

# A+ Operating System Technologies (2003) Examination Objectives

Effective November 26, 2003

## Introduction

For A+ Certification, the examinee must pass both this examination and the A+ Core Hardware examination. The Operating System Technologies examination measures essential operating system competencies for an entry-level IT professional or PC service technician with the equivalent knowledge of at least 500 hours of hands-on experience in the lab or field.

CompTIA recently convened a core of A+ subject matter experts representing a diverse group of IT professionals, which resulted in the revised CompTIA A+ Operating System Technologies (2003) examination Objectives. The A+ Operating System Technologies exam will continue to validate that the successful candidate can demonstrate basic knowledge of operating systems (Windows 9x, Windows NT 4.0 Workstation, and Windows 2000). Additionally, the 2003 Objectives will cover later operating systems (Windows Me and Windows XP).

The skills and knowledge measured by this examination are derived from an industry-level and worldwide critical incident analysis, which was validated through a survey of almost 2,000 A+ certified professionals. The results of the survey are 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 or PC service technician with the equivalent knowledge of at least 500 hours of hands-on experience in the lab or field. The intent is to certify individuals in a body of knowledge that is identified and accepted as the baseline or foundation of an entry-level IT professional or PC technician. It is not intended to measure 'cutting edge' technologies.

### NOTE:

- September 12<sup>th</sup>, 2003 CompTIA A+ exams in English will continue to test against the 2001 objectives in a conventional (linear, non-adaptive) format and will incorporate items against the 2003 objectives that do not count against the final score.
- **November 26, 2003 A+ exams in English test against the 2003 objectives and the 2001 objectives are retired.**
- This examination blueprint for the A+ Operating System Technologies examination includes the 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	% Of Examination
1.0 OS Fundamentals	28%
2.0 Installation, Configuration and Upgrading	31%
3.0 Diagnosing and Troubleshooting	25%
4.0 Networks	16%
Total	100.00%

## Domain 1 Operating System Fundamentals

### 1.1 Identify the major desktop components and interfaces, and their functions. Differentiate the characteristics of Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP.

Content may include the following:

- o Contrasts between Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP
- o Major Operating System components
  - o Registry
  - o Virtual Memory
  - o File System
- o Major Operating System Interfaces
  - o Windows Explorer
  - o My Computer
  - o Control Panel
  - o Computer Management Console
  - o Accessories/System Tools
  - o Command line
  - o Network Neighborhood/My Network Places
  - o Task Bar/systray
  - o Start Menu
  - o Device Manager

### 1.2 Identify the names, locations, purposes, and contents of major system files.

Content may include the following:

- o Windows 9x –specific files
  - o IO.SYS
  - o MSDOS.SYS
  - o AUTOEXEC.BAT
  - o COMMAND.COM
  - o CONFIG.SYS
  - o HIMEM.SYS
  - o EMM386.exe
  - o WIN.COM
  - o SYSTEM.INI
  - o WIN.INI
  - o Registry data files
    - SYSTEM.DAT
    - USER.DAT
- o Windows NT-based specific files
  - o BOOT.INI
  - o NTLDR

- NTDETECT.COM
- NTBOOTDD.SYS
- NTUSER.DAT
- Registry data files

### **1.3 Demonstrate the ability to use command-line functions and utilities to manage the operating system, including the proper syntax and switches.**

Command line functions and utilities include:

- Command/CMD
- DIR
- ATTRIB
- VER
- MEM
- SCANDISK
- DEFRAG
- EDIT
- XCOPY
- COPY
- FORMAT
- FDISK
- SETVER
- SCANREG
- MD/CD/RD
- Delete/Rename
- DELTREE
- TYPE
- ECHO
- SET
- PING

### **1.4 Identify basic concepts and procedures for creating, viewing, and managing disks, directories and files. This includes procedures for changing file attributes and the ramifications of those changes (for example, security issues).**

Content may include the following:

