

NETWORKING ASSIGNMENT

CIDR Notation

Example:

VPC name = VPC1 IP Address : 10.0.0.0/22 - 1024 IP Address

Total number of bits in IPV4 – 32

Bits in CIDR IP Address – 22

$32 - 22 = 10$, $2^{10} = 1024$ IP Address

Exercise:

$/23 \rightarrow 32-23 = 9 \rightarrow 2^9 \rightarrow 512$

$/24 \rightarrow 32-24 = 8 \rightarrow 2^8 \rightarrow 256$

$/25 \rightarrow 32-25 = 7 \rightarrow 2^7 \rightarrow 128$

$/26 \rightarrow 32-26 = 6 \rightarrow 2^6 \rightarrow 64$

$/27 \rightarrow 32-27 = 5 \rightarrow 2^5 \rightarrow 32$

$/28 \rightarrow 32-28 = 4 \rightarrow 2^4 \rightarrow 16$

$/21 \rightarrow 32-21 = 11 \rightarrow 2^{11} \rightarrow 2048$

$/20 \rightarrow 32-20 = 12 \rightarrow 2^{12} \rightarrow 4096$

$/19 \rightarrow 32-19 = 13 \rightarrow 2^{13} \rightarrow 8192$

$/18 \rightarrow 32-18 = 14 \rightarrow 2^{14} \rightarrow 16384$

$/17 \rightarrow 32-17 = 15 \rightarrow 2^{15} \rightarrow 32768$

$/16 \rightarrow 32-16 = 16 \rightarrow 2^{16} \rightarrow 65536$

Example 1:

VPC1 – 10.0.0.0/24 \rightarrow 256 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address -24

$32-24=8$, $2^8=256$ IP Address

10.0.0.0, 10.0.0.2,.....,10.0.0.255

Example 2:

VPC2 – 10.0.0.0/23 → 512 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address -23

$32-23=9$, $2^9=512$ IP Address

10.0.0.0, 10.0.0.2,.....,10.0.0.255,10.0.1.0,.....10.0.1.255

Example 3:

VPC3 – 10.0.0.0/22 → 1024 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address - 22

$32-22=10$, $2^{10}=1024$ IP Address

10.0.0.0,...,10.0.0.255,10.0.1.0,.....10.0.1.255,10.0.2.0,.....10.0.2.255,10.0.3.0,...10.0.3.255

Example 4:

VPC4 – 10.0.0.0/25→ 128 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address -25

$32-25=7$, $2^7=128$ IP Address

10.0.0.0,....,10.0.0.127

Example 5:

VPC – 10.0.0.0/26 → 64 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address - 26

$32-26=6$, $2^6=64$ IP Address

10.0.0.0, 10.0.0.1,.....,10.0.0.63

Example 6:

VPC – 10.0.0.0/27 → 32 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address -27

$32-27=, 2^5 = 32$ IP Address

10.0.0.0, 10.0.0.1,.....,10.0.0.31

Example 7:

VPC – 10.0.0.0/28 → 16 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address - 28

$32-28=, 2^4 = 16$ IP Address

10.0.0.0, 10.0.0.1,.....,10.0.0.15

Example 8:

VPC – 10.0.0.0/21 → 2048 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address -21

$32-21=, 2^{11}= 2048$ IP Address

10.0.0.0, 10.0.0.1,.....,10.0.0.255,..., 10.0.7.0,.....10.0.7.255

Example 9:

VPC – 10.0.0.0/20 → 4096 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address - 20

$32-20=, 2^{12}=4096$ IP Address

10.0.0.0, 10.0.0.1,.....,10.0.0.255,.....,10.0.15.0,.....10.0.15.255

Example 10:

VPC – 10.0.0.0/19 → 8192 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address - 19

$32-19=, 2^{13} = 8192$ IP Address

10.0.0.1, 10.0.0.2,.....,10.0.0.255,10.0.1.0,.....10.0.1.255,...,10.0.30.0,..10.0.30.255

Example 11:

VPC – 10.0.0.0/18 → 16384 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address - 18

$32-18=, 2^{14} = 16384$ IP Address

10.0.0.1, 10.0.0.2,.....,10.0.0.255,10.0.1.0,.....10.0.1.255,10.0.63.0,...,10.0.63.255

Example 12:

VPC – 10.0.0.0/17 → 32786 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address - 17

$32-17=, 2^{15} = 32786$ IP Address

10.0.0.1, 10.0.0.2,.....,10.0.0.255,10.0.1.0,.....10.0.1.255,10.0.127.0,...,10.0.127.255

Example 13:

VPC – 10.0.0.0/16 → 65536 IP Address

Total number of bits in IPV4 -32

Bits in CIDR IP Address - 16

$32-16=, 2^{16} = 65536$ IP Address

10.0.0.1, 10.0.0.2,.....,10.0.0.255,10.0.1.0,.....10.0.1.255,10.0.255.0,...,10.0.255.255

