



# CompTIA A+ Certification Exam: Core 1 Objectives

**EXAM NUMBER: CORE 1 (220-1001)**



# About the Exam

Candidates are encouraged to use this document to help prepare for CompTIA A+ Core 1. In order to receive the CompTIA A+ certification, you must pass two exams: Core 1 (220-1101) and Core 2 (220-1102). CompTIA A+ Core 1 measures the necessary skills for an entry-level IT professional. Successful candidates will have the knowledge required to:

- Assemble components based on customer requirements
- Install, configure, and maintain PCs, mobile devices, and software for end users
- Understand the basics of networking and security forensics
- Properly and safely diagnose, resolve, and document common hardware and software issues
- Apply troubleshooting skills
- Provide appropriate customer support
- Understand the basics of scripting, virtualization, desktop imaging, and deployment

These content examples are meant to clarify the test objectives and should not be construed as a comprehensive listing of all the content of this examination.

## EXAM ACCREDITATION

CompTIA A+ is accredited by ANSI to show compliance with the ISO 17024 Standard and, as such, undergoes regular reviews and updates to the exam objectives.

## EXAM DEVELOPMENT

CompTIA exams result from subject matter expert workshops and industry-wide survey results regarding the skills and knowledge required of an entry-level IT professional.

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## PLEASE NOTE

The lists of examples provided in bulleted format are not exhaustive lists. Other examples of technologies, processes, or tasks pertaining to each objective may also be included on the exam although not listed or covered in this objectives document. CompTIA is constantly reviewing the content of our exams and updating test questions to be sure our exams are current and the security of the questions is protected. When necessary, we will publish updated exams based on testing exam objectives. Please know that all related exam preparation materials will still be valid.

## TEST DETAILS

Required exam	Core 1
Number of questions	Maximum of 90
Types of questions	Multiple choice and performance-based
Length of test	90 minutes
Recommended experience	12 months of experience as an IT support specialist
Passing score	675 (on a scale of 100–900)

## EXAM OBJECTIVES (DOMAINS)

The table below lists the domains measured by this examination and the extent to which they are represented:

DOMAIN	PERCENTAGE OF EXAMINATION
1.0 Mobile Devices	14%
2.0 Networking	20%
3.0 Hardware	27%
4.0 Virtualization and Cloud Computing	12%
5.0 Hardware and Network Troubleshooting	27%
<b>Total</b>	<b>100%</b>



# 1.0 Mobile Devices

## 1.1 Given a scenario, install and configure laptop hardware and components.

- **Hardware/device replacement**
  - Keyboard
  - Hard drive
    - SSD vs. hybrid vs. magnetic disk
    - 1.8in vs. 2.5in
  - Memory
  - Smart card reader
  - Optical drive
- Wireless card/Bluetooth module
- Cellular card
- Video card
- Mini PCIe
- Screen
- DC jack
- Battery
- Touchpad
- Plastics/frames
- Speaker
- System board
- CPU

## 1.2 Given a scenario, install components within the display of a laptop.

- **Types**
  - LCD
  - OLED
- **WiFi antenna connector/placement**
- **Webcam**
- **Microphone**
- **Inverter**
- **Digitizer/touchscreen**

## 1.3 Given a scenario, use appropriate laptop features.

- **Special function keys**
  - Dual displays
  - Wireless (on/off)
  - Cellular (on/off)
  - Volume settings
  - Screen brightness
  - Bluetooth (on/off)
  - Keyboard backlight
  - Touchpad (on/off)
- Screen orientation
- Media options (fast forward/rewind)
- GPS (on/off)
- Airplane mode
- **Docking station**
- **Port replicator**
- **Physical laptop lock and cable lock**
- **Rotating/removable screens**

## 1.4 Compare and contrast characteristics of various types of other mobile devices.

- **Tablets**
- **Smartphones**
- **Wearable technology devices**
  - Smart watches
  - Fitness monitors
  - VR/AR headsets
- **E-readers**
- **GPS**



## 1.5 Given a scenario, connect and configure accessories and ports of other mobile devices.

### • Connection types

- Wired
  - Micro-USB/Mini-USB/USB-C
  - Lightning
  - Tethering
  - Proprietary vendor-specific ports (communication/power)
- Wireless
  - NFC
  - Bluetooth
  - IR
  - Hotspot

### • Accessories

- Headsets
- Speakers
- Game pads
- Extra battery packs/battery chargers
- Protective covers/waterproofing
- Credit card readers
- Memory/MicroSD

