



# CompTIA A+ Certification Exam Objectives

## Exam Number: 220-802



### Introduction

In order to receive CompTIA A+ certification a candidate must pass two exams. The first exam is the CompTIA A+ 220-801 Certification Exam. The CompTIA A+ 220-802 Certification Exam is the second exam required in order for CompTIA A+ certification candidates to complete their certification.

The CompTIA A+ 220-802 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 while applying troubleshooting skills. Successful candidates will also provide appropriate customer support; understand the basics of virtualization, desktop imaging, and deployment.

CompTIA A+ is ISO 17024 Accredited (Personnel Certification Accreditation) and, as such, undergoes regular reviews and updates to the exam objectives. The following CompTIA A+ 220-802 certification 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+ 220-802 certification exam is based on these objectives.

Domain	Percentage of Examination
Operating Systems	33%
Security	22%
Mobile Devices	9%
Troubleshooting	36%
<b>Total</b>	100%

**\*\*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 Operating Systems

### 1.1 Compare and contrast the features and requirements of various Microsoft Operating Systems.

- Windows XP Home, Windows XP Professional, Windows XP Media Center, Windows XP 64-bit Professional
- Windows Vista Home Basic, Windows Vista Home Premium, Windows Vista Business, Windows Vista Ultimate, Windows Vista Enterprise
- Windows 7 Starter, Windows 7 Home Premium, Windows 7 Professional, Windows 7 Ultimate, Windows 7 Enterprise
- Features:
  - 32-bit vs. 64-bit
  - Aero, gadgets, user account control, bit-locker, shadow copy, system restore, ready boost, sidebar, compatibility mode, XP mode, easy transfer, administrative tools, defender, Windows firewall, security center, event viewer, file structure and paths, category view vs. classic view
- Upgrade paths – differences between in place upgrades, compatibility tools, Windows upgrade OS advisor

### 1.2 Given a scenario, install, and configure the operating system using the most appropriate method.

- Boot methods
  - USB
  - CD-ROM
  - DVD
  - PXE
- Type of installations
  - Creating image
  - Unattended installation
  - Upgrade
  - Clean install
  - Repair installation
  - Multiboot
  - Remote network installation
  - Image deployment
- Partitioning
  - Dynamic
  - Basic
  - Primary
  - Extended
  - Logical
- File system types/formatting
  - FAT
  - FAT32
  - NTFS
  - CDFS
  - Quick format vs. full format
- Load alternate third party drivers when necessary
- Workgroup vs. Domain setup
- Time/date/region/language settings
- Driver installation, software and windows updates
- Factory recovery partition

### 1.3 Given a scenario, use appropriate command line tools.

- Networking
  - PING
  - TRACERT
  - NETSTAT
  - IPCONFIG
  - NET
  - NSLOOKUP
  - NBTSTAT
- OS
  - TASKKILL
  - BOOTREC
  - SHUTDOWN
  - TASKLIST
  - MD
  - RD
  - CD
  - DEL
  - FDISK
  - FORMAT
  - COPY
  - XCOPY
  - ROBOCOPY
  - DISKPART
  - SFC
  - CHKDSK
  - [command name] /?
- Recovery console
  - Fixboot
  - Fixmbr

### 1.4 Given a scenario, use appropriate operating system features and tools.

- Administrative
  - Computer management
  - Device manager
  - Users and groups
  - Local security policy
  - Performance monitor
  - Services
  - System configuration
  - Task scheduler
  - Component services
  - Data sources
  - Print management
  - Windows memory diagnostics
  - Windows firewall
  - Advanced security
- MSCONFIG
  - General
  - Boot
  - Services
  - Startup
  - Tools
- Task Manager

- Applications
- Processes
- Performance
- Networking
- Users
- Disk management
  - Drive status
  - Mounting
  - Extending partitions
  - Splitting partitions
  - Assigning drive letters
  - Adding drives
  - Adding arrays
- Other
  - User State Migration tool (USMT), File and Settings Transfer Wizard, Windows Easy Transfer
- Run line utilities
  - MSCONFIG
  - REGEDIT
  - CMD
  - SERVICES.MSC
  - MMC
  - MSTSC
  - NOTEPAD
  - EXPLORER
  - MSINFO32
  - DXDIAG

**1.5 Given a scenario, use Control Panel utilities** (the items are organized by “classic view/large icons” in Windows).