1.VPC 2 – 20.15.0.0/23 => $32-23 = 2^9 = 512$

- 20.15.0.0, 20.15.0.1,...20.15.1.255
- 2.VPC 3– 20.15.0.0/24 $\Rightarrow 32-24=2^8=256$
- 20.15.0.0, 20.15.0.1,...20.15.0.255
- 3.VPC 4– 20.15.0.0/25 $\Rightarrow 32-25=2^7=128$
- 20.15.0.0,.....20.15.0.255
- 4.VPC 5– 20.15.0.0/26 $\Rightarrow 32-26=2^6=64$
- 20.15.0.0,.....,20.15.0.63
- 5.VPC 6– 20.15.0.0/27 $\Rightarrow 32-27=2^5=32$
- 20.15.0.0,.....,20.15.0.31
- 6.VPC 7– 20.15.0.0/28 $\Rightarrow 32-28=2^4=16$
- 20.15.0.0,.....,20.15.0.15
- 7.VPC 8– 20.15.0.0/22 $\Rightarrow 32-22=2^{10}=1024$
- 20.15.0.0,.....,20.15.3.255
- 8.VPC 9– 20.15.0.0/21 $\Rightarrow 32-21=2^{11}=2048$
- 20.15.0.0,.....,20.15.7.255
- 9.VPC 10– 20.15.0.0/20 $\Rightarrow 32-20 = 2^{12}=4096$
- 20.15.0.0,.....20.15.15.255
- 10.VPC 11– 20.15.0.0/19 $\Rightarrow 32-19 = 2^{13} =8192$
- 20.15.0.0,.....,20.15.31.255
- 11.VPC 12– 20.15.0.0/18 $\Rightarrow 32-18 =2^{14} = 16384$
- 20.15.0.0,.....,20.15.63.255
- 12.VPC 13– 20.15.0.0/17 $\Rightarrow 32-17 = 2^{15} =32768$
- 20.15.0.0,.....,20.15.127.255
- 13.VPC 14– 20.15.0.0/16 $\Rightarrow 32-16 = 65534$
- 20.15.0.0,.....,20.15.255.255

Example - 1 :

VPC1– 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

Example - 2 :

VPC2 – 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

Example - 3:

VPC3 – 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

Example - 4:

VPC4 – 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

Example - 5:

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

Example - 6:

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

Example - 7:

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

Example - 8:

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 – 20.15.24.0/20

Subnet 4 – 2048 IP's – 20.15.28.0/21

Subnet 5 – 1024 IP's – 20.15.36.0/22

Subnet 6 – 2048 IP's – 20.15.40.0/21

Subnet 7 – 4096 IP's – 20.15.48.0/20

Example - 9:

VPC9– 20.15.0.0/16

Subnet 1 – 4096 IP's – 20.15.0.0/20

Subnet 2 – 16384 IP's – 20.15.16.0/18

Subnet 3 – 4096 IP's – 20.15.80.0/20

Subnet 4 – 2048 IP's – 20.15.96.0/21

Subnet 5 – 1024 IP's – 20.15.104.0/22

Subnet 6 – 8192 IP's – 20.15.108.0/19

Subnet 7 – 4096 IP's – 20.15.140.0/20

Example - 10:

VPC10– 20.15.0.0/17

Subnet 1 – 2048 IP's – 20.15.0.0/21

Subnet 2 – 8192 IP's – 20.15.8.0/19

Subnet 3 – 2048 IP's – 20.15.40.0/21

Subnet 4 – 1024 IP's – 20.15.48.0/22

Subnet 5 – 512 IP's – 20.15.52.0/23

Subnet 6 – 4096 IP's – 20.15.54.0/20

Subnet 7 – 512 IP's – 20.15.70.0/23

Subnet 8 – 2048 IP's – 20.15.72.0/21

Example - 11:

VPC11– 20.15.0.0/18

Subnet 1 – 2048 IP's – 20.15.0.0/21

Subnet 2 – 4096 IP's – 20.15.8.0/20

Subnet 3 – 512 IP's – 20.15.24.0/23

Subnet 4 – 1024 IP's – 20.15.26.0/22

Subnet 5 – 512 IP's – 20.15.30.0/23

Subnet 6 – 4096 IP's – 20.15.32.0/20

Subnet 7 – 1024 IP's – 20.15.48.0/22

Subnet 8 – 2048 IP's – 20.15.52.0/21

Example - 12:

VPC12– 10.0.0.0/16

Subnet 1 – 4096 IP's – 10.0.0.0/20

Subnet 2 – 1024 IP's – 10.0.16.0/21

Subnet 3 – 8192 IP's – 10.0.20.0/19

Subnet 4 – 4096 IP's – 10.0.52.0/20

Subnet 5 – 2048 IP's – 10.0.68.0/21

Subnet 6 – 4096 IP's – 10.0.76.0/20