Basic Troubleshooting Process for Operating Systems

Applying the Troubleshooting Process to Operating Systems

OS problems can result from a combination of hardware, software, and network issues. Computer technicians must be able to analyze the problem and determine the cause of the error to repair the computer. This process is called troubleshooting.

The first step in the troubleshooting process is to identify the problem. The figure is a list of open-ended and closed-ended questions to ask the customer.

Step 1: Identify the Problem	
Open-ended Questions	• What problems are you having? • What operating system is installed on the computer? • What updates have you performed lately? • What programs have you installed recently? • What were you doing when the problem was discovered?
Closed-ended Questions	• Can you boot the operating system? • Can you boot up in safe mode? • Have you changed your password recently? • Have you seen any error messages on the computer? • Has anyone else used the computer recently? • Has any hardware been added recently?

Establish a Theory of Probable Cause

After you have talked to the customer, you can establish a theory of probable causes. The figure lists some common probable causes for OS problems.

Step 2: Establish a Theory of Probable Cause	
Common Causes of Operating System Problems	• Incorrect settings in BIOS • Caps lock key is set to on • Non-bootable media in the floppy drive during computer boot up • Password has changed • Incorrect monitor settings in control panel • Operating system update failure • Driver update failure • Malware infection • Hard drive failure • Corrupt operating system files

Test the Theory to Determine Cause

After you have developed some theories about what is wrong, test your theories to determine the cause of the problem. The figure shows a list of quick procedures that can help determine the exact cause of the problem or even correct the problem. If a quick procedure does correct the problem, you can jump to verifying the full system functionality. If a quick procedure does not correct the problem, you need to research the problem further to establish the exact cause.

Step 3: Test the Theory to Determine Cause	
Common steps to determine cause	• Log in as a different user • Use third party diagnostic software • Determine if new software or software updates have just been installed • Uninstall recently installed applications • Boot into safe mode to determine if the problem is driver-related • Roll back newly updated drivers • Examine Device Manager for device conflicts • Examine Event logs for warnings or errors • Check the hard drive for errors and fix file system issues • Use the system file checker to recover corrupt system files • Use system restore if a system update or service pack has been installed

Establish a plan of Action to Resolve the Problem and Implement the Solution

After you have determined the exact cause of the problem, establish a plan of action to resolve the problem and implement the solution. The figure shows some sources you can use to gather additional information to resolve an issue.

Step 4: Establish a Plan of Action to Resolve the Problem and Implement the Solution	
If no solution is achieved in the previous step, further research is needed to implement the solution	• Helpdesk Repair Logs • Other Technicians • Manufacturer FAQs • Technical Websites • Newsgroups • Computer Manuals • Device Manuals • Online Forums • Internet Search

Verify Full System Functionality and Implement Preventive Measures

After you have corrected the problem, verify full system functionality and, if applicable, implement preventive measures. The figure lists the steps to verify full system functionality.

Step 5: Verify Full System Functionality and if Applicable Implement Preventive Measures	
Verify full functionality	• Shut down the computer and restart it • Check event logs to make sure there are no new warnings or errors • Check Device Manager to see that there are no warnings or errors • Run DxDiag to make sure DirectX is running correctly • Make sure applications run properly • Make sure network shares are accessible • Make sure the Internet can be accessed • Re-run system file checker to ensure all files are correct • Check Task Manager to ensure that the status of all programs is Running • Re-run any third party diagnostic tools

Document Findings, Actions, and Outcomes

In the final step of the troubleshooting process, you must document your findings, actions, and outcomes. The figure lists the tasks required to document the problem and the solution.

Step 6: Document Findings, Actions, and Outcomes	
Document your findings, actions, and outcomes	• Discuss the solution implemented with the customer • Have the customer verify that the problem has been solved • Provide the customer with all paperwork • Document the steps taken to solve the problem in the work order and the technician's journal • Document any components used in the repair • Document the time spent to resolve the problem

Common Problems and Solutions for Operating Systems

OS problems can be attributed to hardware, application, or configuration issues, or to some combination of the three. You will resolve some types of OS problems more often than others. The figure is a chart of common operating system problems and solutions.

