



CompTIA

A+

CERTIFICATION

Plus Series

Ultimate CompTIA A+ Cheat Sheet

220-1201 and 220-1202

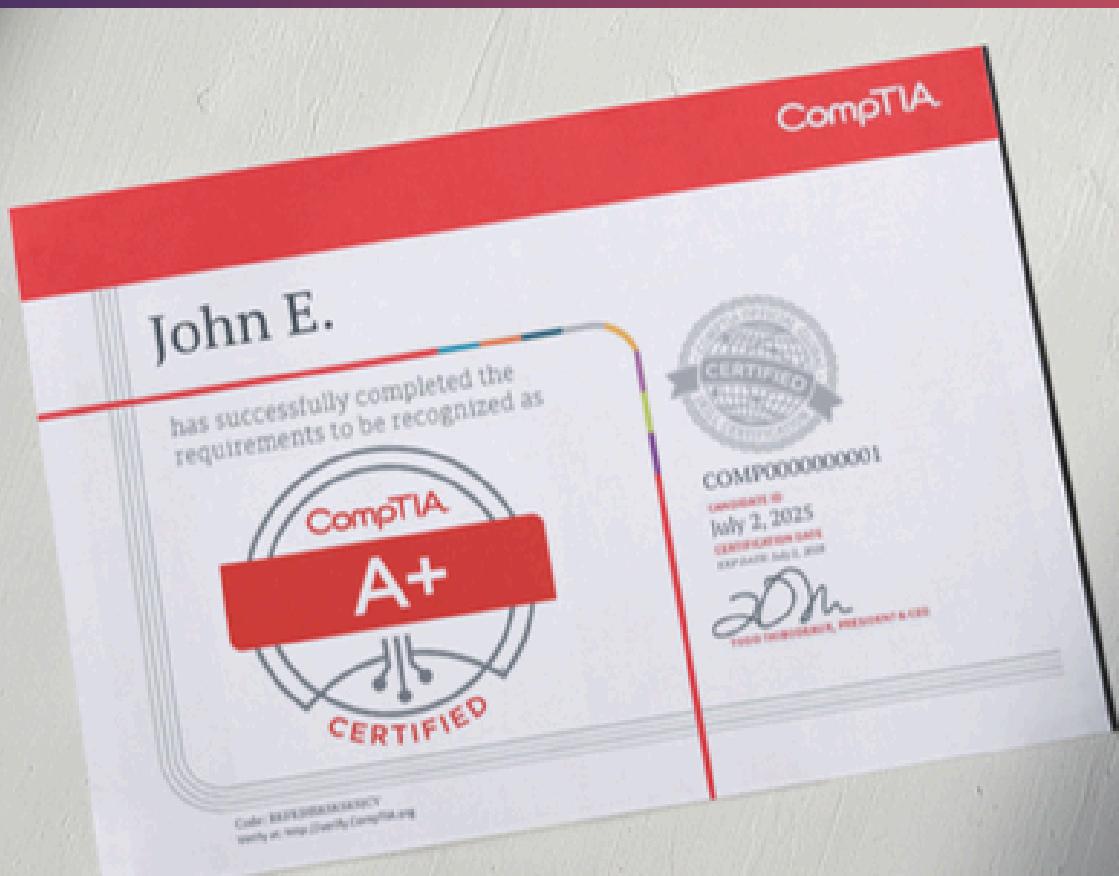
CompTIA A+ Cheat Sheet

220-1201 and 220-1202

You've made an excellent choice aiming for the CompTIA A+ certification. It goes without saying that you want to excel in these exams. A+ gives you a solid footing as you embark on a new career in IT, and it contains essential IT knowledge for a journey into cyber security.

As A+ covers many technical topics broadly, it can be challenging to recall fine details, especially when troubleshooting problems described in the exam questions.

Therefore, we've prepared this CompTIA A+ cheat sheet for you as an ongoing revision checklist and to provide direction in your exam preparation. When you're ready, let's review our must-know concepts below.



