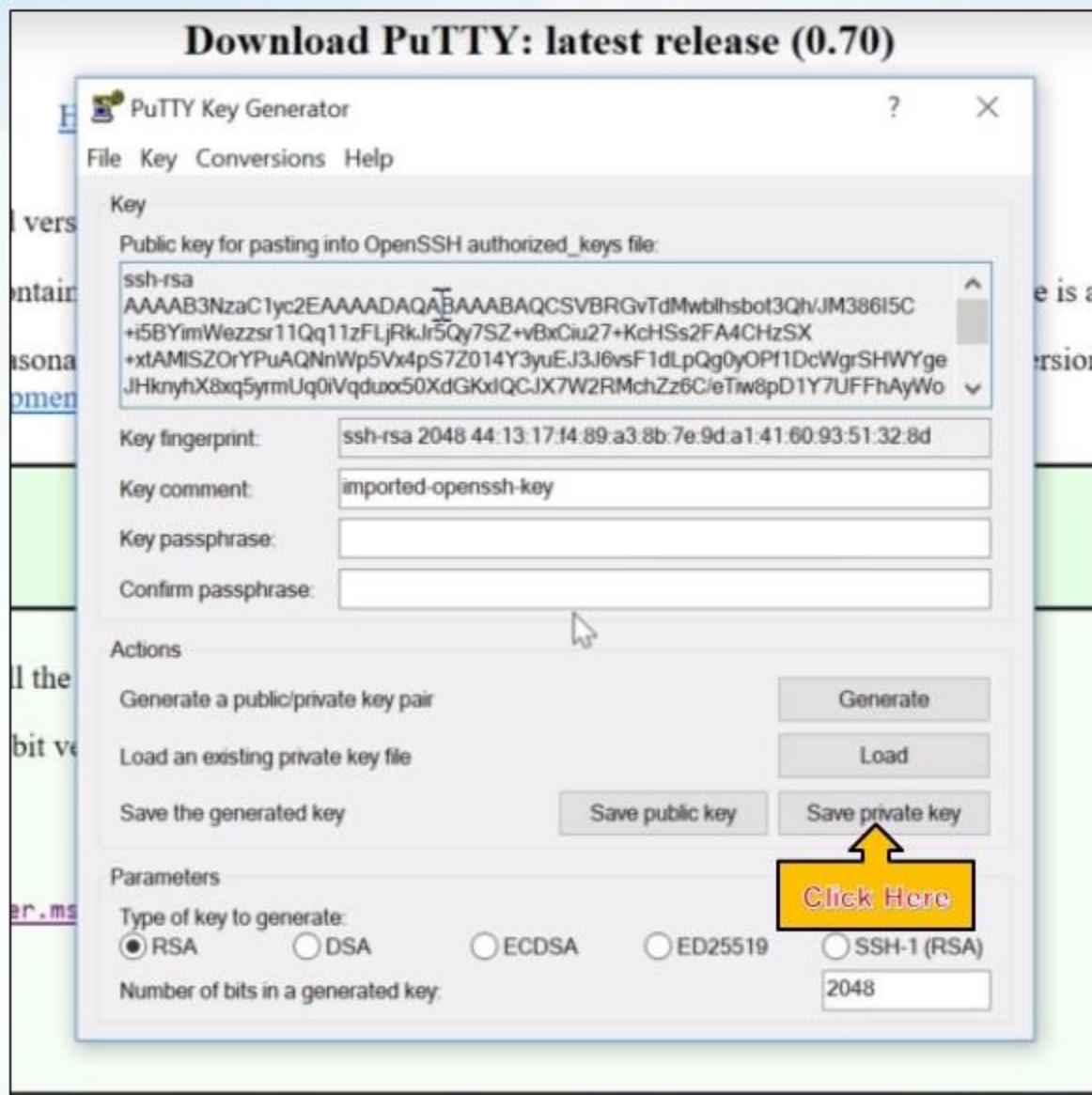


## Download PuTTY: latest release (0.70)

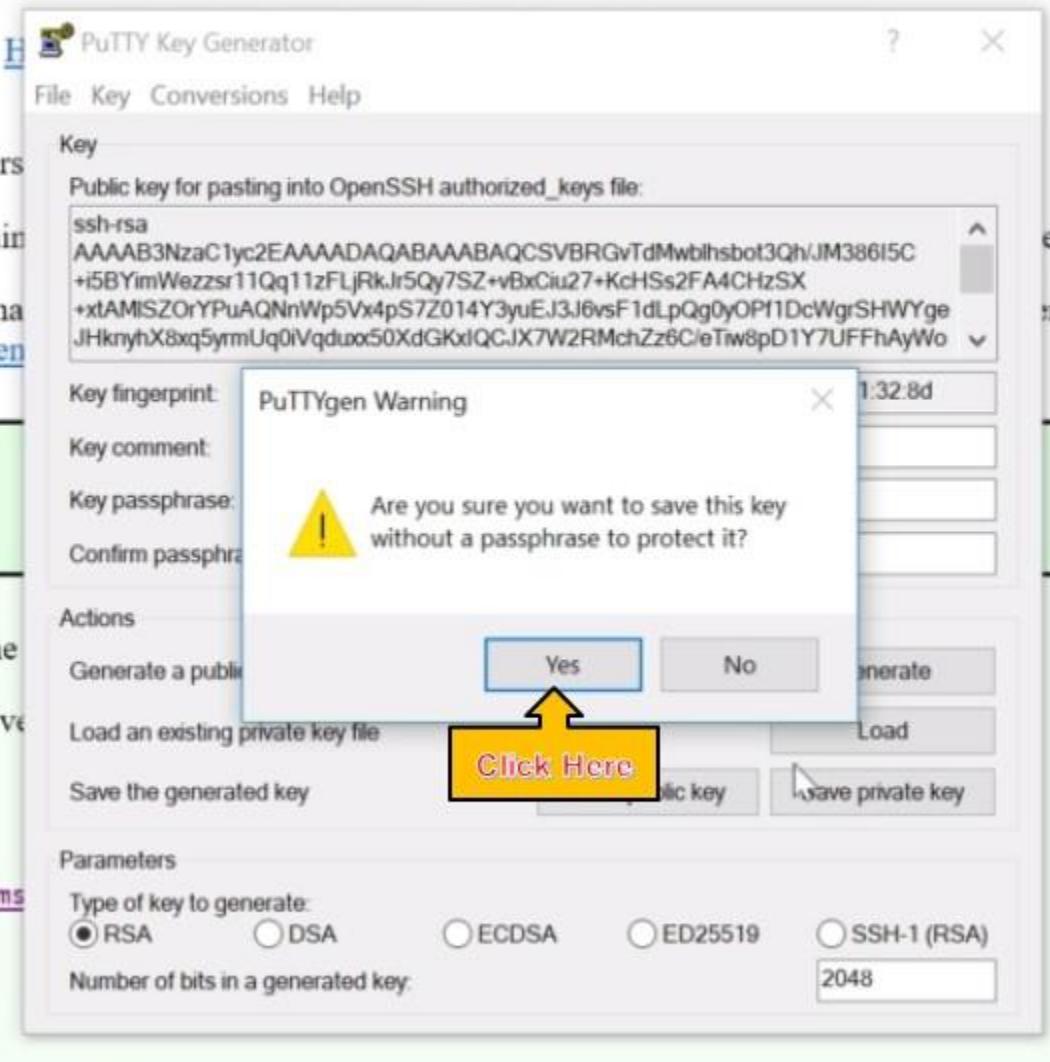


## Download PuTTY: latest release (0.70)

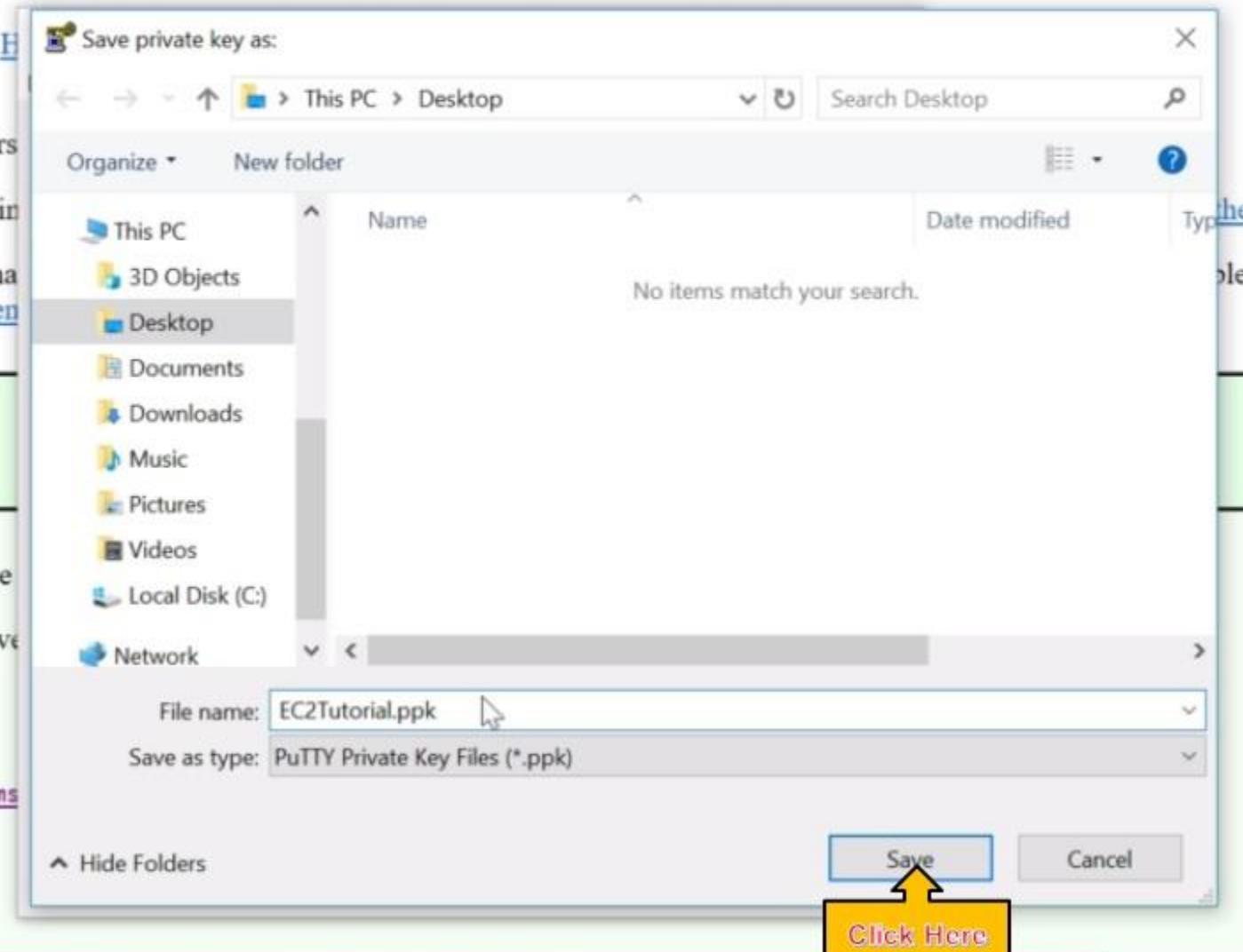




## Download PuTTY: latest release (0.70)



## Download PuTTY: latest release (0.70)



## Download PuTTY: latest release (0.70)

**PutTY Key Generator**

File Key Conversions Help

Key

Public key for pasting into OpenSSH authorized\_keys file:

```
ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQCSVBRGvTdMwbihsb0t3Qh/JM386i5C+5BYimWezzsr11Qq11zFljRk.lr5Qy7SZ+vBxCiuj27+KcHSs2FA4CHzSX+xtAMISZOrYPuAQNnWp5Vx4pS7Z014Y3yuEJ3J6vsf1dLpQg0yOPf1DcWgrSHWYgeJHknyhX8xq5yrmUq0lVqduox50XdGKxlQCJX7W2RMchZz6C/eTw8pD1Y7UFFhAyWo
```

Key fingerprint: ssh-rsa 2048 44:13:17:f4:89:a3:8b:7e:9d:a1:41:60:93:51:32:8d

Key comment: imported-ssh-key

Key passphrase:

Confirm passphrase:

Actions

Generate a public/private key pair

Load an existing private key file

Save the generated key

Parameters

Type of key to generate:  RSA  DSA  ECDSA  ED25519  SSH-1 (RSA)

Number of bits in a generated key: 2048

**Click Here**

Download PuTTY: latest

<https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html>

Download PuTTY: latest release (0.70)

Click Here

Photos

PuTTY (64-bit)

Pageant

PSFTP

PuTTY

PuTTY Web Site

PuTTYgen

Remote Desktop

Settings

Skype

Sticky Notes

Sway

Wednesday 19

See all your mail in one place

Mail

Alarms & Clock

My Office

OneNote

Explore

Microsoft Store

Microsoft Edge

Analysis: On Kavanaugh, a  
Changed America...

Mostly Sunny

71° 84° 71°

News Washington...

Skype

Xbox

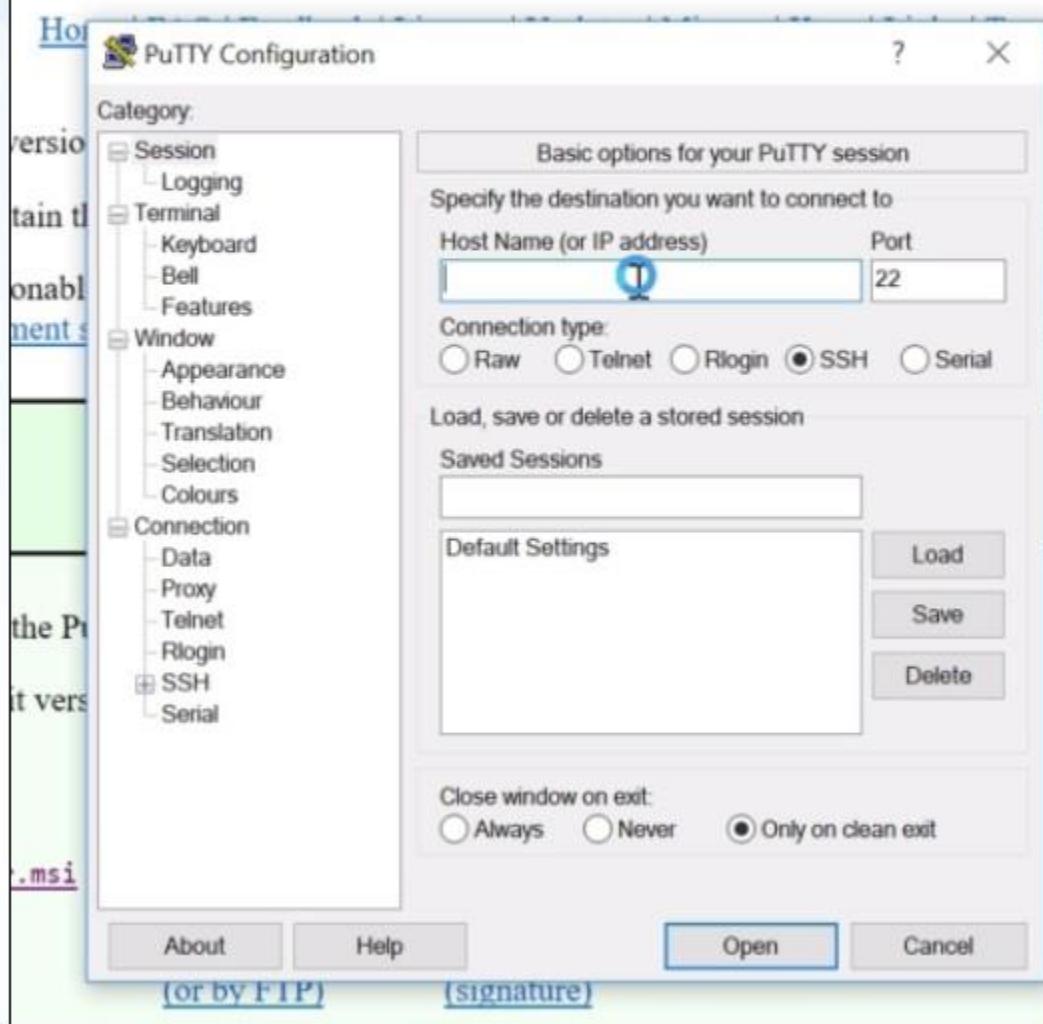
Play

Photos

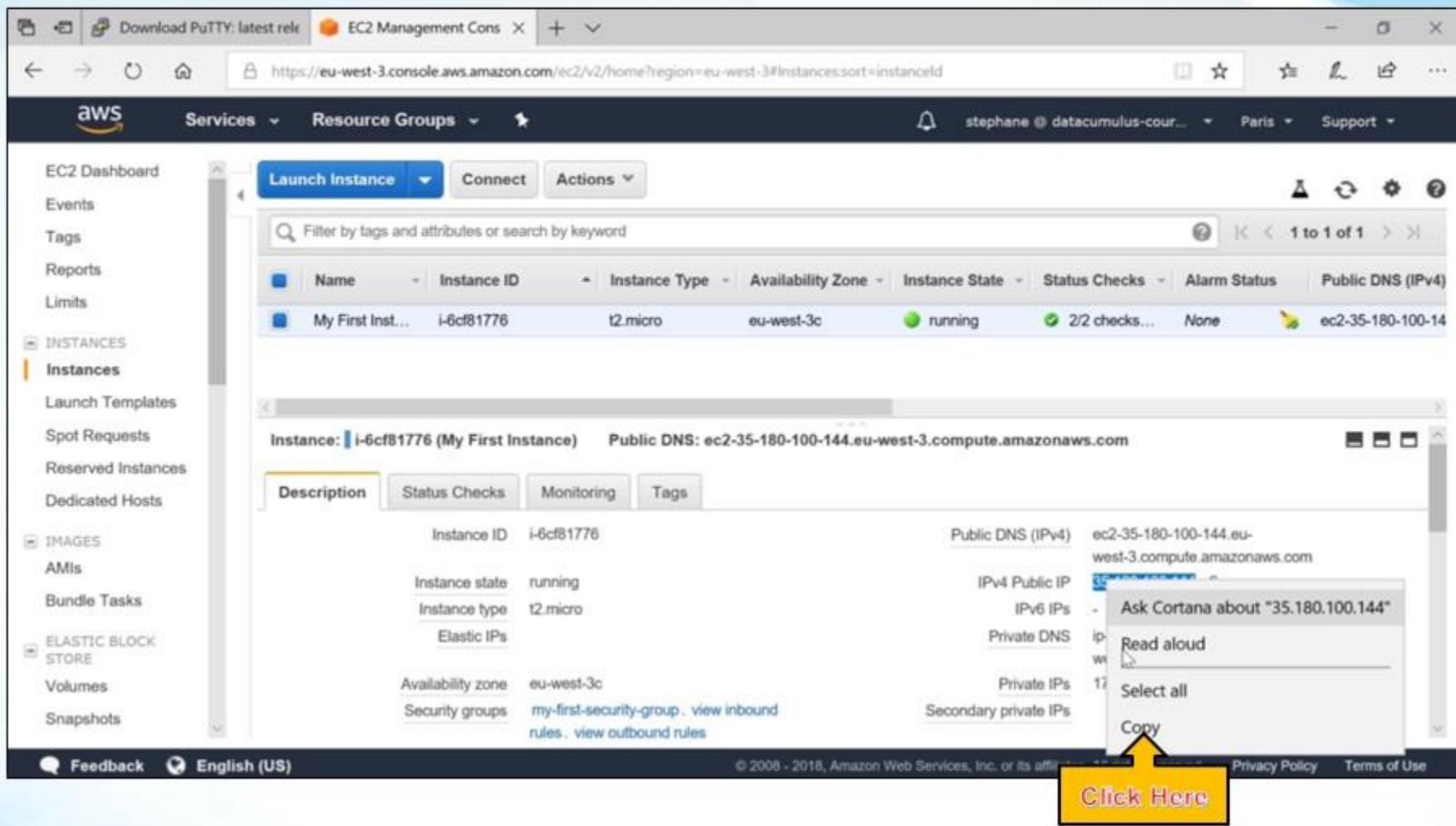
Network S... Sway Code Writer

Remote Deskt... Tips Translator

## Download PuTTY: latest release (0.70)



ere is a perm  
version of th  
s.



Download PuTTY: latest rels EC2 Management Cons × +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#Instances:sort=instanceId

aws Services Resource Groups

EC2 Dashboard Events Tags Reports Limits

**INSTANCES**

**Instances** (My First Inst... i-6cf81776 t2.micro eu-west-3c running 2/2 checks... None ec2-35-180-100-14)

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

1 to 1 of 1

Instance: i-6cf81776 (My First Instance) Public DNS: ec2-35-180-100-144.eu-west-3.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-6cf81776	Public DNS (IPv4)	ec2-35-180-100-144.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.100.144
Instance type	t2.micro	IPv6 IPs	
Elastic IPs		Private DNS	
Availability zone	eu-west-3c	Private IPs	
Security groups	my-first-security-group . view inbound rules . view outbound rules	Secondary private IPs	

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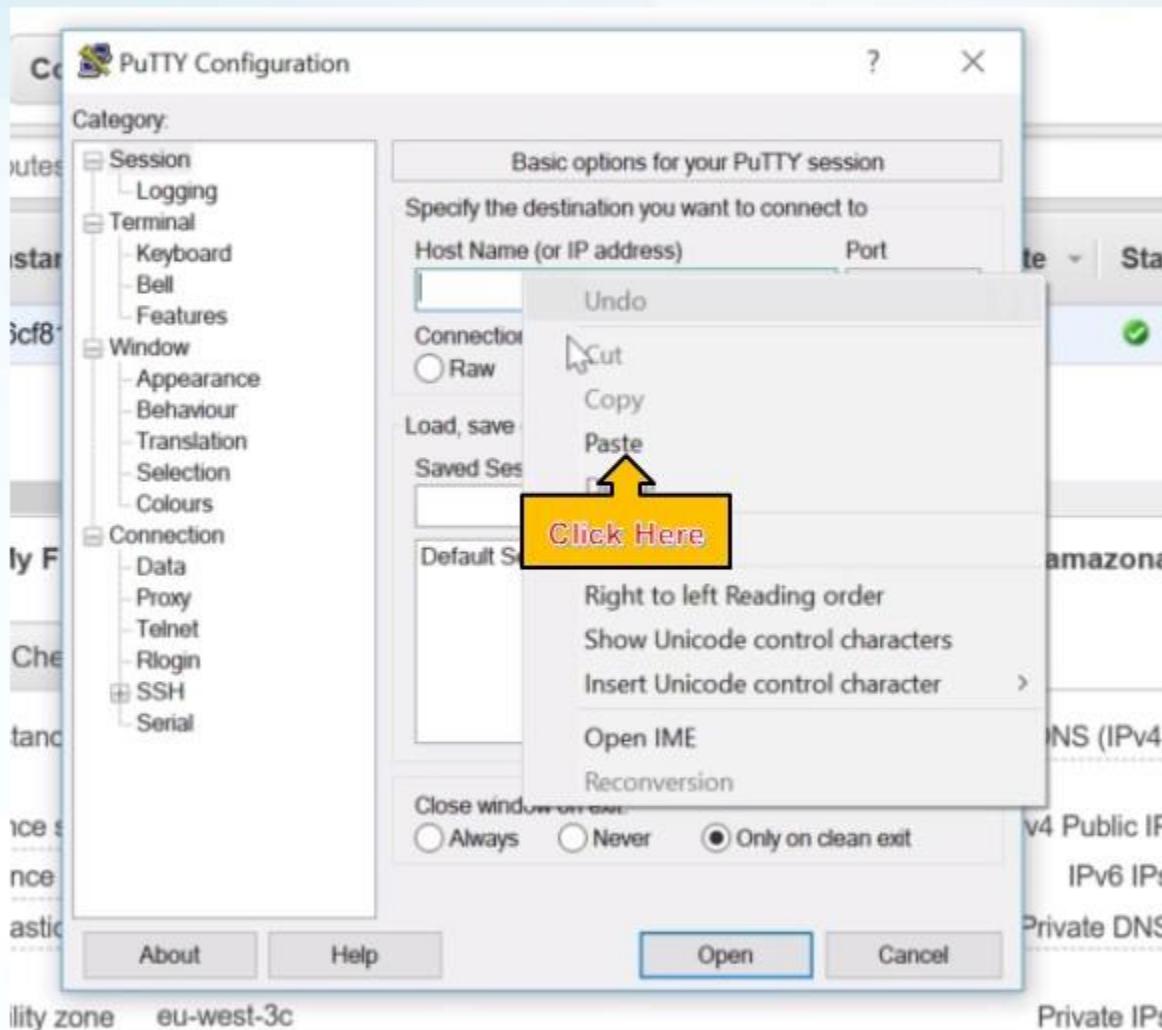
Ask Cortana about "35.180.100.144"

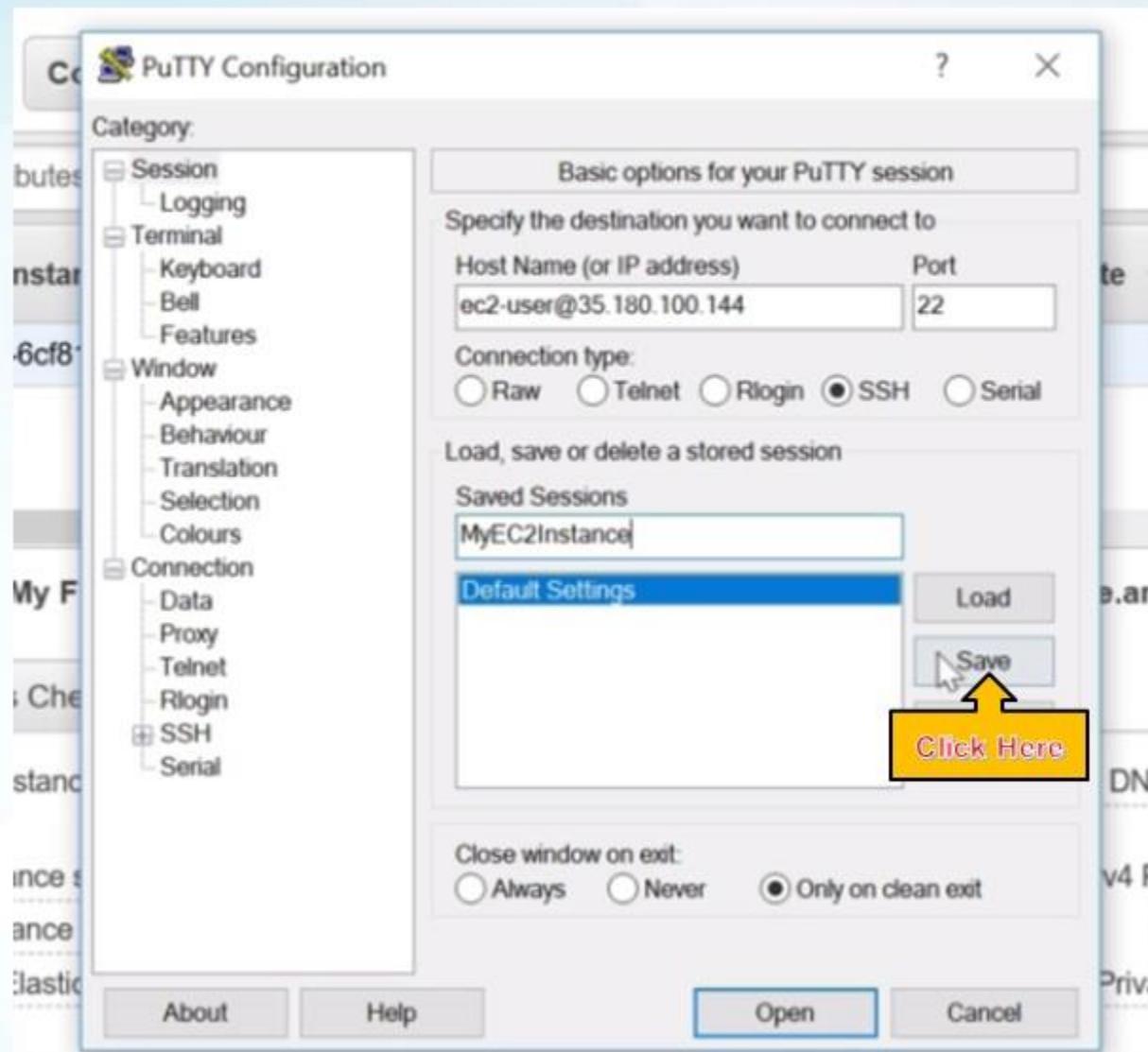
Read aloud

Select all

Copy

Click Here





Putty Configuration

Category:

- Session
- Logging
- Terminal
- Keyboard
- Bell
- Features
- Window
- Appearance
- Behaviour
- Translation
- Selection
- Colours
- Connection
- Data
- Proxy
- Telnet
- Rlogin
- SSH
- Serial

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address): ec2-user@35.180.100.144

Port: 22

Connection type:  Raw  Telnet  Rlogin  SSH  Serial

Load, save or delete a stored session

Saved Sessions: MyEC2Instance

Default Settings: MyEC2Instance

Click Here

Load

Save

Delete

Close window on exit:

Always  Never  Only on clean exit

About Help Open Cancel

Private IP: 35.180.100.144

Public IP: 35.180.100.144

Region: eu-west-3c

Availability zone: eu-west-3c

Private DNS: ec2-35-180-100-144.eu-west-3.compute.amazonaws.com

Public DNS: ec2-35-180-100-144.eu-west-3.compute.amazonaws.com

Private IP: 169.254.169.254

Public IP: 169.254.169.254

Region: eu-west-3c

Availability zone: eu-west-3c

Private DNS: ec2-169-254-169-254.eu-west-3.compute.amazonaws.com

Public DNS: ec2-169-254-169-254.eu-west-3.compute.amazonaws.com

The screenshot shows the AWS Management Console with the EC2 service selected. A specific EC2 instance is being viewed, with its details listed on the right: Instance ID (t2.micro), Instance state (running), Instance type (t2.micro), Elastic IPs, Availability zone (eu-west-3c), and Security groups (my-first-security-group). A Putty Security Alert dialog is overlaid on the screen, asking for permission to add the server's host key to the registry. The dialog includes a warning icon, a message text area, and four buttons: Yes, No, Cancel, and Help. A large yellow arrow points to the 'Yes' button, with the text 'Click Here' overlaid in red. The status bar at the bottom right shows the instance's public IP (35.180.100.144) and private IP (172.31.34.12).

EC2

Events

Tags

Reports

Limits

INSTANCES

Instances

Launched

Spotted

Reservations

Dedicated Hosts

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

Download Putty: latest rel

EC2 Management Cons

35.180.100.144 - PuTTY

les:sort=instanceId

stephane @ datacumulus-com

PuTTY Security Alert

! The server's host key is not cached in the registry. You have no guarantee that the server is the computer you think it is.

The server's ssh-ed25519 key fingerprint is:  
ssh-ed25519 256 66:f0:8b:8f:42:6c:37:d8:86:92:ed:eb:07:ab:e5:b7

If you trust this host, hit Yes to add the key to PuTTY's cache and carry on connecting.

If you want to carry on connecting just once, without adding the key to the cache, hit No.

If you do not trust this host, hit Cancel to abandon the connection.

Yes

No

Cancel

Help

Click Here

2/2 checks...

35.180.100.144

Private DNS (IPv4)

IPv4 Public IP

IPv6 IPs

Private DNS

Private IPs

Secondary private IPs

eu-west-3c

my-first-security-group . view inbound rules . view outbound rules

172.31.34.12

Download PuTTY: latest release EC2 Management Cons + ↻

35.180.100.144 - PuTTY

Using username "ec2-user".

EC2 Event Tag Report Limit

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PUTTY Fatal Error

Disconnected: No supported authentication methods available (server sent: publickey, gssapi-keyex, gssapi-with-mic)

OK

Click Here

Instance ID: i-6cf81776

Instance state: running

Instance type: t2.micro

Elastic IPs

Availability zone: eu-west-3c

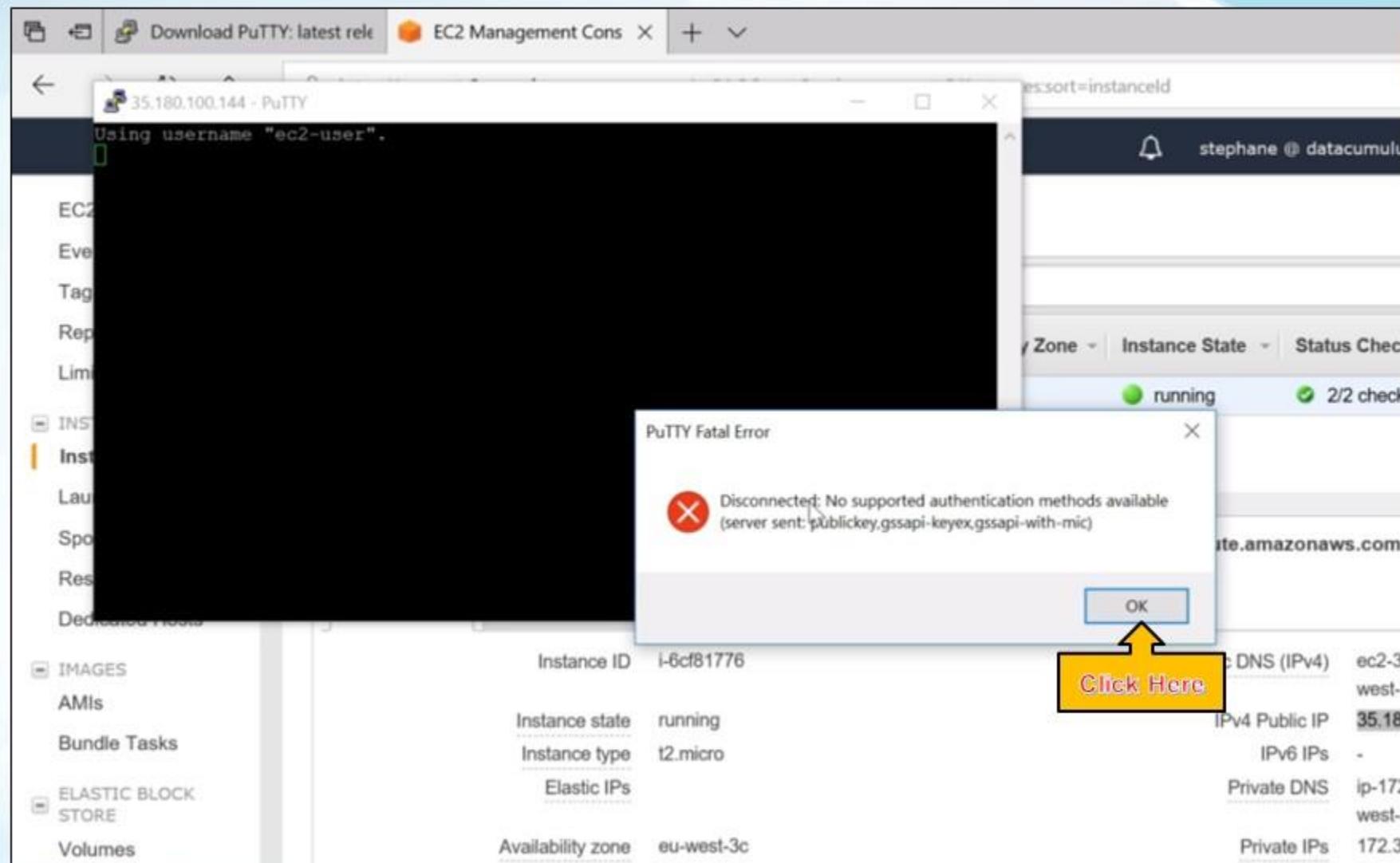
Public DNS (IPv4): ec2-3-west-35.180.100.144

