

VPC Overview

Virtual Private Cloud (VPC) is a virtual network that closely resembles a traditional network that we operate in your own data center, with the benefits of using the scalable infrastructure of AWS. A virtual private cloud (VPC) is logically isolated from other virtual networks in the AWS cloud.

We can launch our AWS resources, such as Amazon EC2 instances, into our VPC. Those resources could be private to our VPC and not accessible from the Internet, or they could be made public and accessible to a select group of IP addresses or the entire Web.

You have complete control over your virtual networking environment, including selection of your own IP address range, creation of subnets, and configuration of route tables and network gateways

What we can do with VPC?

- Launch instances into a subnet of your choosing.
- Assign custom IP address ranges in each subnet.
- Configure route tables between subnets.
- Create internet gateway and attach it to our VPC.
- Better security control over your AWS resources

Subnet

A subnet is a range of IP addresses in your VPC. You can launch AWS resources into a subnet that you select. If a subnet doesn't have a route to the internet gateway, the subnet is known as a *private subnet*.

A VPC spans all the Availability Zones in the region. After creating a VPC, you can add one or more subnets in each Availability Zone. When you create a subnet, you specify the CIDR block for the subnet, which is a subset of the VPC CIDR block. Each subnet must reside entirely within one Availability Zone and cannot span zones. Availability Zones are distinct locations that are engineered to be isolated from failures in other Availability Zones. By launching instances in separate Availability Zones, you can protect your applications from the failure of a single location.

Route Tables

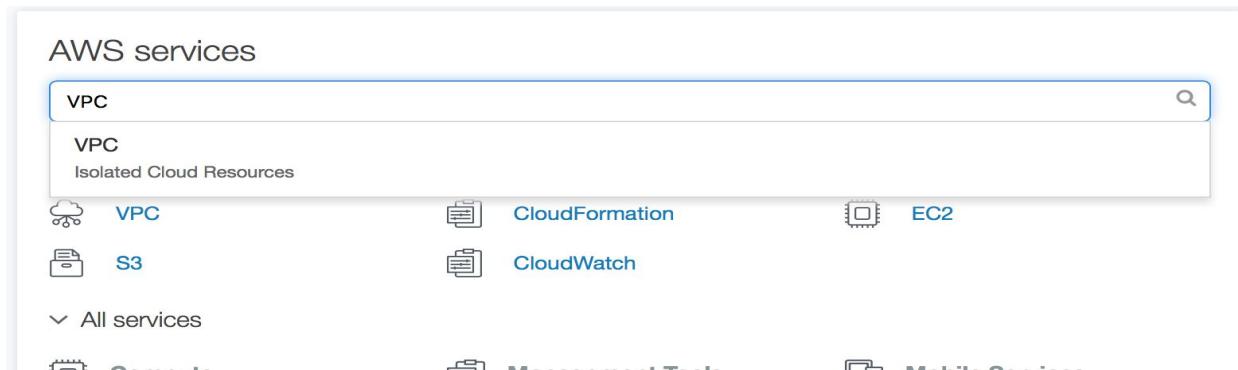
A route table contains a set of rules, called routes, that are used to determine where network traffic is directed. Each subnet in your VPC must be associated with a routing table; the table controls the routing for the subnet. A subnet can only be associated with one route table at a time, but you can associate multiple subnets with the same route table.

Security Groups

A security group acts as a virtual firewall for your EC2 instance (Virtual machine) to control inbound and outbound traffic. When you launch an instance in a VPC, you can assign up to five security groups to the instance. Security groups act at the instance level, not the subnet level. Therefore, each instance in a subnet in your VPC could be assigned to a different set of security groups. If you don't specify a particular group at launch time, the instance is automatically assigned to the default security group for the VPC.

You might set up network ACLs with rules similar to your security groups in order to add an additional layer of security to your VPC

AWS Services Search bar VPC



Select type of the VPC(VPC with Public/Private Subnets)

Step 1: Select a VPC Configuration

VPC with a Single Public Subnet

VPC with Public and Private Subnets

VPC with Public and Private Subnets and Hardware VPN Access

VPC with a Private Subnet Only and Hardware VPN Access

In addition to containing a public subnet, this configuration adds a private subnet whose instances are not addressable from the Internet. Instances in the private subnet can establish outbound connections to the Internet via the public subnet using Network Address Translation (NAT).

Creates:

A /16 network with two /24 subnets. Public subnet instances use Elastic IPs to access the Internet. Private subnet instances access the Internet via Network Address Translation (NAT). (Hourly charges for NAT devices apply.)

Select

Cancel and Exit

Create VPC name

Create VPC

A VPC is an isolated portion of the AWS cloud populated by AWS objects, such as Amazon EC2 instances. You must specify an IPv4 address range for your VPC. Specify the IPv4 address range as a Classless Inter-Domain Routing (CIDR) block; for example, 10.0.0.0/16. You cannot specify an IPv4 CIDR block larger than /16. You can optionally associate an Amazon-provided IPv6 CIDR block with the VPC.

