

Cloud Computing

Homework 4

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You and 2 friends start a financial company, which is located in Northern Virginia. Each of you will run an organization: Research, Sales, and IT. All three organizations need computer systems. You are responsible for the IT systems for the company, so you must decide the strategy. You finally remember what you learn in Cloud Computing class at school and after completing a business case, you decide to go with Cloud Computing instead of On-Premise computing. Here is what you decide and will implement:

- a. Use AWS
- b. Create a customized VPC with a subnet for each department.
 - Region: you decide to use the region closest to your office to minimize latency.
 - Define the VPC CIDR block.
 - VPC Name: yourlastname-VPC-HW4
 - Create 3 subnets, one for each of the organization. You expect the company to grow so **each of the subnet** must be able to have **10 hosts** (EC2s). Here are the configurations of the 3 subnets:
 - i. For IT department (yours)
 1. Subnet Name: yourlastname-IT
 2. CIDR: define the CIDR block just enough (the minimum block size) to handle the hosts (10).
 3. You want every EC2 you created:
 - a. Has a public IP
 - b. AMI:ubuntu server 18.04 LTS
 - c. Instance type: t2.micro
 - d. To protect from PoD attack, allow ping from your laptop only
 - e. for security reasons you only allow ssh from your laptop only
 4. You just started the company so you only need to spin up 1 EC2.
 - a. EC2 Name: yourlastname-IT-host1
 - ii. For Sales department
 1. Subnet Name: yourlastname-Sales
 2. CIDR: define the CIDR block just enough (the minimum block size) to handle the hosts (10).
 3. You want every EC2 you created:
 - a. Has a public IP
 - b. AMI:ubuntu server 18.04 LTS
 - c. Instance type: t2.micro
 - d. allow ping and ssh from everywhere
 4. You just started up the company so you only need to spin up 1 EC2.
 - a. EC2 Name: yourlastname-Sales-host1
 - iii. For Research department
 1. Subnet Name: yourlastname-RND

2. CIDR: define the CIDR block just enough (the minimum block size) to handle the hosts (10).
 3. You want every EC2 you created:
 - a. has public IP
 - b. AMI:ubuntu server 18.04 LTS
 - c. Instance type: t2.micro
 - d. RND is very critical and you want to protect it so you only allow ssh from your laptop
 - e. To avoid PoD (Ping Of Death) attack, you only allow ping **internally** from **all of your IT hosts**.
 4. You just started the company so you only need to spin up 1 EC2.
 - a. EC2 Name: yourlastname-RND-host1
- Note: 1 subnet route table can be associated with multiple subnets

What to submit:

1. AWS Region (1): _____ **N.Virginia**

The screenshot shows the AWS Management Console for the N. Virginia region. The left sidebar contains navigation links for VPC Dashboard, Subnets, Route Tables, Internet Gateways, Egress Only Internet Gateways, Carrier Gateways, DHCP Options Sets, Elastic IPs, Managed Prefix Lists, Endpoints, Endpoint Services, NAT Gateways, and Peering Connections. The main content area displays 'Resources by Region' for N. Virginia, showing counts for various VPC resources: VPCs (2), Subnets (9), Route Tables (3), Internet Gateways (2), Egress-only Internet Gateways (0), DHCP options sets (1), NAT Gateways (0), VPC Peering Connections (0), Network ACLs (2), Security Groups (9), Customer Gateways (0), and Virtual Private Gateways (0). The right sidebar shows 'Service Health' for Amazon EC2 - US East (N. Virginia) with a status of 'Service is operating normally'. Below this are 'Settings' (Zones, Console Experiments) and 'Additional Information' (VPC Documentation, All VPC Resources, Forums, Report an Issue). The bottom of the console shows the 'Transit Gateway Network Manager' section.

2. Your VPC CIDR block (2): _____ **172.16.0.0/16**

The screenshot shows the AWS Management Console for the N. Virginia region, specifically the 'Your VPCs (1/2)' page. A table lists the VPCs, with one VPC selected: 'medagiri-VPC-HW4' with VPC ID 'vpc-0e79965c4a934ecff', State 'Available', and IPv4 CIDR '172.16.0.0/16'. Below the table, the details for the selected VPC are shown, including the 'CIDRs' tab. The 'IPv4 CIDRs' section shows a table with one entry: '172.16.0.0/16' with a status of 'Associated'. The 'IPv6 CIDRs' section is also visible but empty. The bottom of the console shows the URL 'https://console.aws.amazon.com/vpc/home?region=us-east-1#'. The footer contains copyright information and links to Privacy Policy and Terms of Use.