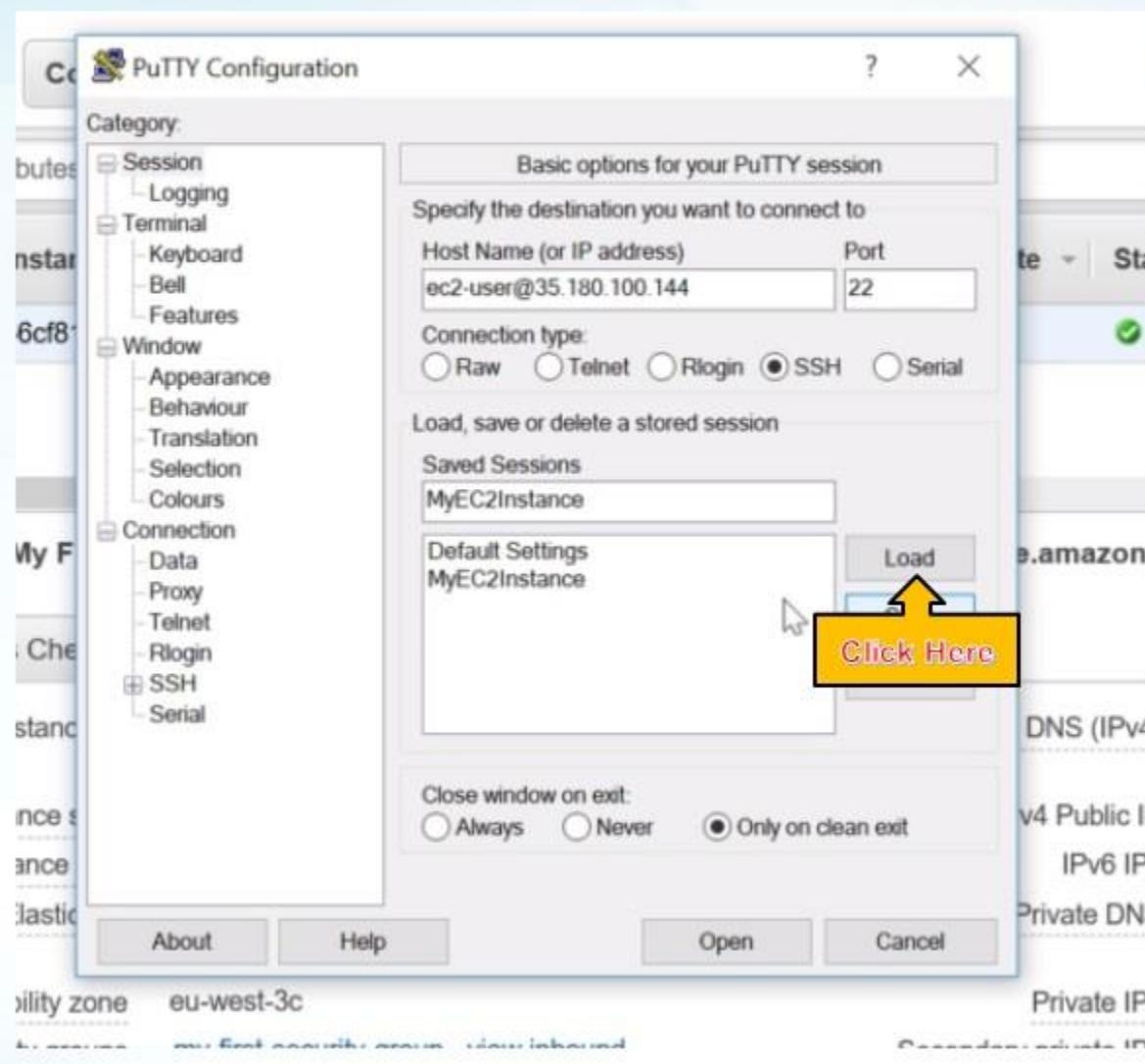
IPv4 Public IP: 35.180.100.144

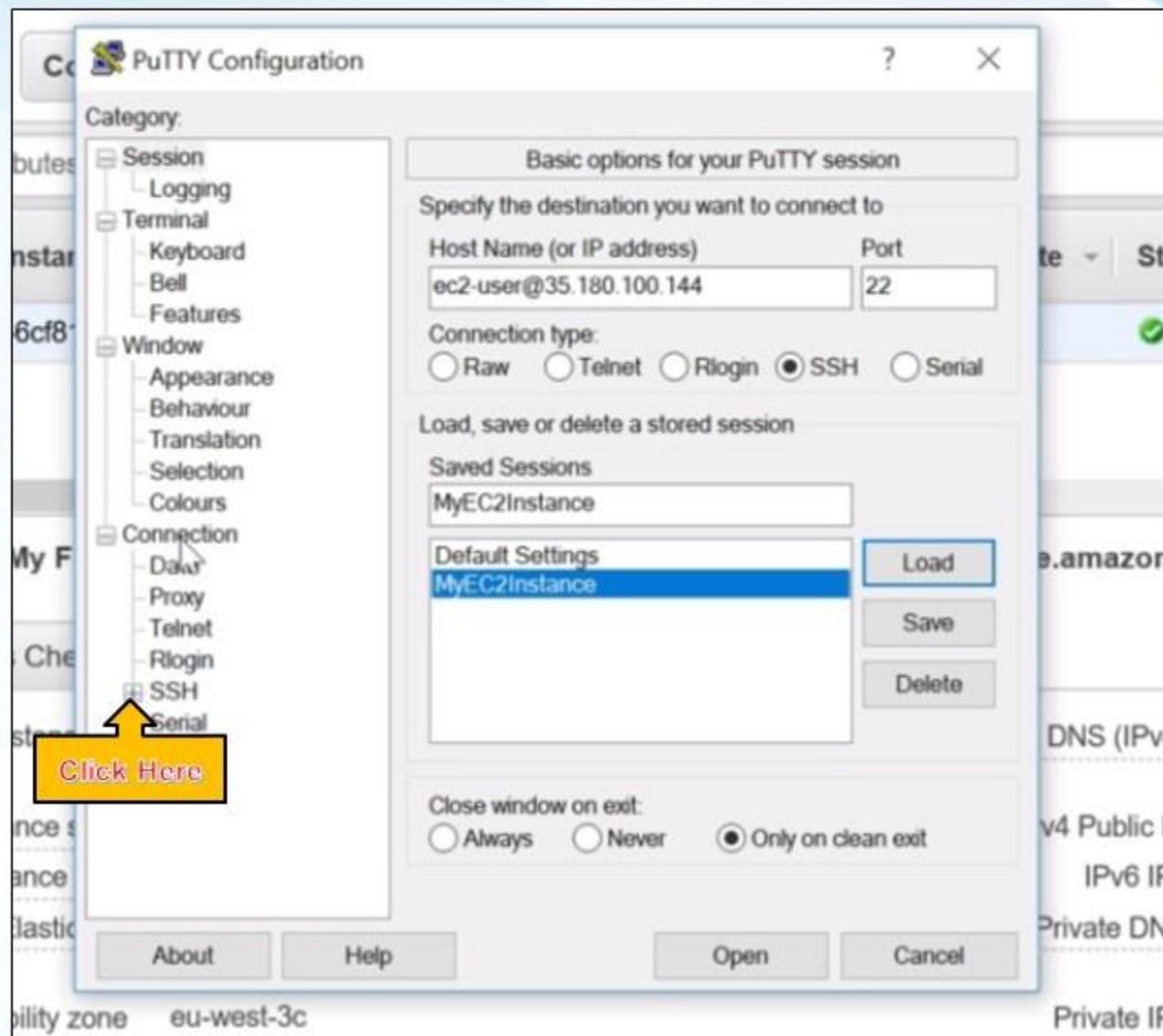
IPv6 IPs: -

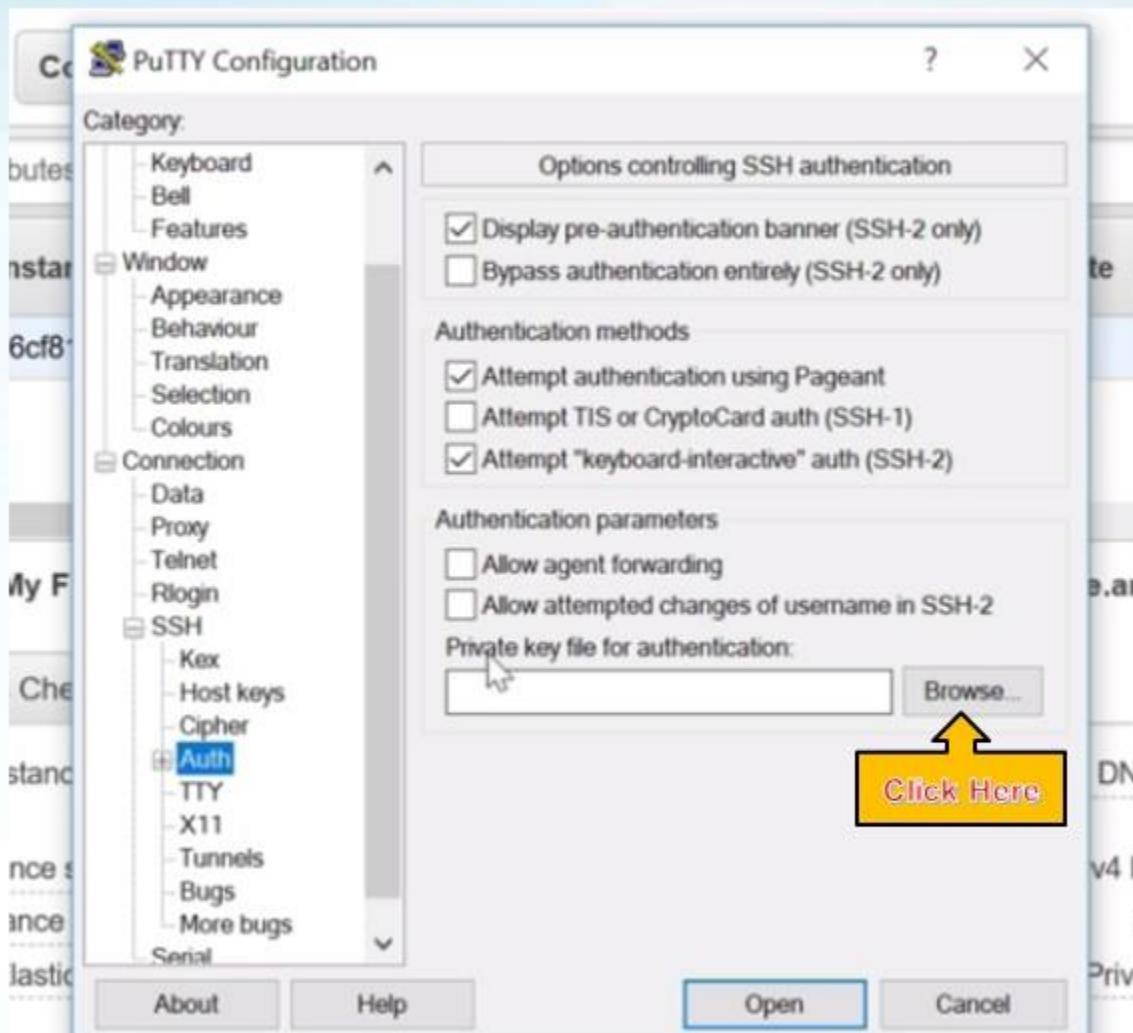
Private DNS: ip-172-west-35.180.100.144

Private IPs: 172.35.180.100.144









ility zone

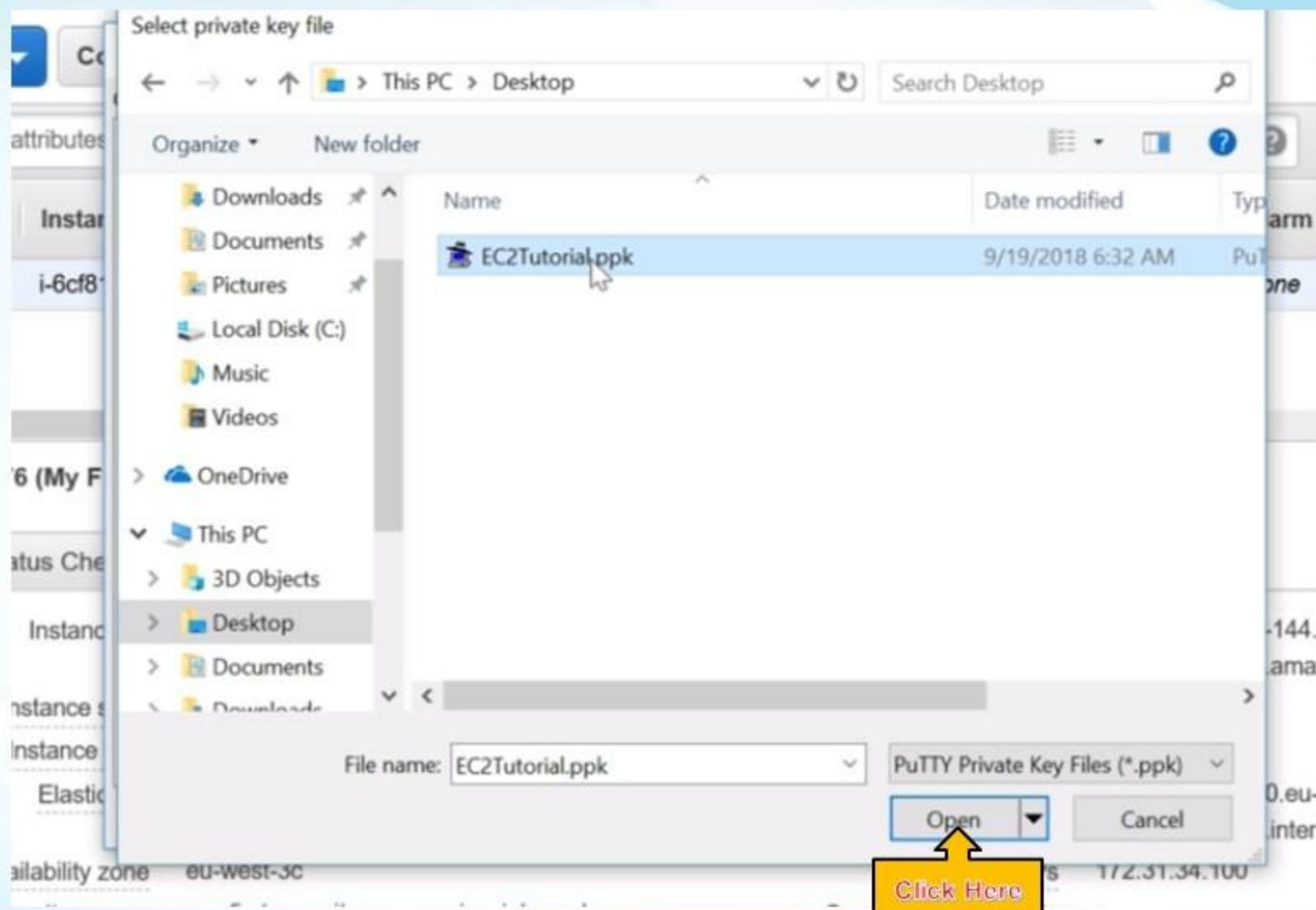
eu-west-3c

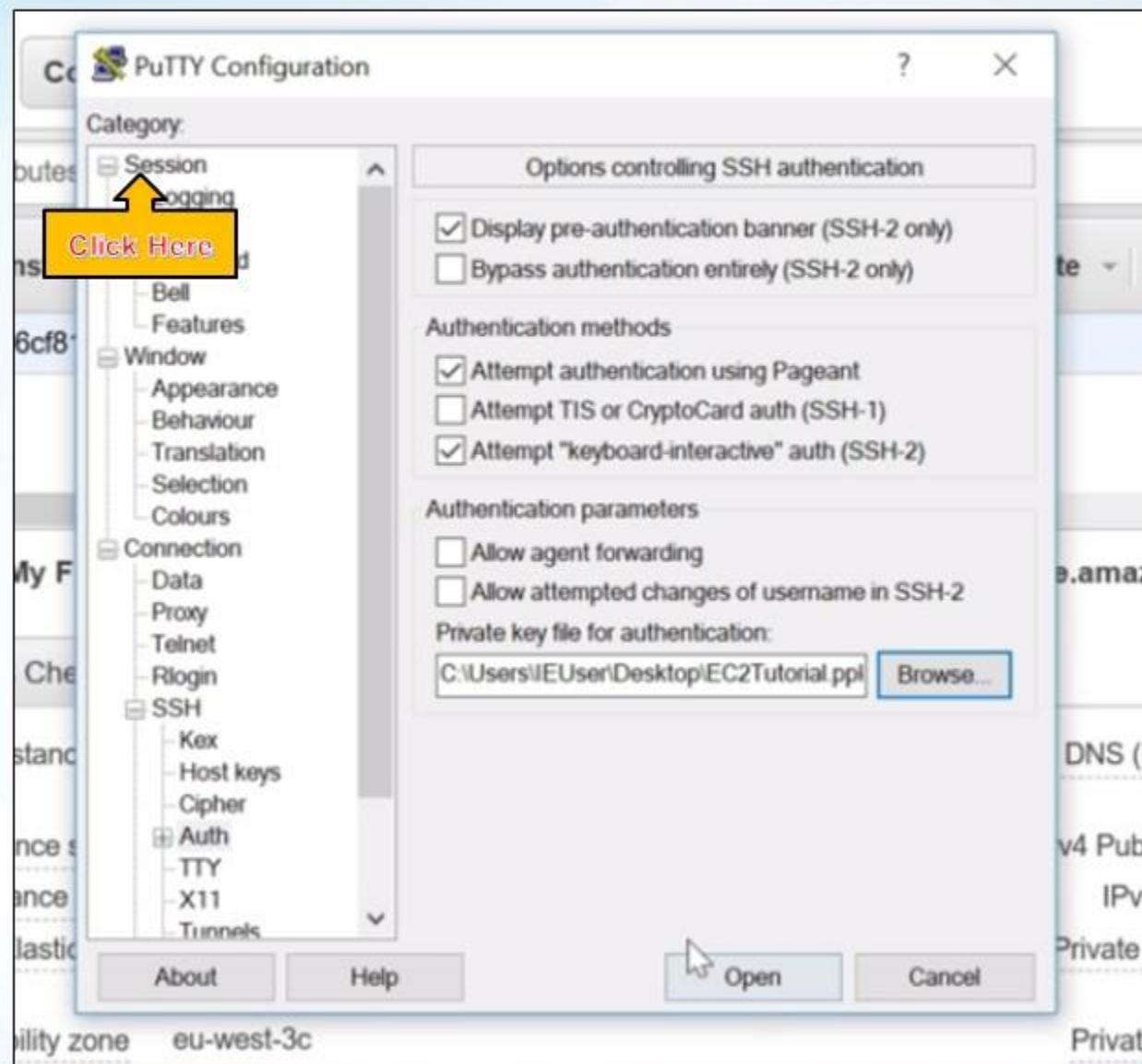
ty groups

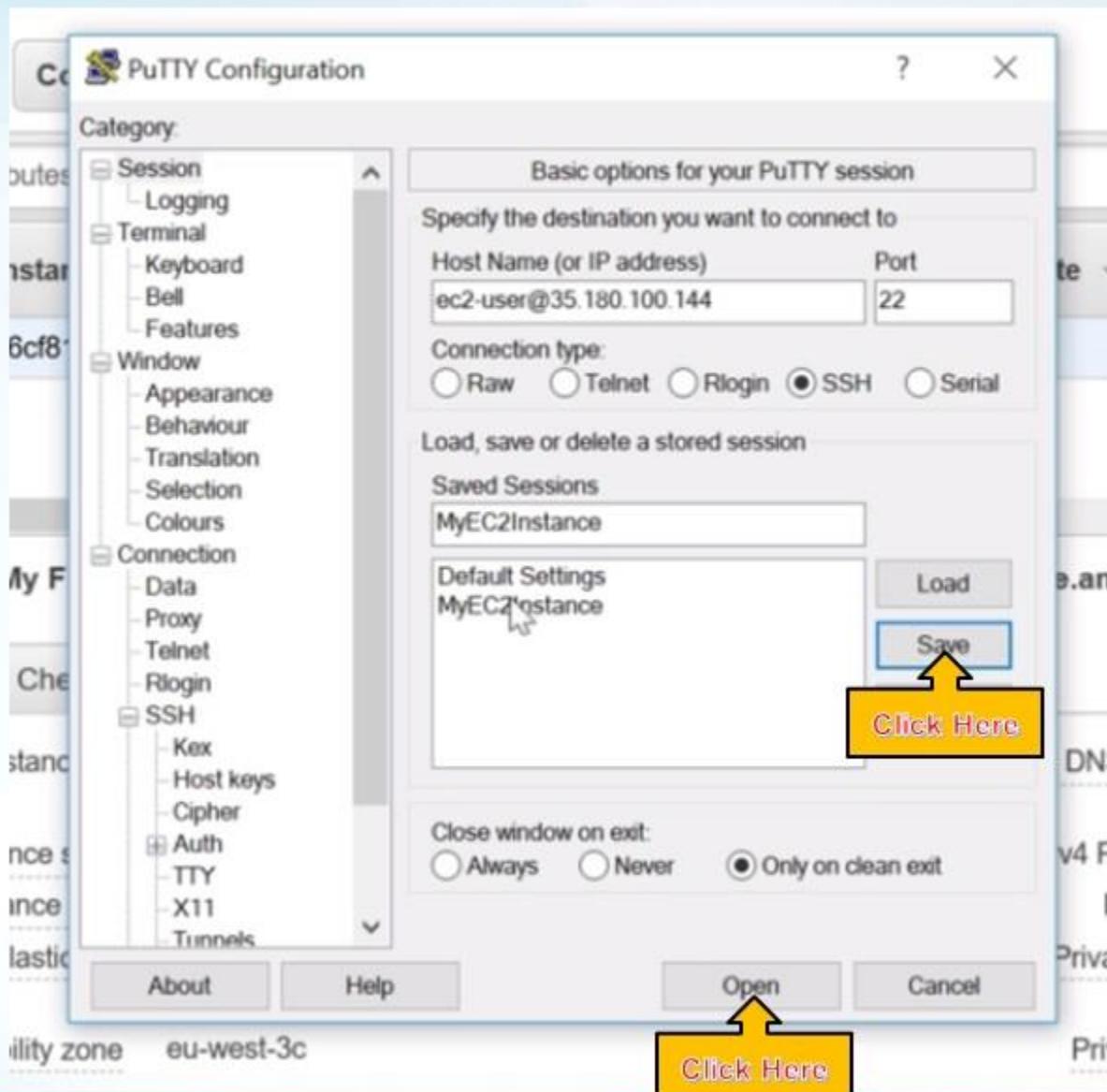
my-first-security-group . view inbound

Pr

Secondary pri

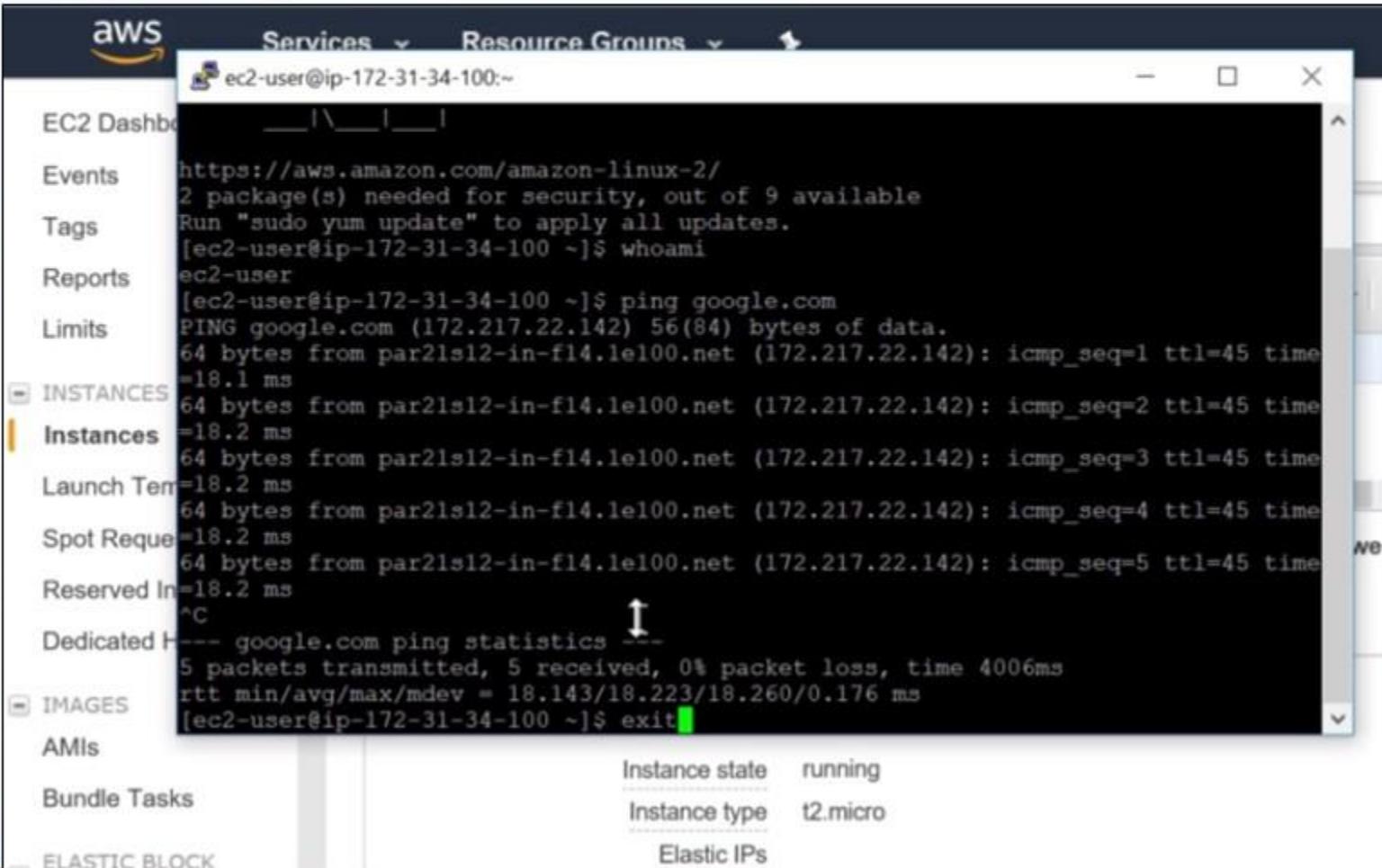






```
ec2-user@ip-172-31-34-100:~ - □ X
Using username "ec2-user".
Authenticating with public key "imported-openssh-key"
Last login: Wed Sep 19 13:15:13 2018 from 83.159.94.61
[ec2-user@ip-172-31-34-100 ~]$
```

whoami  
ping google.com  
exit



The screenshot shows a terminal window within an AWS Lambda function execution environment. The terminal output is as follows:

```
aws Services Resource Groups
[ec2-user@ip-172-31-34-100:~]
[ec2-user@ip-172-31-34-100:~] whoami
[ec2-user@ip-172-31-34-100:~] ping google.com
PING google.com (172.217.22.142) 56(84) bytes of data.
64 bytes from par21s12-in-f14.1e100.net (172.217.22.142): icmp_seq=1 ttl=45 time=18.1 ms
64 bytes from par21s12-in-f14.1e100.net (172.217.22.142): icmp_seq=2 ttl=45 time=18.2 ms
64 bytes from par21s12-in-f14.1e100.net (172.217.22.142): icmp_seq=3 ttl=45 time=18.2 ms
64 bytes from par21s12-in-f14.1e100.net (172.217.22.142): icmp_seq=4 ttl=45 time=18.2 ms
64 bytes from par21s12-in-f14.1e100.net (172.217.22.142): icmp_seq=5 ttl=45 time=18.2 ms
^C
Dedicated Host ping statistics
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 18.143/18.223/18.260/0.176 ms
[ec2-user@ip-172-31-34-100:~] exit
```

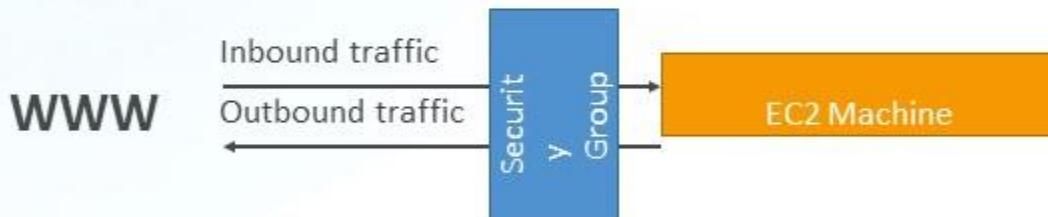
Below the terminal, the Lambda function configuration is shown:

	Instance state	running
Instance type	t2.micro	
Elastic IPs		

# Introduction to Security Groups

# Introduction to Security Groups

- Security Groups are the fundamental of network security in AWS
- They control how traffic is allowed into or out of our EC2 Machines.



- It is the most fundamental skill to learn to troubleshoot networking issues
- We'll learn how to use them to allow, inbound and outbound ports

EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&instances=

Services ▼ Resource Groups ▼ ▶

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Actions ▼

Filter by tags and attributes or search by keyword

1 to 1 of 1

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	2/2 checks	None	ec2-35-180-100-144.eu...	35.180.100.144	-

Description	Status Checks	Monitoring	Tags
Instance ID	i-6cf81776	Public DNS (IPv4)	ec2-35-180-100-144.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.100.144
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c	Private IPs	172.31.34.100
Security groups	my-first-security-group, view inbound rules, View outbound rules	Secondary private IPs	
Scheduled events	No scheduled events	VPC ID	vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)	Subnet ID	subnet-391dc774
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True

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EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:

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Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-100-144.eu

Description	Status Checks	Monitoring	Tags
Instance ID	i-6cf81776		Public DNS (IPv4) ec2-35-180-100-144.eu-west-3.compute.amazonaws.com
Instance state	running		IPv4 Public IP 35.180.100.144
Instance type	t2.micro		IPv6 IPs -
Elastic IPs			Private DNS ip-172-31-34-100.eu-west-3.compute.int
Availability zone	eu-west-3c		Private IPs 172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules		Secondary private IPs
Scheduled events	No scheduled events		
AMI ID	amzn2-ami-hvm-2.0.201 06340c8c12baa6a09	Ports	my-first-security-group
Platform	-	Protocol	tcp
IAM role	-	Source	0.0.0.0/0

Security Groups associated with i-6cf81776

Ports	Protocol	Source	my-first-security-group
22	tcp	0.0.0.0/0	✓

Source/dest. check True

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EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3Instances: stephane @ datacumulus-cour... Paris Support

Services Resource Groups

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	2/2 checks	None	ec2-35-180-100-144.eu...	35.180.100.144	-

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Description Status Checks Monitoring Tags

Instance ID	i-6cf81776	Public DNS (IPv4)	ec2-35-180-100-144.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.100.144
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c	Private IPs	172.31.34.100
Security groups	my-first-security-group, view inbound rules, View outbound rules	Secondary private IPs	
Scheduled events		VPC ID	vpc-d74714be
AMI	180810-x86_64-gp2 (ami-00000000)	Subnet ID	subnet-391dc774
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True

Click Here

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EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&SecurityGroups:groupId=sg-cd5b1fa5;sort=groupId

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**Create Security Group** Actions

Group ID : sg-cd5b1fa5 Add filter

Name	Group ID	Group Name	VPC ID
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	

Security Group: sg-cd5b1fa5

Description Inbound Outbound Tags

Name: my-first-security-group  
ID: sg-cd5b1fa5

**Click Here**

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https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#SecurityGroups:groupId=sg-cd5b1fa5;sort=groupId

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**Create Security Group** Actions

Group ID : sg-cd5b1fa5

Name	Group ID	Group Name	VPC ID
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	

Security Group: sg-cd5b1fa5

Description Inbound Outbound Tags

**Click Here**

Type	Protocol	Port Range
SSH	TCP	22

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Create Security Group Actions

Group ID : sg-cd5b1fa5 Add filter

Name	Group ID	Group Name	VPC ID	Description
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	Created with my first EC2 Instance	

Security Group: sg-cd5b1fa5

Description Inbound **Outbound** Tags

Click Here

Type	Protocol	Port Range	Destination
All traffic	All	All	0.0.0.0/0

EC2 Management Console x +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#SecurityGroups:groupId=sg-cd5b1fa5;sort=groupId

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Create Security Group Actions

Group ID : sg-cd5b1fa5 Add filter

Name	Group ID	Group Name	VPC ID
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	

Security Group: sg-cd5b1fa5

Description Inbound Outbound **Tags**

Add/Edit

Click Here

Key	Value
This resource currently has no tags	

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Create Security Group Actions

Group ID : sg-cd5b1fa5 Add filter

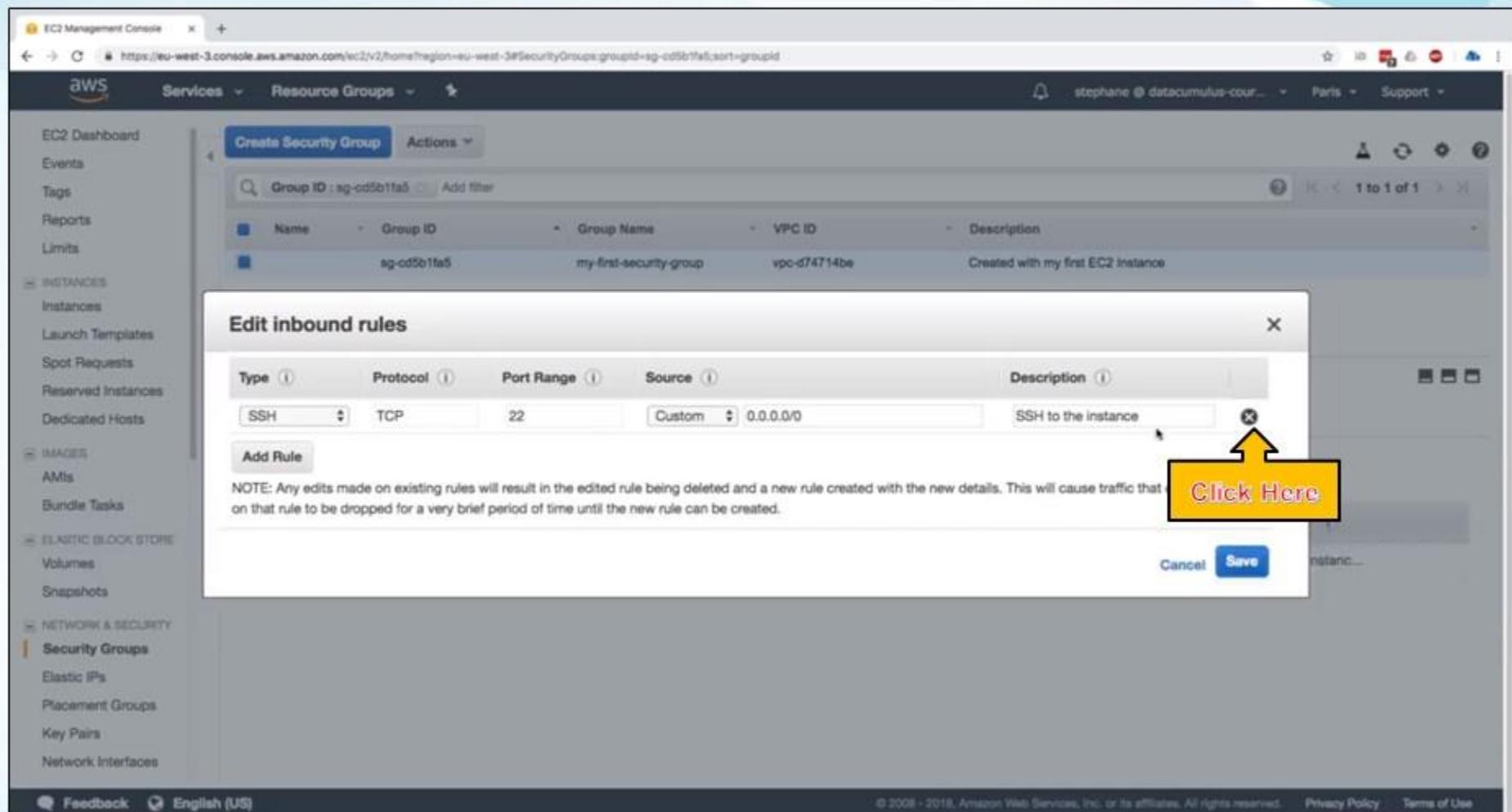
Name	Group ID	Group Name	VPC ID
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	

Security Group: sg-cd5b1fa5

Description Inbound Outbound Tags

Edit

Click Here	Protocol	Port Range
SSH	TCP	22



EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&SecurityGroups groupId=sg-cd5b1fa5;sort=groupId

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Create Security Group Actions ▼

Group ID : sg-cd5b1fa5 Add filter

1 to 1 of 1

Name	Group ID	Group Name	VPC ID	Description
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	Created with my first EC2 instance	

Edit inbound rules

Type ▼ Protocol ▼ Port Range ▼ Source ▼ Description ▼

SSH TCP 22 Custom 0.0.0.0/0 SSH to the instance

Add Rule

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that on that rule to be dropped for a very brief period of time until the new rule can be created.

Cancel Save

Click Here

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EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#SecurityGroups:groupId=sg-0d5b1fa5:sort=groupId

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Create Security Group Actions

Group ID: sg-0d5b1fa5 Add filter

Name	Group ID	Group Name	VPC ID	Description
sg-0d5b1fa5	my-first-security-group	vpc-d74714be	Created with my first EC2 Instance	

Edit inbound rules

Type Protocol Port Range Source Description

This security group has no rules

Add Rule

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

Cancel Save

Click Here

SSH to the instance...

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https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&SecurityGroups群体=sg-cd5b1fa5&sort=groupId

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Create Security Group Actions

Group ID : sg-cd5b1fa5 Add filter

Name	Group ID	Group Name	VPC ID	Description
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	Created with my first EC2 Instance	

Security Group: sg-cd5b1fa5

Description Inbound Outbound Tags

Edit

Type	Protocol	Port Range	Source	Description
This security group has no rules				

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ssh -i EC2Tutorial.pem ec2-user@35.180.100.144

```
✖ ~ /aws-course ➔ ssh -i EC2Tutorial.pem ec2-user@35.180.100.144
^C
✖ ~ /aws-course ➔ █
```

Create Security Group Actions

Group ID : sg-cd5b1fa5 Add filter

Name	Group ID	Group Name	VPC ID
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	

Security Group: sg-cd5b1fa5

Description Inbound Outbound Tags

Edit

Click Here	Protocol	Port Range
SSH	TCP	22

EC2 Management Console

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#SecurityGroups:groupid=sg-cd5b1fa5:sort=groupid

aws Services Resource Groups Actions

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Create Security Group

Group ID: sg-cd5b1fa5 Add filter

Name	Group ID	Group Name	VPC ID	Description
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	Created with my first EC2 instance	

1 to 1 of 1

Edit inbound rules

Type: SSH Protocol: TCP Port Range: 22 Source: Custom 0.0.0.0/0 Description: SSH allowed from anywhere

Add Rule

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

Cancel Save

Click Here

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EC2 Management Console +/-

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#SecurityGroups:groupid=sg-cd5b1fa5;sort=groupid

AWS Services Resource Groups

stephane @ datacumulus-cour... Parts Support

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Create Security Group Actions

Group ID : sg-cd5b1fa5 Add filter

Name	Group ID	Group Name	VPC ID	Description
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	Created with my first EC2 Instance	

Security Group: sg-cd5b1fa5

Description Inbound Outbound Tags

Edit

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	0.0.0.0/0	SSH allowed from a...