## 1.6 Given a scenario, configure basic mobile device network connectivity and application support.

### • Wireless/cellular data network (enable/disable)

- Hotspot
- Tethering
- Airplane mode

### • Bluetooth

- Enable Bluetooth
- Enable pairing
- Find a device for pairing
- Enter the appropriate pin code
- Test connectivity

### • Corporate and ISP email configuration

- POP3
- IMAP
- Port and SSL settings
- S/MIME

### • Integrated commercial provider email configuration

- iCloud
- Google/Inbox
- Exchange Online
- Yahoo

### • PRI updates/PRL updates/baseband updates

- Radio firmware
- IMEI vs. IMSI
- VPN

## 1.7 Given a scenario, use methods to perform mobile device synchronization.

### • Synchronization methods

- Synchronize to the cloud
- Synchronize to the desktop
- Synchronize to the automobile

### • Types of data to synchronize

- Contacts
- Applications
- Email
- Pictures
- Music
- Videos

### - Calendar

- Bookmarks
- Documents
- Location data
- Social media data
- E-books
- Passwords

### • Mutual authentication for multiple services (SSO)

### • Software requirements to install the application on the PC

### • Connection types to enable synchronization



## 2.0 Networking

### 2.1 Compare and contrast TCP and UDP ports, protocols, and their purposes.

- Ports and protocols
  - 21 – FTP
  - 22 – SSH
  - 23 – Telnet
  - 25 – SMTP
  - 53 – DNS
  - 80 – HTTP
  - 110 – POP3
  - 143 – IMAP
  - 443 – HTTPS
  - 3389 – RDP
  - 137-139 – NetBIOS/NetBT
  - 445 – SMB/CIFS
  - 427 – SLP
  - 548 – AFP
  - 67/68 – DHCP
  - 389 – LDAP
  - 161/162 – SNMP
- TCP vs. UDP

### 2.2 Compare and contrast common networking hardware devices.

- Routers
- Switches
  - Managed
  - Unmanaged
- Access points
- Cloud-based network controller
- Firewall
- Network interface card
- Repeater
- Hub
- Cable/DSL modem
- Bridge
- Patch panel
- Power over Ethernet (PoE)
  - Injectors
  - Switch
- Ethernet over Power

### 2.3 Given a scenario, install and configure a basic wired/wireless SOHO network.

- Router/switch functionality
- Access point settings
- IP addressing
- NIC configuration
  - Wired
  - Wireless
- End-user device configuration
- IoT device configuration
  - Thermostat
- Light switches
- Security cameras
- Door locks
- Voice-enabled, smart speaker/digital assistant
- Cable/DSL modem configuration
- Firewall settings
  - DMZ
  - Port forwarding
- NAT
- UPnP
- Whitelist/blacklist
- MAC filtering
- QoS
- Wireless settings
  - Encryption
  - Channels
  - QoS

### 2.4 Compare and contrast wireless networking protocols.

- 802.11a
- 802.11b
- 802.11g
- 802.11n
- 802.11ac
- Frequencies
  - 2.4Ghz
  - 5Ghz
- Channels
  - 1-11
- Bluetooth
- NFC
- RFID
- Zigbee
- Z-Wave
- 3G
- 4G
- 5G
- LTE



## 2.5 Summarize the properties and purposes of services provided by networked hosts.

- **Server roles**
    - Web server
    - File server
    - Print server
    - DHCP server
    - DNS server
  - Proxy server
  - Mail server
  - Authentication server
  - syslog
  - **Internet appliance**
    - UTM
    - IDS
    - IPS
    - End-point management server
  - **Legacy/embedded systems**
- 

## 2.6 Explain common network configuration concepts.

- **IP addressing**
    - Static
    - Dynamic
    - APIPA
    - Link local
  - **DNS**
  - **DHCP**
    - Reservations
  - **IPv4 vs. IPv6**
  - **Subnet mask**
  - **Gateway**
  - **VPN**
  - **VLAN**
  - **NAT**
- 

## 2.7 Compare and contrast Internet connection types, network types, and their features.

- **Internet connection types**
    - Cable
    - DSL
    - Dial-up
    - Fiber
    - Satellite
  - ISDN
  - Cellular
    - Tethering
    - Mobile hotspot
  - Line-of-sight wireless Internet service
  - **Network types**
    - LAN
    - WAN
    - PAN
    - MAN
    - WMN
- 

## 2.8 Given a scenario, use appropriate networking tools.

- **Crimper**
- **Cable stripper**
- **Multimeter**
- **Tone generator and probe**
- **Cable tester**
- **Loopback plug**
- **Punchdown tool**
- **WiFi analyzer**



