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The image. A young Sudanese woman. If you have no time for the image, you may be missing what makes networking relevant: humanity, her skin in evening light deep as amber, deep as the Sahara at dusk. Her hair cascades in fine black braids—a revelation that black can be warm and unfathomable in its tones. She holds a long, slender leaf over one eye. The leaf's surface branches into a network of fractal infinity. It is just one leave, and it is finer than any network you will ever create. And what does she see with the other eye? Does she see you? How will she shape her world? How will you shape yours?—How does the sum of your networking shape what is around you? Or does it? Is it just a network? Network computing isn't just about servers and NOSes and cabling and protocols; it's about creating a world that never existed and seeing it as you've never seen anything. That being so, the Sudanese woman signifies everything about networking. That's why when our designer (who is at least as good at his work as I am at mine) comes to us with an image like this, I respond the same as I would respond to an eccentric network implementation: I stifle the first impulse: "what in heck were you thinking!" And I try for "Show me what you were thinking; help me to see something I hadn't considered." Anyway, you would not guess a black and white half-tone photograph could have such richness of tones, such textures. Don't overthink it, but think a little outside the box.

—From the Editor

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Q2 INSTITUTE TECHNICAL RESOURCE CD—GET IT, USE IT

BY ED KRACH AND CHRIS HASH

If you had a tool that could turn 30 minutes of time into 24 hours or more, would you use it? Of course you would! Everyone needs more time, especially busy network professionals.

Well, the second-quarter Network Professional Technical Resource CD (Q2 CD) is out. It's a great tool for enhancing your career; it's your one-stop shop for finding and downloading software in minutes instead of hours, keeping current on industry developments, and accessing all kinds of educational resources. We've done the work for you by compiling a wealth of information onto one CD that's fast and easy to use. What's on the Q2 CD? Here are some of the highlights.

Licensed Software. The Technical Resource CD brings live licensed software to your mailbox every quarter. Your membership provides access to some of the hottest solutions in the marketplace via a special agreement for full-version software (for your personal and educational use only). Here's a look at what's on the Q2 CD.

Executive Software

- Disk Keeper 3.0 for NT Server
- Network Undelete for NT - Client
- Network Undelete for NT - Administrator

Symantec

- Norton Anti-Virus for NetWare
- Norton Anti-Virus for Lotus Notes|
- Norton Anti-Virus for NT
- Norton Anti-Virus for Win95
- Norton Anti-Virus for Firewalls
- Norton Anti-Virus for Internet Gateways
- CrashGuard Deluxe
- Norton For Your Eyes Only for Win95
- Norton For Your Eyes Only for NT
- Norton Uninstaller Deluxe

PCAnywhere 8.0
Norton Utilities 3.0

Stac
Reachout Enterprise 8.0
Replica for IntraNetware (for CNI members only)

Network Associates
McAfee VirusScan for NT
McAfee VirusScan for Win95

MCS Dallas

Calypso Mail 2.4

Complete one-stop index to the entire CD. In response to your requests, the Q2 CD's contents will be fully indexed all in one place. Use the index either to find what you want in minutes or to get a more detailed look at the entire CD.

Trial software. Stay up-to-date by reviewing some of the best and newest technology available.

Look in one place—here—instead of hundreds. We've pre-screened the software and included only technically viable programs, so you won't waste any time trying to review software that doesn't work or isn't useful. You'll also save the time of downloading live trial software, because we've already done that for you. Just access the software you want from the CD. You keep up-to-date in much less time, with less work and less distraction. Check out what's in store for you in Q2.

Fluke
Network Inspector 2.1

Cheyenne
ARCserve Replication for NT

Hilgraeve Software DropChute+
Hyper Access

Network Associates
NetXRay 3.0
VirusScan for NT
VirusScan for Win95
WebScanX

Symantec
Visual Page 1.1
Norton Anti-Virus 4.0 for Win95
Norton Anti-Virus 4.0 for NT

IpSwitch WS_FTP Pro 5.0
WS_Ping Pro Pack

What's Up Gold

Artisoft
iShare 3.0

FileMaker
FileMaker Pro 4.0

Visio
Visio Professional

Stac
Replica for IntranetWare

MicroVision
Web Express 3.0

Seagate Software
Backup Exec for NT

Novell and MS NOS updates. Get all the latest updates to Novell and Microsoft NOS software.

