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Placement Empowerment Program

Cloud Computing and DevOps Centre

Set Up a Private Network in the Cloud Create a Virtual Private Cloud (VPC) with subnets for your instances. Configure routing for internal communication between subnets.

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Introduction:

In modern cloud computing, securing network infrastructure is crucial for businesses and organizations. AWS Virtual Private Cloud (VPC) allows users to create a logically isolated network within the AWS cloud, enabling them to define and control their network environment. This document outlines a step-by-step approach to setting up a private network in AWS using a VPC with subnets and internal routing.

Overview:

A Virtual Private Cloud (VPC) is a dedicated cloud network that allows users to launch AWS resources in an isolated and controlled environment. This setup includes:

- Creating a VPC with a specific CIDR block.
- Configuring public and private subnets.
- Setting up route tables to enable internal communication.

- Implementing security groups to restrict traffic.
- Deploying EC2 instances to test connectivity.

objective:

The primary objective of this task is to establish a private network in AWS that allows secure internal communication between instances while restricting internet access to certain subnets. The key goals include:

- Creating a VPC with subnets.
- Configuring routing and network access controls.
- Deploying and verifying EC2 instance connectivity.

Importance of AWS CLI In Cloud networking:

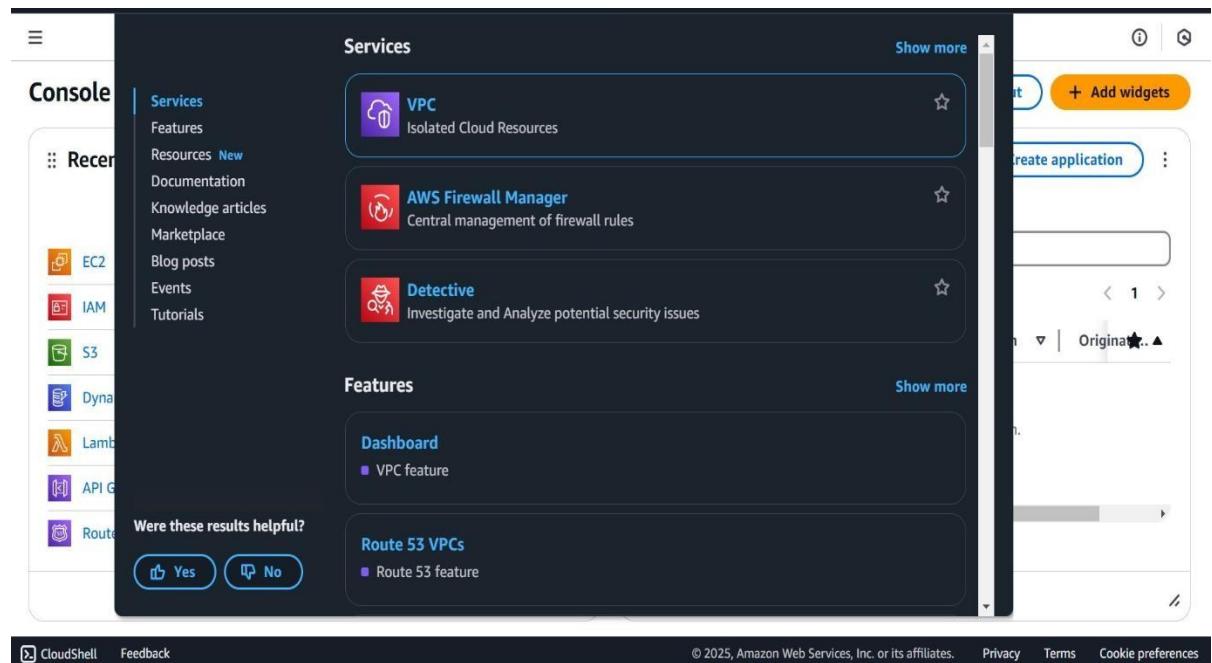
AWS CLI (Command Line Interface) plays a crucial role in automating and managing cloud resources efficiently. Some benefits include:

- **Speed and Automation:** Enables quick setup of VPCs, subnets, and other resources.
- **Scripting Capabilities:** Allows the execution of scripts to create and configure networks.