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**ssh -i EC2Tutorial.pem ec2-user@35.180.100.144**

```
x ~ /aws-course ssh -i EC2Tutorial.pem ec2-user@35.180.100.144
Last login: Wed Sep 19 13:42:49 2018 from 83.159.94.61
```

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

```
https://aws.amazon.com/amazon-linux-2/
2 package(s) needed for security, out of 9 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-34-100 ~]$
```

# Security Groups

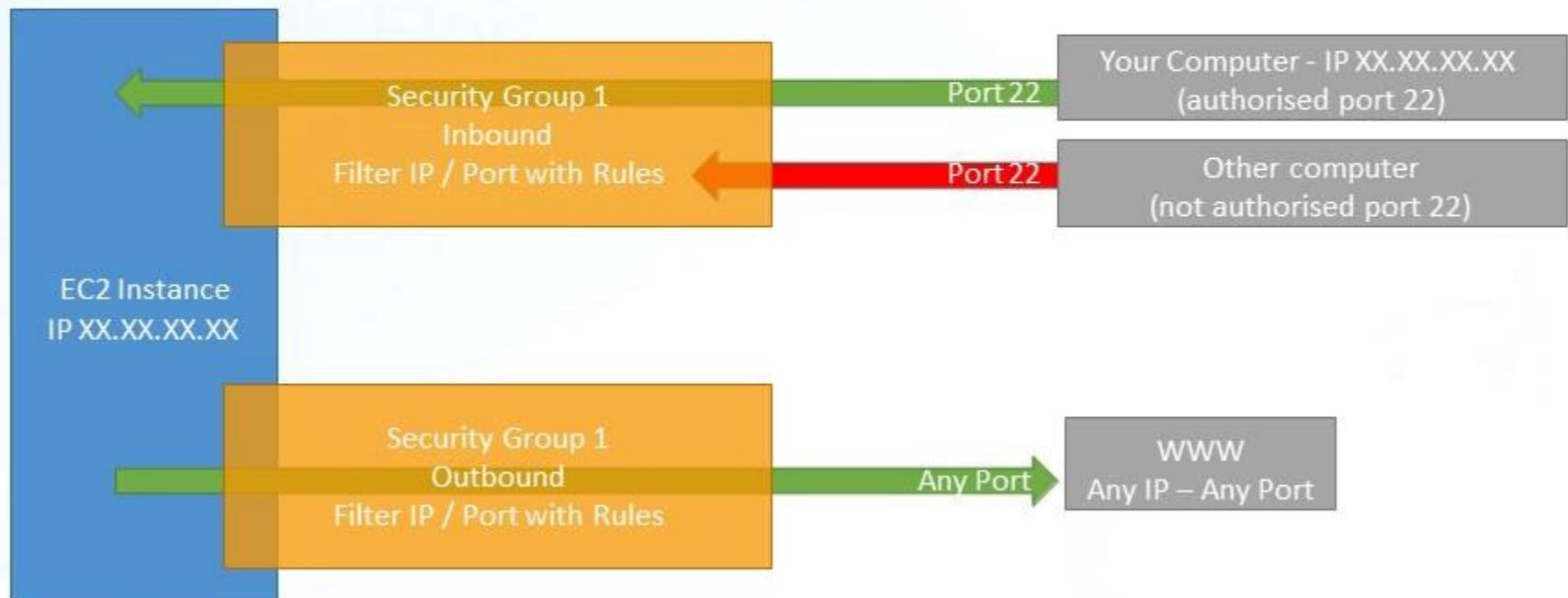
## Deeper Dive

## Security Groups Deeper Dive

- Security groups are acting as a “**firewall**” on EC2 instances
- They regulate:
  - Access to Ports
  - Authorised IP ranges – IPv4 and IPv6
  - Control of inbound network (from other to the instance)
  - Control of outbound network (from the instance to other)

Type	Protocol	Port Range	Source	Description
HTTP	TCP	80	0.0.0.0/0	test http page
SSH	TCP	22	122.149.196.85/32	
Custom TCP Rule	TCP	4567	0.0.0.0/0	java app

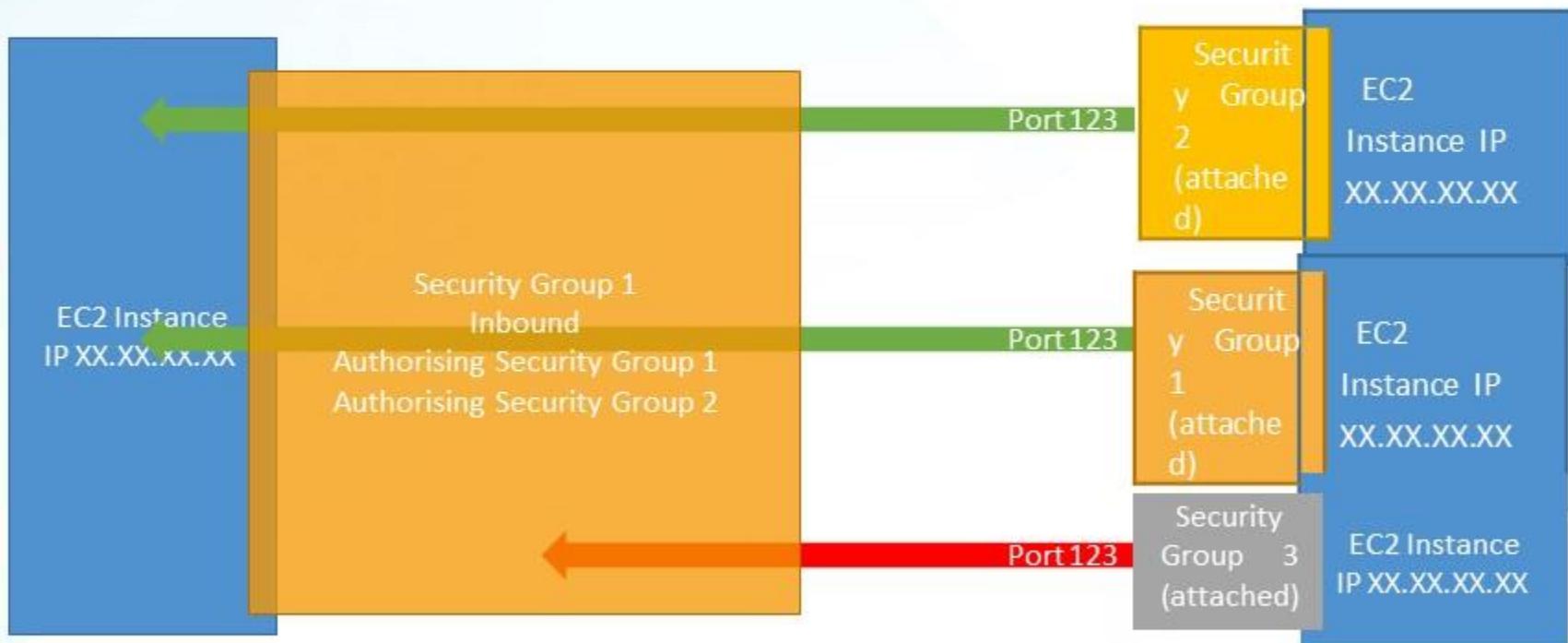
# Security Groups Diagram



## Security Groups Good to know

- Can be attached to multiple instances
- Locked down to a region / VPC combination
- Does live “outside” the EC2 – if traffic is blocked the EC2 instance won’t see it
- It’s good to maintain one separate security group for SSH access
- If your application is not accessible (time out), then it’s a security group issue
- If your application gives a “connection refused” error, then it’s an application error or it’s not launched
- All inbound traffic is **blocked** by default
- All outbound traffic is **authorised** by default

# Referencing other security groups Diagram

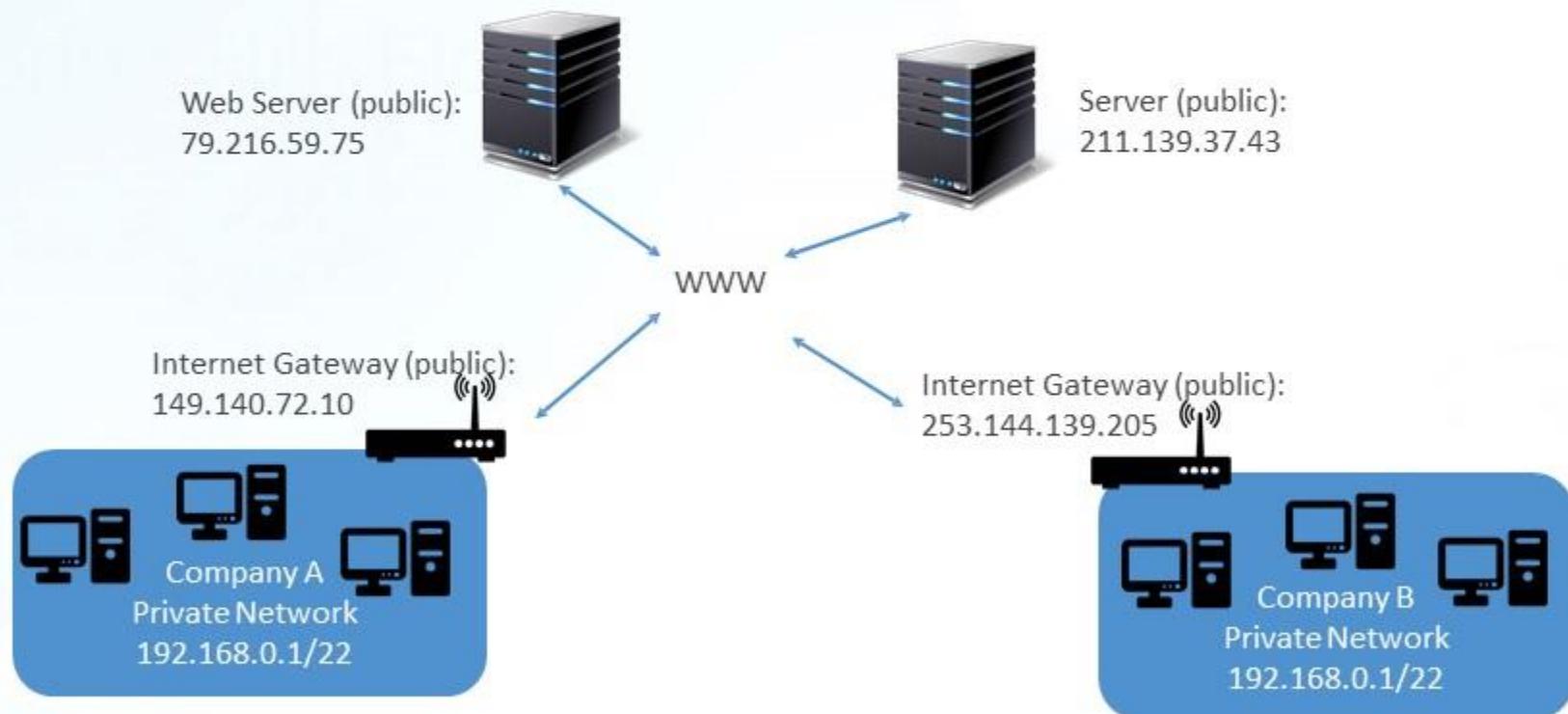


# Private vs Public IP (IPv4)

## Private vs Public IP (IPv4)

- Networking has two sorts of IPs. IPv4 and IPv6:
  - IPv4: **1.160.10.240**
  - IPv6: **3ffe:1900:4545:3:200:f8ff:fe21:67cf**
- **In this course, we will only be using IPv4.**
- IPv4 is still the most common format used online.
- IPv6 is newer and solves problems for the Internet of Things (IoT).
- IPv4 allows for **3.7 billion** different addresses in the public space
- IPv4: [0-255].[0-255].[0-255].[0-255].

## Private vs Public IP (IPv4) Example



## Private vs Public IP (IPv4) Fundamental Differences

- Public IP:
  - Public IP means the machine can be identified on the internet (WWW)
  - Must be unique across the whole web (not two machines can have the same public IP).
  - Can be geo-located easily
- Private IP:
  - Private IP means the machine can only be identified on a private network only
  - The IP must be unique across the private network
  - BUT two different private networks (two companies) can have the same IPs.
  - Machines connect to WWW using an internet gateway (a proxy)
  - Only a specified range of IPs can be used as private IP

## Elastic IPs

- When you stop and then start an EC2 instance, it can change its public IP.
- If you need to have a fixed public IP for your instance, you need an Elastic IP
- An Elastic IP is a public IPv4 IP you own as long as you don't delete it
- You can attach it to one instance at a time

## Elastic IP

- With an Elastic IP address, you can mask the failure of an instance or software by rapidly remapping the address to another instance in your account.
- You can only have 5 Elastic IP in your account (you can ask AWS to increase that).
- Overall, try to avoid using Elastic IP:
  - They often reflect poor architectural decisions
  - Instead, use a random public IP and register a DNS name to it
  - Or, as we'll see later, use a Load Balancer and don't use a public IP

## Private vs Public IP (IPv4) In AWS EC2 – Hands On

- By default, your EC2 machine comes with:
  - A private IP for the internal AWS Network
  - A public IP, for the WWW.
- When we are doing SSH into our EC2 machines:
  - We can't use a private IP, because we are not in the same network
  - We can only use the public IP.
- If your machine is stopped and then started, the public IP can change

# Private vs Public IP vs Elastic IP Hands On

EC2 Management Console

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:sort=instanceid

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Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

1 to 1 of 1

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
My First Instance	i-6cfb1776	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-100-144.eu...	35.180.100.144	-

Instance: i-6cfb1776 (My First Instance) Public DNS: ec2-35-180-100-144.eu-west-3.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags	
Instance ID	i-6cfb1776		Public DNS (IPv4)	ec2-35-180-100-144.eu-west-3.compute.amazonaws.com
Instance state	running		IPv4 Public IP	35.180.100.144
Instance type	t2.micro		IPv6 IPs	-
Elastic IPs			Private IP	-
Availability zone	eu-west-3c		Private IP	-
Security groups	my-first-security-group, view inbound rules, view outbound rules		Secondary private IP's	-
Scheduled events	No scheduled events		VPC ID	vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c6c12baa6a09)		Subnet ID	subnet-391dc774
Platform	-		Network interfaces	eth0
IAM role	-		Source/dest. check	True

Copy It

```
ssh -i EC2Tutorial.pem ec2-user@35.180.100.144
```

```
x ~aws-course ssh -i EC2Tutorial.pem ec2-user@35.180.100.144
Last login: Wed Sep 19 13:45:10 2018 from 83.159.94.61
```

Amazon Linux 2 AMI

<https://aws.amazon.com/amazon-linux-2/>

2 package(s) needed for security, out of 9 available

Run "sudo yum update" to apply all updates.

```
[ec2-user@ip-172-31-34-100 ~]$ ^C
```

```
[ec2-user@ip-172-31-34-100 ~]$ logout
```

Connection to 35.180.100.144 closed.

✖ ~aws-course

**ssh -i EC2Tutorial.pem ec2-user@172.31.34.100**



```
~/aws-course > ssh -i EC2Tutorial.pem ec2-user@172.31.34.100
```

**ssh -i EC2Tutorial.pem ec2-user@35.180.100.144**

```
x ~ aws-course ➔ ssh -i EC2Tutorial.pem ec2-user@35.180.100.144
Last login: Wed Sep 19 14:02:22 2018 from 83.159.94.61
```

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

<https://aws.amazon.com/amazon-linux-2/>

2 package(s) needed for security, out of 9 available

Run "sudo yum update" to apply all updates.

[ec2-user@ip-172-31-34-100 ~]\$

EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&instances.sort=instanceId

aws Services Resource Groups stephane @ datacumulus-cour...

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Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	2/2	2/2	ec2-35-180-100-144

Connect  
Get Windows Password  
Launch More Like This

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CloudWatch Monitor

**Copy It**

Instance: i-6cf81776 (My First Instance) Public DNS: ec2-35-180-100-144.eu-west-3.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags
Instance ID	i-6cf81776	Public DNS (IPv4)	ec2-35-180-100-144.eu-west-3.com...
Instance state	running	IPv4 Public IP	35.180.100.144
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-34-100.eu-west-3.compute...
Availability zone	eu-west-3c	Private IPs	172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	
Scheduled events	No scheduled events	VPC ID	vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)	Subnet ID	subnet-391dc774
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True

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EC2 Management Console

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&instances.sort=instanceId

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Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-100-144.eu...

**Stop Instances**

Are you sure you want to stop these instances?

i-6cf81776 (My First Instance)

**Note that when your instances are stopped:**

Any data on the ephemeral storage of your instances will be lost.

Cancel Yes, Stop

Copy It

Elastic IPs	eu-west-3c	Private DNS	ip-172-31-10-10.ec2...
Availability zone	my-first-security-group, view inbound rules, view outbound rules	Private IPs	172.31.10.10
Security groups	No scheduled events	Secondary private IPs	ompute.int...
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa5a09)	VPC ID	vpc-d74714be
Scheduled events		Subnet ID	subnet-391dc774
Platform		Network Interfaces	eth0

EC2 Management Console

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&instances=sort=instanceid

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Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
My First Instance	i-6cf81776	t2.micro	eu-west-3c	stopped	None				

1 to 1 of 1

Instance: i-6cf81776 (My First Instance) Private IP: 172.31.34.100

Description Status Checks Monitoring Tags

Instance ID	i-6cf81776	Public DNS (IPv4)	-
Instance state	stopped	IPv4 Public IP	-
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c	Private IPs	172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	
Scheduled events	-	VPC ID	vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)	Subnet ID	subnet-391dc774
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	EC2 Tutorial	T2 Unlimited	Disabled
Owner	387124123361	EBS-optimized	False
Launch time	September 19, 2018 at 2:47:57 PM UTC+2 (1 hour)	Root device type	ebs
Termination protection	False	Root device	/dev/xvda

EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:sort=instanceId

aws Services Resource Groups star

stephane @ datacumulus-cour...

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Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
My First Instance	i-6cf81776	t2.micro	eu-west-3c	stopped	Connect	Get Windows Password	

Instance: i-6cf81776 (My First Instance) Private IP: 172.31.34.100

Description	Status Checks	Monitoring	Tags	Public DNS (IPv4)	IPv4 Public IP	IPv6 IPs	Private DNS	Private IPs	Secondary private IPs	VPC ID	Subnet ID
Instance ID	i-6cf81776						ip-172-31-34-100.eu-west-3.compute.int	172.31.34.100		vpc-d74714be	subnet-391dc774
Instance state	stopped										
Instance type	t2.micro										
Elastic IPs											
Availability zone	eu-west-3c										
Security groups	my-first-security-group, view inbound rules, view outbound rules										
Scheduled events	-										
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)										
Platform	-										
IAM role	-										
Key pair name	EC2 Tutorial										
Owner	387124123361										
Launch time	September 19, 2018 at 2:47:57 PM UTC+2 (1 hour)										
Termination protection	False										

Instance State Start

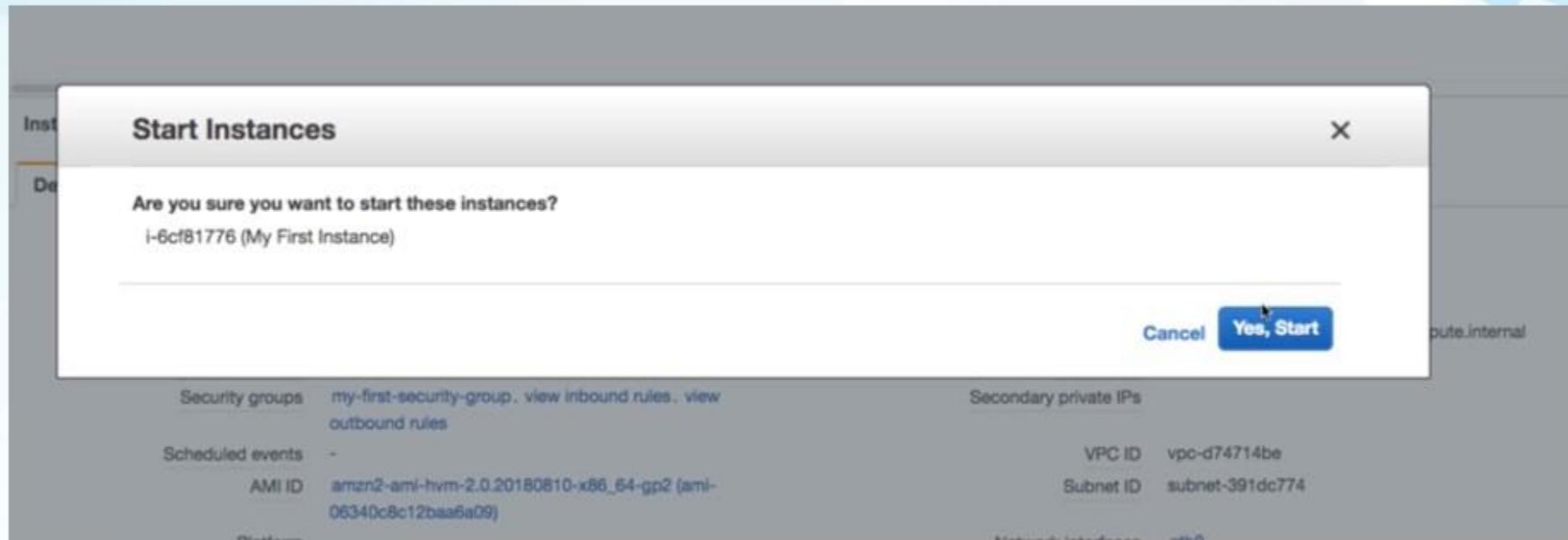
Instance Settings

Image

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CloudWatch Monitoring

Copy It



EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3Instances:sort=instanceId

**aws** Services Resource Groups ?

stephane @ datacumulus-cour...

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Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
My First Instance	i-6cf81776	t2.micro	eu-west-3c	<span style="color: yellow;">pending</span>	<span style="color: green;">Initializing</span>	None	<span style="color: green;">ip-172-31-34-100.eu-west-3.compute.internal</span>

Instance: i-6cf81776 (My First Instance) Private IP: 172.31.34.100

Description	Status Checks	Monitoring	Tags
Instance ID	i-6cf81776		Public DNS (IPv4) -
Instance state	pending		IPv4 Public IP -
Instance type	t2.micro		IPv6 IPs -
Elastic IPs			Private DNS ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c		Private IPs 172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules		Secondary private IPs
Scheduled events	-		VPC ID vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)		Subnet ID subnet-391dc774
Platform	-		Network interfaces eth0
IAM role	-		Source/dest. check True
Key pair name	EC2 Tutorial		T2 Unlimited Disabled
Owner	387124123361		EBS-optimized False
Launch time	September 19, 2018 at 4:04:19 PM UTC+2 (less than one hour)		Root device type ebs

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&instances.sort=instanceId

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**LOAD BALANCING**

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	Initializing	None	ec2-35-180-43-69.eu-

Instance: i-6cf81776 (My First Instance) Public DNS: ec2-35-180-43-69.eu-west-3.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags
Instance ID: i-6cf81776			Public DNS (IPv4): ec2-35-180-43-69.eu-west-3.compute.amazonaws.com
Instance state: running			IPv4 Public IP: 35.180.43.69 (2)
Instance type: t2.micro			IPv6 IPs: -
Elastic IPs: -			Private D: -
Availability zone: eu-west-3c			Private IP: -
Security groups: my-first-security-group, view inbound rules, view outbound rules			Secondary private IPs: -
Scheduled events: No scheduled events			VPC ID: vpc-d74714be
AMI ID: amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baaa09)			Subnet ID: subnet-391dc774
Platform: -			Network interfaces: eth0
IAM role: -			Source/dest. check: True
Key pair name: EC2 Tutorial			T2 Unlimited: Disabled
Owner: 387124123361			EBS-optimized: False
Launch time: September 19, 2018 at 4:04:19 PM UTC+2 (less than one hour)			Root device type: ebs

**Copy It**

ssh -i EC2Tutorial.pem ec2-user@35.180.100.144  
yes

```
✖ ➔ ~/aws-course ➔ ssh -i EC2Tutorial.pem ec2-user@35.180.43.69
The authenticity of host '35.180.43.69 (35.180.43.69)' can't be established.
ECDSA key fingerprint is SHA256:gLqFnUlIDsBNQZFkmzJLGNRTtry2CbQ8L2N3ZUU0DTYQ.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '35.180.43.69' (ECDSA) to the list of known hosts.
Last login: Wed Sep 19 14:02:46 2018 from 83.159.94.61
```

—| ( —|— )  
—| ( —|— /    Amazon Linux 2 AMI  
—| \—|—|

```
https://aws.amazon.com/amazon-linux-2/
2 package(s) needed for security, out of 9 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-34-100 ~]$ █
```

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&instances=sort+instanceId

aws Services Resource Groups

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Click Here

**LOAD BALANCING**

Feedback English (US)

Launch Instance Connect Actions

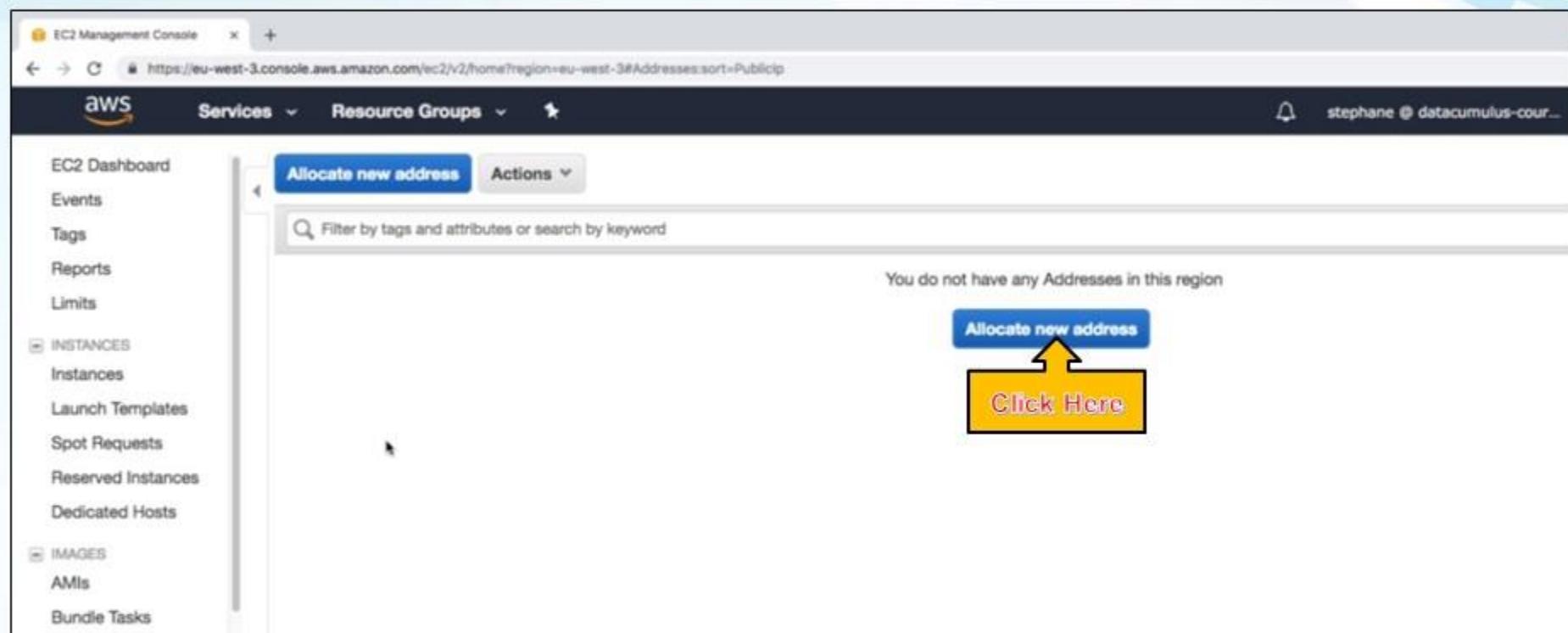
Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	Initializing	None	ec2-35-180-43-69.eu-w...

Instance: i-6cf81776 (My First Instance) Public DNS: ec2-35-180-43-69.eu-west-3.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags
Instance ID	i-6cf81776		Public DNS (IPv4) ec2-35-180-43-69.eu-west-3.compute.amazonaws.com
Instance state	running		IPv4 Public IP 35.180.43.69
Instance type	t2.micro		IPv6 IPs -
Elastic IPs			Private DNS ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c		Private IPs 172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules		Secondary private IPs
Scheduled events	No scheduled events		VPC ID vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180610-x86_64-gp2 (ami-06340c8c12baa6a09)		Subnet ID subnet-391dc774
Platform	-		Network interfaces eth0
IAM role	-		Source/dest. check True
Key pair name	EC2 Tutorial		T2 Unlimited Disabled
Owner	387124123361		EBS-optimized False
Launch time	September 19, 2018 at 4:04:19 PM UTC+2 (less than one hour)		Root device type ebs

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The screenshot shows the AWS EC2 Management Console interface. The top navigation bar includes the AWS logo, a 'Services' dropdown, a 'Resource Groups' dropdown, and a user profile for 'stephane @ datacumulus-cour...'. The main left sidebar lists various EC2 management categories: EC2 Dashboard, Events, Tags, Reports, Limits, INSTANCES (with sub-options: Instances, Launch Templates, Spot Requests, Reserved Instances, Dedicated Hosts), and IMAGES (with sub-options: AMIs, Bundle Tasks). The main content area has a header with 'Allocate new address' and 'Actions' buttons, and a search bar. A message states 'You do not have any Addresses in this region'. A prominent blue button labeled 'Allocate new address' is highlighted with a yellow box and a yellow arrow pointing to the text 'Click Here'.

EC2 Management Console

aws Services Resource Groups

stephane @ datacumulus-cour...

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Allocate new address

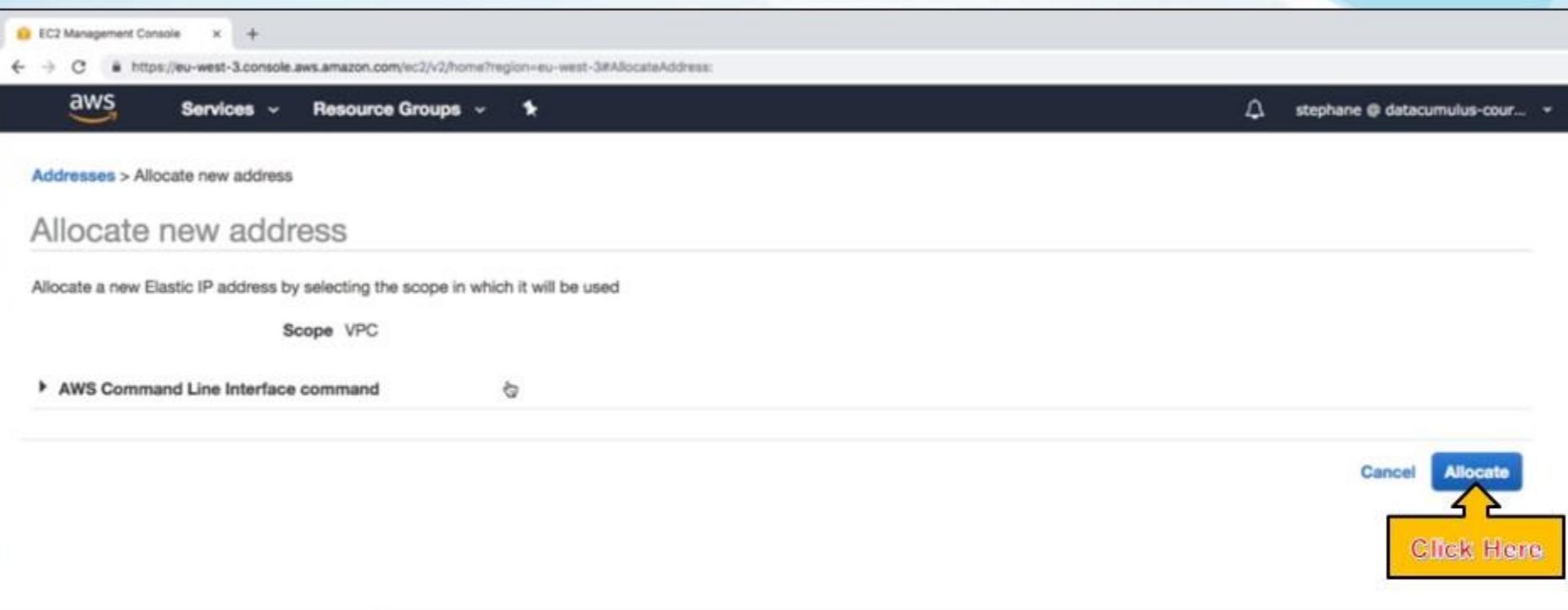
Actions

Filter by tags and attributes or search by keyword

You do not have any Addresses in this region

Allocate new address

Click Here



EC2 Management Console x +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#AllocateAddress:

aws Services Resource Groups

stephane @ datacumulus-cour...

Addresses > Allocate new address

## Allocate new address

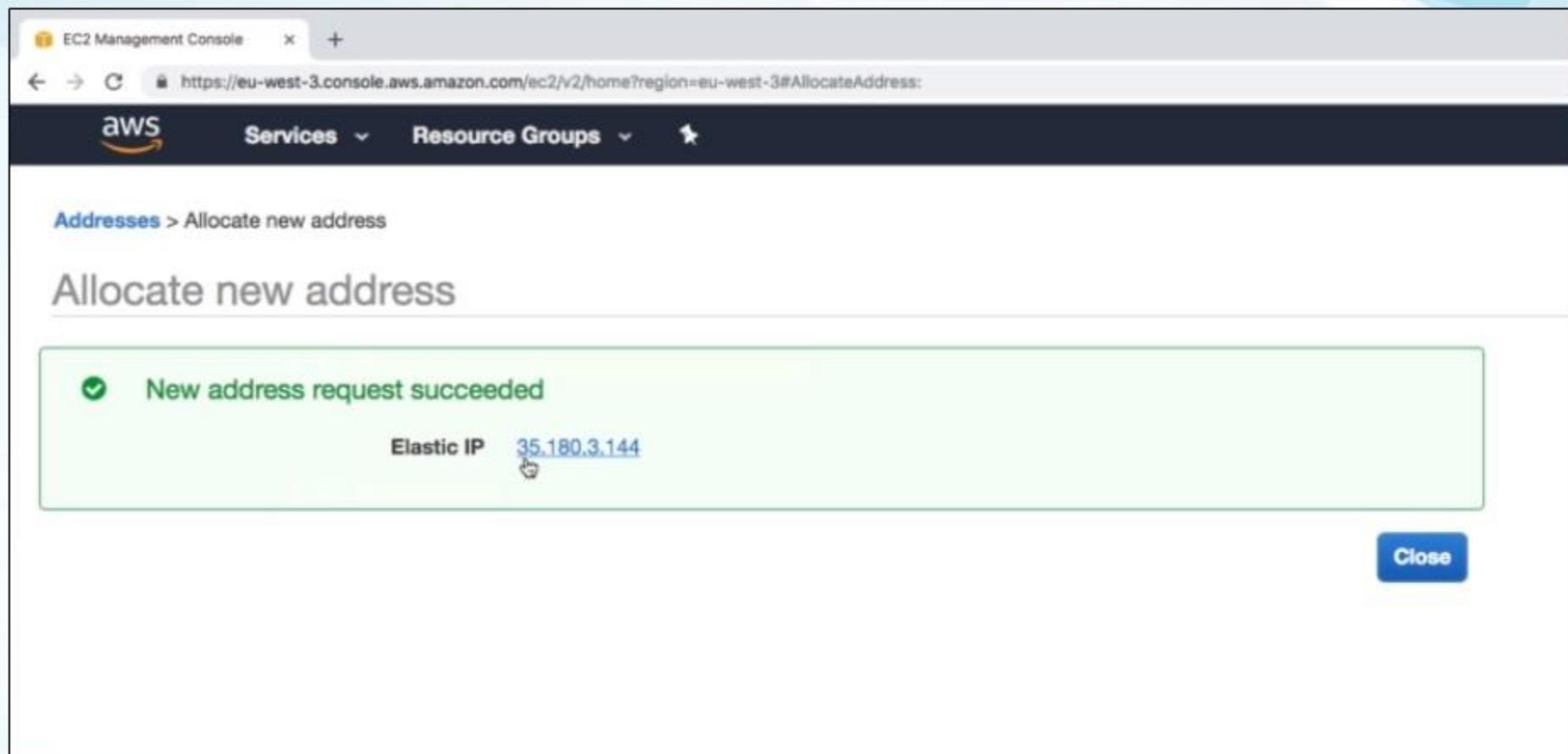
Allocate a new Elastic IP address by selecting the scope in which it will be used

Scope: VPC

AWS Command Line Interface command

Cancel **Allocate**

**Click Here** 



The screenshot shows a browser window for the EC2 Management Console. The URL is <https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#AllocateAddress:>. The AWS logo is in the top left, followed by 'Services' and 'Resource Groups' dropdowns. The main content area shows the path 'Addresses > Allocate new address' and the title 'Allocate new address'. A green success message box contains the text 'New address request succeeded' with a checkmark icon. Below it, the 'Elastic IP' label is followed by the IP address '35.180.3.144' in blue text with a cursor icon pointing to it. A 'Close' button is in the bottom right corner of the message box.

