

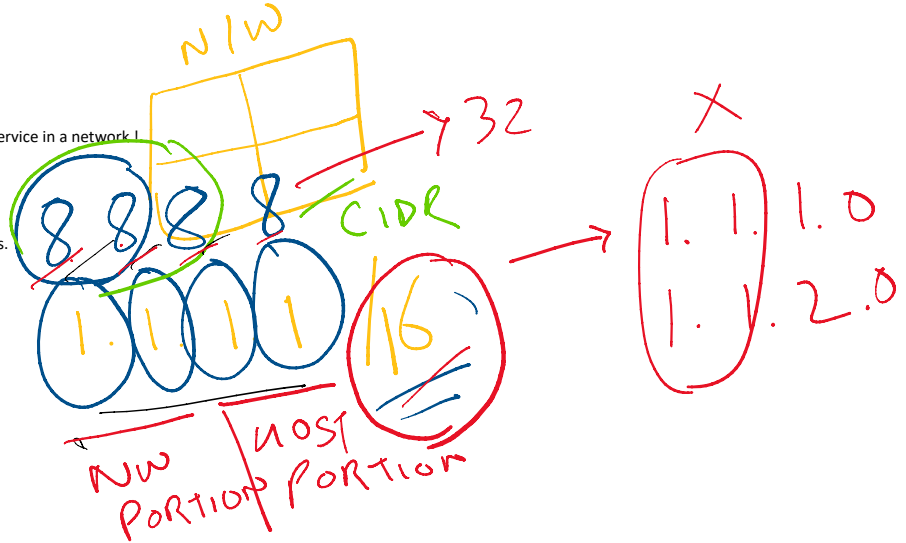
TOPICS COVERED

1. Virtual Private Cloud (VPC)
2. Projects, networks, and subnetworks
3. 3 VPC Networks
4. Network Isolation
5. Subnetworks Cross Zones and IP Reservation
6. Expand Subnets
7. Internal and External IP Addresses
8. Routes
9. Firewall Rules
10. Shared VPC vs VPC Peering
11. Demo:
 - Create a VPC
 - Expand a Subnet
 - Internal and External IP
 - Network isolation
 - Shared VPC
 - VPC Peering

- VPC : Virtual Private Cloud [Do not confuse with deployment models]

Basic Of Networking

- IP Address : Unique number that is assigned to host/interface/device/service in a network.
- Subnet : A portion of a network.
 - o 1.1.1.1/16 [IP Address Range / CIDR Range]
 - o The value of each octet is in range of 0 - 255 Decimal
 - o 1 Octet = 8 bits
- Subnet Mask - 32 bit number used in networking to divide an IP address.



Region vs Zones

- Region - A geographical distribution
- Zones - The actual Datacenter of the cloud.

VPC

- GCP's managed [Google takes care of it] networking service.
- Most of the services need n/w present in order to deploy them.
- RFC 1918 address range
 - o 10.0.0.0/8
 - o 172.12.0.0/12
 - o 192.168.0.0/16

3 Types of VPC Network

DEFAULT VPC	AUTO MODE	CUSTOM MODE
<ul style="list-style-type: none">- It is given to you by default when you create a project.- There will be a subnet created in every region.- No ! This is good for learning/testing purpose only.- We recommend to use CUSTOM MODE.	<ul style="list-style-type: none">- It is actually a default mode VPC only !• If you delete your default VPC and want a similar VPC with subnets in all the regions. Auto Mode is the answer.• Auto mode can be converted to Custom VPC at any point in time.	<ul style="list-style-type: none">- You can control where you want the subnet to be created !- Full control of the IP range- Regional IP allocation<ul style="list-style-type: none">o 10.0.0.0/8o 172.12.0.0/12o 192.168.0.0/16- Full control on the range/region. <p>This is the recommended VPC in Production solutions !</p> <p>- But a custom mode VPC cannot be converted to Auto mode !</p>

VPC is NOT associated to the region !
VPC is GLOBAL. The subnets are regional

GCP is the only cloud to have networking as Global !
Azure and AWS have regional networking.

