# TROUBLESHOOTING

- Troubleshooting Definition
- CompTIA Troubleshooting Steps
  - Identify the Problem
  - Establish a Theory of Probable Cause
  - Test the Theory
  - Establish a Plan
  - Verify Full System Functionality
  - Document Findings
- Troubleshooting Tips
- CPU Issues
- RAM Issues
- Motherboard Issues

- Storage Issues
- Video Issues
- Network Issues
- Operating System Issues
- Software Application Issues
- Windows Recovery
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  - Startup Repair Installation
  - Recovery Console
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- Security Issues
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- System Component Troubleshooting Tips

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- Troubleshooting is the process of determining the cause of a problem or issue and correcting it

- It is used to fix problems with hardware, software, and other IT services

- Can be challenging to learn and use

- Identify the problem
- Establish a theory of probable cause
- Test the theory
- If theory is wrong, establish and test new theory
- Establish a plan to resolve problem
- Verify full system functionality
- Document findings, actions, and outcomes

- Have end user describe the problem

- Review error messages

- Recreate the problem

- Review recent system changes (software and hardware)

- Backup the system before making any significant changes

- Check for simple and common issues first before complicated issues

- Check for the most obvious cause or things that typically go wrong

- From this, create a list of probable causes

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- If your theory is correct, then create a plan to solve the issue

- If the theory is incorrect, test other probable causes

- Add probable causes to the list if necessary and test those new probable causes

- If simple cause are incorrect, consider more complicated causes and test them

- Escalate to someone more capable of solving the problem

- Develop and implement a plan to solve the problem

- Consider the impact of the plan, example downtime, other software

- Consider temporary solutions when the complete solution will take longer or have significant side effects

- Test to make sure the solution solved the problem

- Explain and demonstrate the solution to the user to their satisfaction

- Test the system to make sure the solution did not create additional problems

- Document findings, actions, and outcomes

- Document the procedure to implement the solution

- Document any additional pertinent notes

- Documentation should be clear enough so another technician can understand it and it can be used as a reference in the future

- Reproducing the problem is usually critical to finding the cause and a solution

- Visit the website of the hardware or software product to find solutions and download files

- Replacing hardware components individually can help to find the cause when trying to identify hardware issues

- Consider updating hardware drivers

- Hardware manufacturers can provide diagnostic software

- Have spare components available for testing in addition to a basic tool kit

- Inconsistent issues can be from environmental causes, such as overheating or loose connectors

| Symptom | Causes | Solution |
|---|---|---|
| Sudden shutdown, system lockup, overheating, continuous reboots | Failed cooling system component | Cooling system contact w/ CPU. Replace fan. Connect power to fan, replace CPU, clear dust |
| Unable to insert CPU into CPU slot on motherboard | Unmatched CPU and motherboard socket | Obtain matched CPU and motherboard |
| CPU POST Error on boot | Faulty CPU | Replace CPU |

**this list of issues is NOT all inclusive**

| Symptom | Causes | Solution |
|---|---|---|
| POST Beeps, computer doesn't boot, blank screen, RAM unrecognized | Unseated RAM, unmatch RAM to motherboard/CPU | Use compatible RAM, ensure RAM modules are seated properly |
| System crashes, lockups, unexpected shutdowns, system stop errors (BSOD) | General Protection Faults (GPF), faulty software, overheating | Increase memory, use ECC, update software |
| BIOS error message, new memory not recognized by OS | Unseated RAM, excessive RAM for motherboard | Upgrade BIOS firmware, replace with compatible RAM |

**this list of issues is NOT all inclusive**

| Symptom | Causes | Solution |
|---|---|---|
| High hard disk usage, slow system | Not enough RAM for software | Add compatible memory |
| Memory error messages, POST error messages | Poor contact between motherboard memory slot and RAM | Use compressed air to blow dust from slots |

| Symptom | Causes | Solution |
|---|---|---|
| Power failure, only fans run, components attached to MB do not work, system does not POST | Motherboard capacitor failure, not enough power | Check for signs of physical damage, swollen or burned out capacitors, blown, foam board, has a broken connector, corrosion, dirty fans and chips, etc.<br>Check voltage from power supply to MB, upgrade power supply unit |
| BIOS errors | CMOS and jumper issue,<br>BIOS flash failed during BIOS update, incorrect BIOS settings | Clear CMOS with jumper JBAT1, clear CMOS settings by removing battery, try BIOS recovery for AMI or Award BIOS |
| Non supported components | Many of the newer chipsets will not support 3.3v AGP cards, incompatible expansion cards | Check manufacturer's website and verify that components are supported |