About CompTIA A+ Certifications

CompTIA A+ is a popular entry point into the IT and cyber security industry. If you're seeking to become a technical support specialist, field service technician, help desk technician, service desk analyst, data support technician, or desktop support administrator, A+ will get your foot in the door.

You must pass two examinations to obtain A+:

- Core 1 (220-1201), which focuses on mobile devices, hardware, networking, virtualization, and cloud computing; and
- Core 2 (220-1202), which is about software, cyber security, and operational procedures.

Troubleshooting is a main component in both exams.

Each of the Core examinations has at most 90 questions, either multiple-choice or performance-based. You must complete each exam in 90 minutes. On a scale of 100–900, the passing scores for Core 1 and Core 2 are 675 and 700, respectively.

The latest CompTIA A+ exam codes are **220-1201** for Core 1 and **220-1202** for Core 2. They have been available since March 2025 and will retire in 2027–2028. Both exams cost a combined total of \$265 USD (see [all pricing](#)).

As an authorized CompTIA partner, we are able to offer significant discounts on exam vouchers. Click the banner below to see our prices.



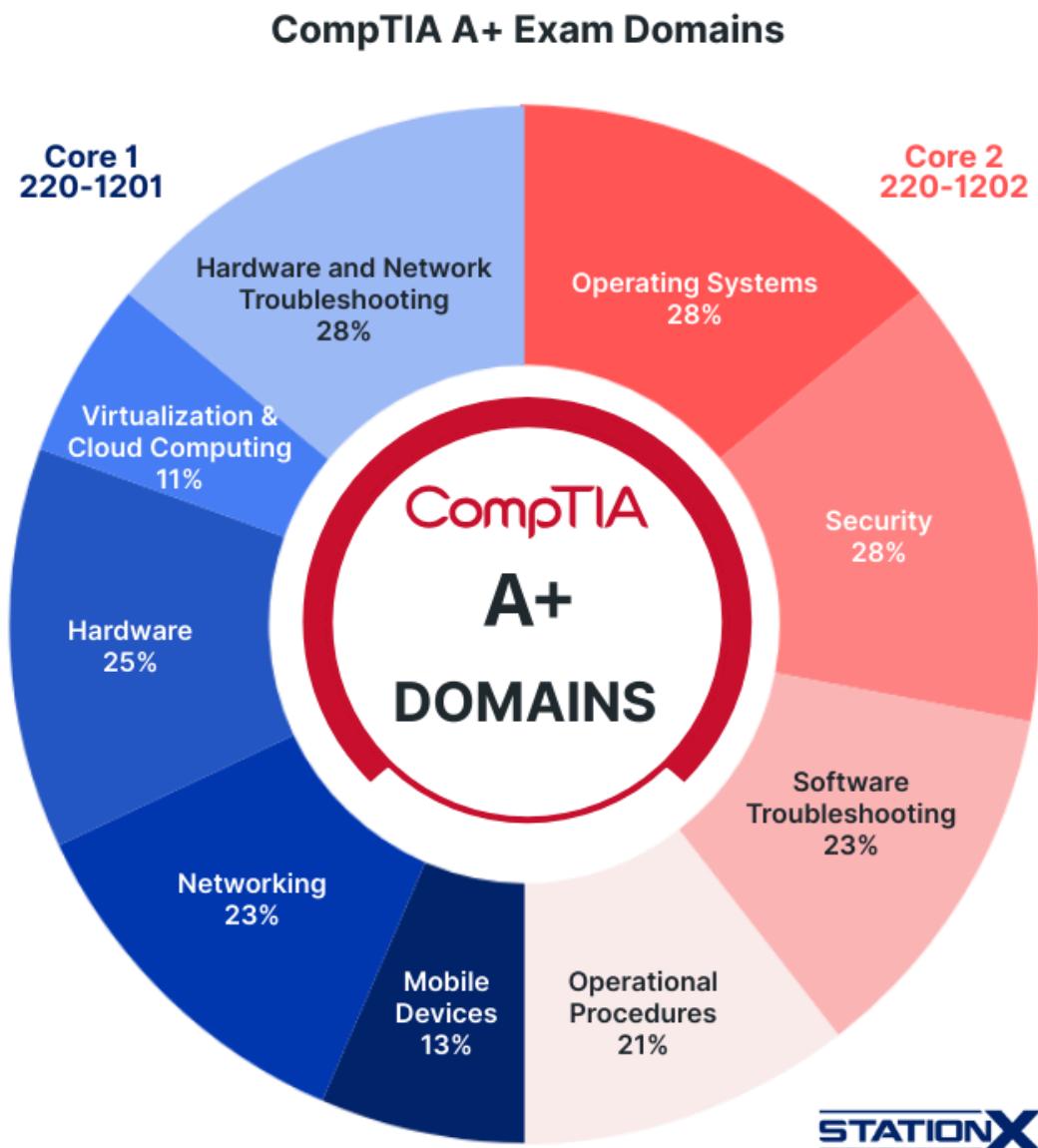
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A+ has no formal prerequisites, but CompTIA recommends that you have **12 months** of **hands-on experience** in an **IT support specialist** job role.