3. Your yourlastname-IT subnet CIDR block (2): _____ **172.16.0.0/28**

The screenshot shows the AWS VPC console interface. On the left, the 'VIRTUAL PRIVATE CLOUD' section is expanded, showing 'Your VPCs' and 'Subnets'. The 'Subnets' link is selected. The main panel displays a list of subnets. The 'medagiri-IT' subnet is selected, and its details are shown below. The subnet ID is 'subnet-0ce1b4d857a19bb2a', the VPC is 'vpc-0e79965c4a934ecff', and the state is 'available'. The IPv4 CIDR is '172.16.0.0/28'. The available IPv4 addresses are 10. The availability zone is 'us-east-1a (use1-az1)'. The route table is 'rtb-0dfd31bb88d0234d7'. The default subnet is 'No'. The auto-assign customer-owned IPv4 address is 'No'. The auto-assign IPv6 address is 'No'. The owner is '431429019981'.

Name	Subnet ID	State	VPC	IPv4 CIDR	Available IPv4	IPv6 CIDR
medagiri-RND	subnet-0eeb1cfbc1dd9ac38	available	vpc-0e79965c4a934ecff	172.16.0.32/28	10	-
medagiri-Sales	subnet-0989681c5cb27263b	available	vpc-0e79965c4a934ecff	172.16.0.16/28	10	-
medagiri-IT	subnet-0ce1b4d857a19bb2a	available	vpc-0e79965c4a934ecff	172.16.0.0/28	10	-

Subnet: subnet-0ce1b4d857a19bb2a

Description	Flow Logs	Route Table	Network ACL	Tags	Sharing
Subnet ID	subnet-0ce1b4d857a19bb2a				
VPC	vpc-0e79965c4a934ecff medagiri-VPC-HW4				
State	available				
IPv4 CIDR	172.16.0.0/28				
Available IPv4 Addresses	10				
IPv6 CIDR	-				
Availability Zone	us-east-1a (use1-az1)				
Network Border Group	us-east-1				
Route Table	rtb-0dfd31bb88d0234d7 medagiri-vpc-rt				
Network ACL	acl-03fee8654d2bbe99f				
Default subnet	No				
Auto-assign public IPv4 address	Yes				
Auto-assign customer-owned IPv4 address	No				
Customer-owned IPv4 pool	-				
Auto-assign IPv6 address	No				
Outpost ID	-				
Owner	431429019981				

4. Your yourlastname-Sales subnet CIDR block (2): _____ **172.16.0.16/28**

The screenshot shows the AWS VPC console interface. On the left, the 'VIRTUAL PRIVATE CLOUD' section is expanded, showing 'Your VPCs' and 'Subnets'. The 'Subnets' link is selected. The main panel displays a list of subnets. The 'medagiri-Sales' subnet is selected, and its details are shown below. The subnet ID is 'subnet-0989681c5cb27263b', the VPC is 'vpc-0e79965c4a934ecff', and the state is 'available'. The IPv4 CIDR is '172.16.0.16/28'. The available IPv4 addresses are 10. The availability zone is 'us-east-1b (use1-az2)'. The route table is 'rtb-0dfd31bb88d0234d7'. The default subnet is 'No'. The auto-assign customer-owned IPv4 address is 'No'. The auto-assign IPv6 address is 'No'. The owner is '431429019981'.

Name	Subnet ID	State	VPC	IPv4 CIDR	Available IPv4	IPv6 CIDR
medagiri-RND	subnet-0eeb1cfbc1dd9ac38	available	vpc-0e79965c4a934ecff	172.16.0.32/28	10	-
medagiri-Sales	subnet-0989681c5cb27263b	available	vpc-0e79965c4a934ecff	172.16.0.16/28	10	-
medagiri-IT	subnet-0ce1b4d857a19bb2a	available	vpc-0e79965c4a934ecff	172.16.0.0/28	10	-

Subnet: subnet-0989681c5cb27263b

Description	Flow Logs	Route Table	Network ACL	Tags	Sharing
Subnet ID	subnet-0989681c5cb27263b				
VPC	vpc-0e79965c4a934ecff medagiri-VPC-HW4				
State	available				
IPv4 CIDR	172.16.0.16/28				
Available IPv4 Addresses	10				
IPv6 CIDR	-				
Availability Zone	us-east-1b (use1-az2)				
Network Border Group	us-east-1				
Route Table	rtb-0dfd31bb88d0234d7 medagiri-vpc-rt				
Network ACL	acl-03fee8654d2bbe99f				
Default subnet	No				
Auto-assign public IPv4 address	Yes				
Auto-assign customer-owned IPv4 address	No				
Customer-owned IPv4 pool	-				
Auto-assign IPv6 address	No				
Outpost ID	-				
Owner	431429019981				