## 3.0 Hardware

### 3.1 Explain basic cable types, features, and their purposes.

- **Network cables**
  - Ethernet
    - Cat 5
    - Cat 5e
    - Cat 6
    - Plenum
    - Shielded twisted pair
    - Unshielded twisted pair
      - 568A/B
  - Fiber
  - Coaxial
  - Speed and transmission limitations
- **Video cables**
  - VGA
  - HDMI
  - Mini-HDMI
  - DisplayPort
  - DVI (DVI-D/DVI-I)
- **Multipurpose cables**
  - Lightning
  - Thunderbolt
  - USB
  - USB-C
  - USB 2.0
- USB 3.0
- **Peripheral cables**
  - Serial
- **Hard drive cables**
  - SATA
  - IDE
  - SCSI
- **Adapters**
  - DVI to HDMI
  - USB to Ethernet
  - DVI to VGA

### 3.2 Identify common connector types.

- RJ-11
- RJ-45
- RS-232
- BNC
- RG-59
- RG-6
- USB
- Micro-USB
- Mini-USB
- USB-C
- DB-9
- Lightning
- SCSI
- eSATA
- Molex

### 3.3 Given a scenario, install RAM types.

- **RAM types**
  - SODIMM
  - DDR2
  - DDR3
  - DDR4
- Single channel
- Dual channel
- Triple channel
- Error correcting
- Parity vs. non-parity





### 3.4 Given a scenario, select, install and configure storage devices.

- **Optical drives**
  - CD-ROM/CD-RW
  - DVD-ROM/DVD-RW/DVD-RW DL
  - Blu-ray
  - BD-R
  - BD-RE
- **Solid-state drives**
  - M2 drives
  - NVME
  - SATA 2,5
- **Magnetic hard drives**
  - 5,400rpm
  - 7,200rpm
  - 10,000rpm
  - 15,000rpm
  - Sizes:
    - 2.5
    - 3.5
- **Hybrid drives**
- **Flash**
  - SD card
  - CompactFlash
  - Micro-SD card
  - Mini-SD card
  - xD
- **Configurations**
  - RAID 0, 1, 5, 10
  - Hot swappable

### 3.5 Given a scenario, install and configure motherboards, CPUs, and add-on cards.

- **Motherboard form factor**
  - ATX
  - mATX
  - ITX
  - mITX
- **Motherboard connectors types**
  - PCI
  - PCIe
  - Riser card
  - Socket types
  - SATA
  - IDE
  - Front panel connector
  - Internal USB connector
- **BIOS/UEFI settings**
  - Boot options
  - Firmware updates
- Security settings
- Interface configurations
- Security
  - Passwords
  - Drive encryption
  - TPM
  - LoJack
  - Secure boot
- **CMOS battery**
- **CPU features**
  - Single-core
  - Multicore
  - Virtualization
  - Hyperthreading
  - Speeds
  - Overclocking
  - Integrated GPU
- **Compatibility**
  - AMD
  - Intel
- **Cooling mechanism**
  - Fans
  - Heat sink
  - Liquid
  - Thermal paste
- **Expansion cards**
  - Video cards
    - Onboard
    - Add-on card
  - Sound cards
  - Network interface card
  - USB expansion card
  - eSATA card

### 3.6 Explain the purposes and uses of various peripheral types.

- **Printer**
- **ADF/flatbed scanner**
- **Barcode scanner/QR scanner**
- **Monitors**
- **VR headset**
- **Optical drive types**
- **Mouse**
- **Keyboard**
- **Touchpad**
- **Signature pad**
- **Game controllers**
- **Camera/webcam**
- **Microphone**
- **Speakers**
- **Headset**
- **Projector**
  - Lumens/brightness
- **External storage drives**
- **KVM**
- **Magnetic reader/chip reader**
- **NFC/tap pay device**
- **Smart card reader**



### 3.7 Summarize power supply types and features.

- Input 115V vs. 220V
  - Output 5V vs. 12V
  - 24-pin motherboard adapter
  - Wattage rating
  - Number of devices/types of devices to be powered
- 

### 3.8 Given a scenario, select and configure appropriate components for a custom PC configuration to meet customer specifications or needs.