EC2 Management Console

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#AllocateAddress:

aws Services Resource Groups

Addresses > Allocate new address

Allocate new address

New address request succeeded

Elastic IP 35.180.3.144

Close

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#Addresses:sort=PublicIp

aws Services Resource Groups

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Allocate new address Actions

Filter by tags and attributes or search by keyword

Name	Elastic IP	Allocation ID	Instance	Private IP address	Scope	Association ID	Network
	35.180.3.144	eipalloc-e3d9eccd	-	-	vpc	-	-

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#Addresses:sort=PublicIp

aws Services Resource Groups stephane @ datacumulus

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Allocate new address Actions

Filter by tags and attributes or search by keyword

Name	Elastic IP	Allocation ID	Instance	Private IP address	Scope	Association ID
	35.180.3.144				vpc	

Release addresses

Associate address

Click Here

Address: 35.180.3.144

Description Tags

Elastic IP	35.180.3.144	Allocation ID	eipalloc-e3d9eccd
Instance	-	Private IP address	-
Scope	vpc	Association ID	-
Public DNS	-	Network interface ID	-
Network interface owner	-		

EC2 Management Console +/-

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&AssociateAddress=PublicIp=35.180.3.144

**aws** Services Resource Groups star

stephane @ datacumulus-cour...

Addresses > Associate address

## Associate address

Select the instance OR network interface to which you want to associate this Elastic IP address (35.180.3.144)

Resource type  Instance ?  
 Network interface

Instance  I ▼ C

Private IP  ▼ C ?

Reassociation  Allow Elastic IP to be reassociated if already attached ?

**Warning**  
If you associate an Elastic IP address with your instance, your current public IP address is released. [Learn more](#).

▶ AWS Command Line Interface command

Cancel Associate

EC2 Management Console [+](#)

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#AssociateAddress:Publicip=35.180.3.144

aws Services Resource Groups

stephane @ datacumulus-cour...

Addresses > Associate address

## Associate address

Select the instance OR network interface to which you want to associate this Elastic IP address (35.180.3.144)

Resource type  Instance [i](#)  
 Network interface

Instance  [C](#)

Private IP  [C](#) [i](#)

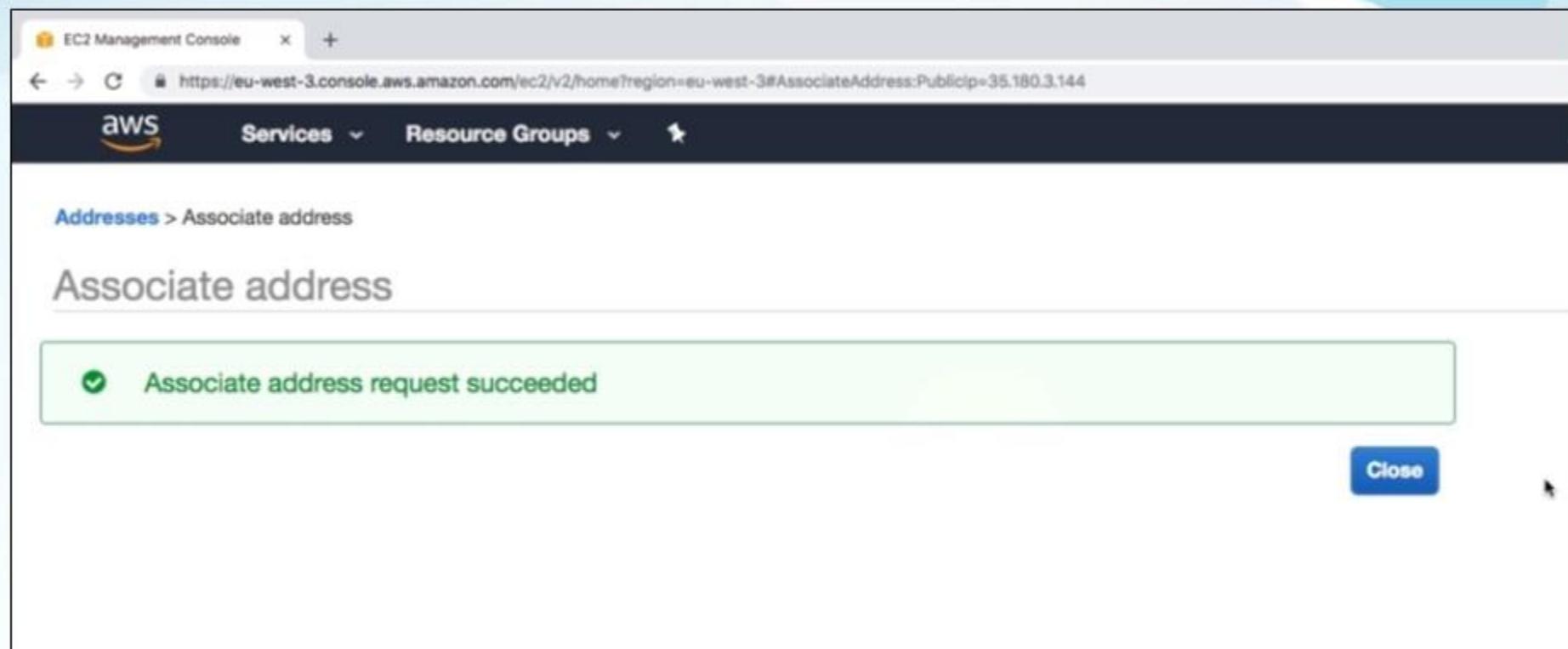
Reassociation  Allow Elastic IP to be reassociated if already attached [i](#)

**Warning**  
If you associate an Elastic IP address with your instance, your current public IP address is released. [Learn more](#).

AWS Command Line Interface command

[Cancel](#) [Associate](#)

**Click Here** 



The screenshot shows a browser window for the AWS EC2 Management Console. The URL is <https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#AssociateAddress:PublicIp=35.180.3.144>. The AWS logo is in the top left, followed by 'Services' and 'Resource Groups' dropdowns. The main content area shows the path 'Addresses > Associate address' and the title 'Associate address'. A green success message box contains the text 'Associate address request succeeded' with a checkmark icon. A 'Close' button is in the bottom right of the message box. The background shows a light blue and white decorative header.

EC2 Management Console

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#AssociateAddress:PublicIp=35.180.3.144

aws Services Resource Groups

Addresses > Associate address

Associate address

Associate address request succeeded

Close

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#Addresses:sort=PublicIp

aws Services Resource Groups

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Allocate new address Actions

Filter by tags and attributes or search by keyword

Name	Elastic IP	Allocation ID	Instance	Private IP address	Scope	Association ID	Network Interface
	35.180.3.144	eipalloc-e3d9eccd	i-6cfb1776	172.31.34.100	vpc	eipassoc-163e27cd	eni-c82192e3

Address: 35.180.3.144

Description Tags

Elastic IP	35.180.3.144	Allocation ID	eipalloc-e3d9eccd
Instance	i-6cfb1776	Private IP address	172.31.34.100
Scope	vpc	Association ID	eipassoc-163e27cd
Public DNS	ec2-35-180-3-144.eu-west-3.compute.amazonaws.com	Network interface ID	eni-c82192e3
Network interface owner	387124123361		

Click Here

EC2 Management Console

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:instanceId=i-6cf81776;sort=instanceId

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Launch Instance Connect Actions

Instance ID: i-6cf81776 Add filter

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Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	Initializing	None	ec2-35-180-3-144.eu-w...	35.180.3.144	

Instance: i-6cf81776 (My First Instance) Elastic IP: 35.180.3.144

Description Status Checks Monitoring Tags

Instance ID	i-6cf81776	Public DNS (IPv4)	ec2-35-180-3-144.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.3.144
Instance type	t2.micro	IPv6 IPs	
Elastic IPs	35.180.3.144*	Private IP	172.31.11.11
Availability zone	eu-west-3c	Private DNS	ec2-35-180-3-144.eu-west-3.compute.internal
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IP	
Scheduled events	No scheduled events	VPC ID	vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)	Subnet ID	subnet-391dc774
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	EC2 Tutorial	T2 Unlimited	Disabled
Owner	387124123361	EBS-optimized	False
Launch time	September 19, 2018 at 4:04:19 PM UTC+2 (less than one hour)	Root device type	ebs

Copy It

```
ssh -i EC2Tutorial.pem ec2-user@35.180.3.144
yes
```

```
Last login: Wed Sep 19 14:50:01 on ttys003
~/aws-course ➔ ssh -i EC2Tutorial.pem ec2-user@35.180.3.144
The authenticity of host '35.180.3.144 (35.180.3.144)' can't be established.
ECDSA key fingerprint is SHA256:gLqFnUlIDsBNQZFkmzJLGNRTry2CbQ8L2N3ZUU0DTYQ.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '35.180.3.144' (ECDSA) to the list of known hosts.
Last login: Wed Sep 19 14:05:06 2018 from 83.159.94.61
```

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

```
https://aws.amazon.com/amazon-linux-2/
2 package(s) needed for security, out of 9 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-34-100 ~]$ █
```

Screenshot of the AWS EC2 Management Console showing the instance details for "My First Instance" (i-6cf81776).

The instance is currently running in the eu-west-3c availability zone. The "Actions" menu is open, and a yellow box with the text "Click Here" and an arrow points to the "Stop" button in the "Instance State" dropdown.

**Instance: i-6cf81776 (My First Instance)    Elastic IP: 35.180.3.144**

Description	Value
Instance ID	i-6cf81776
Instance state	running
Instance type	t2.micro
Elastic IPs	35.180.3.144*
Availability zone	eu-west-3c
Security groups	my-first-security-group, view inbound rules, view outbound rules
Scheduled events	No scheduled events
AMI ID	amzn2-ami-hvm-2.0.20180610-x86_64-gp2 (ami-06340c8c12baa6a09)
Platform	-
IAM role	-
Key pair name	EC2 Tutorial
Owner	387124123361
Launch time	September 19, 2018 at 4:04:19 PM UTC+2 (less than one hour)
Public DNS (IPv4)	ec2-35-180-3-144.eu-west-3.compute.amazonaws.com
IPv4 Public IP	35.180.3.144
IPv6 IPs	-
Private DNS	ip-172-31-34-100.eu-west-3.compute.internal
Private IPs	172.31.34.100
Secondary private IPs	-
VPC ID	vpc-d74714be
Subnet ID	subnet-391dc774
Network interfaces	eth0
Source/dest. check	True
T2 Unlimited	Disabled
EBS-optimized	False
Root device type	ebs

## Stop Instances

Are you sure you want to stop these instances?

- i-6cf81776 (My First Instance)

**Note that when your instances are stopped:**

- Any data on the ephemeral storage of your instances will be lost.

[Cancel](#) [Yes, Stop](#)

No scheduled events

ID	Image ID	VPC ID	Subnet ID
amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-08340a8c13bae6a00)		vpc-d74714	subnet-391

EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:instanceId=i-6cf81776;sort=instanceId

Services ▼ Resource Groups ▼ ★

stephane @ datacumulus-cour... ▼ Paris ▼

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Launch Instance ▼ Connect Actions ▼

Instance ID : i-6cf81776 Add filter

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Pub...
My First Instance	i-6cf81776	t2.micro	eu-west-3c	stopped	None		ec2-35-180-3-144.eu-w...	35.180.3...

Instance: i-6cf81776 (My First Instance)    Elastic IP: 35.180.3.144

Description	Status Checks	Monitoring	Tags
Instance ID: i-6cf81776			Public DNS (IPv4): ec2-35-180-3-144.eu-west-3.compute.amazonaws.com
Instance state: stopped			IPv4 Public IP: 35.180.3.144
Instance type: t2.micro			IPv6 IPs: -
Elastic IPs: 35.180.3.144*			Private DNS: ip-172-31-34-100.eu-west-3.compute.internal
Availability zone: eu-west-3c			Private IPs: 172.31.34.100
Security groups: my-first-security-group, view inbound rules, view outbound rules			Secondary private IPs: -
Scheduled events: -			VPC ID: vpc-d74714be
AMI ID: amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)			Subnet ID: subnet-391dc774
Platform: -			Network interfaces: eth0
IAM role: -			Source/dest. check: True
Key pair name: EC2 Tutorial			T2 Unlimited: Disabled
Owner: 387124123361			EBS-optimized: False

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&instances:instanceId=i-6cf81776,sort=instanceId

Services Resource Groups Actions

Launch Instance Connect Actions

Instance ID : i-6cf81776 Add filter

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
My First Instance	i-6cf81776	t2.micro	eu-west-3c	stopped	None	None	ec2-35-180-3-144.eu-w...	35.180.3.144	None

Connect  
Get Windows Password  
Launch More Like This  
Instance State  
Instance Settings  
Image  
Networking  
CloudWatch Monitoring

Change Security Groups  
Attach Network Interface  
Detach Network Interface  
Disassociate Elastic IP Address  
Change Source/dest. check  
Change Secondary private IP

Public DNS (IPv4)  
IPv4 Public IP  
IPv6  
Private IP  
Private IPs  
Secondary private IPs

Instance: i-6cf81776 (My First Instance) Elastic IP: 35.180.3.144

Description Status Checks Monitoring Tags

Instance ID	i-6cf81776	VPC ID	vpc-d74714be
Instance state	stopped	Subnet ID	subnet-391dc774
Instance type	t2.micro	Network interfaces	eth0
Elastic IPs	35.180.3.144*	Source/dest. check	True
Availability zone	eu-west-3c	T2 Unlimited	Disabled
Security groups	my-first-security-group, view inbound rules, view outbound rules	EBS-optimized	False
Scheduled events	-	Root device type	ebs
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)		
Platform	-		
IAM role	-		
Key pair name	EC2 Tutorial		
Owner	387124123361		
Launch time	September 19, 2018 at 4:04:19 PM UTC+2 (less than one hour)		

Click Here

## Disassociate Elastic IP Address



Are you sure that you wish to disassociate this Elastic IP Address?

Public IP 35.180.3.144

Instance ID i-6cf81776

Network interface ID eni-c82192e3

Cancel

Yes, Disassociate

Click Here

VPC ID

vpc-d747

EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:instanceId=i-6cf81776;sort=instanceId

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Elastic IPs Elastic IPs

Place Groups

**Click Here** Click Here

**LOAD BALANCING** Load Balancing

Instance ID : i-6cf81776 Add filter

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
My First Instance	i-6cf81776	t2.micro	eu-west-3c	stopped	None				

Instance: i-6cf81776 (My First Instance) Private IP: 172.31.34.100

Description	Status Checks	Monitoring	Tags
Instance ID: i-6cf81776	Public DNS (IPv4): -	IPv4 Public IP: -	IPv6 IPs: -
Instance state: stopped	Private DNS: ip-172-31-34-100.eu-west-3.compute.internal	Private IPs: 172.31.34.100	Secondary private IPs: -
Instance type: t2.micro	VPC ID: vpc-d74714be	Subnet ID: subnet-391dc774	
Elastic IPs:	Network interfaces: eth0	Source/dest. check: True	
Availability zone: eu-west-3c	T2 Unlimited: -	EBS-optimized: False	
Security groups: my-first-security-group, view inbound rules, view outbound rules	Root device type: ebs		
Scheduled events: -			
AMI ID: amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12bea6a09)			
Platform: -			
IAM role: -			
Key pair name: EC2 Tutorial			
Owner: 387124123361			
Launch time: September 19, 2018 at 4:04:19 PM UTC+2 (less than one hour)			

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&Addresses:sort=Publicip

aws Services Resource Groups stephane @ datacumulus-cour...

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Allocate new address Actions

Filter by tags and attributes or search by keyword

Name	Elastic IP	Allocation ID	Instance	Private IP address	Scope	Association ID	Network
	35.180.3.144	eipalloc-e3d9eccd	-	-	vpc	-	-

Address: 35.180.3.144

Description Tags

Elastic IP	35.180.3.144	Allocation ID	eipalloc-e3d9eccd
Instance	-	Private IP address	-
Scope	vpc	Association ID	-
Public DNS	-	Network interface ID	-
Network interface owner	-		

Right Click

EC2 Management Console x +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#Addresses:sort=PublicIP

aws Services Resource Groups

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Allocate new address Actions

Filter by tags and attributes or search by keyword

Name	Elastic IP	Allocation ID	Instance	Private IP address
	35.180.3.144	ed9eccd	-	-

Release addresses

Click Here

Add/Edit Tags

Address: 35.180.3.144

Description Tags

Elastic IP 35.180.3.144

Instance -

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#Addresses:sort=PublicIP

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Allocate new address Actions

Filter by tags and attributes or search by keyword

Name	Elastic IP	Allocation ID	Instance	Private IP address	Scope	Association ID	Net
	35.180.3.144	eipalloc-e3d9eccd			vpc		

Address: 35.180.3.144

Description Tags

Elastic IP Instance Scope Public DNS Network interface owner

Release addresses

Are you sure you want to release these 1 IP addresses?

Elastic IP: 35.180.3.144 (eipalloc-e3d9eccd)

Cancel Release

Click Here

EC2 Management Console + New

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#Addresses:sort=Publicip

aws Services Resource Groups

stephane @ datacumulus-cour...

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Filter by tags and attributes or search by keyword

You do not have any Addresses in this region

Allocate new address

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&instances=instanceId+i-6cf81776&sort=instanceId

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Launch Instance Connect Actions

Instance ID: i-6cf81776 Add filter

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
My First Instance	i-6cf81776	t2.micro	eu-west-3c	stopped	None	None	None	None	None

Instance: i-6cf81776 (My First Instance) Private IP: 172.31.34.100

Description Status Checks Monitoring Tags

Instance ID	i-6cf81776	Public DNS (IPv4)	-
Instance state	stopped	IPv4 Public IP	-
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c	Private IPs	172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	
Scheduled events	-	VPC ID	vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)	Subnet ID	subnet-391dc774
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	EC2-Tutorial	T2 Unlimited	Disabled
Owner	387124123361	EBS-optimized	False
Launch time	September 19, 2018 at 4:04:19 PM UTC+2 (less than one hour)	Root device type	ebs

EC2 Management Console

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:instanceId=i-6cf81776;sort=instanceId

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Launch Instance Connect Actions

Instance ID : i-6cf81776 Add filter

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Ala
My First Instance	i-6cf81776	t2.micro		stopped		No

Instance: i-6cf81776 (My First Instance) Private IP: 172.31.34.10

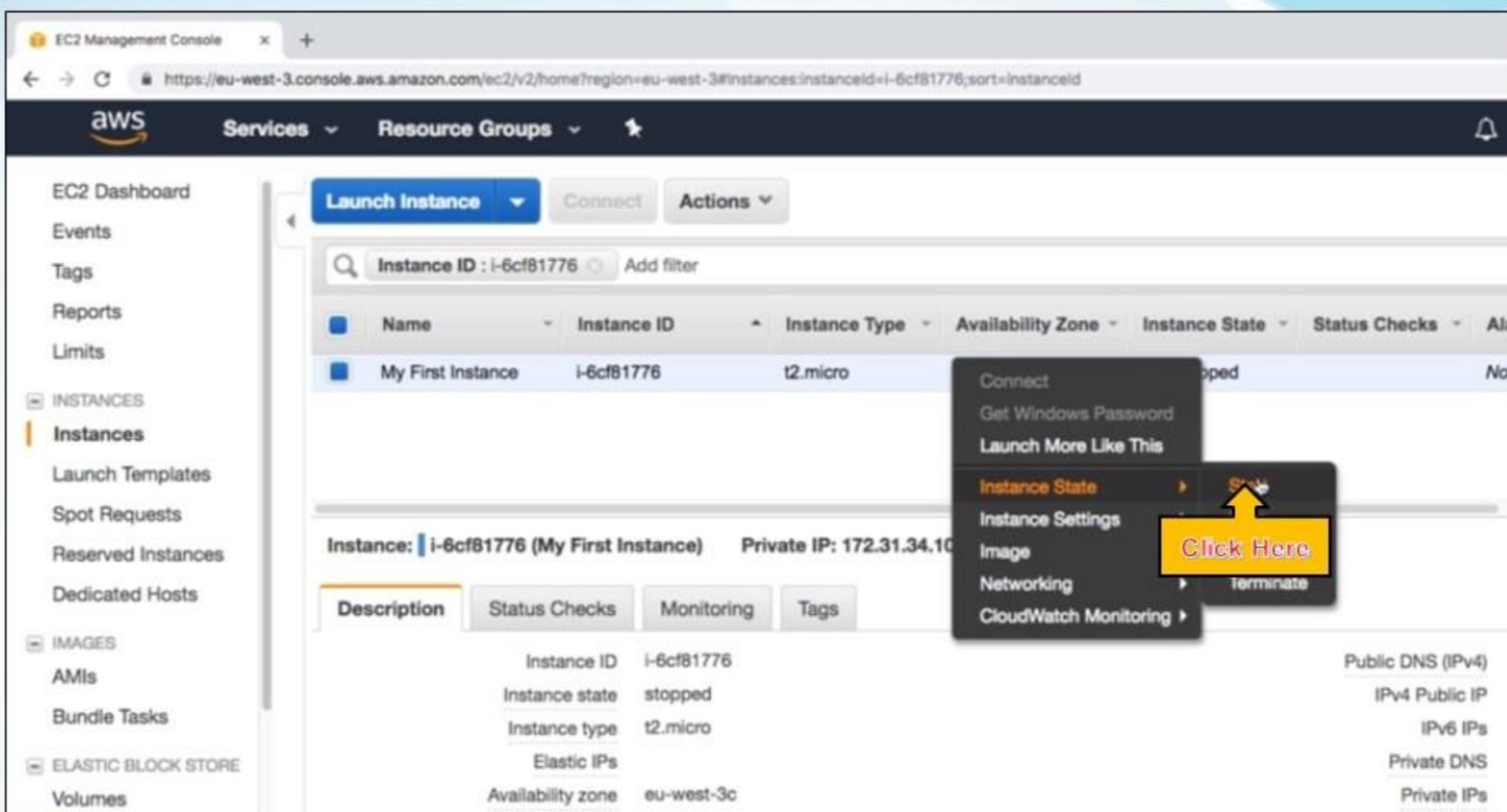
Description Status Checks Monitoring Tags

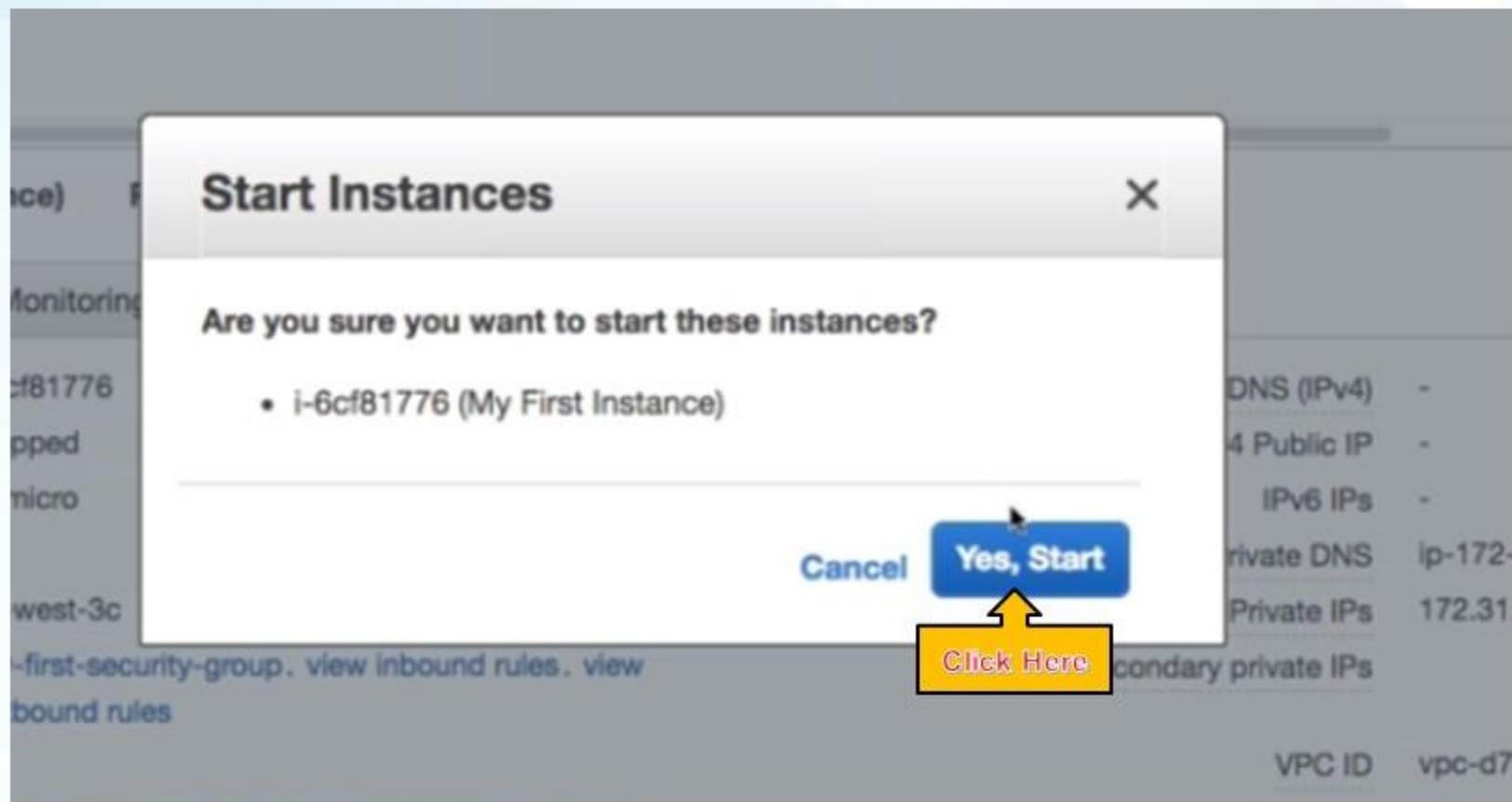
Instance ID: i-6cf81776  
Instance state: stopped  
Instance type: t2.micro  
Elastic IPs  
Availability zone: eu-west-3c

Public DNS (IPv4)  
IPv4 Public IP  
IPv6 IPs  
Private DNS  
Private IPs

Connect  
Get Windows Password  
Launch More Like This  
Instance State  
Instance Settings  
Image  
Networking  
CloudWatch Monitoring

Start (arrow)  
Click Here  
Terminate





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https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:sort=instanceId

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Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-42-243.eu...

Instance: i-6cf81776 (My First Instance) Public DNS: ec2-35-180-42-243.eu-west-3.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags
Instance ID	i-6cf81776		Public DNS (IPv4) ec2-35-180-42-243.eu-west-3.compute.amazonaws.com
Instance state	running		IPv4 Public IP 35.180.42.243
Instance type	t2.micro		IPv6 IPs -
Elastic IPs			Private DNS ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c		Private IPs 172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules		Secondary private IPs
Scheduled events	No scheduled events		VPC ID vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)		Subnet ID subnet-391dc774
Platform	-		Network interfaces eth0

# Install Apache on EC2

## Launching an Apache Server on EC2

- Let's leverage our EC2 instance
- We'll install an Apache Web Server to display a web page
- We'll create an index.html that shows the hostname of our machine

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https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3instances:sort=instanceId

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Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
My First Instance	i-6cfb1776	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-42-243.eu-west-3.compute.amazonaws.com	35.180.42.243	-

Instance: i-6cfb1776 (My First Instance) Public DNS: ec2-35-180-42-243.eu-west-3.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags
Instance ID	i-6cfb1776	Public DNS (IPv4)	ec2-35-180-42-243.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.42.243
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c	Private IPs	172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	
Scheduled events	No scheduled events	VPC ID	vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)	Subnet ID	subnet-391dc774
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	EC2 Tutorial	T2 Unlimited	Disabled
Owner	387124123361	EBS-optimized	False
Launch time	September 19, 2018 at 4:08:35 PM UTC+2 (less than one hour)	Root device type	ebs

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https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&instances.sort=instanceId

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Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
My First Instance	i-6cfb1776	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-42-243.eu...	35.180.42.243	

Instance: i-6cfb1776 (My First Instance) Public DNS: ec2-35-180-42-243.eu-west-3.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-6cfb1776	Public DNS (IPv4)	ec2-35-180-42-243.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.42.243
Instance type	t2.micro	IPv6 IPs	
Elastic IPs		Private DNS	compute.internal
Availability zone	eu-west-3c	Secondary private IP	
Security groups	my-first-security-group, view inbound rules, view outbound rules	VPC ID	
Scheduled events	No scheduled events	Subnet ID	
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)	Network interfaces	eth0
Platform	-	Source/dest. check	True
IAM role	-	T2 Unlimited	Disabled
Key pair name	EC2 Tutorial	EBS-optimized	False
Owner	387124123361	Root device type	ebs
Launch time	September 19, 2018 at 4:08:35 PM UTC+2 (less than one hour)		

Look Up "35.180.42.243"

Click Here

**ssh -i EC2Tutorial.pem ec2-user@35.180.42.243**  
**yes**

```
✖ ➔ ~/aws-course ➔ ssh -i EC2Tutorial.pem ec2-user@35.180.42.243
The authenticity of host '35.180.42.243 (35.180.42.243)' can't be established.
ECDSA key fingerprint is SHA256:gLqFnUlIDsBNQZFkmzJLGNRTry2CbQ8L2N3ZUU0DTYQ.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '35.180.42.243' (ECDSA) to the list of known hosts.
Last login: Wed Sep 19 14:07:16 2018 from 83.159.94.61
```

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

```
https://aws.amazon.com/amazon-linux-2/
2 package(s) needed for security, out of 9 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-34-100 ~]$ █
```

sudo su

```
[ec2-user@ip-172-31-34-100 ~]$ sudo su  
[root@ip-172-31-34-100 ec2-user]# █
```

# yum update -y

```
(5/9): libsemanage-2.5-11.amzn2.x86_64.rpm | 152 kB 00:00:00
(6/9): kernel-4.14.67-71.56.amzn2.x86_64.rpm | 19 MB 00:00:00
(7/9): mariadb-libs-5.5.60-1.amzn2.x86_64.rpm | 770 kB 00:00:00
(8/9): policycoreutils-2.5-22.amzn2.x86_64.rpm | 867 kB 00:00:00
(9/9): yum-3.4.3-158.amzn2.0.2.noarch.rpm | 1.2 MB 00:00:00

Total                                         37 MB/s | 36 MB 00:00:00

Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Updating : libsemanage-2.5-11.amzn2.x86_64          1/17
  Updating : 1:dbus-libs-1.10.24-7.amzn2.x86_64      2/17
  Updating : 1:dbus-1.10.24-7.amzn2.x86_64          3/17
  Updating : policycoreutils-2.5-22.amzn2.x86_64      4/17
  Installing: kernel-4.14.67-71.56.amzn2.x86_64      5/17
  Updating : kernel-tools-4.14.67-71.56.amzn2.x86_64  6/17
  Updating : amazon-ssm-agent-2.3.50.0-1.amzn2.x86_64  7/17
  Updating : 1:mariadb-libs-5.5.60-1.amzn2.x86_64      8/17
  Updating : yum-3.4.3-158.amzn2.0.2.noarch          9/17
  Cleanup  : 1:dbus-1.6.12-17.amzn2.x86_64          10/17
  Cleanup  : policycoreutils-2.5-17.1.amzn2.x86_64    11/17
  Cleanup  : yum-3.4.3-154.amzn2.0.1.noarch          12/17
  Cleanup  : libsemanage-2.5-8.amzn2.x86_64          13/17
  Cleanup  : 1:dbus-libs-1.6.12-17.amzn2.x86_64      14/17
  Cleanup  : kernel-tools-4.14.62-70.117.amzn2.x86_64 15/17
  Cleanup  : amazon-ssm-agent-2.2.619.0-1.amzn2.x86_64 16/17
  Cleanup  : 1:mariadb-libs-5.5.56-2.amzn2.x86_64      17/17
```

# yum install -y httpd.x86\_64

```
Installing : apr-1.6.3-5.amzn2.x86_64 1/9
Installing : apr-util-bdb-1.6.1-5.amzn2.x86_64 2/9
Installing : apr-util-1.6.1-5.amzn2.x86_64 3/9
Installing : httpd-tools-2.4.34-1.amzn2.1.0.x86_64 4/9
Installing : generic-logos-httpd-18.0.0-4.amzn2.noarch 5/9
Installing : mailcap-2.1.41-2.amzn2.noarch 6/9
Installing : httpd-filesystem-2.4.34-1.amzn2.1.0.noarch 7/9
Installing : mod_http2-1.10.18-1.amzn2.0.x86_64 8/9
Installing : httpd-2.4.34-1.amzn2.1.0.x86_64 9/9
Verifying : apr-1.6.3-5.amzn2.x86_64 1/9
Verifying : apr-util-1.6.1-5.amzn2.x86_64 2/9
Verifying : httpd-filesystem-2.4.34-1.amzn2.1.0.noarch 3/9
Verifying : mod_http2-1.10.18-1.amzn2.0.x86_64 4/9
Verifying : httpd-tools-2.4.34-1.amzn2.1.0.x86_64 5/9
Verifying : httpd-2.4.34-1.amzn2.1.0.x86_64 6/9
Verifying : mailcap-2.1.41-2.amzn2.noarch 7/9
Verifying : generic-logos-httpd-18.0.0-4.amzn2.noarch 8/9
Verifying : apr-util-bdb-1.6.1-5.amzn2.x86_64 9/9

Installed:
httpd.x86_64 0:2.4.34-1.amzn2.1.0
```

Dependency Installed:

apr.x86_64 0:1.6.3-5.amzn2	apr-util.x86_64 0:1.6.1-5.amzn2	apr-util-bdb.x86_64 0:1.6.1-5.amzn2
generic-logos-httpd.noarch 0:18.0.0-4.amzn2	httpd-filesystem.noarch 0:2.4.34-1.amzn2.1.0	httpd-tools.x86_64 0:2.4.34-1.amzn2.1.0
mailcap.noarch 0:2.1.41-2.amzn2	mod_http2.x86_64 0:1.10.18-1.amzn2.0	

Complete!
[root@ip-172-31-34-100 ec2-user]#

## systemctl start httpd.service

```
[root@ip-172-31-34-100 ec2-user]# systemctl start httpd.service
[root@ip-172-31-34-100 ec2-user]# systemctl enable httpd
```

**Common error:** if you get *bash: systemctl: command not found*  
Make sure you are using **Amazon Linux 2**, not Amazon Linux

## systemctl enable httpd.service

```
[root@ip-172-31-34-100 ec2-user]# systemctl start httpd.service
[root@ip-172-31-34-100 ec2-user]# systemctl enable httpd.service
Created symlink from /etc/systemd/system/multi-user.target.wants/httpd.service to /usr/lib/systemd/system/httpd.service.
[root@ip-172-31-34-100 ec2-user]# curl localhost:80
```

# curl localhost:80

```
<p>If you would like to let the administrators of this website know that you've seen this page instead of the page you expected, you should send them e-mail. In general, mail sent to the name "webmaster" and directed to the website's domain should reach the appropriate person.</p>

<p>For example, if you experienced problems while visiting www.example.com, you should send e-mail to "webmaster@example.com".</p>

<hr />
</div>

<div class="content-column-right">
    <h2>If you are the website administrator:</h2>

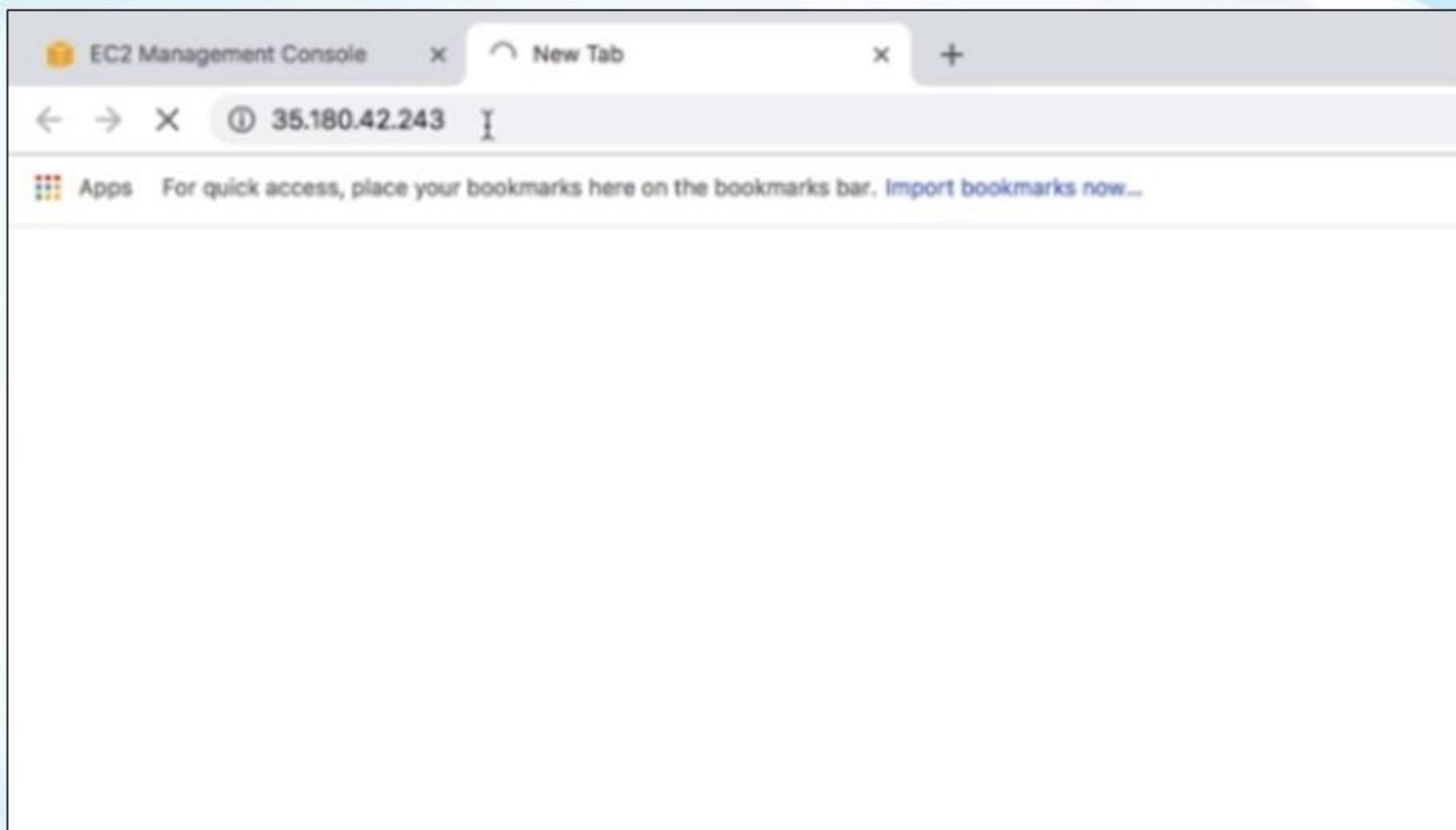
    <p>You may now add content to the directory <tt>/var/www/html/</tt>. Note that until you do so, people visiting your website will see this page, and not your content. To prevent this page from ever being used, follow the instructions in the file <tt>/etc/httpd/conf.d/welcome.conf</tt>.</p>

    <p>You are free to use the image below on web sites powered by the Apache HTTP Server:</p>

    <p align="center"><a href="http://httpd.apache.org/"></a></p>

    </div>
</div>
</body>
</html>
[root@ip-172-31-34-100 ec2-user]#
```

## 35.180.42.243



EC2 Management Console New Tab

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&instances=sort:instanceid

aws Services Resource Groups

stephane @ datacumulus-cour...

