

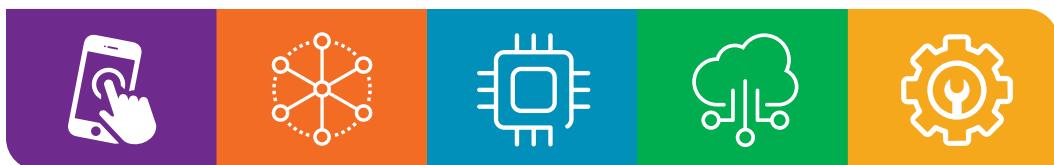


CompTIA A+

Certification Exam

Core 1 Objectives

EXAM NUMBER: CORE 1 (220-1101)



About the Exam

Candidates are encouraged to use this document to help prepare for the CompTIA A+ Core 1 (220-1101) certification exam. In order to receive the CompTIA A+ certification, you must pass two exams: Core 1 (220-1101) and Core 2 (220-1102). The CompTIA A+ Core 1 (220-1101) and Core 2 (220-1102) certification exams will verify the successful candidate has the knowledge and skills required to:

- Install, configure, and maintain computer equipment, mobile devices, and software for end users
- Service components based on customer requirements
- Understand networking basics and apply basic cybersecurity methods to mitigate threats
- Properly and safely diagnose, resolve, and document common hardware and software issues
- Apply troubleshooting skills and provide customer support using appropriate communication skills
- Understand the basics of scripting, cloud technologies, virtualization, and multi-OS deployments in corporate environments

This is equivalent to 12 months of hands-on experience working in a help desk support technician, desktop support technician, or field service technician job role. 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

The CompTIA A+ Core 1 (220-1101) exam 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 existing exam objectives. Please know that all related exam preparation materials will still be valid.

TEST DETAILS

| | |
|------------------------|--|
| Required exam | A+ Core 1 (220-1101) |
| Number of questions | Maximum of 90 |
| Types of questions | Multiple-choice and performance-based |
| Length of test | 90 minutes |
| Recommended experience | 12 months of hands-on experience in a help desk support technician, desktop support technician, or field service technician job role |
| 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 | 15% |
| 2.0 Networking | 20% |
| 3.0 Hardware | 25% |
| 4.0 Virtualization and Cloud Computing | 11% |
| 5.0 Hardware and Network Troubleshooting | 29% |
| Total | 100% |



1.0 Mobile Devices

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

- **Hardware/device replacement**
 - Battery
 - Keyboard/keys
 - Random-access memory (RAM)
- **Physical privacy and security components**
 - Biometrics
 - Near-field scanner features
- Hard disk drive (HDD)/solid-state drive (SSD) migration
- HDD/SSD replacement
- Wireless cards

1.2 Compare and contrast the display components of mobile devices.

- **Types**
 - Liquid crystal display (LCD)
 - In-plane switching (IPS)
 - Twisted nematic (TN)
 - Vertical alignment (VA)
 - Organic light-emitting diode (OLED)
- **Mobile display components**
 - WiFi antenna connector/placement
 - Camera/webcam
 - Microphone
- **Touch screen/digitizer**
- **Inverter**

1.3 Given a scenario, set up and configure accessories and ports of mobile devices.

- **Connection methods**
 - Universal Serial Bus (USB)/USB-C/microUSB/miniUSB
 - Lightning
 - Serial interfaces
 - Near-field communication (NFC)
 - Bluetooth
 - Hotspot
- **Accessories**
 - Touch pens
 - Headsets
 - Speakers
 - Webcam
- **Docking station**
- **Port replicator**
- **Trackpad/drawing pad**



1.4 Given a scenario, configure basic mobile-device network connectivity and application support.

- Wireless/cellular data network (enable/disable)
 - 2G/3G/4G/5G
 - Hotspot
 - Global System for Mobile Communications (GSM) vs. code-division multiple access (CDMA)
 - Preferred Roaming List (PRL) updates
- Bluetooth
 - Enable Bluetooth
 - Enable pairing
 - Find a device for pairing
 - Enter the appropriate PIN code
 - Test connectivity
- Location services
 - Global Positioning System (GPS) services
 - Cellular location services
- Mobile device management (MDM)/mobile application management (MAM)
 - Corporate email configuration
 - Two-factor authentication
 - Corporate applications
- Mobile device synchronization
 - Account setup
 - Microsoft 365
 - Google Workspace
 - iCloud
 - Data to synchronize
 - Mail
 - Photos
 - Calendar
 - Contacts