- **Graphic/CAD/CAM design workstation**
    - SSD
    - High-end video
    - Maximum RAM
  - **Audio/video editing workstation**
    - Specialized audio and video card
    - Large, fast hard drive
    - Dual monitors
  - **Virtualization workstation**
    - Maximum RAM and CPU cores
  - **Gaming PC**
    - SSD
    - High-end video/specialized GPU
    - High-definition sound card
    - High-end cooling
  - **Network attached storage device**
    - Media streaming
    - File sharing
    - Gigabit NIC
    - RAID array
    - Hard drive
  - **Standard thick client**
    - Desktop applications
    - Meets recommended requirements for selected OS
  - **Thin client**
    - Basic applications
    - Meets minimum requirements for selected OS
    - Network connectivity
- 

### 3.9 Given a scenario, install and configure common devices.

- **Desktop**
  - Thin client
  - Thick client
  - Account setup/settings
- **Laptop/common mobile devices**
  - Touchpad configuration
  - Touchscreen configuration
- Application installations/configurations
- Synchronization settings
- Account setup/settings
- Wireless settings



### 3.10 Given a scenario, configure SOHO multifunction devices/printers and settings.

- **Use appropriate drivers for a given operating system**
  - Configuration settings
    - Duplex
    - Collate
    - Orientation
    - Quality
- **Device sharing**
  - Wired
    - USB
    - Serial
    - Ethernet
  - Wireless
    - Bluetooth
    - 802.11(a, b, g, n, ac)
    - Infrastructure vs. ad hoc
  - Integrated print server (hardware)
  - Cloud printing/remote printing
- **Public/shared devices**
  - Sharing local/networked device via operating system settings
    - TCP/Bonjour/AirPrint
  - Data privacy
    - User authentication on the device
    - Hard drive caching

### 3.11 Given a scenario, install and maintain various print technologies.

- **Laser**
  - Imaging drum, fuser assembly, transfer belt, transfer roller, pickup rollers, separate pads, duplexing assembly
  - Imaging process: processing, charging, exposing, developing, transferring, fusing, and cleaning
  - Maintenance: Replace toner, apply maintenance kit, calibrate, clean
- **Inkjet**
  - Ink cartridge, print head, roller, feeder, duplexing assembly, carriage, and belt
  - Calibrate
  - Maintenance: Clean heads, replace cartridges, calibrate, clear jams
- **Thermal**
  - Feed assembly, heating element
  - Special thermal paper
  - Maintenance: Replace paper, clean heating element, remove debris
- **Impact**
  - Print head, ribbon, tractor feed
  - Impact paper
  - Maintenance: Replace ribbon, replace print head, replace paper
- **Virtual**
  - Print to file
  - Print to PDF
  - Print to XPS
  - Print to image
- **3D printers**
  - Plastic filament



# 4.0 Virtualization and Cloud Computing

## 4.1 Compare and contrast cloud computing concepts.

- **Common cloud models**
  - IaaS
  - SaaS
  - PaaS
  - Public vs. private vs. hybrid vs. community
- **Shared resources**
  - Internal vs. external
- **Rapid elasticity**
- **On-demand**
- **Resource pooling**
- **Measured service**
- **Metered**
- **Off-site email applications**
- **Cloud file storage services**
  - Synchronization apps
- **Virtual application streaming/ cloud-based applications**
  - Applications for cell phones/tablets
  - Applications for laptops/desktops
- **Virtual desktop**
  - Virtual NIC

## 4.2 Given a scenario, set up and configure client-side virtualization.

- **Purpose of virtual machines**
- **Resource requirements**
- **Emulator requirements**
- **Security requirements**
- **Network requirements**
- **Hypervisor**



## 5.0 Hardware and Network Troubleshooting

### 5.1 Given a scenario, use the best practice methodology to resolve problems.

- Always consider corporate policies, procedures, and impacts before implementing changes

#### 1. Identify the problem

- Question the user and identify user changes to computer and perform backups before making changes
- Inquire regarding environmental or infrastructure changes

- Review system and application logs

#### 2. Establish a theory of probable cause (question the obvious)

- If necessary, conduct external or internal research based on symptoms

#### 3. Test the theory to determine cause

- Once the theory is confirmed, determine the next steps to resolve problem
- If theory is not confirmed re-establish new theory or escalate

#### 4. Establish a plan of action to resolve the problem and implement the solution

#### 5. Verify full system functionality and, if applicable, implement preventive measures

#### 6. Document findings, actions, and outcomes

### 5.2 Given a scenario, troubleshoot problems related to motherboards, RAM, CPUs, and power.

#### • Common symptoms

- Unexpected shutdowns
- System lockups
- POST code beeps
- Blank screen on bootup
- BIOS time and setting resets
- Attempts to boot to incorrect device

- Continuous reboots

- No power
- Overheating
- Loud noise
- Intermittent device failure
- Fans spin – no power to other devices
- Indicator lights

- Smoke

- Burning smell
- Proprietary crash screens (BSOD/pin wheel)
- Distended capacitors
- Log entries and error messages

### 5.3 Given a scenario, troubleshoot hard drives and RAID arrays.

#### • Common symptoms

- Read/write failure
- Slow performance
- Loud clicking noise
- Failure to boot
- Drive not recognized