5. Your yourlastname-RND subnet CIDR block (2): 172.16.0.32/28

The screenshot shows the AWS VPC console with the 'medagiri-RND' subnet selected. The subnet ID is subnet-0eeb1cfbc1dd9ac38, and its state is 'available'. The VPC is vpc-0e79965c4a934ecff. The IPv4 CIDR block is 172.16.0.32/28, and there are 10 available IPv4 addresses. The subnet is located in the us-east-1c (use1-az4) availability zone. The route table is rtb-0cfd31bb8d0234d7. The subnet is the default subnet for the VPC. The auto-assign public IPv4 address is set to 'Yes'.

Name	Subnet ID	State	VPC	IPv4 CIDR	Available IPv4	IPv6 CIDR
medagiri-RND	subnet-0eeb1cfbc1dd9ac38	available	vpc-0e79965c4a934ecff	172.16.0.32/28	10	-
medagiri-Sales	subnet-0989681c5cb27263b	available	vpc-0e79965c4a934ecff	172.16.0.16/28	10	-
medagiri-IT	subnet-0ce1b4d857a19bb2a	available	vpc-0e79965c4a934ecff	172.16.0.0/28	10	-

Subnet: subnet-0eeb1cfbc1dd9ac38

Description	Flow Logs	Route Table	Network ACL	Tags	Sharing
Subnet ID	Subnet ID	Subnet ID	Subnet ID	Subnet ID	Subnet ID
Subnet ID	subnet-0eeb1cfbc1dd9ac38	Subnet ID	subnet-0eeb1cfbc1dd9ac38	Subnet ID	subnet-0eeb1cfbc1dd9ac38
VPC	vpc-0e79965c4a934ecff medagiri-VPC-HW4	VPC	vpc-0e79965c4a934ecff medagiri-VPC-HW4	VPC	vpc-0e79965c4a934ecff medagiri-VPC-HW4
Available IPv4 Addresses	10	Available IPv4 Addresses	10	Available IPv4 Addresses	10
Availability Zone	us-east-1c (use1-az4)	Availability Zone	us-east-1c (use1-az4)	Availability Zone	us-east-1c (use1-az4)
Route Table	rtb-0cfd31bb8d0234d7 medagiri-vpc-r1	Route Table	rtb-0cfd31bb8d0234d7 medagiri-vpc-r1	Route Table	rtb-0cfd31bb8d0234d7 medagiri-vpc-r1
Default subnet	No	Default subnet	No	Default subnet	No
Auto-assign customer-owned IPv4 address	No	Auto-assign customer-owned IPv4 address	No	Auto-assign customer-owned IPv4 address	No
Auto-assign IPv6 address	No	Auto-assign IPv6 address	No	Auto-assign IPv6 address	No
Owner	431429019981	Owner	431429019981	Owner	431429019981
State	available	State	available	State	available
IPv4 CIDR	172.16.0.32/28	IPv4 CIDR	172.16.0.32/28	IPv4 CIDR	172.16.0.32/28
IPv6 CIDR	-	IPv6 CIDR	-	IPv6 CIDR	-
Network Border Group	us-east-1	Network Border Group	us-east-1	Network Border Group	us-east-1
Network ACL	acl-03fee865d42bbe99f	Network ACL	acl-03fee865d42bbe99f	Network ACL	acl-03fee865d42bbe99f
Auto-assign public IPv4 address	Yes	Auto-assign public IPv4 address	Yes	Auto-assign public IPv4 address	Yes
Customer-owned IPv4 pool	-	Customer-owned IPv4 pool	-	Customer-owned IPv4 pool	-
Outpost ID	-	Outpost ID	-	Outpost ID	-

