Networking Contd

CIDR

- Expand `10.100.128.0/18`

```
10.100.128.0/18
N (1) = 18
n = 32 - 18 = 14

ip:             10.100.10xxxxxx.xxxxxxx
sm: 11111111.11111111.11000000.0000000
start:          10.100.10000000.0000000 = 10.100.128.0
end:            10.100.10111111.1111111 = 10.100.191.255
```

Lets create a private network

- Private network

```
10.0.0.0/8 => 10.0.0.0 to 10.255.255.255
172.16.0.0/12 => 172.16.0.0 to 172.31.255.255
192.168.0.0/16 => 192.168.0.0 to 192.168.255.255
```

- Lets create a private network for 190 devices

```
2^n - 2 ~= 190
2^n ~= 190
n = 8
N = 32 - 8 = 24

192.168.0.0/24
ip:  192.168.0.X
SM: 11111111.11111111.11111111.00000000
range: 192.168.0.0 to 192.168.0.255
```

- Lets create a private network of size 1200 devices

```
2^n -2 ~= 1200
2^n ~= 1200
n = 11
N = 32 -11 = 21
```

```
ip: 172.16.0.0/21
                172.16.00000xxx.0
SM: 11111111.11111111.11111000.00000000
range: 172.16.0.0 to 172.16.7.255
```

- Lets create a private network of size 67000 devices

```
2^n ~= 67000
n = 17
N = 32 -17 = 15

ip: 10.0.0.0/15
10.0.0.0 to 10.1.255.255
```