Here is a chart on CompTIA A+ exam objectives (domains):

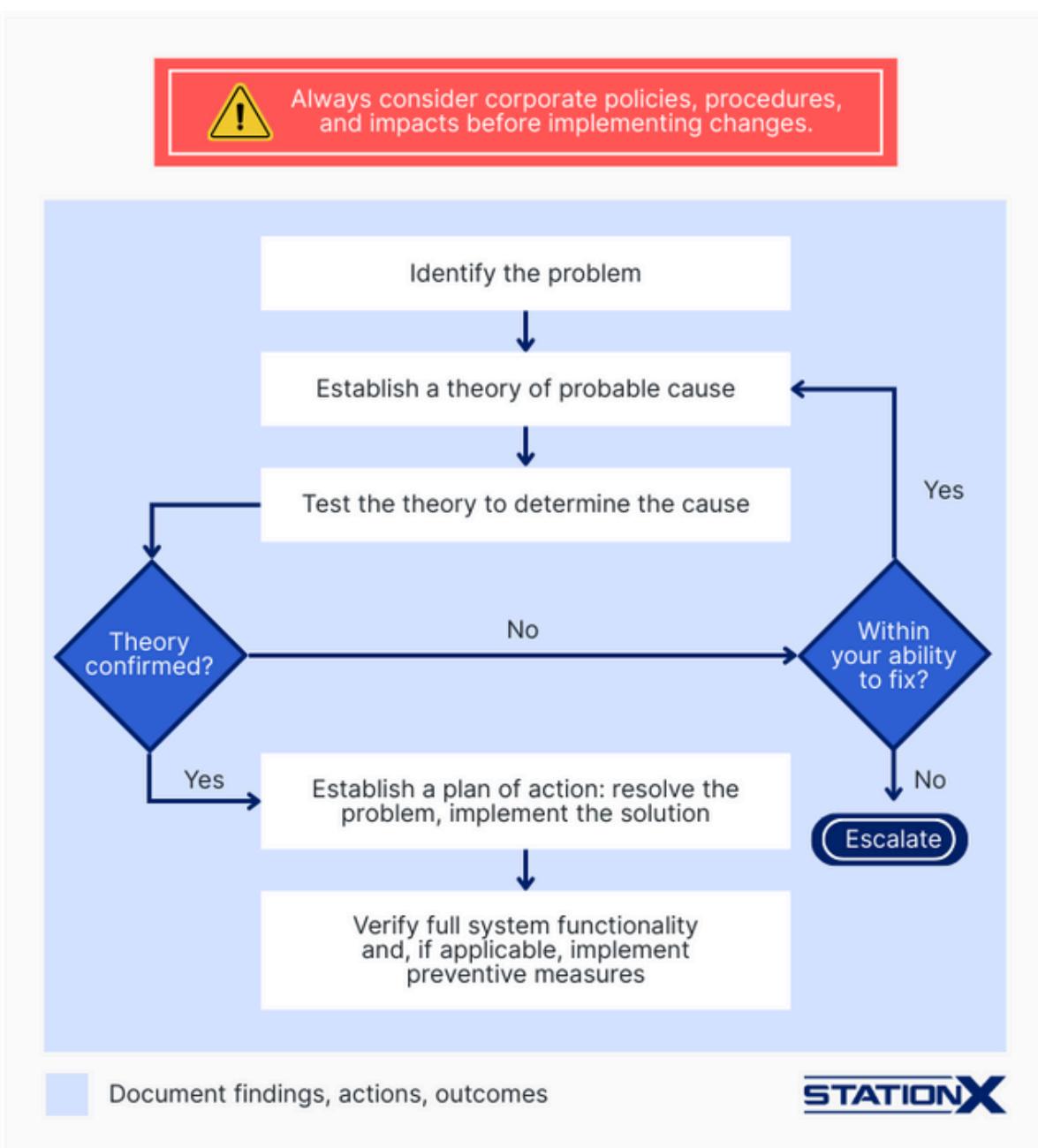


A+ Core 1 (220-1201) Domains	% of exam
Mobile Devices	13%
Networking	23%
Hardware	25%
Virtualization and Cloud Computing	11%
Hardware and Network Troubleshooting	28%

A+ Core 2 (220-1202) Domains	% of exam
Operating Systems	28%
Security	28%
Software Troubleshooting	23%
Operational Procedures	21%

Despite its practicality and necessity for A+ competence, the **Troubleshooting Methodology** illustrated below is no longer a formal A+ examination objective with explicit test items. Still, you'll have to apply it in answering A+ exam questions.

CompTIA A+: Technical Troubleshooting Best Practice Methodology



Core 1 220-1201 Cheat Sheet

This section covers important concepts for Core 1. We skip the domain on troubleshooting as it builds upon the other domains.

Mobile Devices

With the ubiquity of mobile devices, mastering the configuration of mobile devices is an essential skill for aspiring IT support technicians.

Concept	Explanation