- Disks
  - Partitions
    - Active Partition
    - Primary Partition
    - Extended Partition
    - Logical partition
  - Files Systems
    - FAT16
    - FAT32
    - NTFS4
    - NTFS5.x
- Directory Structures (root directory, subdirectories, etc)
  - Create folders
  - Navigate the directory structure
  - Maximum depth

- o Files
  - o Creating files
  - o File naming conventions (Most common extensions, 8.3, maximum length)
  - o File attributes - Read Only, Hidden, System, and Archive attributes
  - o File Compression
  - o File Encryption
  - o File Permissions
  - o File types (text vs binary file)

**1.5 Identify the major operating system utilities, their purpose, location, and available switches.**

- o Disk Management Tools
  - DEFRAG.EXE
  - FDISK.EXE
  - Backup/Restore Utility (MSbackup, NTBackup, etc)
  - ScanDisk
  - CHKDSK
  - Disk Cleanup
  - Format
- o System Management Tools
  - Device manager
  - System Monitor
  - Computer Manager
  - MSCONFIG.EXE
  - REGEDIT.EXE (View information/Backup registry)
  - REGEDT32.EXE
  - SYSEDIT.EXE
  - SCANREG
  - COMMAND/CMD
  - Event Viewer
  - Task Manager
- o File Management Tools
  - ATTRIB.EXE
  - EXTRACT.EXE
  - Edit.com
  - Windows Explorer

**Domain 2 Installation, Configuration and Upgrading**

**2.1 Identify the procedures for installing Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP, and bringing the operating system to a basic operational level.**

Content may include the following:

- o Verify hardware compatibility and minimum requirements
- o Determine OS installation options
  - o Installation type (typical, custom, other)
  - o Network configuration
  - o File system type
  - o Dual Boot Support
- o Disk preparation order (conceptual disk preparation)

- Start the installation
  - Partition
  - Format drive
- Run appropriate set up utility
  - Setup
  - Winnt
- Installation methods
  - Bootable CD
  - Boot floppy
  - Network installation
  - Drive Imaging
- Device Driver Configuration
  - Load default drivers
  - Find updated drivers
- Restore user data files (if applicable)
- Identify common symptoms and problems

**2.2 Identify steps to perform an operating system upgrade from Windows 9.x/ME, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP. Given an upgrade scenario, choose the appropriate next steps.**

Content may include the following:

- Upgrade paths available
- Determine correct upgrade startup utility (e.g. WINNT32 vs WINNT)
- Verify hardware compatibility and minimum requirements
- Verify application compatibility
- Apply OS service packs, patches, and updates
- Install additional Windows components

**2.3 Identify the basic system boot sequences and boot methods, including the steps to create an emergency boot disk with utilities installed for Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP.**

Content may include the following:

- Boot Sequence
  - Files required to boot
  - Boot steps (9.x, NT-based)
- Alternative Boot Methods
  - Using a Startup disk
  - Safe/VGA-only mode
  - Last Known Good configuration
  - Command Prompt mode
  - Booting to a system restore point
  - Recovery Console
  - Boot.ini switches
  - Dual Boot
- Creating Emergency Disks with OS Utilities
- Creating emergency repair disk (ERD)

## **2.4 Identify procedures for installing/adding a device, including loading, adding, and configuring device drivers, and required software.**

Content may include the following:

- Device Driver Installation
  - Plug and Play (PNP) and non-PNP devices
  - Install and configure device drivers
  - Install different device drivers
  - Manually install a device driver
  - Search the Internet for updated device drivers
  - Using unsigned drivers (driver signing)
- Install Additional Windows components
- Determine if permissions are adequate for performing the task

## **2.5 Identify procedures necessary to optimize the operating system and major operating system subsystems.**

Content may include the following:

- Virtual Memory Management
- Disk Defragmentation
- Files and Buffers
- Caches
- Temporary file management

## Domain 3 Diagnosing and Troubleshooting

### 3.1 Recognize and interpret the meaning of common error codes and startup messages from the boot sequence, and identify steps to correct the problems.