**this list of issues is NOT all inclusive**

| Symptom | Causes | Solution |
|---------|--------|----------|
| Slow system performance | Fragmented file system, low disk space remaining, slow drive interface, slow rotational speed for HDD | Defrag files system, remove unneeded files, upgrade drive to SATA and SSD |
| POST boot errors, system will not boot, RAID errors, "Hard drive not found" | Improperly configured BIOS or RAID controller settings | Properly configure BIOS and RAID controller. Ensure power and data connects are seated properly. Consult manufacturer documentation. |
| POST error "No operating system found" | Non-bootable media | Properly configure BIOS and RAID controller. Install/repair OS |

\*\*this list of issues is NOT all inclusive\*\*

| Symptom | Causes | Solution |
|---|---|---|
| Monitor does not display an image, system does not boot | Improperly seated video card, missing video card, monitor connected improperly | Check monitor connections, ensure video card is present and properly seated |
| Image on screen is cut off, skewed, missing, or doesn't fill the screen | Non native resolution (LCD), | LCD - use LCD native resolution<br><br>CRT - use monitor to change horizontal and vertical geometry and size<br><br>Check screen brightness |
| Screen is wavy or flickers, users report headache | Low refresh rate | Increase refresh rate. If not possible, decrease the resolution and increase the refresh rate |

\*\*this list of issues is NOT all inclusive\*\*

| Symptom | Causes | Solution |
|---|---|---|
| No Connectivity, Limited Connectivity | Network cable not connected to NIC, improper configuration of NIC and OS network settings | Ensure proper connection of network cable to NIC and wall jack, and that NIC and OS network settings are configured properly, replace network cables |
| Poor Wireless Connectivity | Poor signal quality | Verify wireless NIC and router settings, move wireless NIC closer to the wireless access point, relocate wireless access point, add another wireless access point |
| Configurations Issues, local connectivity | Workstations configurations, static IP assignment, duplicate IP address | Use DHCP, resolve duplicate IP assignment manually |
| Physical Connection Issues | Network cable, hub, switch, router not working properly | Swap the cable, use different hub or router ports, NIC card should be properly seated |

**this list of issues is NOT all inclusive**

| Symptom | Causes | Solution |
|---------|--------|----------|
| Interference | Electromagnetic fields and radio frequency interference | Network cable: check if cable is next to motors or lights<br>Wireless: check for other device transmitting on same frequency and channel |
| IP configuration issues | Its cause by improper configurations of node network settings (IP address, subnet mask, gateway) etc | Verify IP address proper and subnet mask used properly. Verify default gateway and DNS configured properly. |
| Communication issue | TCP/IP configuration issues, physical media issues | Ping the local host 127.0.01, if successful TCP/IP configured properly. Ping/tracert a network node or WAN server. Check physical media and connections. |
| Login issue | Authentication issues, account locked due to many incorrect login attempts, CAPS lock, disabled user account | Verify correct user name/password and permissions, Caps and number lock properly enabled or disabled,  making sure user's account is enabled. |

**this list of issues is NOT all inclusive**

| Symptom | Causes | Solution |
|---|---|---|
| Failure to boot | Invalid boot disk, invalid boot priority, power supply issues | Boot in safe mode, verify proper power connectivity, set proper priority of bootable devices |
| Missing Operating System | System files corrupted, while boot system from other disk than actual one | Check BIOS boot order setup, check for missing or corrupted NTLDR and boot.ini files, install/repair OS |
| Missing GUI | Corrupted video driver, problems with monitor, problems with video card itself | Start system in safe mode, install proper video card driver, replace video card, check monitor connections |

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| Symptom | Causes | Solution |
|---|---|---|
| BSOD (Blue Screen of Death) Official Name: stop error | Memory protection error, faulty hardware | Note the error message display on BSOD, search Internet for the BSOD errors and solutions. Replace RAM with ECC |
| Automatic shutdown and restart | System crash, power failure | Educate users on proper shutdown procedure, setup UPS, keep backup data. Upon restart, check storage device for errors. |
| Missing DLL (Dynamic Link Library) | Corrupted or missing DLL, application uninstall process removed DLL, corruption of DLL during install process | Repair or uninstall then reinstall application, use Windows restore point or SFC command for system DLLs |