- **Remote Management:** Helps manage cloud resources without needing a graphical interface.
- **Cost Efficiency:** Reduces human errors and improves operational efficiency

Step-by-Step procedure:

Step 1: Login to AWS console and create a virtual private cloud.



VPC dashboard

Create VPC **Launch EC2 Instances**

Note: Your Instances will launch in the Asia Pacific region.

Resources by Region

You are using the following Amazon VPC resources

Service Health

Settings

Additional Information

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[VPC](#) > [Your VPCs](#) > Create VPC

Create VPC Info

A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.

VPC settings

Resources to create Info

Create only the VPC resource or the VPC and other networking resources.

VPC only

VPC and more

Name tag - optional

Creates a tag with a key of 'Name' and a value that you specify.

my-sewey

IPv4 CIDR block Info

- IPv4 CIDR manual input
- IPAM-allocated IPv4 CIDR block

IPv4 CIDR

10.0.0.0/16

CIDR block size must be between /16 and /28.

IPv6 CIDR block Info

CloudShell Feedback

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[VPC](#) > [Your VPCs](#) > [vpc-0b4329a83cadd844e](#)

VPC dashboard

EC2 Global View

[Filter by VPC](#)

Virtual private cloud

Your VPCs

Subnets

Route tables

Internet gateways

Egress-only Internet gateways

DHCP option sets

Elastic IPs

Managed prefix lists

NAT gateways

Peering connections

Security

Network ACLs

Feedback

You successfully created vpc-0b4329a83cadd844e / my-sewey

vpc-0b4329a83cadd844e / my-sewey

[Actions](#)

Details Info

VPC ID
vpc-0b4329a83cadd844e

State
Available

Block Public Access
 Off

DNS hostnames
Disabled

DNS resolution

Enabled

Tenancy

default

DHCP option set

dopt-023619f75753173c6

Main route table

rtb-00f77b642565d005d

Main network ACL

acl-00bf34a39882a33a3

Default VPC

No

IPv4 CIDR

10.0.0.0/16

IPv6 pool

-

IPv6 CIDR (Network border group)

-

Network Address Usage metrics

Disabled

Route 53 Resolver DNS Firewall rule groups

-

[Resource map](#) Info

[CIDRs](#)

[Flow logs](#)

[Tags](#)

[Integrations](#)

[Resource map](#) Info

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Step 2: Create public and private subnet.

Go to **subnet** and click **create subnet**.

The screenshot shows the 'Create subnet' wizard in the AWS VPC console. The top navigation bar includes 'VPC', 'Subnets', and 'Create subnet'. The main form has two sections: 'VPC' and 'Subnet settings'. In the 'VPC' section, 'VPC ID' is set to 'vpc-0b4329a83cadd844e (my-sewey)'. Under 'Associated VPC CIDRs', 'IPv4 CIDRs' is listed as '10.0.0.0/16'. The 'Subnet settings' section is titled 'Subnet 1 of 1' and contains a 'Subnet name' field with the placeholder 'Create a tag with a key of 'Name' and a value that you specify.' At the bottom, there are links for 'CloudShell', 'Feedback', and 'Cookie preferences', along with copyright information: '© 2025, Amazon Web Services, Inc. or its affiliates.' and links for 'Privacy', 'Terms', and 'Cookie preferences'.

VPC > Subnets > Create subnet

IPv4 VPC CIDR block Info
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.

10.0.0.0/16

IPv4 subnet CIDR block
10.0.0.0/20 4,096 IPs

Tags - optional

Key	Value - optional
Name	let_goo3

Add new tag
You can add 49 more tags.
Remove

Add new subnet

Cancel **Create subnet**

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VPC dashboard <

EC2 Global View Filter by VPC:

Virtual private cloud

- Your VPCs
- Subnets**
- Route tables
- Internet gateways
- Egress-only Internet gateways
- DHCP option sets
- Elastic IPs
- Managed prefix lists
- NAT gateways
- Peering connections

Security

Network ACLs

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Subnets (2) Info Last updated less than a minute ago

Actions **Create subnet**

Find resources by attribute or tag

Subnet ID : subnet-050a077de11355e3f X Subnet ID : subnet-075894cd5818cdc08 X Clear filters

Name	Subnet ID	State	VPC
sub1	subnet-050a077de11355e3f	Available	vpc-0b4329a83cadd844e my...
sub2	subnet-075894cd5818cdc08	Available	vpc-0b4329a83cadd844e my...

