



Workstation
Server
Enterprise

The Troubleshooting Process

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About Chapter 26

Have you ever wondered where to begin when faced with a tough troubleshooting problem? Or wondered where to get help when you just couldn't find a workable solution? Chapter 26 holds the answers to these questions and more.

After a brief overview of troubleshooting, this chapter explains my recommended five-step approach to troubleshooting.

The process basically boils down to gathering information, defining the problem, listing the probable causes of the problem, identifying possible solutions and attempting to fix the problem, and finally, resolving and documenting the problem.

The last half of this chapter is jam-packed with resources that can help you when you're troubleshooting basic or advanced Windows NT problems. You'll be introduced to Microsoft TechNet, the Microsoft Technical Support Web site, the Microsoft Download Service, as well as several additional troubleshooting resources.

Chapter 26 is a "must read" no matter which of the three Windows NT 4.0 Microsoft Certified Professional exams you're preparing for. This chapter maps to nearly all of the Troubleshooting objectives for these exams.

Overview of Troubleshooting

Some say that troubleshooting is a science. Others say it's a fine art. I guess it's really a bit of both — a methodical approach to solving a problem that's devised from a person's base of knowledge, experience, and intuition.

Perhaps the best preparation for becoming an outstanding troubleshooter is to gain an in-depth understanding of how what you're troubleshooting works — in this case, Windows NT in a workstation, server, or enterprise environment. In addition to understanding Windows NT, you also need to have an intimate understanding of networking and PC hardware. This combined knowledge will form the backbone of your troubleshooting capability.

You can gain this understanding and knowledge in several ways. This book is a great place to start. You can also attend classes, read other books, and work in the Windows NT networking world. One of the best ways to obtain understanding and knowledge is through on-the-job experience.

When you're faced with a tough troubleshooting problem, remember that you're probably *not* the first or only person who's ever had this problem. Don't be afraid to call your friends, colleagues, and professional contacts. Troubleshooting a critical system at 2:00 a.m. is no time to be a Lone Ranger. (Okay, maybe you shouldn't call your friends *then*.) Above all, especially if you've never encountered a problem like it before, use *all* of the troubleshooting resources and technical references available to you — your problem and its solution are probably out there; you just have to find them.

Finally, there's no substitute for experience. If you've seen the problem before, hopefully a little light will come on, and you will remember how you solved it before.

The Troubleshooting Process

There are many effective troubleshooting methods. Different people use different methods to arrive at the same solution.

While there may not be one “best” troubleshooting method out there, there are some basic steps you can take to simplify and organize the troubleshooting process.

The basic steps I use when troubleshooting Windows NT are:

- Gather information
- Define the problem
- List probable causes
- Identify possible solutions and attempt to fix the problem
- Resolve and document the problem

The following sections discuss each of these steps in detail.

Gather Information

The troubleshooting process typically starts by a user reporting a problem to you. In this step, you gather specific information that will help you identify the problem.

Talk to the user(s) who is experiencing the problem. Ask a lot of questions.

Specifically, find out:

- What *exactly* is the problem?

Sometimes it's painstakingly difficult and time-consuming to identify the problem. A user's description of a problem, such as "I can't get on the network," can mean anything from "I can't log on" to "I can't get my e-mail." Be patient with the user, and encourage him or her to be as specific as possible.

- If the problem is experienced regularly, *when* does the problem occur?
- If an error message was displayed, *what* did the message say?

Ask the user to write the error message down verbatim, if possible. A paraphrased or otherwise interpreted error message can be extremely difficult to research in a knowledge base.

- Did the user correctly perform all necessary steps to complete the task?

Consider walking the user through the correct steps to see if you can recreate the problem.

- Has whatever is not working now *ever* worked before?
- If it did work before, when did it *stop* working?
- What has changed since the last time it worked?

This may be the single most important question you can ask. I usually ask this question several times during the troubleshooting process. Often, problems are created by users, administrators, or consultants who have changed, fixed, optimized, or otherwise fiddled with a perfectly good, functional system.

Define the Problem

Once you've gathered information, you're ready to define the problem. Sometimes the problem is glaringly obvious from the information you've gathered. Other times, you'll need to piece together bits and pieces of information from various users before you can identify the problem.

Identifying the problem as accurately as you can is an important step, because all of your efforts to resolve the problem, from that point, will be based on this diagnosis.

