Introduction
In order to receive CompTIA A+ certification a candidate must pass two exams. The first exam is CompTIA A+ 220-901 Certification Exam. The CompTIA A+ 220-901 examination measures necessary competencies for an entry-level IT professional with the equivalent knowledge of at least 12 months of hands-on experience in the lab or field.

Successful candidates will have the knowledge required to:
- Assemble components based on customer requirements
- Install, configure and maintain devices, PCs 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 virtualization, desktop imaging, and deployment

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. The following CompTIA A+ 220-901 exam objectives result from subject matter expert workshops and industry-wide survey results regarding the skills and knowledge required of an entry-level IT professional. The percentages in this document represent the relative importance of the subject areas (domains) in the associated body of knowledge, and together establish the foundation of an entry-level IT professional.

This examination blueprint includes domain weighting, test objectives, and example content. Example topics and concepts are included to clarify the test objectives and should not be construed as a comprehensive listing of all the content of this examination.

Candidates are encouraged to use this document to guide their studies. The table below lists the domains measured by this examination and the extent to which they are represented. The CompTIA A+ 220-901 exam is based on these objectives.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Percentage of Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Hardware</td>
<td>34%</td>
</tr>
<tr>
<td>2.0 Networking</td>
<td>21%</td>
</tr>
<tr>
<td>3.0 Mobile Devices</td>
<td>17%</td>
</tr>
<tr>
<td>4.0 Hardware &amp; Network Troubleshooting</td>
<td>28%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>
CompTIA Authorized Materials Use Policy

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**Note: The lists of examples provided in bulleted format below each objective 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 existing exam objectives. Please know that all related exam preparation materials will still be valid.
1.0 Hardware

1.1 Given a scenario, configure settings and use BIOS/UEFI tools on a PC.

- Firmware upgrades – flash BIOS
- BIOS component information
  - RAM
  - Hard drive
  - Optical drive
  - CPU
- BIOS configurations
  - Boot sequence
  - Enabling and disabling devices
  - Date/time
  - Clock speeds
  - Virtualization support
  - BIOS security (passwords, drive encryption: TPM, lo-jack, secure boot)
- Built-in diagnostics
- Monitoring
  - Temperature monitoring
  - Fan speeds
  - Intrusion detection/notification
  - Voltage
  - Clock
  - Bus speed

1.2 Explain the importance of motherboard components, their purpose, and properties.

- Sizes
  - ATX
  - Micro-ATX
  - Mini-ITX
  - ITX
- Expansion slots
  - PCI
  - PCI-X
  - PCIe
  - miniPCI
- RAM slots
- CPU sockets
- Chipsets
  - North Bridge
  - South Bridge
- CMOS battery
- Power connections and types
- Fan connectors
- Front/Top panel connectors
  - USB
  - Audio
  - Power button
  - Power light
  - Drive activity lights
  - Reset button
• Bus speeds

1.3 Compare and contrast various RAM types and their features.
• Types
  o DDR
  o DDR2
  o DDR3
  o SODIMM
  o DIMM
  o Parity vs. non-parity
  o ECC vs. non-ECC
  o RAM configurations
    • Single channel vs. dual channel vs. triple channel
      o Single sided vs. double sided
      o Buffered vs. unbuffered
• RAM compatibility

1.4 Install and configure PC expansion cards.
• Sound cards
• Video cards
• Network cards
• USB cards
• Firewire cards
• Thunderbolt cards
• Storage cards
• Modem cards
• Wireless/cellular cards
• TV tuner cards
• Video capture cards
• Riser cards

1.5 Install and configure storage devices and use appropriate media.
• Optical drives
  o CD-ROM / CD-RW
  o DVD-ROM / DVD-RW / DVD-RW DL
  o Blu-Ray
  o BD-R
  o BD-RE
• Magnetic hard disk drives
  o 5400 rpm
  o 7200 rpm
  o 10,000 rpm
• Hot swappable drives
• Solid state/flash drives
  o Compact flash
  o SD
  o Micro-SD
  o Mini-SD
  o xD
  o SSD
  o Hybrid
  o eMMC
• RAID types
1.6 Install various types of CPUs and apply the appropriate cooling methods.