Name tag	<input type="text"/>	<small>i</small>
IPv4 CIDR block*	<input type="text"/>	<small>i</small>
IPv6 CIDR block*	<input checked="" type="radio"/> No IPv6 CIDR Block <input type="radio"/> Amazon provided IPv6 CIDR block	<small>i</small>
Tenancy	Default	<small>i</small>

Cancel **Yes, Create**

After creating VPC name

VPC Dashboard

Create subnet

Filter by VPC:

Virtual Private Cloud

Your VPCs

Subnets

Route Tables

Internet Gateways

Exclude Only Internet

Name	Subnet ID	State	VPC	IPv4 CIDR
	subnet-90e792f5	available	vpc-27fc9c43 Default	172.31.64.0/20

Create a Public Subnet

Create subnet

Specify your subnet's IP address block in CIDR format; for example, 10.0.0.0/24. IPv4 block sizes must be between a /16 netmask and /28 netmask, and can be the same size as your VPC. An IPv6 CIDR block must be a /64 CIDR block.

Name tag [i](#)

VPC* [i](#)

VPC CIDRs	CIDR	Status	Status Reason
	192.168.0.0/16	associated	

Availability Zone [i](#)

IPv4 CIDR block* [i](#)

* Required [Cancel](#) [Create](#)

Subnet was Created

Create subnet

 The following Subnet was created:

Subnet ID [subnet-ad42c7f1](#)

[Close](#)

Create a Private Subnet

[Subnets](#) > Create subnet

Create subnet

Specify your subnet's IP address block in CIDR format; for example, 10.0.0.0/24. IPv4 block sizes must be between a /16 netmask and /28 netmask, and can be the same size as your VPC. An IPv6 CIDR block must be a /64 CIDR block.

Name tag	e91_private_subnet	i	
VPC*	vpc-65ff2a1f	i	
VPC CIDRs	CIDR	Status	Status Reason
	192.168.0.0/16	associated	
Availability Zone	us-east-1b	i	
IPv4 CIDR block*	192.168.16.0/20	i	

* Required

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

[Subnets](#) > Create subnet

Create subnet

The following Subnet was created:

Subnet ID subnet-827bc3e5

[Close](#)

Create Internet Gateway

[Internet gateways](#) > Create internet gateway

Create internet gateway

An internet gateway is a virtual router that connects a VPC to the internet. To create a new internet gateway specify the name for the gateway below.

Name tag e91_gw i

* Required

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

[Internet gateways](#) > Create internet gateway

Create internet gateway

✓ The following internet gateway was created:

Internet gateway ID igw-209da558

[Close](#)

Internet Gateway Console

[Create internet gateway](#) [Actions ▾](#)

Filter by tags and attributes or search by keyword

Name	ID	State	VPC
igw-147a8c70	attached	vpc-27fc9c43 De...	
e91_gw	igw-209da558	detached	-

From the console (attach internet gateway to a VPC)

[Create internet gateway](#) [Actions ▾](#)

Filter by tags and attributes

Name	ID	State	VPC
igw-147a8c70	attached	vpc-27fc9c43 De...	
e91_gw	igw-209da558	detached	-

Specify which VPC

[Internet gateways](#) > Attach to VPC

Attach to VPC

Attach an internet gateway to a VPC to enable communication with the internet. Specify the VPC you would like to attach below.

VPC* [?](#)

[AWS Command Line Interface command](#)

* Required

[Cancel](#) [Attach](#)

Internet gateway console(State attached)

The screenshot shows the AWS VPC Internet Gateways page. On the left, there's a sidebar with links like 'Virtual Private Cloud', 'Our VPCs', 'Subnets', 'Route Tables', 'Internet Gateways', 'Ingress Only Internet Gateways', and 'DHCP Options Sets'. The main area has a search bar and a table with columns: Name, ID, State, and VPC. There are two entries: one named 'igw-147a8c70' and another named 'e91_gw' which is selected. The 'e91_gw' entry is attached to the VPC 'vpc-65ff2a1f | e91_vpc'.

Routing Table console (shows Default Subnets)

The screenshot shows the AWS VPC Route Tables page. The sidebar is identical to the previous screenshot. The main area shows a table with columns: Name, Route Table ID, Explicitly Associated, Main, and VPC. There are two route tables listed: 'rtb-c8b0e7b7' and 'rtb-5e92c83a', both associated with the 'Main' VPC and the 'vpc-65ff2a1f | e91_vpc' VPC.

Create Routing table for the Public VPC

The screenshot shows the 'Create Route Table' dialog box. It contains a descriptive text about route tables, a 'Name tag' input field with 'e91_public_rt', a 'VPC' dropdown menu set to 'vpc-65ff2a1f | e91_vpc', and two buttons at the bottom: 'Cancel' and 'Yes, Create'.