List Probable Causes

Once you've defined the problem, make a list of all the hardware and software components, configurations, and common user errors that could be a probable cause of the problem. Don't overlook the obvious here. Is it plugged in? Is it turned on? Is the computer cabled to the network?

Sometimes it's difficult to identify probable causes. For example, if an application fails and Windows NT displays an obscure error message, you might have to do extensive research just to come up with one or more probable causes of the problem.

After you've listed all the probable causes you can, place the items on your list in order, from the most likely cause of the problem to the least likely cause of the problem. If your intuition or experience tells you that one or two of the items may be the culprit, place these at the top of your list.

Identify Possible Solutions and Attempt to Fix the Problem

Starting at the top of your list, identify possible solutions for the first one or two probable causes.

Many causes, by their very nature, imply a solution. For example, if you suspect that the cause of the problem is a bad network cable, it's fairly obvious that replacing the network cable should resolve the problem. Other causes, such as a hardware component that's not on the Hardware Compatibility List (HCL), may involve significant amounts of research to come up with a workable solution.

Next, starting at the top of your list of probable causes, implement one of the possible solutions that you identified for the most likely cause of the problem. This may involve repairing, replacing, or reconfiguring the suspected offending component or remedying the suspected user error.

Test the system after this step to determine whether the problem is fixed. If this change *doesn't* fix the problem, restore the system to its original configuration and proceed to the next item on the list. Continue this process until you are satisfied that you have identified the cause and solution to the problem.



Don't change more than one component at a time or you may have a difficult time determining what's broken and what isn't.

Resolve and Document the Problem

Once you have positively identified the problem's cause and solution, permanently implement the solution. If the solution to the problem is a configuration change, no more work is required here—you have already implemented a permanent fix to the problem. However, if you determined that a segment of network cable in a wall (or ceiling) was defective by temporarily bypassing this segment, you will have to have the cable segment in the wall (or ceiling) replaced to fix the situation permanently.

Test the system again to make sure the problem is really fixed, and that you have not created any new problems in the system. If the problem only occurred at specific times, test the system during those times to ensure that the problem has been remedied.

Once you're satisfied that you have resolved the problem, document the problem, the date it occurred, and its solution in a trouble log. This will aid you and other engineers in your company if and when this problem reoccurs.



I can't tell you how many times I've spent four hours solving a problem, only to remember afterward that I had solved the exact same problem six months or a year before. If I'd documented the problem the first time, I would have saved myself four hours of troubleshooting the second time around.

Resources for Troubleshooting

Several resources are available to help you when you're troubleshooting Windows NT. Use these resources — they are your friends.

Using outside resources enables you to draw on the experience of others. Typically, you won't be the first person to have encountered a particular problem. If others have had this same problem before you, it is likely that this problem (and its solution) is documented in a knowledge-base resource.

Troubleshooting resources come in many flavors. Knowledge bases are often chock-full of white papers, configuration hints and tips, and problem-specific troubleshooting information. If you have a modem and/or an Internet connection, you can access download services and FTP sites to obtain the latest patches, fixes, drivers, and white papers. You can also access technical support forums via modem or the World Wide Web. On these forums you can post a question, and other professionals may read it and reply to you.

The next sections discuss some of the most helpful and common Windows NT troubleshooting resources: *Microsoft TechNet*, the Micro House Technical Library, the Microsoft Technical Support Web site, the Microsoft Download Service, and other troubleshooting resources.

Microsoft TechNet

Microsoft TechNet is an invaluable knowledge base — I recommend using it as your first and primary troubleshooting resource. *TechNet* is published monthly by Microsoft on multiple compact discs. In my opinion, the price of an annual subscription is money well spent.

TechNet includes a complete set of all Microsoft operating system Resource Kits (currently in a help file format), the entire Microsoft Knowledge Base, and supplemental compact discs full of patches, fixes, and drivers (so you don't have to spend time downloading them).

TechNet is particularly helpful when troubleshooting a specific problem. When Microsoft Technical Support helps a client troubleshoot a problem, that problem and its solution are documented. All significant problems and their solutions are then placed in the *TechNet* resource. *TechNet* includes thousands of problems and their respective solutions.

Using *TechNet* is fairly straightforward. Figure 26-1 shows the opening dialog box for *TechNet*. Notice the categories that are displayed in the Entire Contents list box.