Random Access Memory (RAM)	<ul style="list-style-type: none"> RAM DIMMs include DDR (184 pins), DDR2 (240 pins), DDR3 (240 pins) and DDR4 (288 pins). RAM SODIMMs include DDR (200 pin), DDR2 (200 pin), DDR3 (204 pin), and DDR4 (260 pin). Dual-channel: 2x width of 128-bit bus. Triple-channel: 3x width of 192-bit bus. Quad-channel: 4x width of 256-bit bus. Latency measured as CL or CAS.
Hard disk drive (HDD)	<p>Speeds: 5,400 RPM, 7,200 RPM, 10,000 RPM, 15,000 RPM</p> <p>Form factors: 3.5", 2.5"</p>
Solid-state drive (SSD)	<p>Communication interfaces:</p> <ul style="list-style-type: none"> Non-Volatile Memory Express (NVMe) SATA Peripheral Component Interconnect Express (PCIe): x1, x2, x8, x16 <p>Form factors: M.2, mSATA</p>
Bluetooth	<p>Short-range technology for simplifying communication and connectivity among network devices</p>
Bluetooth transmission range lengths	<ul style="list-style-type: none"> Class I: 100m Class II: 10m (most popular) Class III: 1m (unpopular)
Bluetooth maximum data transfer rate	<ul style="list-style-type: none"> Version 1: 721 Kb/s Version 2: 2.1 Mb/s Version 3: 24 Mb/s