- Socket types
  - Intel: 775, 1155, 1156, 1366, 1150, 2011
  - AMD: AM3, AM3+, FM1, FM2, FM2+

- Characteristics
  - Speeds
  - Cores
  - Cache size/type
  - Hyperthreading
  - Virtualization support
  - Architecture (32-bit vs. 64-bit)
  - Integrated GPU
  - Disable execute bit

- Cooling
  - Heat sink
  - Fans
  - Thermal paste
  - Liquid-based
  - Fanless/passive

1.7 Compare and contrast various PC connection interfaces, their characteristics and purpose.

- Physical connections
  - USB 1.1 vs. 2.0 vs. 3.0
    - Connector types: A, B, mini, micro
  - Firewire 400 vs. Firewire 800
  - SATA1 vs. SATA2 vs. SATA3, eSATA
  - Other connector types
    - VGA
    - HDMI
    - DVI
    - Audio
      - Analog
      - Digital (Optical connector)
        - RJ-45
        - RJ-11
        - Thunderbolt

- Wireless connections
  - Bluetooth
  - RF
  - IR
- NFC

- Characteristics
  - Analog
  - Digital
  - Distance limitations
  - Data transfer speeds
  - Quality
  - Frequencies

1.8 Install a power supply based on given specifications.
- Connector types and their voltages
  - SATA
  - Molex
  - 4/8-pin 12v
  - PCIe 6/8-pin
  - 20-pin
  - 24-pin

- Specifications
  - Wattage
  - Dual rail
  - Size
  - Number of connectors
  - ATX
  - Micro-ATX
  - Dual voltage options

1.9 Given a scenario, select the appropriate components for a custom PC configuration, to meet customer specifications or needs.
- Graphic / CAD / CAM design workstation
  - Multicore processor
  - 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
  - Multicore processor
  - High-end video/specialized GPU
  - High definition sound card
  - High-end cooling

- Home Theater PC
  - Surround sound audio
  - HDMI output
  - HTPC compact form factor
  - TV tuner

- Standard thick client
  - Desktop applications
  - Meets recommended requirements for selected OS

- Thin client
  - Basic applications
  - Meets minimum requirements for selected OS
  - Network connectivity
• Home Server PC
  o Media streaming
  o File sharing
  o Print sharing
  o Gigabit NIC
  o RAID array

1.10 Compare and contrast types of display devices and their features.
  • Types
    o LCD
      ▪ TN vs. IPS
      ▪ Fluorescent vs. LED backlighting
    o Plasma
    o Projector
    o OLED
  • Refresh / frame rates
  • Resolution
  • Native resolution
  • Brightness/lumens
  • Analog vs. digital
  • Privacy/antiglare filters
  • Multiple displays
  • Aspect ratios
    o 16:9
    o 16:10
    o 4:3

1.11 Identify common PC connector types and associated cables.
  • Display connector types
    o DVI-D
    o DVI-I
    o DVI-A
    o DisplayPort
    o RCA
    o HD15 (i.e. DE15 or DB15)
    o BNC
    o miniHDMI
    o miniDin-6
  • Display cable types
    o HDMI
    o DVI
    o VGA
    o Component
    o Composite
    o Coaxial
  • Device cables and connectors
    o SATA
    o eSATA
    o USB
    o Firewire (IEEE1394)
    o PS/2
    o Audio
  • Adapters and convertors
    o DVI to HDMI
USB A to USB B
USB to Ethernet
DVI to VGA
Thunderbolt to DVI
PS/2 to USB
HDMI to VGA

1.12 Install and configure common peripheral devices.
- Input devices
  - Mouse
  - Keyboard
  - Scanner
  - Barcode reader
  - Biometric devices
  - Game pads
  - Joysticks
  - Digitizer
  - Motion sensor
  - Touch pads
  - Smart card readers
  - Digital cameras
  - Microphone
  - Webcam
  - Camcorder
- Output devices
  - Printers
  - Speakers
- Display devices
- Input & Output devices
  - Touch screen
  - KVM
  - Smart TV
  - Set-Top Box
  - MIDI enabled devices

1.13 Install SOHO multifunction device / printers and configure appropriate 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. adhoc
  - 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

1.14 Compare and contrast differences between the various print technologies and the associated imaging process.

• 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

• Inkjet
  ○ Ink cartridge, print head, roller, feeder, duplexing assembly, carriage and belt
  ○ Calibration