Content may include the following:

- Common Error Messages and Codes
  - Boot failure and errors
    - Invalid boot disk
    - Inaccessible boot device
    - Missing NTLDR
    - Bad or missing Command interpreter
  - Startup messages
    - Error in CONFIG.SYS line XX
    - Himem.sys not loaded
    - Missing or corrupt Himem.sys
    - Device/Service has failed to start
  - A device referenced in SYSTEM.INI, WIN.INI, Registry is not found
  - Event Viewer – Event log is full
  - Failure to start GUI
  - Windows Protection Error
  - User-modified settings cause improper operation at startup
  - Registry corruption
- Using the correct Utilities
  - Dr. Watson
  - Boot Disk
  - Event Viewer

### 3.2 Recognize when to use common diagnostic utilities and tools. Given a diagnostic scenario involving one of these utilities or tools, select the appropriate steps needed to resolve the problem.

Utilities and tools may include the following:

- Startup disks
  - Required files for a boot disk
  - Boot disk with CD-ROM support
- Startup Modes
  - Safe mode
  - Safe Mode with command prompt
  - Safe mode with networking
  - Step-by-Step/Single step mode
  - Automatic skip driver (ASD.exe)
- Diagnostic tools, utilities and resources
  - User/installation manuals
  - Internet/web resources
  - Training materials
  - Task Manager
  - Dr. Watson
  - Boot Disk
  - Event Viewer

- Device Manager
- WinMSD
- MSD
- Recovery CD
- CONFIGSAFE
- Eliciting problem symptoms from customers
- Having customer reproduce error as part of the diagnostic process
- Identifying recent changes to the computer environment from the user

### **3.3 Recognize common operational and usability problems and determine how to resolve them.**

Content may include the following:

- Troubleshooting Windows-specific printing problems
  - Print spool is stalled
  - Incorrect/incompatible driver for print
  - Incorrect parameter
- Other Common problems
  - General Protection Faults
  - Bluescreen error (BSOD)
  - Illegal operation
  - Invalid working directory
  - System lock up
  - Option (Sound card, modem, input device) or will not function
  - Application will not start or load
  - Cannot log on to network (option – NIC not functioning)
  - Applications don't install
  - Network connection
- Viruses and virus types
  - What they are
  - TSR (Terminate Stay Resident) programs and virus
  - Sources (floppy, emails, etc.)
  - How to determine presence

## **Domain 4 Networks**

### **4.1 Identify the networking capabilities of Windows. Given configuration parameters, configure the operating system to connect to a network.**

Content may include the following:

- Configure protocols
  - TCP/IP
    - Gateway
    - Subnet mask
    - DNS (and domain suffix)
    - WINS
    - Static address assignment
    - Automatic address assignment (APIPA, DHCP)
  - IPX/SPX (NWLink)
  - Appletalk
  - NetBEUI/ NetBIOS
- Configure Client options

- Microsoft
- Novell
- Verify the configuration
- Understand the use of the following tools
  - IPCONFIG.EXE
  - WINIPCFG.EXE
  - PING
  - TRACERT.EXE
  - NSLOOKUP.EXE
- Share resources (Understand the capabilities/limitations with each OS version)
- Setting permissions to shared resources
- Network type and network card

## **4.2 Identify the basic Internet protocols and terminologies. Identify procedures for establishing Internet connectivity. In a given scenario, configure the operating system to connect to and use Internet resources.**

Content may include the following:

- Protocols and terminologies
  - ISP
  - TCP/IP
  - E-mail (POP, SMTP, IMAP)
  - HTML
  - HTTP
  - HTTPS
  - SSL
  - Telnet
  - FTP
  - DNS
- Connectivity technologies
  - Dial-up networking
  - DSL networking
  - ISDN networking
  - Cable
  - Satellite
  - Wireless
  - LAN
- Installing and Configuring browsers
  - Enable/disable script support
  - Configure Proxy Settings
  - Configure security settings
- Firewall protection under Windows XP