

TASK – 10

VPC Transit gateway:

- A VPC Transit Gateway is a network hub service, often used in AWS, that simplifies the connectivity of multiple virtual private clouds (VPCs) and on-premises networks by providing a central point for traffic routing.
- Instead of creating separate direct connections between networks (like in VPC peering), a transit gateway works as a central cloud router, allowing each network to connect once and communicate with all other connected networks.

Creation of VPC:

The screenshot shows the AWS VPC console interface. On the left, there's a navigation sidebar with sections like '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, Route servers), 'Security' (Network ACLs, Security groups), and 'PrivateLink and Lattice'. The main area is titled 'Your VPCs (4) Info' and contains a table with four rows of VPC data. The columns are Name, VPC ID, State, Block Public..., IPv4 CIDR, and IPv6 CIDR. The VPCs listed are: - (Available, Off, 172.31.0.0/16, -), myvpc_1 (Available, Off, 10.0.0.0/16, -), myvpc_2 (Available, Off, 11.0.0.0/16, -), and myvpc_3 (Available, Off, 12.0.0.0/16, -). Below the table, there's a section titled 'Select a VPC above'.

Name	VPC ID	State	Block Public...	IPv4 CIDR	IPv6 CIDR
-	vpc-00aa32b792ae81dee	Available	Off	172.31.0.0/16	-
myvpc_1	vpc-07dc02cd359ddaa59	Available	Off	10.0.0.0/16	-
myvpc_2	vpc-0cb6fda7d2ddd3ec8	Available	Off	11.0.0.0/16	-
myvpc_3	vpc-005ec9f2cc9f0a449	Available	Off	12.0.0.0/16	-

Creation of subnets:

The screenshot shows the AWS VPC console interface, similar to the previous one but for subnets. The left sidebar has the same sections: '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, Route servers), 'Security' (Network ACLs, Security groups), and 'PrivateLink and Lattice'. The main area is titled 'Subnets (6) Info' and contains a table with six rows of subnet data. The columns are Name, Subnet ID, State, VPC, Block Public..., and IPv4 CIDR. The subnets listed are: subnet_1 (Available, Off, vpc-07dc02cd359ddaa59 | myvpc_1, 10.0.1.0/24), - (Available, Off, vpc-00aa32b792ae81dee, 172.31.32.0), subnet_3 (Available, Off, vpc-005ec9f2cc9f0a449 | myvpc_2, 12.0.1.0/24), subnet_2 (Available, Off, vpc-00aa32b792ae81dee, 172.31.0.0/24), and subnet_09cd94db8c5f77451 (Available, Off, vpc-00aa32b792ae81dee, 172.31.0.0/24). Below the table, there's a section titled 'Select a subnet'.

Name	Subnet ID	State	VPC	Block Public...	IPv4 CIDR
subnet_1	subnet-0e58b034a73bdd400	Available	vpc-07dc02cd359ddaa59 myvpc_1	Off	10.0.1.0/24
-	subnet-00b1fcf1e5e29345	Available	vpc-00aa32b792ae81dee	Off	172.31.32.0
subnet_3	subnet-0797662b3e57fb8a	Available	vpc-005ec9f2cc9f0a449 myvpc_2	Off	12.0.1.0/24
subnet_2	subnet-09cd94db8c5f77451	Available	vpc-00aa32b792ae81dee	Off	172.31.0.0/24
	subnet-05f93502851b0a5f9	Available	vpc-0cb6fda7d2ddd3ec8 myvpc_3	Off	11.0.1.0/24

Creation of Route tables:

The screenshot shows the AWS VPC Route Tables console. The left sidebar navigation includes 'Virtual private cloud' (Your VPCs, Subnets, Route tables), 'Security' (Network ACLs, Security groups), and 'PrivateLink and Lattice'. The main content area displays a table titled 'Route tables (7) Info' with columns: Name, Route table ID, Explicit subnet associa..., Edge associations, Main, and VPC. The table lists seven route tables: '-' (rtb-013ed9a3068a5f7f0), rt_vp1 (rtb-0e331280ed93c27a8), rt_vp2 (rtb-0f640b6b9d0b7e0a1), and rt_vp3 (rtb-0e07ceca02c188cc5). Each row has a checkbox for selection. Below the table is a section titled 'Select a route table'.

