



# 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.

- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>• Ports and protocols           <ul style="list-style-type: none"> <li>- 21 – FTP</li> <li>- 22 – SSH</li> <li>- 23 – Telnet</li> <li>- 25 – SMTP</li> <li>- 53 – DNS</li> <li>- 80 – HTTP</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>- 110 – POP3</li> <li>- 143 – IMAP</li> <li>- 443 – HTTPS</li> <li>- 3389 – RDP</li> <li>- 137-139 – NetBIOS/NetBT</li> <li>- 445 – SMB/CIFS</li> <li>- 427 – SLP</li> </ul> | <ul style="list-style-type: none"> <li>- 548 – AFP</li> <li>- 67/68 – DHCP</li> <li>- 389 – LDAP</li> <li>- 161/162 – SNMP</li> </ul> |
|--|---|---|

#### • TCP vs. UDP

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

- |  |  |  |
|--|--|--|
| <ul style="list-style-type: none"> <li>• Routers</li> <li>• Switches           <ul style="list-style-type: none"> <li>- Managed</li> <li>- Unmanaged</li> </ul> </li> <li>• Access points</li> <li>• Cloud-based network controller</li> </ul> | <ul style="list-style-type: none"> <li>• Firewall</li> <li>• Network interface card</li> <li>• Repeater</li> <li>• Hub</li> <li>• Cable/DSL modem</li> <li>• Bridge</li> </ul> | <ul style="list-style-type: none"> <li>• Patch panel</li> <li>• Power over Ethernet (PoE)           <ul style="list-style-type: none"> <li>- Injectors</li> <li>- Switch</li> </ul> </li> <li>• Ethernet over Power</li> </ul> |
|--|--|--|

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

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|--|--|--|
| <ul style="list-style-type: none"> <li>• Router/switch functionality</li> <li>• Access point settings</li> <li>• IP addressing</li> <li>• NIC configuration           <ul style="list-style-type: none"> <li>- Wired</li> <li>- Wireless</li> </ul> </li> <li>• End-user device configuration</li> <li>• IoT device configuration           <ul style="list-style-type: none"> <li>- Thermostat</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>- Light switches</li> <li>- Security cameras</li> <li>- Door locks</li> <li>- Voice-enabled, smart speaker/digital assistant</li> <li>• Cable/DSL modem configuration</li> <li>• Firewall settings           <ul style="list-style-type: none"> <li>- DMZ</li> <li>- Port forwarding</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>- NAT</li> <li>- UPnP</li> <li>- Whitelist/blacklist</li> <li>- MAC filtering</li> <li>• QoS</li> <li>• Wireless settings           <ul style="list-style-type: none"> <li>- Encryption</li> <li>- Channels</li> <li>- QoS</li> </ul> </li> </ul> |
|--|--|--|

### 2.4 Compare and contrast wireless networking protocols.

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>• 802.11a</li> <li>• 802.11b</li> <li>• 802.11g</li> <li>• 802.11n</li> <li>• 802.11ac</li> <li>• Frequencies           <ul style="list-style-type: none"> <li>- 2.4Ghz</li> <li>- 5Ghz</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Channels           <ul style="list-style-type: none"> <li>- 1-11</li> </ul> </li> <li>• Bluetooth</li> <li>• NFC</li> <li>• RFID</li> <li>• Zigbee</li> <li>• Z-Wave</li> <li>• 3G</li> </ul> | <ul style="list-style-type: none"> <li>• 4G</li> <li>• 5G</li> <li>• LTE</li> </ul> |
|---|--|---|



## 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.

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|--|---|--|
| <ul style="list-style-type: none"><li>• <b>Graphic/CAD/CAM design workstation</b><ul style="list-style-type: none"><li>- SSD</li><li>- High-end video</li><li>- Maximum RAM</li></ul></li><li>• <b>Audio/video editing workstation</b><ul style="list-style-type: none"><li>- Specialized audio and video card</li><li>- Large, fast hard drive</li><li>- Dual monitors</li></ul></li><li>• <b>Virtualization workstation</b><ul style="list-style-type: none"><li>- Maximum RAM and CPU cores</li></ul></li></ul> | <ul style="list-style-type: none"><li>• <b>Gaming PC</b><ul style="list-style-type: none"><li>- SSD</li><li>- High-end video/specialized GPU</li><li>- High-definition sound card</li><li>- High-end cooling</li></ul></li><li>• <b>Network attached storage device</b><ul style="list-style-type: none"><li>- Media streaming</li><li>- File sharing</li><li>- Gigabit NIC</li><li>- RAID array</li><li>- Hard drive</li></ul></li></ul> | <ul style="list-style-type: none"><li>• <b>Standard thick client</b><ul style="list-style-type: none"><li>- Desktop applications</li><li>- Meets recommended requirements for selected OS</li></ul></li><li>• <b>Thin client</b><ul style="list-style-type: none"><li>- Basic applications</li><li>- Meets minimum requirements for selected OS</li><li>- Network connectivity</li></ul></li></ul> |
|--|---|--|
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### 3.9 Given a scenario, install and configure common devices.