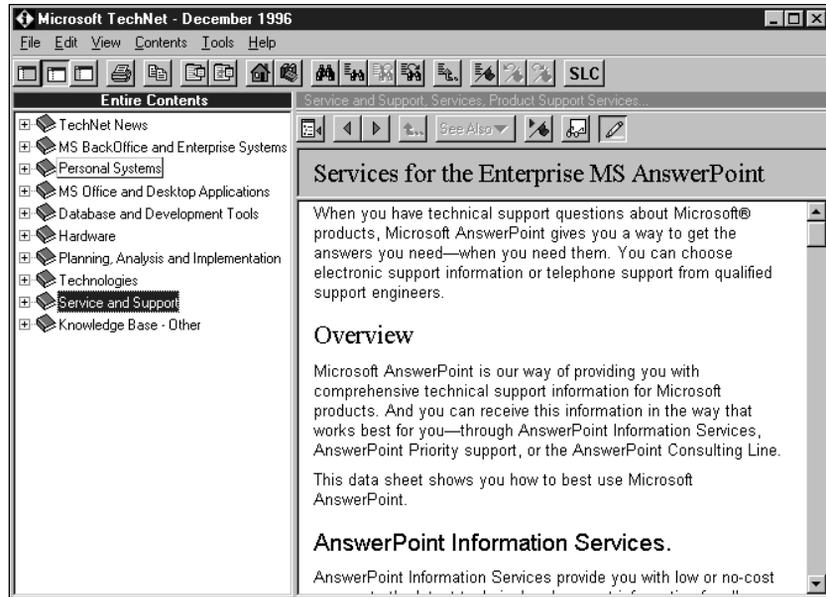


FIGURE 26-1 Starting *Microsoft TechNet*

You can search the entire contents of *TechNet*, or a specific subset of the contents for information on a specific topic. To begin a search, click the Query icon (which appears in the toolbar as a pair of binoculars). The Query dialog box appears, as shown in Figure 26-2.

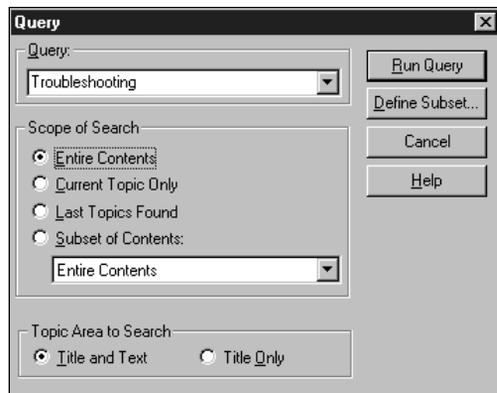


FIGURE 26-2 Performing a search in *Microsoft TechNet*

Type the topic you want information on in the Query drop-down list box. Be as specific as you can. Even when you are specific, don't be surprised to see numerous articles that include the words you searched for. You can include multiple words in your query, and you can use the logical operators AND, OR, and NOT within the query. If you need more information on constructing a query, click the Help command button in this dialog box. When you're ready to execute the search, click the Run Query command button.

I can't recommend this resource highly enough. When you're troubleshooting, think *TechNet* first.



You can order *Microsoft TechNet* by calling (800)-344-2121 in the U.S. If you're a Microsoft Certified Professional or an MCSE, discounts or special promotions may be offered for first-year subscriptions.

Micro House Technical Library

The *Micro House Technical Library* is a useful CD-ROM-based set of encyclopedias that contains hardware configuration information. This resource can be particularly helpful when you need to configure a specific hardware device, such as a motherboard, I/O card, or network adapter.

Have you ever lost the documentation for a hard drive (or any other piece of hardware)? I have. If you have access to the *Micro House Technical Library*, it could save you a lengthy phone call to product support to obtain jumper switch settings and other configuration information.

An evaluation copy of this product is included on the compact disc that accompanies this book. The *Micro House Technical Library* can be purchased from Micro House International. Their phone number for sales (in the U.S.) is 1-800-926-8299.

Microsoft Technical Support Web Site

Microsoft Technical Support has its own site on the World Wide Web. You can access this site by first accessing the Microsoft Support home page at: <http://www.microsoft.com/support/>. Figure 26-3 shows the Microsoft Support home page.