Concept	Explanation
Subscriber Identity Module (SIM)/eSIM	Used for identifying a user to a mobile network, allowing access to voice and data services.
Tethering	Using smartphone cellular data connection to provide internet access to another device
Docking station	Hardware containing multiple ports to connect your laptop or mobile device to other devices, such as larger monitors, and lets you charge devices
Port replicator	Hardware for quickly connecting multiple peripherals to a laptop via USB technologies. Be prepared for exam questions comparing docking station vs port replicator.
Recognizing data caps	<ul style="list-style-type: none"> • Monitor data usage • Set data limits and warnings • Limit background data • Adjust sync frequency • Disable automatic downloads • Use Wi-Fi when possible

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Comparison of 3G vs 4G vs 5G

WIRELESS CELLULAR NETWORK	3G	4G	5G
Introduced 	2001	2009	2018
Technology 	WCDMA	LTE, WiMAX	MIMO, mm Waves
Access system 	CDMA	CDMA	OFDM, BDMA
Switching type 	Packet switching without air interference	Packet switching	Packet switching
Internet service 	Broadband	Ultra-broadband	Wireless World Wide Web
Bandwidth 	25 MHz	100 MHz	30–300 GHz
Speed 	up to 2 Mbps	up to 100 Mbps	up to 10 Gbps
Latency 	100–500 ms	30–50 ms	as low as 1 ms
Data capacity 	Limited	Much higher than 3G	Extremely high, supports IoT, IIoT
Best for 	Web browsing, emails, basic apps	Streaming, video calls, gaming	Smart cities, AR/VR, real-time applications
Cost for users 	Cheap, slow	Standard	Expensive (for early adopters), super fast
Key advantage 	High-security, global roaming	Fast, reliable connections	Ultra-fast low-latency support of millions of devices

Networking

A+ covers network topologies, the devices connecting them, ports, protocols, and the software aspects of networking.

Concept	Explanation
AAA	Authentication, Authorization, and Accounting
WISP	Wireless internet service provider
Transmission Control Protocol (TCP)	Connection-oriented, SYN-ACK handshake
User Datagram Protocol (UDP)	Connectionless, best-effort
LAN	Local area network
WAN	Wide area network
MAN	Metropolitan area network
PAN	Personal area network
SAN	Storage area network
WLAN	Wireless local area network
VLAN	Virtual LAN
VPN	Virtual private network
Switch	Connect computers in LAN
Router	Connects ≥ 2 LANs to the Internet
Firewall	Safeguards computers and networks against unauthorized access
UTM	Unified threat management
MAC	Media access control
DSL	Digital subscriber line
ONT	Optical network terminal
APIPA	Automatic Private IP Addressing
PoE	Power over Ethernet
DKIM	DomainKeys Identified Mail
SPF	Sender Policy Framework

Wireless Ethernet

Version	Data transmission rate	Frequency modulation (GHz)
802.11a	54 Mb/s	5
802.11b	11 Mb/s	2.4
802.11g	54 Mb/s	2.4
802.11n	300/600 Mb/s	2.4, 5
802.11ac	≥1.7 Gb/s	5
802.11ax	≤9.6 Gb/s	2.4, 5, 6

Ports and Protocols:

Port	Network protocol
21	File Transfer Protocol (FTP)
22	Secure Shell (SSH)
23	Telnet
25, 587	Simple Mail Transfer Protocol (SMTP)
53	Domain Naming System (DNS)
67/68	Dynamic Host Configuration Protocol (DHCP)
80	Hypertext Transfer Protocol (HTTP)
110	Post Office Protocol (POP3)
137–139	NetBIOS
143	Internet Message Access Protocol (IMAP)
389	Lightweight Directory Access Protocol (LDAP)
443	HTTP Secure (HTTPS)
445	Server Message Block (SMB)/Common Internet File System (CIFS)
3389	Remote Desktop Protocol (RDP)

Remember to check out our [Common Ports Cheat Sheet](#).