• Thermal
  ○ Feed assembly, heating element
  ○ Special thermal paper

• Impact
  ○ Print head, ribbon, tractor feed
  ○ Impact paper

• Virtual
  ○ Print to file
  ○ Print to PDF
  ○ Print to XPS
  ○ Print to image

1.15 Given a scenario, perform appropriate printer maintenance.

• Laser
  ○ Replacing toner, applying maintenance kit, calibration, cleaning

• Thermal
  ○ Replace paper, clean heating element, remove debris

• Impact
  ○ Replace ribbon, replace print head, replace paper

• Inkjet
  ○ Clean heads, replace cartridges, calibration, clear jams

2.0 Networking

2.1 Identify the various types of network cables and connectors.

• Fiber
  ○ Connectors: SC, ST and LC

• Twisted Pair
  ○ Connectors: RJ-11, RJ-45
  ○ Wiring standards: T568A, T568B

• Coaxial
  ○ Connectors: BNC, F-connector

2.2 Compare and contrast the characteristics of connectors and cabling.

• Fiber
  ○ Types (single-mode vs. multi-mode)
  ○ Speed and transmission limitations

• Twisted pair
  ○ Types: STP, UTP, CAT3, CAT5, CAT5e, CAT6, CAT6e, CAT7, plenum, PVC
2.3 **Explain the properties and characteristics of TCP/IP.**

- IPv4 vs. IPv6
- Public vs. private vs. APIPA/link local
- Static vs. dynamic
- Client-side DNS settings
- Client-side DHCP
- Subnet mask vs. CIDR
- Gateway

2.4 **Explain common TCP and UDP ports, protocols, and their purpose.**

- **Ports**
  - 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

- **Protocols**
  - DHCP
  - DNS
  - LDAP
  - SNMP
  - SMB
  - CIFS
  - SSH
  - AFP

- **TCP vs. UDP**

2.5 **Compare and contrast various WiFi networking standards and encryption types.**

- **Standards**
  - 802.11 a/b/g/n/ac
  - Speeds, distances and frequencies
- **Encryption types**
  - WEP, WPA, WPA2, TKIP, AES

2.6 **Given a scenario, install and configure SOHO wireless/wired router and apply appropriate settings.**

- Channels
- Port forwarding, port triggering
• DHCP (on/off)
• DMZ
• NAT / DNAT
• Basic QoS
• Firmware
• UPnP

2.7 Compare and contrast Internet connection types, network types, and their features.
• Internet Connection Types
  o Cable
  o DSL
  o Dial-up
  o Fiber
  o Satellite
  o ISDN
  o Cellular
    ▪ Tethering
    ▪ Mobile hotspot
  o Line of sight wireless internet service
• Network Types
  o LAN
  o WAN
  o PAN
  o MAN

2.8 Compare and contrast network architecture devices, their functions, and features.
• Hub
• Switch
• Router
• Access point
• Bridge
• Modem
• Firewall
• Patch panel
• Repeaters/extenders
• Ethernet over Power
• Power over Ethernet injector

2.9 Given a scenario, use appropriate networking tools.
• Crimper
• Cable stripper
• Multimeter
• Tone generator & probe
• Cable tester
• Loopback plug
• Punchdown tool
• WiFi analyzer

3.0 Mobile Devices

3.1 Install and configure laptop hardware and components.
• Expansion options
  o Express card /34
3.2 Explain the function of components within the display of a laptop.

- Types
  - LCD
    - TN vs. IPS
    - Fluorescent vs. LED backlighting
  - OLED
- Wi-Fi antenna connector/placement
- Webcam
- Microphone
- Inverter
- Digitizer

3.3 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
  - Touch pad (on/off)
  - Screen orientation
  - Media options (fast forward/rewind)
  - GPS (on/off)
  - Airplane mode
• Docking station
• Physical laptop lock and cable lock
• Rotating / removable screens

3.4 Explain the characteristics of various types of other mobile devices.
• Tablets
• Smart phones
• Wearable technology devices
  o Smart watches
  o Fitness monitors
  o Glasses and headsets
• Phables
• e-Readers
• Smart camera
• GPS

3.5 Compare and contrast accessories & ports of other mobile devices.
• Connection types
  o NFC
  o Proprietary vendor specific ports (communication/power)
  o microUSB/miniUSB
  o Lightning
  o Bluetooth
  o IR
  o Hotspot / tethering
• Accessories
  o Headsets
  o Speakers
  o Game pads
  o Docking stations
  o Extra battery packs/battery chargers
  o Protective covers / water proofing
  o Credit card readers
  o Memory/MicroSD

4.0 Hardware and Network Troubleshooting

4.1 Given a scenario, troubleshoot common problems related to motherboards, RAM, CPU and power with appropriate tools.
• Common symptoms
  o Unexpected shutdowns
  o System lockups
  o POST code beeps
  o Blank screen on bootup
  o BIOS time and settings resets
  o Attempts to boot to incorrect device
  o Continuous reboots
  o No power
  o Overheating
  o Loud noise
  o Intermittent device failure
  o Fans spin – no power to other devices
  o Indicator lights
  o Smoke
• Burning smell
• Proprietary crash screens (BSOD/pin wheel)
• Distended capacitors