- Common to all Microsoft Operating Systems
  - Internet options
    - Connections
    - Security
    - General
    - Privacy
    - Programs
    - Advanced
  - Display/Display Settings
    - Resolution
  - User accounts
  - Folder options
    - Sharing
    - View hidden files
    - Hide extensions
    - Layout
  - System
    - Performance (virtual memory)
    - Remote settings
    - System protection
  - Windows firewall
  - Power options
    - Hibernate
    - Power plans

- Sleep/suspend
  - Standby
- Unique to Windows XP
  - Add/remove programs
  - Network connections
  - Printers and faxes
  - Automatic updates
  - Network setup wizard
- Unique to Vista
  - Tablet PC settings
  - Pen and input devices
  - Offline files
  - Problem reports and solutions
  - Printers
- Unique to Windows 7
  - HomeGroup
  - Action Center
    - Security Center
  - Remote Applications and Desktop Connections
  - Troubleshooting

#### **1.6 Setup and configure Windows networking on a client/desktop.**

- HomeGroup, file/print sharing
- WorkGroup vs. domain setup
- Network shares/mapping drives
- Establish networking connections
  - VPN
  - Dialups
  - Wireless
  - Wired
  - WWAN (Cellular)
- Proxy settings
- Remote desktop
- Home vs. Work vs. Public network settings
- Firewall settings
  - Exceptions
  - Configuration
  - Enabling/disabling Windows firewall
- Configuring an alternative IP address in Windows
  - IP addressing
  - Subnet mask
  - DNS
  - Gateway
- Network card properties
  - Half duplex/full duplex/auto
  - Speed
  - Wake-on-LAN
  - QoS

#### **1.7 Perform preventive maintenance procedures using appropriate tools.**

- Best practices
  - Schedules backups
  - Scheduled check disks
  - Scheduled defragmentation

- Windows updates
- Patch management
- Driver/firmware updates
- Antivirus updates
- Tools
  - Backup
  - System restore
  - Check disk
  - Recovery image
  - Defrag

**1.8 Explain the differences among basic OS security settings.**

- User and groups
  - Administrator
  - Power user
  - Guest
  - Standard user
- NTFS vs. Share permissions
  - Allow vs. deny
  - Moving vs. copying folders and files
  - File attributes
- Shared files and folders
  - Administrative shares vs. local shares
  - Permission propagation
  - Inheritance
- System files and folders
- User authentication
  - Single sign-on

**1.9 Explain the basics of client-side virtualization.**

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

## **2.0 Security**

**2.1 Apply and use common prevention methods.**

- Physical security
  - Lock doors
  - Tailgating
  - Securing physical documents/passwords/shredding
  - Biometrics
  - Badges
  - Key fobs
  - RFID badge
  - RSA token
  - Privacy filters
  - Retinal
- Digital security
  - Antivirus
  - Firewalls

- Antispyware
- User authentication/strong passwords
- Directory permissions
- User education
- Principle of least privilege
- 2.2 Compare and contrast common security threats.**
- Social engineering
- Malware
- Rootkits
- Phishing
- Shoulder surfing
- Spyware
- Viruses
  - Worms
  - Trojans
- 2.3 Implement security best practices to secure a workstation.**
- Setting strong passwords
- Requiring passwords
- Restricting user permissions
- Changing default user names
- Disabling guest account
- Screensaver required password
- Disable autorun
- 2.4 Given a scenario, use the appropriate data destruction/disposal method.**
- Low level format vs. standard format
- Hard drive sanitation and sanitation methods
  - Overwrite
  - Drive wipe
- Physical destruction
  - Shredder
  - Drill
  - Electromagnetic
  - Degaussing tool
- 2.5 Given a scenario, secure a SOHO wireless network.**
- Change default user-names and passwords
- Changing SSID
- Setting encryption
- Disabling SSID broadcast
- Enable MAC filtering
- Antenna and access point placement
- Radio power levels
- Assign static IP addresses
- 2.6 Given a scenario, secure a SOHO wired network.**
- Change default usernames and passwords
- Enable MAC filtering
- Assign static IP addresses
- Disabling ports
- Physical security

## 3.0 Mobile Devices

### 3.1 Explain the basic features of mobile operating systems.

- Android vs. iOS
  - Open source vs. closed source/vendor specific
  - App source (app store and market)
  - Screen orientation (accelerometer/gyroscope)
  - Screen calibration
  - GPS and geotracking

