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Feature

How to Solve Computer Networking Related Problems

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Let's face it, our jobs are about solving problems. It you don't like solving problems, you probably shouldn't be working with computers and computer networking. When the day comes when hardware and software are able to solve problems on their own, that will be the day when we need to find something else to do for a living. The good news is that as hardware and software become increasing complex, the higher the probability that something will go wrong, the lower the probability that the hardware or software will be will be able to fix itself and the guarantee that it will be more difficult than ever to determine what the problem is and how to fix it.

What methods do you use to solve a new problem? What goes into problem solving problems and what are the prerequisites to solving any problem? I'd break the requirements and methods into the following areas:

- Basic understanding of the technologies
- The ability to formulate the right question
- Knowledge of the available problem solving resources
- The ability to use the problem solving resources effectively

Basic Knowledge

You won't even know where to begin if you don't have a basic understanding of the technology. For example, suppose you're an Active Directory expert and you know everything there is to know about Windows 2000 Active Directory. Someone puts an ISA Server 2000 firewall at the edge of your network. Everything is working fine and then Internet access stops. You don't know anything about ISA Server 2000 firewalls. How can you possibly solve the problem? All you know is that "the Internet doesn't work any more".

How often have you heard that sort of question? "The Internet doesn't work any more. Why?" or "The Active Directory isn't working right, how can I fix it?" or "the Exchange Server isn't getting mail, I require a solution now". Those are observations, not problem statements.

In order to solve a problem, you must have a basic understanding of the technology so that you're able to at least categorize the problem. For example, instead of saying "the Exchange Server doesn't work", you would say "the SMTP service isn't receiving mail from external SMTP servers, but its receiving mail from internal SMTP clients and internal SMTP servers just fine". At this point you've narrowed the problem down to "my Exchange Server isn't receiving mail from external SMTP servers.

Don't even try to solve problems with unknown technologies. You're

likely to make the problem worse and much more difficult for the next guy to come and fix if you do.

Asking Questions

The second key to effective problem solving is formulating the right questions. Once you've identified the problem, you can formulate a question or series of questions that guide you on your search for answers. For example, suppose you've identified and summarized the problem with the Exchange Server as we have above. You've identified that the Exchange Server is not accepting mail from external SMTP servers. What kind of questions would you ask?

What would cause the Exchange Server to stop receiving mail from external Exchange Servers?

- What would stop inbound access for TCP port 25?
- Are any other protocols affected, or is it just TCP port 25?
- Are any other servers affected by this inbound SMTP problem?
- What services need to work properly in order to receive mail from external SMTP servers?
- What protocols, other than SMTP, are required to receive mail from

  external SMTP servers?
- Are the SMTP packets arriving at the gateway? Are they arriving to

  the internal SMTP relay? Are they arriving to the Exchange Server?

This is just a small sample of questions that you might ask yourself when trying to solve the problem "external SMTP servers can't send SMTP messages to my Exchange Server". The question asking process serves a very important function. It causes you to focus on the problem and then places you into the *context* of the problem, not just the problem itself. You know problems don't live in isolation, so you first start thinking about "direct causes" (like problems with the Exchange Server itself), and then you consider "indirect" causes (like "what other services are required to get SMTP messages to the Exchange Server?")

It would be great if problem solving were as simple as asking and answering the right questions. The big challenge is to ask the right questions, and the right questions might not be the first ones you ask. If problem solving were easy, you could actually use the decision trees in the Resource Kit to solve your Windows problems! <g>.

The question asking process engages what you know both consciously and what you know unconsciously. It "engages your brain" and starts both your conscious (the "thinking" process that you're aware of) and the unconscious (the processes that you're not aware of) problem solving facilities to go into action. What's amazing is that the unconscious problem solving mechanisms continue to work even when you're done with consciously thinking about the problem. But you have to "feed" these unconscious processes with a lot of well considered questions.

You can set about looking for answers once you have your questions. You'll be able to answer many of the questions using information you already know. For example, you know you can determine if the SMTP packets have arrived at the firewall, SMTP relay and Exchange Server by running a packet sniffer on the interfaces responsible for accepting these messages. Just set up the sniffers and go to an external network client to send a message via an external SMTP server and watch the action.

Problem Solving Resources

Sometimes you'll run up against a wall and need extra help. Where can you go?

- Look up the answer in a book
- Use a mailing list dedicated your subject
- Use a newsgroup dedicated to your subject
- Use a search engine like **www.google.com** or **www.alltheweb.com**
- Pay a consultant

The first method, looking up an answer in a book, is how things used to be done. I think most of us now use books more for entertainment and education more than we use them for problem solving. Book indexes just aren't very good at helping solve problems.

