CompTIA A+ 220-602
2006 Examination Objectives

Introduction

In order to receive CompTIA A+ certification a candidate must pass two exams. The first exam is CompTIA A+ Essentials. Objectives for the CompTIA A+ Essentials Examination are available for public review at www.comptia.org.

The CompTIA A+ 220-602 exam is targeted for individuals who work or intend to work in a mobile or corporate technical environment with a high level of face-to-face client interaction. Job titles in some organizations which are descriptive of the role of this individual may be: Enterprise technician, IT administrator, field service technician, PC technician, etc. Ideally, the CompTIA A+ 220-602 candidate has already passed the CompTIA A+ Essentials examination.

Individuals in some non-technical roles such as student, sales personnel or small business office managers may also find the validation of skills associated with the CompTIA A+ credential to be valuable.

CompTIA recently convened a core of CompTIA A+ subject matter experts representing a diverse group of employers, educators and IT professionals which resulted in the revised CompTIA A+ examinations objectives. The skills and knowledge measured by these objectives were validated through a survey of more then 5,000 CompTIA A+ certified professionals and employers. The results of the survey were used in weighting the domains and ensuring that the weighting is representative of the relative importance of that content to the job requirements 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.

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

Domain	**Percentage of Examination**
1.0 Personal Computer Components	18%
2.0 Laptop and Portable Devices	9%
3.0 Operating Systems	20%
4.0 Printers and Scanners	14%
5.0 Networks	11%
6.0 Security	8%
7.0 Safety and Environmental Issues	5%
8.0 Communication and Professionalism	15%
Total	100%

1.0 Personal Computer Components

1.1 Install, configure, optimize and upgrade personal computer components

- Add, remove and configure personal computer components including selection and installation of appropriate components for example:
  - Storage devices
  - Motherboards
  - Power supplies
  - Processors / CPUs
  - Memory
  - Display devices
  - Input devices (e.g. basic, specialty and multimedia)
  - Adapter cards
  - Cooling systems

1.2 Identify tools, diagnostic procedures and troubleshooting techniques for personal computer components

- Identify and apply basic diagnostic procedures and troubleshooting techniques
  - Isolate and identify the problem using visual and audible inspection of components and minimum configuration
- Recognize and isolate issues with peripherals, multimedia, specialty input devices, internal and external storage and CPUs
- Identify the steps used to troubleshoot components (e.g. check proper seating, installation, appropriate components, settings and current driver) for example:
  - Power supply
  - Processor / CPUs and motherboards
  - Memory
  - Adapter cards
  - Display and input devices
- Recognize names, purposes, characteristics and appropriate application of tools for example:
  - Multi-meter
  - Anti-static pad and wrist strap
  - Specialty hardware / tools
  - Loop back plugs
  - Cleaning products (e.g. vacuum, cleaning pads)

1.3 Perform preventative maintenance of personal computer components

- Identify and apply common preventative maintenance techniques for personal computer components for example:
  - Display devices (e.g. cleaning, ventilation)
  - Power devices (e.g. appropriate source such as power strip, surge protector, ventilation and cooling)
  - Input devices (e.g. covers)
  - Storage devices (e.g. software tools such as DEFRAG and cleaning of optics and tape heads)
  - Thermally sensitive devices such as motherboards, CPU, adapter cards memory (e.g. cleaning, air flow)

2.0 Laptops and Portable Devices

2.1 Identify fundamental principles of using laptops and portable devices

- Identify appropriate applications for laptop-specific communication connections such as Bluetooth, infrared, cellular WAN and Ethernet

- Identify appropriate laptop-specific power and electrical input devices and determine how amperage and voltage can affect performance
- Identify the major components of the LCD including inverter, screen and video card

2.2 Install, configure, optimize and upgrade laptops and portable devices

- Removal of laptop-specific hardware such as peripherals, hot-swappable and non-hot-swappable devices
- Describe how video sharing affects memory upgrades

2.3 Use tools, diagnostic procedures and troubleshooting techniques for laptops and portable devices

- Use procedures and techniques to diagnose power conditions, video, keyboard, pointer and wireless card issues for example:
    - Verify AC power (e.g. LEDs, swap AC adapter)
    - Verify DC power
    - Remove unneeded peripherals
    - Plug in external monitor
    - Toggle Fn keys
    - Check LCD cutoff switch
    - Verify backlight functionality and pixilation
    - Stylus issues (e.g. digitizer problems)
    - Unique laptop keypad issues
    - Antenna wires

3.0 Operating Systems – unless otherwise noted, operating systems referred with within include Microsoft Windows 2000, XP Professional, XP Home and Media Center.