4.2 Given a scenario, troubleshoot hard drives and RAID arrays with appropriate tools.
    • Common symptoms
      o Read/write failure
      o Slow performance
      o Loud clicking noise
      o Failure to boot
      o Drive not recognized
      o OS not found
      o RAID not found
      o RAID stops working
      o Proprietary crash screens (BSOD/pin wheel)
      o S.M.A.R.T. errors
    • Tools
      o Screwdriver
      o External enclosures
      o CHKDSK
      o FORMAT
      o File recovery software
      o Bootrec
      o Diskpart
      o Defragmentation tool

4.3 Given a scenario, troubleshoot common video, projector and display issues.
    • Common symptoms
      o VGA mode
      o No image on screen
      o Overheat shutdown
      o Dead pixels
      o Artifacts
      o Color patterns incorrect
      o Dim image
      o Flickering image
      o Distorted image
      o Distorted geometry
      o Burn-in
      o Oversized images and icons

4.4 Given a scenario, troubleshoot wired and wireless networks with appropriate tools.
    • Common symptoms
      o No connectivity
      o APIPA/link local address
      o Limited connectivity
      o Local connectivity
      o Intermittent connectivity
      o IP conflict
      o Slow transfer speeds
4.5 Given a scenario, troubleshoot and repair 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 re-assembly
  - Document and label cable and screw locations
  - Organize parts
  - Refer to manufacturer resources
  - Use appropriate hand tools

4.6 Given a scenario, troubleshoot printers with appropriate tools.

- 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
- Error codes
- Printing blank pages
- No image on printer display

- Tools
  - Maintenance kit
  - Toner vacuum
  - Compressed air
  - Printer spooler