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|---|--|
| <ul style="list-style-type: none"><li>• <b>Desktop</b><ul style="list-style-type: none"><li>- Thin client</li><li>- Thick client</li><li>- Account setup/settings</li></ul></li><li>• <b>Laptop/common mobile devices</b><ul style="list-style-type: none"><li>- Touchpad configuration</li><li>- Touchscreen configuration</li></ul></li></ul> | <ul style="list-style-type: none"><li>- Application installations/configurations</li><li>- Synchronization settings</li><li>- Account setup/settings</li><li>- Wireless settings</li></ul> |
|---|--|



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.

- |   |   |   |
|---|---|---|
| <ul style="list-style-type: none"><li>• <b>Common symptoms</b><ul style="list-style-type: none"><li>- VGA mode</li><li>- No image on screen</li><li>- Overheat shutdown</li><li>- Dead pixels</li></ul></li></ul> | <ul style="list-style-type: none"><li>- Artifacts</li><li>- Incorrect color patterns</li><li>- Dim image</li><li>- Flickering image</li><li>- Distorted image</li></ul> | <ul style="list-style-type: none"><li>- Distorted geometry</li><li>- Burn-in</li><li>- Oversized images and icons</li></ul> |
|---|---|---|
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**5.5** Given a scenario, troubleshoot common mobile device issues while adhering to the appropriate procedures.

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|---|---|--|
| <ul style="list-style-type: none"><li>• <b>Common symptoms</b><ul style="list-style-type: none"><li>- No display</li><li>- Dim display</li><li>- Flickering display</li><li>- Sticking keys</li><li>- Intermittent wireless</li><li>- Battery not charging</li><li>- Ghost cursor/pointer drift</li><li>- No power</li><li>- Num lock indicator lights</li><li>- No wireless connectivity</li><li>- No Bluetooth connectivity</li></ul></li></ul> | <ul style="list-style-type: none"><li>- Cannot display to external monitor</li><li>- Touchscreen non-responsive</li><li>- Apps not loading</li><li>- Slow performance</li><li>- Unable to decrypt email</li><li>- Extremely short battery life</li><li>- Overheating</li><li>- Frozen system</li><li>- No sound from speakers</li><li>- GPS not functioning</li><li>- Swollen battery</li></ul> | <ul style="list-style-type: none"><li>• <b>Disassembling processes for proper reassembly</b><ul style="list-style-type: none"><li>- Document and label cable and screw locations</li><li>- Organize parts</li><li>- Refer to manufacturer resources</li><li>- Use appropriate hand tools</li></ul></li></ul> |
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**5.6** Given a scenario, troubleshoot printers.

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|--|--|--|
| <ul style="list-style-type: none"><li>• <b>Common symptoms</b><ul style="list-style-type: none"><li>- Streaks</li><li>- Faded prints</li><li>- Ghost images</li><li>- Toner not fused to the paper</li><li>- Creased paper</li><li>- Paper not feeding</li></ul></li></ul> | <ul style="list-style-type: none"><li>- Paper jam</li><li>- No connectivity</li><li>- Garbled characters on paper</li><li>- Vertical lines on page</li><li>- Backed-up print queue</li><li>- Low memory errors</li><li>- Access denied</li></ul> | <ul style="list-style-type: none"><li>- Printer will not print</li><li>- Color prints in wrong print color</li><li>- Unable to install printer</li><li>- Printing blank pages</li><li>- No image on printer display</li><li>- Multiple failed jobs in logs</li></ul> |
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**5.7** Given a scenario, troubleshoot common wired and wireless network problems.