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Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-42-243.eu-west-3.compute.amazonaws.com

Instance: i-6cf81776 (My First Instance) Public DNS: ec2-35-180-42-243.eu-west-3.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags
Instance ID	i-6cf81776	Public DNS (IPv4)	ec2-35-180-42-243.eu-west-3.com
Instance state	running	IPv4 Public IP	35.180.42.243
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-34-100.eu-west-3.com
Availability zone	eu-west-3c	Private IPs	172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	
Scheduled events	No scheduled events		
AMI ID	amzn2-ami-hvm-2.0.20106340c6c12baa5a09		
Platform	-		
IAM role	-		
Key pair name	EC2 Tutorial		
Owner	387124123361		
Launch time	September 19, 2018 at 4:08:35 PM UTC+2 (less than one hour)		

Security Groups associated with i-6cf81776

Ports	Protocol	Source	my-first-security-group
22	tcp	0.0.0.0/0	✓

Source/dest. check: true

T2 Unlimited: Disabled

EBS-optimized: False

Root device type: ebs

EC2 Management Console New Tab +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#SecurityGroups:groupId=sg-cd5b1fa5;sort=groupId

aWS Services Resource Groups

stephane @ datacumulus-cour...

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Create Security Group Actions

Group ID : sg-cd5b1fa5 Add filter

Name	Group ID	Group Name	VPC ID	Description
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	Created with my first EC2 Instance	

Security Group: sg-cd5b1fa5

Description Inbound Outbound Tags

Edit

Click Here

Protocol	Port Range	Source	Description
TCP	22	0.0.0.0/0	SSH allow

### Edit inbound rules

**Type** (i) **Protocol** (i) **Port Range** (i) **Source** (i) **Description** (i)

SSH	TCP	22	Custom	0.0.0.0/0	SSH allowed from anywhere	
-----	-----	----	--------	-----------	---------------------------	---

**Add Rule**

**Click Here**

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on the old rule to be dropped for a very brief period of time until the new rule can be created.

**Cancel** **Save**

### Edit inbound rules

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom 0.0.0.0/0	SSH allowed from anywhere
HTTP	TCP	80	Custom 0.0.0.0/0	Allow HTTP traffic for Apache

**Add Rule**

Allow HTTP traffic for Apache

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

Cancel **Save**

**Click Here**

EC2 Management Console Test Page for the Apache HTTP Server +

Not Secure | 35.180.42.243

## Test Page

This page is used to test the proper operation of the Apache HTTP server after it has been installed. If you can read this page, it means that the Apache HTTP server installed at this site is working properly.

**If you are a member of the general public:**

The fact that you are seeing this page indicates that the website you just visited is either experiencing problems, or is undergoing routine maintenance.

If you would like to let the administrators of this website know that you've seen this page instead of the page you expected, you should send them e-mail. In general, mail sent to the name "webmaster" and directed to the website's domain should reach the appropriate person.

For example, if you experienced problems while visiting [www.example.com](http://www.example.com), you should send e-mail to ["webmaster@example.com"](mailto:webmaster@example.com).

**If you are the website administrator:**

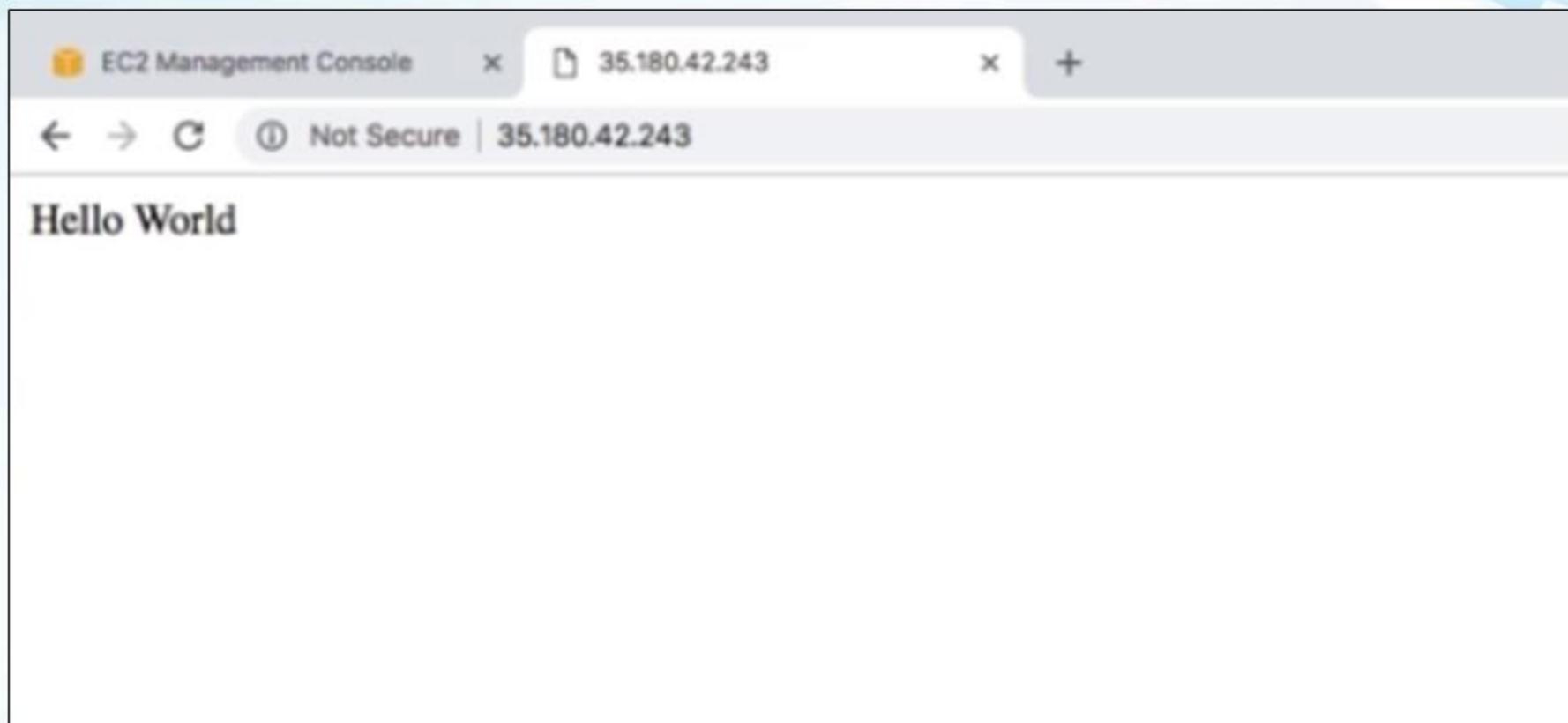
You may now add content to the directory `/var/www/html/`. Note that until you do so, people visiting your website will see this page, and not your content. To prevent this page from ever being used, follow the instructions in the file `/etc/httpd/conf.d/welcome.conf`.

You are free to use the image below on web sites powered by the Apache HTTP Server:

The logo consists of the text "Powered by" above the word "APACHE" in a stylized, multi-colored font. To the left of the text is a graphic element resembling a red and yellow flame or a stylized 'A'.

**echo “hello World” > /var/www/html/index.html**

```
[root@ip-172-31-34-100 ec2-user]# echo "Hello World" > /var/www/html/index.html
[root@ip-172-31-34-100 ec2-user]# █
```



**echo "Hello World" from \$(hostname -f)" > /var/www/html/index.html**

**hostname -f**

```
[root@ip-172-31-34-100 ec2-user]# echo "Hello World" > /var/www/html/index.html
[root@ip-172-31-34-100 ec2-user]# echo "Hello World from $(hostname -f)" > /var/www/html/index.html
[root@ip-172-31-34-100 ec2-user]# hostname -f
ip-172-31-34-100.eu-west-3.compute.internal
[root@ip-172-31-34-100 ec2-user]#
```



# EC2 User Data

## EC2 User Data

- It is possible to bootstrap our instances using an EC2 User data script.
- Bootstrapping means launching commands when a machine starts
- That script is only run once at the instance first start
- EC2 user data is used to automate boot tasks such as:
  - Installing updates
  - Installing software
  - Downloading common files from the internet
  - Anything you can think of
- The EC2 User Data Script runs with the root user

## EC2 User Data Hands-On

- We want to make sure that this EC2 instance has an Apache HTTP server installed on it – to display a simple web page
- For it, we are going to write a user-data script.
- This script will be executed at the first boot of the instance.
- Let's get hands on!

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:sort=instanceId

aws Services Resource Groups stephane @ datacumulus-cour...

EC2 Dashboard Events Tags Reports Limits

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**IMAGES** AMIs Bundle Tasks

**ELASTIC BLOCK STORE** Volumes Snapshots

**NETWORK & SECURITY** Security Groups Elastic IPs Placement Groups

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
My First Instance	i-6cf81776	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-42-243.eu...

Instance: i-6cf81776 (My First Instance) Public DNS: ec2-35-180-42-243.eu-west-3.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-6cf81776	Public DNS (IPv4)	ec2-35-180-42-243.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.42.243
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c	Private IPs	172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	
Scheduled events	No scheduled events	VPC ID	vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa8a09)	Subnet ID	subnet-391dc774

Connect Get Windows Password Launch More Like This

Instance State Start Stop Reboot Terminate

Instance Settings Image Networking CloudWatch Monitoring

**Click Here**

First Instance   i-6cf81776   t2.micro   eu-west-3c   running   2/2 checks ...   None   ec2-35-180-42-2

**Terminate Instances** X

**Warning**  
On an EBS-backed instance, the default action is for the root EBS volume to be deleted when the instance is terminated. Storage on any local drives will be lost.

Are you sure you want to terminate these instances?

- i-6cf81776 (My First Instance, ec2-35-180-42-243.eu-west-3.compute.amazonaws.com)

Cancel Yes, Terminate

Click Here 

Scheduled events: No scheduled events

AMI ID: amzn2-ami-hvm-2.0.20180810-x86\_64-gp2 (ami-06340c8c12baa6a09)

Subnet ID: subnet-391dc774

EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:sort=instanceId

aws Services Resource Groups stephane @ datacumulus-cour...

EC2 Dashboard Launch Instance Connect Actions

Events Attributes or search by keyword

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**Instances** Click Here

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My First Instance Instance ID: i-6cf81776 Instance Type: t2.micro Availability Zone: eu-west-3c Instance State: shutting-down Status Checks: None Alarm Status: None Public DNS (IPv4): ec2-35-180-42-243.eu...

Instance: i-6cf81776 (My First Instance) Public DNS: ec2-35-180-42-243.eu-west-3.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags
Instance ID	i-6cf81776		Public DNS (IPv4) ec2-35-180-42-243.eu-west-3.compute.amazonaws.com
Instance state	shutting-down		IPv4 Public IP 35.180.42.243
Instance type	t2.micro		IPv6 IPs -
Elastic IPs			Private DNS ip-172-31-34-100.eu-west-3.compute.internal
Availability zone	eu-west-3c		Private IPs 172.31.34.100
Security groups	my-first-security-group, view inbound rules, view outbound rules		Secondary private IPs

EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#LaunchInstanceWizard:

Services ▼ Resource Groups ▼

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

stephane @ datacumulus-cour... Paris Support

## Step 1: Choose an Amazon Machine Image (AMI)

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.

Search for an AMI by entering a search term e.g. "Windows"

Cancel and Exit

Quick Start

1 to 35 of 35 AMIs

Image	Name	Description	Root device type	Virtualization type	Select	
	Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-06340c8c12baa6a09	Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras.	Amazon Linux	Free tier eligible	Root device type: sbs Virtualization type: hvm	
	Amazon Linux AMI 2018.03.0 (HVM), SSD Volume Type - ami-0ebc281c20e89ba4b	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.	Amazon Linux	Free tier eligible	Root device type: ebs Virtualization type: hvm	
	SUSE Linux Enterprise Server 15 (HVM), SSD Volume Type - ami-01116bee807116ce	SUSE Linux Enterprise Server 15 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled.	SUSE Linux	Free tier eligible	Root device type: ebs Virtualization type: hvm	
	Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-0370f4064dbc392b9	Ubuntu Server 16.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical ( <a href="http://www.ubuntu.com/cloud/services">http://www.ubuntu.com/cloud/services</a> ).	Ubuntu Server	Free tier eligible	Root device type: ebs Virtualization type: hvm	

Click Here

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#LaunchInstanceWizard:

aws Services Resource Groups

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

stephane @ datacumulus-cour... Paris Support

## 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
General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
General purpose	t2.micro	1	1	EBS only	-	Low to Moderate	Yes
General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
General purpose	m5.large	2	8	EBS only	Yes	Up to 10 Gigabit	Yes
General purpose	m5.xlarge	4	16	EBS only	Yes	Up to 10 Gigabit	Yes

Click Here

Cancel Previous Review and Launch Next: Configure Instance Details

Click Here

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&launchInstanceWizard

Services Resource Groups

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-d74714be (default)  Create new VPC

Subnet: No preference (default subnet in any Availability Zone)  Create new subnet

Auto-assign Public IP: Use subnet setting (Enable)

Placement group:  Add instance to placement group.

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.

T2 Unlimited:  Enable  
Additional charges may apply

Cancel Previous  Next: Add Storage

EC2 Management Console +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#LaunchInstanceWizard:

Services ▼ Resource Groups ▼

stephane @ datacumulus-cour... ▼ Paris ▼ 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

Auto-assign Public IP  ⓘ  Use subnet setting (Enable)

Placement group  ⓘ   Add instance to placement group.

IAM role  ⓘ  None  ⓘ  C Create new IAM role

Shutdown behavior  ⓘ  Stop

Enable termination protection  ⓘ   Protect against accidental termination

Monitoring  ⓘ   Enable CloudWatch detailed monitoring  
Additional charges apply.

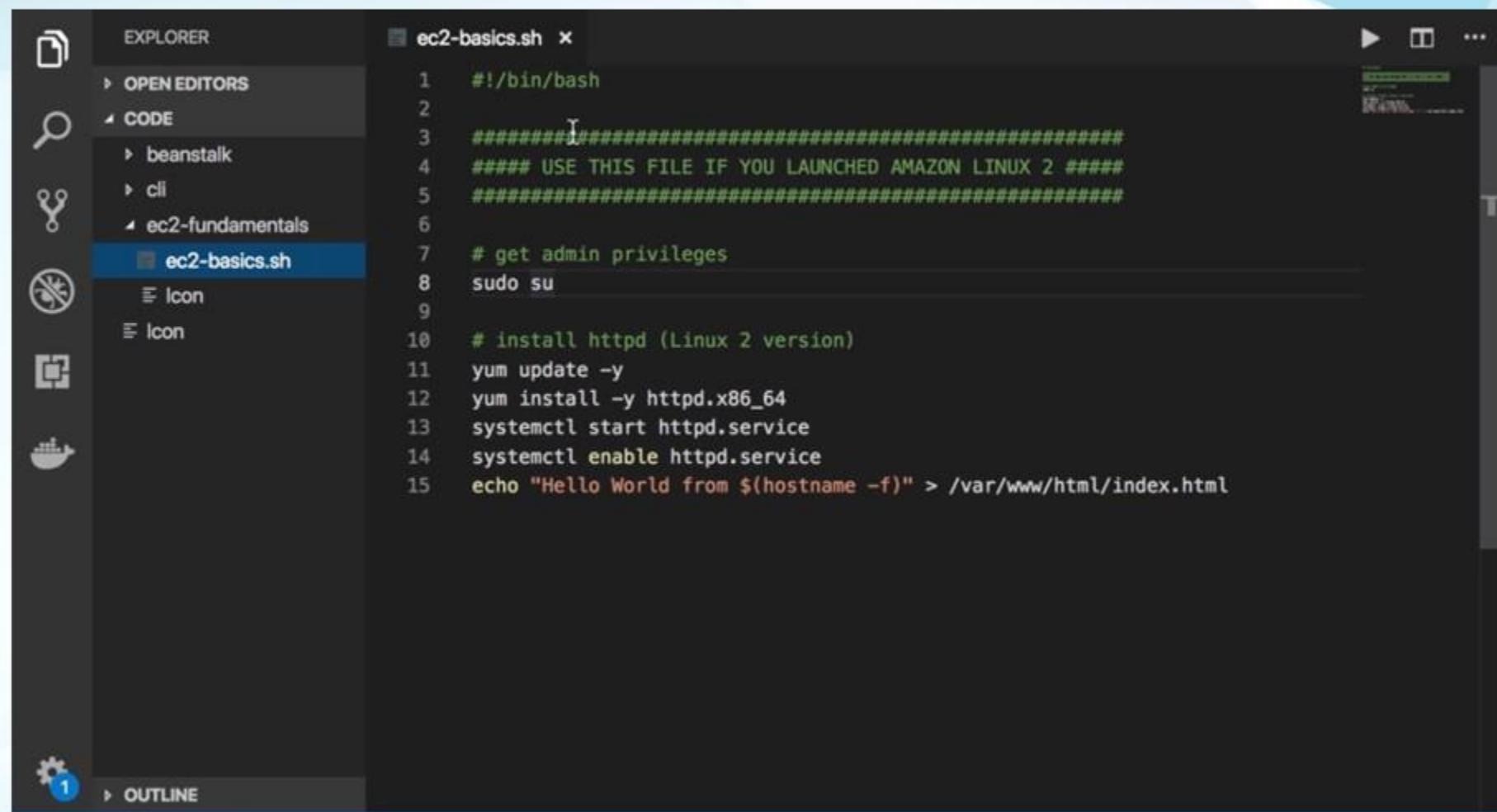
Tenancy  ⓘ  Shared - Run a shared hardware instance  
Additional charges will apply for dedicated tenancy.

T2 Unlimited  ⓘ   Enable  
Additional charges may apply

Advanced Details

User data  ⓘ   As text  As file  Input is already base64 encoded  
(Optional)

Cancel Previous Review and Launch Next: Add Storage



The image shows a screenshot of the Visual Studio Code (VS Code) interface. The left sidebar (Explorer) lists several projects and files under the 'CODE' category: 'beanstalk', 'cli', 'ec2-fundamentals', and 'ec2-basics.sh'. The 'ec2-basics.sh' file is currently selected and highlighted with a blue background. The main editor area displays the content of the 'ec2-basics.sh' script:

```
1 #!/bin/bash
2
3 ##### I
4 ##### USE THIS FILE IF YOU LAUNCHED AMAZON LINUX 2 #####
5 #####
6
7 # get admin privileges
8 sudo su
9
10 # install httpd (Linux 2 version)
11 yum update -y
12 yum install -y httpd.x86_64
13 systemctl start httpd.service
14 systemctl enable httpd.service
15 echo "Hello World from $(hostname -f)" > /var/www/html/index.html
```

The status bar at the bottom left shows a gear icon with the number '1' and the text 'OUTLINE'.

**Tenancy**

Shared - Run a shared hardware instance



Additional charges will apply for dedicated tenancy.

**T2 Unlimited**

Enable

Additional charges may apply

ils

**User data**

As text  As file  Input is already base64 encoded

```
#!/bin/bash
```

# Remember, EC2 User Data is automatically run with the **sudo** command

```
1  #!/bin/bash
2
3  ##### USE THIS FILE IF YOU LAUNCHED AMAZON LINUX 2 #####
4
5
6
7  # get admin privileges
8  sudo su
9
10 # install httpd (Linux 2 version)
11 yum update -y
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13 systemctl start httpd.service
14 systemctl enable httpd.service
15 echo "Hello World from $(hostname -f)" > /var/www/html/index.html
```

# Remember, EC2 User Data is automatically run with the **sudo** command

## Step 3: Configure Instance Details

Auto-assign Public IP

User

Placement group

Add instance to placement group.

IAM role

None

**C** 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.

T2 Unlimited

Enable

Additional charges may apply

## Advanced Details

User data

As text  As file  Input is already base64 encoded

```
#!/bin/bash
# install httpd (Linux 2 version)
yum update -y
yum install -y httpd.x86_64
systemctl start httpd.service
systemctl enable httpd.service
```

Cancel

Previous

**Review and Launch**

Next: Add Storage

Click Here

EC2 Management Console x

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#LaunchInstanceWizard:

Services ▼ Resource Groups ▼

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

stephane @ datacumulus-cour... Paris Support

## 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 (i) Volumes (i)

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

Click Here

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home/?region=eu-west-3#/LaunchInstanceWizard

Services Resource Groups

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

## 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: **Click Here** (highlighted with a yellow box and an arrow pointing to it)

Details: **ard-1** created 2018-09-19T16:31:03.368+02:00

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom 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

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#LaunchInstanceWizard:

Services Resource Groups

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

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

Security Group ID	Name	Description	Actions
sg-de480cb6	default	default VPC security group	<a href="#">Copy to new</a>
sg-cd5b1fa5	my-first-security-group	Created with my first EC2 Instance	<a href="#">Copy to new</a>

Inbound rules for sg-cd5b1fa5 (Selected security groups: sg-cd5b1fa5)

Type	Protocol	Port Range	Source	Description
HTTP	TCP	80	0.0.0.0/0	Allow HTTP traffic...
SSH	TCP	22	0.0.0.0/0	SSH allowed from a...

Cancel Previous Review and Launch



Click Here

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#LaunchInstanceWizard:

Services Resource Groups

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 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, my-first-security-group, 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](#)

**Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-06340c8c12baa6a09**  
**Free tier eligible** Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras.  
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 ID	Name	Description
sg-0d5b1fa5	my-first-security-group	Created with my first EC2 Instance

All selected security groups have been included in the launch.

**Launch** Click Here

ur se  
address  
urity g  
ume 1  
ort. It p  
y groups  
9.1, and the la  
work Perform  
to Moderat

## 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](#).

Choose an existing key pair

Select a key pair

EC2 Tutorial

I acknowledge that I have access to the selected private key file (EC2 Tutorial.pem), and that without this file, I won't be able to log into my instance.

**Click Here**

Cancel Launch Instances

Name	Description
my-first-security-group	Created with my first EC2 Instance

## 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.

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EC2 Tutorial

I acknowledge that I have access to the selected private key file (EC2 Tutorial.pem), and that without this file, I won't be able to log into my instance.

Cancel

Launch Instances

Click Here

Name

Description

EC2 Management Console x +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#LaunchInstanceWizard:

aws Services Resource Groups star

stephane @ datacumulus-cour... dropdown

## Launch Status



Initiating Instance Launches

Please do not close your browser while this is loading

Initiating launches...

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&launchInstanceWizard

aws Services Resource Groups stephane @ datacumulus-cour... Paris Support

## Launch Status

**Your instances are now launching**  
The following instance launches have been initiated: i-17f31c0d [View launch log](#)

**Get notified of estimated charges**  
Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

### How to connect to your instances

Your instances are launching, and it may take a few minutes until they are in the running state, when they will be ready for you to use. Usage hours on your new instances will start immediately and continue to accrue until you stop or terminate your instances.

Click [View Instances](#) to monitor your instances' status. Once your instances are in the running state, you can connect to them from the Instances screen. Find out how to connect to your instances.

Here are some helpful resources to get you started

- How to connect to your Linux instance
- Learn about AWS Free Usage Tier
- Amazon EC2: User Guide
- Amazon EC2: Discussion Forum

While your instances are launching you can also

- Create status check alarms to be notified when these instances fail status checks. (Additional charges may apply)
- Create and attach additional EBS volumes (Additional charges may apply)
- Manage security groups

[View Instances](#)

**Click Here**

EC2 Management Console https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:sort=instanceId

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Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

1 to 2 of 2

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
i-17f31c0d	i-17f31c0d	t2.micro	eu-west-3c	pending	Initializing	None	ec2-35-180-139-99.eu...	35.180.139.99	-
My First Instance	i-6cf81776	t2.micro	eu-west-3c	terminated	None	None	-	-	-

Instance: i-6cf81776 (My First Instance) Public DNS: -

Description Status Checks Monitoring Tags

Instance ID	i-6cf81776	Public DNS (IPv4)	-
Instance state	terminated	IPv4 Public IP	-
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	-
Availability zone	eu-west-3c	Private IPs	-
Security groups	-	Secondary private IPs	-
Scheduled events	-	VPC ID	-
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)	Subnet ID	-
Platform	-	Network interfaces	-
IAM role	-	Source/dest. check	False
Key pair name	EC2 Tutorial	T2 Unlimited	Disabled
Owner	387124123361	EBS-optimized	False
Launch time	September 19, 2018 at 4:08:35 PM UTC+2 (less than one hour)	Root device type	ebs

EC2 Management Console +/-

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:sort=instanceId

**aws** Services Resource Groups ?

stephane

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**Launch Instance** ▼ Connect Actions ▼

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status
My Second Inst	i-17f31c0d	t2.micro	eu-west-3c	<span>pending</span>	<span>Initializing</span>	None
13/255	i-00000000	t2.micro	eu-west-3c	<span>terminated</span>		None

Instance: i-17f31c0d Public DNS: ec2-35-180-139-99.eu-west-3.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-17f31c0d	Public DNS (IPv4)	ec2-35-180-
Instance state	pending	IPv4 Public IP	35.180.139.
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-3
Availability zone	eu-west-3c	Private IPs	172.31.37.2
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	

EC2 Management Console

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&instanceId=sort+instances

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Filter by tags and attributes or search by keyword

1 to 2 of 2

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
My Second Instance	i-17f31c0d	t2.micro	eu-west-3c	running	Initializing	None	ec2-35-180-139-99.eu-west-3.compute.amazonaws.com	35.180.139.99	-
My First Instance	i-6cf81776	t2.micro	eu-west-3c	terminated	-	None	-	-	-

Instance: i-17f31c0d (My Second Instance) Public DNS: ec2-35-180-139-99.eu-west-3.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags	
Instance ID	i-17f31c0d		Public DNS (IPv4)	ec2-35-180-139-99.eu-west-3.compute.amazonaws.com
Instance state	running		IPv4 Public IP	35.180.139.99
Instance type	t2.micro		IPv6 IPs	-
Elastic IPs			Private DNS	ip-172-31-37-215.eu-west-3.compute.internal
Availability zone	eu-west-3c		Private IPs	172.31.37.215
Security groups	my-first-security-group, view inbound rules, view outbound rules		Secondary private IPs	
Scheduled events	No scheduled events		VPC ID	vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)		Subnet ID	subnet-391dc774
Platform	-		Network interfaces	eth0
IAM role	-		Source/dest. check	True
Key pair name	EC2 Tutorial		T2 Unlimited	Disabled
Owner	387124123361		EBS-optimized	False
Launch time	September 19, 2018 at 4:31:35 PM UTC+2 (less than one hour)		Root device type	ebs

EC2 Management Console x +

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3&instances=sort=instanceId

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Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Pub
My Second Instance	i-17f31c0d	t2.micro	eu-west-3c	running	Initializing	None	ec2-35-180-139-99.eu...	35.180...
My First Instance	i-6cf81776	t2.micro	eu-west-3c	terminated		None	ec2-35-180-139-99.eu...	-

Instance: i-17f31c0d (My Second Instance) Public DNS: ec2-35-180-139-99.eu-west-3.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-17f31c0d	Public DNS (IPv4)	ec2-35-180-139-99.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.139.99
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	Look Up "35.180.139.99"
Availability zone	eu-west-3c	Private IPs	-
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	-
Scheduled events	No scheduled events	VPC ID	vpc
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)	Subnet ID	Speech Services
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	EC2 Tutorial	T2 Unlimited	Disabled
Owner	387124123361	EBS-optimized	False
Launch time	September 19, 2018 at 4:31:35 PM UTC+2 (less than one	Root device type	ebs

Click Here



**ssh -i EC2Tutorial.pem ec2-user@35.180.139.99**  
**yes**

```
x ~ /aws-course ➔ ssh -i EC2Tutorial.pem ec2-user@35.180.139.99
The authenticity of host '35.180.139.99 (35.180.139.99)' can't be established.
ECDSA key fingerprint is SHA256:VV2Tk/P3MWyYD0Vd5XWm+H4H0Va7esFetn+wnW7+7k.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '35.180.139.99' (ECDSA) to the list of known hosts.
```

—| ( —|— )  
—| ( —|— /   Amazon Linux 2 AMI  
—| \—|—|

<https://aws.amazon.com/amazon-linux-2/>  
[ec2-user@ip-172-31-37-215 ~]\$ █

**cat /var/www/html/index.html**

```
[ec2-user@ip-172-31-37-215 ~]$ cat /var/www/html/index.html
Hello World from ip-172-31-37-215.eu-west-3.compute.internal
[ec2-user@ip-172-31-37-215 ~]$ █
```

# **EC2 Mid Way Quiz**

Question 1:

ap-northeast-1a is a...

Region



Availability Zone

Question 2:

Availability Zones are

all together in one data center

in geographically isolated data centers

Question 3:

All of these are IAM components except...

- Users
-  Organisations
- Roles
- Policies
- Groups

Question 4:

IAM Users are defined on a per-region basis

true

 false

Question 5:

An IAM user can belong to multiple groups

true

false

Question 6:

You are getting started with AWS and your manager wants things to remain simple yet secure. He wants management of engineers to be easy, and not re-invent the wheel every time someone joins your company. What will you do?

- I'll create one IAM user and everyone will share the credentials
- I'll create multiple IAM users, and assign each user their own policy
- I'll create multiple IAM users and groups, and assign policies to groups. New users will be added to groups

Question 7:

You should share your IAM credentials with colleagues if they quickly need access to help you

<input checked="" type="checkbox"/>  No
<input type="radio"/> Yes

Question 8:

You pay for an EC2 instance **compute** component

- only when it's in "running" state
- if it's "running" and "stopped" state

Question 9:

You are getting a permission error exception when trying to SSH into your Linux Instance

The security group is misconfigured

the key is missing permissions chmod 0400

the Linux instance is misconfigured

Question 10:

You are getting a network timeout when trying to SSH into your EC2 instance

- your security groups are misconfigured
- your key is missing permissions
- the linux instance is misconfigured

Question 11:

When a security group is created, what is the default behavior?

Allow all traffic inbound and allow all traffic outbound

Allow all traffic inbound and deny all traffic outbound

Deny all traffic inbound and allow all traffic outbound

Deny all traffic inbound and deny all traffic outbound

Question 12:

Security groups can reference all of the following except:

IP address

CIDR block

Security Group

  DNS name

Question 13:

You want to provide startup instructions to your EC2 instances, you should be using

EC2 Meta Data

EC2 User Data

EC2 Startup Data

# EC2 Instances Launch Modes

## EC2 Instance Launch Types

- On Demand Instances: short workload, predictable pricing
- Reserved Instances: long workloads ( $\geq 1$  year)
- Convertible Reserved Instances: long workloads with flexible instances
- Scheduled Reserved Instances: launch within time window you reserve
- Spot Instances: short workloads, for cheap, can lose instances
- Dedicated Instances: no other customers will share your hardware
- Dedicated Hosts: book an entire physical server, control instance placement

## EC2 On Demand

- Pay for what you use (billing per second, after the first minute)
- Has the highest cost but no upfront payment
- No long term commitment
- Recommended for short-term and un-interrupted workloads, where you can't predict how the application will behave.

## EC2 Reserved Instances

- Up to 75% discount compared to On-demand
  - Pay upfront for what you use with long term commitment
  - Reservation period can be 1 or 3 years
  - Reserve a specific instance type
  - Recommended for steady state usage applications (think database)
- 
- **Convertible Reserved Instance**
    - can change the EC2 instance type
    - Up to 54% discount
  - **Scheduled Reserved Instances**
    - launch within time window you reserve
    - When you require a fraction of day / week / month

## EC2 Spot Instances

- Can get a discount of up to 90% compared to On-demand
- You bid a price and get the instance as long as its under the price
- Price varies based on offer and demand
- Spot instances are reclaimed with a 2 minute notification warning when the spot price goes above your bid
- Used for batch jobs, Big Data analysis, or workloads that are resilient to failures.
- Not great for critical jobs or databases

## EC2 Dedicated Hosts

- Physical dedicated EC2 server for your use
- Full control of EC2 Instance placement
- Visibility into the underlying sockets / physical cores of the hardware
- Allocated for your account for a 3 year period reservation
- More expensive
- Useful for software that have complicated licensing model (BYOL – Bring Your Own License)
- Or for companies that have strong regulatory or compliance needs

# EC2 Dedicated Instances

- Instances running on hardware that's dedicated to you
- May share hardware with other instances in same account
- No control over instance placement (can move hardware after Stop / Start)

Characteristic	Dedicated Instances	Dedicated Hosts
Enables the use of dedicated physical servers	X	X
Per instance billing (subject to a \$2 per region fee)	X	
Per host billing		X
Visibility of sockets, cores, host ID		X
Affinity between a host and instance		X
Targeted instance placement		X
Automatic instance placement	X	X
Add capacity using an allocation request		X

## Which host is right for me?



- **On demand:** coming and staying in resort whenever we like, we pay the full price
- **Reserved:** like planning ahead and if we plan to stay for a long time, we may get a good discount.
- **Spot instances:** the hotel allows people to bid for the empty rooms and the highest bidder keeps the rooms. You can get kicked out at any time
- **Dedicated Hosts:** We book an entire building of the resort

# EC2 Launch Modes Hands On

EC2 Management Console Launch instances — AWS CLI 1.11

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#instances:sort=instanceId

aws Services Resource Groups

datacumulus-course Ireland Support

Events Tags Reports Limits

INSTANCES Instances Launch Templates Spot Requests Reserved Instances Dedicated Hosts

**Click Here**

Filter by tags and attributes or search by keyword

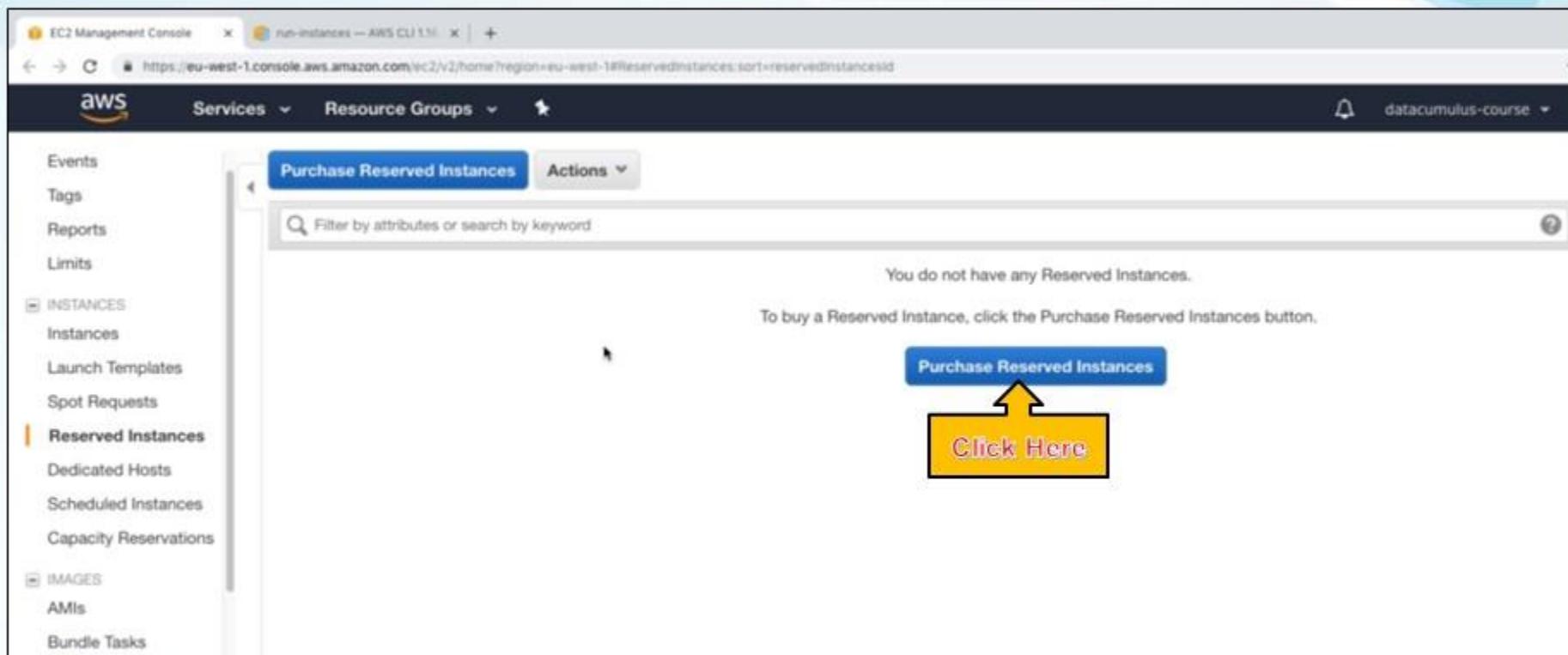
1 to 20 of 20

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IP
	i-013a50a26e27925...	t2.micro	eu-west-1c	terminated		None		
	i-02010b6577829c15c	t2.micro	eu-west-1c	terminated		None		
	i-024c50f9eb419d538	t2.micro	eu-west-1c	terminated		None		
MyFirstInstance	i-0280be480e6e17a...	t2.micro	eu-west-1c	running	2/2 checks ...	None	ec2-34-245-19-247.eu...	34
	i-029a14225b1cc4493	t2.micro	eu-west-1c	terminated		None		
	i-0304647e7b63016f3	t2.micro	eu-west-1c	terminated		None		
	i-047e1cb619135401e	t2.micro	eu-west-1c	terminated		None		

Select an instance above

IMAGES AMIs Bundle Tasks

ELASTIC BLOCK STORE Volumes Snapshots Lifecycle Manager



The screenshot shows the AWS EC2 Management Console with the URL <https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#ReservedInstances:sort=reservedInstancesId>. The left sidebar is open, showing the 'Instances' section with 'Reserved Instances' selected. The main content area has a heading 'Purchase Reserved Instances' and a search bar. Below the search bar, a message says 'You do not have any Reserved Instances. To buy a Reserved Instance, click the Purchase Reserved Instances button.' A large yellow box highlights the 'Purchase Reserved Instances' button, with a red arrow pointing to the text 'Click Here'.