6. Submit the screenshot of the EC2s together (1).

The screenshot shows the AWS EC2 console with the 'medagiri-RND-host1' instance selected. The instance ID is i-007402b85492fe4a3, and its state is 'running'. The instance type is t2.micro, and it is located in the us-east-1c (use1-az4) availability zone. The status checks show 2/2 checks passed. The public DNS (IPv4) is 18.212.218.7.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP
medagiri-RND-host1	i-007402b85492fe4a3	t2.micro	us-east-1c	running	2/2 checks ...	None	18.212.218.7	18.212.218.7
medagiri-IT-host1	i-043fd1ee7e7a259cf	t2.micro	us-east-1a	running	2/2 checks ...	None	18.234.76.25	18.234.76.25
medagiri-Sales-host1	i-0faf1de42179c7b18	t2.micro	us-east-1b	running	2/2 checks ...	None	54.173.59.11	54.173.59.11

Instances: i-0faf1de42179c7b18 (medagiri-Sales-host1), i-043fd1ee7e7a259cf (medagiri-IT-host1), i-007402b85492fe4a3 (medagiri-RND-host1)

Description: i-0faf1de42179c7b18, i-043fd1ee7e7a259cf, i-007402b85492fe4a3

7. Submit the screenshot of (3):

a. Security Group of yourlastname-IT-host1 (inbound rules)

The screenshot shows the AWS Security Groups console with the 'medagiri-IT' security group selected. The security group ID is sg-0cc90422a2b518ee2, and it was created on 2020-09-22T19:33:50.266-05:00. The owner is 431429019981. The inbound rules count is 2, and the outbound rules count is 1.

Security group name	Security group ID	Description	VPC ID
medagiri-IT	sg-0cc90422a2b518ee2	launch-wizard-5 created 2020-09-22T19:33:50.266-05:00	vpc-0e79965c4a934ecff

Owner: 431429019981

Inbound rules count: 2 Permission entries

Outbound rules count: 1 Permission entry

Inbound rules

Type	Protocol	Port range	Source	Description - optional
SSH	TCP	22	64.189.205.232/32	-
All ICMP - IPv4	ICMP	All	64.189.205.232/32	-

b. Security Group of yourlastname-Sales-host1 (inbound rules)

The screenshot shows the AWS Management Console interface. The left sidebar contains navigation links for EC2 Dashboard, Events, Tags, Limits, Instances, Images, and Elastic Block Store. The main content area displays the details for the 'medagiri-Sales' security group. The 'Inbound rules' tab is selected, showing a table with two rules: SSH (TCP, port 22, source 0.0.0.0/0) and All ICMP - IPv4 (ICMP, port All, source 0.0.0.0/0).

Details

Security group name medagiri-Sales	Security group ID sg-0e122de7208dbf785	Description launch-wizard-5 created 2020-09-22T19:35:25.176-05:00	VPC ID vpc-0e79965c4a934ecff
Owner 431429019981	Inbound rules count 2 Permission entries	Outbound rules count 1 Permission entry	

Inbound rules

Type	Protocol	Port range	Source	Description - optional
SSH	TCP	22	0.0.0.0/0	-
All ICMP - IPv4	ICMP	All	0.0.0.0/0	-

c. Security Group of yourlastname-RND-host1 (inbound rules)

The screenshot shows the AWS Management Console interface. The left sidebar contains navigation links for EC2 Dashboard, Events, Tags, Limits, Instances, Images, and Elastic Block Store. The main content area displays the details for the 'launch-wizard-5' security group. The 'Inbound rules' tab is selected, showing a table with two rules: SSH (TCP, port 22, source 64.189.205.232/32) and All ICMP - IPv4 (ICMP, port All, source 172.16.0.0/28).

Details

Security group name launch-wizard-5	Security group ID sg-01183ed82c95080b4	Description launch-wizard-5 created 2020-09-22T19:36:47.831-05:00	VPC ID vpc-0e79965c4a934ecff
Owner 431429019981	Inbound rules count 2 Permission entries	Outbound rules count 1 Permission entry	

Inbound rules

Type	Protocol	Port range	Source	Description - optional
SSH	TCP	22	64.189.205.232/32	-
All ICMP - IPv4	ICMP	All	172.16.0.0/28	-

8. Do the ping command to check connections (6)

Internal IP address	yourlastname-IT-host1	yourlastname-Sales-host1	yourlastname-RND-host1
yourlastname-IT-host1	Y	Y	Y
yourlastname-Sales-host1	N	Y	N
yourlastname-RND-host1	N	Y	Y
Your laptop	N	N	N

9. Do ping command to check connections (6):

Public IP address	yourlastname-IT-host1	yourlastname-Sales-host1	yourlastname-RND-host1
yourlastname-IT-host1	N	Y	N
yourlastname-Sales-host1	N	Y	N
yourlastname-RND-host1	N	Y	N
Your laptop	Y	Y	N