Common Ports and Protocols: Unencrypted vs Encrypted

Unencrypted vs Encrypted

20/21	FTP	22
23	Telnet	
25	SMTP	587
80	HTTP	443
389	LDAP	636

Other Important Ports

53	DNS	67/68
69	TFTP	123
161/162	SNMP	445
514	Syslog	1433
3389	RDP	5060/5061

Hardware

Acquaint yourself with different hardware specifications and their purposes.

Concept	Explanation
Motherboard	<ul style="list-style-type: none"> For connecting all components. Form factors: ATX, microATX, and ITX. Types of expansion buses: PCI Express (PCIe) and PCI. Intel chipsets link to CPU via DMI or QPI. AMD CPU-to-chipset connection is HyperTransport.
Central processing unit (CPU)	<p>Handles most calculations. Each core contains L1/L2 cache. The entire CPU shares L3 cache.</p> <p>Intel CPUs use these sockets:</p> <ul style="list-style-type: none"> LGA775 1150 1155 1156 1366 2011 <p>AMD CPUs use these sockets:</p> <ul style="list-style-type: none"> AM3 AM3+ FM1 FM2 FM2
Serial Advanced Technology Attachment (SATA)	<p>Consists of a 15-pin power connection and a 7-pin data connector.</p> <p>Revisions:</p> <ul style="list-style-type: none"> Rev 1 (1.5 Gb/s), Rev 2 (3 Gb/s), Rev 3 (6 Gb/s), Rev 3.2 (SATA Express) (16 Gb/s), Rev 3.2 (SATA Express) (16 Gb/s). <p>mSATA = mini-SATA. eSATA = External SATA.</p>
Redundant Array of Independent/Inexpensive Disks (RAID)	<ul style="list-style-type: none"> RAID 0 = striping; not fault-tolerant. RAID 1 = mirroring. RAID 1 + two disk controllers = disk duplexing. RAID 5 = striping with parity. RAID 6 = double-parity RAID for fault tolerance and data redundancy. RAID 10 = mirrored sets in a striped set.

Concept	Explanation
Small Computer Systems Interface (SCSI)	Modern SCSI standards: <ul style="list-style-type: none">• Serial Attached SCSI (SAS)• Internet SCSI
IPS	In-plane switching. Possesses wider viewing angle.
TN	Twisted nematic
OLED	Organic light-emitting diode
Mini-LED	Mini light-emitting diode
Optical media	Optical disc drives use changeable media to store and retrieve data. Versions: <ul style="list-style-type: none">• read-only memory (ROM)• write-once ®• rewritable/write-many (RW)
Laptop	Portable miniaturized versions of desktop computers. Uses M.2, Mini PCIe, and Mini PCI (internal) and ExpressCard /34 and /54 (external). Replaceable components: <ul style="list-style-type: none">• Keyboards• Touchpads• SODIMM RAM• Screens• Inverters• Batteries• Optical disc drives• Smart card readers• Hard drives (SSD, HDD, or hybrid).
Heat sink	When installing a heat sink, use thermal paste or pads for filling in gaps and increasing thermal conductivity between CPU and heat sink. Liquid-based cooling systems have higher thermal transfer capabilities than air cooling. To minimize overheating, a “dual-rail” power supply unit (PSU) separates and controls the current in each wire.
Sound card	Links as x1 PCIe (or PCI cards) and will typically have PC 99 color-coded 1/8" mini-jacks for I/O and speakers and optical I/Os known as S/PDIF.