2.0 Networking

2.1 Compare and contrast Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) ports, protocols, and their purposes.

- Ports and protocols

- 20/21 – File Transfer Protocol (FTP)
- 22 – Secure Shell (SSH)
- 23 – Telnet
- 25 – Simple Mail Transfer Protocol (SMTP)
- 53 – Domain Name System (DNS)
- 67/68 – Dynamic Host Configuration Protocol (DHCP)
- 80 – Hypertext Transfer Protocol (HTTP)
- 110 – Post Office Protocol 3 (POP3)

- 137/139 – Network Basic Input/Output System (NetBIOS)/NetBIOS over TCP/IP (NetBT)
- 143 – Internet Mail Access Protocol (IMAP)
- 161/162 – Simple Network Management Protocol (SNMP)
- 389 – Lightweight Directory Access Protocol (LDAP)
- 443 – Hypertext Transfer Protocol Secure (HTTPS)
- 445 – Server Message Block (SMB)/Common Internet File System (CIFS)

- 3389 – Remote Desktop Protocol (RDP)

- **TCP vs. UDP**

- Connectionless
 - DHCP
 - Trivial File Transfer Protocol (TFTP)
- Connection-oriented
 - HTTPS
 - SSH

2.2 Compare and contrast common networking hardware.

- Routers

- **Switches**

- Managed
- Unmanaged

- Access points

- Patch panel

- **Firewall**

- **Power over Ethernet (PoE)**

- Injectors
- Switch
- PoE standards

- Hub

- Cable modem

- Digital subscriber line (DSL)

- **Optical network terminal (ONT)**

- Network interface card (NIC)

- **Software-defined networking (SDN)**



2.3 Compare and contrast protocols for wireless networking.

- Frequencies

- 2.4GHz
- 5GHz
- Channels
- Regulations
- 2.4GHz vs. 5GHz
- Bluetooth

- 802.11

- a
- b
- g
- n
- ac (WiFi 5)
- ax (WiFi 6)

- Long-range fixed wireless

- Licensed
- Unlicensed
- Power
- Regulatory requirements for wireless power
- NFC
- Radio-frequency identification (RFID)

2.4 Summarize services provided by networked hosts.

- Server roles

- DNS
- DHCP
- Fileshare
- Print servers
- Mail servers
- Syslog
- Web servers
- Authentication, authorization, and accounting (AAA)

- Internet appliances

- Spam gateways
- Unified threat management (UTM)
- Load balancers
- Proxy servers

- Legacy/embedded systems

- Supervisory control and data acquisition (SCADA)
- Internet of Things (IoT) devices

2.5 Given a scenario, install and configure basic wired/wireless small office/home office (SOHO) networks.

- Internet Protocol (IP) addressing

- IPv4
 - Private addresses
 - Public addresses
- IPv6
- Automatic Private IP Addressing (APIPA)
- Static
- Dynamic
- Gateway



2.6 Compare and contrast common network configuration concepts.

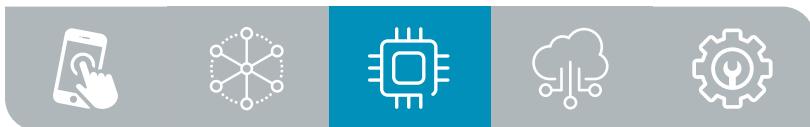
- DNS
 - Address
 - A
 - AAAA
 - Mail exchanger (MX)
 - Text (TXT)
 - Spam management
 - (i) DomainKeys Identified Mail (DKIM)
 - (ii) Sender Policy Framework (SPF)
 - (iii) Domain-based Message Authentication, Reporting, and Conformance (DMARC)
 - DHCP
 - Leases
 - Reservations
 - Scope
 - Virtual LAN (VLAN)
 - Virtual private network (VPN)
-

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

- Internet connection types
 - Satellite
 - Fiber
 - Cable
 - DSL
 - Cellular
 - Wireless Internet service provider (WISP)
 - Network types
 - Local area network (LAN)
 - Wide area network (WAN)
 - Personal area network (PAN)
 - Metropolitan area network (MAN)
 - Storage area network (SAN)
 - Wireless local area network (WLAN)
-