The Q2 CD contains over 200 Mb of software updates. You'll find it all in one place on the CD, and you'll save the time of downloading 200 Mb of files. Take the Q2 CD with you to sites that need to be updated, and the download time you'll save grows exponentially.

Over 100 links to new releases, patches, and drivers.

We've created links to over a hundred update pages for various PC and network companies. If you need a new product release, patch, or driver, you can find it quickly here. No more hunt-and-peck searching for individual vendors' web pages! This one tool can save you hours.

Get on the Net. If you're not on the Net already, you should be. Check out our two Internet sign-up packages on the Q2 CD, one from Minespring.com and one from Earthlink. They're both found in the *Internet_signup* directory on the CD. Get on the Net, and get more effective in less time.

Education. An interactive book excerpt, *Pure IP*, by Laura Chappell, is contained on the Q2 CD. Both Novell and Microsoft are moving to a standard Internet Protocol, Native IP. Use this book excerpt to learn about Native IP so you'll know what's going on.

Load the Q2 CD right now

Just put it in your drive, and the first page will come up automatically. You can start clicking right away. Take 30 minutes to peruse the contents of the CD. You'll see how the wealth of software and information it contains can keep you up-to-date, save you time, and enhance your career as

PRODUCT REVIEW: NETWORK GENERAL'S NETXRAY PROTOCOL AND NETWORK MONITOR, VERSION 3.0

BY BOB ROSS, CNP

This article reviews of Network General's newest version (3.0) of its NetXRay Protocol Analyzer and Network Monitor product—a network management tool that lets you capture and decode packets, monitor statistics, and generate network traffic. It runs on Windows 95 and Windows NT (4.0, not on 3.51). It supports Ethernet, Fast Ethernet (100BASE-T), Token-Ring, and 100VG-AnyLAN.

Cool Features

NetXRay using the multitasking capabilities of MS Windows 95 and MS Windows NT to do multiple operations concurrently and to run currently with other applications on the same machine. This also allows it to generate traffic on the network as it is capturing traffic.

NetXRay is capable of capturing all packets at full wire speed while running over 10MB Ethernet, but you will not want to try to capture all packets on a very busy Token-Ring, Fast Ethernet, or 100VG network. As one would expect, over these faster topologies, NetXRay has a hard time keeping up with the traffic flow.

NetXRay supports filters so you only have to look at the traffic that you are interested in. It also supports saving packets to a file in real time. This allows you to capture larger amount traffic than the memory buffer would hold. It decodes most major protocols (the list is long) and allows you to parse and decode nonsupported protocols (such as a proprietary protocol) through custom DLLs that you supply. NetXRay uses an address book to translate HEX node addresses into user-defined names. Network alarms can be set at predefined thresholds and generated.

One of NetXRay coolest features is the ability to set capture triggers that allow you to determine start of capture and end of capture event triggers. If you have a seemingly random problem on your network, and you are having a hard time capturing the packets to analyze the problem, then you can set a trigger to automatically start the capture when the problem occurs. A demo version of NetXRay is on this CD-

ROM and is well worth your time to try it out (The CD-ROM version contains screenshots of NetXRay consoles, statistical screens, graphical traffic map, and so on).

My Experience

I found NetXRay to be very usable and friendly. I have used Novell's Lanalyzer extensively in the past and found NetXRay to be very easy to use without spending a lot of time reading the manual. NetXRay can display a lot of different information and it has many different ways available to display the information. You can see it in table form, bar graph, or pie chart format. You can export the data for use in a spreadsheet. All this helps to visualize what is going on and solve your problems.