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C Dashboard

Search by VPC: Select a VPC

Virtual Private Cloud

- 1 VPCs
- 1 Subnets
- 1 Route Tables
- 1 Internet Gateways
- 1 Static IP Sets
- 1 IP points
- 1 IP point Services

Create Route Table Delete Route Table Set As Main Table

Search Route Tables and their X

1 to 3 of 3 Route Tables

Name	Route Table ID	Explicitly Associated With	Main	VPC
rtb-c8b0e7b7	0 Subnets	Yes	vpc-65ff2a1f e91_vpc	
e91_public_rt	rtb-c8b3e4b7	0 Subnets	No	vpc-65ff2a1f e91_vpc
rtb-5e92c83a	0 Subnets	Yes	vpc-27fc9c43 Default	

rtb-c8b3e4b7 | e91_public_rt

Summary Routes Subnet Associations Route Propagation Tags

Route Table ID: rtb-c8b3e4b7 | e91_public_rt

Main: no
VPC: vpc-65ff2a1f | e91_vpc

Explicitly Associated With: 0 Subnets

Card

Search Route Tables and their X

1 to 3 of 3 Route Tables

Name	Route Table ID	Explicitly Associated With	Main	VPC
rtb-c8b0e7b7	0 Subnets	Yes	vpc-65ff2a1f e91_vpc	
e91_public_rt	rtb-c8b3e4b7	0 Subnets	No	vpc-65ff2a1f e91_vpc
rtb-5e92c83a	0 Subnets	Yes	vpc-27fc9c43 Default	

rtb-c8b3e4b7 | e91_public_rt

Summary Routes Subnet Associations Route Propagation Tags

Cancel Save

View: All rules

Destination	Target	Status	Propagated	Remove
192.168.0.0/16	local	Active	No	
0.0.0.0/0	igw-209da558	No		X

Add another route

Subnet Association

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Dashboard by VPC: Select a VPC

Virtual Private Cloud VPCs Subnets Route Tables Internet Gateways Egress Only Internet Gateways DHCP Options Sets Elastic IPs Endpoints Endpoint Services NAT Gateways Peering Connections Security Work ACLs Security Groups

Create Route Table Delete Route Table Set As Main Table Search Route Tables and their X

Route Tables (3)

Name	Route Table ID	Explicitly Associated	Main	VPC
rtb-c8b0e7b7	rtb-c8b0e7b7	0 Subnets	Yes	vpc-65ff2a1f e91_vpc
e91_public_rt	rtb-c8b3e4b7	0 Subnets	No	vpc-65ff2a1f e91_vpc
rtb-5e92c83a	rtb-5e92c83a	0 Subnets	Yes	vpc-27fc9c43 Default

rtb-c8b3e4b7 | e91_public_rt

Summary Routes Subnet Associations Route Propagation Tags

Edit

Subnet IPv4 CIDR IPv6 CIDR

You do not have any subnet associations.

The following subnets have not been explicitly associated with any route tables and are therefore associated with the main route table:

Subnet	IPv4 CIDR	IPv6 CIDR
subnet-ad42c7f1 e91_public_subnet	192.168.0.0/20	-
subnet-827bc3e5 e91_private_subnet	192.168.16.0/20	-

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Dashboard by VPC: Select a VPC

Virtual Private Cloud VPCs Subnets Route Tables Internet Gateways Egress Only Internet Gateways DHCP Options Sets Elastic IPs Endpoints Endpoint Services NAT Gateways Peering Connections Security Work ACLs Security Groups

Create Route Table Delete Route Table Set As Main Table Search Route Tables and their X

Route Tables (3)

Name	Route Table ID	Explicitly Associated	Main	VPC
rtb-c8b0e7b7	rtb-c8b0e7b7	0 Subnets	Yes	vpc-65ff2a1f e91_vpc
e91_public_rt	rtb-c8b3e4b7	0 Subnets	No	vpc-65ff2a1f e91_vpc
rtb-5e92c83a	rtb-5e92c83a	0 Subnets	Yes	vpc-27fc9c43 Default

rtb-c8b3e4b7 | e91_public_rt

Summary Routes Subnet Associations Route Propagation Tags

Cancel Save

Associate Subnet IPv4 CIDR IPv6 CIDR Current Route Table

Associate	Subnet	IPv4 CIDR	IPv6 CIDR	Current Route Table
<input checked="" type="checkbox"/>	subnet-ad42c7f1 e91_public_subnet	192.168.0.0/20	-	Main
<input type="checkbox"/>	subnet-827bc3e5 e91_private_subnet	192.168.16.0/20	-	Main

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PC Dashboard Iter by VPC: Select a VPC

Virtual Private Cloud Your VPCs Subnets Route Tables Internet Gatewaysgress Only Internet Gateways HCP Options Sets Elastic IPs Endpoints Endpoint Services AT Gateways Peering Connections Security Network ACLs Security Groups

Create Route Table Delete Route Table Set As Main Table Search Route Tables and their X

