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## QAZ

There have been many papers discussing the major aspects of the QAZ companion virus, and a compilation of several of these papers indicates that there may yet be surprises. We are dealing with a selective, stealthy infectious agent in that the spreading process is limited. When introduced into on a single LAN without effective AV protection, QAZ can remain for a long time undetected. With QAZ, anything can be uploaded and run. An infected PC can, using uploaded tools, attack anything. When caught in a trace or in a log...

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QAZ is a network worm. It infects “in the fashion of a companion virus”(4, 14). It is a Win32 executable file written in C++. It first appeared in China in July, 2000 and by Aug 9, 2000, SARC had received over 70 submissions (1). Still this virus/Trojan is considered to be the basic vector in the Microsoft hack.

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### THE INFECTION PROCESS

The infection process itself has a surprise. The primary source of infection is thought to consist of delivery by email, downloads from a web site, or through IRC chatrooms (6), but in an article in “From Chaos Manor Mail – Mail 128 – Nov 20-26, 2000” (3) we have the following dialog apparently indicating a forth method of infection.

<http://www.jerrypournelle.com/archives2/archives2mail/mail128.html#QAZ>

See “More on the QAZ situation” – Monday Nov. 20, 2000.

“De ar Jerry,  
With regards to Miles Turneys’ email about the QAZ worm,  
I can confirm that it can infect PCs directly, not necessarily  
via email or downloads

In summer I was running a single PC – no firewall – on  
a dial up connection at our beach house. Two or Three times  
while connected Viruscan popped up a window announcing  
that it had intercepted the QAZ worm. One of these times the  
PC was just setting there idle while we were having supper...

David Cefai”

Whether the PC was sitting in an idle loop or running a screen saver was not said. An analysis of this mode of attack could have said a lot. If this PC was not already infected (the Viruscan apparently did not detect it) the mechanism of this attack through an ISP and dial up modem implies another infection mode available to QAZ..

From this same article (3) Miles Turney speculates as follows which initiated the above response:

“...and I don't think I got the virus from email. I do though spend  
great amounts of time dialed online downloading newsgroups  
files. Right before I was notified about the virus I had just been

online downloading a game for about 3 continuous days. I assume someone probed my machine and uploaded the virus like that since I do not have any type of firewall software. It is also possible that it was in one of the files I downloaded. By the way, I am using Norton Anti-Virus 2001 and it did not detect the virus until I did a full hard-drive scan, even with the latest definitions at the time. It did not detect it when it actually infected my machine. I hope this is informative and keep up the great work on BYTE.

Miles Turney “

Looking at both comments, it is possible to glean the following:

- 1). Neither was using a firewall at the time of infection or attempted infection. Probes would not have been stopped or recorded.
- 2). In the case where infection actually occurred, Norton AV detected QAZ on the HD but not during the download (or entry) process. Viruscan did detect QAZ on the entry process.
- 3). A PC can be probed during a download or in an idle loop for open ports.

Could this fourth mode of infection be directed through some open port at a randomly selected or predetermined IP address? The circumstances in David Cefai's statement can be read to indicate this.

### THE WORM QAZ

Normally the worm spreads a copy of itself through local network drives that are read/write shared. Actually shared files are all that is necessary. The worm scans network resources and looks for the WIN string in their names (1), for example, the WINDOWS directory on a remote computer within a LAN. It then looks for the Notepad.exe file. If it finds it, it renames it Note.com which is a file about 52 kbytes in size and then writes itself into a file named Notepad.exe file which is a file of about 118 kbytes in size (5, 13). The larger size for Notepad.exe and the existence of the file Note.com means probable infection with the QAZ Trojan.

The QAZ worm normally gets into a LAN PC from outside the LAN via its virus character as an email attachment that must be opened by someone (6). Infection is not enough however. The worm must be activated by a user running Notepad.exe (1). When activated, the worm registers itself in the windows registry in the auto start section:

HKLM\Software\microsoft\Windows\Current Version\Run by entering the value

Start IE = “Notepad.exe qazwsx.hsq”



write or upload files, and execute files, delete files.

Detailed removal instructions and a fix tool for QAZ are found in (5) and are not repeated here. Norton's AV Center suggests sharing with read-only access or using password protection on the shares if write access is necessary. Encrypted file transfer is another option (9).

## SPECULATION AND THE GREATEST HACK

The QAZ virus was found involved in the Microsoft hack (8) where Gary McGraw said: <http://www.zdnet.com/enterprise/stories/main/0,10228,2652161,00.html>

“...the QAZ Trojan found at Microsoft is a form of remote execution software that is planted on a computer through an e-mail attachment, a Word document.