Concept	Explanation
Video card	<p>You link them to motherboards through x16 PCIe or PCI expansion slots.</p> <p>Video connector types and cables:</p> <ul style="list-style-type: none"> • DVI • VGA • HDMI • Mini-HDMI • DisplayPort • Mini DisplayPort • S-Video • Component Video/RGB • Composite <p>Typical color depths:</p> <ul style="list-style-type: none"> • 16-bit • 24-bit • 32-bit <p>Typical resolutions (aspect ratio)</p> <ul style="list-style-type: none"> • 1280×720 (720p, 16:9) • 1920×1080 (1080p, 16:9) • 1366×786 (16:9) • 1680×1050 (WSXGA+, 8:5) • 1920×1200 (WUXGA, 8:5) • 640×480 (VGA, 4:3)
BIOS/Unified Extensible Firmware Interface (UEFI)	<ul style="list-style-type: none"> • Locates, tests, and initializes components and boots to the hard drive, optical disc, USB flash drive, or network by PXE. • CMOS stores time/date and passwords. • A CR2032 lithium battery powers the CMOS.
Thunderbolt	<ul style="list-style-type: none"> • Version 1 is 10 Gb/s and uses DisplayPort; • Version 2 is 20 Gb/s and also uses DisplayPort; • Version 3 is 40 Gb/s and uses USB-C.
Universal Serial Bus (USB)	<ul style="list-style-type: none"> • USB 2.0 • USB 3.0 • USB-C • microUSB • miniUSB
T568A	<ol style="list-style-type: none"> 1. White/green 2. Green 3. White/orange 4. Blue 5. White/blue 6. Orange 7. White/brown 8. Brown

Concept	Explanation
T568B	Swap “green” and “orange” in T568A
Single-mode vs. multimode	(Optic fiber) Allowing one or multiple light modes to propagate
Coaxial	F-type, Bayonet Neill-Concelman
Twinaxial/twinax	Has two inner conductors instead of one as in coaxial
STP/UTP	Shielded/Unshielded twisted pair; RJ45, RJ11 (Registered jack)
Optical	SC, ST, LC, FC, MT-RJ
SC	Subscriber connector
ST	Straight tip
LC	Lucent connector
FC	Fibre Channel
Plenum-rated	Fire-resistant cable; compare with riser-rated, non-plenum rated, and PVC
UTP category	Define speed and length of cables: <ul style="list-style-type: none"> • Cat 3 • Cat 5 • Cat 5e • Cat 6/6a • Cat 7 • Cat 8
Molex	Power connector in older computers and fans
Lightning	Proprietary Apple connection interface for charging and data transfer
DisplayPort	For connecting a video source to a display device such as a monitor. Be prepared to compare DisplayPort vs HDMI in exam questions.

Virtualization and Cloud Computing

Both virtualization technologies and cloud computing were minor topics in earlier versions of A+, but they're only getting more popular. Therefore, they're here to stay.

Abbreviation	Explanation
IaaS	Infrastructure as a service
PaaS	Platform as a service
SaaS	Software as a service
VDI	Virtual desktop infrastructure

Virtual machines (VMs) come in these two types:

Hypervisor	Elaboration
Type 1	Bare or native metal
Type 2	App-like VM on the operating system

Here are additional virtualization concepts to grasp:

Concept	Explanation
Ingress/Egress	Management of network traffic entering/leaving a specific environment
Elasticity	Dynamic adjustability of resource allocation in response to changing workload demands
Availability	Operationability and accessibility despite failures or planned downtime
Multitenancy	A single instance of an application serves multiple users while maintaining separate data and configurations.

Core 2 220-1202 Cheat Sheet

This section covers key ideas for Core 2. We skip the domain on troubleshooting as it builds upon the other domains.

Operating Systems

It's essential to become familiar with various operating systems, particularly Windows. You can also get our command-line cheat sheets for [Linux](#) and [Unix](#) (applies to Mac).

Concept	Explanation
Master boot record (MBR)	A hard drive has up to four partitions but only one extended partition.
GPT (GUID Partition Table)	A hard drive has 128 partitions and may exceed MBR's 2 TB limit. Stored in multiple locations. Requires UEFI-compliant motherboard.
EOL	End-of-life
CDFS	Compact disc file system
NFS	Network file system
NTFS	New Technology File System
ReFS	Resilient File System
FAT32	File Allocation Table 32
ext4	Fourth extended file systems
exFAT	Extensible File Allocation Table
XFS	Extended filesystem
APFS	Apple File System

Security

Here are some essential cyber security concepts you must know to pass A+.