### 3.2 Establish basic network connectivity and configure email.

- Wireless / cellular data network (enable/disable)
- Bluetooth
  - Enable Bluetooth
  - Enable pairing
  - Find device for pairing
  - Enter appropriate pin code
  - Test connectivity
- Email configuration
  - Server address
    - POP3
    - IMAP
    - Port and SSL settings
  - Exchange
  - Gmail

### 3.3 Compare and contrast methods for securing mobile devices.

- Passcode locks
- Remote wipes
- Locator applications
- Remote backup applications
- Failed login attempts restrictions
- Antivirus
- Patching/OS updates

### 3.4 Compare and contrast hardware differences in regards to tablets and laptops.

- No field serviceable parts
- Typically not upgradeable
- Touch interface
  - Touch flow
  - Multitouch
- Solid state drives

### 3.5 Execute and configure mobile device synchronization.

- Types of data to synchronize
  - Contacts
  - Programs
  - Email
  - Pictures
  - Music
  - Videos
- Software requirements to install the application on the PC
- Connection types to enable synchronization



## 4.0 Troubleshooting

### 4.1 Given a scenario, explain the troubleshooting theory.

- Identify the problem
  - Question the user and identify user changes to computer and perform backups before making changes
- Establish a theory of probable cause (question the obvious)
- Test the theory to determine cause
  - Once theory is confirmed determine next steps to resolve problem
  - If theory is not confirmed re-establish new theory or escalate
- Establish a plan of action to resolve the problem and implement the solution
- Verify full system functionality and if applicable implement preventive measures
- Document findings, actions and outcomes

### 4.2 Given a scenario, troubleshoot common problems related to motherboards, RAM, CPU and power with appropriate tools.

- Common symptoms
  - Unexpected shutdowns
  - System lockups
  - POST code beeps
  - Blank screen on bootup
  - BIOS time and settings 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
  - BSOD
- Tools
  - Multimeter
  - Power supply tester
  - Loopback plugs
  - POST card

### 4.3 Given a scenario, troubleshoot hard drives and RAID arrays with appropriate tools.

- 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
  - BSOD
- Tools
  - Screwdriver
  - External enclosures
  - CHKDSK

- FORMAT
- FDISK
- File recovery software

**4.4 Given a scenario, troubleshoot common video and display issues.**

- Common symptoms
  - VGA mode
  - No image on screen
  - Overheat shutdown
  - Dead pixels
  - Artifacts
  - Color patterns incorrect
  - Dim image
  - Flickering image
  - Distorted image
  - Discoloration (degaussing)
  - BSOD

**4.5 Given a scenario, troubleshoot wired and wireless networks with appropriate tools.**

- Common symptoms
  - No connectivity
  - APIPA address
  - Limited connectivity
  - Local connectivity
  - Intermittent connectivity
  - IP conflict
  - Slow transfer speeds
  - Low RF signal
- Tools
  - Cable tester
  - Loopback plug
  - Punch down tools
  - Toner probes
  - Wire strippers
  - Crimper
  - PING
  - IPCONFIG
  - TRACERT
  - NETSTAT
  - NBTSTAT
  - NET
  - Wireless locator

**4.6 Given a scenario, troubleshoot operating system problems with appropriate tools.**

- Common symptoms
  - BSOD
  - Failure to boot
  - Improper shutdown
  - Spontaneous shutdown/restart
  - RAID not detected during installation
  - Device fails to start
  - Missing dll message
  - Services fails to start
  - Compatibility error
  - Slow system performance
  - Boots to safe mode

- File fails to open
- Missing NTLDR
- Missing Boot.ini
- Missing operating system
- Missing Graphical Interface
- Graphical Interface fails to load
- Invalid boot disk
- Tools
  - Fixboot
  - Recovery console
  - Fixmbr
  - Sfc
  - Repair disks
  - Pre-installation environments
  - MSCONFIG
  - DEFRAG
  - REGSRV32
  - REGEDIT
  - Event viewer
  - Safe mode
  - Command prompt
  - Emergency repair disk
  - Automated system recovery