Demo Version Constraints

- Only a 256K buffer
- Will only display 5 captured packets
- No file spooling
- No Triggers
- Send a maximum of 5 packets
- Maximum of 5 host in the host table
- Maximum of 5 entries in the matrix table
- Maximum of 5 samples in the history log
- Maximum 5 samples in the protocol distribution log

Product Requirements

The following system requirements are recommended for NetXRay Version 3.0:

- Processor: Intel-based industry standard computer with 80486 DX/50 processor(minimum); Pentium 90 or faster (preferred).
- Memory
 - Windows 95: 12MB minimum; 16MB preferred
 - Windows NT: 24MB minimum; 32MB preferred

- Monitor: 640 X 480, 16 color minimum; 1024 X 768 265 color preferred
- Operating System
Microsoft Windows 95 or Microsoft Windows NT 4.0,
- Network Interface Card: Any NIC using an NDIS 1.2 (32-bit) driver.
- Disk Drive: CD-ROM drive or 3.5-inch, 1.44 floppy drive.
- Hard Disk Space: A minimum of 8MB of available disk space.

Installation

Installation is simple and straight forward. You run the NX30Demo.exe program from the CD-ROM. I did not encounter problems with the installation.

Un-installation

To uninstall the program, you select Add/Remove Programs from the Control Panel. Then you select NetXRayV0300Demo-D and click on Add/Remove. Follow the instructions from there. Be sure to delete the CincoNet directory from under Program Files after the un-installation completes.

Conclusions

I found NetXRay easy to install and use. It has lots of features that would make it an ideal tool to use in solving network problems. The information is accessible and understandable. Its extensive reporting capability makes creating reports of what is happening on the network easy. It is a useful tool and an integral part of any serious network troubleshooter's toolkit.

SOFTSKILLS: KNOWING AND USING TEAM RESOURCES

DARYL ALDER

This is the third in a series of career development articles written especially for network computing and other technical professionals. The Institute recognizes that in addition to continually updating technical skills and gaining work experience, technical experts need to develop professionally and use ethical practices.

Have you ever stopped to ask yourself, "How familiar am I with *all* my resources?" Usually during such a self inventory, things come to mind like money, tools, literature, hardware, software—the stuff around us. But activities like training courses, meetings, and events are also resources. Our time and talents factor in too.

Though these are valuable, a greater resource lies in the people around you. Their time, talents, and contacts are a vital reserve that you should come to appreciate.

Laurie Beth Jones shares an excellent example: "A young physician started his practice hoping to market his sports medicine skills. He spent thousands of dollars advertising in the newspaper week after week with very little result. One day as he was bemoaning his lack of business to his

receptionist, she casually said, 'My husband is the president of the local jogging club. Why don't you do a seminar for them next week?' That was just what he was looking for: one human being, close at hand, with the resources he needed. Soon his practice was filled with people who knew someone whom he knew."

Isn't it amazing how often the least likely team member often has the answer you are desperately seeking. As a network professional, you shouldn't operate in a vacuum; human relationships are simply another network you are responsible for.

Responsibility for your human network demands attention. Just as a computer network's efficiencies can be improved, your human network will improve as you manage its components better. You must take the time to understand how it works, study it as a system and know its strong and weak points.

A good way to start this process is the Resource Capability Inventory. (We developed this simple tool at the Leadership

Institute for Excellence; a 4-day chapter officer leadership training course). Simply list questions on a chart or spread sheet. Each column asks one of the following:

- Who are you?
- What is your contact information? (Address, phone/fax, e-mail)
- What are your greatest talents/strengths?
- What are your outside interests?
- What unique things do you have access to? (Mountain cabin, boat, financial consultant, martial arts studio, etc.)
- Who do you know and what skill do they have?

In a staff meeting, team members can ask these simple questions of each other and record them on flip charts. Or the information could be gathered during performance reviews or following informal chats around the office. Once compiled into a table, it is a revealing document.

Situations will come up where you will need each other's skills, talents, or friends and relatives to get the job done. The process of discovering those resources helps identify tools the team can use to accomplish its tasks. It also prepares them to accept new challenges.

The most important thing you will get out of this process, is coming to know what your team cares about individually, what motivates them, and how they can contribute—sometimes in ways you may have not considered before.

Knowing and using the resources of the group helps form a team. It is a starting point for developing understanding among members. As they learn about each other's abilities, it builds a feeling of unity. In essence it will make your group a team.

Knowing the resources of the group also helps point out strengths and weaknesses in the group's knowledge and skills. It helps the leader set training objectives to improve

team member skills. When the resources are present to teach each other, the team is even further strengthened.