Common Problems and Solutions

Identify the Problem	Probable Causes	Possible Solutions
The OS locks up.	• The computer is overheating. • Some of the operating system files may be corrupted. • The power supply, RAM, hard drive, or motherboard may be defective. • The BIOS settings may be incorrect. • An unknown event has occurred that has caused the OS to lock up. • An incorrect driver has been installed.	• Clean internal components. • Check the fan connections to ensure fans are operating properly. • Run the system file checker (SFC) to replace corrupt operating system files. • Test the power supply, RAM, hard drive, or motherboard with third party diagnostic software and replace as necessary. • Address any events in the event log. • Examine and adjust the BIOS settings. • Install or roll back updated drivers.
The keyboard or mouse does not respond.	• Communication between the keyboard or mouse and the computer has failed. • The computer has an incompatible or an out-of-date driver. • The cable has been damaged. • The device is defective. • A KVM switch is being used and the active computer is not being displayed.	• Reboot the computer. • Install or roll back drivers. • Replace the device. • Change the input on the KVM switch.

The operating system will not start.	• A hardware device failed to initialize. • There is a non-bootable disk in the boot drive. • Some of the operating system files may be corrupted. • The Master Boot Record is corrupted. • The power supply, RAM, hard drive, or motherboard may be defective. • New hardware drivers did not install properly. • Windows updates have corrupted the operating system.	• Reboot the computer. • Remove all non-bootable media from the drives. • Restore Windows using the System Restore tool. • Recover the system disk using the System Image Recovery tool. • Perform a Repair Installation on the operating system. • Use the Recovery Console to fix the Master Boot Record. • Replace the power supply, RAM, hard drive, or motherboard with one that works. • Disconnect any newly connected devices and use the Last Known Good Configuration option to start the operating system. • Boot the computer in Safe Mode and address all events in the event log.
The computer displays an "Invalid Boot Disk" error after the POST.	• Media that does not have an operating system is in a drive. • The boot order is not set correctly in BIOS. • The hard drive is not detected or the jumpers are not set correctly. • The hard drive does not have an operating system installed. • The MBR is corrupted. • The computer has a boot sector virus. • The hard drive is failing.	• Remove all media from the drives. • Change the boot order in BIOS to start with the boot drive. • Reconnect the hard drive cables or reset the hard drive jumpers. • Install an operating system. • Run fdisk /mbr from the CLI in Windows XP only. • Run virus removal software. • Replace the hard drive.
The computer displays an "Inaccessible Boot Device" error after the POST.	• A recently installed device driver is incompatible with the boot controller. • BOOTMGR is corrupted in Windows 7 or Windows Vista. • NTLDR is corrupted in Windows XP.	• Use the last known good configuration to boot the computer. • Boot the computer in safe mode and load a restore point from before the installation of new hardware. • Restore the BOOTMGR file from Windows 7 or Windows Vista installation media. • Restore the NTLDR from Windows XP installation media.

