Network Types

LAN	Local Area Network	A single home or office network
WAN	Wide Area Network	Linking multiple resources or LANs - Multiple office networks
MAN	Metropolitan Area Network	Linking multiple LANs - SOC, school networks, city networks

Network Topologies

Bus Topology	All computers are connected to a single cable	Antiquated process - still used in broadcast media
Star Topology	Each node is connected to a switch	Most common network setup you will see
Ring Topology	Each node is connected to one other. Reduces chances of packet collision	Rarely seen outside of a MAN or ISP datacenter-to-datacenter connection
Mesh Topology	Each node has an independent connection to every other node on the network	Used by MSPs and ISPs for highly-available and fault tolerant networks.

Network Cables - Copper

Cable Type	Max data transfer speed	Max Operating Length
CAT5	100 Mbps	100 Meters
CAT5e	1 Gbps	100 Meters
CAT6	10 Gbps	55 Meters
CAT6a	10 Gbps	100 Meters
CAT7	10 Gbps	100 Meters
CAT8	40 Gbps	30 Meters

Network Cables - Fiber

Cable Type	Max Speed/-Distance	Typical Use
OM1 - Orange Jacket	10 Gbps/33 Meters	100 Mbps Ethernet
OM2 - Orange Jacket	10 Gbps/82 Meters	1 Gbps Ethernet
OM3 - Aqua Jacket	10 Gbps/300 Meters	10 Gbps Ethernet
OM4 - Aqua Jacket	10 Gbps/400 Meters	100 Gbps Ethernet @ 150 meters
OM5 - Green Jacket	10 Gbps/400 Meters	Improvements on OM4. It breaks down light wavelengths more efficiently.
OS1 - Yellow Jacket	up to 100 Gbps/10 km	Single mode fiber for connecting indoor nodes. Used in fiber internet connections and datacenters.
OS2 - Yellow Jacket	up to 100 Gbps/200 km	Single mode fiber for connecting infrastructure outdoors. Used for MANs, ISPs, or MSPs.

7 Layer OSI Model

Layer	Typical Use	Protocols
Application	End User Layer	HTTP, FTP, SSH, DNS
Presentation	Syntax Layer	SSL, SSH, IMAP, MPEG, JPEG
Session	Sync & Send Layer	APIs, Sockets
Transport	End-to-end Connections	TCP, UDP
Network	Packets	IP, ICMP, IPSec, IGMP
Data Link	Frames	Ethernet, PPP, Switch
Physical	Physical Structure	Fiber, Access Points, Copper Cabling

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Cheatography

Networking Fundamentals Cheat Sheet

by Thatdudeoverthere via cheatography.com/118792/cs/28141/

OSI Troubleshooting

Layer	Command	Purpose
Physical	`ip -br -c link`	Is your physical interface up? Gives you detailed inform-ation on your NICs and virtual NICs.
Data Link	`ip neighbor show`	Displays the Address Resolution Protocol (ARP) table. Shows the IP and MAC addresses of computers you can reach on the network.
Network	`ip -br -c address show` or `ip -br -c a'`	Displays your network cards, their connection status, the IP address and CIDR. Make sure you have a valid IP address on your LAN NIC.

OSI Troubleshooting (cont)

Transport	`ss -tunlp4`	*Socket Statistics* gives you a list of connections and ports on your server. Use it to make sure you are able to connect to certain devices **-t** Show TCP ports **-u** Show UDP ports **-n** Do not try to resolve hostnames **-l** Show only listening ports **-p** Show processes that are using a particular socket **-4** Only show IPv4 sockets
Session	SSH or RTP	Get a device to accept your SSH session or initialize an RTP session from a camera. Keep in mind, RTP is different from RTSP.
Presentation	HTML, RTSP	Connect to a camera's webpage, or query a camera stream through VLC.
Application	Using the program	Can you interact with a webpage? Can you view DS logs once it's running? Good! Then you've confirmed the *Application* is up and running.

`ping <we bsite or IP addres s>`	Ping the device you're trying to connect to, or ping a commonly used server like Google's DNS (8.8.8.8) .
`traceroute <we bsite or IP addres s>`	Sends a packet out to a destination using Time to Live (TTL). The end result is a list of routers that the packet interacted with on the way to the destination
`ns lookup <we bsite name>`	Checks recognized DNS entries on your server. Make sure the IPs match up with results from ping

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Network Hardware

Network Border

Firewall	Prevents unauthorized access into a LAN.
Reside-ntial Gateway	"The wifi" - That little black box that people have near their TVs that they call: the internet. This will be the handoff from an ISP to your LAN or firewall.

Network Core

Gateway	Provides compatibility between different networks.
Router	Forwards data packets between different networks. They "direct traffic" typically received from outside networks.
Switch	Connects devices together by using packet switching. Used for internal traffic.
Wireless Access Point	The Wifi! This allows wireless devices to connect to a network rather than plugging into a switch directly.
Patch Panel	You plug your computer into a wall port. The wall port is connected to a patch panel. The patch panel connects to the switch. This prevents a tech from running new cables through a wall every time a computer joins the network.

Network Hardware (cont)

Network End Stations

Network Interface Controller (NIC)	The ethernet jack on a computer.
Wireless Network Interface Controller	Same thing as a NIC, but it uses radio waves to connect to an access point instead of a cable.

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