2.8 Given a scenario, use networking tools.

- | | | |
|--|---|--|
| <ul style="list-style-type: none"> • Crimper • Cable stripper • WiFi analyzer | <ul style="list-style-type: none"> • Toner probe • Punchdown tool • Cable tester | <ul style="list-style-type: none"> • Loopback plug • Network tap |
|--|---|--|



3.0 Hardware

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

- Network cables
 - Copper
 - Cat 5
 - Cat 5e
 - Cat 6
 - Cat 6a
 - Coaxial
 - Shielded twisted pair
 - (i) Direct burial
 - Unshielded twisted pair
 - Plenum
 - Optical
 - Fiber
 - T568A/T568B
- Peripheral cables
 - USB 2.0
 - USB 3.0
 - Serial
 - Thunderbolt
- Video cables
 - High-Definition Multimedia Interface (HDMI)
 - DisplayPort
 - Digital Visual Interface (DVI)
 - Video Graphics Array (VGA)
- Hard drive cables
 - Serial Advanced Technology Attachment (SATA)
 - Small Computer System Interface (SCSI)
 - External SATA (eSATA)
 - Integrated Drive Electronics (IDE)
- Adapters
 - RJ11
 - RJ45
 - F type
 - Straight tip (ST)
 - Subscriber connector (SC)
 - Lucent connector (LC)
 - Punchdown block
 - microUSB
 - miniUSB
 - USB-C
 - Molex
 - Lightning port
 - DB9

3.2 Given a scenario, install the appropriate RAM.

- RAM types
 - Virtual RAM
 - Small outline dual inline memory module (SODIMM)
 - Double Data Rate 3 (DDR3)
 - Double Data Rate 4 (DDR4)
 - Double Data Rate 5 (DDR5)
 - Error correction code (ECC) RAM
- Single-channel
- Dual-channel
- Triple-channel
- Quad-channel



3.3 Given a scenario, select and install storage devices.

- Hard drives
 - Speeds
 - 5,400rpm
 - 7,200rpm
 - 10,000rpm
 - 15,000rpm
 - Form factor
 - 2.5
 - 3.5
 - SSDs
 - Communications interfaces
 - Non-volatile Memory Express (NVMe)
 - SATA
 - Peripheral Component Interconnect Express (PCIe)
 - Form factors
 - M.2
 - mSATA
 - Drive configurations
 - Redundant Array of Independent (or Inexpensive) Disks (RAID) 0, 1, 5, 10
 - Removable storage
 - Flash drives
 - Memory cards
 - Optical drives
-

3.4 Given a scenario, install and configure motherboards, central processing units (CPUs), and add-on cards.

- Motherboard form factor
 - Advanced Technology eXtended (ATX)
 - Information Technology eXtended (ITX)
- Motherboard connector types
 - Peripheral Component Interconnect (PCI)
 - PCI Express (PCIe)
 - Power connectors
 - SATA
 - eSATA
 - Headers
 - M.2
- Motherboard compatibility
 - CPU sockets
 - Advanced Micro Devices, Inc. (AMD)
 - Intel
 - Server
 - Multisocket
- Desktop
 - Mobile
- Basic Input/Output System (BIOS)/Unified Extensible Firmware Interface (UEFI) settings
 - Boot options
 - USB permissions
 - Trusted Platform Module (TPM) security features
 - Fan considerations
 - Secure Boot
 - Boot password
- Encryption
 - TPM
 - Hardware security module (HSM)
- CPU architecture
 - x64/x86
 - Advanced RISC Machine (ARM)
 - Single-core
 - Multicore
- Multithreading
- Virtualization support
- Expansion cards
 - Sound card
 - Video card
 - Capture card
 - NIC
- Cooling
 - Fans
 - Heat sink
 - Thermal paste/pads
 - Liquid