- OS not found
- RAID not found
- RAID stops working
- Proprietary crash screens (BSOD/pin wheel)
- S.M.A.R.T. errors

**5.4** Given a scenario, troubleshoot video, projector, and display issues.

- **Common symptoms**
    - VGA mode
    - No image on screen
    - Overheat shutdown
    - Dead pixels
  - Artifacts
  - Incorrect color patterns
  - Dim image
  - Flickering image
  - Distorted image
  - Distorted geometry
  - Burn-in
  - Oversized images and icons
- 

**5.5** Given a scenario, troubleshoot common mobile device issues while adhering to the appropriate procedures.

- **Common symptoms**
    - No display
    - Dim display
    - Flickering display
    - Sticking keys
    - Intermittent wireless
    - Battery not charging
    - Ghost cursor/pointer drift
    - No power
    - Num lock indicator lights
    - No wireless connectivity
    - No Bluetooth connectivity
  - Cannot display to external monitor
  - Touchscreen non-responsive
  - Apps not loading
  - Slow performance
  - Unable to decrypt email
  - Extremely short battery life
  - Overheating
  - Frozen system
  - No sound from speakers
  - GPS not functioning
  - Swollen battery
  - **Disassembling processes for proper reassembly**
    - Document and label cable and screw locations
    - Organize parts
    - Refer to manufacturer resources
    - Use appropriate hand tools
- 

**5.6** Given a scenario, troubleshoot printers.

- **Common symptoms**
    - Streaks
    - Faded prints
    - Ghost images
    - Toner not fused to the paper
    - Creased paper
    - Paper not feeding
  - Paper jam
  - No connectivity
  - Garbled characters on paper
  - Vertical lines on page
  - Backed-up print queue
  - Low memory errors
  - Access denied
  - Printer will not print
  - Color prints in wrong print color
  - Unable to install printer
  - Printing blank pages
  - No image on printer display
  - Multiple failed jobs in logs
- 

**5.7** Given a scenario, troubleshoot common wired and wireless network problems.

- **Common symptoms**
  - Limited connectivity
  - Unavailable resources
    - Internet
    - Local resources
      - Shares
      - Printers
      - Email
- No connectivity
- APIPA/link local address
- Intermittent connectivity
- IP conflict
- Slow transfer speeds
- Low RF signal
- SSID not found

# CompTIA A+ Acronyms

The following is a list of acronyms that appear on the CompTIA A+ exams. Candidates are encouraged to review the complete list and attain a working knowledge of all listed acronyms as a part of a comprehensive exam preparation program.

<b>ACRONYM</b>	<b>SPELLED OUT</b>	<b>ACRONYM</b>	<b>SPELLED OUT</b>
AC	Alternating Current	CGA	Computer Graphics and Applications
ACL	Access Control List	CIDR	Classless Inter-Domain Routing
ACPI	Advanced Configuration Power Interface	CIFS	Common Internet File System
ADF	Automatic Document Feeder	CMOS	Complementary Metal-Oxide Semiconductor
ADSL	Asymmetrical Digital Subscriber Line	CNR	Communications and Networking Riser
AES	Advanced Encryption Standard	COMx	Communication port (x=port number)
AHCI	Advanced Host Controller Interface	CPU	Central Processing Unit
AP	Access Point	CRT	Cathode-Ray Tube
APIPA	Automatic Private Internet Protocol Addressing	DaaS	Data as a Service
APM	Advanced Power Management	DAC	Discretionary Access Control
ARP	Address Resolution Protocol	DB-25	Serial Communications D-Shell Connector, 25 pins
ASR	Automated System Recovery	DB-9	Serial Communications D-Shell Connector, 9 pins
ATA	Advanced Technology Attachment	DBaaS	Database as a Service
ATAPI	Advanced Technology Attachment Packet Interface	DC	Direct Current
ATM	Asynchronous Transfer Mode	DDoS	Distributed Denial of Service
ATX	Advanced Technology Extended	DDR	Double Data Rate
AUP	Acceptable Use Policy	DDR RAM	Double Data Rate Random Access Memory
A/V	Audio Video	DFS	Distributed File System
BD-R	Blu-ray Disc Recordable	DHCP	Dynamic Host Configuration Protocol
BIOS	Basic Input/Output System	DIMM	Dual Inline Memory Module
BD-RE	Blu-ray Disc Rewritable	DIN	Deutsche Industrie Norm
BNC	Bayonet-Neill-Concelman	DLT	Digital Linear Tape
BSOD	Blue Screen of Death	DLP	Digital Light Processing or Data Loss Prevention
BYOD	Bring Your Own Device	DMA	Direct Memory Access
CAD	Computer-Aided Design	DMZ	Demilitarized Zone
CAPTCHA	Completely Automated Public Turing test to tell Computers and Humans Apart	DNS	Domain Name Service or Domain Name Server
CD	Compact Disc	DoS	Denial of Service
CD-ROM	Compact Disc-Read-Only Memory	DRAM	Dynamic Random Access Memory
CD-RW	Compact Disc-Rewritable	DRM	Digital Rights Management
CDFS	Compact Disc File System	DSL	Digital Subscriber Line
CERT	Computer Emergency Response Team	DVD	Digital Versatile Disc
CFS	Central File System, Common File System, or Command File System	DVD-RAM	Digital Versatile Disc-Random Access Memory
		DVD-ROM	Digital Versatile Disc-Read Only Memory
		DVD-R	Digital Versatile Disc-Recordable
		DVD-RW	Digital Versatile Disc-Rewritable