CompTIA A+ Acronyms

**Introduction**
The following is a list of acronyms which 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.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>alternating current</td>
</tr>
<tr>
<td>ACL</td>
<td>access control list</td>
</tr>
<tr>
<td>ACPI</td>
<td>advanced configuration power interface</td>
</tr>
<tr>
<td>ACT</td>
<td>activity</td>
</tr>
<tr>
<td>ADSL</td>
<td>asymmetrical digital subscriber line</td>
</tr>
<tr>
<td>AGP</td>
<td>accelerated graphics port</td>
</tr>
<tr>
<td>AHCI</td>
<td>Advanced host controller interface</td>
</tr>
<tr>
<td>AP</td>
<td>Access point</td>
</tr>
<tr>
<td>APIPA</td>
<td>automatic private internet protocol addressing</td>
</tr>
<tr>
<td>APM</td>
<td>advanced power management</td>
</tr>
<tr>
<td>ARP</td>
<td>address resolution protocol</td>
</tr>
<tr>
<td>ASR</td>
<td>automated system recovery</td>
</tr>
<tr>
<td>ATA</td>
<td>advanced technology attachment</td>
</tr>
<tr>
<td>ATAPI</td>
<td>advanced technology attachment packet interface</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
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<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>ATM</td>
<td>Asynchronous Transfer Mode</td>
</tr>
<tr>
<td>ATX</td>
<td>Advanced Technology Extended</td>
</tr>
<tr>
<td>AUP</td>
<td>Acceptable Use Policy</td>
</tr>
<tr>
<td>A/V</td>
<td>Audio Video</td>
</tr>
<tr>
<td>BIOS</td>
<td>Basic Input/Output System</td>
</tr>
<tr>
<td>BNC</td>
<td>Bayonet-Neill-Concelman or British Naval Connector</td>
</tr>
<tr>
<td>BTX</td>
<td>Balanced Technology Extended</td>
</tr>
<tr>
<td>CAPTCHA</td>
<td>Completely Automated Public Turing Test To Tell Computers and Humans Apart</td>
</tr>
<tr>
<td>CCFL</td>
<td>Cold Cathode Fluorescent Lamp</td>
</tr>
<tr>
<td>CD</td>
<td>Compact Disc</td>
</tr>
<tr>
<td>CD-ROM</td>
<td>Compact Disc-Read-Only Memory</td>
</tr>
<tr>
<td>CD-RW</td>
<td>Compact Disc-Rewritable</td>
</tr>
<tr>
<td>CDFS</td>
<td>Compact Disc File System</td>
</tr>
<tr>
<td>CFS</td>
<td>Central File System, Common File System, Command File System</td>
</tr>
<tr>
<td>CIFS</td>
<td>Common Internet File System</td>
</tr>
<tr>
<td>CMOS</td>
<td>Complementary Metal-Oxide Semiconductor</td>
</tr>
<tr>
<td>CNR</td>
<td>Communications and Networking Riser</td>
</tr>
<tr>
<td>COMx</td>
<td>Communication Port (x=Port Number)</td>
</tr>
<tr>
<td>CPU</td>
<td>Central Processing Unit</td>
</tr>
<tr>
<td>CRT</td>
<td>Cathode-Ray Tube</td>
</tr>
<tr>
<td>DAC</td>
<td>Discretionary Access Control</td>
</tr>
<tr>
<td>DB-25</td>
<td>Serial Communications D-Shell Connector, 25 Pins</td>
</tr>
<tr>
<td>DB-9</td>
<td>9 Pin D Shell Connector</td>
</tr>
<tr>
<td>DC</td>
<td>Direct Current</td>
</tr>
<tr>
<td>DDOS</td>
<td>Distributed Denial of Service</td>
</tr>
<tr>
<td>DDR</td>
<td>Double Data-Rate</td>
</tr>
<tr>
<td>DDR RAM</td>
<td>Double Data-Rate Random Access Memory</td>
</tr>
<tr>
<td>DDR SDRAM</td>
<td>Double Data-Rate Synchronous Dynamic Random Access Memory</td>
</tr>
<tr>
<td>DFS</td>
<td>Distributed File System</td>
</tr>
<tr>
<td>DHCP</td>
<td>Dynamic Host Configuration Protocol</td>
</tr>
<tr>
<td>DIMM</td>
<td>Dual Inline Memory Module</td>
</tr>
<tr>
<td>DIN</td>
<td>Deutsche Industrie Norm</td>
</tr>
<tr>
<td>DLT</td>
<td>Digital Linear Tape</td>
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<tr>
<td>DLP</td>
<td>Digital Light Processing</td>
</tr>
<tr>
<td>DMA</td>
<td>Direct Memory Access</td>
</tr>
<tr>
<td>DMZ</td>
<td>Demilitarized Zone</td>
</tr>
<tr>
<td>DNS</td>
<td>Domain Name Service or Domain Name Server</td>
</tr>
<tr>
<td>DOS</td>
<td>Denial of Service</td>
</tr>
<tr>
<td>DRAM</td>
<td>Dynamic Random Access Memory</td>
</tr>
<tr>
<td>DRM</td>
<td>Digital Rights Management</td>
</tr>
<tr>
<td>DSL</td>
<td>Digital Subscriber Line</td>
</tr>
<tr>
<td>DVD</td>
<td>Digital Video Disc or Digital Versatile Disc</td>
</tr>
<tr>
<td>DVD-RAM</td>
<td>Digital Video Disc-Random Access Memory</td>
</tr>
</tbody>
</table>
DVD-ROM  digital video disc-read only memory
DVD-R    digital video disc-recordable
