CIDR (classless Inter Domain Routing) :-

/16 /17 /18 /19 /20 /21 /22

/23 /24 /25 /26 /27 /28

Eg:- VPC1 - 10.0.0.0/22 — 1024 IP addresses

Total no. of bits — 32

Bits in CIDR IP address — 22

32-22 = 10 => 2^{10} = 1024 IP addresses

/23 => 32-23 = 9 => 2^9 = 512

/24 => 32-24 = 8 => 2^8 = 256

/25 => 32-25 = 7 => 2^7 = 128

/26 => 32-26 = 6 => 2^6 = 64

/27 => 32-27 = 5 => 2^5 = 32

/28 => 32-28 = 4 => 2^4 = 16

/21 => 32-21 = 11 => 2^{11} = 2048

/20 => 32-20 = 12 => 2^{12} = 4096

/19 => 32-19 = 13 => 2^{13} = 8192

/18 => 32-18 = 14 => 2^{14} = 16384

/17 => 32-17 = 15 => 2^{15} = 32768

/16 => 32-16 = 16 => 2^{16} = 65536

Eg 1:- VPC1 — 10.0.0.0/24 — 256 IP address

Total Number of Bits in IPV4 — 32

Bits in CIDR IP address — 24

32-24=8, 2^8=256 IP Addresses

10.0.0.0, 10.0.0.1, 10.0.0.2, ..., 10.0.0.255

256

Eg 2:- VPC2 — 10.0.0.0/23 — 512 IP Addresses

Total number of Bits in IPV4 — 32

Bits in CIDR IP address — 23

32-23=9, 2^9=512 IP addresses

10.0.0.0 10.0.0.1, 10.0.0.2, ..., 10.0.0.255, 10.0.1.0,

10.0.1.1, ... 10.0.1.255.

Eg 3:- VPC 3 − 10.0.0.0/22 − 1024 IP addresses

$32 - 22 = 10 \Rightarrow 2^{10} = 1024$

10.0.0.0, ... 10.0.0.255 {256}, 10.0.1.0, ... 10.0.1.255 {512}

.... 10.0.2.0, ... 10.0.2.255 {768}, ... 10.0.3.0, ... 10.0.3.255 {1024}

* VPC 4 − 10.0.0.0/25 − 128 IP addresses

10.0.0.0, ..., 10.0.0.127

* VPC5 − 10.0.0.0/26 − 64 IP addresses

10.0.0.0, ..., 10.0.0.63

* VPC 6 − 10.0.0.0/27 − 32 IP addresses

10.0.0.0, ..., 10.0.0.31

* VPC 7 − 10.0.0.0/28 − 16 IP addresses

10.0.0.0, ..., 10.0.0.15

* VPC8 − 10.0.0.0/21 − 2048 IP address

10.0.0.0, ..., 10.0.7.255

* VPC9 − 10.0.0.0/20 − 4096 IP address

10.0.0.0, ..., 10.0.15.255

* VPC 10 − 10.0.0.0/19 − 8192 IP address

10.0.0.0, ..., 10.0.31.255

* VPC 11 − 10.0.0.0/18 − 16384 IP addresses

10.0.0.0, ..., 10.0.63.255

* VPC 12 − 10.0.0.0/17 − 32768 IP addresses

10.0.0.0, ..., 10.0.127.255

$15 \times 2 = 30$

$2 \times 2 +$

* $(n \times 2) + 1$
$2n + 1$

10.0.3.255 (1024)
256
10.0.4.255 (1280)
256
10.0.5.255 (1536)
256
10.0.6.255 (1792)
256
10.0.7.255 2048
256
10.0.8.255 2304
256
10.0.9.255 (2560)
256
10.0.10.255 2816
256
10.0.11.255 3072
256
10.0.12.255 3328
256
10.0.13.255 3584
256
10.0.14.255 3840
256
10.0.15.255 (4096)
256
16 4352
256
17 4608
256
18 4864
256
19 512
256
20 537
256
21 563
256
22 588
256
23 61
256
24 640
256
25 665
256
26 691
256
27 716
256
28 742
256
29 768
256
130 793
256
31 819