EC2 Management Console run-instances — AWS CLI 1.16.0 +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#ReservedInstances:sort=reservedInstancesId

aws Services Resource Groups

Events Tags Reports Limits

INSTANCES Instances Launch Templates Spot Requests Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations

IMAGES AMIs Bundle Tasks

Purchase Reserved Instances Actions

Filter by attributes or search by keyword

You do not have any Reserved Instances.

To buy a Reserved Instance, click the Purchase Reserved Instances button.

Purchase Reserved Instances

Click Here

EC2 Management Console Run Instances — AWS CLI 1.10 +

<https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#ReservedInstances:sort=reservedInstancesId>

Services Resource Groups datacumulus-course Ireland Support

Events  
Tags  
Reports  
Limits  
**INSTANCES**  
Instances  
Launch Terms  
Spot Requests  
**Reserved Instances**  
Dedicated Hosts  
Scheduled Instances  
Capacity Reservations  
**IMAGES**  
AMIs  
Bundle Tasks  
**ELASTIC BLOCK STORE**  
Volumes  
Snapshots  
Lifecycle Manager  
**NETWORK & SECURITY**  
Security Groups  
Elastic IP Addresses  
Placement Groups  
Key Pairs

## Purchase Reserved Instances

Only show offerings that reserve capacity

Platform	Linux/UNIX	Tenancy	Default	Offering Class	Any
Instance Type	t2.micro	Term	Any	Payment Option	Any

Search

To find a Reserved Instance offering, complete the following steps:

1. Specify the offering details and click **Search**.
2. Select the Reserved Instances and specify the quantity that you want, and **Add** them to your cart.
3. Click **View Cart** to view your cart before purchasing the Reserved Instances.
4. Click **Purchase** to complete your purchase.

Note: Additional taxes may apply.

Reserved Instances sold through the Reserved Instance Marketplace are identical to those sold by Amazon Web Services, except they may have different prices and terms. For more information about the Reserved Instance Marketplace, go to the Reserved Instance Marketplace web page.

You currently have no items in your cart.

**Cancel** **View Cart**

EC2 Management Console Run Instances -- AWS CLI 1.11 +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#reservedInstances:sort=reservedInstancesId

aws Services Resource Groups

datacumulus-course Ireland Support

Events Tags Reports Limits Instances Launch Terms Spot Requests Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations Images AMIs Bundle Tasks Elastic Block Storage Volumes Snapshots Lifecycle Manager Network & Security Groups Elastic IPs Placement Groups Key Pairs

## Purchase Reserved Instances

Only show offerings that reserve capacity

Platform	Linux/UNIX	Tenancy	Default	Offering Class	Convertible
Instance Type	c4.xlarge	Term	12 months - ...	Payment Option	All Upfront

Search

To find a Reserved Instance offering, complete the following steps:

1. Specify the offering details and click **Search**.
2. Select the Reserved Instances and specify the quantity that you want, and **Add** them to your cart.
3. Click **View Cart** to view your cart before purchasing the Reserved Instances.
4. Click **Purchase** to complete your purchase.

**Click Here**

Note: Additional taxes may apply.

Reserved Instances sold through the Reserved Instance Marketplace are identical to those sold by Amazon Web Services, except they may have different prices and terms. For more information about the Reserved Instance Marketplace, go to the Reserved Instance Marketplace web page.

You currently have no items in your cart.

Cancel View Cart

EC2 Management Console    run-instances -- AWS CLI 1.11.0    +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#ReservedInstances:sort=reservedInstancesId

aws Services Resource Groups

Events Tags Reports Limits

INSTANCES Instances Launch Term Spot Request Reserved Instances Dedicated Host Scheduled Maintenance Capacity Reserve

PURCHASE RESERVED INSTANCES

Purchase Reserved Instances

Only show offerings that reserve capacity

Platform: Linux/UNIX    Tenancy: Default    Offering Class: Convertible

Instance Type: c4.xlarge    Term: 12 months - ...    Payment Option: All Upfront

Search

Seller	Term	Effective Rate	Upfront Price	Hourly Rate	Payment Option	Offering Class	Quantity Available	Desired Quantity	Normalized units per hour
AWS	36 months	\$0.124	\$3,258.00	\$0.000	All Upfront	convertible	Unlimited	1	8

Add to Cart

Click Here

You currently have no items in your cart.

Cancel View Cart

## Purchase Reserved Instances

Only show offerings that reserve capacity

Platform	Linux/UNIX	Tenancy	Default	Offering Class	Convertible				
Instance Type	c4.xlarge	Term	12 months - ...	Payment Option	All Upfront				
Seller	Term	Effective Rate	Upfront Price	Hourly Rate	Payment Option	Offering Class	Quantity Available	Desired Quantity	Normalized units per hour
AWS	36 months	\$0.124	\$3,258.00	\$0.000	All Upfront	Convertible	Unlimited	1	8

[Add to Cart](#)

Your cart: 1 Reserved Instance, Total Due Now: \$3,258.00  
Additional taxes may apply.

[Cancel](#) [View Cart](#)

**Click Here** 

EC2 Management Console run-instances — AWS CLI 1.11 | +

<https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1&ReservedInstances:sort=reservedInstancesId>

**aws** Services Resource Groups

Events Tags Reports Limits

**INSTANCES**

- Instances
- Launch Templates
- Spot Requests
- Reserved Instances**
- Dedicated Hosts
- Scaling Instances

**Click Here**

**RESERVED INSTANCES**

**Purchase Reserved Instances**

Actions

Filter by attributes or search by keyword

You do not have any Reserved Instances.

To buy a Reserved Instance, click the Purchase Reserved Instances button.

**Purchase Reserved Instances**

AMIs

Bundle Tasks

**ELASTIC BLOCK STORE**

Volumes

EC2 Management Console run-instances — AWS CLI 1.11.100 | +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1&hosts=sort=hostId

aws Services Resource Groups

datacumulus-course

Events

Tags

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Limits

**INSTANCES**

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- Launch Templates
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- Reserved Instances
- Dedicated Hosts**
- Scheduled Instances
- Capacity Reservations

**IMAGES**

- AMIs
- Bundle Tasks

**ELASTIC BLOCK STORE**

- Volumes
- Snapshots
- Lifecycle Manager

**NETWORK & SECURITY**

- Security Groups

## Welcome to Dedicated Hosts

My Dedicated Host

My Instance 1

My Instance 2

My Instance 3

Launch Instance Here

An Amazon EC2 Dedicated host is a physical server with EC2 instance capacity dedicated for your use and allows you to reliably launch EC2 instances on the same Dedicated host over time. You have visibility over how your Dedicated hosts are utilized and you can determine how many sockets and cores are installed on the server. These features allow you to minimize licensing costs in a bring-your-own-license (BYOL) scenario and help you address corporate compliance and regulatory requirements.

Learn more about the differences between Dedicated hosts and Dedicated instances.

Allocate a Host

Click Here

EC2 Management Console run-instances — AWS CLI 1.11 | +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#AllocateHosts:

aws Services Resource Groups

Hosts > Allocate Dedicated Host

## Allocate Dedicated Host

Dedicated hosts allow you to provision EC2 instances on physical servers fully dedicated for your use.

Instance type\*  ⓘ

Availability Zone\*  ⓘ

Allow instance auto-placement  Yes, allow EC2 to automatically place untargeted instance launches on the Dedicated host(s). ⓘ

No

Quantity\*  ⓘ

### Tags

Key	(127 characters maximum)	Value	(255 characters maximum)
-----	--------------------------	-------	--------------------------

*This resource currently has no tags*

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

**Add Tag** 50 remaining (Up to 50 tags maximum)

Note: You will be billed per allocated Dedicated host, not per instance.

▶ [AWS Command Line Interface command](#)

EC2 Management Console run-instances — AWS CLI 1.11 | +

<https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1&ReservedInstances:sort=reservedInstancesId>

**aws** Services Resource Groups

Events Tags Reports Limits

**INSTANCES**

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- Capacity Reservations

**Click Here**

**ELASTIC BLOCK STORE**

Volumes

**Purchase Reserved Instances** Actions

Filter by attributes or search by keyword

You do not have any Reserved Instances.

To buy a Reserved Instance, click the Purchase Reserved Instances button.

**Purchase Reserved Instances**

EC2 Management Console    X    Run Instances — AWS CloudWatch Metrics    X    +

https://eu-west-1.console.aws.amazon.com/ec2/p/v1/9/home?region=eu-west-1&

Services    Resource Groups

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EC2 Dashboard

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Elastic IPs

Placement Groups

Key Pairs

Network Interfaces

LOAD BALANCING

Load Balancers

## Welcome to Amazon EC2 Scheduled Reserved Instances

Scheduled Instances allow you to reserve Amazon EC2 instances on a recurring schedule. You can purchase daily, weekly, or monthly reservations to ensure your applications have the compute capacity you need, when you need it.

**Purchase Scheduled Instances**

Prefers to run your capacity on a continuous (24x7) basis? Check out Standard Reserved Instances.

**Click Here**

**More about Scheduled Reserved Instances**

 **Reserve Capacity**  
Like Standard Reserved Instances, Scheduled Instances allow you to reserve Amazon EC2 computing capacity so that you can launch the number of instances you reserved when you need them.

[Learn more](#)

 **Plan Ahead and Save**  
Scheduled Instances are cost-effective for workloads that run on a daily, weekly, or monthly recurring schedules. You pay only for the time you reserved.

[Learn more](#)

 **Run on Your Schedule**  
You can use Scheduled Instances for applications that do not require 24x7 access to capacity, such as overnight analytics jobs, weekday 9-to-5 financial processes, or monthly statistical modeling.

[Learn more](#)

EC2 Management Console Run Instances — AWS CLI 1.10.0 +

https://eu-west-1.console.aws.amazon.com/ec2/v2/wizard?region=eu-west-1

aws Services Resource Groups

datacumulus-course Ireland Support

## Scheduled Reserved Instances Reservation Wizard

Step 1: Find a schedule Step 2: Review and purchase

### Find available schedules

Scheduled Instances allow you to purchase recurring Amazon EC2 compute capacity by the hour for a one-year term. To find a Scheduled Instance offering, specify the date, duration, frequency, and compute capacity requirements for your application. Click 'Find schedules' to view a list of available schedules, and choose one or more schedules to purchase by adding them to your cart.

#### Create a schedule

Starting on

for duration  hours

+/- 2 hours

Recurring

#### Instance details

Platform

Instance type

Availability Zone

EC2 Management Console run-instances — AWS CLI 1.11 | +

<https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1&ReservedInstances:sort=reservedInstancesId>

**aws** Services Resource Groups

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**INSTANCES**

- Instances
- Launch Templates
- Spot Requests
- Reserved Instances** Click Here
- Scheduled Instances

**IMAGES**

- AMIs
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**ELASTIC BLOCK STORE**

- Volumes

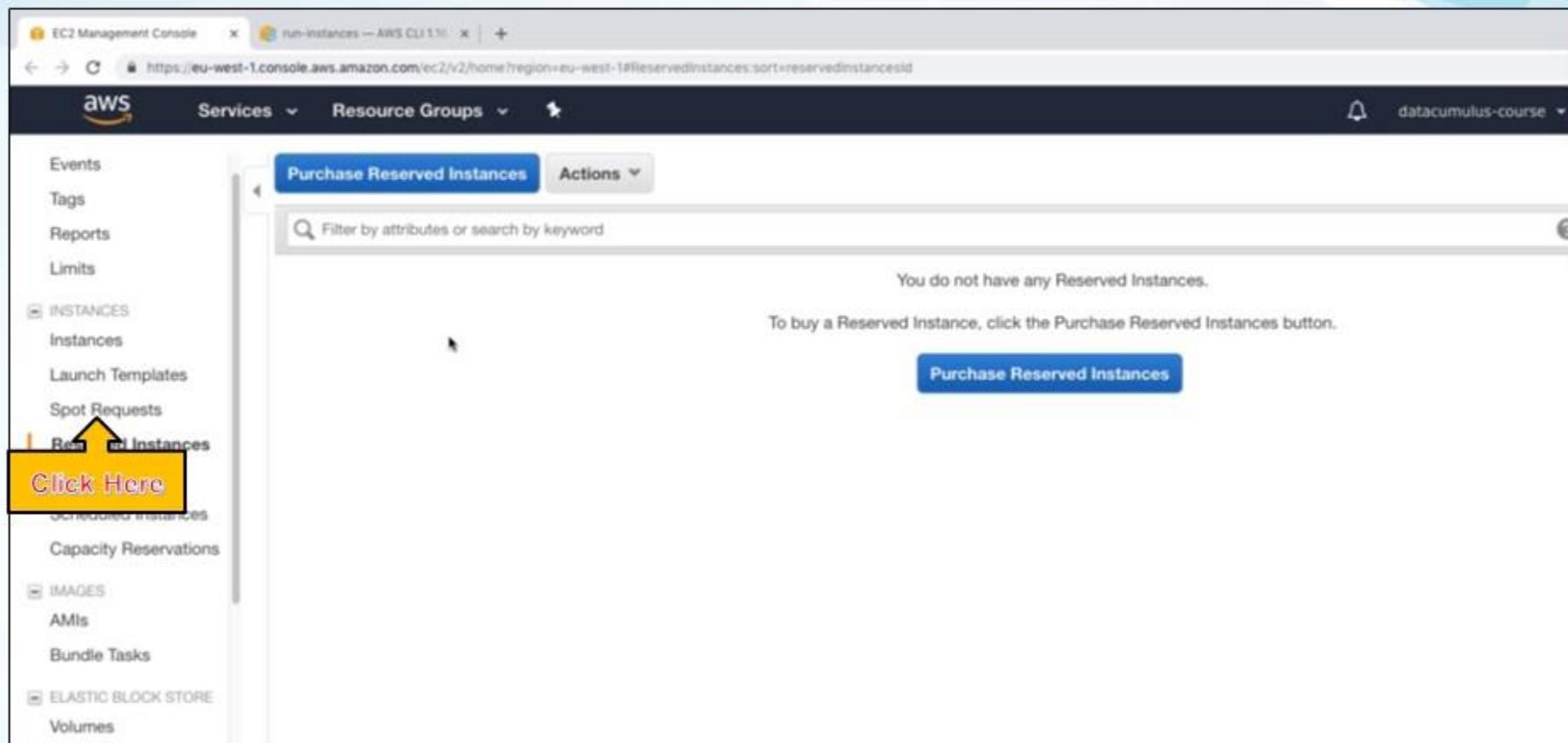
**Purchase Reserved Instances** Actions

Filter by attributes or search by keyword

You do not have any Reserved Instances.

To buy a Reserved Instance, click the Purchase Reserved Instances button.

**Purchase Reserved Instances**



EC2 Management Console x Run Instances — AWS CLI 1.16.0 x +

https://eu-west-1.console.aws.amazon.com/ec2sp/v1/spot/home?region=eu-west-1

aws Services Resource Groups ▶

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Elastic Block Store

Volumes

Snapshots

Network & Security

Security Groups

Request Spot Instances Actions ▾ Pricing History Savings Summary

Request type: all ▾ State: all ▾ Search by keyword

Request Id	Request type	Instance type	State	Capacity	Status	Persistence	Created
You currently have no Spot requests in this region.							
If you are new to EC2 Spot instances, visit the <a href="#">Getting Started page</a> .							
Click the Request Spot Instances button to launch a Spot instance.							
<a href="#">Request Spot Instances</a>							
Select a Spot request above to see more details							

EC2 Management Console x Run Instances — AWS CLI 1.11 | +

<https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1&ReservedInstances:sort=reservedInstancesId>

**aws** Services ▼ Resource Groups ▼ datacumulus-course ▼

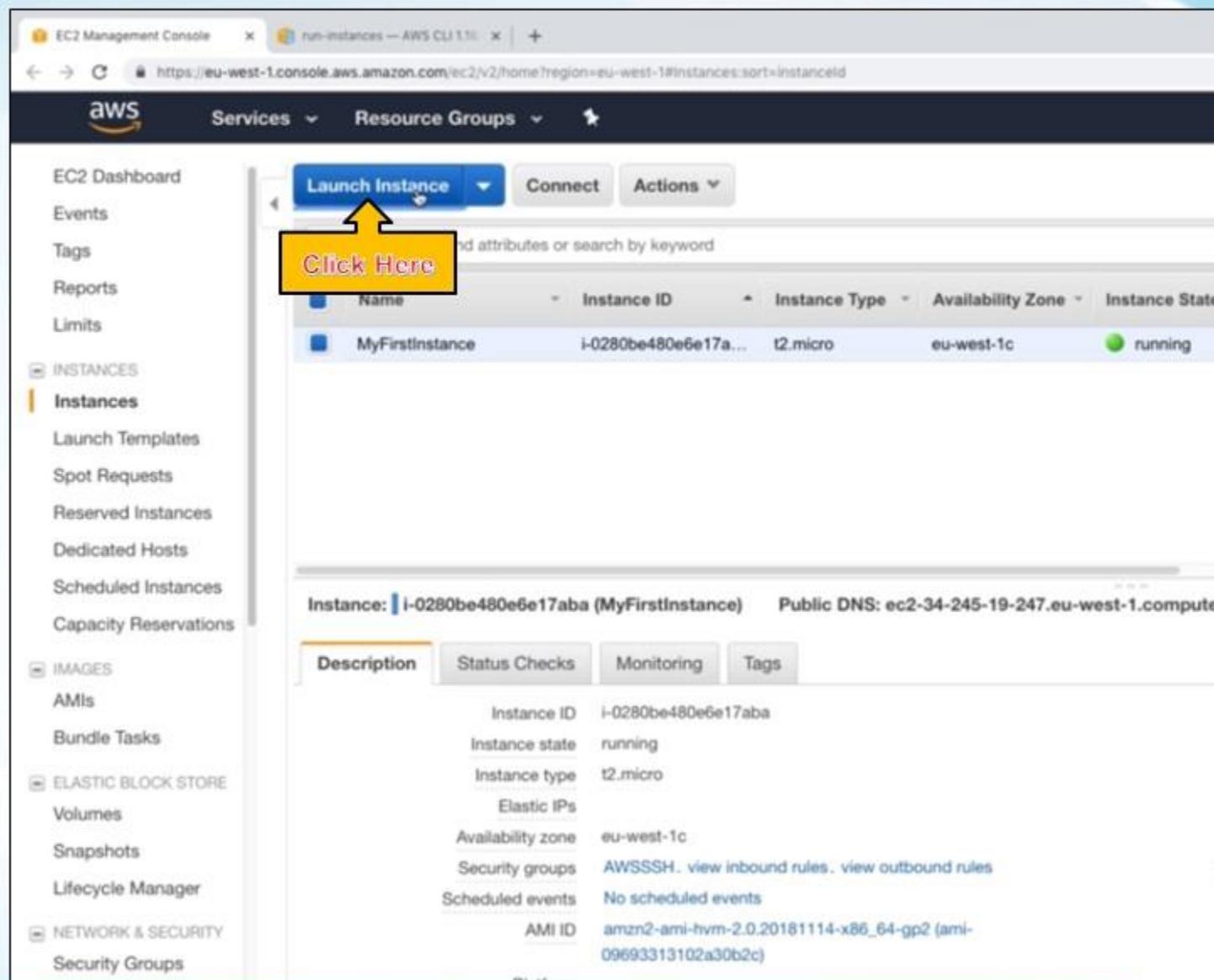
Events  
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**Click Here** ▼ **Launch Instances**  
Dedicated Hosts  
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Volumes

**Purchase Reserved Instances** Actions ▼

Filter by attributes or search by keyword

You do not have any Reserved Instances.  
To buy a Reserved Instance, click the Purchase Reserved Instances button.

**Purchase Reserved Instances**



EC2 Management Console run-instances — AWS CLI 1.11... +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#instances:sort=instanceId

aws Services Resource Groups

EC2 Dashboard Events Tags Reports Limits

INSTANCES Instances Launch Templates Spot Requests Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations

IMAGES AMIs Bundle Tasks

ELASTIC BLOCK STORE Volumes Snapshots Lifecycle Manager

NETWORK & SECURITY Security Groups

Launch Instance Connect Actions

Click Here

Name	Instance ID	Instance Type	Availability Zone	Instance State
MyFirstInstance	i-0280be480e6e17aba	t2.micro	eu-west-1c	running

Instance: i-0280be480e6e17aba (MyFirstInstance) Public DNS: ec2-34-245-19-247.eu-west-1.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-0280be480e6e17aba
Instance state	running
Instance type	t2.micro
Elastic IPs	
Availability zone	eu-west-1c
Security groups	AWSSSH, view inbound rules, view outbound rules
Scheduled events	No scheduled events
AMI ID	amzn2-ami-hvm-2.0.20181114-x86_64-gp2 (ami-09693313102a30b2c)

EC2 Management Console EC2 Instances — AWS CLI 1.11 +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#LaunchInstanceWizard:

aws Services Resource Groups

datacumulus-course Ireland 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)

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.

Search for an AMI by entering a search term e.g. "Windows"

1 to 36 of 36 AMIs

Quick Start

My AMIs

AWS Marketplace

Community AMIs

Free tier only

Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-09693313102a30b2c Select

Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Gilbo 2.28, Binutils 2.29.1, and the latest software packages through extras.

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

Amazon Linux AMI 2018.03.0 (HVM), SSD Volume Type - ami-031a3db8bacbcd20 Select

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.

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

Red Hat Enterprise Linux 7.5 (HVM), SSD Volume Type - ami-7c491f05 Select

Red Hat Enterprise Linux version 7.5 (HVM), EBS General Purpose (SSD) Volume Type

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

SUSE Linux Enterprise Server 15 (HVM), SSD Volume Type - ami-050889503ddaec473 Select

SUSE Linux Enterprise Server 15 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled.

Click Here



EC2 Management Console Run Instances — AWS CLI 1.11 +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1&LaunchInstanceWizard=1

aws Services Resource Groups

dataacumulus-course Ireland Support

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
General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
General purpose	<b>t2.micro</b> Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
General purpose	t3.nano	2	0.5	EBS only	Yes	Up to 5 Gigabit	Yes
General purpose	t3.micro	2	1	EBS only	Yes	Up to 5 Gigabit	Yes

Cancel Previous Review and Launch Next: Configure Instance Details

**Click Here** 

EC2 Management Console nan-instances -- AWS CLI 1.17.0 + https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1&launchInstanceWizard: Paused

aws Services Resource Groups

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

Purchasing option:  Request Spot instances

Network:

Subnet:

Auto-assign Public IP:

Placement group:  Add instance to placement group.

Capacity Reservation:

IAM role:

Shutdown behavior:

Enable termination protection:  Protect against accidental termination

Monitoring:  Enable CloudWatch detailed monitoring  
Additional charges apply.

Tenancy:   
Additional charges will apply for dedicated tenancy.

T9/T9+ Unlimited

**Click Here** (A yellow arrow points to the "Request Spot instances" checkbox)

## Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances, or

Number of instances (i)

1

Launch into Auto Scaling Group (i)

Purchasing option (i)

Request Spot instances

Current price (i)

Availability Zone	Current price
eu-west-1a	\$0.0038
eu-west-1b	\$0.0038
eu-west-1c	\$0.0038

Maximum price (i)

\$  e.g. 0.045 = 4.5 cents/hour (Optional)

Persistent request (i)

Persistent request

Launch group (i)

(Optional)

Request valid from (i)

Any time [Edit](#)

Request valid to (i)

Any time [Edit](#)

EC2 Management Console | run-instances — AWS CLI 1.16 | t2 micro pricing - Google Search

https://www.google.fr/search?q=t2+micro+pricing&lz=1C5CHFA\_enAU704AU704&oq=t2+micro+pricing&aqs=chrome..69i57.1844j0j7&sourceld=chrome

Google t2 micro pricing

All News Shopping Maps Images More Settings Tools

About 55,500,000 results (0.52 seconds)

New Low Cost EC2 Instances with Burstable Performance

Name	vCPUs	Price / Hour (Linux)
t2.micro	1	\$0.013
t2.small	1	\$0.026
t2.medium	2	\$0.052

Jul 1, 2014

New Low Cost EC2 Instances with Burstable Performance | AWS ...

<https://aws.amazon.com/blogs/aws/low-cost-burstable-ec2-instances/>

About this result Feedback

aws Services Resource Groups

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 price, and more.

Number of instances	<input type="text" value="1"/>	Launch into Auto Scaling Group								
Purchasing option	<input checked="" type="checkbox"/> Request Spot instances									
Current price	<table border="1"><thead><tr><th>Availability Zone</th><th>Current price</th></tr></thead><tbody><tr><td>eu-west-1a</td><td>\$0.0038</td></tr><tr><td>eu-west-1b</td><td>\$0.0038</td></tr><tr><td>eu-west-1c</td><td>\$0.0038</td></tr></tbody></table>		Availability Zone	Current price	eu-west-1a	\$0.0038	eu-west-1b	\$0.0038	eu-west-1c	\$0.0038
Availability Zone	Current price									
eu-west-1a	\$0.0038									
eu-west-1b	\$0.0038									
eu-west-1c	\$0.0038									
Maximum price	<input type="text" value="\$ 0.005"/>									
Persistent request	<input type="checkbox"/> Persistent request									
Launch group	(Optional)									
Request valid from	Any time <a href="#">Edit</a>									
Request valid to	Any time <a href="#">Edit</a>									

aws Services Resource Groups

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

Purchasing option  Request Spot instances

Network  vpc-cf92b5a9 (default)  Create new VPC

Subnet  No preference (default subnet in any Availability Zone)  Create new subnet

Auto-assign Public IP  Use subnet setting (Enable)

Placement group

Capacity Reservation

IAM role  Create new IAM role

Shutdown behavior

Enable termination protection

Monitoring

Tenancy  Shared - Run a shared hardware instance  Additional charges will apply for dedicated tenancy.

T2/T3 Unlimited  Enable  Additional charges may apply

Advanced Details

Shutdown behavior	<span>i</span>	<input type="button" value="Stop"/>
Enable termination protection	<span>i</span>	<input type="checkbox"/> Protect against accidental termination
Monitoring	<span>i</span>	<input type="checkbox"/> Enable CloudWatch detailed monitoring Additional charges apply.
Tenancy	<span>i</span>	<ul style="list-style-type: none"><li>✓ Shared - Run a shared hardware instance</li><li><b>Dedicated - Run a Dedicated instance</b></li><li>Dedicated host - Launch this instance on a Dedicated host</li></ul>
T2/T3 Unlimited	<span>i</span>	<input type="checkbox"/> Enable Additional charges may apply

# EC2 Instance Types

## Deep Dive

## EC2 Instance Types – Main ones

- R: applications that needs a lot of RAM – in-memory caches
- C: applications that needs good CPU – compute / databases
- M: applications that are balanced (think “medium”) – general / web app
- I: applications that need good local I/O (instance storage) – databases
- G: applications that need a GPU – video rendering / machine learning
- T2 / T3: burstable instances (up to a capacity)
- T2 / T3 - unlimited: unlimitedburst
- Real-world tip: use <https://www.ec2instances.info>



EC2 Management Console | Run Instances -- AWS CLI (1.13) | 12 micro pricing - Google Sheets | Amazon EC2 Instance Comparison | +

https://ec2instances.info

EC2 RDS

Last Update: 2018-11-29 18:00:01 UTC

**EC2Instances.info** Easy Amazon EC2 Instance Comparison

**EC2** **RDS**

Region: US East (N. Virginia) Cost: Hourly Reserved: 1-year - No Upfront Columns Compare Selected Clear Filters CSV

Filter: Min Memory (GiB): 0 Min vCPUs: 0 Min Storage (GiB): 0 Search:

Name	API Name	Memory	vCPUs	Instance Storage	Network Performance	Linux On Demand cost	Linux Reserved cost	Windows On Demand cost
M1 General Purpose Small	m1.small	1.7 GiB	1 vCPUs	160 GiB HDD + 900MB swap	Low	\$0.044000 hourly	\$0.028000 hourly	\$0.075000 hourly
M1 General Purpose Medium	m1.medium	3.75 GiB	1 vCPUs	410 GiB HDD	Moderate	\$0.087000 hourly	\$0.056000 hourly	\$0.149000 hourly
M1 General Purpose Large	m1.large	7.5 GiB	2 vCPUs	840 GiB (2 * 420 GiB HDD)	Moderate	\$0.175000 hourly	\$0.112000 hourly	\$0.299000 hourly
M1 General Purpose Extra Large	m1.xlarge	15.0 GiB	4 vCPUs	1680 GiB (4 * 420 GiB HDD)	High	\$0.350000 hourly	\$0.224000 hourly	\$0.598000 hourly
C1 High-CPU Medium	c1.medium	1.7 GiB	2 vCPUs	350 GiB HDD + 900MB swap	Moderate	\$0.130000 hourly	\$0.091000 hourly	\$0.210000 hourly
C1 High-CPU Extra Large	c1.xlarge	7.0 GiB	8 vCPUs	1680 GiB (4 * 420 GiB HDD)	High	\$0.520000 hourly	\$0.364000 hourly	\$0.840000 hourly
Cluster Compute Eight Extra Large	cc2.8xlarge	60.5 GiB	32 vCPUs	3360 GiB (4 * 840 GiB HDD)	10 Gigabit	\$2.000000 hourly	\$1.090000 hourly	\$2.570000 hourly
M2 High Memory Extra Large	m2.xlarge	17.1 GiB	2 vCPUs	420 GiB HDD	Moderate	\$0.245000 hourly	\$0.111000 hourly	\$0.345000 hourly
M2 High Memory Double Extra Large	m2.2xlarge	34.2 GiB	4 vCPUs	850 GiB HDD	Moderate	\$0.490000 hourly	\$0.222000 hourly	\$0.690000 hourly
M2 High Memory Quadruple Extra Large	m2.4xlarge	68.4 GiB	8 vCPUs	1680 GiB (2 * 840 GiB HDD)	High	\$0.980000 hourly	\$0.444000 hourly	\$1.380000 hourly
High Storage Eight Extra Large	hs1.8xlarge	117.0 GiB	16 vCPUs	48000 GiB (24 * 2000 GiB HDD)	10 Gigabit	\$4.600000 hourly	\$2.574000 hourly	\$4.931000 hourly
T1 Micro	t1.micro	0.613 GiB	1 vCPUs		EBS only Very Low	\$0.020000 hourly	\$0.014000 hourly	\$0.020000 hourly
T3 Nano	t3.nano	0.5 GiB	2 vCPUs for a 1h 12m burst		EBS only Low	unavailable	unavailable	unavailable
T3 Micro	t3.micro	1.0 GiB	2 vCPUs for a 2h 24m burst		EBS only Low to Moderate	unavailable	unavailable	unavailable
T3 Small	t3.small	2.0 GiB	2 vCPUs for a 4h 48m burst		EBS only Low to Moderate	unavailable	unavailable	unavailable
T3 Medium	t3.medium	4.0 GiB	2 vCPUs for a 4h 48m burst		EBS only Low to Moderate	unavailable	unavailable	unavailable
T3 Large	t3.large	8.0 GiB	2 vCPUs for a 7h 12m burst		EBS only Low to Moderate	unavailable	unavailable	unavailable

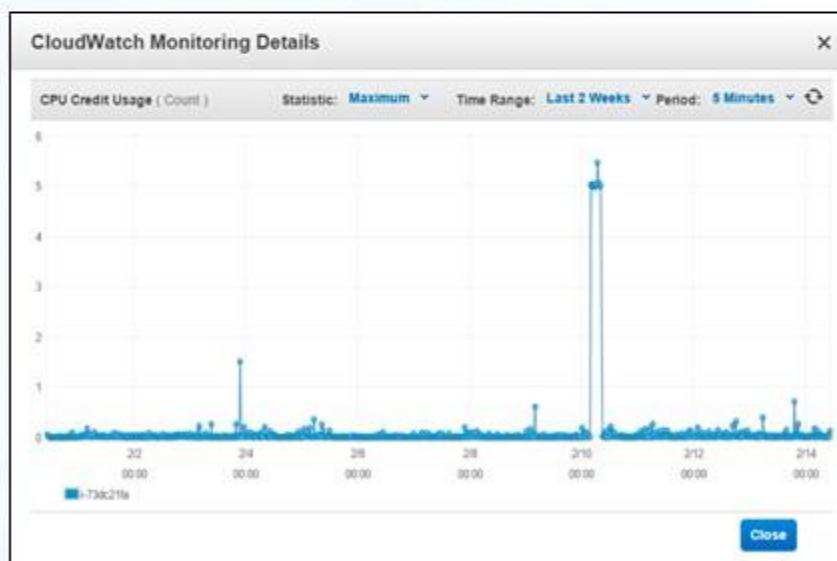
AWS EC2 Instance Comparison Table						
Instance Type	Instance ID	Memory (GiB)	Processor	Network	Storage	Price (USD)
T3 Nano	t3.nano	0.5 GiB	2 vCPUs for a 1h 12m burst		EBS only	Low
T3 Micro	t3.micro	1.0 GiB	2 vCPUs for a 2h 24m burst		EBS only	Low to Moderate
T3 Small	t3.small	2.0 GiB	2 vCPUs for a 4h 48m burst		EBS only	Low to Moderate
T3 Medium	t3.medium	4.0 GiB	2 vCPUs for a 4h 48m burst		EBS only	Low to Moderate
T3 Large	t3.large	8.0 GiB	2 vCPUs for a 7h 12m burst		EBS only	Low to Moderate
T3 Extra Large	t3.xlarge	16.0 GiB	4 vCPUs for a 9h 36m burst		EBS only	Moderate
T3 Double Extra Large	t3.2xlarge	32.0 GiB	8 vCPUs for a 9h 36m burst		EBS only	Moderate
T2 Nano	t2.nano	0.5 GiB	1 vCPUs for a 1h 12m burst		EBS only	Low
T2 Micro	t2.micro	1.0 GiB	1 vCPUs for a 2h 24m burst		EBS only	Low to Moderate
T2 Small	t2.small	2.0 GiB	1 vCPUs for a 4h 48m burst		EBS only	Low to Moderate
T2 Medium	t2.medium	4.0 GiB	2 vCPUs for a 4h 48m burst		EBS only	Low to Moderate
T2 Large	t2.large	8.0 GiB	2 vCPUs for a 7h 12m burst		EBS only	Low to Moderate
T2 Extra Large	t2.xlarge	16.0 GiB	4 vCPUs for a 5h 24m burst		EBS only	Moderate
T2 Double Extra Large	t2.2xlarge	32.0 GiB	8 vCPUs for a 4h 48m burst		EBS only	Moderate
M5 General Purpose Large	m5.large	8.0 GiB	2 vCPUs		EBS only	High
M5 General Purpose Extra Large	m5.xlarge	16.0 GiB	4 vCPUs	Q	EBS only	High
M5 General Purpose Double Extra Large	m5.2xlarge	32.0 GiB	8 vCPUs		EBS only	High
M5 General Purpose Quadruple Extra Large	m5.4xlarge	64.0 GiB	16 vCPUs		EBS only	High
M5 General Purpose 12xlarge	m5.12xlarge	192.0 GiB	48 vCPUs		EBS only	10 Gigabit
M5 General Purpose 24xlarge	m5.24xlarge	384.0 GiB	96 vCPUs		EBS only	25 Gigabit
M4 General Purpose Large	m4.large	8.0 GiB	2 vCPUs		EBS only	Moderate
M4 General Purpose Extra Large	m4.xlarge	16.0 GiB	4 vCPUs		EBS only	High
M4 General Purpose Double Extra Large	m4.2xlarge	32.0 GiB	8 vCPUs		EBS only	High
M4 General Purpose Quadruple Extra Large	m4.4xlarge	64.0 GiB	16 vCPUs		EBS only	High
M4 General Purpose Deca Extra Large	m4.10xlarge	160.0 GiB	40 vCPUs		EBS only	10 Gigabit
M4 General Purpose 16xlarge	m4.16xlarge	256.0 GiB	64 vCPUs		EBS only	25 Gigabit
C5 High-CPU Large	c5.large	4.0 GiB	2 vCPUs		EBS only	Up to 10 Gbps

## Burstable Instances (T2/T3)

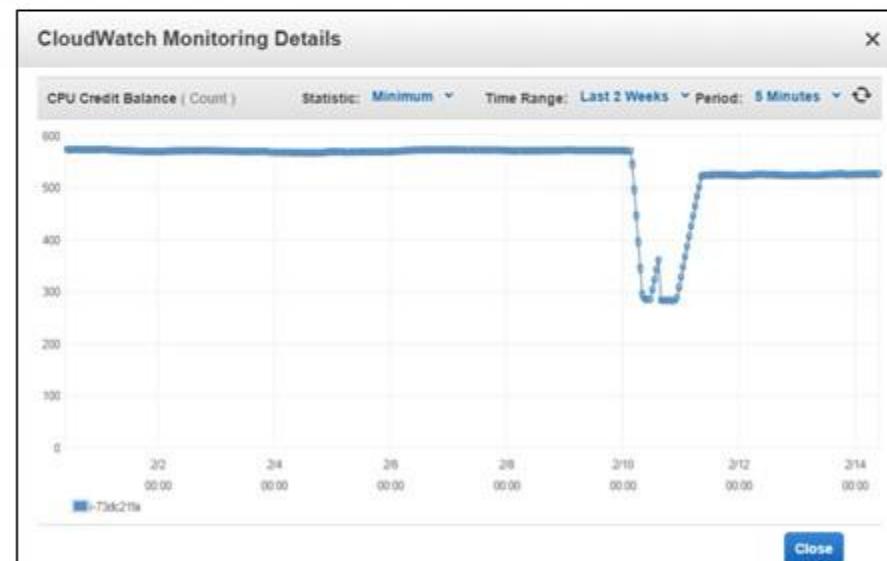
- AWS has the concept of burstable instances (T2/T3 machines)
- Burst means that overall, the instance has OK CPU performance.
- When the machine needs to process something unexpected (a spike in load for example), it can burst, and CPU can be VERY good.
- If the machine bursts, it utilizes “burst credits”
- If all the credits are gone, the CPU becomes BAD
- If the machine stops bursting, credits are accumulated over time

## Burstable Instances (T2/T3)

- Burstable instances can be amazing to handle unexpected traffic and getting the insurance that it will be handled correctly
- If your instance consistently runs low on credit, you need to move to a different kind of non-burstable instance



Credit usage



Credit balance

# CPU Credits

Instance type	Launch credits	vCPUs	CPU credits earned per hour	Maximum earned CPU credit balance	vCPUs	Baseline performance (% CPU utilization)
t2.nano	30	1	3	72	1	5%
t2.micro	30	1	6	144	1	10%
t2.small	30	1	12	288	1	20%
t2.medium	60	2	24	576	2	40% (of 200% max)*
t2.large	60	2	36	864	2	60% (of 200% max)*
t2.xlarge	120	4	54	1296	4	90% (of 400% max)*
t2.2xlarge	240	8	81	1944	8	135% (of 800% max)*

## T2/T3 Unlimited

- Nov 2017: It is possible to have an “unlimited burst credit balance”
- You pay extra money if you go over your credit balance, but you don’t lose in performance
- Overall, it is a new offering, so be careful, costs could go high if you’re not monitoring the health of your instances
- Read more here: <https://aws.amazon.com/blogs/aws/new-t2-unlimited-going-beyond-the-burst-with-high-performance/>

# EC2 AMIs

## What's an AMI?

- As we saw, AWS comes with base images such as:
  - Ubuntu
  - Fedora
  - RedHat
  - Windows
  - Etc...
- These images can be customised at runtime using EC2 User data
- But what if we could create our own image, ready to go?
- That's an AMI – an image to use to create our instances
- AMIs can be built for Linux or Windows machines

## Why would you use a custom AMI?

- Using a custom built AMI can provide the following advantages:
  - Pre-installed packages needed
  - Faster boot time (no need for ec2 user data at boot time)
  - Machine comes configured with monitoring/ enterprise software
  - Security concerns – control over the machines in the network
  - Control of maintenance and updates of AMIs over time
  - Active Directory Integration out of the box
  - Installing your app ahead of time (for faster deploys when auto-scaling)
  - Using someone else's AMI that is optimised for running an app, DB, etc.
- AMI are built for a specific AWS region (!)