Select a subnet

Step 3: Configure route tables

Navigate to **route tables** and click **create route tables**.

The screenshot shows the AWS VPC dashboard. On the left, there's a sidebar with navigation links like 'Your VPCs', 'Subnets', 'Route tables' (which is selected), 'Internet gateways', 'Egress-only Internet gateways', 'DHCP option sets', 'Elastic IPs', 'Managed prefix lists', 'NAT gateways', and 'Peering connections'. Below that is a 'Security' section with 'Network ACLs'. At the bottom of the sidebar are 'CloudShell' and 'Feedback' buttons. The main content area is titled 'Route tables (1) Info' and shows a table with one row. The table has columns for 'Name' (with a dropdown menu), 'Route table ID' (rtb-0c1fc6fe0dbdd0e0f), 'Explicit subnet assoc...', 'Edge associations', and 'Main' (set to 'Yes'). A search bar at the top says 'Find resources by attribute or tag'. At the bottom of the main area, it says 'Select a route table'.

The screenshot shows the 'Edit subnet associations' page. The URL is 'VPC > Route tables > rtb-0c3772d7ee2841ee0 > Edit subnet associations'. The title is 'Edit subnet associations'. It says 'Change which subnets are associated with this route table.' Below is a table titled 'Available subnets (2/2)' with two rows: 'sub1' and 'sub2'. The 'sub1' row has a checked checkbox in the first column. To the right of the table are columns for 'Subnet ID', 'IPv4 CIDR', 'IPv6 CIDR', and 'Route table ID'. The 'Route table ID' for both rows is 'Main (rtb-00f77b642565d005d)'. Below the table is a 'Selected subnets' section with two items: 'subnet-050a077de11355e3f / sub1' and 'subnet-075894cd5818cdc08 / sub2'. At the bottom are 'Cancel' and 'Save associations' buttons.

Step 4: Configure security groups

The screenshot shows the AWS VPC Route Tables page. At the top, a green banner displays the message: "You have successfully updated subnet associations for rtb-0c3772d7ee2841ee0 / my-route07." Below the banner, the title "rtb-0c3772d7ee2841ee0 / my-route07" is shown. The main area is divided into sections: "Details" (Route table ID: rtb-0c3772d7ee2841ee0, Main: No, Owner ID: vpc-0b4329a83cadd844e | my-sewhey), "Explicit subnet associations" (2 subnets), and "Edge associations" (none). Below these are tabs for "Routes", "Subnet associations", "Edge associations", "Route propagation", and "Tags". Under the "Routes" tab, a table lists one route: Destination 10.0.0.0/16, Target local, Status Active, and Propagated Yes. The bottom right corner includes copyright information: "© 2025, Amazon Web Services, Inc. or its affiliates." and links for "Privacy", "Terms", and "Cookie preferences".

Step 5: Launch EC2 instances

Go to EC2 instance, click create instance

The screenshot shows the AWS EC2 Services page. On the left, a sidebar menu is open under "Services", listing "EC2", "EC2 Image Builder", and "EC2 Global View". Below this, a "Features" section is visible with a "Dashboard" item. A "Were these results helpful?" poll at the bottom has two buttons: "Yes" and "No". The main content area is mostly blank, with a small "associations" section visible on the right.

The screenshot shows the AWS EC2 Instances page for an instance named 'jeff078'. The instance ID is 'i-0c838020364bbeae8'. The instance is currently running. It has a private IPv4 address of '10.0.1.159' and a private IP DNS name of 'ip-10-0-1-159.ap-south-1.compute.internal'. The instance type is 't2.micro'. It is associated with a VPC ID 'vpc-0b4329a83cadd844e' and a subnet ID 'subnet-0f0-077d-3175e-761a1'. There is also a note about AWS Compute Optimizer finding.

Step 6: Test internal communication

```
ssh -i your-key.pem ec2-user@PRIVATE_INSTANCE_IP
```

expected outcome:

After completing these steps, you will achieve:

- 1) A secure VPC setup with private and public subnets.
- 2) Internal communication between instances in a controlled environment.
- 3) A strong understanding of AWS networking principles.
- 4) A private subnet isolated from internet access.