Once the document is opened, an underlying Word Macro or Application script is activated and ...”

There are many reasons why Microsoft may have been hacked. We got the Biggest, an assault on Microsoft's image, an attempt to plant dirty code or having some think that someone did thereby impairing Microsoft's credibility, to post the source code claiming “Information Should Be Free”, to trade the code in the hacker community, to demonstrate that with enough time, resources, and money, almost any computer network can be hacked. On and on the list of possible reasons go. Perhaps only the hacker knows for sure.

But, hacking and a successful hack are not the same thing. Most are caught rattling the doors. A few get in but are discovered (and possibly identified and caught) before any compromise occurs. On occasion however, a hacker gets in and undiscovered, spends weeks and possibly much longer with his effort (2).

Somehow QAZ got onto an internal development LAN at Microsoft. It was not detected when it entered or for some time after. Estimates range from a few days to months. It either came in through the mail servers most likely well protected with AV software or it was brought in some other way. There are several possibilities.

QAZ could have been sent in as an encrypted email attachment sent to an employee with an account somewhere on the development LAN in question. (Sending it to all on the LAN is an option but this would have to be handled by the server from the inside by some kind of “copy all” request). That would get it past the mail server AV software and onto the LAN. If that LAN did not use host AV on its PCs, or had it turned off, this employee would have to decrypt the email to infect his PC. QAZ would still have to be activated by accessing Notepad on that infected PC. Then QAZ will spread by the Trojan

mode to most if not all of the other PCs on that LAN that had shared Windows directories or shared Notepad.exe files.

This Microsoft LAN could also have been initially infected via sneaker-net, either through detachable media or by connecting it to an infected portable PC. It has been said that an employ had taken a portable PC home and that PC became infected while connected to the Internet via a dial up ISP. Two possibilities:

- 1). This portable PC was infected as a result of a horrific QAZ spamming incident on the Internet (10).
- 2). This PC was targeted via IP address (possibly random) / port scanned and infected as described by the forth method under “The Infection Process” while connected to the Internet via his ISP (3).

Both of these seem remote. For Microsoft, most papers I’ve read favor infection by email attachment. Encrypted email attachments requires decryption on the inside. All methods require activation on the inside by accessing Notepad. The Windows directory is not normally a shared directory. Notepad.exe is not normally a shared file. The C drive...?

The rest is history.

## WHAT’S NEXT

From an MSNBC news Bulletin (2) written by Bob Sullivan, MSNBC, we get a glimpse using five quips from this document found at:

<http://www.msnbc.com/news/481998.asp?cp1=1#BODY>

(See complete story).

“Microsoft break-in takes hacking to a new level.”

“. . .But computer-security experts have long feared what a clever hacker with a more stealthy virus planted inside a company might be able to accomplish. Those fears are now reality, and the successful attack on Microsoft is being called “the biggest hacking case ever,” ...”

“ ... “WE’VE BEEN FORECASTING worm-based industrial espionage to happen for quite some time,” said Mikko Hyppönen, anti-virus researcher for F-Secure Corp. “It has finally happened. I’m just surprised it happened at the top.” ...”

“...At a hacker conference in Amsterdam this week called “Black Hat Briefings,” computer security researchers were openly speculating about the possibility of a successful Trojan attack. One theory: a computer criminal could create a designer virus aimed at breaking into a single company, authored so it would spread in only a limited fashion. That would prevent the rogue program from calling attention to itself, which would prevent anti-virus companies from finding it and adding it to their anti-virus detection software. ...”

“ ...“There is no way to guarantee you are 100 percent secure,” said one hacker, who asked not to be identified. “If you really want to do it, you can write a program to do that.”

A successful attack would only require convincing one employee to open the virus. ...”

Any of this sound familiar?

## LESSONS LEARNED

We are dealing with a selective, stealthy infectious agent in that the spreading process is limited. When introduced into on a single LAN without effective AV protection, QAZ can remain for a long time undetected. With QAZ, anything can be uploaded and run. An infected PC can, using uploaded tools, attack anything. When caught in a trace or in a log, the owner is the owner of the infected PC and not the attacker. Usually the attack tools will be found on the QAZ infected PC only during use. They will not be there when someone knocks on the door (12).

The most desirable PCs to infect are those that are always left on and connected to a LAN that is connected to the internet or connected to an ISP through a DSL. These machines are always available to the attacker either through the back door or through direct logon via the users account name and password provided by QAZ.

The first lesson: Turn the PC off when not in use for more than a few hours. This denies the use of the PC to the attacker when you are not using it, which is usually a large percent of the 24 hour day. When you are using it, consider heavy unexpected HD use to be trouble and act accordingly (12).