**this list of issues is NOT all inclusive**

| Symptom | Causes | Solution |
|---|---|---|
| Shortcut malfunction issues | Application uninstalled or path changed | Better to fix the shortcut vs reinstalling software, edit shortcut properties, Target = executable, Start in = folder executable runs in |
| Installation issues | Corrupted installation files, permissions, group membership | Administrators can install applications, standard users typically cannot |

| Symptom | Causes | Solution |
|---|---|---|
| OS compatibility | Applications not compatible OS | Verify application compatibility with hardware and operating system, use Compatibility Mode (Vista/7) or Windows XP Mode (7 Enterprise and Ultimate Edition) |
| Service fail to start | Application not installed properly, or not supported | Check Event Viewer for additional information, use service console (MMC) or NET START to start service, automatically if needed, verify the service configured with proper user account |

- System Restore Point
  - Used to restore Windows to a previous point when Windows was working properly
  - Saves system configuration and files, and some applications
  - Does not restore data files
  - Windows automatically creates a restore point before drivers are installed
  - User can manually create a restore point
  - Start → All Programs → Accessories → System Tools → System Restore
  - Can be accessed in safe mode or during Windows 7 repair
- Startup Repair Installation
  - Feature available with Windows installation media to repair Windows installations.
  - Can be accessed from the install menus

- Recovery Console
  - Command line interface
  - Used to diagnose and repair Windows, repair MBR, view log files, alter Windows services, repairing registry, system files, boot.ini, and partition storage devices
  - help /[command] or Microsoft website from another system for specific command information
- Automated System Recovery (XP)/Complete PC

  Restore (Win 7)
  - Reformats Windows system volume, destroys data
  - ASR only restores the OS system, not applications or data
  - Complete PC Restore can restore backup data
  - Run from install media, XP - may need diskette

- Recovery disk/partition
  - Many computers do not ship with installation media. A separate partition on the bootable storage device has the software to reinstall Windows
  - Recovery partition can be hidden from Windows
  - Performs a "factory reset" installs and configures Windows the same as it came from the manufacturer
  - Reformats the Windows system volume, destroying data and user configuration
  - Access via BIOS or special key combination (device specific)
  - Can be faster than installing from Windows installation media
- Previous File Version
  - (Vista/7) restore an individual file to a previous save
  - Can be the fastest way to fix and recover corrupted files
  - Accessed from file properties (right click)

| Symptom | Causes | Solution |
|---|---|---|
| Hi-jacked Email | Attackers gained access to e-mail account | Good password habits, never use personal information for passwords that is easy to obtain using Internet or social media |
| Redirects to rogue websites | Malicious links that look correct, but redirects the user to a malicious website | Before clicking on a link, verify that it isn't redirecting to a malicious site by checking URL (address bar) |
| Slow computer performance, Internet connectivity issues, OS lockups, missing files, renamed system files | Malware infection | Quarantine system, disable system restore, update anti-malware and scan for malware, may need to use Safe Mode |

**this list of issues is NOT all inclusive**

| Symptom | Causes | Solution |
|---|---|---|
| Printer does not print | Cable is wrong or loose, printer drivers not installed properly | Verify that the cable is connected on both ends, printer is turned on, network printers with correct TCP/IP configuration, install printer drivers properly, clear printer spooler |
| Printout quality is poor | Images become faint when ink, ribbon or toner are low | Check ribbon, ink, and toner levels |
| Postscript text | Incorrect Driver installed | Verify that the latest version of the driver for the specific make/model is installed |

| Symptom | Causes | Solution |
|---|---|---|
| Notebook runs for only a short time even while plugged in | Power adapter is bad | Try using a different adapter or verify the power coming from the adapter |
| Your laptop has no display at all | Problem with video card or display | Check function keys to switch to laptop display, use an external monitor or remote desktop to connect from an external source, or replace video card or laptop display |
| Unable to connect to network | Network card switch if off | Locate external switch and turn it on |

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- Verify components are compatible by checking the Microsoft Hardware Compatibility List (HCL)
- It is better to download the latest driver from manufacturer's website vs using installation media
- Follow manufacturer's instructions for installation
  - Driver installation may be required first before connecting component (USB)
  - BIOS setting may need to be changed before software installation
- Check component is powered and connected properly
- Move component to a different port or slot

- Use the Device Manager to ensure component is recognized and configured properly
  - Yellow question (?) mark indicates Windows cannot find a suitable driver
  - Red (X) indicates a disabled component/device
  - Exclamation point (!) indicates a problem with the driver/device
  - Microsoft provides generic drivers for some components. It is generally best to use the manufacturer's drivers
- For continuing issues, check with the same model that is known to be working
- Consider using a Windows Restore point for newly installed components that cause significant issues with booting or OS function
- Consider using Windows Safe Mode to install and configure components/devices/drivers
- Unable to boot into a GUI? examine ntbtlog.txt which logs drivers loaded during bootup

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# THANK YOU