Name	Route Table ID	Explicitly Associated	Main	VPC
rtb-c8b0e7b7	0 Subnets	Yes	vpc-65ff2a1f e91_vpc	
e91_public_rt	1 Subnet	No	vpc-65ff2a1f e91_vpc	
rtb-5e92c83a	0 Subnets	Yes	vpc-27fc9c43 Default	

rtb-c8b3e4b7 | e91_public_rt

Summary Routes Subnet Associations Route Propagation Tags

Edit Save Successful

Subnet	IPv4 CIDR	IPv6 CIDR
subnet-ad42c7f1 e91_public_subnet	192.168.0.0/20	-

The following subnets have not been explicitly associated with any route tables and are therefore associated with the main route table:

Subnet	IPv4 CIDR	IPv6 CIDR
subnet-827bc3e5 e91_private_subnet	192.168.16.0/20	-

Create Route Table

A route table specifies how packets are forwarded between the subnets within your VPC, the Internet, and your VPN connection.

Name tag: e91_private_rt

VPC: vpc-65ff2a1f | e91_vpc

Cancel Yes, Create

Create Route Table **Delete Route Table** **Set As Main Table**

Search Route Tables and their X « « 1 to 4 of 4 Routes » »

<input type="checkbox"/>	Name	Route Table ID	Explicitly Associated	Main	VPC
<input type="checkbox"/>	rtb-c8b0e7b7	0 Subnets	Yes	vpc-65ff2a1f e91_vpc	
<input type="checkbox"/>	e91_public_rt	rtb-c8b3e4b7	1 Subnet	No	vpc-65ff2a1f e91_vpc
<input type="checkbox"/>		rtb-5e92c83a	0 Subnets	Yes	vpc-27fc9c43 Default
<input checked="" type="checkbox"/>	e91_private_rt	rtb-c3bfe8bc	0 Subnets	No	vpc-65ff2a1f e91_vpc

rtb-c3bfe8bc | e91_private_rt

Summary **Routes** **Subnet Associations** **Route Propagation** **Tags**

Cancel **Save**

Associate	Subnet	IPv4 CIDR	IPv6 CIDR	Current Route Table
<input type="checkbox"/>	subnet-ad42c7f1 e91_public_subnet	192.168.0.0/20	-	rtb-c8b3e4b7 e91_public_rt
<input checked="" type="checkbox"/>	subnet-827bc3e5 e91_private_subnet	192.168.16.0/20	-	Main

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VPC Dashboard **Create NAT Gateway** **Actions**

Filter by VPC: Select a VPC None found

You do not have any NAT Gateways in this region

Click the Create NAT Gateway button to create your first NAT Gateway

Create NAT Gateway

Virtual Private Cloud

- Your VPCs
- Subnets
- Route Tables
- Internet Gateways
- Egress Only Internet Gateways
- DHCP Options Sets
- Elastic IPs
- Endpoints
- Endpoint Services
- NAT Gateways
- Peering Connections

Create NAT Gateway

Create a NAT gateway and assign it an Elastic IP address. [Learn more.](#)

Subnet* C i

Elastic IP Allocation ID* C Create New EIP i

New EIP (18.206.141.112) creation successful.

* Required

Cancel Create a NAT Gateway

Create NAT Gateway Actions ▾

Filter by tags and attributes or search by keyword

Name	NAT Gateway ID	Status	Status Message	Elastic IP Address	Private IP Address	Network Interface ID
nat-05980944ec2a8fb3b	nat-05980944ec2a8fb3b	-	-	-	-	-

NAT Gateway: nat-05980944ec2a8fb3b

Details Monitoring Tags

NAT Gateway ID	nat-05980944ec2a8fb3b	Status	pending
Status Message	-	Elastic IP Address	-
Private IP Address	-	Network Interface ID	-
VPC	vpc-65ff2a1f e91_vpc	Subnet	subnet-ad42c7f1 e91_public_subnet
Created	August 5, 2018 at 4:36:38 PM UTC-4	Deleted	-

Allocate new address Actions ▾

Filter by tags and attributes or search by keyword

Name	Elastic IP	Allocation ID	Instance	Private IP address	Scope
18.206.141.112	eipalloc-42689049	-	-	-	vpc

Description Tags

Address: 18.206.141.112

Elastic IP	18.206.141.112	Allocation ID	eipalloc-42689049
Instance	-	Private IP address	-
Scope	vpc	Association ID	-

Filter by VPC: Select a VPC

Create subnet

Actions ▾

- Delete subnet
- Create flow log
- Modify auto-assign IP settings**
- Edit IPv6 CIDRs
- Edit network ACL association
- Edit route table association
- Add/Edit Tags

Subnet ID	State	VPC	IPv4 CIDR
subnet-ad42c7f1	available	vpc-65ff2a1f e91_vpc	192.168.0.0/20
subnet-827bc3e5	available	vpc-65ff2a1f e91_vpc	192.168.16.0..
subnet-e7b85ecd	available	vpc-27fc9c43 Default	172.31.48.0/20
subnet-976a11b0	available	vpc-27fc9c43 Default	172.31.80.0/20