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|---|--|
| <ul style="list-style-type: none"><li>• <b>Common symptoms</b><ul style="list-style-type: none"><li>- Limited connectivity</li><li>- Unavailable resources<ul style="list-style-type: none"><li>- Internet</li><li>- Local resources<ul style="list-style-type: none"><li>- Shares</li><li>- Printers</li><li>- Email</li></ul></li></ul></li></ul></li></ul> | <ul style="list-style-type: none"><li>- No connectivity</li><li>- APIPA/link local address</li><li>- Intermittent connectivity</li><li>- IP conflict</li><li>- Slow transfer speeds</li><li>- Low RF signal</li><li>- SSID not found</li></ul> |
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# 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.

| ACRONYM | SPELLED OUT  | ACRONYM | SPELLED OUT                                      |
|---------|--|---------|--|
| 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                |

| ACRONYM | SPELLED OUT  | ACRONYM  | SPELLED OUT                                       |
|---------|--|----------|---|
| 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<br>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              |



**ACRONYM      SPELLED OUT**

|           |  |
|-----------|--|
| MDM       | Mobile Device Management                                       |
| MFA       | Multifactor Authentication                                     |
| MFD       | Multifunction Device   |
| MFP       | Multifunction Product  |
| MicroDIMM | Micro Dual Inline Memory Module                                |
| MIDI      | Musical Instrument Digital Interface                           |
| MIME      | Multipurpose Internet Mail Extension                           |
| MIMO      | Multiple Input Multiple Output                                 |
| MMC       | Microsoft Management Console                                   |
| MP3       | Moving Picture Experts Group Layer 3 Audio                     |
| MP4       | Moving Picture Experts Group Layer 4                           |
| MPEG      | Moving Picture Experts Group                                   |
| MSConfig  | Microsoft Configuration  |
| MSDS      | Material Safety Data Sheet                                     |
| MT-RJ     | Mechanical Transfer Registered Jack                            |
| MUI       | Multilingual User Interface                                    |
| NaaS      | Network as a Service   |
| NAC       | Network Access Control   |
| NAS       | Network-Attached Storage                                       |
| NAT       | Network Address Translation                                    |
| NetBIOS   | Networked Basic Input/Output System                            |
| NetBEUI   | Networked Basic Input/Output<br>System Extended User Interface |
| NFC       | Near Field Communication                                       |
| NFS       | Network File System  |
| NIC       | Network Interface Card   |
| NiCd      | Nickel Cadmium   |
| NiMH      | Nickel Metal Hydride   |
| NLX       | New Low-profile Extended                                       |
| NNTP      | Network News Transfer Protocol                                 |
| NTFS      | New Technology File System                                     |
| NTLDR     | New Technology Loader  |
| NTP       | Network Time Protocol  |
| NTSC      | National Transmission Standards Committee                      |
| NVMe      | Non-volatile Memory Express                                    |
| OCR       | Optical Character Recognition                                  |
| OEM       | Original Equipment Manufacturer                                |
| OLED      | Organic Light Emitting Diode                                   |
| OS        | Operating System   |
| PaaS      | Platform as a Service  |
| PAL       | Phase Alternating Line   |
| PAN       | Personal Area Network  |
| PAT       | Port Address Translation                                       |
| PC        | Personal Computer  |
| PCI       | Peripheral Component Interconnect                              |
| PCI       | Payment Card Industry  |

**ACRONYM      SPELLED OUT**

|        |  |
|--------|--|
| PCIe   | Peripheral Component Interconnect Express                  |
| PCIX   | Peripheral Component Interconnect Extended                 |
| PCL    | Printer Command Language                                   |
| PCMCIA | Personal Computer Memory<br>Card International Association |
| PE     | Preinstallation Environment                                |
| PGA    | Pin Grid Array   |
| PGA2   | Pin Grid Array 2   |
| PGP    | Pretty Good Protection                                     |
| PII    | Personally Identifiable Information                        |
| PIN    | Personal Identification Number                             |
| PHI    | Personal Health Information                                |
| PKI    | Public Key Infrastructure                                  |
| PnP    | Plug and Play  |
| PoE    | Power over Ethernet  |
| POP3   | Post Office Protocol 3                                     |
| PoS    | Point of Sale  |
| POST   | Power-On Self-Test   |
| POTS   | Plain Old Telephone Service                                |
| PPM    | Pages Per Minute   |
| PPP    | Point-to-Point Protocol                                    |
| PPTP   | Point-to-Point Tunneling 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  |
| PVA    | Patterned Vertical Alignment                               |
| PVC    | Permanent Virtual Circuit                                  |
| PXE    | Preboot Execution Environment                              |
| QoS    | Quality of Service   |
| RADIUS | Remote Authentication Dial-In User Server                  |
| RAID   | Redundant Array of<br>Independent (or Inexpensive) Disks   |
| RAM    | Random Access Memory                                       |
| RAS    | Remote Access Service                                      |
| RDP    | Remote Desktop Protocol                                    |
| RF     | Radio Frequency  |
| RFI    | Radio Frequency Interference                               |
| RFID   | Radio Frequency Identification                             |
| 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                                |