3.1 Identify the fundamental principles of operating systems

- Use command-line functions and utilities to manage operating systems, including proper syntax and switches for example:
    - CMD
    - HELP
    - DIR
    - ATTRIB
    - EDIT
    - COPY
    - XCOPY
    - FORMAT
    - IPCONFIG
    - PING
    - MD / CD / RD
- Identify concepts and procedures for creating, viewing and managing disks, directories and files on operating systems
    - Disks (e.g. active, primary, extended and logical partitions and file systems including FAT32 and NTFS)
    - Directory structures (e.g. create folders, navigate directory structures)
    - Files (e.g. creation, attributes, permissions)
- Locate and use operating system utilities and available switches for example:
    - Disk management tools (e.g. DEFRAG, NTBACKUP, CHKDSK, Format)
    - System management tools
        - Device and Task Manager
        - MSCONFIG>EXE
        - REGEDIT.EXE
        - REGEDT32.EXE
        - CMD

        - Event Viewer
        - System Restore
        - Remote Desktop
    - File management tools (e.g. Windows EXPLORER, ATTRIB.EXE)

3.2 Install, configure, optimize and upgrade operating systems – references to upgrading from Windows 95 and NT may be made

- Identify procedures and utilities used to optimize operating systems for example:
    - Virtual memory
    - Hard drives (e.g. disk defragmentation)
    - Temporary files
    - Services
    - Startup
    - Application

3.3 Identify tools, diagnostic procedures and troubleshooting techniques for operating systems

- Demonstrate the ability to recover operating systems (e.g. boot methods, recovery console, ASR, ERD)
- Recognize and resolve common operational problems for example:
    - Windows specific printing problems (e.g. print spool stalled, incorrect / incompatible driver form print)
    - Auto-restart errors
    - Bluescreen error
    - System lock-up
    - Device drivers failure (input / output devices)
    - Application install, start or load failure
- Recognize and resolve common error messages and codes for example:
    - Boot (e.g. invalid boot disk, inaccessible boot drive, missing NTLDR)
    - Startup (e.g. device / service failed to start, device / program in registry not found)
    - Event Viewer
    - Registry
    - Windows reporting
- Use diagnostic utilities and tools to resolve operational problems for example:
    - Bootable media
    - Startup modes (e.g. safe mode, safe mode with command prompt or networking, step-by-step / single step mode)
    - Documentation resources (e.g. user / installation manuals, internet / web based, training materials)
    - Task and Device Manager
    - Event Viewer
    - MSCONFIG
    - Recover CD / recovery partition
    - Remote Desktop Connection and Assistance
    - System File Checker (SFC)

3.4 Perform preventative maintenance for operating systems

- Demonstrate the ability to perform preventative maintenance on operating systems including software and Windows updates (e.g. service packs), scheduled backups / restore, restore points

4.0 Printers and Scanners

4.1 Identify the fundamental principles of using printers and scanners

- Describe processes used by printers and scanners including laser, ink dispersion, thermal, solid ink and impact printers and scanners

4.2 Install, configure, optimize and upgrade printers and scanners

- Install and configure printers / scanners
  - Power and connect the device using local or network port
  - Install and update device driver and calibrate the device
  - Configure options and default settings
  - Install and configure print drivers (e.g. PCL™, Postscript™, GDI)
  - Validate compatibility with operating system and applications
  - Educate user about basic functionality
- Install and configure printer upgrades including memory and firmware
- Optimize scanner performance including resolution, file format and default settings

4.3 Identify tools and diagnostic procedures to troubleshooting printers and scanners

- Gather information about printer / scanner problems
- Review and analyze collected data
- Isolate and resolve identified printer / scanner problem including defining the cause, applying the fix and verifying functionality
- Identify appropriate tools used for troubleshooting and repairing printer / scanner problems
  - Multi-meter
  - Screwdrivers
  - Cleaning solutions
  - Extension magnet
  - Test patterns