A mailing list is a great way to solve problems. The key is figuring out what mailing list to ask the question. The trick is to ask the question correctly. Make sure you do your research first so that you can formulate the question according to the traditions and mores of the group. If you don't, the "list trolls" will shoot you down.

Newsgroups are probably the best place to find answers. Just remember that newsgroups share the same burden as mailing lists: you need to formulate your questions correctly or you'll not get an answer or worse, scorn will be poured upon you. The great thing about newsgroups is this is the place the best and brightest hang out. Although not technically newsgroups, you can often find excellent advice on Web boards, such as those you find at
http://boards.cramsession.com/boards/default.asp

Search engines are the problem solving method of choice among many experienced problem solvers. For example, you can use Google to search not only Web sites, but newsgroups as well. The requirement is to ask the right question by formulating the right query. Putting together good queries is a matter of trial and error combined with experience.
And that brings us to the last step: using these problem solving resources effectively. Mailing lists and newsgroups are always a crapshoot because you have to hope someone will take time to think about your problem and know the answer. On the other hand, Google is nice because if you type in the question you often will be able to come up with an answer, even if there is no specific article that contains the precise answer to your questions or problem.

Using a Consultant

Your resource of last resort is the consultant. The consultant is an uber specialist who has insights and knowledge of the subject that's giving your problems. They see things you don't see. However, you have to be sure to pick the right specialist. All specialists consider problems to be nails and they are hammers. If the problem is the "nail" of their specialty, you could end up wasting a lot of money.

Using Google

Let's return to our example and add a twist. During our question asking process, we discovered that the firewall protecting the network is ISA Server. What search string would you use when you get to the Google search page? How about:

"isa server" inbound exchange stops

Most of the stuff on the first page doesn't look very interesting. Look at the entries on the second and third page. Nothing obvious stick out. However, while reading the results of the Google search, you realize that you forgot about the spam filtering software on the SMTP relay. Google helped you because there were a lot of advertisements for spam filtering software! You check the spam whacker and you realize that your "assistant" had misconfigured the software and it was identifying everything as spam!

Problem solved. (BTW -- this was a real life problem).

Conclusion

Problem solving requires basic knowledge, question asking, knowledge of available question answering resources and the ability to use the resources effectively. There's one more thing: practice. The more often you put yourself into problem solving mode, the better you'll get. That's how the "old pro's" are able to seem like magicians when they solve problems. They do it everyday and go through these processes so quickly that they don't expend much energy consciously engaging their problem solving processes. They just kick in!

Take some time to help other people with their problems if you don't have enough problems to solve at work. Make a goal to solve 2 or 5 or 10 or 20 problems a day. You'll notice that you'll be able to solve more problems each day as you get better. I hope you you'll benefit from what you've read here and please let me know if you have your own problem solving tips and tricks.

Thomas W Shinder, .Net Admin bi-Weekly Editor
Co-Author, **Configuring ISA Server 2000**
Co-Author, **ISA Server and Beyond**

Q & A

What SMTP Servers are Responsible for Domain Mail?   ▲ to top

Question:

Hi Dr. Tom,

How can you find out what the MX record is for a website? If there is one? I know that you can find out the DNS record using NSLOOKUP <website name>. What can you use to find out what the MX is? I have a Web server set up and I can send mail out but I am not getting it back to me. I am not getting an error that it can't be delivered, so I want to make sure that the MX record is there and that it is at the right address. Thanks! --Smitty

Answer:

Thanks for writing us, Smitty! MX records are used by SMTP servers to determine what server or servers receive mail for a particular domain. The MX record depends on the existence of a Host (A) record. For example, you have domain named domain.com. Your mail server's name is mail.domain.com and its IP address is 222.222.222.1. Your MX record points to mail.domain.com and the Host record for mail.domain.com points to 222.222.222.1. That's how SMTP servers figure out what IP address to send SMTP mail to for a specific domain. You can use the nslookup tool to find information about MX records. Check this out:

```
F:\>nslookup
Default Server: constellation.tacteam.net
Address: 192.168.1.185

> set type=mx
> brainbuzz.com.
Server: constellation.tacteam.net
Address: 192.168.1.185

Non-authoritative answer:
brainbuzz.com MX preference = 20, mail exchanger =
mail.brainbuzz.com
brainbuzz.com MX preference = 10, mail exchanger =
mail2.brainbuzz.com

brainbuzz.com nameserver = bbdns3.brainbuzz.com
brainbuzz.com nameserver = ns1.cramsession.com
brainbuzz.com nameserver = ns2.cramsession.com
brainbuzz.com nameserver = ns3.cramsession.com
brainbuzz.com nameserver = ns4.cramsession.com
mail2.brainbuzz.com internet address = 209.82.99.7
mail.brainbuzz.com internet address = 206.132.202.17
```

When you get to the nslookup command prompt, use the "set type=mx" command so that you query for MX records. Here you can see Cramsession has two mail servers and the addresses are resolved at the bottom for the print out.