The second lesson: If you are on a well protected internal LAN and things from the inside start showing up on the outside, some host(s) on that internal LAN probably contain(s) a big surprise (11).

The third lesson: Even with up to date AV you can still be infected. AV companies may not know about a new virus or Trojan and with no signatures, you will not be able to detect the intruder with a simple scan.

The fourth lesson: Learn to use Netstat -a and run it often. This will list all ports that are connected and all ports that are listening and can be connected to by others. You want to know about any that you don't normally use.

The fifth lesson is the unthinkable one. If you are dealing with a selective limited spreader, there may be an insider involved. Contact, then leave it to the people whose job it is to handle this type of thing.

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## RESOURCES:

1. F-Secure Virus Descriptions:  
NAME: Qaz ALIAS Worm QAZ , Worm\_qaz  
<http://www.Europe.F-Secure.com/v-descs/qaz.shtml>
2. MSNBC How did it happen? By Bob Sullivan MSNBC  
<http://www.msnbc.com/news/481998.asp?cp1=1#BODY>  
(Click on complete story).
3. From Chaos Manor Mail – Mail 128, Nov 20 – 26, 2000  
See “AND more on the QAZ Situation:” Monday Nov. 20, 2000  
<http://www.jerrypournelle.com/archives2/archives2mail/mail128.html#QAZ>
4. Open Document  
  
Name: QAZ.worm  
Aliases: QAZ.trojan,TROJ\_QAZ.A,W32.HLLW.Qaz.A,QAZ  
<http://www.canada-av.com/sensible/home.nsf/0e4787861e3415d6852568c900171f98/8c257bbb0cf2c4388525693b007f82c9?OpenDocument>
5. SYMANTEC SECURITY UPDATES W32.HLLW.Qaz.A  
(Companion Virus)  
<http://www.sarc.com/avcenter/venc/data/w32.hllw.qaz.a.html>
6. Qaz.trojan Infects Networks By Robert Vamosi August 14, 2000  
<http://www.zdnet.com/filters/printerfriendly/0,6061,2605063-2,00.html>  
also  
<http://www.zdnet.com/zdhelp/stories/main/0,5594,2605063,00.htm>
7. THE SECURIUS NEWSLETTER  
December 7, 2000 | Vol. 1, #11 | <http://www.securius.com>  
<http://www.securius.com/newsletter/archive/111.txt>
8. Experts ponder the Microsoft attack  
Charles Babcock, Interactive Week  
November 9, 2000 4:37 PM ET  
<http://www.zdnet.com/enterprise/stories/main/0,10228,2652161,00.html>

9. EBuilt An Enterprisr Application Builder – ENCRYPT is the answer.  
<http://www.ebuilt.com/MeetEbuilt/Covered/10092000cw.htm>
10. Linnet Solutions \_ The home PC model “How was Microsoft Cracked”  
<http://www.ec11.dial.pipex.com/virus.htm>
11. **Microsoft Corporation: "What the QAZ happened?"**  
Timothy J. Rogers November 21, 2000  
**The Microsoft Hack:**  
<http://www.sans.org/infosecFAQ/malicious/QAZ2.htm>
12. **QAZ Trojan on Campus** Deanne Palmer November 21, 2000  
[http://www.sans.org/infosecFAQ/malicious/QAZ\\_campus.htm](http://www.sans.org/infosecFAQ/malicious/QAZ_campus.htm)
13. QAZ by Kevin Skelly - UMass  
[http://www.oit.umass.edu/publications/at\\_oit/spring01/skelly-viruses.html](http://www.oit.umass.edu/publications/at_oit/spring01/skelly-viruses.html)
14. UVa Information Technology and Communication  
Virus Alert on W32.HLLW.Qaz.A  
<http://www.itc.virginia.edu/desktop/security/w32hllwqaz.html>

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SANS Baltimore Fall 2018	Baltimore, MDUS	Sep 08, 2018 - Sep 15, 2018	Live Event
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SANS London September 2018	London, GB	Sep 17, 2018 - Sep 22, 2018	Live Event
SANS Network Security 2018	Las Vegas, NVUS	Sep 23, 2018 - Sep 30, 2018	Live Event
Oil & Gas Cybersecurity Summit & Training 2018	Houston, TXUS	Oct 01, 2018 - Oct 06, 2018	Live Event
SANS DFIR Prague Summit & Training 2018	Prague, CZ	Oct 01, 2018 - Oct 07, 2018	Live Event
SANS Brussels October 2018	Brussels, BE	Oct 08, 2018 - Oct 13, 2018	Live Event
SANS Amsterdam October 2018	Amsterdam, NL	Oct 08, 2018 - Oct 13, 2018	Live Event
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