## Using Public AMIs

- You can leverage AMIs from other people
  - You can also pay for other people's AMI by the hour
    - These people have optimised the software
    - The machine is easy to run and configure
    - You basically rent "expertise" from the AMI creator
  - AMI can be found and published on the Amazon Marketplace
- **Warning:**
- Do not use an AMI you don't trust!
  - Some AMIs might come with malware or may not be secure for your enterprise

## AMI Storage

- Your AMI take space and they live in Amazon S3
- Amazon S3 is a durable, cheap and resilient storage where most of your backups will live
- By default, your AMIs are private, and locked for your account / region
- You can also make your AMIs public and share them with other AWS accounts or sell them on the AMI Marketplace

## AMI Pricing

- AMIs live in Amazon S3, so you get charged for the actual space it takes in Amazon S3
- Amazon S3 pricing in US-EAST-1:
  - First 50 TB / month: \$0.023 per GB
  - Next 450 TB / month: \$0.022 per GB
- Overall it is quite inexpensive to store private AMIs.
- Make sure to remove the AMIs you don't use

# **EC2 AMI Hands On**

EC2 Management Console Paused

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1instances:sort:instanceid

Services Resource Groups Actions

EC2 Dashboard Launch Instance Connect

Events Tags Reports Limits

**INSTANCES** Instances Launch Templates Spot Requests Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations

**IMAGES** AMIs Bundle Tasks

**ELASTIC BLOCK STORE** Volumes Snapshots Lifecycle Manager

**NETWORK & SECURITY** Security Groups Elastic IPs Placement Groups

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IP
MyFirstInstance	i-0280be480e6e17a...	t2.micro	eu-west-1c	running	2/2 checks ...	None	ec2-34-245-19-247.eu...	34

Instance: i-0280be480e6e17a (MyFirstInstance) Public DNS: ec2-34-245-19-247.eu-west-1.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags
Instance ID: i-0280be480e6e17a	Public DNS (IPv4): ec2-34-245-19-247.eu-west-1.compute.amazonaws.com	IPv4 Public IP: 34.245.19.247	
Instance state: running	IPv6 IPs: -	Private DNS: ip-172-31-23-225.eu-west-1.compute.internal	
Instance type: t2.micro	Private IPs: 172.31.23.225	Secondary private IPs: -	
Elastic IPs: -	Subnet ID: subnet-fd0360b5	VPC ID: vpc-cf92b5a9	
Availability zone: eu-west-1c	Network interfaces: eth0	Source/dest. check: True	
Security groups: AWSSSH, view inbound rules, view outbound rules	AMI ID: amzn2-ami-hvm-2.0.20181114-x86_64-gp2 (ami-09683313102a30b2c)	T2/T3 Unlimited	Disabled
Scheduled events: No scheduled events	Platform: -		
AMI ID: amzn2-ami-hvm-2.0.20181114-x86_64-gp2 (ami-09683313102a30b2c)	IAM role: -		
Key pair name: AWSCourse			

**sudo su**  
**yum update -y**

```
[ec2-user@ip-172-31-23-225 ~]$ sudo su
[root@ip-172-31-23-225 ec2-user]# yum update -y
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
amzn2-core
No packages marked for update
[root@ip-172-31-23-225 ec2-user]# yum install -y httpd
```

# yum install -y httpd

```
Verifying : apr-util-1.6.1-5.amzn2.0.2.x86_64 1/9
Verifying : mod_http2-1.11.1-1.amzn2.x86_64 2/9
Verifying : apr-util-bdb-1.6.1-5.amzn2.0.2.x86_64 3/9
Verifying : apr-1.6.3-5.amzn2.0.2.x86_64 4/9
Verifying : mailcap-2.1.41-2.amzn2.noarch 5/9
Verifying : generic-logos-httpd-18.0.0-4.amzn2.noarch 6/9
Verifying : httpd-tools-2.4.34-1.amzn2.1.1.x86_64 7/9
Verifying : httpd-2.4.34-1.amzn2.1.1.x86_64 8/9
Verifying : httpd-filesystem-2.4.34-1.amzn2.1.1.noarch 9/9
```

Installed:  
httpd.x86\_64 0:2.4.34-1.amzn2.1.1

Dependency Installed:  
apr.x86\_64 0:1.6.3-5.amzn2.0.2      apr-util.x86\_64 0:1.6.1-5.amzn2.0.2      apr-util-bdb.x86\_64 0:1.6.1-5.amzn2.0.2  
generic-logos-httpd.noarch 0:18.0.0-4.amzn2      httpd-filesystem.noarch 0:2.4.34-1.amzn2.1.1      httpd-tools.x86\_64 0:2.4.34-1.amzn2.1.1  
mailcap.noarch 0:2.1.41-2.amzn2      mod\_http2.x86\_64 0:1.11.1-1.amzn2

Complete!  
[root@ip-172-31-23-225 ec2-user]# █

**Systemctl start httpd**

**Systemctl enable httpd**

```
[root@ip-172-31-23-225 ec2-user]# systemctl start httpd
[root@ip-172-31-23-225 ec2-user]# systemctl enable httpd
Created symlink from /etc/systemd/system/multi-user.target.wants/httpd.service to /usr/lib/systemd/system/httpd.service.
[root@ip-172-31-23-225 ec2-user]# █
```

**echo “Hello world” > /var/www/html/index.html**

```
[root@ip-172-31-23-225 ec2-user]# echo "Hello world" > /var/www/html/index.html
[root@ip-172-31-23-225 ec2-user]# curl localhost:80
Hello world
[root@ip-172-31-23-225 ec2-user]# █
```

EC2 Management Console Paused

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1instances.sort=instanceId

aws Services Resource Groups

EC2 Dashboard Events Tags Reports Limits

**INSTANCES**

**Instances**

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**IMAGES**

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**ELASTIC BLOCK STORE**

Volumes Snapshots Lifecycle Manager

**NETWORK & SECURITY**

Security Groups Elastic IPs Placement Groups

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

1 to 1 of 1

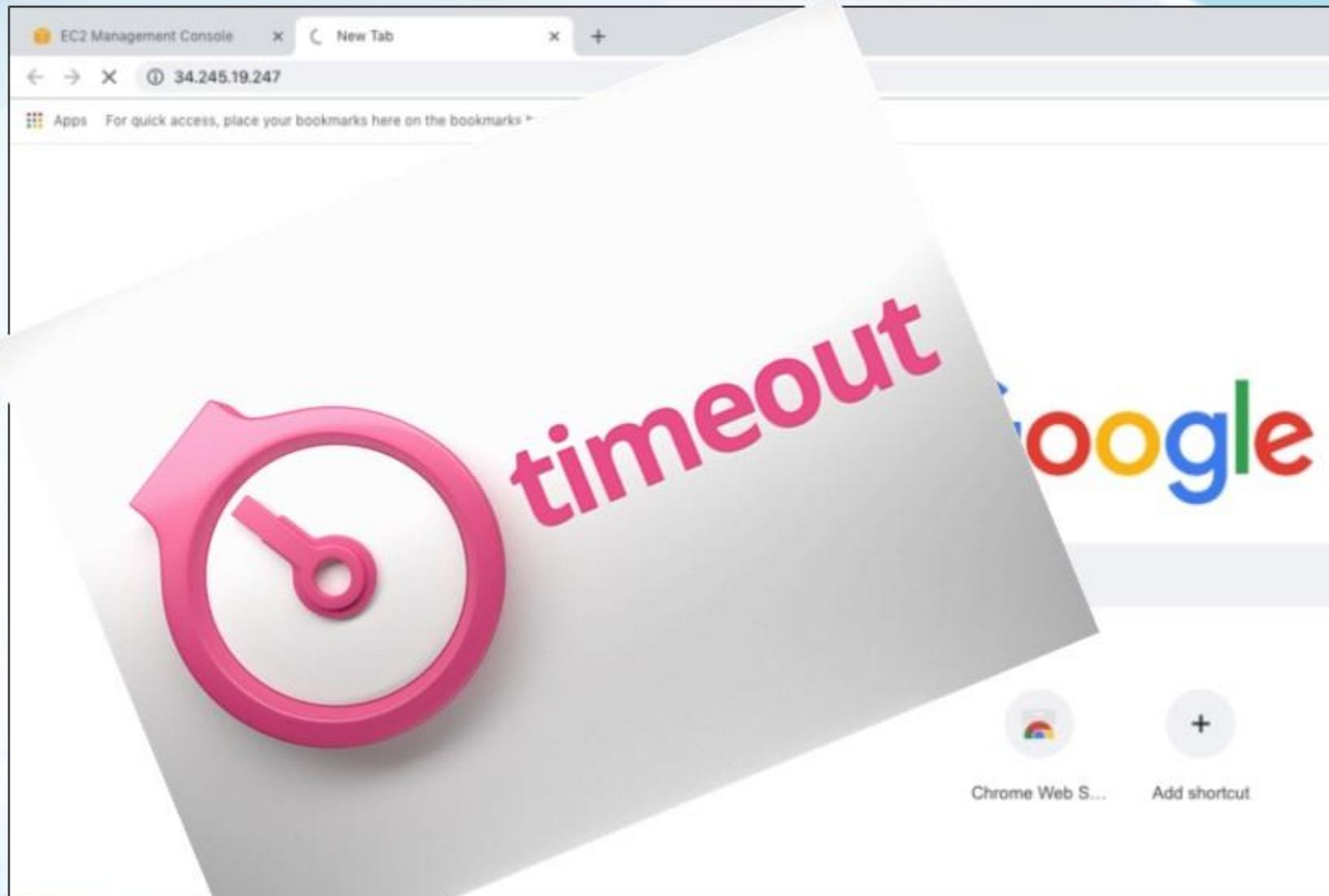
Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IP
MyFirstInstance	i-0280be480e6e17aba...	t2.micro	eu-west-1c	running	2/2 checks ...	None	ec2-34-245-19-247.eu...	34

Instance: i-0280be480e6e17aba (MyFirstInstance) Public DNS: ec2-34-245-19-247.eu-west-1.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-0280be480e6e17aba	Public DNS (IPv4)	ec2-34-245-19-247.eu-west-1.compute.amazonaws.com
Instance state	running	IPv4 Public IP	34.245.19.247
Instance type	t2.micro	IPv6 IPs	
Elastic IPs	eu-west-1c	Private IP	172.31.10.2 -> 34.245.19.247.eu-west-1.compute.internal
Availability zone	eu-west-1c	Secondary private IP	
Security groups	AWSSSH, view inbound rules, view outbound rules	VPC ID	vpc-cf92b5a9
Scheduled events	No scheduled events	Subnet ID	subnet-fd0360b5
AMI ID	amzn2-ami-hvm-2.0.20181114-x86_64-gp2 (ami-09693313102a30b2c)	Network interfaces	eth0
Platform	-	Source/dest. check	True
IAM role	-	T2/T3 Unlimited	Disabled
Key pair name	AWSCourse	EBS-optimized	False
Owner	387124123361	Root device type	ebs
Launch time	November 26, 2018 at 3:27:53 PM UTC+1 (1 hour)		

**Copy It**



ng-ec2-00000000000000000000000000000000

awscompute

vpc-00000000000000000000000000000000

lambda-wiz-00000000000000000000000000000000

### Edit inbound rules

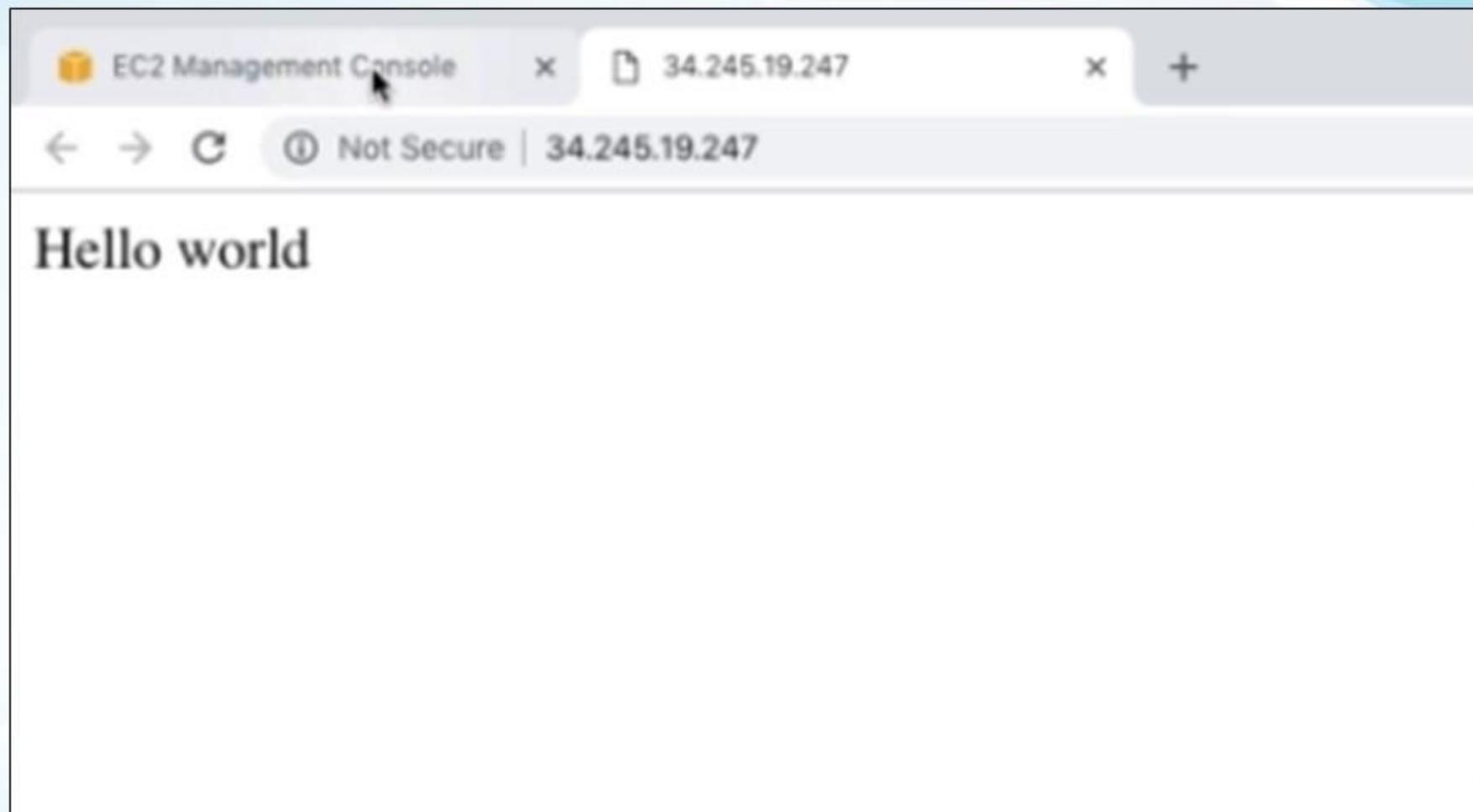
Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop
HTTP	TCP	80	Custom 0.0.0.0/0, ::/0	Apache Server

[Add Rule](#)

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

[Cancel](#) [Save](#)

**Click Here**



EC2 Management Console 34.245.19.247

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1&instances.sort=instanceId

aws Services Resource Groups

EC2 Dashboard Events Tags Reports Limits

**INSTANCES**

**Instances** (selected)

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**IMAGES**

AMIs

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**ELASTIC BLOCK STORE**

Volumes Snapshots

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State
MyFirstInstance	i-0280be4	t2.micro	eu-west-1c	running

Connect  
Get Windows Password  
Create Template From Instance  
Launch More Like This

Instance State: Public DNS: ec2-34-245-19-247.eu-west-1.compute.amazonaws.com

Instance Settings  
Image  
Networking  
CloudWatch Monitoring

Instance state: running  
Instance type: t2.micro  
Elastic IPs  
Availability zone: eu-west-1c  
Security groups: AWSSSH, view inbound rules, view outbound rules  
Scheduled events: No scheduled events  
AMI ID: amzn2-ami-hvm-2.0.20181114-x86\_64-gp2 (ami-09693313102a30b2c)

Click Here

Public DNS (IPv4)  
IPv4 Public IP  
IPv6 IPs  
Private DNS  
Private IPs  
Secondary private IPs  
VPC ID  
Subnet ID

Filter by tags and attributes or search by keyword

## Create Image

Instance ID: i-0280be480e6e17aba

Image name:

Image description:

No reboot:

### Instance Volumes

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encrypted
Root	/dev/xvda	snap-0a6e23c3b1d2e969d	8	General Purpose SSD (gp2)	100 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted

Add New Volume

Total size of EBS Volumes: 8 GiB  
When you create an EBS image, an EBS snapshot will also be created for each of the above volumes.

Owner: 387124123361      EBS-optimized: False

## Create Image



Instance ID  i-0280be480e6e17aba

Image name  My-Apache-Server

Image description  image that creates and start an apache server

No reboot 

### Instance Volumes

Volume Type 	Device 	Snapshot 	Size (GiB) 	Volume Type 	IOPS 	Throughput (MB/s) 	Delete on Termination 	Encrypted 
Root	/dev/xvda	snap-0a6e23c3b1d2e569d	8	General Purpose SSD (gp2)	100 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted

[Add New Volume](#)

Total size of EBS Volumes: 8 GiB

When you create an EBS image, an EBS snapshot will also be created for each of the above volumes.

[Cancel](#) [Create Image](#)

**Click Here**

## Create Image



- ✓ Create Image request received.

[View pending image ami-008d6f209bf00b821](#)

Any snapshots backing your new EBS image can be managed on the [snapshots screen](#) after successful image creation.

[Close](#)

aws Services Resource Groups

EC2 Dashboard Events Tags Reports Limits

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NETWORK & SECURITY Security Groups Elastic IPs Placement Groups

Launch Actions

Owned by me search: ami-008d6f209bf00b821 Add filter

Name	AMI Name	AMI ID	Source	Owner	Visibility	Status	Creation Date	Platform	Root Device
My-Apache-Se...	My-Apache-Server	ami-008d6f209bf00b821	387124123361/...	387124123361	Private	pending	November 26, 2018 at 4:55:14 PM UTC+1	Other Linux	ebs

Image: ami-008d6f209bf00b821

Details Permissions Tags

AMI ID: ami-008d6f209bf00b821 Owner: 387124123361 Status: pending Creation date: November 26, 2018 at 4:55:14 PM UTC+1 Architecture: x86\_64 Virtualization type: hvm Root Device Name: /dev/xvda RAM disk ID: Product Codes: AMI Name: My-Apache-Server Source: 387124123361/My-Apache-Server State Reason: Platform: Other Linux Image Type: machine Description: image that creates and start an apache server Root Device Type: ebs Kernel ID: Block Devices: /dev/xvda<8:truesp2

Edit

aws Services Resource Groups

EC2 Dashboard Events Tags Reports Limits

**INSTANCES**

- Instances
- Launch Templates
- Spot Requests
- Reserved Instances
- Dedicated Hosts
- Scheduled Instances
- Capacity Reservations

**IMAGES**

**AMIs**

- Bundle Tasks

**ELASTIC BLOCK STORE**

- Volumes
- Snapshots
- Lifecycle Manager

Owned by me search : ami-008d6f209bf00b821 Add filter

Name	AMI Name	AMI ID	Source	Owner
My-Apache-Server	ami-008d6f209bf00b821	387124123361		

Image: ami-008d6f209bf00b821

Details Permissions Tags

AMI ID: ami-008d6f209bf00b821  
Owner: 387124123361  
Status: available  
Creation date: November 26, 2018 at 4:55:14 PM UTC+1  
Architecture: x86\_64  
Virtualization type: hvm  
Root Device Name: /dev/xvda  
RAM disk ID: -

Launch

Spot Request

Deregister

Register New AMI

Copy AMI

Permissions

Click Here

Modify Boot Volume Setting

## Copy AMI



AMI ami-008d6f209bf00b821 will be copied to a new AMI. Set the new AMI settings below.

Destination region\*

Select destination region



Click Here

Name

My-Apache-Server

Description

[Copied ami-008d6f209bf00b821 from eu-west-1] My-Apache

Encryption

Encrypt target EBS snapshots 

Cancel

Copy AMI

## Copy AMI



AMI ami-008d6f209bf00b821 will be copied to a new AMI. Set the new AMI settings below.

Destination region\*

- ✓ Select destination region
- Asia Pacific (Tokyo)
- Asia Pacific (Seoul)
- Asia Pacific (Mumbai)
- Asia Pacific (Singapore)
- Asia Pacific (Sydney)
- Canada (Central)
- EU (Frankfurt)
- EU (Ireland)**
- EU (London)
- EU (Paris)
- South America (Sao Paulo)
- US East (N. Virginia)
- US East (Ohio)
- US West (N. California)
- US West (Oregon)

Name

Description

 821 from eu-west-1] My-Apache

Encryption

 lots 

EC2 Management Console 34.345.19.247

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1&Images.visibility=owned-by-me;search=ami-008d6f209bf00b821;sort=name

aws Services Resource Groups

EC2 Dashboard Events Tags Reports Limits

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ELASTIC BLOCK STORE Volumes Snapshots Lifecycle Manager

NETWORK & SECURITY Security Groups Elastic IPs

Launch Actions

Owned by me search: ami-008d6f209bf00b821 Add filter

1 to 1 of 1

Name	AMI Name	AMI ID	Source	Owner	Visibility	Status	Creation Date	Platform	Root Device
My-Apache-Se...	ami-008d6f209bf00b821	38	Launch	Private	available	November 26, 2018 at 4:55:14 PM UTC+1	Other Linux	ebs	

Image: ami-008d6f209bf00b821

Details Permissions Tags

Click Here

AMI ID: ami-008d6f209bf00b821 Owner: 387124123361 Status: available Creation date: November 26, 2018 at 4:55:14 PM UTC+1 Architecture: x86\_64 Virtualization type: hvm Root Device Name: /dev/xvda RAM disk ID: Product Codes:

AMI Name: My-Apache-Server Source: 387124123361/My-Apache-Server State Reason: Platform: Other Linux Image Type: machine Description: image that creates and starts an apache server Root Device Type: ebs Kernel ID: Block Devices: /dev/xvda=snap-082e0e943c8aaa07d:8:true:gp2

## Modify Image Permissions



This image is currently:  Public  Private

AWS Account Number

*This image currently has no permissions*

AWS Account Number

Add Permission

Add "create volume" permissions to the following associated snapshots when creating permissions:

- snap-082e0e943c8aaa07d

Cancel

Save

EC2 Management Console    34.245.19.247

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#images:visibility=owned-by-me:search=ami-008d6f209bf00b821:sort=name

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**AMIs**

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Owned by me search : ami-008d6f209bf00b821 Add filter

Name	AMI Name	AMI ID	Source	Owner	Visibility	Status
My-Apache-Se...	ami-008d6f209bf00b821	38712412	38712412	Private	available	

Image: ami-008d6f209bf00b821

Details Permissions Tags

AMI ID: ami-008d6f209bf00b821  
Owner: 387124123361  
Status: available  
Creation date: November 26, 2018 at 4:55:14 PM UTC+1  
Architecture: x86\_64  
Virtualization type: hvm

AMI Name: My-Apache-Server  
Source: 38712412  
State Reason: -  
Platform: Other Linux  
Image Type: machine  
Description: image for Apache Server

**Launch**

**Click Here**

Copy AMI  
Modify Image Permissions  
Add/Edit Tags  
Modify Boot Volume Setting

aws Services Resource Groups

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
General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
General purpose	t2.micro	1	1	EBS only	-	Low to Moderate	Yes
General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
General purpose	t3.nano	2	0.5	EBS only	Yes	Up to 5 Gigabit	Yes
General purpose	t3.micro	2	1	EBS only	Yes	Up to 5 Gigabit	Yes

Cancel Previous Review and Launch Next: Configure Instance Details

Click Here

aws Services Resource Groups

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-cf92b5a9 (default) Create new VPC

Subnet: No preference (default subnet in any Availability Zone) Create new subnet

Auto-assign Public IP: Use subnet setting (Enable)

Placement group: Add instance to placement group.

Capacity Reservation: Open Create new Capacity Reservation

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.

Cancel Previous Review and Launch Next: Add Storage

**Click Here**

AWS Services Resource Groups

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/xvda	snap-082e0e943c8aaa07d	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.

Cancel Previous Review and Launch Next: Add Tags

Click Here

AWS Services Resource Groups ★

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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

**Click Here**

aws Services Resource Groups ★

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

## 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:

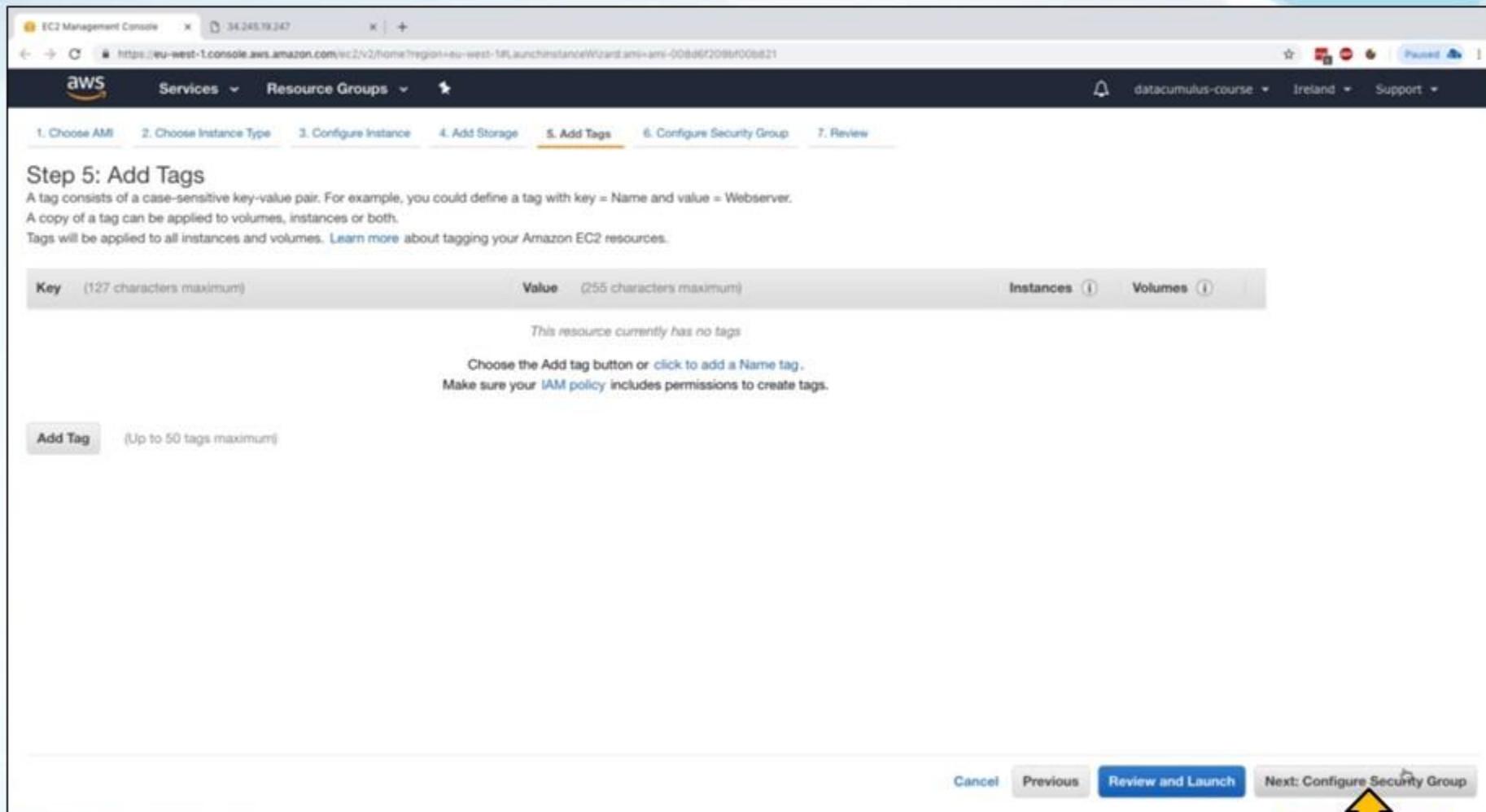
Description:

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

[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](#)



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https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1&launchInstanceWizard.ami=ami-008a6f209bf00821

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

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## 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
<i>This resource currently has no tags</i>					

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

**Click Here**

Services ▾ Resource Groups ▾

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

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

Security group:  New security group  Existing security group

Click Here

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

**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

AWS Services Resource Groups →

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

## 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 ID	Name	Description	Actions
sg-02369aba3e9743aa4	AWSSSH	launch-wizard-2 created 2018-11-26T14:40:51.126+01:00	<a href="#">Copy to new</a>
sg-6f58f310	default	default VPC security group	<a href="#">Copy to new</a>
sg-0296092124837b8e7	efs	SG for our EFS drive	<a href="#">Copy to new</a>
sg-036fdf5c027f91372	launch-wizard-1	launch-wizard-1 created 2018-11-22T15:06:11.628+01:00	<a href="#">Copy to new</a>

Select a security group above to view its inbound rules.

Cancel Previous **Review and Launch**

AWS Services Resource Groups 6. Configure Security Group 7. Review

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags

## 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 ID	Name	Description	Actions
sg-02369aba3e9743aa4	AWSSSH	launch-wizard-2 created 2018-11-26T14:40:51,126+01:00	<a href="#">Copy to new</a>
sg-6f58f310	default	default VPC security group	<a href="#">Copy to new</a>
sg-0296092124837b8e7	efs	SG for our EFS drive	<a href="#">Copy to new</a>
sg-036fdf5c02791372	launch-wizard-1	launch-wizard-1 created 2018-11-22T15:06:11,628+01:00	<a href="#">Copy to new</a>

Inbound rules for sg-02369aba3e9743aa4 (Selected security groups: sg-02369aba3e9743aa4)

Type	Protocol	Port Range	Source	Description
HTTP	TCP	80	0.0.0.0/0	Apache Server
HTTP	TCP	80	0.0.0.0/0	Apache Server
SSH	TCP	22	0.0.0.0/0	

Cancel Previous **Review and Launch**

Click Here

AWS Services Resource Groups ★ datacumulus-course Ireland Support

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 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, AWSSSH, 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](#)

**My-Apache-Server - ami-008d6f209bf00b821**  
image that creates and starts an apache server  
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 ID	Name	Description
sg-02369aba3e9743aa4	AWSSSH	launch-wizard-2 created 2018-11-26T14:40:51.126+01:00

All selected security groups inbound rules

[Cancel](#) [Previous](#) **Launch**

**Click Here** 

## Select an existing key pair or create a new key pair X

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](#).

Choose an existing key pair

Select a key pair

AWSCourse

I acknowledge that I have access to the selected private key file (AWSCourse.pem), and that without this file, I won't be able to log into my instance.

**Click Here** 

**Cancel** **Launch Instances** 

**Click Here** 

EC2 Management Console x 34.245.19.247 x +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#LaunchInstanceWizard:ami=ami-008d6f209bf00b821

aws Services Resource Groups star bell

## Launch Status



Initiating Instance Launches

Please do not close your browser while this is loading

Initiating launches...

[Services](#)[Resource Groups](#)[datacumulus-course](#)[Ireland](#)[Support](#)

## Launch Status

**Your instances are now launching**

The following instance launches have been initiated: i-05e2246f49a03b0bc [View launch log](#)

**Get notified of estimated charges**

Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

### How to connect to your instances

Your instances are launching, and it may take a few minutes until they are in the **running** state, when they will be ready for you to use. Usage hours on your new instances will start immediately and continue to accrue until you stop or terminate your instances.

Click [View Instances](#) to monitor your instances' status. Once your instances are in the **running** state, you can [connect](#) to them from the Instances screen. Find out how to connect to your instances.