- Lets create a private network of 100 devices

```
2^n ~ = 100
n = 7
N = 25
ip: 192.168.0.0/25
    192.168.0.128/25
    192.168.1.0/25
    192.168.1.128/25
    ..
    192.168.255.0/25
    10.100.101.128/25
    172.17.200.128/25
  ip                 a.b.c.dxxxxxxx
  ip:                a.b.c.0xxxxxxx
                     a.b.c.1xxxxxxx
SM: 11111111.11111111.11111111.10000000
```
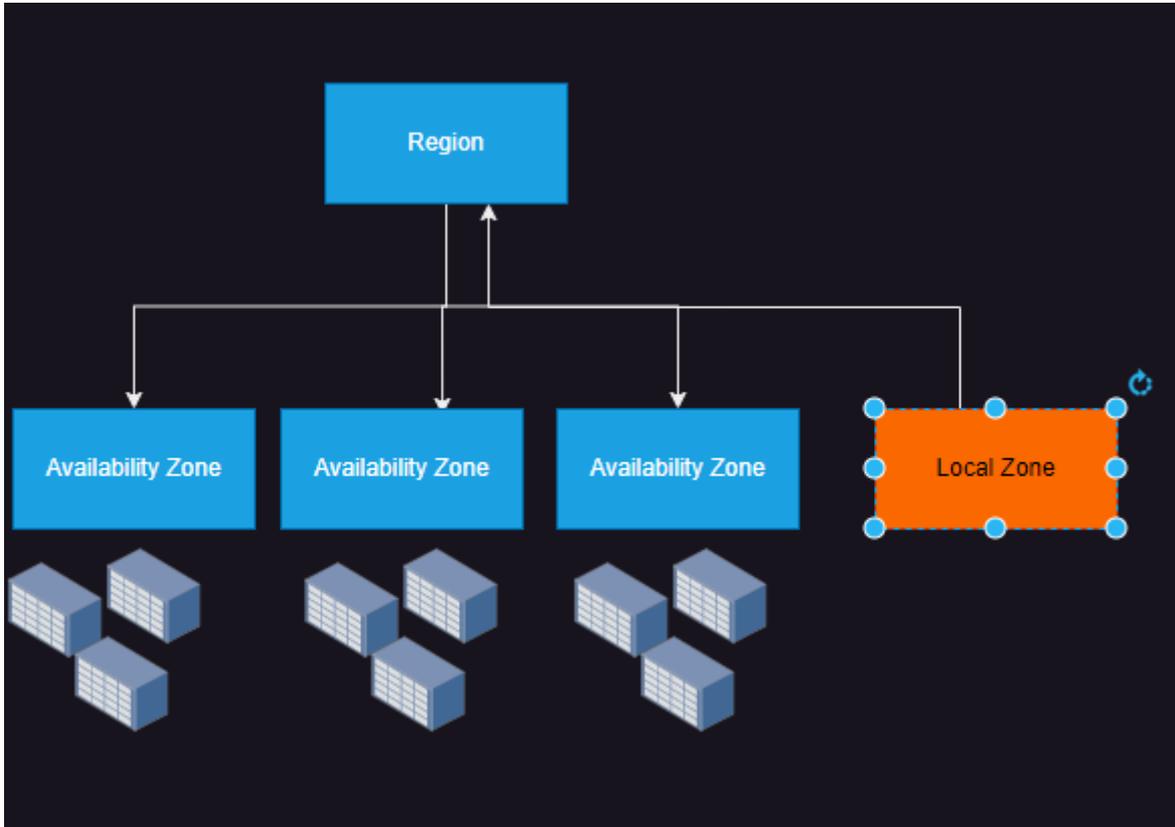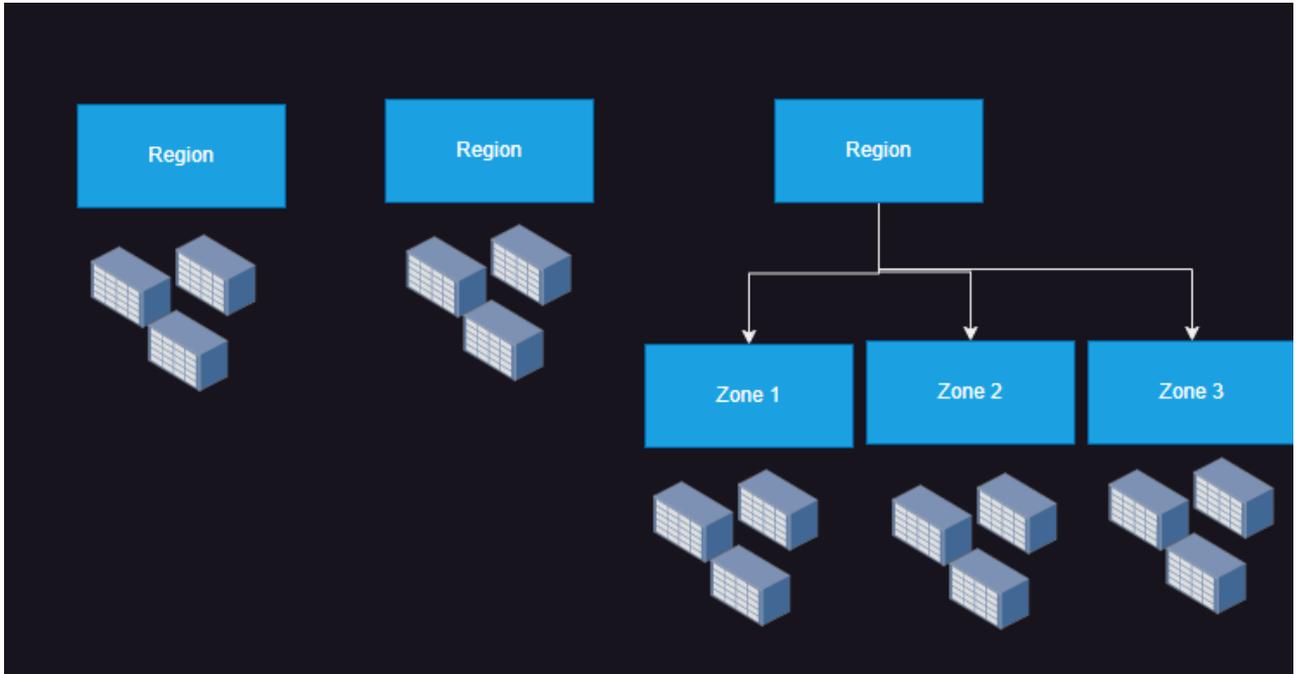
AWS Global INfrastructure

- Region
- Availability Zones
- Local Zones
- Global Network
- Note: In AWS the private network which we will be creating is called as vpc (Virtual private cloud). VPC belongs to a region and in each AZ we can create subnets.