Subnet: subnet-ad42c7f1

Description Flow Logs Route Table Network ACL Tags

Subnet ID: subnet-ad42c7f1	State: available
VPC: vpc-65ff2a1f e91_vpc	IPv4 CIDR: 192.168.0.0/20
Available IPv4 Addresses: 4090	IPv6 CIDR: -
Availability Zone: us-east-1a	Route Table: rtb-c8b3e4b7 e91_public_rt
Network ACL: acl-9c6458e6	Default subnet: No
Auto-assign public IPv4 address: No	Auto-assign IPv6 address: No

[Subnets](#) > Modify auto-assign IP settings

Modify auto-assign IP settings

Enable the auto-assign IP address setting to automatically request a public IPv4 or IPv6 address for an instance launched in this subnet. You can override the auto-assign IP settings for an instance at launch time.

Subnet ID: subnet-ad42c7f1

Auto-assign IPv4 Enable auto-assign public IPv4 address [?](#)

* Required

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

[Subnets](#) > Modify auto-assign IP settings

Modify auto-assign IP settings

Enable the auto-assign IP address setting to automatically request a public IPv4 or IPv6 address for an instance launched in this subnet. You can override the auto-assign IP settings for an instance at launch time.

Subnet ID: subnet-ad42c7f1

Auto-assign IPv4 Enable auto-assign public IPv4 address [?](#)

* Required

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

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Filter by VPC: Select a VPC Create Security Group Security Group Actions

Virtual Private Cloud Your VPCs Subnets Route Tables Internet Gateways Egress Only Internet Gateways DHCP Options Sets Elastic IPs Endpoints Endpoint Services NAT Gateways Peering Connections Security Network ACLs Security Groups

Filter All security groups Search Security Groups and t X 1 to 4 of 4 Security Groups

Name tag	Group ID	Group Name	VPC	Description
	sg-0c6c9c41	default	vpc-65ff2a1f e91_vpc	default VPC security group
	sg-23d01b5a	default	vpc-27fc9c43 Default	default VPC security group

Select a security group above

Create Security Group Security Group Actions

Filter All security groups Search Security Groups and t X 1 to 4 of 4 Security Groups

Name tag: e91_ssh_internet

Group name: e91_ssh_internet

Description: open e91 ssh port to the internet

VPC: vpc-65ff2a1f | e91_vpc

Cancel Yes, Create

Create Security Group | Security Group Actions

Filter All security groups | Search Security Groups and t X

1 to 5 of 5 S

Create Security Group

Name tag: e91_web_internet

Group name: e91_web_internet

Description: open e91 web ports to the internet

VPC: vpc-65ff2a1f | e91_vpc

Cancel | Yes, Create

Create Security Group | Security Group Actions

Filter All security groups | Search Security Groups and t X

1 to 6 of 6 Sec

Name tag	Group ID	Group Name	VPC	Description
<input checked="" type="checkbox"/> e91_web_internet	sg-26af5c6b	e91_web_internet	vpc-65ff2a1f e91_vpc	open e91 web ports to the internet
<input type="checkbox"/> e91_ssh_internet	<input type="button" value="Edit"/>	e91_ssh_internet	vpc-65ff2a1f e91_vpc	open e91 ssh port to the internet

sg-26af5c6b | e91_web_internet

Summary | Inbound Rules | Outbound Rules | Tags

Edit

Type	Protocol	Port Range	Source	Description
HTTP (80)	TCP (6)	80	0.0.0.0/0	open 80 to internet
HTTPS (443)	TCP (6)	443	0.0.0.0/0	open 443 to internet...

