

# TCP/IP

## Quick Reference Card



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### TCP/IP

Application	Process / Application	FTP, HTTP, Telnet etc
Presentation		
Session	Host to Host	TCP UDP
Transport		
Network	Internet	IP, ARP, RARP, ICMP, IGMP
Data Link	Network Access	Ethernet Token Ring etc
Physical		

- TCP:** Transmission Control Protocol, guaranteed delivery service.
- UDP:** User Datagram Protocol, connectionless datagram delivery service.
- IP:** Internet Protocol
- ICMP:** Internet Control Message Protocol
- IGMP:** Internet Group Management Protocol
- ARP:** Address Resolution Protocol, used to obtain the hardware address of a TCP/IP host system.
- RARP:** Reverse Address Resolution Protocol
- FTP:** File Transfer Protocol, used for downloading files from the Internet.
- HTTP:** Hyper Text Transfer Protocol, used for viewing Internet pages
- DHCP:** Dynamic Host Configuration Protocol, used to allocate IP addresses dynamically to host systems from a DHCP server.
- PING:** Program Internet Gropper, used as a diagnostic test between TCP/IP host systems.
- Traceroute:** A diagnostic program used to trace the route that IP is taking through a network.

### Common Port Assignments

17	quote	Quote of the day
20	ftp	FTP, data
21	ftp	FTP. control
23	telnet	Telnet
25	smtp	Mail
37	time	time server
39	rlp	Resource location protocol
42	name	Host Name Server
43	whois	NIC Name
53	name	Domain Name Server
67	bootps	Bootp or DHCP Server
68	bootpc	Bootp or DHCP Client
69	tftp	Trivial File transfer
70	gopher	finger
80	www-http	World Wide Web hypertext transfer protocol
88	kerberos	Kerberos 5
101	hostnames	Host Name Server
107	rtelnet	Remote Telnet Service
109	pop2	Post Office protocol Ver 2
110	pop3	Post Office protocol Ver 3
111	sunrpc	SUN remote procedure call
119	nntp	Network News Transfer Protocol
123	ntp	Network Time Protocol
137	netbios-ns	NETBIOS Name Service
138	netbios-dgm	NETBIOS Datagram Service
139	netbios-ssn	NETBIOS Session service
143	imap	Internet Message Access
158	pcmail-srv	PCMail Server
161	snmp	Simple network management protocol
162	snmptrap	SNMP trap
170	print-srv	Network postscript
179	bgp	Border Gateway Protocol
194	irc	Internet Relay Chat
213	ipx	IPX over IP
389	ldap	Lightweight Directory Access Protocol
443	https	Secure HTTP (Mcom)
445	microsoft-ds	Microsoft-ds
464	kpasswd	Kerberos (v5)
500	isakmp	Internet Key Exchange
512	exec	Remote Process Execution
512	biff	comsat
513	login	Remote Login or whod
514	cmd	shell or syslog
515	printer	LPD spooler
520	router	route routed
525	timed	timeserver
1433	ms-sql-s	Microsoft-SQL-Server
1434	ms-sql-m	Microsoft-SQL-Monitor
1512	wins	Microsoft Windows Internet Name Service

### The Fundamentals

- To display a system's ARP (address resolution protocol) table:** Use `arp -a` (arp space minus a)
- To delete an ARP entry:** Use `arp -d <ipaddress>`
- To display the local system's IP settings on Windows 95, 98 and ME:** Use WINIPCFG
- To display the local system's IP settings on Windows NT, 2000 and XP:** Use a command prompt and `IPCONFIG /ALL`
- To display the local system's IP settings on UNIX:** Use `ifconfig -a` (space before -a)
- To ping an IP address:** Use `ping <ipaddress>`, i.e. `ping 10.1.1.1`
- To ping a system name:** Use `ping <name>`
- To ping continuously on a Windows operating system:** Use `ping -t <name or ipaddress>`
- To display a system's routing table:** Use `netstat -nr`
- To trace a route on Windows systems:** Use `tracert <name or ipaddress>`

### ICMP Messages

- Echo request and Echo reply:** Used by the PING program
- Destination unreachable:** The gateway's routing table has no entry for the destination network.
- Source Quench:** The gateway has run out of buffer space.
- Redirect:** The gateway has determined that it is not the optimum choice for the given destination. The redirect packet contains the address of a more suitable gateway.
- Router Advertisement and Solicitation:** Used for router (gateway) discovery. Clients can send a router solicitation to learn of any gateways on the network, routers (gateways) send out a multicast periodically.
- Time Exceeded:** If, while processing an IP packet it's time to live (contained in an IP packet, range is 0 to 255 seconds) goes to zero, the gateway notify the source.
- Parameter problem :** Problem with parameters in the IP header information.
- Timestamp Query and Timestamp Reply:** Used to synchronise time between two hosts.
- Information Request and Information Reply:** Obsolete
- Address mask Request and Reply:** Used to obtain the local subnet mask.
- Trace route:** Used with the traceroute (tracert) program to determine the path IP packets are taking on a network.