The computer displays a "BOOTMGR is missing" error after the POST in Windows 7 and Windows Vista	• BOOTMGR is missing or damaged. • Boot Configuration Data is missing or damaged. • The boot order is not set correctly in BIOS. • The MBR is corrupted. • The hard drive is failing. • The hard drive jumpers are not set correctly.	• Restore BOOTMGR from installation media. • Restore the Boot Configuration Data from installation media. • Change the boot order in BIOS to start with the boot drive. • Run chkdsk /F /R from the recovery console.
The computer displays a "Missing NTLDR" error after the POST in Windows XP	• NTLDR is missing or damaged. • Ntdetect.com is missing or damaged. • Boot.ini is missing or damaged. • The boot order is not set correctly in BIOS. • The MBR is corrupted. • The hard drive is failing. • The hard drive jumpers are not set correctly.	• Restore NTLDR from installation media. • Restore ntdetect.com from installation media. • Restore boot.ini from installation media. • Change the boot order in BIOS to start with the boot drive. • Run fdisk /mbr from the Cmd prompt. • Run chkdsk /F /R from the recovery console. • Reset the hard drive jumpers.
A service failed to start when the computer booted.	• The service is not enabled. • The service is set to Manual. • The failed service requires another service to be enabled.	• Enable the service. • Set the service to Automatic. • Re-enable or re-install the required service.
A device did not start when the computer booted.	• The external device is not powered on. • The data cable or power cable is not connected to the device. • The device has been disabled in BIOS. • The device has failed. • The device has a conflict with a newly installed device. • The driver is corrupted.	• Power on the external device. • Secure the data cable and power cable to the device. • Enable the device in BIOS. • Replace the device. • Remove the newly installed device. • Re-install or roll back the driver.
A program listed in the registry is not found.	• One or more program files have been deleted. • The uninstall program did not work correctly. • The installation directory has been removed. • The hard drive has become corrupted. • The computer has a virus.	• Re-install the program. • Re-install the program and run the un-install program again. • Run chkdsk /F /R to fix the hard drive file entries. • Scan for and remove the virus.

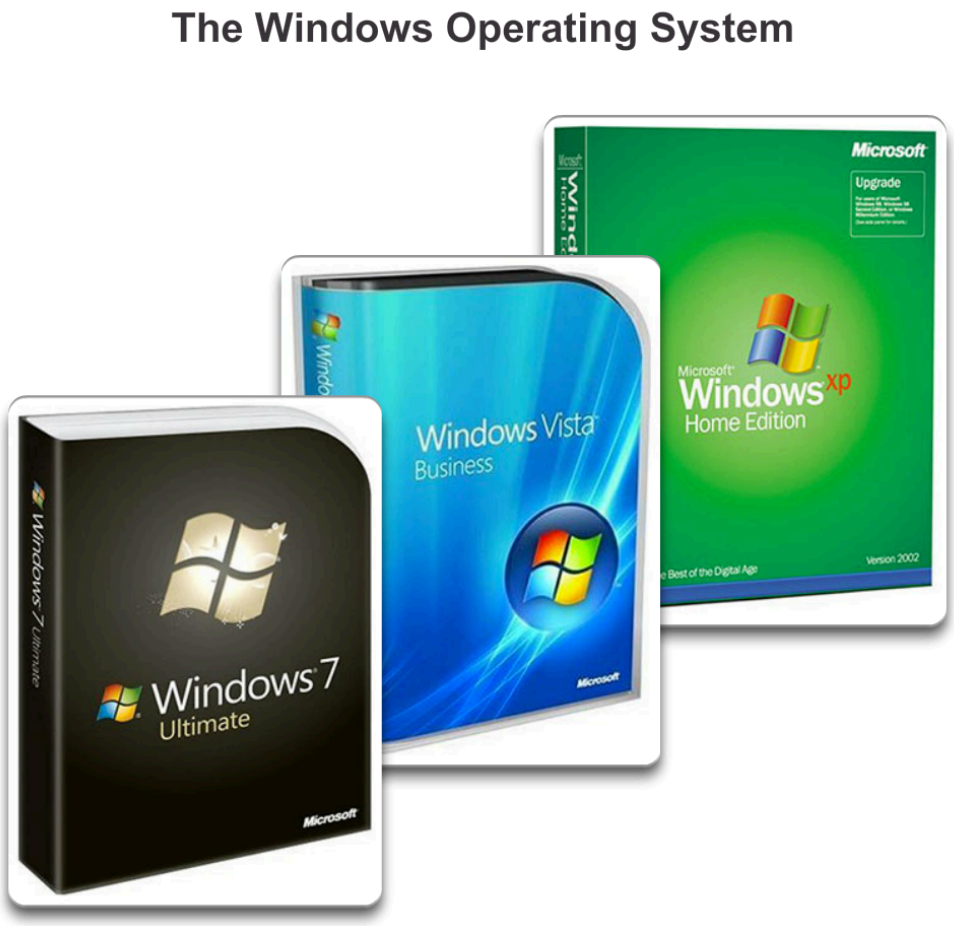
The computer continually restarts without displaying the desktop.	• The computer is set to restart when there is a failure. • A startup file has become corrupted.	• Press F8 to open the Advanced Options Menu and choose Disable automatic restart on system failure. • Run chkdsk /F /R from the recovery console.
The computer displays a black or blue screen of death (BSOD).	• A driver is not compatible with the hardware. • The RAM is failing. • The power supply is failing. • The CPU is failing. • The motherboard is failing.	• Research the STOP error and the name of the module that produced the error. • Replace any failing devices with known-good devices.
The computer locks up without any error messages.	• The CPU or FSB settings are incorrect on the motherboard or in the BIOS. • The computer is overheating. • An update has corrupted the operating system. • The RAM is failing. • The hard drive is failing. • The power supply is failing.	• Check and reset the CPU and FSB settings. • Check and replace any cooling devices as necessary. Uninstall the software update or perform a System Restore. • Run chkdsk /F /R from the recovery consol. • Replace any failing devices with known-good devices.
An application does not install.	• The downloaded application installer contains a virus and has been prevented from installing by virus protection software. • The installation disk or file is corrupted. • The installation application is not compatible with the operating system. • There are too many programs running and not enough memory remaining to install the application. • The hardware does not meet the minimum requirements.	• Obtain a new installation disk or delete the file and download the installation file again. • Run the installation application under compatibility mode. • Close applications before installing a new program. • Install hardware that meets the minimum installation requirements.

