Networking Concepts Cheatsheet

Protocols

TCP: Transmission Control Protocol

Stream protocol used for reliable communication over the Internet, requiring a three-way handshake and providing error correction.

UDP: User Datagram Protocol

Connection-less protocol providing unreliable connections where speed is preferable to integrity, suitable for real-time applications like VoIP and streaming video.

ICMP: Internet Control Message Protocol

Used for networking management and diagnostics between devices and routers such as sending error messages, echo requests and traceroute.

OSI Model

Application (Email client, browser, chat) 7
Presentation (HTML, JPG, XML) 6
Session (HTTP, FTP, SMTP) 5
Transport (TCP, UDP, ICMP) 4
Network (IPv4, IPv6, IPX) 3
Data (MAC, PPP, SLIP) 2
Physical (Ethernet, Fiber, ADSL) 1

Common ports

FTP ..... 21..TCP
SSH ..... 22..TCP
Telnet ..... 23..TCP
SMTP ..... 25..TCP
DNS ..... 53..UDP
TFTP ..... 69..UDP
HTTP ..... 80..TCP
POP3 ..... 110..TCP
NTP ..... 123..UDP
IMAP ..... 143..TCP

Private IPv4 ranges

Class A 10.0.0.0/8
Class B 172.16.0.0/12
Class C 192.168.0.0/16

IPv4 classes

Class A ..... 1.0.0.0 - 127.255.255.255
Class B ..... 128.0.0.0 - 191.255.255.255
Class C ..... 192.0.0.0 - 223.255.255.255
Class D ..... 224.0.0.0 - 239.255.255.255
Class E ..... 240.0.0.0 - 255.255.255.255

UTP cable categories

Cat 1 ..... Phone (no data)
Cat 3 ..... 10Mbps
Cat 5 ..... 100Mbps
Cat 5e 1Gbps
Cat 6 ..... 10Gbps

Cable connectors

Protocol	Connector	Image
Ethernet	RJ45	
Ethernet	BNC	
Fiber	FDDI	
Fiber	SC	
Fiber	SMA	
Fiber	ST	
Serial	Sub-D	

DNS record types

A ..... IPv4 address
AAAA ..... IPv6 address
CNAME ..... Alias name
MX ..... Mail server
NS ..... Name server
PTR ..... Pointer record
TXT ..... Text comment

DNS query example

```
$ nslookup -query=MX google.com
```

IPv6 addresses

General format

bits	48 or more	16 or less	64
field	routing prefix	sub-net	interface

Address ranges

::/128 ..... Reserved
::/0 ..... Default route
::1/128 ..... Loopback
fe80::/10 ..... Link-local
fc00::/7 ..... Unique-local
ff00::/8 ..... Multicast
::ffff:0:0/96 ..... IPv4-mapped
2001::/32 ..... Toredo tunneling
2001:db8::/32 ..... Examples
0100::/64 ..... Null

Network configuration

Linux

```
$ ifconfig eth0 192.168.0.2 netmask 255.255.255.0
up
$ route add default gw 192.168.0.1 eth0
$ echo "nameserver 8.8.8.8" > /etc/resolv.conf
```

Windows

```
> netsh interface ipv4 set address name=2
source=static address=192.168.0.2
mask=255.255.255.0 gateway=192.168.0.1
> netsh interface ipv4 add dnsserver name=2
address=8.8.8.8
```

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Images from Wikipedia.