Creation of Internet Gateway:

The screenshot shows the AWS VPC Internet Gateways console. The left sidebar navigation includes 'Virtual private cloud' (Your VPCs, Subnets, Route tables, Internet gateways), 'Security' (Network ACLs, Security groups), and 'PrivateLink and Lattice'. The main content area displays a table titled 'Internet gateways (4) Info' with columns: Name, Internet gateway ID, State, VPC ID, and Owner. The table lists four internet gateways: '-' (igw-03bbe680f5bcb9f72), igw_vp1 (igw-0a5eeff3c0e55c5a81), igw_vp2 (igw-06bbe98bf953715209), and igw_vp3 (igw-0008dkac6c57b1702). Each row has a checkbox for selection. Below the table is a section titled 'Select an internet gateway above'.

Creation of Security Groups:

The screenshot shows the AWS VPC console with the URL ap-southeast-1.console.aws.amazon.com/vpcconsole/home?region=ap-southeast-1#SecurityGroups. A success message at the top states: "Security group (sg-0beda0f4d3a9a9ceb | sg_vpc3) was created successfully". The main table displays 19 security groups, including the newly created one. The table columns are: Name, Security group ID, Security group name, VPC ID, and Description. The newly created group is listed with the name "sg_vpc3".

Name	Security group ID	Security group name	VPC ID	Description
sg-0e4346a5a43a925ba	sg_vpc1	vpc-07dc02cd359ddaa59	sg1	
sg-0b583598d115ad22c	default	vpc-07dc02cd359ddaa59	default VPC sec	
sg-0beda0f4d3a9a9ceb	sg_vpc3	vpc-005ec9f2cc9ff0a449	sg_3	
sg-07c3d812811778fa4	launch-wizard-41	vpc-00aa32b792ae81dee	launch-wizard-	
sg-07aec593fe64982e4	launch-wizard-46	vpc-00aa32b792ae81dee	launch-wizard-	
sg-000bd749d81b277cc	launch-wizard-39	vpc-00aa32b792ae81dee	launch-wizard-	
sg-085c8ac9df0e5cf50	sg_vpc2	vpc-0cb6fdad7d2ddd3ec8	sg_2	

Creation of Transit gateways:

The screenshot shows the AWS VPC console with the URL ap-southeast-1.console.aws.amazon.com/vpcconsole/home?region=ap-southeast-1#TransitGateways. A message at the top encourages visualizing and monitoring transit gateways using AWS Network Manager. The main table displays 1 transit gateway, which has been created. The table columns are: Name, Transit gateway ID, Owner ID, and State. The newly created gateway is listed with the name "transit_gateway" and ID "tgw-0de6d5af5427c65cc".

Name	Transit gateway ID	Owner ID	State
transit_gateway	tgw-0de6d5af5427c65cc	39382745998	Available

Attachment of transit gateways:

The screenshot shows the AWS VPC console with the URL ap-southeast-1.console.aws.amazon.com/vpcconsole/home?region=ap-southeast-1#TransitGatewayAttachments. The left sidebar is collapsed, and the main area displays a table titled "Transit gateway attachments (3)". The table has columns for Name, Transit gateway attachment ID, Transit gateway ID, State, Resource type, and Resource ID. The data is as follows:

Name	Transit gateway attachment ID	Transit gateway ID	State	Resource type	Resource ID
transit_attachment3	tgw-attach-0022b8419a8ebdd37	tgw-0de6d5af5427c65cc	Available	VPC	vpc-005ec0f2cc0f0a445
transit_attachment2	tgw-attach-02dc4d3659c436ef8	tgw-0de6d5af5427c65cc	Available	VPC	vpc-0cb6fda7d2ddd3ec
transit_attachment1	tgw-attach-08e5522f2131cd96a	tgw-0de6d5af5427c65cc	Available	VPC	vpc-07dc02cd359ddaa

Then attaching create transit gateway attachment to routes:

The screenshot shows the AWS VPC console with the URL [ap-southeast-1.console.aws.amazon.com/vpcconsole/home?region=ap-southeast-1>EditRoutes\(RouteTableId=rtb-0e331280ed93c27a8](https://ap-southeast-1.console.aws.amazon.com/vpcconsole/home?region=ap-southeast-1>EditRoutes(RouteTableId=rtb-0e331280ed93c27a8)). The left sidebar shows "Route tables" and "rtb-0e331280ed93c27a8". The main area is titled "Edit routes" and displays a table with columns: Destination, Target, Status, Propagated, and Route Origin. The data is as follows:

Destination	Target	Status	Propagated	Route Origin
10.0.0.0/16	local	Active	No	CreateRouteTable
11.0.0.0/16	Transit Gateway	Active	No	CreateRoute
12.0.0.0/16	Transit Gateway	Active	No	CreateRoute
0.0.0.0/0	Internet Gateway	Active	No	CreateRoute

At the bottom, there are buttons for "Add route", "Cancel", "Preview", and "Save changes".