3.5 Given a scenario, install or replace the appropriate power supply.

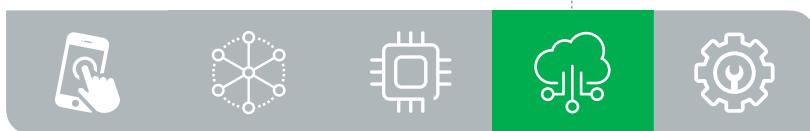
- Input 110-120 VAC vs. 220-240 VAC
 - Output 3.3V vs. 5V vs. 12V
 - 20-pin to 24-pin motherboard adapter
 - Redundant power supply
 - Modular power supply
 - Wattage rating
-

3.6 Given a scenario, deploy and configure multifunction devices/printers and settings.

- Properly unboxing a device - setup location considerations
 - Use appropriate drivers for a given OS
 - Printer Control Language (PCL) vs. PostScript
 - Device connectivity
 - USB
 - Ethernet
 - Wireless
 - Public/shared devices
 - Printer share
 - Print server
 - Configuration settings
 - Duplex
 - Orientation
 - Tray settings
 - Quality
 - Security
 - User authentication
 - Badging
 - Audit logs
 - Secured prints
 - Network scan services
 - Email
 - SMB
 - Cloud services
 - Automatic document feeder (ADF)/flatbed scanner
-

3.7 Given a scenario, install and replace printer consumables.

- Laser
 - Imaging drum, fuser assembly, transfer belt, transfer roller, pickup rollers, separation 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 belt
 - Calibration
 - Maintenance: Clean heads, replace cartridges, calibrate, clear jams
- Thermal
 - Feed assembly, heating element
 - Special thermal paper
 - Maintenance: Replace paper, clean heating element, remove debris
 - Heat sensitivity of paper
- Impact
 - Print head, ribbon, tractor feed
 - Impact paper
 - Maintenance: Replace ribbon, replace print head, replace paper
- 3-D printer
 - Filament
 - Resin
 - Print bed



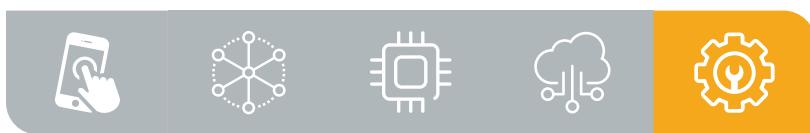
4.0 Virtualization and Cloud Computing

4.1 Summarize cloud-computing concepts.

- Common cloud models
 - Private cloud
 - Public cloud
 - Hybrid cloud
 - Community cloud
 - Infrastructure as a service (IaaS)
 - Software as a service (SaaS)
 - Platform as a service (PaaS)
- Cloud characteristics
 - Shared resources
 - Metered utilization
 - Rapid elasticity
 - High availability
 - File synchronization
- Desktop virtualization
 - Virtual desktop infrastructure (VDI) on premises
 - VDI in the cloud

4.2 Summarize aspects of client-side virtualization.

- Purpose of virtual machines
 - Sandbox
 - Test development
 - Application virtualization
 - Legacy software/OS
 - Cross-platform virtualization
- Resource requirements
- Security requirements



5.0 Hardware and Network Troubleshooting

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

- Always consider corporate policies, procedures, and impacts before implementing changes
- Identify the problem
 - Gather information from the user, identify user changes, and, if applicable, perform backups before making changes
 - Inquire regarding environmental or infrastructure changes
 - Establish a theory of probable cause (question the obvious)
 - If necessary, conduct external or internal research based on symptoms
 - Test the theory to determine the cause
 - Once the theory is confirmed, determine the next steps to resolve the problem
 - If the theory is not confirmed, re-establish a new theory or escalate
 - Establish a plan of action to resolve the problem and implement the solution
 - Refer to the vendor's instructions for guidance
 - Verify full system functionality and, if applicable, implement preventive measures
 - Document the findings, actions, and outcomes

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

- Common symptoms
 - Power-on self-test (POST) beeps
 - Proprietary crash screens (blue screen of death [BSOD]/pinwheel)
 - Black screen
 - No power
 - Sluggish performance
 - Overheating
 - Burning smell
 - Intermittent shutdown
 - Application crashes
 - Grinding noise
 - Capacitor swelling
 - Inaccurate system date/time



5.3 Given a scenario, troubleshoot and diagnose problems with storage drives and RAID arrays.

- Common symptoms
 - Light-emitting diode (LED) status indicators
 - Grinding noises
 - Clicking sounds
 - Bootable device not found
 - Data loss/corruption
 - RAID failure
 - Self-monitoring, Analysis, and Reporting Technology (S.M.A.R.T.) failure
 - Extended read/write times
 - Input/output operations per second (IOPS)
 - Missing drives in OS
-

