Global Information Assurance Certification Paper

Patch DoS
December 12, 2001
Chad Oleary

Background

> "Research carried out by Activis on upgrades required for several leading products, has shown that for a company with an infrastructure of only 8 firewalls and nine servers, the IT manager would have had to make 1,315 updates in the past nine months, year to date. This is equivalent to five updates per working day. In addition, they would be expected to manage over half a million log file entries every day." (1)

Introduction

With the current economic situation throughout the world, recent events regarding homeland security in the United States, and the ongoing transition into a new E business era, the pressure to secure our networks and systems has resulted in some troubling trends. While we are all aware of the "ship first, patch later" methodology used in most IT projects, we are just starting to feel the ramifications of these methods as they relate to security in a 24x7x365, e-commerce environment.

Too Many Patches, Not Enough Time

From the example provided above, you can see that the situation is bad. To compound this, recent outbreaks of Code Red, Nimba, et al., have left most organizations in a situation that could be termed "Patch DoS". Put simply, the industry is nearing a Denial of Service condition due the timing and frequency required by the patch process. The research from Activis goes even further to say that this is "jeopardizing network security." (1)

We can look to the past of software development for some clues as to what has happened and what we can expect. What if Netscape had taken the time to "do it right?" Would we even know about them? How about this story from an IBM software engineer: "I have installed software that did not work at all. When I reluctantly printed out the readme, it said that this software requires a patch available on the Internet. I could hardly believe that a manufacturer would ship software that was completely broken and then require its users to download a patch to enable it to work." (2)

To compound the issue, clustered systems to provide High Availability usually need to have the entire cluster taken offline, upgraded, and then, hopefully, restored to service. Try doing this to your HSRP routers, firewalls pairs, redirection devices, and operating systems at your e-commerce site. You'll quickly find out that you've spent so much time patching these systems that you're now out of business.

What? These systems are not patched?

From time to time we have all run into that one application that refuses to cooperate as attempts are made to patch the underling operating system. At this point we need to bring in the programmers and dig through the code to find the culprit so that the operating system can be patched. Now the IT manager is faced with more than a simple patch, it's now diverted virtually all the resources at her disposal. To compound the matter, patches are supposed to be "infrequent", so often policies generally do not exist and time is not allocated to allow for these efforts.

Another notion that was presented by Stephan Somogyi, of ZDNet:

> "One reason why security-related updates aren't being installed is almost certainly inertia. The system isn't crashing and anyone who's spent more than a few days being a system administrator knows that good updates can go very bad indeed and wreak havoc with one's uptime. Better to leave well enough alone, some might think." (3)

While this may still be the case at some shops, I think we have all seen recent events turn even the most die-hard uptime fan turn into a patch believer. However, in the context of addressing the patch problem, Mr. Somogyi goes on to say, "Bruce Schneier argues that a standardized certification entity is a bad idea, and his arguments are reasonable. However, the FBI's dire warnings are unlikely to have any effect until there's some kind of enforcement oomph behind it." (3)

Certified to Patch

Bruce Schneier fittingly describes the founding of Underwriters Laboratories in a special to ZDNet:

> "Underwriters Laboratories (UL) is an independent testing organization that rates electrical equipment, safes, and a whole lot of other things. It all started in 1893, when William Henry Merrill was called in to find out

> why the Palace of Electricity at the Columbian Exposition in Chicago kept catching on fire (not the best way to tout the wonders of electricity).” (4)

The example that Mr. Schneier offers is that of a safe, “Safes, for example, are rated based on time and materials. A "TL-15" rating means that the safe is secure against a burglar limited to safecracking tools (and not torches or explosives) and 15 minutes' working time.” (4).

These ratings are exactly what the Center for Internet Security is beginning to initiate for IT systems. The members of this organization are the same players that have helped bring security out of the unspoken world and into the boardroom, such as ISC² and SANS. As part of this process to rate and evaluate the security of server and network operating systems, the Center for Internet Security intends to rate these systems on a scale of 1-10. The center has released several tools in assessing the security of networked systems. They have released platform specific tools to perform a benchmark analysis of Windows 2000 and Solaris. They have also released “An Automated Scanning Tool for the SANS/FBI Top Twenty List.” (5)

With tools like this in place, we can begin to bring some order to the patch process. Not only do we now have the ability to rate which patches need to be applied first, and where, but we can also show a benchmark for our progress. To help things even more, these tools can be used again and again to determine if a patch has created “new” problems that were unexpected. Also, they can help benchmark the successes or failures of many of the proposed upgrades to the patch process.