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

Instances

Launch Templates

Spot Requests

Reserved Instances

Dedicated Hosts

Scheduled Instances

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Create Key Pair

Import Key Pair

Delete

Filter by attributes or search by keyword

Key pair name: id_rsa

Fingerprint: 9c:1a:65:ca:f9:49:86:a6:68:b0:84:fc:2a:e1:75:4c

Create Key Pair

Key pair name: e91_key

Cancel Create

e91_key.pem.txt

```
-----BEGIN RSA PRIVATE KEY-----
MIIEp0IBAAKCAQEaudghTtVyrqn00SryZJDJ5hIU4msTwfNc+YR2nyAenUTJ47JcWmfrBCU9qP60
zF1I9DZoNffJV6I5Vt3CWEBCiLj2a0vs8WjuTTJ4AkSogPB9p+3lsbl4nc7Nv8bXdwE6asyBB6y
7+ERQWkyemWe9uw8FL+ZpmTBQEY1GMLHPLTLPsEdN6d1h7h596tzYtYLMjz9Rs9N3Sk9jePzj1
I1xpGrcfSpseCqMzPtMyBch7XE896xTXYnGLExCLJpw0qrwHsehE5bjhW+RCWxLwIDAQABaoIBAATFCUX0sJzK
4j+lg9wY4zWmbSbKfL1Tk6LvwheeWqr40qWv0wKshCbLBp0RJIA2Ch8ZPxNmBtIDJSwKFasoK7f
ObL+g0TqQ6Nz0WMomHPUCNxdiQIUh901B8700aVyQJ+RFBawVj17oBxRLxjc0eQmxIlQLpGh7c
wwM0b4quF/mh1J0TRV/4q0W1tZW2GmdpWdMaC0hP2591aP+EjCyPTa3P7rDsb+F2QG00sXpNf+A
tuPtMw3XUclZw0TfYNnePTNwfMuJo7tVakqPSYzt/HnyZLaDvcnGAh7y0Wr0Xs9pScf1xofybT
n8rkk1Bgr8Ufz7ZgKG1u61NMIECgYEAs3QVVab1bEdHTvN5DF0DPBq4CniiI8Fjvsz7dxGat5
rzqzqkgyznM/J/qg+h4cTheY06Sbqm59731CkIgkhH4HKsaMzz/azch91aYJXQLb46p4/vy7gwbx
b50v7VAdg2luUFKZDuuBBBFTJ67VYEnsgto5ksPga7sbelwOp+EcgYEAl0LvhAwdd5A8jma16qY+
wgr6pbYeBfdL4rz5J0mZodKIB1kPGzkDgv/br7pfmvr1HFejBRMMTK075jKEJwsj+gBvnFIotcb
gq56T44a+vAH/W37YdtuUqe/c45qwrHKC4Kgxyr0vouz7n07p0joPkgbUQ1jluxZCg+fMvb0w8C
gYEAtzGoFlxSzmvTq1/7CYq0qgrcpGd76J8PZ0j0hHYD5ucJJW+sNOLwTF0XLgcvNUU6uJLKW1
ZEUKvtmgUX1E13++IFsiPlKtyRhvt7yw93h6UFvWt2V0zhWpIhtIancQ6xbYtE08Q9+SciPEybXG
EJ2Jwvl+U2x6/c8r3D1sMECgYEAv6DpvwGiadxPbFe8/bm9TzTC6W0+MP+qIZELIomnUN3A5vnr
bwqT7ycyhP+IE22cqRC70Gw5X9rKJDMAQKsvKHTbk/8Zp/vLCGKG0+enr6w0mZk9HPAFC+MoIr3B
rLiNjwfdrllaJQjmTrqzWlM0L01e0PFMFL4EFLCy5Ix0/eJUCgYEAmas6CXhku6XVTosNmuyTsnP0
ERC5u7pU5C8GWY5ifNnpj0J1cM/KHna0D1AdcZ5qrbsq73d5fJjlT8CbJxPhl2mAAdhzua5litv
XXG7B1dpJKM82qEqp7p7Xdp3KHme7dC6CoUdc3DwHE0bmo4/JhCQnswuT/3EJVQnQHIRRA=
-----END RSA PRIVATE KEY-----
```

Scheduled Instances

	Key pair name	id_rsa
IMAGES	Fingerprint	9c:1a:65:ca:f9:49:86:a6:68:b0:84:fc:2a:e1:75:4c

```
cBook-Pro---Faras-Sadek:~ faras$ mv ~/Downloads/e91_key.pem.txt .ssh/
cBook-Pro---Faras-Sadek:~ faras$ chmod 600 .ssh/e91_key.pem.txt
cBook-Pro---Faras-Sadek:~ faras$ mv .ssh/e91_key.pem .ssh/e91_key.pem
cBook-Pro---Faras-Sadek:~ faras$
```

The screenshot shows the AWS EC2 Instances page. On the left sidebar, under 'INSTANCES', 'Instances' is selected. In the main content area, there is a table with one row. The row contains a checkbox, the name 'emr.cr.iq', the Instance ID 'i-0ef762cd55dba88a2', the Availability Zone 'us-east-1c', and the status 'stopped'. Below the table, a message says 'Select an instance above'.

Step 1: Choose an Amazon Machine Image (AMI)

[Cancel and Exit](#)

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

The screenshot shows the 'Choose an AMI' step of the EC2 wizard. On the left, a sidebar lists 'My AMIs', 'AWS Marketplace' (with a note 'Free tier eligible'), and 'Community AMIs'. The 'Amazon Linux' item in the 'AWS Marketplace' section is highlighted. The main content area displays the 'Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-b70554c8' details, including its description, root device type (ebs), virtualization type (hvm), and ENA Enabled status (Yes). A 'Select' button is visible on the right. At the bottom, a navigation bar shows steps 1 through 7.

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.

The screenshot shows the 'Choose an Instance Type' step of the EC2 wizard. At the top, there are filters for 'All instance types' and 'Current generation'. The table below lists instance types, their families, types, vCPUs, memory, instance storage, EBS-optimized status, network performance, and IPv6 support. The 't2.micro' instance is selected, indicated by a blue border around its row.

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

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 Launch into Auto Scaling Group

Purchasing option Request Spot instances

Network

Subnet
4090 IP Addresses available

Auto-assign Public IP

Placement group Add instance to placement group.