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

- Common symptoms
 - Incorrect data source
 - Physical cabling issues
 - Burned-out bulb
 - Fuzzy image
 - Display burn-in
 - Dead pixels
 - Flashing screen
 - Incorrect color display
 - Audio issues
 - Dim image
 - Intermittent projector shutdown
-

5.5 Given a scenario, troubleshoot common issues with mobile devices.

- Common symptoms
 - Poor battery health
 - Swollen battery
 - Broken screen
 - Improper charging
 - Poor/no connectivity
 - Liquid damage
 - Overheating
 - Digitizer issues
 - Physically damaged ports
 - Malware
 - Cursor drift/touch calibration



5.6 Given a scenario, troubleshoot and resolve printer issues.

- Common symptoms

- Lines down the printed pages
- Garbled print
- Toner not fusing to paper
- Paper jams
- Faded print
- Incorrect paper size

- Paper not feeding

- Multipage misfeed

- Multiple prints pending in queue

- Speckling on printed pages

- Double/echo images on the print

- Incorrect chroma display

- Grinding noise

- Finishing issues

- Staple jams

- Hole punch

- Incorrect page orientation

5.7 Given a scenario, troubleshoot problems with wired and wireless networks.

- Common symptoms

- Intermittent wireless connectivity
- Slow network speeds

- Limited connectivity

- Jitter
- Poor Voice over Internet Protocol (VoIP) quality

- Port flapping

- High latency
- External interference

CompTIA A+ Core 1 (220-1101) Acronym List

The following is a list of acronyms that appear on the CompTIA A+ Core 1 (220-1101) exam. Candidates are encouraged to review the complete list and attain a working knowledge of all listed acronyms as part of a comprehensive exam preparation program.

| Acronym | Definition | Acronym | Definition |
|----------------|---|----------------|---|
| AAA | Authentication, Authorization, and Accounting | DIMM | Dual Inline Memory Module |
| AC | Alternating Current | DKIM | DomainKeys Identified Mail |
| ACL | Access Control List | DMA | Direct Memory Access |
| ADF | Automatic Document Feeder | DMARC | Domain-based Message Authentication, Reporting, and Conformance |
| AES | Advanced Encryption Standard | DNS | Domain Name System |
| AP | Access Point | DoS | Denial of Service |
| APFS | Apple File System | DRAM | Dynamic Random-Access Memory |
| APIPA | Automatic Private Internet Protocol Addressing | DRM | Digital Rights Management |
| APK | Android Package | DSL | Digital Subscriber Line |
| ARM | Advanced RISC [Reduced Instruction Set Computer] Machine | DVI | Digital Visual Interface |
| ARP | Address Resolution Protocol | DVI-D | Digital Visual Interface-Digital |
| ATA | Advanced Technology Attachment | ECC | Error Correcting Code |
| ATM | Asynchronous Transfer Mode | EFS | Encrypting File System |
| ATX | Advanced Technology Extended | EMI | Electromagnetic Interference |
| AUP | Acceptable Use Policy | EOL | End-of-Life |
| BIOS | Basic Input/Output System | esATA | External Serial Advanced Technology Attachment |
| BSOD | Blue Screen of Death | ESD | Electrostatic Discharge |
| BYOD | Bring Your Own Device | EULA | End-User License Agreement |
| CAD | Computer-aided Design | exFAT | Extensible File Allocation Table |
| CAPTCHA | Completely Automated Public Turing Test to Tell Computers and Humans Apart | ext | Extended File System |
| CD | Compact Disc | FAT | File Allocation Table |
| CDFS | Compact Disc File System | FAT12 | 12-bit File Allocation Table |
| CDMA | Code-Division Multiple Access | FAT16 | 16-bit File Allocation Table |
| CERT | Computer Emergency Response Team | FAT32 | 32-bit File Allocation Table |
| CIFS | Common Internet File System | FSB | Front-Side Bus |
| CMD | Command Prompt | FTP | File Transfer Protocol |
| CMOS | Complementary Metal-Oxide Semiconductor | GFS | Grandfather-Father-Son |
| CPU | Central Processing Unit | GPS | Global Positioning System |
| CRL | Certificate Revocation List | GPT | GUID [Globally Unique Identifier] Partition Table |
| DC | Direct Current | GPU | Graphics Processing Unit |
| DDoS | Distributed Denial of Service | GSM | Global System for Mobile Communications |
| DDR | Double Data Rate | GUI | Graphical User Interface |
| DHCP | Dynamic Host Configuration Protocol | GUID | Globally Unique Identifier |
| | | HAL | Hardware Abstraction Layer |
| | | HAV | Hardware-assisted Virtualization |