Wireless encryption protocols:

Acronyms	Explanation
WPA2, WPA3	Wi-Fi Protected Access (version 2 and 3)
TKIP	Temporal Key Integrity Protocol
AES	Advanced Encryption Standard
RADIUS	Remote Authentication Dial-In User Service
TACACS+	Terminal Access Controller Access-Control System

Social Engineering:

Technique	Explanation
Phishing/Vishing/Smishing	Attack by email/telephone or voicemail/SMS
QR code phishing	Attack by QR code
Spear phishing	Attack by emails purportedly from trusted senders
Whaling	Phishing that targets high-ranking people, such as C-suite executives
Shoulder surfing	Look over someone's shoulder, often with a recording device
Tailgating	Unauthorized entity follows authorized party into secured premises
Impersonation	Attacks using stolen credentials or personal information
Dumpster diving	Recover information from trash
Evil twin	Setting up a fake Wi-Fi access point, hoping people choose it over the genuine one.

Threats:

Name	Explanation
Denial of service (DoS)	Overwhelming a target using a single machine
Distributed denial of service (DDoS)	DoS using multiple machines
Zero-day attack	Vulnerability unbeknownst to developers
Spoofing	Faking authorized access
On-path attack	Wi-Fi network as a trap
Brute-force attack	Trying character combinations
Dictionary attack	Using lists of probable passwords
Insider threat	An insider potentially uses their authorized access or understanding of an organization to harm that organization
Structured Query Language (SQL) injection	Manipulating SQL to modify remote database (such as by using sqlmap)
Cross-site scripting (XSS)	Injecting malicious scripts into normal websites
Business email compromise (BEC)	Hijacking chain-of-command
Supply chain/pipeline attack	Compromising the supply chain

Mitigations:

The following table is not an exhaustive list of mitigations.

Acronym	Explanation
EDR	Endpoint detection and response
MDR	Managed detection and response
XDR	Extended detection and response
ACL	Access control list
Email security gateway	Incoming/outgoing email monitoring/filtering gatekeeper
Software firewall	Network traffic monitor and controller

Malware:

Name	Explanation
Virus	Runs on a computer without the user's knowledge. Example: Boot sector virus
Worm	Replicates itself across a network
Trojan Horse	Useful utility covering for malicious programs
Spyware	Spies on a computer and records its activities. Examples: keylogger, adware, stalkerware
Rootkit	Gains administrator-level access to the system core undetected
Ransomware	Holds a computer hostage until the user pays
Cryptominer	CPU hijacker to mine crypto
Fileless malware	Runs legitimate programs on RAM without creating or downloading files
PUP	Compromising the supply chain



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Best Practice Procedures for Malware Removal

01

Investigate and verify malware symptoms.

02

Quarantine infected system.

03

Disable System Restore in Windows Home.

04

Remediate infected systems.

- Update anti-malware software.
- Scanning and removal techniques (e.g., safe mode, preinstallation environment).

05

Reimage/reinstall.

06

Schedule scans and run updates.

07

Enable System Restore and create a restore point in Windows Home.

08

Educate the end user.

Operational Procedures

The following table outlines some best practices related to documentation, change management, and backup/recovery.

Acronym/Concept	Explanation
CMDB	Configuration Management Database
SLA	Service-level agreement
SOP	Standard operating procedures
GFS	Grandfather-father-son Other backup rotation schemes: <ul style="list-style-type: none">• Onsite vs. offsite• 3-2-1 backup rule
ESD	Electrostatic discharge
Ticketing systems	<ul style="list-style-type: none">• User information• Device information• Description of issues• Categories• Severity• Escalation levels• Issue description• Progress notes• Issue resolution
Backup	<ul style="list-style-type: none">• Full• Incremental• Differential• Synthetic full

CompTIA A+ Cheat Sheet Conclusion

We hope this updated CompTIA A+ cheat sheet helps you in your studies as a brief recap of key points.

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Above all, we wish you success in the exam and beyond.

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