4.4 Perform preventative maintenance of printers and scanners

- Perform scheduled maintenance according to vendor guidelines (e.g. install maintenance kits, reset page counts)
- Ensure a suitable environment
- Use recommended supplies

5.0 Networks

5.1 Identify the fundamental principles or networks

- Identify names, purposes and characteristics of basic network protocols and terminologies for example:
  - ISP
  - TCP / IP (e.g. gateway, subnet mask, DNS, WINS, static and automatic address assignment)
  - IPX / SPX (NWLink)
  - NETBEUI / NETBIOS
  - SMTP
  - IMAP
  - HTML
  - HTTP
  - HTTPS
  - SSL
  - Telnet
  - FTP

    - DNS
- Identify names, purposes and characteristics of technologies for establishing connectivity for example:
    - Dial-up networking
    - Broadband (e.g. DSL, cable, satellite)
    - ISDN networking
    - Wireless (all 802.11)
    - LAN / WAN
    - Infrared
    - Bluetooth
    - Cellular
    - VoIP

5.2 Install, configure, optimize and upgrade networks

- Install and configure browsers
    - Enable / disable script support
    - Configure proxy and security settings
- Establish network connectivity
    - Install and configure network cards
    - Obtain a connection
    - Configure client options (e.g. Microsoft, Novell) and network options (e.g. domain, workgroup, tree)
    - Configure network options
- Demonstrate the ability to share network resources
    - Models
    - Configure permissions
    - Capacities / limitations for sharing for each operating system

5.3 Use tools and diagnostic procedures to troubleshoot network problems

- Identify names, purposes and characteristics of tools for example:
    - Command line tools (e.g. IPCONFIG.EXE, PING.EXE, TRACERT.EXE, NSLOOKUP.EXE)
    - Cable testing device
- Diagnose and troubleshoot basic network issue for example:
    - Driver / network interface
    - Protocol configuration
        - TCP / IP (e.g. gateway, subnet mask, DNS, WINS, static and automatic address assignment)
        - IPX / SPX (NWLink)
    - Permissions
    - Firewall configuration
    - Electrical interference

5.4 Perform preventative maintenance of networks including securing and protecting network cabling

6.0 Security

6.1 Identify the fundamentals and principles of security

- Identify the purposes and characteristics of access control for example:
    - Access to operating system (e.g. accounts such as user, admin and guest. Groups, permission actions, types and levels), components, restricted spaces
- Identify the purposes and characteristics of auditing and event logging

6.2 Install, configure, upgrade and optimize security

- Install and configure software, wireless and data security for example:
    - Authentication technologies
    - Software firewalls
    - Auditing and event logging (enable / disable only)
    - Wireless client configuration
    - Unused wireless connections
    - Data access (e.g. permissions, basic local security policy)
    - File systems (converting from FAT32 to NTFS only)

6.3 Identify tool, diagnostic procedures and troubleshooting techniques for security

- Diagnose and troubleshoot software and data security issues for example:
    - Software firewall issues
    - Wireless client configuration issues
    - Data access issues (e.g. permissions, security policies)
    - Encryption and encryption technology issues

6.4 Perform preventative maintenance for security

- Recognize social engineering and address social engineering situations

7.0 Safety and Environmental Issues

7.1 Identify potential hazards and proper safety procedures including power supply, display devices and environment (e.g. trip, liquid, situational, atmospheric hazards and high-voltage and moving equipment)

8.0 Communication and Professionalism

8.1 Use good communication skills including listening and tact / discretion, when communicating with customers and colleagues

- Use clear, concise and direct statements
- Allow the customer to complete statements – avoid interrupting
- Clarify customer statements – ask pertinent questions
- Avoid using jargon, abbreviations and acronyms
- Listen to customers

8.2 Use job-related professional behavior including notation of privacy, confidentiality and respect for the customer and customers' property

- Behavior
    - Maintain a positive attitude and tone of voice
    - Avoid arguing with customers and / or becoming defensive
    - Do not minimize customers' problems
    - Avoid being judgmental and / or insulting or calling the customer names
    - Avoid distractions and / or interruptions when talking with customers
- Property
    - Telephone, laptop, desktop computer, printer, monitor, etc.