CIDR & Subnetting Cheat Sheet

A professional reference for network engineers, students, and CCNA / Network+ candidates. Covers CIDR notation, RFC-reserved ranges, IPv6 essentials, cloud provider reservations, and common subnet sizes for everyday work.

1. CIDR Quick Reference (/0 – /32)

CIDR	Subnet Mask	Wildcard Mask	Total IPs	Usable Hosts
/0	0.0.0.0	255.255.255.255	4,294,967,296	4,294,967,294
/1	128.0.0.0	127.255.255.255	2,147,483,648	2,147,483,646
/2	192.0.0.0	63.255.255.255	1,073,741,824	1,073,741,822
/3	224.0.0.0	31.255.255.255	536,870,912	536,870,910
/4	240.0.0.0	15.255.255.255	268,435,456	268,435,454
/5	248.0.0.0	7.255.255.255	134,217,728	134,217,726
/6	252.0.0.0	3.255.255.255	67,108,864	67,108,862
/7	254.0.0.0	1.255.255.255	33,554,432	33,554,430
/8	255.0.0.0	0.255.255.255	16,777,216	16,777,214
/9	255.128.0.0	0.127.255.255	8,388,608	8,388,606
/10	255.192.0.0	0.63.255.255	4,194,304	4,194,302
/11	255.224.0.0	0.31.255.255	2,097,152	2,097,150
/12	255.240.0.0	0.15.255.255	1,048,576	1,048,574
/13	255.248.0.0	0.7.255.255	524,288	524,286
/14	255.252.0.0	0.3.255.255	262,144	262,142
/15	255.254.0.0	0.1.255.255	131,072	131,070
/16	255.255.0.0	0.0.255.255	65,536	65,534
/17	255.255.128.0	0.0.127.255	32,768	32,766
/18	255.255.192.0	0.0.63.255	16,384	16,382
/19	255.255.224.0	0.0.31.255	8,192	8,190
/20	255.255.240.0	0.0.15.255	4,096	4,094
/21	255.255.248.0	0.0.7.255	2,048	2,046
/22	255.255.252.0	0.0.3.255	1,024	1,022
/23	255.255.254.0	0.0.1.255	512	510
/24	255.255.255.0	0.0.0.255	256	254
/25	255.255.255.128	0.0.0.127	128	126
/26	255.255.255.192	0.0.0.63	64	62
/27	255.255.255.224	0.0.0.31	32	30
/28	255.255.255.240	0.0.0.15	16	14
/29	255.255.255.248	0.0.0.7	8	6
/30	255.255.255.252	0.0.0.3	4	2
/31	255.255.255.254	0.0.0.1	2	2 (RFC 3021)
/32	255.255.255.255	0.0.0.0	1	1

2. Common Subnet Sizes & Use Cases

CIDR	Mask	Hosts	Typical Use Case
/30	255.255.255.252	2	Point-to-point link (router-to-router)
/29	255.255.255.248	6	Small server segment, Azure minimum
/28	255.255.255.240	14	AWS VPC minimum subnet size
/27	255.255.255.224	30	Small office VLAN
/26	255.255.255.192	62	Medium VLAN, printer/IoT segment
/25	255.255.255.128	126	Branch office, large VLAN
/24	255.255.255.0	254	Standard LAN segment
/23	255.255.254.0	510	Large office floor
/22	255.255.252.0	1,022	Building or campus
/20	255.255.240.0	4,094	Cloud subnet (typical VPC)
/16	255.255.0.0	65,534	Enterprise site, AWS/Azure VPC
/12	255.240.0.0	1,048,574	Regional aggregate
/8	255.0.0.0	16,777,214	Organization-wide private space

3. Private & Reserved IPv4 Ranges

Range	Standard	Purpose
10.0.0.0/8	RFC 1918	Private network (Class A)
172.16.0.0/12	RFC 1918	Private network (Class B)
192.168.0.0/16	RFC 1918	Private network (Class C)
100.64.0.0/10	RFC 6598	Carrier-Grade NAT (CGNAT)
127.0.0.0/8	RFC 1122	Loopback (localhost)
169.254.0.0/16	RFC 3927	Link-local (APIPA auto-config)
224.0.0.0/4	RFC 5771	Multicast
240.0.0.0/4	RFC 1112	Reserved (former Class E)
192.0.2.0/24	RFC 5737	Documentation (TEST-NET-1)
198.51.100.0/24	RFC 5737	Documentation (TEST-NET-2)
203.0.113.0/24	RFC 5737	Documentation (TEST-NET-3)
0.0.0.0/8	RFC 1122	"This network" — source only
255.255.255.255/32	RFC 919	Limited broadcast

4. IPv6 Essential Prefixes

Prefix	Standard	Purpose
`::/128`	RFC 4291	Unspecified address
`::1/128`	RFC 4291	Loopback
`fe80::/10`	RFC 4291	Link-local (always present)
`fc00::/7`	RFC 4193	Unique local address (ULA) — private
`2000::/3`	RFC 3513	Global unicast (public IPv6)
`ff00::/8`	RFC 4291	Multicast
`2001:db8::/32`	RFC 3849	Documentation prefix
`64:ff9b::/96`	RFC 6052	NAT64 well-known prefix
`::ffff:0:0/96`	RFC 4291	IPv4-mapped IPv6 addresses

5. Powers of 2 (Quick Math)

Power	Value	Equivalent CIDR	Notes
`2^1`	`2`	`/31`	Smallest P2P (RFC 3021)
`2^2`	`4`	`/30`	Old P2P standard
`2^3`	`8`	`/29`	6 usable hosts
`2^4`	`16`	`/28`	14 usable hosts
`2^5`	`32`	`/27`	30 usable hosts
`2^6`	`64`	`/26`	62 usable hosts
`2^7`	`128`	`/25`	126 usable hosts
`2^8`	`256`	`/24`	254 usable hosts
`2^10`	`1,024`	`/22`	~1K hosts
`2^16`	`65,536`	`/16`	~65K hosts
`2^20`	`1,048,576`	`/12`	~1M hosts
`2^24`	`16,777,216`	`/8`	~16M hosts

6. Cloud Provider Reserved IPs

Provider	Reserved per Subnet	Min Subnet	Notes
AWS VPC	5 (first 4 + last 1)	`/28`	.0 net, .1 router, .2 DNS, .3 reserved, last broadcast
Azure VNet	5 (first 4 + last 1)	`/29`	Similar to AWS pattern
Google Cloud	4 (first 2 + last 2)	`/29`	Network, gateway, second-last, broadcast
Oracle Cloud (OCI)	3	`/30`	Network, gateway, broadcast
Standard / On-prem	2 (first + last)	`/30`	RFC compliant: network + broadcast

7. Kev Formulas

Total IPs in a subnet: 2^(32 – prefix)
Usable hosts (standard): 2^(32 – prefix) – 2 (subtract network and broadcast)
Number of subnets when splitting: 2^(new_prefix – old_prefix)
Block size in a given octet: 256 – mask_octet_value
Magic number method: identify the "interesting" octet (where the mask transitions), then increment by block size to find subnet boundaries.

8. Subnetting Decision Quick-Guide

1. Determine required hosts per subnet.
2. Find smallest prefix that fits: prefix = 32 – ceil(log2(hosts + 2)).
3. Verify against cloud provider reservations if applicable.
4. Plan for 30–50% growth headroom.
5. Use VLSM to avoid IP waste — allocate largest subnets first.
6. Document everything in your IPAM.
7. Validate non-overlap before deployment.
8. Test in non-production environment first.

Disclaimer