Azure Global Infrastructure

- Region
- Zone
- Backbone Network
- Refer Here for microsoft data centers

- Note: In Azure the private network which we will be creating is called as Vnet (Virtual networks). Vnet belongs to a region and subnet also belongs to a region. Servers can only to added to subnets not networks.
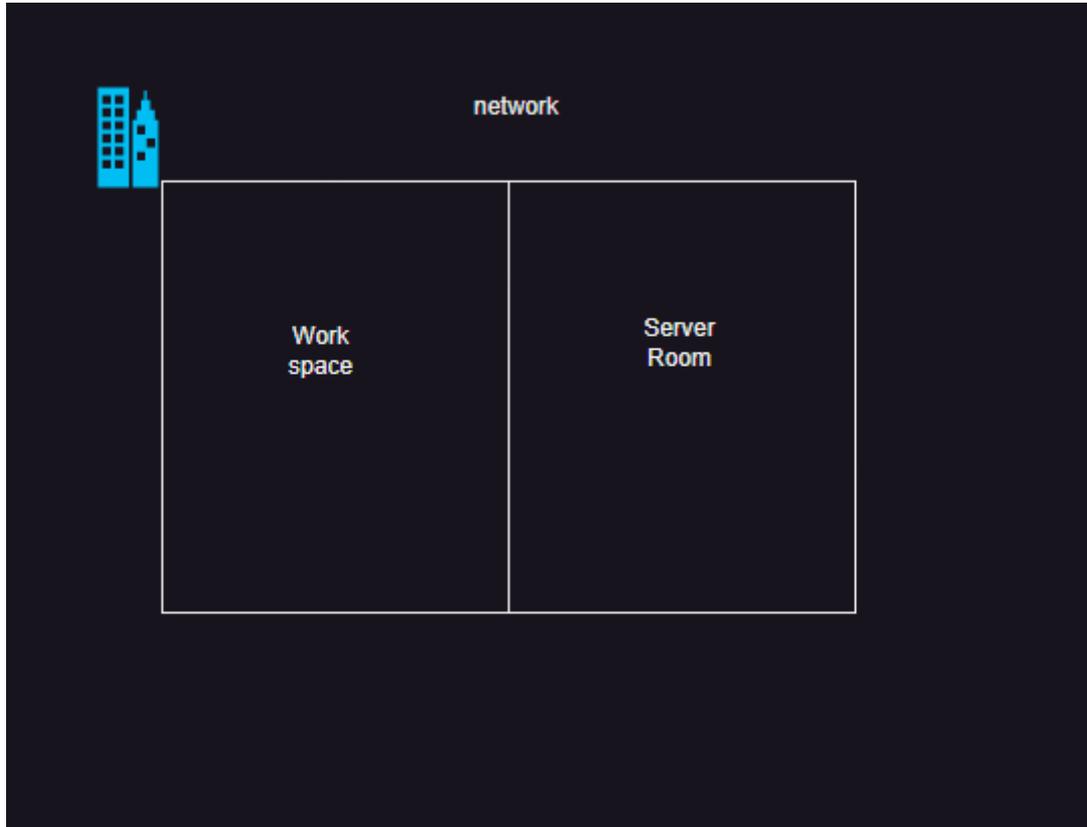
Networks on cloud

- The networks which we create on cloud are virtual in nature.
- Since in the cloud, the resources are connected to subnets, we need to learn subnetting

Subnetting

- Subnetting is breaking a large network into multiple smaller networks

Scenario: Simple subnetting

- Consider the following case

- Organization has a need to connect 500 devices to a network

- Server Room needs a subnet which will connect 250 servers

- Workspace needs to connect to 250 devices

- Lets find cidr range for office network

```
# office

2^n - 2 ~= 500
n = 9
N = 23

office cidr
10.0.0.0/23
```

- Server room

```
2^n - 2 ~= 250
n = 8
N = 24
```

- Workspace

```
2^n - 2 ~= 250
n = 8
N = 24
```

- Combine

```
nip: 10.0.0.0/23
nsm: 11111111.11111111.11111110.00000000
ssm: 11111111.11111111.11111111.00000000
   ---------------------------------------
                        X
             10.0.0000000x.00000000
             10.0.0.0/24
             10.0.1.0/24
```