## Subnet Masks

Number of Bits	Subnet Mask	Number of networks
1	128	N/A
2	192	2
3	224	6
4	240	14
5	248	30
6	252	62
7	254	126
8	255	254

### Default Subnet Masks

Class A	255.0.0.0
Class B	255.255.0.0
Class C	255.255.255.0

## Address Classes

Class	Address Range	Number of networks
Class A	1.0.0.0—126.0.0.0	126
Class B	128.0.0.0—191.0.0.0	16,384
Class C	192.0.0.0—223.0.0.0	2,015,775
Class D	224.0.0—239.0.0.0	N/A
Class E	240.0.0.0—254.0.0.0	N/A

## Classless Addressing (CIDR)

Uses the format:-

Network address/Number of ones in the subnet mask, i.e.

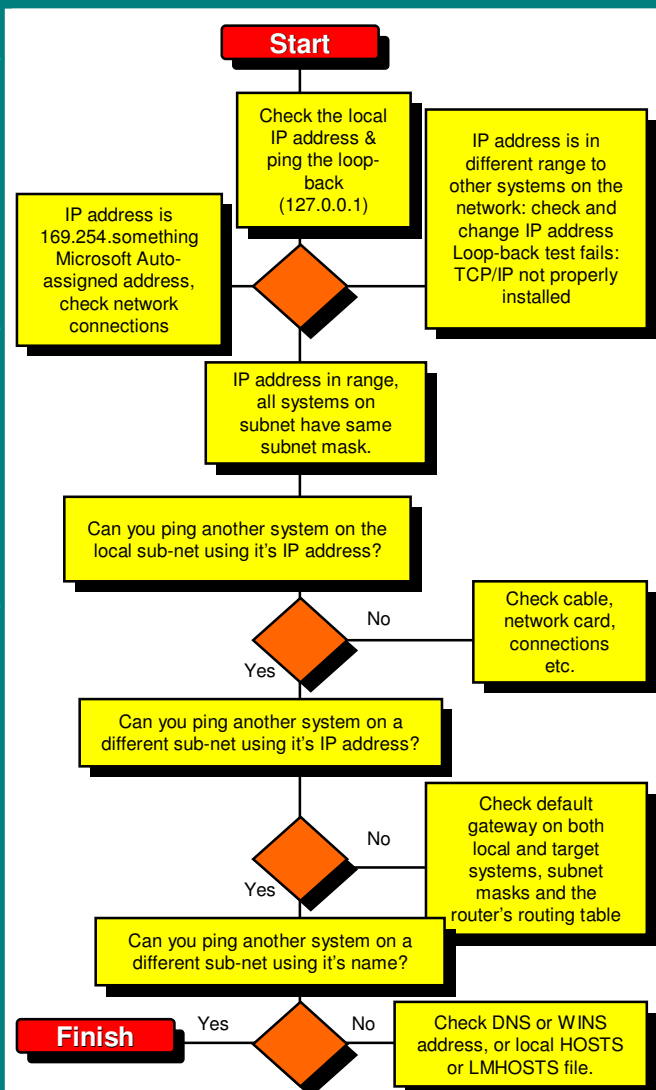
10/8	=	10.0.0.0	255.0.0.0
172.16/16	=	172.16.0.0	255.255.0.0
200.1.1/24	=	200.1.1.0	255.255.255.0

## TCP/IP Configuration Files

All the files below are plain text files with no file extension. Some, like protocols are sometimes plural and sometimes not, ie protocol or protocols. Files are held in the /etc directory on UNIX systems, in the Windows directory on Windows 95,98 and ME, and in the Winnt\system32\drivers\etc directory on Windows NT, 2000 and XP. Some files may not be present on some systems.

<b>Services:</b>	Used to store port assignments
<b>Protocols:</b>	Specifies each protocol's ID number
<b>Hosts:</b>	Host name to IP address lookup table
<b>Lmhosts:</b>	Host name to IP address lookup table for Windows systems
<b>Networks:</b>	This file contains information about network names and IP addresses.
<b>Gateways:</b>	Used to store static routes on some systems

## Trouble-shooting



## TCP/IP Configuration Files

## Suggested Private Addresses

Use these addresses for local networks.

Start Addr.	End Addr.	Subnet Mask
10.0.0.0	10.255.255.255	255.0.0.0
172.16.0.0	172.31.255.255	255.240.0.0
192.168.0.0	192.168.255.255	255.255.0.0
<b>Microsoft Auto Assignment</b>		
169.254.0.0	169.254.254.254	255.255.0.0

## Other Notable Addresses

127.0.0.1	Loop-back, used to specify THIS system
0.0.0.0	Martian address, used for default routes