The process will reveal a secondary capacity you may not have been aware of. For example, you may find a team member who has access to a lakeside cabin you can use for a planning retreat. Another may know a business consultant who can help you solve a problem at work. And so on.

In his book *The Greatest Salesman of All Time*, Joe Girard, claims that each person knows at least 250 other people—people he needs to know, who could become his friends and customers. If this is true of all your team members, there must be thousands of resources you could put into your human network.

Leaders are also a resource because they can use their knowledge of the group's resources to organize work. They can select the right tools for the job and draw on the knowledge and skills of group members to get things done.

To serve as a resource, leaders must be aware of their own capabilities, as well as those of the group. In addition they must work to know outside resources available to the group.

When leaders use the knowledge and skills of group members to get a job done, they gain experience and improve their skills. They develop a positive attitude toward using a skill. This in turn improves individual member confidence, which leads to greater team motivation.

Leveraging others so they can play a more vital role in your life and career is an important leadership choice. There are many ways to get to know the people around you, but whatever way you choose it will take time. It has to be a priority since situations will come up where you will need other's skills, talents or friends and relatives to get the job done.

WHETHER YOUR ORGANIZATION IS BIG OR LITTLE, WHAT CAN DIRECTORY SERVICES DO FOR YOU

by Terry L. Jeffress, Niche Associates

In almost any current networking industry magazine, you will encounter some discussion about directory services. Novell and Microsoft argue about whose directory services better suit your needs. Everyone's talking X.500 and LDAP, as if reciting a catechism.

But what exactly is a directory service, and why should you or your customers be interested in having a networked directory? And ignoring industry banter, just what exactly is the real value of a directory?

What is a Directory Service, Really?

Since most network operating systems either have implemented or will soon implement a directory service, you need to know what a directory service is and how to explain directory services to your customers.

Probably the easiest way to explain directory services is to compare a network directory to a common telephone directory. A phone directory provides names, addresses, and phone numbers of residences and businesses in a calling area. When you look up a person in the phone directory, you learn how to contact that person over the telephone network and where that person physically resides.

A network directory can provide a similar service by storing users' names and other information. For example, most email systems implement a directory that enables users to look up the e-mail addresses of other users on that system. Also, most network operating systems maintain a directory of users, their passwords, and a list of access controls defining what network resources those users can use.

In the past, each system implemented its directory in its own way, and usually in a manner incompatible with other applications. For example, email systems and network operating systems maintained separate user directories—in spite of the fact that the two directories store redundant information.

In contrast, a modern network directory service provides a single, unified directory that contains information about all users and is accessible from any application. Thus, both the operating system and the email system could use the same database to store and retrieve data about users.

But network directory services go beyond storing information about users. A directory service provides a flexible, extensible database that can store information about almost anything. Directories store information in objects, and an object can represent anything: a person, a group, a room, a project, a workstation, a network address. Virtually anything you can think of can be represented in a network directory service.

For example, you can create objects in your directory that represent physical resources such as conference rooms and equipment. Then, your scheduling and workflow applications can use the directory not only to determine when all your team members can attend a meeting, but also to find and reserve the closest available conference room, to schedule the equipment you will need, and to notify all the team members by email.

What Can a Directory Do for Me?

Directory services might be the greatest idea since the network interface card, but unless it provides a real return on your investment, you probably couldn't care less. So let's examine some benefits of implementing a directory service.

Network directory service and typical network administration tasks such as adding a new user to the network. Without a directory service, you have to create the user in each independent directory on your network. First, you have to create the user's network operating system account, add the user as a member of the appropriate groups, and assign the user rights to particular files and directories. If you have more than one server or system that the user must access, you must repeat the process

and create a network account for the user on each system.

You probably also have to add the user to the email system, again creating the user, and entering the user's name and data into the email system's directory. You would then have to add the user to any other custom directories that you might have.

If you have a database application, you might have to add the user to the database's directory of authorized users. Do you have a document management system, a project tracking system, a workflow system, a voice mail system, or a payroll system? Then you might have to add the user to the separate directories of each of these independent systems.

However, if all of your applications access a central directory service, then you only have to enter the user's name and details once. Each system can then access information about the user from the directory. You save time by not having to enter user data in multiple systems, and you can have a single administration tool to manage the entire directory, rather than an independent management tool for

each system.