IAM role

Shutdown behavior

Enable termination protection Protect against accidental termination

Monitoring Enable CloudWatch detailed monitoring
Additional charges apply.

Tenancy

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-00d1996891a5d2fbc	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.

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	e91_ec2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

[Add another tag](#) (Up to 50 tags maximum)

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
<input type="checkbox"/> sg-0ccfc9c41	default	default VPC security group	Copy to new
<input type="checkbox"/> sg-12a1525f	e91_ssh_internet	open e91 ssh port to the internet	Copy to new
<input checked="" type="checkbox"/> sg-26af5c6b	e91_web_internet	open e91 web ports to the internet	Copy to new

Inbound rules for sg-12a1525f (Selected security groups: sg-26af5c6b)

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	0.0.0.0/0	open 22 to interne...

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

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.

AMI Details

[Edit AMI](#)



Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-b70554c8

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-26af5c6b	e91_web_internet	open e91 web ports to the internet

All selected security groups inbound rules

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	0.0.0.0/0	open 22 to interne...

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

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.

AMI Details

Amazon Linux 2 AMI
Free tier eligible

Amazon Linux 2 comes with the latest version of the Amazon Linux 2 operating system, which includes the latest security patches and updates. It is a highly reliable and secure platform for running your applications.

Root Device Type: ebs Virtualization Type: HVM

Instance Type

Instance Type	ECUs
t2.micro	Variable

Security Groups

Security Group ID: sg-26af5c6b

All selected security groups inbound rules

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

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
e91_key

I acknowledge that I have access to the selected private key file (e91_key.pem), and that without this file, I won't be able to log into my instance.

Launch Instances

3, Glibc 2.26, Binutils Edit AMI
Edit instance type
Network Performance
Low to Moderate Edit security groups
Internet

Launch Status

 Your instances are now launching

The following instance launches have been initiated: [i-068c8e2534ad86535](#) 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 Dashboard

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EC2 Dashboard

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- Security Groups
- Elastic IPs
- Placement Groups

Launch Instance | Connect | Actions

search : i-068c8e2534ad86535 | Add filter

Name	Instance ID	Availability Zone	Instance State
e91_ec2	i-068c8e2534ad86535	us-east-1a	pending

Instance: i-068c8e2534ad86535 (e91_ec2) Public IP: 54.160.149.69

Description Status Checks Monitoring Tags

Instance ID	i-068c8e2534ad86535	Public DNS (IPv4)	-
Instance state	pending	IPv4 Public IP	54.160.149.69
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-192-168-15-71.ec2.internal
Availability zone	us-east-1a	Private IPs	192.168.15.71
Security groups	e91_web_internet . view inbound rules . view outbound rules	Secondary private IPs	
Scheduled events	-	VPC ID	vpc-65ff2a1f
AMI ID	amzn2-ami-hvm-2.0.20180622.1-x86_64-gp2 (ami-b70554c8)	Subnet ID	subnet-ad42c7f1
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	e91_key	T2 Unlimited	Disabled
EBS-optimized	False	Owner	072955634019
Root device type	ebs	Launch time	August 5, 2018 at 5:00:10 PM UTC-4 (less than one hour)
		Termination protection	False

Launch Instance | Connect | Actions

search : i-068c8e2534ad86535 | Add filter

Name	Instance ID	Availability Zone	Instance State
e91_ec2	i-068c8e2534ad86535	us-east-1a	running

Instance: i-068c8e2534ad86535 (e91_ec2) Public IP: 54.160.149.69

Description Status Checks Monitoring Tags

Instance ID	i-068c8e2534ad86535	Public DNS (IPv4)	-
Instance state	running	IPv4 Public IP	54.160.149.69
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-192-168-15-71.ec2.internal
Availability zone	us-east-1a	Private IPs	192.168.15.71
Security groups	e91_web_internet . view inbound rules . view outbound rules	Secondary private IPs	
Scheduled events	No scheduled events	VPC ID	vpc-65ff2a1f
AMI ID	amzn2-ami-hvm-2.0.20180622.1-x86_64-gp2 (ami-b70554c8)	Subnet ID	subnet-ad42c7f1
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	e91_key	T2 Unlimited	Disabled
EBS-optimized	False	Owner	072955634019
Root device type	ebs	Launch time	August 5, 2018 at 5:00:10 PM UTC-4 (less than one hour)
		Termination protection	False

```
[MacBook-Pro---Faras-Sadek:~ farass$ telnet 54.160.149.69 22
Trying 54.160.149.69...
```

Servicess Resources Groups

EC2 Dashboard Events Tags Reports Limits Instances Launch Templates Spot Requests Reserved Instances Dedicated Hosts Scheduled Instances Images AMIs Bundle Tasks ELASTIC BLOCK STORE

Launch Instance Connect Actions

search : i-068c8e2534ad86535 Add filter

Name e91_ec2

Instance ID: i-068c8e2534ad86535 54.160.149.69

Description Status Check Instance State Instance Settings Image Networking CloudWatch Monitoring

