

IP Address Version 4 (IPv4)

Mar'18

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Wednesday

0112 (080-285)

IP address:- Internet Protocol is

connection less protocol working at layer 3.

What is IP address and how it work?

An IP address is typically numbers separated by dots and when we talk about IP addresses three information that go hand-in-hand our IP address subnet mask and gateway.

Let us look at a sample IP address of a computer as :-

IP Address 192.168.100.225

Subnet Mask 255.255.255.0

Gateway 192.168.100.1

Notes

Gateway is sometimes called Router.

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WK 12 (081-284)

Thursday

M T W T F S S							M T W T F S S							
				1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24	25	
26	27	28												

For computer it is just numbers written in binary digits as:-

IP Address 11000000.10101000.01100100.11100001

Subnet Mask 11111111.11111111.11111111.00000000

Gateway 11000000.10101000.01100100.00000001

But since humans do not have capacity to remember these numbers, so these binary numbers are converted to decimal numbers and hence easy to remember by human being.

In other words

IP address version 4 is a combination of 4 octets separated by dots.

Notes

IP addresses are used to identify

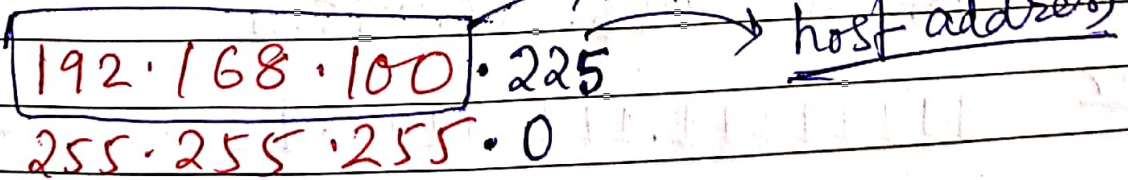
any computer connected over internet network for communication.

Subnet Mask:- Subnet mask will always be a series of one followed by a series of zeros. So if we look at the subnet mask the transition from ones to zeros happen at the place which separates the network part and the host part in this example

192.168.100 is the network bit.

Let me just take another color

So in this case this is the network part and host part :-



Notes 192.168.100.1

Always remember the IP address and the gateway needs to be in the network. If this changes then the

network is not valid.
8 Next is the classes of the network.

9 The class of the network is decided
by the first octate.

10 Class Name Range of first Octate

11 class A 1 - 126

12 class B 128 - 191

13 class C 192 - 223

14

Between class A and class B
one skipped number 127 is
used for loopback.

Subnet mask for class C type

network is 255.255.255.0

or 11111111.11111111.11111111.0

Notes

Here 24 One's are there

So, another way of representing
class C Network's IP address is

192.168.100.225/24

Here, 192.168.100.0 is known

as Network ID (First IP address of the network) and the address

192.168.100.255 becomes the broadcast IDs in this case.

So, valid IP addresses are there in this network we use ~~the~~ from 1 to 254.

So, to know how many IP addresses (valid) are there in a network

Class C → $2^8 - 2 = 256 - 2 = 254$

We can say that in the above network there can be 254 valid hosts (maximum) which does not include Network ID and Broadcast Address (IDs).

Notes

Class B :-

Class B network's first octate range is 128 and last is 191.

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WK 13 (086-279)

Tuesday

Feb'2018	M	T	W	T	F	S	S	M	T	W	T	F	S	S	
					1	2	3	4	5	6	7	8	9	10	11
	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	26	27	28												

Let us consider an IP address:-

8

IP Address: 172.123.100.225

9

Subnet Mask: 255.255.0.0

10

Gateway: 172.123.1.225

11

Class B IP address will have

a subnet mask 255.255.0.0.

In binary form it has 16 1's.

14

Hence it can be written as:-

15

IP address: 172.123.100.225/16

16

Subnet Mask: 255.255.0.0

17

Gateway: 172.123.1.225

18

In class B :-

Notes

Network ID (First):

172.123.0.0

Broadcast: 172.123.255.255

Valid IP's are between

~~172.123.0.0 to 172.123.255.254~~

Then the no. of IP's (valid) in

class B Network is $2^{16} - 2$

= 65,534 ← class B

class A :-

class A type network will have

a subnet mask of 255.0.0.0

class A IP address looks like:-

IP address 100.228.111.225/8

Subnet Mask ~~255~~.0.0.0

Gateway 100.101.123.1

Notes

In this type of network:-

Network ID is (First IP Address)
 100.0.0.0

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WK 13 (088-277)

Thursday

M T W T F S S							M T W T F S S										
							1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24	25				
26	27	28															

Valid IP address Start: _____

100.0.0.1

Valid IP address end: _____

100.255.255.254

Hence, in class A network,

valid IP's are $2^{24} - 2$

That means

20,97,150

class A

Q. Is this a valid IP address: -

IP Address: 133.123.100.225

Gateway: 133.132.100.1

Ans, This is not valid address because

Notes network part is different in

IP and Gateway.

	M	T	W	T	F	S	S	M	T	W	T	F	S	S
							1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16	17	18	19	20	21	22	
23	24	25	26	27	28	29	30							

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Friday

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WK 13 (089-276)

Q. Is this valid? -

IP address: 192.168.100.315

Gateway: 192.168.100.1

Ans → No. Network part is ok for

class C Network but host part has

315 which is not possible because it

has a valid range of 0 to 255.