| Acronym | Definition | Acronym | Definition |
|----------------|---|----------------|---|
| HCL | Hardware Compatibility List | MX | Mail Exchange |
| HDCP | High-bandwidth Digital Content Protection | NAC | Network Access Control |
| HDD | Hard Disk Drive | NAT | Network Address Translation |
| HDMI | High-Definition Multimedia Interface | NDA | Non-disclosure Agreement |
| HSM | Hardware Security Module | NetBIOS | Networked Basic Input/Output System |
| HTML | Hypertext Markup Language | NetBT | NetBIOS over TCP/IP [Transmission Control Protocol/Internet Protocol] |
| HTTP | Hypertext Transfer Protocol | NFC | Near-field Communication |
| HTTPS | Hypertext Transfer Protocol Secure | NFS | Network File System |
| I/O | Input/Output | NIC | Network Interface Card |
| IaaS | Infrastructure as a Service | NTFS | New Technology File System |
| ICR | Intelligent Character Recognition | NVMe | Non-volatile Memory Express |
| IDE | Integrated Drive Electronics | OCR | Optical Character Recognition |
| IDS | Intrusion Detection System | OLED | Organic Light-emitting Diode |
| IEEE | Institute of Electrical and Electronics Engineers | ONT | Optical Network Terminal |
| IMAP | Internet Mail Access Protocol | OS | Operating System |
| IOPS | Input/Output Operations Per Second | PaaS | Platform as a Service |
| IoT | Internet of Things | PAN | Personal Area Network |
| IP | Internet Protocol | PC | Personal Computer |
| IPS | Intrusion Prevention System | PCIe | Peripheral Component Interconnect Express |
| IPS | In-plane Switching | PCL | Printer Command Language |
| IPSec | Internet Protocol Security | PE | Preinstallation Environment |
| IR | Infrared | PII | Personally Identifiable Information |
| IrDA | Infrared Data Association | PIN | Personal Identification Number |
| IRP | Incident Response Plan | PKI | Public Key Infrastructure |
| ISO | International Organization for Standardization | PoE | Power over Ethernet |
| ISP | Internet Service Provider | POP3 | Post Office Protocol 3 |
| ITX | Information Technology eXtended | POST | Power-on Self-Test |
| KB | Knowledge Base | PPP | Point-to-Point Protocol |
| KVM | Keyboard-Video-Mouse | PRL | Preferred Roaming List |
| LAN | Local Area Network | PSU | Power Supply Unit |
| LC | Lucent Connector | PXE | Preboot Execution Environment |
| LCD | Liquid Crystal Display | RADIUS | Remote Authentication Dial-in User Service |
| LDAP | Lightweight Directory Access Protocol | RAID | Redundant Array of Independent (or Inexpensive) Disks |
| LED | Light-emitting Diode | RAM | Random-access Memory |
| MAC | Media Access Control/Mandatory Access Control | RDP | Remote Desktop Protocol |
| MAM | Mobile Application Management | RF | Radio Frequency |
| MAN | Metropolitan Area Network | RFI | Radio-Frequency Interference |
| MBR | Master Boot Record | RFID | Radio-Frequency Identification |
| MDM | Mobile Device Management | RJ11 | Registered Jack Function 11 |
| MFA | Multifactor Authentication | RJ45 | Registered Jack Function 45 |
| MFD | Multifunction Device | RMM | Remote Monitoring and Management |
| MFP | Multifunction Printer | RTO | Recovery Time Objective |
| MMC | Microsoft Management Console | SaaS | Software as a Service |
| MOU | Memorandum of Understanding | SAN | Storage Area Network |
| MSDS | Material Safety Data Sheet | SAS | Serial Attached SCSI [Small Computer System Interface] |
| MSRA | Microsoft Remote Assistance | SATA | Serial Advanced Technology Attachment |