A computer with Windows 7 installed does not run Aero.	The computer does not meet the minimum hardware requirements for running Aero.	Upgrade the processor, RAM, and video card to meet the minimum Microsoft requirements for Aero.
The search feature takes a long time to find results.	• The index service is not running. • The index service is not indexing in the correct locations.	• Start the index services using services.msc. • Change the settings of the index service in the Advanced Options panel.
The UAC no longer prompts the user for permission.	The UAC has been turned off.	Turn on the UAC in the User Account applet in the Control Panel.
No gadgets appear on the desktop.	• The gadgets have never been installed or have been uninstalled. • The XML necessary to render the gadget is broken, corrupted, or not installed.	• Right-click on the desktop > Gadgets > right-click on a gadget > Add. • Register the file msxml3.dll by entering regsvr32 msxml3.dll > Enter at the command prompt.
The computer is running slowly and has a delayed response.	A process is using most of the CPU resources.	• Restart the process with services.msc. • If the process is not needed, end the process with Task Manager. • Restart the computer.
The computer does not recognize an external drive.	The OS does not have the correct drivers for the external drive.	Download the correct drivers for the drive.
The new sound card does not work.	The volume has been muted.	Unmute the volume with the Sound control panel utility.
Some external devices from a 32-bit computer do not work on a 64-bit computer.	Incorrect device drivers are installed.	Update the device drivers to 64-bit drivers.
After upgrading to Windows 7, the computer runs very slowly.	Aero is causing the computer to run slowly.	Turn off Aero in Windows 7.

Summary

This chapter introduced computer operating systems. As a technician, you should be skilled at installing, configuring, and troubleshooting an OS. The following concepts from this chapter are important to remember:

- Several different operating systems are available, and you must consider the customer's needs and environment when choosing an OS.



- The main steps in setting up a customer's computer include preparing the hard drive, installing the OS, creating user accounts, and configuring installation options.
- A GUI shows icons of all files, folders, and applications on the computer. A pointing device, such as a mouse, is used to navigate in a GUI desktop.
- A CLI uses commands to complete tasks and navigate the file system.
- You should establish a backup strategy that allows for the recovery of data. Normal, copy, differential, incremental, and daily backups are all optional backup tools available in Windows operating systems.
- With a virtual machine manager, system resources on a host computer can be allocated to run virtual machines. Virtual machines run operating systems, and using them can provide users with greater system functionality.
- Preventive maintenance techniques help to ensure optimal performance of the OS.
- Some of the tools available for troubleshooting an OS problem include administrative tools, system tools, and CLI commands.