* VPC 13 – 10.0.0.0/16 – 65536 IP addresses
10.0.0.0, ... , 10.0.255.255

* VPC 2 – 20.15.0.0/23 – 512 IP addresses
range – 20.15.0.0, ... , 20.15.1.255

* VPC 3 – 20.15.0.0/24
range – 20.15.0.0, . . . , 20.15.0.255

* VPC 4 – 20.15.0.0/25
Range – 20.15.0.0, . . . , 20.15.0.127

* VPC 5 – 20.15.0.0/26
Range – 20.15.0.0, ... , 20.15.0.63

* VPC 6 – 20.15.0.0/27
Range – 20.15.0.0, . . . 20.15.0.31

* VPC 7 – 20.15.0.0/28
Range – 20.15.0.0, . . . , 20.15.0.15

* VPC 8 – 20.15.0.0/22
Range – 20.15.0.0, . . . , 20.15.3.255

* VPC 9 – 20.15.0.0/21
Range – 20.15.0.0, . . . , 20.15.7.255

* VPC 10 – 20.15.0.0/20
Range – 20.15.0.0, . . . , 20.15.15.255

* VPC 11 – 20.15.0.0/19
20.15.0.0, ... , 20.15.31.255

* VPC 12 – 20.15.0.0/18
20.15.0.0, . . . , 20.15.63.255

* VPC 13 – 20.15.0.0/17
20.15.0.0, . . . , 20.15.127.255

* VPC 14 – 20.15.0.0/16

20.15.0.0, ..., 20.15.255.255

Subnetworking

Eg 1 :- VPC 1 – 20.15.0.0/22 -

Subnet 1 – 256 IP's – 20.15.0.0/24

Subnet 2 – 256 IP's – 20.15.1.0/24

Subnet 3 – 256 IP's – 20.15.2.0/24

Subnet 4 – 256 IP's – 20.15.3.0/24

Eg 2 :- VPC 2 – 20.15.0.0/21 -

Subnet 1 – 512 IP's – 20.15.0.0/23

Subnet 2 – 512 IP's – 20.15.2.0/23

Subnet 3 – 512 IP's – 20.15.4.0/23

Subnet 4 – 512 IP's – 20.15.6.0/23

Eg 3 :- VPC 3 – 20.15.0.0/20 -

Subnet 1 – 1024 IP's – 20.15.0.0/22

Subnet 2 – 1024 IP's – 20.15.4.0/22

Subnet 3 – 1024 IP's – 20.15.8.0/22

Subnet 4 – 1024 IP's – 20.15.12.0/22

Eg 4 :- VPC 4 – 20.15.0.0/19 -

Subnet 1 – 2048 IP's – 20.15.0.0/21

Subnet 2 – 2048 IP's – 20.15.8.0/21

Subnet 3 – 2048 IP's – 20.15.16.0/21

Subnet 4 – 2048 IP's – 20.15.24.0/21

Eg5: VPC5 – 20.15.0.0/18

subnet 1 – 4096 IP's – 20.15.0.0/20

subnet 2 – 4096 IP's – 20.15.16.0/20

subnet 3 – 4096 IP's – 20.15.32.0/20

subnet 4 – 4096 IP's – 20.15.48.0/20

Eg6: VPC6 – 20.15.0.0/17

subnet 1 – 8192 IP's – 20.15.0.0/19

subnet 2 – 8192 IP's – 20.15.32.0/19

subnet 3 – 8192 IP's – 20.15.64.0/19

subnet 4 – 8192 IP's – 20.15.96.0/19

Eg7: VPC7 – 20.15.0.0/16

subnet 1 – 16384 IP's – 20.15.0.0/18

subnet 2 – 16384 IP's – 20.15.64.0/18

subnet 3 – 16384 IP's – 20.15.128.0/18

subnet 4 – 16384 IP's – 20.15.192.0/18

Eg8: VPC8 – 20.15.0.0/18

subnet 1 – 4096 IP's – 20.15.0.0/20

subnet 2 – 2048 IP's – 20.15.16.0/21

subnet 3 – 1024 IP's – 20.15.24.0/21

subnet 4 – 2048 IP's – 20.15.28.0/22

subnet 5 – 1024 IP's – 20.15.96.0/22

subnet 6 – 2048 IP's – 20.15.40.0/21

subnet 7 – 4096 IP's – 20.15.48.0/20