<b>ACRONYM</b>	<b>SPELLED OUT</b>	<b>ACRONYM</b>	<b>SPELLED OUT</b>
DVI	Digital Visual Interface	HTTP	Hypertext Transfer Protocol
DVI-D	Digital Visual Interface--Digital	HTTPS	Hypertext Transfer Protocol Secure
ECC	Error Correcting Code	I/O	Input/Output
ECP	Extended Capabilities Port	IaaS	Infrastructure as a Service
EEPROM	Electrically Erasable Programmable Read-Only Memory	ICMP	Internet Control Message Protocol
EFS	Encrypting File System	ICR	Intelligent Character Recognition
EIDE	Enhanced Integrated Drive Electronics	IDE	Integrated Drive Electronics
EMI	Electromagnetic Interference	IDS	Intrusion Detection System
EMP	Electromagnetic Pulse	IEEE	Institute of Electrical and Electronics Engineers
EPROM	Erasable Programmable Read-Only Memory	IIS	Internet Information Services
EPP	Enhanced Parallel Port	IMAP	Internet Mail Access Protocol
ERD	Emergency Repair Disk	IMEI	International Mobile Equipment Identity
eSATA	External Serial Advanced Technology Attachment	IMSI	International Mobile Subscriber Identity
ESD	Electrostatic Discharge	IP	Internet Protocol
EULA	End User License Agreement	IPConfig	Internet Protocol Configuration
EVGA	Extended Video Graphics Adapter/Array	IPP	Internet Printing Protocol
Ext2	Second Extended File System	IPS	Intrusion Prevention System
exFAT	Extended File Allocation Table	IPSec	Internet Protocol Security
FAT	File Allocation Table	IR	Infrared
FAT12	12-bit File Allocation Table	IrDA	Infrared Data Association
FAT16	16-bit File Allocation Table	IRP	Incident Response Plan
FAT32	32-bit File Allocation Table	IRQ	Interrupt Request
FDD	Floppy Disk Drive	ISA	Industry Standard Architecture
FPM	Fast Page Mode	ISDN	Integrated Services Digital Network
FSB	Front-Side Bus	ISO	International Organization for Standardization
FTP	File Transfer Protocol	ISP	Internet Service Provider
FQDN	Fully Qualified Domain Name	JBOD	Just a Bunch of Disks
GDDR	Graphics Double Data Rate	KB	Knowledge Base
GDI	Graphics Device Interface	KVM	Kernel-based Virtual Machine
GUI	Graphical User Interface	KVM	Keyboard-Video-Mouse
GUID	Globally Unique Identifier	LAN	Local Area Network
GPS	Global Positioning System	LBA	Logical Block Addressing
GPT	GUID Partition Table	LC	Lucent Connector
GPU	Graphics Processing Unit	LCD	Liquid Crystal Display
GSM	Global System for Mobile Communications	LDAP	Lightweight Directory Access Protocol
HAL	Hardware Abstraction Layer	LED	Light Emitting Diode
HAV	Hardware Assisted Virtualization	LPD/LPR	Line Printer Daemon/Line Printer Remote
HCL	Hardware Compatibility List	LPT	Line Printer Terminal
HDCP	High-Bandwidth Digital Content Protection	LVD	Low Voltage Differential
HDD	Hard Disk Drive	MAC	Media Access Control/Mandatory Access Control
HDMI	High Definition Media Interface	MAN	Metropolitan Area Network
HIPS	Host Intrusion Prevention System	MAPI	Messaging Application Programming Interface
HPFS	High Performance File System	mATX	Micro Advanced Technology Extended
HTML	Hypertext Markup Language	MAU	Media Access Unit/Media Attachment Unit
HTPC	Home Theater PC	MBR	Master Boot Record
		MBSA	Microsoft Baseline Security Analyzer