Screenshot of the AWS VPC console showing the 'Edit routes' page for a route table.

The route table has the following routes:

Destination	Target	Status	Propagated	Route Origin
11.0.0.0/16	local	Active	No	CreateRouteTable
10.0.0.0/16	Transit Gateway	Active	No	CreateRoute
12.0.0.0/16	Transit Gateway	Active	No	CreateRoute
0.0.0.0/0	Internet Gateway	Active	No	CreateRoute

Buttons at the bottom: Add route, Cancel, Preview, Save changes.

Screenshot of the AWS VPC console showing the 'Edit routes' page for a route table.

The route table has the following routes:

Destination	Target	Status	Propagated	Route Origin
12.0.0.0/16	local	Active	No	CreateRouteTable
10.0.0.0/16	Transit Gateway	Active	No	CreateRoute
11.0.0.0/16	Transit Gateway	Active	No	CreateRoute
0.0.0.0/0	Internet Gateway	Active	No	CreateRoute

Buttons at the bottom: Add route, Cancel, Preview, Save changes.

Creation of Instances:

The screenshot shows the AWS Management Console with the EC2 Instances page open. The left sidebar shows navigation options like Dashboard, EC2 Global View, Events, Instances (selected), Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations, Images, AMIs, AMI Catalog, and Elastic Block Store. The main content area displays a table of three instances:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
instance_vpc3	i-0a3470c2d51fd4ee1	Running	t2.micro	2/2 checks passed	View alarms	ap-southeast-1a	-
instance_vpc1	i-07e9e803d2d0cc4f8	Running	t2.micro	2/2 checks passed	View alarms	ap-southeast-1a	-
instance_vpc2	i-0cb40b51585eccf7	Running	t2.micro	2/2 checks passed	View alarms	ap-southeast-1a	-

Check for the internet connectivity through ping command:

The screenshot shows an EC2 CloudShell terminal window. The user has run several ping commands from the instance's IP (10.0.1.137) to various external hosts. The output of the terminal is as follows:

```
[ec2-user@ip-10-0-1-137 ~]$ ping 13.229.214.211
PING 13.229.214.211 (13.229.214.211) 56(84) bytes of data.
64 bytes from 13.229.214.211: icmp_seq=1 ttl=126 time=1.46 ms
64 bytes from 13.229.214.211: icmp_seq=2 ttl=126 time=1.40 ms
64 bytes from 13.229.214.211: icmp_seq=3 ttl=126 time=1.77 ms
64 bytes from 13.229.214.211: icmp_seq=4 ttl=126 time=0.893 ms
64 bytes from 13.229.214.211: icmp_seq=5 ttl=126 time=1.27 ms
^Z
[1]+  Stopped                  ping 13.229.214.211
[ec2-user@ip-10-0-1-137 ~]$ ping 11.0.1.131
PING 11.0.1.131 (11.0.1.131) 56(84) bytes of data.
64 bytes from 11.0.1.131: icmp_seq=1 ttl=126 time=5.35 ms
64 bytes from 11.0.1.131: icmp_seq=2 ttl=126 time=0.666 ms
64 bytes from 11.0.1.131: icmp_seq=3 ttl=126 time=1.19 ms
^Z
[2]+  Stopped                  ping 11.0.1.131
[ec2-user@ip-10-0-1-137 ~]$ ping 13.212.14.108
PING 13.212.14.108 (13.212.14.108) 56(84) bytes of data.
64 bytes from 13.212.14.108: icmp_seq=1 ttl=126 time=0.643 ms
64 bytes from 13.212.14.108: icmp_seq=2 ttl=126 time=1.03 ms
64 bytes from 13.212.14.108: icmp_seq=3 ttl=126 time=0.967 ms
^Z
[3]+  Stopped                  ping 13.212.14.108
[ec2-user@ip-10-0-1-137 ~]$ ping 12.0.1.227
PING 12.0.1.227 (12.0.1.227) 56(84) bytes of data.
64 bytes from 12.0.1.227: icmp_seq=1 ttl=126 time=2.00 ms
64 bytes from 12.0.1.227: icmp_seq=2 ttl=126 time=1.34 ms
```