DVD-RW   digital video disc-rewritable
DVI      digital visual interface
ECC      error correcting code/error checking and correction
ECP      extended capabilities port
EEPROM   electrically erasable programmable read-only memory
EFS      encrypting file system
EIDE     enhanced integrated drive electronics
EMI      electromagnetic interference
EMP      electromagnetic pulse
EPROM    erasable programmable read-only memory
EPP      enhanced parallel port
ERD      emergency repair disk
ESD      electrostatic discharge
EULA     End User License Agreement
EVGA     extended video graphics adapter/array
EVDO     evolution data optimized or evolution data only
FAT      file allocation table
FAT12    12-bit file allocation table
FAT16    16-bit file allocation table
FAT32    32-bit file allocation table
FDD      floppy disk drive
Fn       Function (referring to the function key on a laptop)
FPM      fast page-mode
FRU      field replaceable unit
FSB      Front Side Bus
FTP      file transfer protocol
FQDN     fully qualified domain name
Gb       gigabit
GB       gigabyte
GDI      graphics device interface
GHz      gigahertz
GUI      graphical user interface
GPS      global positioning system
GSM      global system for mobile communications
HAL      hardware abstraction layer
HAV      Hardware Assisted Virtualization
HCL      hardware compatibility list
HDD      hard disk drive
HDMI     high definition media interface
HPFS     high performance file system
HTML     hypertext markup language
HTPC     home theater PC
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTTP</td>
<td>hypertext transfer protocol</td>
</tr>
<tr>
<td>HTTPS</td>
<td>hypertext transfer protocol over secure sockets layer</td>
</tr>
<tr>
<td>I/O</td>
<td>input/output</td>
</tr>
<tr>
<td>ICMP</td>
<td>internet control message protocol</td>
</tr>
<tr>
<td>ICR</td>
<td>intelligent character recognition</td>
</tr>
<tr>
<td>IDE</td>
<td>integrated drive electronics</td>
</tr>
<tr>
<td>IDS</td>
<td>Intrusion Detection System</td>
</tr>
<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineers</td>
</tr>
<tr>
<td>IIS</td>
<td>Internet Information Services</td>
</tr>
<tr>
<td>IMAP</td>
<td>internet mail access protocol</td>
</tr>
<tr>
<td>IMEI</td>
<td>International Mobile Equipment Identity</td>
</tr>
<tr>
<td>IMSI</td>
<td>International Mobile Subscriber Identity</td>
</tr>
<tr>
<td>IP</td>
<td>internet protocol</td>
</tr>
<tr>
<td>IPCONFIG</td>
<td>internet protocol configuration</td>
</tr>
<tr>
<td>IPP</td>
<td>internet printing protocol</td>
</tr>
<tr>
<td>IPS</td>
<td>In-plane Switching</td>
</tr>
<tr>
<td>IPSEC</td>
<td>Internet Protocol Security</td>
</tr>
<tr>
<td>IR</td>
<td>Infrared</td>
</tr>
<tr>
<td>IrDA</td>
<td>Infrared Data Association</td>
</tr>
<tr>
<td>IRP</td>
<td>Incident Response Plan</td>
</tr>
<tr>
<td>IRQ</td>
<td>Interrupt Request</td>
</tr>
<tr>
<td>ISDN</td>
<td>Integrated Services Digital Network</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization/Industry Standards Organization</td>
</tr>
<tr>
<td>ISP</td>
<td>Internet Service Provider</td>
</tr>
<tr>
<td>JBOD</td>
<td>Just a Bunch of Disks</td>
</tr>
<tr>
<td>Kb</td>
<td>Kilobit</td>
</tr>
<tr>
<td>KB</td>
<td>Kilobyte or Knowledge Base</td>
</tr>
<tr>
<td>LAN</td>
<td>Local Area Network</td>
</tr>
<tr>
<td>LBA</td>
<td>Logical Block Addressing</td>
</tr>
<tr>
<td>LC</td>
<td>Lucent Connector</td>
</tr>
<tr>
<td>LCD</td>
<td>liquid Crystal Display</td>
</tr>
<tr>
<td>LDAP</td>
<td>lightweight directory access protocol</td>
</tr>
<tr>
<td>LED</td>
<td>light emitting diode</td>
</tr>
<tr>
<td>Li-on</td>
<td>lithium-ion</td>
</tr>
<tr>
<td>LPD/LPR</td>
<td>line printer daemon / line printer remote</td>
</tr>
<tr>
<td>LPT</td>
<td>line printer terminal</td>
</tr>
<tr>
<td>LVD</td>
<td>low voltage differential</td>
</tr>
<tr>
<td>MAC</td>
<td>media access control / mandatory access control</td>
</tr>
<tr>
<td>MAPI</td>
<td>messaging application programming interface</td>
</tr>
<tr>
<td>MAU</td>
<td>media access unit, media attachment unit</td>
</tr>
