

Subnetting in 7 Seconds

Video Link: <https://www.youtube.com/watch?v=ZxAwQB8TZsM>

Four Important Addresses:



- Network address / subnet address
 - The first address in the subnet
- Broadcast address
 - The last address in the subnet
- First available host address
 - One more than the network address
- Last available host address
 - One less than the broadcast address



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Network 192.168.1.X

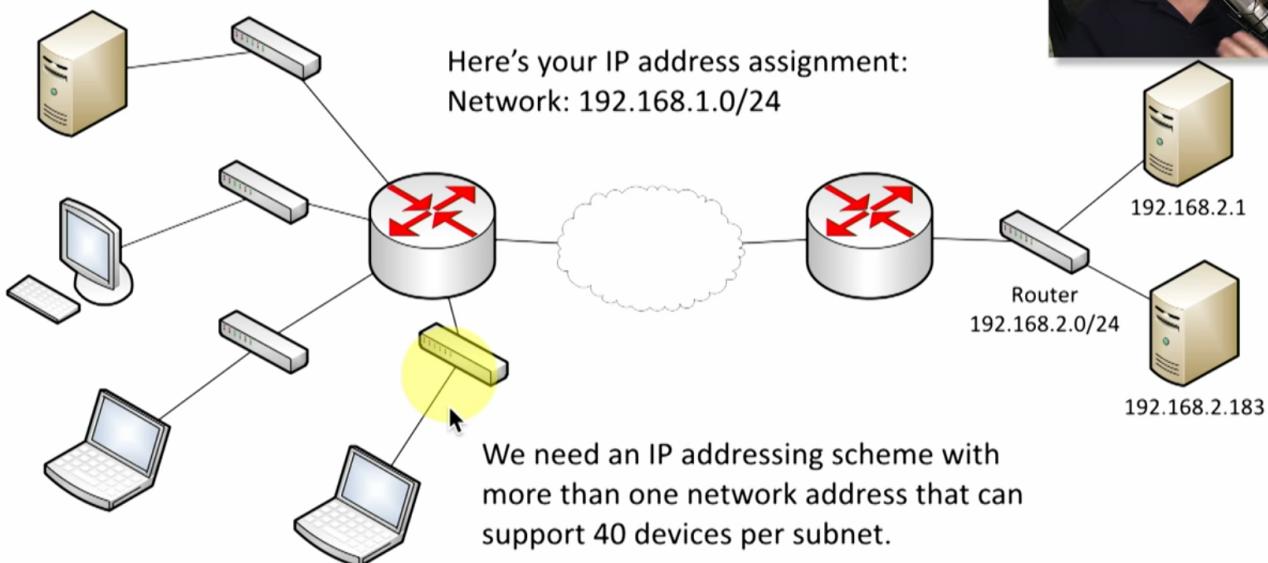
255.255.255.0 1 subnet	0 - 255							
255.255.255.128 2 subnets	0 - 127		128 - 255					
255.255.255.192 4 subnets	0 - 63	64 - 127	128 - 191	192-255				
255.255.255.224 8 subnets	0 - 31	32 - 63	64 - 95	96 - 127	128-159	160-191	192-223	224-255

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Long Form:

Subnetting the network



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Calculating subnet masks



- We have four networks with about 40 devices per subnet

Subnet Mask in Decimal	Subnet Mask in Binary	CIDR Notation	Networks	Hosts per Network
255.255.255.0	11111111.11111111.11111111.00000000	/24	1	254
255.255.255.128	11111111.11111111.11111111.10000000	/25	2	126
255.255.255.192	11111111.11111111.11111111.11000000	/26	4	62
255.255.255.224	11111111.11111111.11111111.11100000	/27	8	30
255.255.255.240	11111111.11111111.11111111.11110000	/28	16	14
255.255.255.248	11111111.11111111.11111111.11111000	/29	32	6
255.255.255.252	11111111.11111111.11111111.11111100	/30	64	2
255.255.255.254	11111111.11111111.11111111.11111110	/31	128	1

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Subnetting the network

- IP address 192.168.1.0, subnet mask 255.255.255.192

192.168.1.0 = 11000000.10101000.00000001.00000000

255.255.255.192 = 11111111.11111111.11111111.11000000

Network = 24 bits	S=2	Host = 6
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Total Subnets = 2 bits = $2^2 = 4$

Hosts per Subnet = 6 bits = $2^6 - 2 = 64 - 2 = 62$

2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1
256	128	64	32	16	8	4	2
2^{16}	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9
65,536	32,768	16,384	8,192	4,096	2,048	1,024	512

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Seven Second Subnetting:

Making a Chart:

Chart 1

Seven second subnetting

128 + 64 = 192 and so on to make column 2.