<b>ACRONYM</b>	<b>SPELLED OUT</b>	<b>ACRONYM</b>	<b>SPELLED OUT</b>
MDM	Mobile Device Management	PCIe	Peripheral Component Interconnect Express
MFA	Multifactor Authentication	PCIX	Peripheral Component Interconnect Extended
MFD	Multifunction Device	PCL	Printer Command Language
MFP	Multifunction Product	PCMCIA	Personal Computer Memory Card International Association
MicroDIMM	Micro Dual Inline Memory Module	PE	Preinstallation Environment
MIDI	Musical Instrument Digital Interface	PGA	Pin Grid Array
MIME	Multipurpose Internet Mail Extension	PGA2	Pin Grid Array 2
MIMO	Multiple Input Multiple Output	PGP	Pretty Good Protection
MMC	Microsoft Management Console	PII	Personally Identifiable Information
MP3	Moving Picture Experts Group Layer 3 Audio	PIN	Personal Identification Number
MP4	Moving Picture Experts Group Layer 4	PHI	Personal Health Information
MPEG	Moving Picture Experts Group	PKI	Public Key Infrastructure
MSConfig	Microsoft Configuration	PnP	Plug and Play
MSDS	Material Safety Data Sheet	PoE	Power over Ethernet
MT-RJ	Mechanical Transfer Registered Jack	POP3	Post Office Protocol 3
MUI	Multilingual User Interface	PoS	Point of Sale
NaaS	Network as a Service	POST	Power-On Self-Test
NAC	Network Access Control	POTS	Plain Old Telephone Service
NAS	Network-Attached Storage	PPM	Pages Per Minute
NAT	Network Address Translation	PPP	Point-to-Point Protocol
NetBIOS	Networked Basic Input/Output System	PPTP	Point-to-Point Tunneling Protocol
NetBEUI	Networked Basic Input/Output System Extended User Interface	PRI	Primary Rate Interface
NFC	Near Field Communication	PROM	Programmable Read-Only Memory
NFS	Network File System	PS/2	Personal System/2 connector
NIC	Network Interface Card	PSTN	Public Switched Telephone Network
NiCd	Nickel Cadmium	PSU	Power Supply Unit
NiMH	Nickel Metal Hydride	PVA	Patterned Vertical Alignment
NLX	New Low-profile Extended	PVC	Permanent Virtual Circuit
NNTP	Network News Transfer Protocol	PXE	Preboot Execution Environment
NTFS	New Technology File System	QoS	Quality of Service
NTLDR	New Technology Loader	RADIUS	Remote Authentication Dial-In User Server
NTP	Network Time Protocol	RAID	Redundant Array of Independent (or Inexpensive) Disks
NTSC	National Transmission Standards Committee	RAM	Random Access Memory
NVMe	Non-volatile Memory Express	RAS	Remote Access Service
OCR	Optical Character Recognition	RDP	Remote Desktop Protocol
OEM	Original Equipment Manufacturer	RF	Radio Frequency
OLED	Organic Light Emitting Diode	RFI	Radio Frequency Interference
OS	Operating System	RFID	Radio Frequency Identification
PaaS	Platform as a Service	RGB	Red Green Blue
PAL	Phase Alternating Line	RIP	Routing Information Protocol
PAN	Personal Area Network	RIS	Remote Installation Service
PAT	Port Address Translation	RISC	Reduced Instruction Set Computer
PC	Personal Computer	RJ-11	Registered Jack Function 11
PCI	Peripheral Component Interconnect	RJ-45	Registered Jack Function 45
PCI	Payment Card Industry		