▼ Here are some helpful resources to get you started

- [How to connect to your Linux instance](#)
- [Learn about AWS Free Usage Tier](#)
- [Amazon EC2: User Guide](#)
- [Amazon EC2: Discussion Forum](#)

While your instances are launching you can also

- [Create status check alarms to be notified when these instances fail status checks. \(Additional charges may apply\)](#)
- [Create and attach additional EBS volumes \(Additional charges may apply\)](#)
- [Manage security groups](#)

[View Instances](#)

AWS Services Resource Groups

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Launch Instance Connect Actions

search: i-05e2246f49a03b0bc Add filter

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IP
	i-05e2246f49a03b0bc	t2.micro	eu-west-1c	pending	Initializing	None	ec2-52-30-27-97.eu-west-1.compute.amazonaws.com	52.30.27.97

Instance: i-05e2246f49a03b0bc Public DNS: ec2-52-30-27-97.eu-west-1.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-05e2246f49a03b0bc	Public DNS (IPv4)	ec2-52-30-27-97.eu-west-1.compute.amazonaws.com
Instance state	pending	IPv4 Public IP	52.30.27.97
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-31-85.eu-west-1.compute.internal
Availability zone	eu-west-1c	Private IPs	172.31.31.85
Security groups	AWSSSH, view inbound rules, view outbound rules	Secondary private IPs	
Scheduled events	-	VPC ID	vpc-cf92b5a9
AMI ID	My-Apache-Server (ami-008d6f209bf00b821)	Subnet ID	subnet-fd0360b5
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	AWSCourse	T2/T3 Unlimited	Disabled
Owner	387124123361	EBS-optimized	False
Launch time	November 26, 2018 at 4:59:45 PM UTC+1 (less than one hour)	Root device type	ebs

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**Launch Instance** Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone
MyFirstInstance	i-0280be480e6e17a...	t2.micro	eu-west-1c
MySecondInstance	6f49a03b0bc	t2.micro	eu-west-1c

16/255

Instance: i-05e2246f49a03b0bc Public DNS: ec2-52-30-27-97.eu-west-1.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-05e2246f49a03b0bc
Instance state	pending
Instance type	t2.micro
Elastic IPs	
Availability zone	eu-west-1c

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Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

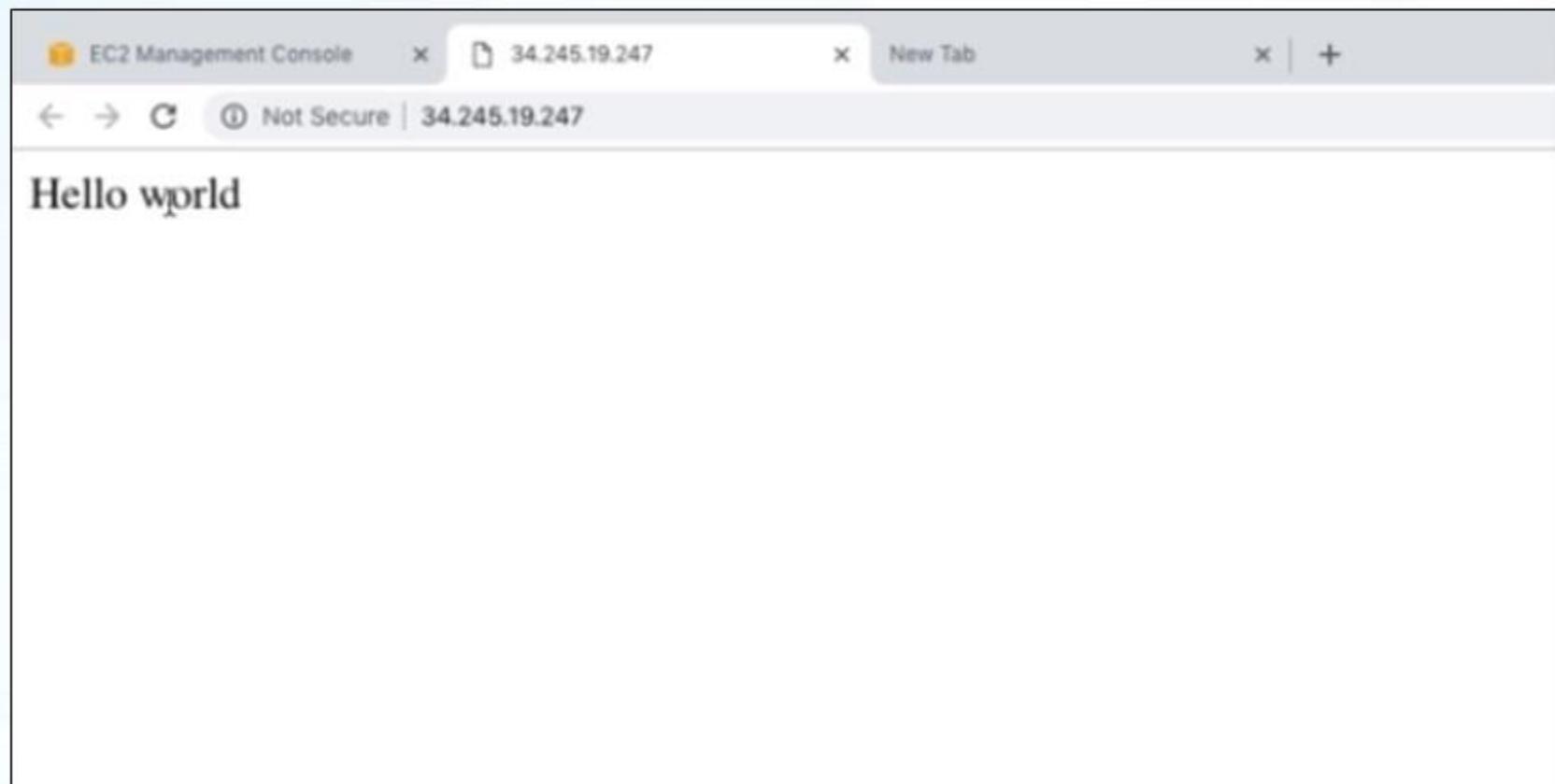
Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv6
MyFirstInstance	i-0280be480e6e17a...	t2.micro	eu-west-1c	running	2/2 checks ...	None	ec2-34-245-19-247.eu...	34
<b>MySecondInstance</b>	i-05e2246f49a03b0bc	t2.micro	eu-west-1c	running	Initializing	None	ec2-52-30-27-97.eu-we...	52

Instance: i-05e2246f49a03b0bc (MySecondInstance) Public DNS: ec2-52-30-27-97.eu-west-1.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-05e2246f49a03b0bc	Public DNS (IPv4)	ec2-52-30-27-97.eu-west-1.compute.amazonaws.com
Instance state	running	IPv4 Public IP	52.30.27.97
Instance type	t2.micro	IPv6 IPs	
Elastic IPs		Private IP	172.31.1.100
Availability zone	eu-west-1c	Private DNS	ec2-52-30-27-97.eu-west-1.compute.internal
Security groups	AWSSSH, view inbound rules, view outbound rules	Secondary private IP	
Scheduled events	No scheduled events	VPC ID	vpc-cf92b5a9
AMI ID	My-Apache-Server (ami-008d8f209bf00b821)	Subnet ID	subnet-fd0360b5
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	AWSCourse	T2/T3 Unlimited	Disabled
Owner	387124123361	EBS-optimized	False

**Copy It**



# Cross Account AMI Copy

## Cross Account AMI Copy (FAQ + Exam Tip)

- You can share an AMI with another AWS account.
- Sharing an AMI does not affect the ownership of the AMI.
- If you copy an AMI that has been shared with your account, you are the owner of the target AMI in your account.
  
- To copy an AMI that was shared with you from another account, the owner of the source AMI must grant you read permissions for the storage that backs the AMI, either the associated EBS snapshot(for an Amazon EBS-backed AMI) or an associated S3 bucket (for an instance store-backed AMI).

## Limits:

- You can't copy an encrypted AMI that was shared with you from another account. Instead, if the underlying snapshot and encryption key were shared with you, you can copy the snapshot while re- encrypting it with a key of your own. You own the copied snapshot, and can register it as a new AMI.
- You can't copy an AMI with an associated **billingProduct** code that was shared with you from another account. This includes Windows AMIs and AMIs from the AWS Marketplace. To copy a shared AMI with a **billingProduct** code, launch an EC2 instance in your account using the shared AMI and then create an AMI from the instance.

<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/CopyingAMIs.html>

EC2 Management Console

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#images:sort=name

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1 to 1 of 1

Name AMI Name AMI ID Source Owner Visibility Status Creation Date Platform

My-Apache-Server ami-0f44ae1e87a9a48e7 387124123361 Private available January 11, 2019 at 3:08:40 AM Other Linux

Image: ami-0f44ae1e87a9a48e7

Details Permissions Tags

Launch

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Register New AMI

Copy AMI

Modify Image Permissions

Add Permissions

Click Here

AMI ID	ami-0f44ae1e87a9a48e7	AMI Name	My-Apache-Server
Owner	387124123361	Source	387124123361/My-Apache-Server
Status	available	State Reason	-
Creation date	January 11, 2019 at 3:08:40 PM UTC+1	Platform	Other Linux
Architecture	x86_64	Image Type	machine
Virtualization type	hvm	Description	image that creates and start an apache server
Root Device Name	/dev/xvda	Root Device Type	ebs
RAM disk ID	-	Kernel ID	-
Product Codes	-	Block Devices	/dev/xvda=snap-046ef11314a329e04:8:true:gp2

Edit

## Modify Image Permissions



This image is currently:  Public  Private

AWS Account N

**Click Here**

387124123362



387124123361



AWS Account Number

Add Permission

Add "create volume" permissions to the following associated snapshots when creating permissions:

- snap-046ef11314a329e04

Cancel

Save

## Modify Image Permissions X

This image is currently:  Public  Private

[Cancel](#)

[Save](#)

## Modify Image Permissions



This image is currently:  Public  Private

AWS Account Number

387124123362

387124123361

AWS Account Number

Click Here

Add Permission

- Add "create volume" permissions to the following associated snapshots when creating permissions:
- snap-046ef11314a329e04

Cancel

Save

## Modify Image Permissions



This image is currently:  Public  Private

AWS Account Number

*This image currently has no permissions*

AWS Account Number

Add Permission

Add "create volume" permissions to the following associated snapshots when creating permissions:

- snap-046ef11314a329e04

Cancel

Save



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Owned by me Filter by tags and attributes or search by keyword

Name	Name	AMI Name	AMI ID	Source	Owner	Visibility	Status	Creation Date	Platform
		My-Apache-Se...	ami-0f44ae1e87a9a48e7	387124123361...	387124123...	Launch	Active	January 11, 2019 at 3:08:40 ...	Other Linux

Image: ami-0f44ae1e87a9a48e7

Details Permissions Tags

AMI ID: ami-0f44ae1e87a9a48e7  
Owner: 387124123361  
Status: available  
Creation date: January 11, 2019 at 3:08:40 PM UTC+1  
Architecture: x86\_64  
Virtualization type: hvm  
Root Device Name: /dev/xvda  
RAM disk ID: -  
Product Codes: -

AMI Name: My-Apache-Server  
Source: 387124123361/My-Apache-Server  
State Reason: -  
Platform: Other Linux  
Image Type: machine  
Description: image that creates and start an apache server  
Root Device Type: ebs  
Kernel ID: -  
Block Devices: /dev/xvda=snap-046ef11314a329e04:8:true:gp2

Launch  
Spot Request  
Deregister  
Register New AMI  
Copy AMI  
Modifications Permissions  
Add/Edit

Click Here

Edit

## Modify Image Permissions



This image is currently:  Public  Private

AWS Account Number

387124123362



387124123361



AWS Account Number

387124123361

Add Permission

- Add "create volume" permissions to the following associated accounts when creating permissions:
- snap-046ef11314a329e04



Click Here

Cancel

Save



Click Here

EC2 Management Console x +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#images:sort=name

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Owned by me ▼ Filter by tags and attributes or search by keyword

Name	Name	AMI Name	AMI ID	Source	Owner
		My-Apache-Se...	ami-0f44ae1e87a9a48e7		7124123361

Image: ami-0f44ae1e87a9a48e7

Details Permissions Tags

AMI ID: ami-0f44ae1e87a9a48e7

Owner: 387124123361

Status: available

Creation date: January 11, 2019 at 3:08:40 PM UTC+1

Architecture: x86\_64

Virtualization type: hvm

Actions (dropdown menu):

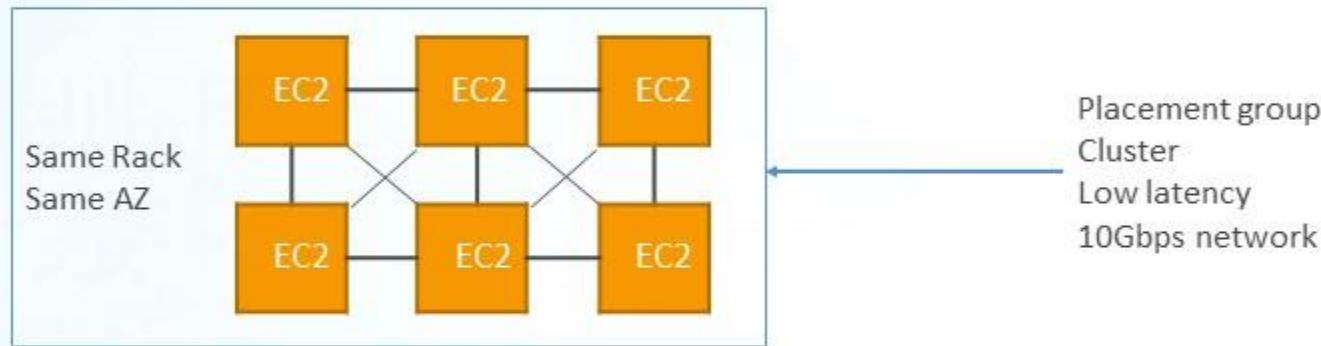
- Launch
- Spot Request
- Deregister
- Register New AMI
- Copy AMI**
- Modify Image Permissions
- Add/Edit Tags
- Modify Boot Volume Setting

# EC2 Placement Groups

## Placement Groups

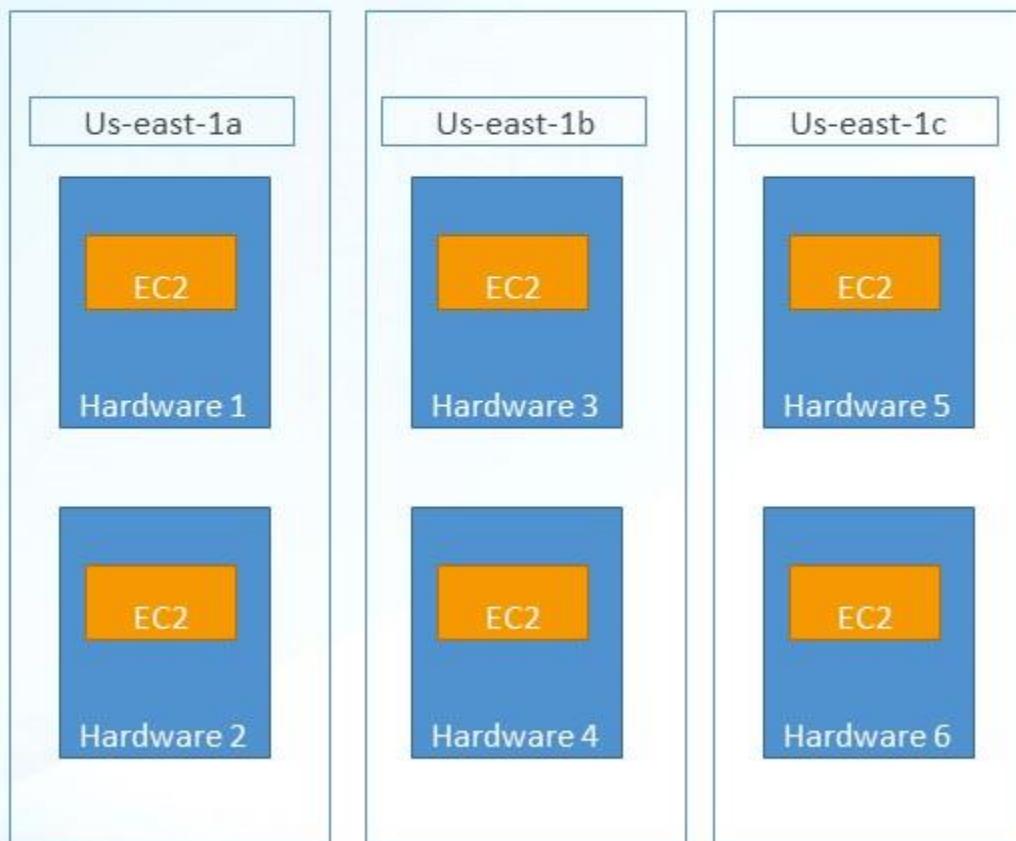
- Sometimes you want control over the EC2 Instance placement strategy
- That strategy can be defined using placement groups
- When you create a placement group, you specify one of the following strategies for the group:
  - ***Cluster***—clusters instances into a low-latency group in a single Availability Zone
  - ***Spread***—spreads instances across underlying hardware (max 7 instances per group per AZ)
  - ***Partition***—spreads instances across many different partitions (which rely on different sets of racks) within an AZ. Scales to 100s of EC2 instances per group (Hadoop, Cassandra, Kafka)

## Placement Groups Cluster



- **Pros:** Great network (10 Gbps bandwidth between instances)
- **Cons:** If the rack fails, all instances fail at the same time
- **Use case:**
  - Big Data job that needs to complete fast
  - Application that needs extremely low latency and high network throughput

# Placement Groups Spread



- **Pros:**

- Can span across Availability Zones (AZ)
- Reduced risk of simultaneous failure
- EC2 Instances are on different physical hardware

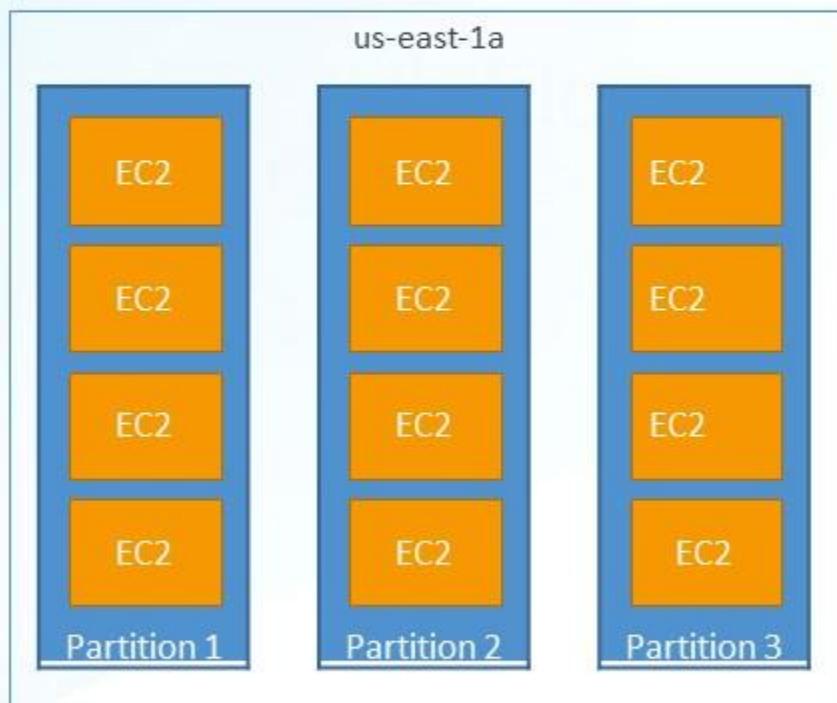
- **Cons:**

- Limited to 7 instances per AZ per placement group

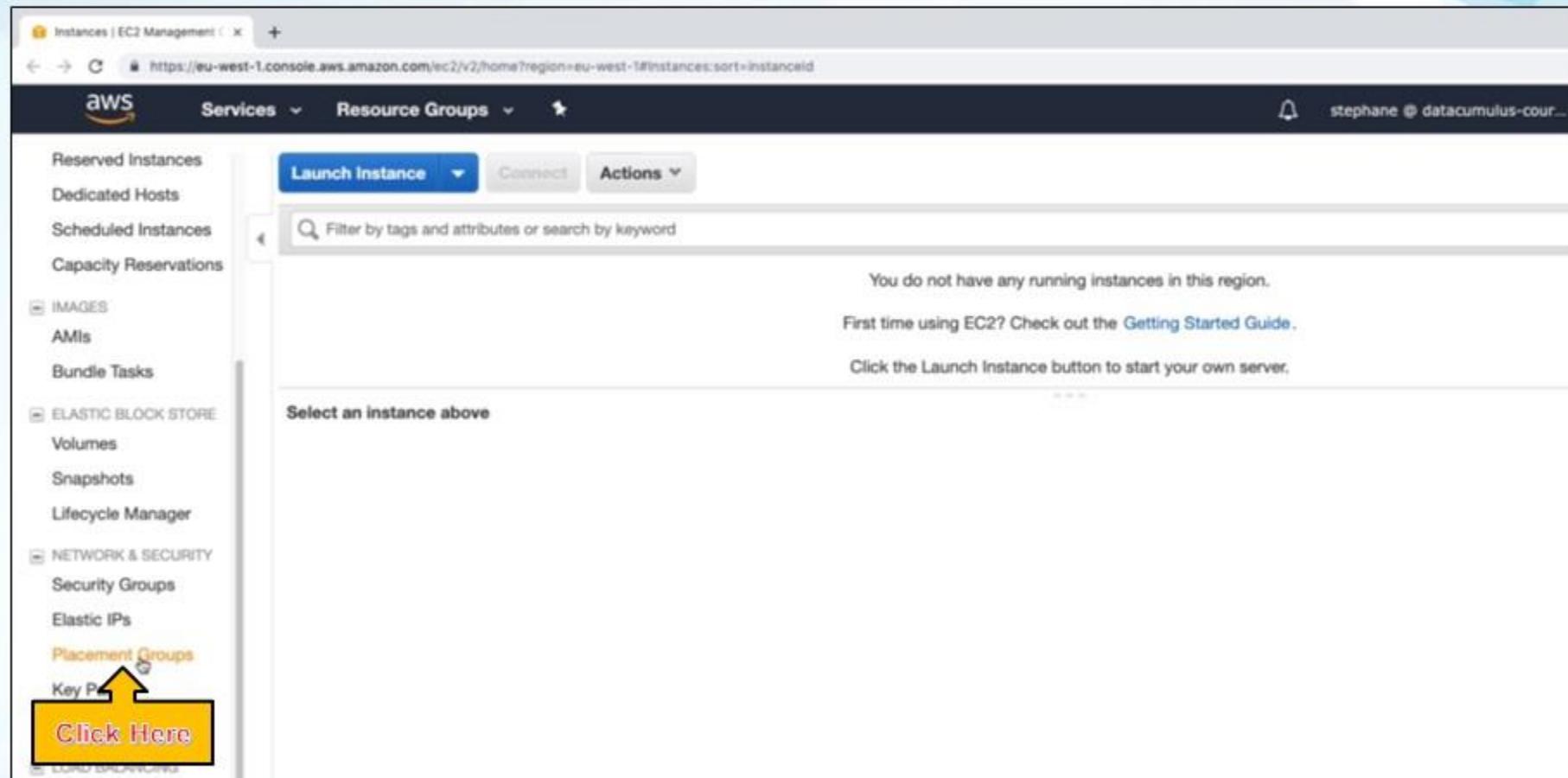
- **Use case:**

- Application that needs to maximize high availability
- Critical Applications where
- each instance must be isolated from failure from each other

# Placements Groups Partition



- Up to 7 partitions per AZ
- Up to 100s of EC2 instances
- The instances in a partition do not share racks with the instances in the other partitions
- A partition failure can affect many EC2 but won't affect other partitions
- EC2 instances get access to the partition information as metadata
- Use cases: HDFS, HBase, Cassandra, Kafka



Instances | EC2 Management +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#instances:sort=instanceId

AWS Services Resource Groups

stephane @ datacumulus-cour...

Reserved Instances

Dedicated Hosts

Scheduled Instances

Capacity Reservations

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

Lifecycle Manager

NETWORK & SECURITY

Security Groups

Elastic IPs

Placement Groups

Key P

Click Here

Load Balancing

Launch Instance Connect Actions

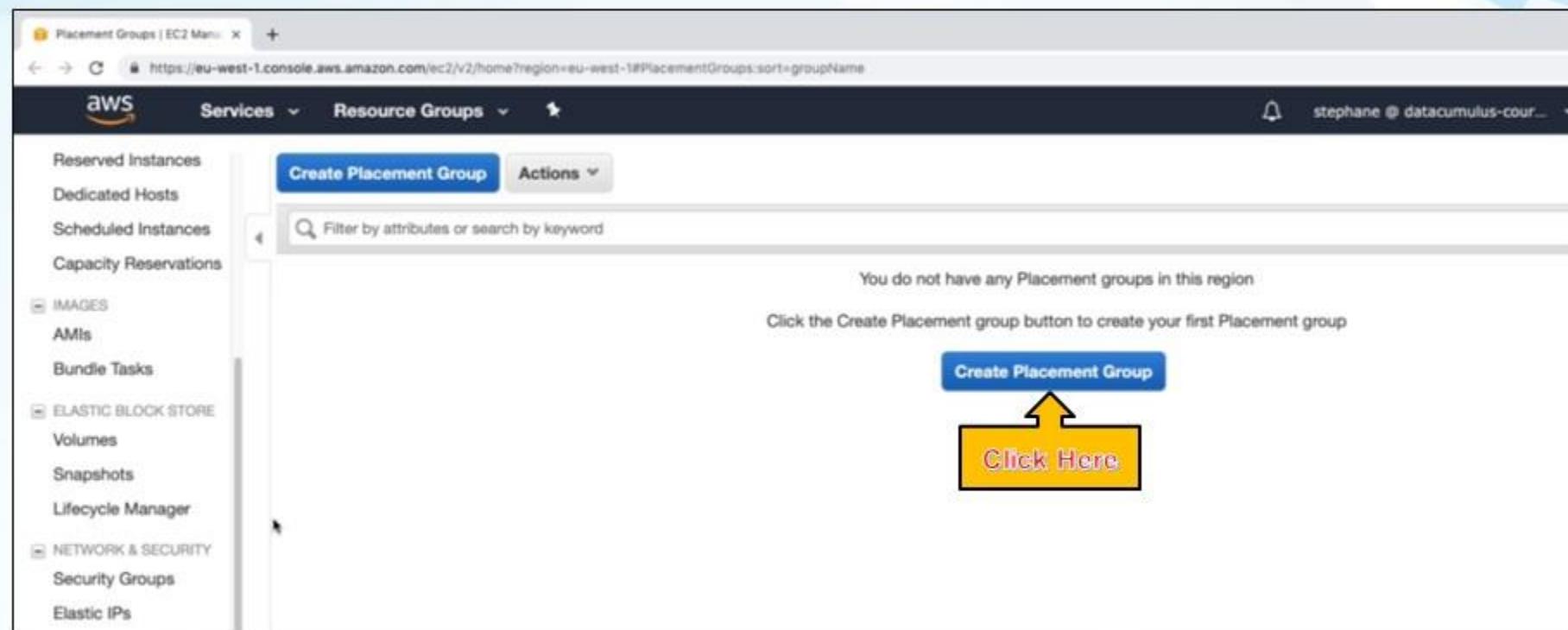
Filter by tags and attributes or search by keyword

You do not have any running instances in this region.

First time using EC2? Check out the Getting Started Guide.

Click the Launch Instance button to start your own server.

Select an instance above



Placement Groups | EC2 Manu X +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#PlacementGroups:sort=groupName

aws Services Resource Groups

stephane @ datacumulus-cour...

Reserved Instances

Dedicated Hosts

Scheduled Instances

Capacity Reservations

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

Lifecycle Manager

NETWORK & SECURITY

Security Groups

Elastic IPs

Create Placement Group Actions

Filter by attributes or search by keyword

You do not have any Placement groups in this region

Click the Create Placement group button to create your first Placement group

Create Placement Group

Click Here

A yellow callout box with a black border and a black arrow points from the text "Click Here" to the "Create Placement Group" button.

[Services](#)[Resource Groups](#)

Placement groups > Create Placement Group

## Create Placement Group

Name



Strategy



▶ AWS Command Line Interface command

\* Required

[Cancel](#)[Create](#)

Click Here

Placement Groups | EC2 Man... X +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#PlacementGroups:sort=groupName

**aws** Services Resource Groups

stephane

Reserved Instances

Dedicated Hosts

Scheduled Instances

Capacity Reservations

**IMAGES**

AMIs

Bundle Tasks

**ELASTIC BLOCK STORE**

Volumes

Snapshots

Lifecycle Manager

**Create Placement Group**

**Click Here**

or search by keyword

Group Name	Strategy	State	Number of Partition
my-high-performance-application	cluster	available	-



Services ▾

Resource Groups ▾



Placement groups &gt; Create Placement Group

## Create Placement Group

Name

my-critical-application



Strategy

Spread



▶ AWS Command Line Interface command

\* Required

Cancel

Create

Click Here



Placement Groups | EC2 Man... X +

https://eu-west-1.console.aws.amazon.com/ec2/v2/home?region=eu-west-1#PlacementGroups:sort=groupName

**aws** Services Resource Groups

stephane

Reserved Instances

Dedicated Hosts

Scheduled Instances

Capacity Reservations

**IMAGES**

AMIs

Bundle Tasks

**ELASTIC BLOCK STORE**

Volumes

Snapshots

Lifecycle Manager

**Create Placement Group**

**Click Here**

or search by keyword

Group Name	Strategy	State	Number of Partition
my-high-performance-application	cluster	available	-

Placement groups > Create Placement Group

## Create Placement Group

Name  ⓘ

Strategy  ⓘ

Number of partitions  ⓘ

▶ AWS Command Line Interface command

\* Required

Cancel

Create

Click Here

aws Services Resource Groups ➔

**Create Placement Group** Actions

Filter by attributes or search by keyword

Group Name	Strategy	State	Number of Partition
my-critical-application	spread	available	-
my-distributed-application	partition	available	3
<b>my-high-performance-application</b>	cluster	available	-

Reserved Instances  
Dedicated Hosts  
Scheduled Instances  
Capacity Reservations  
IMAGES  
AMIs  
Bundle Tasks  
ELASTIC BLOCK STORE  
Volumes  
Snapshots  
Lifecycle Manager  
NETWORK & SECURITY  
Security Groups  
Elastic IPs  
**Placement Groups**  
Key Pairs

aws Services Resource Groups

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
General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
General purpose	t2.micro	1	1	EBS only	-	Low to Moderate	Yes
General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
General purpose	t3.nano	2	0.5	EBS only	Yes	Up to 5 Gigabit	Yes
General purpose	t3.micro	2	1	EBS only	Yes	Up to 5 Gigabit	Yes

Cancel Previous Review and Launch Next: Configure Instance Details



Click Here

aws Services Resource Groups

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-cf92b5a9 (default) Create new VPC

Subnet: No preference (default subnet in any Availability Zone) Create new subnet

Auto-assign Public IP: Use subnet setting (Enable)

Placement group: Add instance to placement group.

Capacity Reservation: Create new Capacity Reservation

IAM role: 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.

Cancel Previous Review and Launch Next: Add Storage

**Click Here** (highlighted with a yellow box and arrow)

Network 

vpc-cf92b5a9 (default)



 Create new VPC

Subnet 

No preference (default subnet in any Availability Zone)

 Create new subnet

Auto-assign Public IP 

Use subnet setting (Enable)



Placement group 

Add instance to placement group

Add to existing placement group.

Add to a new placement group.

Placement group name 

Choose placement group



Network	<a href="#">i</a>	vpc-cf92b5a9 (default)	<a href="#">C</a> Create new VPC
Subnet	<a href="#">i</a>	No preference (default subnet in any Availability Zone)	<a href="#">Create new subnet</a>
Auto-assign Public IP	<a href="#">i</a>	Use subnet setting (Enable)	
Placement group	<a href="#">i</a>	<input checked="" type="checkbox"/> Add instance to placement group	
Placement group name	<a href="#">i</a>	<input type="radio"/> Add to existing placement group. <input type="radio"/> Add to a new placement group. my-critical-application (spread)	
<p>You can launch up to 7 more instances into this placement group. Spread placement groups can have up to seven running instances per Availability Zone. <a href="#">Learn more</a></p>			
Capacity Reservation	<a href="#">i</a>	Open	<a href="#">C</a> Create new Capacity Reservation
IAM role	<a href="#">i</a>	None	<a href="#">C</a> Create new IAM role
Shutdown behavior	<a href="#">i</a>	Stop	

## Step 2: Choose an Instance Type

<input type="checkbox"/>	General purpose	m5a.large	2	8	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5a.xlarge	4	16	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5a.2xlarge	8	32	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5a.4xlarge	16	64	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5a.8xlarge	16	128	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5a.12xlarge	48	192	EBS only	Yes	10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5a.16xlarge	32	256	EBS only	Yes	12 Gigabit	Yes
<input checked="" type="checkbox"/>	General purpose	m5a.24xlarge	96	384	EBS only	Yes	20 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5d.large	2	8	1 x 75 (SSD)	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5d.xlarge	4	16	1 x 150 (SSD)	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5d.2xlarge	8	32	1 x 300 (SSD)	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5d.4xlarge	16	64	2 x 300 (SSD)	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5d.8xlarge	16	128	2 x 600 (SSD)	Yes	10 Gigabit	Yes

[Cancel](#)[Previous](#)[Review and Launch](#)[Next: Configure Instance Details](#)

Click Here

## You selected a different instance type

We've noticed that you changed your **instance type**. Doing so may also **clear** your previous **tenancy, CPU and storage** configuration. Do you want to continue?

Yes, I want to continue with this instance type (**m5a.24xlarge**)

**Click Here**

want to keep my previous instance type selection (**t2.micro**)

Cancel, I want to choose a different instance type

Next

## You selected a different instance type

We've noticed that you changed your **instance type**. Doing so may also **clear** your previous **tenancy, CPU and storage** configuration. Do you want to continue?

- Yes, I want to continue with this instance type (**m5a.24xlarge**)
- No, I want to keep my previous instance type selection (**t2.micro**)
- Cancel, I want to choose a different instance type

Next

Click Here

aws Services Resource Groups ★

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

Number of instances	<input type="text" value="1"/>	Launch into Auto Scaling Group
Purchasing option	<input checked="" type="checkbox"/> Request Spot instances	
Network	<input type="text" value="vpc-cf92b5a9 (default)"/>	<input checked="" type="button"/> Create new VPC
Subnet	<input type="text" value="No preference (default subnet in any Availability Zone)"/>	<input checked="" type="button"/> Create new subnet
Auto-assign Public IP	<input type="text" value="Use subnet setting (Enable)"/>	
Placement group	<input checked="" type="checkbox"/> Add instance to placement group	
Placement group name	<input type="text" value="my-high-performance-application (cluster)"/>	
Capacity Reservation	<input type="text" value="Open"/>	<input checked="" type="button"/> Create new Capacity Reservation
IAM role	<input type="text" value="None"/>	<input checked="" type="button"/> Create new IAM role
CPU options	<input checked="" type="checkbox"/> Specify CPU options	
Shutdown behavior	<input type="text" value="Stop"/>	

# **EC2 for the Solution Architect**



Amazon EC2

## EC2 for Solutions Architects

- EC2 instances are billed by the second, t2.micro is free tier
- On Linux / Mac we use SSH, on Windows we use Putty
- SSH is on port 22, lock down the security group to your IP
- Timeout issues => Security groups issues
- Permission issues on the SSH key => run “chmod 0400”
- Security Groups can reference other Security Groups instead of IP ranges (very popular exam question)
- Know the difference between Private, Public and Elastic IP
- You can customize an EC2 instance at boot time using EC2 User Data

## EC2 for Solutions Architects

- Know the 4 EC2 launch modes:
  - On demand
  - Reserved
  - Spot instances
  - Dedicated Hosts
- Know the basic instance types: R,C,M,I,G,T2/T3
- You can create AMIs to pre-install software on your EC2 => faster boot
- AMI can be copied across regions and accounts
- EC2 instances can be started in placement groups:
  - Cluster
  - Spread

# EC2 Final Quiz

Question 1:

You would like to make sure your EC2 instances have the highest performance while talking to each other as you're performing big data analysis. Which placement group should you choose?

- cluster
- spread

Question 2:

You plan on running an open-source MongoDB database year-round on EC2. Which instance launch mode should you choose?

On-Demand

Reserved Instances

Spot Instances

Question 3:

You built and published an AMI in the ap-southeast-2 region, and your colleague in us-east-1 region cannot see it

Their IAM permissions are wrong.

An AMI created for a region can only be seen in that region

You need to share the AMI with them explicitly

## Question 4:

You are launching an EC2 instance in us-east-1 using this Python script snippet:

(we will see SDK in a later section, for now just look at the code reference `ImageId` )

```
1 | ec2.create_instances(ImageId='ami-b23a5e7', MinCount=1, MaxCount=1)
```

It works well, so you decide to deploy your script in us-west-1 as well. There, the script does not work and fails with "ami not found" error. What's the problem?



AMI is region locked and the same ID cannot be used across regions

The AMI needs to first be shared to another region. The same ID can then be used

Question 5:

You would like to deploy a database technology and the vendor license bills you based on the physical cores and underlying network socket visibility. Which EC2 launch modes allows you to get visibility into them?

Spot Instances

Dedicated Hosts

On-Demand

Reserved Instances

Question 6:

Your application takes about 30 minutes to install, which is the fastest way to reliably start it multiple times with minimum install time?

Use EC2 User Data

  Create an AMI after installing the application

Use the EC2 Cluster Placement Group

Provision an R4.xlarge instance type

# Thank You