| ACRONYM    | SPELLED OUT   |
|------------|---|
| RMA        | Returned Materials Authorization  |
| ROM        | Read-Only Memory  |
| RPO        | Recovery Point Objective  |
| RTC        | Real-Time Clock   |
| RT         | Recovery Time Objective   |
| SaaS       | Software as a Service   |
| SAN        | Storage Area Network  |
| SAS        | Serial Attached SCSI  |
| SATA       | Serial Advanced Technology Attachment   |
| SC         | Subscription Channel  |
| SCP        | Secure Copy Protection  |
| SCSI       | Small Computer System Interface   |
| SCSI ID    | Small Computer System Interface Identifier                                      |
| SD card    | Secure Digital Card   |
| SEC        | Single Edge Connector   |
| SFC        | System File Checker   |
| SFF        | Small Form Factor   |
| SFTP       | Secure File Transfer Protocol   |
| SIM        | Subscriber Identity Module  |
| SIMM       | Single In-Line Memory Module  |
| SLI        | Scalable Link Interface or System Level Integration or Scanline Interleave Mode |
| S.M.A.R.T. | Self-Monitoring, Analysis, and Reporting Technology                             |
| SMB        | Server Message Block  |
| SMTP       | Simple Mail Transfer Protocol   |
| SNMP       | Simple Network Management Protocol  |
| SoDIMM     | Small Outline Dual Inline Memory Module   |
| SOHO       | Small Office/Home Office  |
| SP         | Service Pack  |
| SPDIF      | Sony-Philips Digital Interface Format   |
| SPGA       | Staggered Pin Grid Array  |
| SRAM       | Static Random Access Memory   |
| SSD        | Solid State Drive   |
| SSH        | Secure Shell  |
| SSID       | Service Set Identifier  |
| SSL        | Secure Sockets Layer  |
| SSO        | Single Sign-on  |
| ST         | Straight Tip  |
| STP        | Shielded Twisted Pair   |
| SXGA       | Super Extended Graphics Array   |
| TACACS     | Terminal Access Controller Access-Control System                                |
| TCP        | Transmission Control Protocol   |
| TCP/IP     | Transmission Control Protocol/Internet Protocol                                 |
| TDR        | Time Domain Reflectometer   |
| TFTP       | Trivial File Transfer Protocol  |

| ACRONYM | SPELLED OUT  |
|---------|--|
| TKIP    | Temporal Key Integrity Protocol  |
| TLS     | Transport Layer Security   |
| TN      | Twisted Nematic  |
| TPM     | Trusted Platform Module  |
| UAC     | User Account Control   |
| UDF     | User Defined Functions or Universal Disk Format or Universal Data Format |
| UDP     | User Datagram Protocol   |
| UEFI    | Unified Extensible Firmware Interface                                    |
| UNC     | Universal Naming Convention  |
| UPnP    | Universal Plug and Play  |
| UPS     | Uninterruptible Power Supply   |
| URL     | Uniform Resource Locator   |
| USB     | Universal Serial Bus   |
| USMT    | User State Migration Tool  |
| UTM     | Unified Threat Management  |
| UTP     | Unshielded Twisted Pair  |
| UXGA    | Ultra Extended Graphics Array  |
| VA      | Vertical Alignment   |
| VDC     | Volts DC   |
| VDI     | Virtual Desktop Infrastructure   |
| VESA    | Video Electronics Standards Association                                  |
| VFAT    | Virtual File Allocation Table  |
| VGA     | Video Graphics Array   |
| VLAN    | Virtual LAN  |
| VM      | Virtual Machine  |
| VNC     | Virtual Network Computer   |
| VoIP    | Voice over Internet Protocol   |
| VPN     | Virtual Private Network  |
| VRAM    | Video Random Access Memory   |
| WAN     | Wide Area Network  |
| WAP     | Wireless Access Protocol/Wireless Access Point                           |
| WEP     | Wired Equivalent Privacy   |
| WIFI    | Wireless Fidelity  |
| WINS    | Windows Internet Name Service  |
| WLAN    | Wireless Local Area Network  |
| WMN     | Wireless Mesh Network  |
| WPA     | Wireless Protected Access  |
| WPA2    | WiFi Protected Access 2  |
| WPS     | WiFi Protected Setup   |
| WUXGA   | Wide Ultra Extended Graphics Array                                       |
| WWAN    | Wireless Wide Area Network   |
| XGA     | Extended Graphics Array  |
| ZIF     | Zero-Insertion-Force   |
| 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
- Sound cards
- Network cards
- Wireless NICs
- Fans/cooling devices/heat sink

## CPUs

- Assorted connectors/cables
  - USB
  - HDMI
  - Etc.
- Adapters
- Network cables
- Underterminated 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