<b>ACRONYM</b>	<b>SPELLED OUT</b>	<b>ACRONYM</b>	<b>SPELLED OUT</b>
RMA	Returned Materials Authorization	TKIP	Temporal Key Integrity Protocol
ROM	Read-Only Memory	TLS	Transport Layer Security
RPO	Recovery Point Objective	TN	Twisted Nematic
RTC	Real-Time Clock	TPM	Trusted Platform Module
RT	Recovery Time Objective	UAC	User Account Control
SaaS	Software as a Service	UDF	User Defined Functions or Universal Disk Format or Universal Data Format
SAN	Storage Area Network	UDP	User Datagram Protocol
SAS	Serial Attached SCSI	UEFI	Unified Extensible Firmware Interface
SATA	Serial Advanced Technology Attachment	UNC	Universal Naming Convention
SC	Subscription Channel	UPnP	Universal Plug and Play
SCP	Secure Copy Protection	UPS	Uninterruptible Power Supply
SCSI	Small Computer System Interface	URL	Uniform Resource Locator
SCSI ID	Small Computer System Interface Identifier	USB	Universal Serial Bus
SD card	Secure Digital Card	USMT	User State Migration Tool
SEC	Single Edge Connector	UTM	Unified Threat Management
SFC	System File Checker	UTP	Unshielded Twisted Pair
SFF	Small Form Factor	UXGA	Ultra Extended Graphics Array
SFTP	Secure File Transfer Protocol	VA	Vertical Alignment
SIM	Subscriber Identity Module	VDC	Volts DC
SIMM	Single In-Line Memory Module	VDI	Virtual Desktop Infrastructure
SLI	Scalable Link Interface or System Level Integration or Scanline Interleave Mode	VESA	Video Electronics Standards Association
S.M.A.R.T.	Self-Monitoring, Analysis, and Reporting Technology	VFAT	Virtual File Allocation Table
SMB	Server Message Block	VGA	Video Graphics Array
SMTP	Simple Mail Transfer Protocol	VLAN	Virtual LAN
SNMP	Simple Network Management Protocol	VM	Virtual Machine
SoDIMM	Small Outline Dual Inline Memory Module	VNC	Virtual Network Computer
SOHO	Small Office/Home Office	VoIP	Voice over Internet Protocol
SP	Service Pack	VPN	Virtual Private Network
SPDIF	Sony-Philips Digital Interface Format	VRAM	Video Random Access Memory
SPGA	Staggered Pin Grid Array	WAN	Wide Area Network
SRAM	Static Random Access Memory	WAP	Wireless Access Protocol/Wireless Access Point
SSD	Solid State Drive	WEP	Wired Equivalent Privacy
SSH	Secure Shell	WIFI	Wireless Fidelity
SSID	Service Set Identifier	WINS	Windows Internet Name Service
SSL	Secure Sockets Layer	WLAN	Wireless Local Area Network
SSO	Single Sign-on	WMN	Wireless Mesh Network
ST	Straight Tip	WPA	Wireless Protected Access
STP	Shielded Twisted Pair	WPA2	WiFi Protected Access 2
SXGA	Super Extended Graphics Array	WPS	WiFi Protected Setup
TACACS	Terminal Access Controller Access-Control System	WUXGA	Wide Ultra Extended Graphics Array
TCP	Transmission Control Protocol	WWAN	Wireless Wide Area Network
TCP/IP	Transmission Control Protocol/Internet Protocol	XGA	Extended Graphics Array
TDR	Time Domain Reflectometer	ZIF	Zero-Insertion-Force
TFTP	Trivial File Transfer Protocol	ZIP	Zigzag Inline Package

# A+ Proposed Hardware and Software List

CompTIA has included this sample list of hardware and software to assist candidates as they prepare for the A+ exam. This list may also be helpful for training companies that wish to create a lab component for their training offering. The bulleted lists below each topic are sample lists and not exhaustive.

## EQUIPMENT

- Apple tablet/smartphone
- Android tablet/smartphone
- Windows tablet/Smartphone
- Chromebook
- Windows laptop/Mac laptop/Linux laptop
- Windows desktop/Mac desktop/Linux desktop
- Windows Server w/Active Directory and Print Management
- Monitors
- Projectors
- SOHO router/switch
- Access point
- VoIP phone
- Printer
  - Laser/inkjet
  - Wireless
  - 3D printer
- Surge suppressor
- UPS
- VR headset
- Smart devices (IoT devices)

## SPARE PARTS/HARDWARE

- Motherboards
- RAM
- Hard drives
- Power supplies
- Video cards
- Sounds cards
- Network cards
- Wireless NICs
- Fans/cooling devices/heat sink

- CPUs
- Assorted connectors/cables
  - USB
  - HDMI
  - Etc.
- Adapters
- Network cables
- Underminated network cables/connectors
- AC adapters
- Optical drives
- Screws/stand-offs
- Cases
- Maintenance kit
- Mice/keyboards
- KVM
- Console cable

## TOOLS

- Screw drivers
- Multimeter
- Wire cutters
- Punchdown tool
- Crimper
- Power supply tester
- Cable stripper
- Standard technician toolkit
- ESD strap
- Thermal paste
- Cable tester
- Cable toner
- WiFi analyzer
- SATA to USB connectors

## SOFTWARE

- Operating systems
  - Linux
  - Chrome OS
  - Microsoft Windows
  - Mac OS
  - Android
  - iOS
- PE Disk/Live CD
- Antivirus software
- Virtualization software
- Anti-malware
- Driver software