**4.7 Given a scenario, troubleshoot common security issues with appropriate tools and best practices.**

- Common symptoms
  - Pop-ups
  - Browser redirection
  - Security alerts
  - Slow performance
  - Internet connectivity issues
  - PC locks up
  - Windows updates failures
  - Rogue antivirus
  - Spam
  - Renamed system files
  - Files disappearing
  - File permission changes
  - Hijacked email
  - Access denied
- Tools
  - Anti-virus software
  - Anti-malware software
  - Anti-spyware software
  - Recovery console
  - System restore
  - Pre-installation environments
  - Event viewer
- Best practices for malware removal
  - Identify malware symptoms
  - Quarantine infected system
  - Disable system restore
  - Remediate infected systems

- Update anti-virus software
  - Scan and removal techniques (safe mode, pre-installation environment)
- Schedule scans and updates
- Enable system restore and create restore point
- Educate end user

**4.8 Given a scenario, troubleshoot, and repair common laptop issues while adhering to the appropriate procedures.**

- Common symptoms
  - No display
  - Dim display
  - Flickering display
  - Sticking keys
  - Intermittent wireless
  - Battery not charging
  - Ghost cursor
  - No power
  - Num lock indicator lights
  - No wireless connectivity
  - No Bluetooth connectivity
  - Cannot display to external monitor
- Disassembling processes for proper re-assembly
  - Document and label cable and screw locations
  - Organize parts
  - Refer to manufacturer documentation
  - Use appropriate hand tools

**4.9 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
- 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.

<b>ACRONYM</b>	<b>SPELLED OUT</b>
AC	alternating current
ACL	access control list
ACPI	advanced configuration power interface
ACT	activity
ADSL	asymmetrical digital subscriber line
AGP	accelerated graphics port
AMD	advanced micro devices
APIPA	automatic private internet protocol addressing
APM	advanced power management
ARP	address resolution protocol
ASR	automated system recovery
ATA	advanced technology attachment
ATAPI	advanced technology attachment packet interface
ATM	asynchronous transfer mode
ATX	advanced technology extended
A/V	Audio Video
BIOS	basic input/output system
BNC	Bayonet-Neill-Concelman or British Naval Connector
BTX	balanced technology extended
CAPTCHA	Completely Automated Public Turing Test To Tell Computers and Humans Apart
CCFL	Cold Cathode Fluorescent Lamp
CD	compact disc
CD-ROM	compact disc-read-only memory
CD-RW	compact disc-rewritable
CDFS	compact disc file system
CFS	Central File System, Common File System, Command File System
CMOS	complementary metal-oxide semiconductor
CNR	Communications and Networking Riser
COMx	communication port (x=port number)
CPU	central processing unit
CRIMM	Continuity Rambus Inline Memory Mode
CRT	cathode-ray tube
DAC	discretionary access control

DB-25	serial communications D-shell connector, 25 pins
DB-9	9 pin D shell connector
DC	direct current
DDOS	distributed denial of service
DDR	double data-rate
DDR RAM	double data-rate random access memory
DDR SDRAM	double data-rate synchronous dynamic random access memory
DFS	distributed file system
DHCP	dynamic host configuration protocol
DIMM	dual inline memory module
DIN	Deutsche Industrie Norm
DIP	dual inline package
DLT	digital linear tape
DLP	digital light processing
DMA	direct memory access
DMZ	demilitarized zone
DNS	domain name service or domain name server
DOS	denial of service
DRAM	dynamic random access memory
DSL	digital subscriber line
DVD	digital video disc or digital versatile disc
DVD-RAM	digital video disc-random access memory
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 correction code
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
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
HTTP	hypertext transfer protocol
HTTPS	hypertext transfer protocol over secure sockets layer
I/O	input/output
ICMP	internet control message protocol
ICR	intelligent character recognition
IDE	integrated drive electronics
IDS	Intrusion Detection System
IEEE	Institute of Electrical and Electronics Engineers
IIS	Internet Information Services
IMAP	internet mail access protocol
IP	internet protocol
IPCONFIG	internet protocol configuration
IPP	internet printing protocol
IPSEC	internet protocol security
IR	infrared
IrDA	Infrared Data Association
IRQ	interrupt request
ISA	industry standard architecture
ISDN	integrated services digital network