FIREWALL

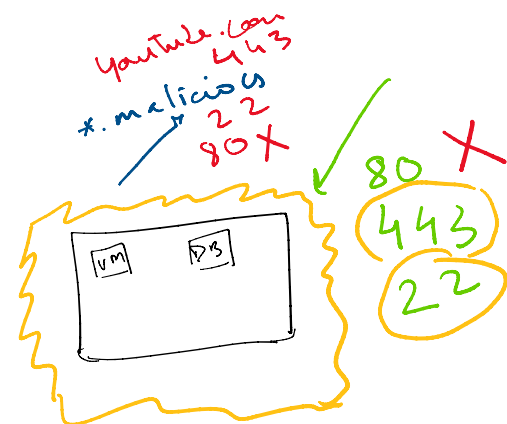
- To protect the devices on a network we create rules on ports will be opened what will be closed.
- Incoming [INGRESS] request or outgoing [EGRESS] request.
- Protect your services in a VPC from unapproved connections.
- Inbound and outboud.

Priority - This governs the order in which a firewall will be applied.

- F/W:Block22-incoming request - Priority :99
- F/W:Allow22 - incoming request - priority :100

PRICING OF VPC

Ingress	No charge
Egress - same zone/google product/different GCP	No Charge



service in same region	
Egress - between zones in the same region	\$0.01
External IP - Pricing	This keeps on changing
Egress between regions	according to the region.

Internal vs External Ips

INTERNAL IP	EXTERNAL IP
- Internal DHCP server.	- From a pool of Ips.
	- External Ips are chargeable.
	- I reserved an external ip and I am not using it/have not assigned it to a resource. I will pay more than the general price of external IP.

Can 2 regions in a same VPC have same IP address ranges?

- NO !

Can 2 different VPC have same IP address ranges?

- YES !

VPC Sharing Networks Across Projects

- Shared VPC
- VPC Peering

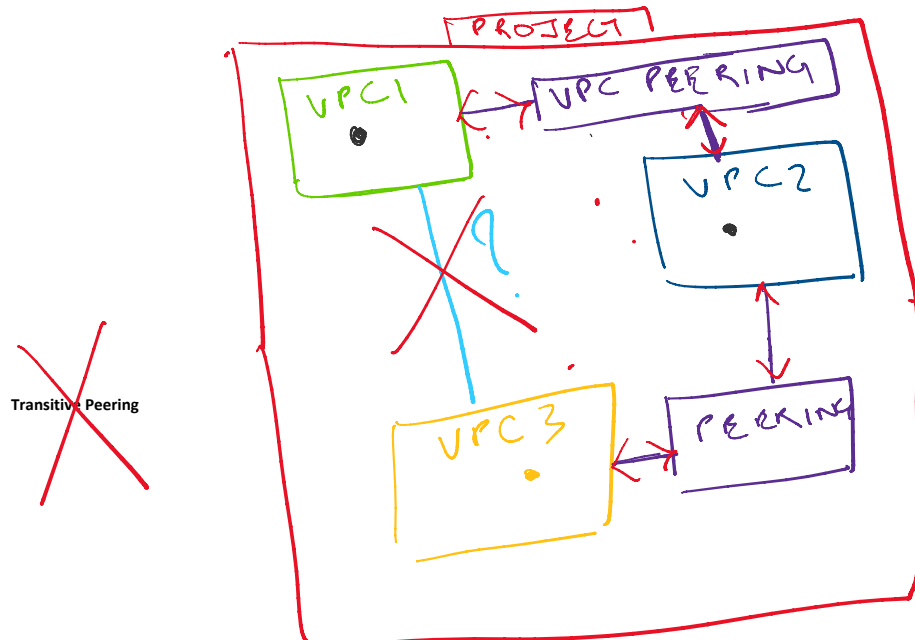
Demo

- 1 Vm in default VPC in Mumbai region with no external IP address.
- 1 Vm in custom-vpc Mumbai region with no external IP address.
 - o Will the VMs able to ping/talk to each other each other as they are in the same region but different VPC?
 - Service in different VPC but in same region cannot talk to each other over private IP.
 - o Will the VMs able to talk to each other if they are in same VPC but different region?
 - YES !!!!
 - Because VPC is GLOBAL !!!

Why is the SSH not working for the customvpc Network?

-Firewall rule was missing for the custom vpc.

- Will the VMs able to ping/talk to each other each other as they are in the same region but different VPC?
 - Service in different VPC but in same region cannot talk to each other over private IP.
 - BUT - If you enable VPC Peering services in different VPCs also can talk to each other over private IP.



Next Week

- Shared VPC
- Hybrid Connectivity
- VPN
- Routers
- Interconnects
- Best Networking solution to select on GCP
- Compute Engine