<tr>
<td>Mb</td>
<td>megabit</td>
</tr>
<tr>
<td>MB</td>
<td>megabyte</td>
</tr>
<tr>
<td>MBR</td>
<td>master boot record</td>
</tr>
<tr>
<td>MBSA</td>
<td>Microsoft Baseline Security Analyzer</td>
</tr>
<tr>
<td>Acronym</td>
<td>Definition</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>MFD</td>
<td>multi-function device</td>
</tr>
<tr>
<td>MFP</td>
<td>multi-function product</td>
</tr>
<tr>
<td>MHz</td>
<td>megahertz</td>
</tr>
<tr>
<td>MicroDIMM</td>
<td>micro dual inline memory module</td>
</tr>
<tr>
<td>MIDI</td>
<td>musical instrument digital interface</td>
</tr>
<tr>
<td>MIME</td>
<td>multipurpose internet mail extension</td>
</tr>
<tr>
<td>MIMO</td>
<td>Multiple Input Multiple Output</td>
</tr>
<tr>
<td>MMC</td>
<td>Microsoft management console</td>
</tr>
<tr>
<td>MP3</td>
<td>Moving Picture Experts Group Layer 3 Audio</td>
</tr>
<tr>
<td>MP4</td>
<td>Moving Picture Experts Group Layer 4</td>
</tr>
<tr>
<td>MPEG</td>
<td>Moving Picture Experts Group</td>
</tr>
<tr>
<td>MS CONFIG</td>
<td>Microsoft configuration</td>
</tr>
<tr>
<td>MSDS</td>
<td>material safety data sheet</td>
</tr>
<tr>
<td>MUI</td>
<td>multilingual user interface</td>
</tr>
<tr>
<td>NAC</td>
<td>network access control</td>
</tr>
<tr>
<td>NAS</td>
<td>network-attached storage</td>
</tr>
<tr>
<td>NAT</td>
<td>network address translation</td>
</tr>
<tr>
<td>NetBIOS</td>
<td>networked basic input/output system</td>
</tr>
<tr>
<td>NetBEUI</td>
<td>networked basic input/output system extended user interface</td>
</tr>
<tr>
<td>NFS</td>
<td>network file system</td>
</tr>
<tr>
<td>NIC</td>
<td>network interface card</td>
</tr>
<tr>
<td>NiCd</td>
<td>nickel cadmium</td>
</tr>
<tr>
<td>NiMH</td>
<td>nickel metal hydride</td>
</tr>
<tr>
<td>NLX</td>
<td>new low-profile extended</td>
</tr>
<tr>
<td>NNTP</td>
<td>network news transfer protocol</td>
</tr>
<tr>
<td>NTFS</td>
<td>new technology file system</td>
</tr>
<tr>
<td>NTLDR</td>
<td>new technology loader</td>
</tr>
<tr>
<td>NTP</td>
<td>Network Time Protocol</td>
</tr>
<tr>
<td>OCR</td>
<td>optical character recognition</td>
</tr>
<tr>
<td>OEM</td>
<td>original equipment manufacturer</td>
</tr>
<tr>
<td>OLED</td>
<td>Organic Light Emitting Diode</td>
</tr>
<tr>
<td>OS</td>
<td>operating system</td>
</tr>
<tr>
<td>PAN</td>
<td>personal area network</td>
</tr>
<tr>
<td>PATA</td>
<td>parallel advanced technology attachment</td>
</tr>
<tr>
<td>PC</td>
<td>personal computer</td>
</tr>
<tr>
<td>PCI</td>
<td>peripheral component interconnect</td>
</tr>
<tr>
<td>PCIe</td>
<td>peripheral component interconnect express</td>
</tr>
<tr>
<td>PCIX</td>
<td>peripheral component interconnect extended</td>
</tr>
<tr>
<td>PCL</td>
<td>printer control language</td>
</tr>
<tr>
<td>PCMCIA</td>
<td>Personal Computer Memory Card International Association</td>
</tr>
<tr>
<td>PE</td>
<td>Preinstallation Environment</td>
</tr>
<tr>
<td>PGA</td>
<td>pin grid array</td>
</tr>
<tr>
<td>PGA2</td>
<td>pin grid array 2</td>
</tr>
<tr>
<td>PII</td>
<td>Personally Identifiable Information</td>
</tr>
</tbody>
</table>
PIN personal identification number
PKI public key infrastructure
PnP plug and play
POP3 post office protocol 3
PoS Point of Sale
POST power-on self test
POTS plain old telephone service
PPP point-to-point protocol
PPTP point-to-point tunnelling protocol
PRI primary rate interface
PROM programmable read-only memory
PS/2 personal system/2 connector
PSTN public switched telephone network
PSU power supply unit
PVC permanent virtual circuit
PXE preboot execution environment
QoS quality of service
RAID redundant array of independent (or inexpensive) discs
RAM random access memory
RAS remote access service
RDP Remote Desktop Protocol
RF radio frequency
RFI radio frequency interference
RGB red green blue
RIP routing information protocol
RIS remote installation service
RISC reduced instruction set computer
RJ-11 registered jack function 11
RJ-45 registered jack function 45
RMA returned materials authorization
ROM read only memory
RTC real-time clock
SAN storage area network
SAS Serial Attached SCSI