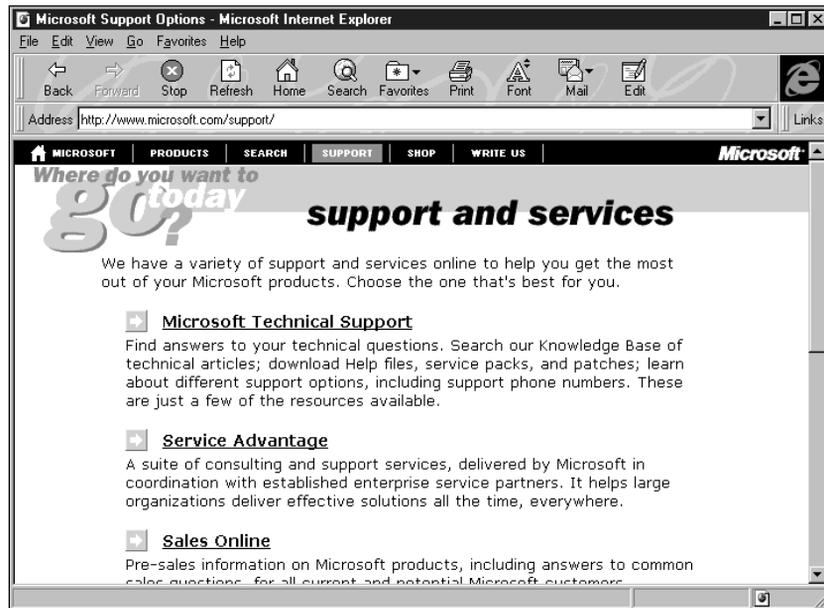
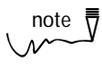


FIGURE 26-3 Accessing the Microsoft Support Web site

Click the Microsoft Technical Support link to access the Microsoft Technical Support home page. A list of several topics/options is displayed on the Technical Support home page, including:

- Knowledge Base
- Troubleshooting Wizards
- Frequently Asked Questions
- Help Files, Service Packs, and Other Files
- Support Options and Phone Numbers
- Submit a Question to a Support Engineer

You can search the Knowledge Base; use the troubleshooting wizards; download service packs, patches, and drivers; or post a question for a support engineer. You can also obtain a phone number to access Microsoft Technical Support engineers directly.

 Be aware that Microsoft charges a fee for most calls to their Technical Support engineers.

The Microsoft Technical Support Web site is a great resource, especially if you don't have *TechNet*.

The Microsoft Download Service

The Microsoft Download Service is a *bulletin board service* (BBS). Through this BBS, you can download patches, fixes, and drivers.

You can access the Microsoft Download Service by using the Windows NT HyperTerminal application. The phone number for the Microsoft Download Service is (425)-936-6735.

The modem settings for accessing the Microsoft Download Service are:

- Data bits = 8
- Parity = 0
- Stop bits = 1
- Flow control = 0

When you first connect to the Microsoft Download Service, a welcome screen appears asking you to enter your full name. After you've entered your name, you'll be prompted to enter the city and state from which you are calling. A scrolling screen containing new user information is displayed. Finally, the main screen appears, as shown in Figure 26-4.

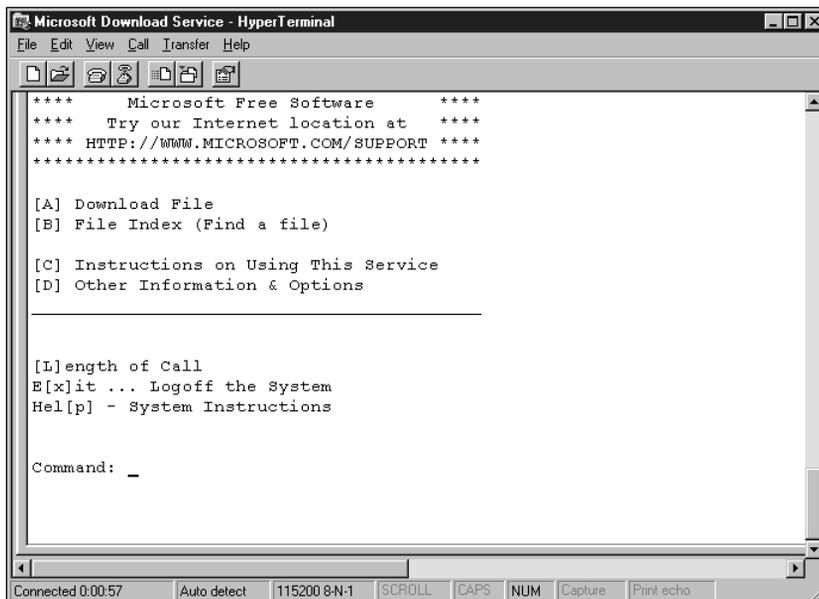


FIGURE 26-4 The Microsoft Download Service main menu

At the main menu, type **B** to access the file index and to search for a file.