| Acronym | Definition |
|----------------|---|
| SC | Subscriber Connector |
| SCADA | Supervisory Control and Data Acquisition |
| SCP | Secure Copy Protection |
| SCSI | Small Computer System Interface |
| SDN | Software-defined Networking |
| SFTP | Secure File Transfer Protocol |
| SIM | Subscriber Identity Module |
| SIMM | Single Inline Memory Module |
| S.M.A.R.T. | Self-monitoring Analysis and Reporting Technology |
| SMB | Server Message Block |
| SMS | Short Message Service |
| SMTP | Simple Mail Transfer Protocol |
| SNMP | Simple Network Management Protocol |
| SNTP | Simple Network Time Protocol |
| SODIMM | Small Outline Dual Inline Memory Module |
| SOHO | Small Office/Home Office |
| SPF | Sender Policy Framework |
| SQL | Structured Query Language |
| 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 |
| TACACS | Terminal Access Controller Access-Control System |
| TCP | Transmission Control Protocol |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| TFTP | Trivial File Transfer Protocol |
| TKIP | Temporal Key Integrity Protocol |

| Acronym | Definition |
|----------------|---------------------------------------|
| TLS | Transport Layer Security |
| TN | Twisted Nematic |
| TPM | Trusted Platform Module |
| UAC | User Account Control |
| UDP | User Datagram Protocol |
| UEFI | Unified Extensible Firmware Interface |
| UNC | Universal Naming Convention |
| UPnP | Universal Plug and Play |
| UPS | Uninterruptible Power Supply |
| USB | Universal Serial Bus |
| UTM | Unified Threat Management |
| UTP | Unshielded Twisted Pair |
| VA | Vertical Alignment |
| VDI | Virtual Desktop Infrastructure |
| VGA | Video Graphics Array |
| VLAN | Virtual LAN [Local Area Network] |
| 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 |
| WEP | Wired Equivalent Privacy |
| WISP | Wireless Internet Service Provider |
| WLAN | Wireless LAN [Local Area Network] |
| WMN | Wireless Mesh Network |
| WPA | WiFi Protected Access |
| WWAN | Wireless Wide Area Network |
| XSS | Cross-site Scripting |

CompTIA A+ Core 1 (220-1101) Proposed Hardware and Software List

**CompTIA has included this sample list of hardware and software to assist candidates as they prepare for the A+ Core 1 (220-1101) exam. This list may also be helpful for training companies that wish to create a lab component to their training offering. The bulleted lists below each topic are sample lists and are not exhaustive.

Equipment

- Apple tablet/smartphone
- Android tablet/smartphone
- Windows tablet
- Chromebook
- Windows laptop/Mac laptop/Linux laptop
- Windows desktop/Mac desktop/Linux desktop
- Windows server with Active Directory and Print Management
- Monitors
- Projectors
- SOHO router/switch
- Access point
- VoIP phone
- Printer
 - Laser/inkjet
 - Wireless
 - 3-D printer
 - Thermal
- Surge suppressor
- Uninterruptible power supply (UPS)
- Smart devices (IoT devices)
- Server with a hypervisor
- Punchdown block
- Patch panel
- Webcams
- Speakers
- Microphones

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
 - DisplayPort
 - DVI
 - VGA
- Adapters
 - Bluetooth adapter
- Network cables
- Unterminated network cable/connectors
- Alternating current (AC) adapters
- Optical drives
- Screws/standoffs
- Cases
- Maintenance kit
- Mice/keyboards
- Keyboard-video-mouse (KVM)
- Console cable
- SSD

Tools

- Screwdriver
- Multimeter
- Wire cutters
- Punchdown tool
- Crimper
- Power supply tester
- Cable stripper
- Standard technician toolkit
- Electrostatic discharge (ESD) strap
- Thermal paste
- Cable tester
- Cable toner
- WiFi analyzer
- SATA to USB connectors

Software

- Operating systems
 - Linux
 - Chrome OS
 - Microsoft Windows
 - macOS
 - Android
 - iOS
- Preinstallation environment (PE) disk/live compact disc (CD)
- Antivirus software
- Virtualization software
- Anti-malware
- Driver software