SATA serial advanced technology attachment
SC subscription channel
SCP secure copy channel
SCSI small computer system interface
SCSI ID small computer system interface identifier
SD card secure digital card
SDRAM synchronous dynamic random access memory
SEC single edge connector
SFC system file checker
SFF Small Form Factor
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLI</td>
<td>scalable link interface or system level integration or scanline interleave mode</td>
</tr>
<tr>
<td>S.M.A.R.T.</td>
<td>self-monitoring, analysis, and reporting technology</td>
</tr>
<tr>
<td>SMB</td>
<td>server message block or small to midsize business</td>
</tr>
<tr>
<td>SMTP</td>
<td>simple mail transfer protocol</td>
</tr>
<tr>
<td>SNMP</td>
<td>simple network management protocol</td>
</tr>
<tr>
<td>SoDIMM</td>
<td>small outline dual inline memory module</td>
</tr>
<tr>
<td>SOHO</td>
<td>small office/home office</td>
</tr>
<tr>
<td>SP</td>
<td>service pack</td>
</tr>
<tr>
<td>SPDIF</td>
<td>Sony-Philips digital interface format</td>
</tr>
<tr>
<td>SPGA</td>
<td>staggered pin grid array</td>
</tr>
<tr>
<td>SRAM</td>
<td>static random access memory</td>
</tr>
<tr>
<td>SSH</td>
<td>secure shell</td>
</tr>
<tr>
<td>SSID</td>
<td>service set identifier</td>
</tr>
<tr>
<td>SSL</td>
<td>secure sockets layer</td>
</tr>
<tr>
<td>ST</td>
<td>straight tip</td>
</tr>
<tr>
<td>STP</td>
<td>shielded twisted pair</td>
</tr>
<tr>
<td>SXGA</td>
<td>super extended graphics array</td>
</tr>
<tr>
<td>TB</td>
<td>terabyte</td>
</tr>
<tr>
<td>TCP</td>
<td>transmission control protocol</td>
</tr>
<tr>
<td>TCP/IP</td>
<td>transmission control protocol/internet protocol</td>
</tr>
<tr>
<td>TDR</td>
<td>time domain reflectometer</td>
</tr>
<tr>
<td>TFTP</td>
<td>trivial file transfer protocol</td>
</tr>
<tr>
<td>TKIP</td>
<td>Temporal Key Integrity Protocol</td>
</tr>
<tr>
<td>TPM</td>
<td>trusted platform module</td>
</tr>
<tr>
<td>UAC</td>
<td>user account control</td>
</tr>
<tr>
<td>UDF</td>
<td>user defined functions or universal disk format or universal data format</td>
</tr>
<tr>
<td>UDP</td>
<td>user datagram protocol</td>
</tr>
<tr>
<td>UEFI</td>
<td>Unified Extensible Firmware Interface</td>
</tr>
<tr>
<td>UNC</td>
<td>universal naming convention</td>
</tr>
<tr>
<td>UPS</td>
<td>uninterruptible power supply</td>
</tr>
<tr>
<td>URL</td>
<td>uniform resource locator</td>
</tr>
<tr>
<td>USB</td>
<td>universal serial bus</td>
</tr>
<tr>
<td>USMT</td>
<td>user state migration tool</td>
</tr>
<tr>
<td>UTP</td>
<td>unshielded twisted pair</td>
</tr>
<tr>
<td>UXGA</td>
<td>ultra extended graphics array</td>
</tr>
<tr>
<td>VESA</td>
<td>Video Electronics Standards Association</td>
</tr>
<tr>
<td>VFAT</td>
<td>virtual file allocation table</td>
</tr>
<tr>
<td>VGA</td>
<td>video graphics array</td>
</tr>
<tr>
<td>VM</td>
<td>Virtual Machine</td>
</tr>
<tr>
<td>VoIP</td>
<td>voice over internet protocol</td>
</tr>
<tr>
<td>VPN</td>
<td>virtual private network</td>
</tr>
<tr>
<td>VRAM</td>
<td>video random access memory</td>
</tr>
<tr>
<td>WAN</td>
<td>wide area network</td>
</tr>
<tr>
<td>WAP</td>
<td>wireless access protocol/wireless access point</td>
</tr>
</tbody>
</table>
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 who wish to create a lab component to their training offering. The bulleted lists below each topic are a sample list and not exhaustive.

Equipment

- Apple tablet / Smart phone
- Android tablet / Smart phone
- Windows tablet / Smart phone
- Windows Laptop / Mac Laptop / Linux Laptop
- Windows Desktop / Mac Desktop / Linux Desktop
- Monitors
- Projectors
- SOHO Router/switch
- Access point
- VoIP phone
- Printer
  - Laser / Inkjet
  - Wireless
- Surge suppressor
- UPS

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
- Unterminated network cable / connectors
- AC adapters
- Optical drives
- Screws/stand-offs
- Cases
- Maintenance kit
- Mice/keyboards

**Tools**

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

**Software**

- Operating system disks
- Antivirus software
- Virtualization software
- Antimalware
- Driver software