How Can I Hide Servers from the Browse List?

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Question:

Dear Dr. Tom,

Hey I just recently ran a command on my ISA server to have it hidden from view from my clients via my network places. The command was something like this

C:\set /Server:servername /hidden or something like this but I can't remember it can anyone help me out on this one? Thanks! --Drifter

Answer:

Hey Drifter, great question! The browser service is a NetBIOS dependent broadcast based service that was designed for small LANs and workgroups. It's one of the legacy Microsoft networking services that refuses to die a natural death. The good news is that you're moving in the right direction! For security reasons, you should hide all of your servers from the browser service. Users should explicitly connect to resources using a UNC path, or a mapped network drive. Allowing users to browse the network for "interesting" information is a setup for disaster. Check out the link for details on hiding machines from the browse list.

http://support.microsoft.com/?kbid=128167

Security Advisories

Flaw in ISA Server DNS Intrusion Detection Filter Can Cause Denial of Service   ▲ to top

IThere's a problem with the DNS Intrusion Detection Application Filter that could allow an intruder to disable the functionality of a DNS server publishing rule. The intruder won't be able to compromise the DNS server or even the ISA Server, but will cause a DoS condition for external users trying to access the machine.

Read more...

The Promise and Peril of Palladium   ▲ to top

What about Palladium? First, its name has changed, but that's not important right now because its sure to change several times over the next few years. What's important is whether it's a security measure or just an irritating dongle. Check out what security guru Tim Mullen has to say on this subject and make your own decision.

Read more...

Flaw in Windows Script Engine Could Allow Code Execution   ▲ to top

A flaw exists in the way the Windows Script Engine for JScript processes information. An attacker could exploit the vulnerability by constructing a web page would execute code of the attacker's choice with the user's privileges when the user visits the page or opens an email with the code.

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News Headlines and Resources

Is Bigger Better or Do Good Things Come in Small Packages?   ▲ *to top*

There seem to be two very disparate trends afoot in the design of notebook computers today. On the one hand, portables are growing bigger, stronger, more powerful, and becoming more like desktop systems in terms of features and specifications. On the other hand, we're seeing smaller, lighter, more compact portable systems that can be carried anywhere without weighing you down. Which is best and which will win?

Read more...

Office 2003 OneNote Demo   ▲ *to top*

Office 2003 brings a new player to the Office suite: OneNote. This new app is a note taking and organizing program. Sure, Outlook can do all that, almost. It lets you use handwritten notes, insert pictures, use HTML and lots more. Check out a demo here.

Read more...

Optimizing Bandwidth at Microsoft   ▲ *to top*

How does a networking software company deal with Internet and remote access for over fifty-thousand employees? Bandwidth isn't free, so optimizing bandwidth usage is critical. This article describes how Microsoft optimizes bandwidth and how much money it saves by doing so.

Read more...

How to Remove and Reinstall TCP/IP on a Win2k Domain Controller   ▲ *to top*

What is the nightmare scenario? How about a corrupted network stack on your only domain controller? Doesn't sound good, does it? Don't jump out the window yet! There's hope. Just check out this KB article.

Read more...

The "Bogon" Reference Page   ▲ *to top*

You know what Bogus means. You know bogus when you see it. But what the heck is a "bogon"? You'll be surprised!

Read more...

Using DCOM Through Firewalls   ▲ *to top*

The MMC uses DCOM to communicate with services on the server you want to connect to. What if that MMC console and the service are on opposite ends of a firewall? This article might be what you need.

Read more...

Support WebCast: Microsoft Windows XP: An Overview of   ▲ *to top*
Windows Image Acquisition

This Support WebCast session will provide an overview of Windows Image Acquisition (WIA) in Microsoft Windows XP. It will also outline the new features that are available for imaging devices (such as scanners and cameras) that use WIA device drivers. Not a server admin topic, but still lots of fun!

Read more...

Download of the Week

IHateSpam   ▲ *to top*

We all hate Spam. It's more common and more offensive than ever, and the problem with Spam is going to get worse before it will get better. Fortunately, there are products--notably Sunbelt Software's iHateSpam— that will help eliminate the vast majority of Spam that arrives in your inbox. IHateSpam comes in two versions, one for Outlook (2000/2002) and another for Outlook Express (version 5 or higher). It installs easily and you can run both versions with a single license. Even better, it is incredibly efficient at removing Spam. With the Outlook version, you can get rid of up to 95% of Spam. The Outlook Express version is not quite as efficient, but still provides excellent results. IHateSpam is one of the few products currently on the market that uses an analysis engine to determine if email is Spam. IHateSpam allows for a great deal of customization and comes with a number of a very good features, including ones to ensure that you don't lose email that might be inappropriately identified as Spam.

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