i-07e9e803d2d0cc4f8 (instance_vpc1)
Public IPs: 47.129.0.235 Private IPs: 10.0.1.137

```
./m/
[ec2-user@ip-11-0-1-131 ~]$ ping 47.129.0.235
PING 47.129.0.235 (47.129.0.235) 56(84) bytes of data.
64 bytes from 47.129.0.235: icmp_seq=1 ttl=126 time=0.983 ms
64 bytes from 47.129.0.235: icmp_seq=2 ttl=126 time=1.54 ms
64 bytes from 47.129.0.235: icmp_seq=3 ttl=126 time=1.66 ms
64 bytes from 47.129.0.235: icmp_seq=4 ttl=126 time=0.862 ms
^Z
[1]+  Stopped                  ping 47.129.0.235
[ec2-user@ip-11-0-1-131 ~]$ ping 10.0.1.137
PING 10.0.1.137 (10.0.1.137) 56(84) bytes of data.
64 bytes from 10.0.1.137: icmp_seq=1 ttl=126 time=2.22 ms
64 bytes from 10.0.1.137: icmp_seq=2 ttl=126 time=2.17 ms
64 bytes from 10.0.1.137: icmp_seq=3 ttl=126 time=1.43 ms
^Z
[2]+  Stopped                  ping 10.0.1.137
[ec2-user@ip-11-0-1-131 ~]$ ping 13.212.14.108
PING 13.212.14.108 (13.212.14.108) 56(84) bytes of data.
64 bytes from 13.212.14.108: icmp_seq=1 ttl=126 time=0.700 ms
64 bytes from 13.212.14.108: icmp_seq=2 ttl=126 time=1.39 ms
64 bytes from 13.212.14.108: icmp_seq=3 ttl=126 time=1.54 ms
64 bytes from 13.212.14.108: icmp_seq=4 ttl=126 time=1.06 ms
^Z
[3]+  Stopped                  ping 13.212.14.108
[ec2-user@ip-11-0-1-131 ~]$ ping 12.0.1.227
PING 12.0.1.227 (12.0.1.227) 56(84) bytes of data.
64 bytes from 12.0.1.227: icmp_seq=1 ttl=126 time=2.48 ms
```

i-0c4b40b51585eccf7 (instance_vpc2)
Public IPs: 13.229.214.211 Private IPs: 11.0.1.131

```
./m/
[ec2-user@ip-12-0-1-227 ~]$ ping 47.129.0.235
PING 47.129.0.235 (47.129.0.235) 56(84) bytes of data.
64 bytes from 47.129.0.235: icmp_seq=1 ttl=126 time=1.55 ms
64 bytes from 47.129.0.235: icmp_seq=2 ttl=126 time=0.815 ms
64 bytes from 47.129.0.235: icmp_seq=3 ttl=126 time=1.55 ms
64 bytes from 47.129.0.235: icmp_seq=4 ttl=126 time=1.04 ms
^Z
[1]+  Stopped                  ping 47.129.0.235
[ec2-user@ip-12-0-1-227 ~]$ ping 10.0.1.137
PING 10.0.1.137 (10.0.1.137) 56(84) bytes of data.
64 bytes from 10.0.1.137: icmp_seq=1 ttl=126 time=1.52 ms
64 bytes from 10.0.1.137: icmp_seq=2 ttl=126 time=1.08 ms
64 bytes from 10.0.1.137: icmp_seq=3 ttl=126 time=0.757 ms
^Z
[2]+  Stopped                  ping 10.0.1.137
[ec2-user@ip-12-0-1-227 ~]$ ping 13.229.214.211
PING 13.229.214.211 (13.229.214.211) 56(84) bytes of data.
64 bytes from 13.229.214.211: icmp_seq=1 ttl=126 time=1.66 ms
64 bytes from 13.229.214.211: icmp_seq=2 ttl=126 time=1.03 ms
64 bytes from 13.229.214.211: icmp_seq=3 ttl=126 time=0.869 ms
^Z
[3]+  Stopped                  ping 13.229.214.211
[ec2-user@ip-12-0-1-227 ~]$ ping 11.0.1.131
PING 11.0.1.131 (11.0.1.131) 56(84) bytes of data.
64 bytes from 11.0.1.131: icmp_seq=1 ttl=126 time=1.35 ms
64 bytes from 11.0.1.131: icmp_seq=2 ttl=126 time=1.39 ms
64 bytes from 11.0.1.131: icmp_seq=3 ttl=126 time=1.07 ms
```

i-0a3470c2d51fd4ee1 (instance_vpc3)
Public IPs: 13.212.14.108 Private IPs: 12.0.1.227