Most of the files you can access from the Microsoft Download Service are the same files available on the *TechNet* compact discs and from the Microsoft Technical Support Web site. This resource can be helpful, but it is the least user friendly of the three Microsoft resources mentioned in this chapter.

Additional Troubleshooting Resources

Other troubleshooting resources are available, including online service forums, Microsoft Solution Providers, a Microsoft FTP site, Internet search tools, and professional contacts and colleagues.

Many online services host forums where you can post a question that will be read by many people, a few of whom may even respond with some free advice.

Some helpful forums include:

- The MS WinNT Forum, the MS Win32 Forum, and the NT Workstation Forum on CompuServe
- The Windows NT Workstation Forum and the Windows NT Server Forum on MSN (The Microsoft Network)

Other resources may be as close as your telephone. For example, when I worked for a national computer reseller, I could send a voice mail message requesting help with a specific problem to all the engineers in the company, nationwide. That one call would usually generate five to ten responses within twenty-four hours.

Microsoft Solution Providers usually have multiple MCSEs on staff. These consultants, who are typically available for an hourly fee, can assist you not only with troubleshooting but also with system design and implementation.

Microsoft has another site on the Internet for those who use FTP to download files. You can access this site at <ftp.microsoft.com>. This site has most of the same files that you can access by using *TechNet*, the Microsoft Technical Support Web site, and the Microsoft Download Service.

Several other Internet sites contain Windows NT information. You can find these sites using Internet search tools such as AltaVista, Lycos, and Yahoo!.

Last but not least, don't forget your professional contacts and colleagues. Many times someone you've worked with or met at a conference will have just the bit of information you need to solve a problem. You might consider joining a professional organization or users group where you can meet and network with other industry professionals.



If you want people to share their time and expertise with you willingly, it's a good idea if you're willing to do the same yourself.

Key Point Summary

This chapter defined and described the troubleshooting process. The following points highlight the major issues:

- Troubleshooting is a methodical approach to solving a problem. The best preparation for becoming an outstanding troubleshooter is to understand intimately what you're troubleshooting—in this case, Windows NT, and the computer hardware and networking environment in which it runs.
- The basic steps suggested for troubleshooting are:
 - Gather information
 - Define the problem
 - List probable causes
 - Identify possible solutions and attempt to fix the problem
 - Resolve and document the problem
- Several resources can help you when you're troubleshooting Windows NT, including knowledge bases, Web sites, download services, and others.
- *Microsoft TechNet* is a CD-ROM-based knowledge base. It contains a complete set of all the Microsoft Resource Kits, the entire Microsoft Knowledge Base, and supplemental compact discs full of patches, fixes, and drivers.
- The Micro House Technical Library is a CD-ROM-based set of encyclopedias that contains hardware configuration information.
- The Microsoft Technical Support Web site, which can be accessed at <http://www.microsoft.com/support/>, is also a great resource. On this site you can search the Microsoft Knowledge Base, use troubleshooting wizards, download service packs, patches, and drivers, obtain support telephone numbers, or post a question for a support engineer.

- The Microsoft Download Service is a BBS. Through this service you can download patches, fixes, and drivers.
- Additional troubleshooting resources include online service forums, Microsoft Solution Providers, a Microsoft FTP site, Internet search tools, and professional contacts and colleagues.

Applying What You've Learned

Now it's time to regroup, review, and apply what you've learned in this chapter.

The questions in the following Instant Assessment section will bring to mind key troubleshooting facts and concepts.

Instant Assessment

1. What is troubleshooting?
2. List the five basic steps suggested for troubleshooting.
3. Which troubleshooting resource is published monthly by Microsoft in a multiple compact disc format?
4. What Microsoft Web site can you access to use troubleshooting wizards, download help files and service packs, and post a question to a support engineer?
5. Which Microsoft troubleshooting resource is a bulletin board service (BBS)?



For answers to the Instant Assessment questions see Appendix D.