ISO	Industry Standards Organization
ISP	internet service provider
JBOD	just a bunch of disks
Kb	kilobit
KB	Kilobyte or knowledge base
LAN	local area network
LBA	logical block addressing
LC	Lucent connector
LCD	liquid crystal display
LDAP	lightweight directory access protocol
LED	light emitting diode
Li-on	lithium-ion
LPD/LPR	line printer daemon / line printer remote
LPT	line printer terminal
LVD	low voltage differential
MAC	media access control / mandatory access control
MAPI	messaging application programming interface
MAU	media access unit, media attachment unit
Mb	megabit
MB	megabyte
MBR	master boot record
MBSA	Microsoft Baseline Security Analyzer
MFD	multi-function device
MHz	megahertz
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
MMX	multimedia extensions
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
MUI	multilingual user interface
NAC	network access control
NAS	network-attached storage
NAT	network address translation
NetBIOS	networked basic input/output system
NetBEUI	networked basic input/output system extended user interface
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
OCR	optical character recognition
OEM	original equipment manufacturer
OLED	Organic Light Emitting Diode
OS	operating system
PAN	personal area network
PATA	parallel advanced technology attachment
PC	personal computer
PCI	peripheral component interconnect
PCIe	peripheral component interconnect express
PCIX	peripheral component interconnect extended
PCL	printer control language
PCMCIA	Personal Computer Memory Card International Association
PDA	personal digital assistant
PGA	pin grid array
PGA2	pin grid array 2
PII	Personally Identifiable Information
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 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
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
RDRAM	RAMBUS® dynamic random access memory
RDP	Remote Desktop Protocol
RF	radio frequency
RFI	radio frequency interference
RGB	red green blue
RIMM	RAMBUS® inline memory module
RIP	routing information protocol
RIS	remote installation service
RISC	reduced instruction set computer
RJ	registered jack
RJ-11	registered jack function 11
RJ-45	registered jack function 45
RMA	returned materials authorization
ROM	read only memory
RS-232 or RS-232C	recommended standard 232
RTC	real-time clock
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
SDRAM	synchronous dynamic random access memory
SEC	single edge connector
SFC	system file checker
SFF	Small Form Factor
SGRAM	synchronous graphics random access memory
SIMM	single inline memory module
SLI	scalable link interface
S.M.A.R.T.	self-monitoring, analysis, and reporting technology
SMB	server message block or small to midsize business
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
SP1	service pack 1
SP2	service pack 2

SP3	service pack 3
SP4	service pack 4
SPDIF	Sony-Philips digital interface format
SPGA	staggered pin grid array
SRAM	static random access memory
SSH	secure shell
SSID	service set identifier
SSL	secure sockets layer
ST	straight tip
STP	shielded twisted pair
SVGA	super video graphics array
SXGA	super extended graphics array
TB	terabyte
TCP	transmission control protocol
TCP/IP	transmission control protocol/internet protocol
TDR	time domain reflectometer
TFTP	trivial file transfer protocol
TKIP	Temporal Key Integrity Protocol
TPM	trusted platform module
UAC	user account control
UART	universal asynchronous receiver transmitter
UDMA	ultra direct memory access
UDP	user datagram protocol
UNC	universal naming convention
UPS	uninterruptible power supply
URL	uniform resource locator
USB	universal serial bus
USMT	user state migration tool
UTP	unshielded twisted pair
UXGA	ultra extended graphics array
VESA	Video Electronics Standards Association
VFAT	virtual file allocation table
VGA	video graphics array
VM	Virtual Machine
VoIP	voice over internet protocol
VPN	virtual private network
VRAM	video random access memory
WAN	wide area network
WAP	wireless application protocol
WEP	wired equivalent privacy
WIFI	wireless fidelity
WINS	windows internet name service

WLAN	wireless local area network
WPA	wireless protected access
WUXGA	wide ultra extended graphics array
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 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

- iPad tablet
- Android tablet
- Laptop
- Desktop
- Monitors
- SOHO Router/switch
- Access point
- Printer (laser/wireless)
- Power strips
- Surge suppressor
- UPS

#### Spare parts/hardware

- Motherboards
- RAM
- Hard drives
- Power supplies
- Video cards
- Sounds cards
- Network cards
- Wireless NICs

Fans/cooling devices  
CPUs  
Connectors/cables  
Adapters  
Network cables/connectors  
AC adapters  
Optical drives  
Jumpers/screws/stand-offs  
Cases  
Bulk cable  
Maintenance kit

### Tools

Screw drivers  
Multimeter  
Wire cutters  
Punchdown tool  
Crimper  
Power supply tester  
Cable stripper  
POST cards  
Standard technician toolkit  
ESD strap

### Software

Operating system disks (WinXP, Vista, Windows 7)  
Antivirus software  
Virtualization software  
Anti-malware  
Driver software  
Anti-spyware