	Masks				Section 1	Section 2	Section 3	Section 4
/1	/9	/17	/25	128	2	128		
/2	/10	/18	/26	192	4	64		
/3	/11	/19	/27	224	8	32		
/4	/12	/20	/28	240	16	16		
/5	/13	/21	/29	248	32	8		
/6	/14	/22	/30	252	64	4		
/7	/15	/23	/31	254	128	2		
/8	/16	/24	/32	255	256	1		

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Chart 2



Seven second subnetting



Network Address Subnet Boundaries

Addresses															
128	0	128													
64	0	64	128	192											
32	0	32	64	96	128	160	192	224							
16	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224
8	0	8	16	24	32	40	48	56	64	72	80	88	96	104	112
4	0	4	8	12	16	20	24	28	32	36	40	44	48	52	56
															60

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Examples Using the charts:

Example 1:

Seven second subnetting

Address: 165.245.12.88/24

Address	165	245	12	88
Mask	255	255	255	0
	↓	↓	↓	↓
Net	165	245	12	0
Broadcast	165	245	12	255
First IP	165	245	12	1
Last IP	165	245	12	254

First IP is network address + 1
Last IP is broadcast address - 1

	Masks				Network	Addresses
/1	/9	/17	/25	128	2	128
/2	/10	/18	/26	192	4	64
/3	/11	/19	/27	224	8	32
/4	/12	/20	/28	240	16	16
/5	/13	/21	/29	248	32	8
/6	/14	/22	/30	252	64	4
/7	/15	/23	/31	254	128	2
/8	/16	/24	/32	255	256	1

Addresses	128	0	128	0	128	0	128	0	192	0	192	0	192	0	224	0	224	0	224	0	240	0	240	0	240	0	248	0
128	0				64				128						192													
64	0								128							192												
32	0		32		64			96	128		160				192													
16	0		16		32		48	64	80	96	112	128		144	160	176	192	208	224	240								
8	0	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	208	
4	0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96	100	104	108

Example 2:

![Screen Shot 2020-05-30 at 1.40.20 PM.png]



Address: 165.245.12.88/26



Address	165	245	12	88
Mask	255	255	255	192
	↓	↓	↓	↓
Net	165	245	12	64
Broadcast	165	245	12	127
First IP	165	245	12	65
Last IP	165	245	12	126

First IP is network address + 1
Last IP is broadcast address - 1

	Masks				Network	Addresses
/1	/9	/17	/25	128	2	128
/2	/10	/18	/26	192	4	64
/3	/11	/19	/27	224	8	32
/4	/12	/20	/28	240	16	16
/5	/13	/21	/29	248	32	8
/6	/14	/22	/30	252	64	4
/7	/15	/23	/31	254	128	2
/8	/16	/24	/32	255	256	1

Addresses	128	0	128	192
64	0	64	128	
32	0	32	64	128
16	0	16	32	64
8	0	8	16	24
4	0	4	8	12
2	0	2	4	8
1	0	1	2	4
0	0	0	0	0

Example 3:



Address: 165.245.12.88/20

Address	165	245	12	88
Mask	255	255	240	0
	↓	↓	↓	↓
Net	165	245	0	0
Broadcast	165	245	15	255
First IP	165	245	0	1
Last IP	165	245	15	254

First IP is network address + 1
Last IP is broadcast address - 1

	Masks				Network	Addresses
/1	/9	/17	/25	128	2	128
/2	/10	/18	/26	192	4	64
/3	/11	/19	/27	224	8	32
/4	/12	/20	/28	240	16	16
/5	/13	/21	/29	248	32	8
/6	/14	/22	/30	252	64	4
/7	/15	/23	/31	254	128	2
/8	/16	/24	/32	255	256	1

Addresses	128	0	128	192
64	0	64	128	
32	0	32	64	128
16	0	16	32	64
8	0	8	16	24
4	0	4	8	12
2	0	2	4	8
1	0	1	2	4
0	0	0	0	0

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Example 4:

The screenshot shows a video call interface. On the left, there's a calculator-like application with a grid of numbers and operators. On the right, there's a table titled "Masks" with columns for /1 through /32, along with network and address counts.

	Masks	Network	Addresses			
/1	/9	/17	/25	128	2	128
/2	/10	/18	/26	192	4	64
/3	/11	/19	/27	224	8	32
/4	/12	/20	/28	240	16	16
/5	/13	/21	/29	248	32	8
/6	/14	/22	/30	252	64	4
/7	/15	/23	/31	254	128	2
/8	/16	/24	/32	255	256	1

Address: 18.172.200.77/11

Address	18	172	200	77
Mask	255	224	0	0
	↓	↓	↓	↓
Net	18	160	0	0
Broadcast	18	191	255	255
First IP	18	160	0	1
Last IP	18	191	255	254

First IP is network address + 1
Last IP is broadcast address - 1

	Masks	Network	Addresses
/1	/9	/17	/25
/2	/10	/18	/26
/3	/11	/19	/27
/4	/12	/20	/28
/5	/13	/21	/29
/6	/14	/22	/30
/7	/15	/23	/31
/8	/16	/24	/32

Addresses	128	0	128	192	224	240
128	0	64	128	192		
64	0	64	128			
32	0	32	64	96	128	160
16	0	16	32	48	64	80
8	0	8	16	24	32	40
4	0	4	8	12	16	20

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