Elastic IPs Availability zone us-east-1a Security groups e91_web_internet

Scheduled events No scheduled events AMI ID amzn2-ami-hvm-2.0.20180622.1

Connect Get Windows Password Launch More Like This

Change Security Groups Attach Network Interface Detach Network Interface Disassociate Elastic IP Address Change Source/Dest. Check Manage IP Addresses

Public DNS (IPv4) - IPv4 Public IP 54.160.149.69 IPv6 IPs - Private DNS ip-192-168-15-71.ec2.internal Private IPs 192.168.15.71 Secondary private IPs VPC ID vpc-65ff2a1f Subnet ID subnet-ad42c7f1

Change Security Groups

Instance ID:i-068c8e2534ad86535
Interface ID:eni-d38178e0

Select Security Group(s) to associate with your instance

Security Group ID	Security Group Name	Description
<input type="checkbox"/> sg-0c6c9c41	default	default VPC security group
<input type="checkbox"/> sg-12a1525f	e91_ssh_internet	open e91 ssh port to the internet
<input checked="" type="checkbox"/> sg-26af5c6b	e91_web_internet	open e91 web ports to the internet

Cancel Assign Security Groups

Change Security Groups

X

Instance ID:i-068c8e2534ad86535

Interface ID:eni-d38178e0

Select Security Group(s) to associate with your instance

Security Group ID	Security Group Name	Description
<input type="checkbox"/> sg-0c6c9c41	default	default VPC security group
<input checked="" type="checkbox"/> sg-12a1525f	e91_ssh_internet	open e91 ssh port to the internet
<input checked="" type="checkbox"/> sg-26af5c6b	e91_web_internet	open e91 web ports to the internet

[Cancel](#)

[Assign Security Groups](#)

```
[MacBook-Pro---Faras-Sadek:~ faras$  
[MacBook-Pro---Faras-Sadek:~ faras$  
[MacBook-Pro---Faras-Sadek:~ faras$ telnet 54.160.149.69 22  
Trying 54.160.149.69...  
Connected to ec2-54-160-149-69.compute-1.amazonaws.com.  
Escape character is '^]'.  
SSH-2.0-OpenSSH_7.4
```

```
MacBook-Pro---Faras-Sadek:~ faras$  
MacBook-Pro---Faras-Sadek:~ faras$ ssh -i ~/.ssh/e91_key.pem root@54.160.149.69  
The authenticity of host '54.160.149.69 (54.160.149.69)' can't be established.  
ECDSA key fingerprint is SHA256:rgsvNt30K8HW4H/w6Ga6mjRzdZIbUd21odIHnCu0haE.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added '54.160.149.69' (ECDSA) to the list of known hosts.  
Please login as the user "ec2-user" rather than the user "root".  
  
Connection to 54.160.149.69 closed.  
MacBook-Pro---Faras-Sadek:~ faras$ ssh -i ~/.ssh/e91_key.pem ec2-user@54.160.149.69  
  
_ _| _ _|_)  
_ | ( _ / Amazon Linux 2 AMI  
__|\_\_|_||  
  
https://aws.amazon.com/amazon-linux-2/  
8 package(s) needed for security, out of 79 available  
Run "sudo yum update" to apply all updates.  
[ec2-user@ip-192-168-15-71 ~]$  
[ec2-user@ip-192-168-15-71 ~]$  
[ec2-user@ip-192-168-15-71 ~]$ █  
  
[ec2-user@ip-192-168-15-71 ~]$  
[ec2-user@ip-192-168-15-71 ~]$  
[ec2-user@ip-192-168-15-71 ~]$ sudo su -  
Last login: Sun Aug  5 21:07:10 UTC 2018 from 128.103.150.246 on pts/0  
[root@ip-192-168-15-71 ~]#  
[root@ip-192-168-15-71 ~]#  
[root@ip-192-168-15-71 ~]#  
[root@ip-192-168-15-71 ~]# ifconfig  
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500  
      inet 192.168.15.71  netmask 255.255.240.0  broadcast 192.168.15.255  
      inet6 fe80::cac:72ff:fe3f:b1bc  prefixlen 64  scopeid 0x20<link>  
        ether 0e:ac:72:3f:b1:bc  txqueuelen 1000  (Ethernet)  
          RX packets 11233  bytes 15645606 (14.9 MiB)  
          RX errors 0  dropped 0  overruns 0  frame 0  
          TX packets 5019  bytes 323750 (316.1 KiB)  
          TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0  
  
lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536  
      inet 127.0.0.1  netmask 255.0.0.0  
      inet6 ::1  prefixlen 128  scopeid 0x10<host>  
        loop  txqueuelen 1000  (Local Loopback)  
          RX packets 8  bytes 648 (648.0 B)  
          RX errors 0  dropped 0  overruns 0  frame 0  
          TX packets 8  bytes 648 (648.0 B)  
          TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0  
  
[root@ip-192-168-15-71 ~]# █
```