Maintaining contexts of objects such as users. Because of the hierarchical nature of the directory, when you place a user in a container within your tree, that user inherits all default rights and privileges associated with that container. For example, if you have a container that represents a department, then when you place a user object in that container, the user automatically gains the rights to the appropriate files, directories, and network services for that department. If the user changes departments, all you have to do is move the user's object from one container to another, and the user will have all necessary rights appropriate for his or her position in the new department.

Simplifying the user's task. Finally, one of the greatest benefits of a directory service is single sign on. The user only has to log in to the network once. Then whenever the user accesses any network services, the directory service automatically authenticates the user in the background without requiring the user to enter another login name or

THE EVOLUTION OF DIRECTORY SERVICES

Today we have several directory services available, such as the Domain Name System (DNS), Novell's Novell Directory Services (NDS), Netscape's Directory Server, Microsoft's Active Directory, and the ISO's X.500. Like most of these directory services, DNS enables all Internet applications to resolve host names (such as `www.npj.com`) into IP addresses (such as `134.104.76.189`). DNS provides a necessary service, but one limited to a single function. A robust network directory service must be more comprehensive.

In 1988, the Consultative Committee on International Telegraphy and Telephony (CCITT) published the first of two versions of the X.500 Directory Services standard. X.500 was a repository of global directory information—storing user names, passwords, photos, locations, and access controls. Intended to be a replacement for DNS, X.500 also enabled applications to locate resources on the Internet. X.500 was more flexible than DNS, offered users many more features and functions, and provided the ability to extend the database to store any type of object in its directory tree.

So, if this standard for directory services exists, why hasn't it been implemented as widely and as rapidly as other stan-

dards such as HTTP? Most implementations of directory services (particularly NDS and Active Directory) were based on the X.500 specification, but required some refinements. In Novell's case, they found some implementation problems with X.500. For example, searching an X.500 directory took a long time. Although in the end, NDS looked a lot like an X.500 directory, Novell achieved its performance requirements only after some major behind-the-scenes changes.

In an attempt to improve on X.500, researchers at the University of Michigan developed the Lightweight Directory Access Protocol (LDAP) in 1993. LDAP preserves the best features of X.500, but remains efficient and small by using only a portion of the X.500 protocol. The result is a directory service with a standard interface that applications can easily access, but LDAP, unfortunately, can perform only a limited range of directory searches.

Almost everyone still agrees that a global directory is a good idea. Novell and Microsoft both hope that their directory implementation becomes the global standard, while other organizations are betting on LDAP.

password.

What Can a Directory Do for My Applications?

Directory services give you the ability to use applications that can intelligently find network resources. The directory knows where to find resources on behalf of the applications. And you can make changes to your network configuration without disrupting network services.

For example, suppose you need to move your database application to a faster and larger server. Since the directory stores the location of the database, any application that needs to access the database will automatically be able to find the database's new location by using the directory.

Conclusion

We are only on the brink of what directory service-enabled applications can begin to accomplish. This is one of the frontiers in the computer industry, and we will continue to see new applications of directory services that make network management easier and less expensive.

Today we are building enterprise-level applications that span buildings, cities, states, and countries. They may use hundreds of network-accessible resources and support thousands of users. The difficulty arises not only in knowing how to build such applications, but in assuring that all of the components, objects, and data bind together effectively on a global network. What's more, to allow for the easy maintenance of these networks, we need mechanisms such as user configuration, single sign-on, and advanced security.

Directory service products and standards satisfy these requirements. However, as with any set of emerging standards, the use of directory services is more an evolution than a revolution. It's going to take time before we have a common set of directory service products using standards upon which everyone can agree. (For a brief history of today's directory services, see the sidebar "The Evolution of Directory Services")

Even though few companies can implement enterprise-wide directories today, forward-looking users and vendors are seeking ways to take things to the next level, making directories easier to use, leveraging the technology, and reducing the costs to implement and manage your networks.



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NICs Network Professional's Reference exists (1) to support the Institute's Technical Resource CD and (2) to give you something to read about your profession and technology when you're somewhere you'd just as soon not bring your laptop—computer.

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