Patching the Patch Process

One of the proposals with Microsoft’s recent security commitment is to integrate the patch delivery process for security related patches into Anti-Virus updates. While this has it own set of political and technical concerns, none quite so directly impact the security community as the issues regarding policy:

> “Eric Chien, chief researcher at antivirus firm Symantec, said the threat is likely to be compounded by Microsoft's dot-Net strategy for online software. ‘Dot-Net uses a policy-based approach to security. The transition to dot-Net is potentially a nightmare for administrators, who will need to be sure that all their policies are correct. The ability to roll out patches to these firms will not help them to set their policies correctly,’” (6)

The dot-Net strategy to approach security via policy is an excellent way to help the small and medium sized companies to begin to understand policies, and

their role in any sized networked environment. However, if these patches overwrite policies previously defined, this could be a major hindrance to acceptance of policy at any organization.

Cryptosystem design has already proven that the concept of peer review and open development works quite well. DeCSS has proven quite well that closed cryptosystems will almost certainly succumb to compromise. These peer reviews and disclosures have been key in identifying and closing security weakness on all major vendors products – whether they be closed or open source.

In reaction to recent events, Microsoft is successfully creating a closed circle for disclosure of potential vulnerabilities, rather than have them disclosed publicly. While this may help keep the "script kiddies" from getting their hands on tools to wreak havoc with the Microsoft product line, is it going to help get the vulnerabilities patched? Already, the indications are no. Recently, Jouko Pynnonen of Oy Online Solutions, Ltd. submitted a serious flaw to Microsoft in their browser:

> "Oy Online Solutions Ltd's security experts have found a flaw in Microsoft Internet Explorer that allows a malicious website to spoof file extensions in the download dialog to make an executable program file look like a text, image, audio, or any other file. If the user chooses to open the file from its current location, the executable program will be run, circumventing Security Warning dialogs, and the attacker could gain control over the user's system.
>
> **VENDOR STATUS**
>
> Microsoft was contacted on November 19th. The company doesn't currently consider this is a vulnerability; they say that the trust decision should be based on the file source and not type. The origin of the file, ie. the web server's hostname can't be spoofed with this flaw. It's not known whether a patch is going to be produced. Microsoft is currently investigating the issue." (7)

To date, @stake, Bindview, Foundstone, Guardent, Internet Security Systems, and Microsoft have announced their intention to participate in this organization. Other members are expected to join the organization in the coming weeks. The current members have proposed using the RFC process to develop future standards for security disclosures. Three characteristics are to be present in each standard developed:

> "Comprehensive. They would cover virtually all aspects of a recommended security vulnerability handling process, including topics like how and where to report a security vulnerability; how long a vendor should take to investigate the report; and the format and content of a

security advisory. They would discuss the obligations of both vendors and researchers.

Collaborative. The standards would provide a framework for a cooperative, collegial relationship between vendors and security researchers that helps all of us deliver on our mutual goal of protecting computer users.

Broadly accepted. Because the standards would be developed as part of the open RFC process, all interested parties would have an opportunity to review drafts and provide feedback. It is our hope that the standards will represent the consensus of the industry, and that the vast majority of the industry will embrace them." (8)

The impact of this organization to the security industry is significant. While it seems to be well intentioned, the potential danger is exemplified in the potential IE hole, explained above, that is yet to be patched. The following are some short-term proposals from the organization:

"Report and address security vulnerabilities thoroughly and expeditiously.

Provide users with a reasonable opportunity to protect their systems against newly announced security vulnerabilities, by observing a 30-day grace period before disclosing details for exploiting the vulnerabilities.

Exercise due diligence when developing security tools, to limit their use to only lawful purposes." (8)

Conclusions

The process of software, system, and network creation has the built in correction and update system, known within the industry as the patch process. We can continue to expect the "ship now, fix later" process. To compound the issue, with the pressures from political and economic situations around the world, we can continue to expect shortages of competent security professions, increased attacks on our infrastructure, and even more demands to provide the services required by an E business driven economy.

The new initiatives to help improve this process, such as certification and the formation of organizations are welcomed. Participation of the entire community is going to be key to the success of these initiatives. Not only participation by patching, and keeping patched the systems we maintain, but also helping to assist in patching the patch process.

References

1) “Demands on IT managers is jeopardizing security.” 29 Nov. 2001. URL: http://www.activis.com/en/contentnews/news29-11-01.html (12 Dec. 2001).

2) Olson, Geoff. “SHODDY SOFTWARE.” URL: http://www.geocities.com/SoHo/Gallery/3452/hitset.htm (12 Dec. 2001).

3) Somogyi, Stephan. “Security lapses must be penalized.” 16 Mar. 2001. URL: http://www.zdnetindia.com/techzone/enterprise/stories/16935.html (12 Dec. 2001).

4) Schneier, Bruce. “Are you ready for a cyber-UL?” 2 Jan. 2001. URL: http://www.zdnet.com/zdnn/stories/comment/0,5859,2669708,00.html (12 Dec. 2001).

5) Center for Internet Security. URL: http://www.cisecurity.org (12 Dec. 2001).

6) Morgan, Gareth. “Microsoft 'patch-bundling' faces hurdles.” 9 Oct. 2001. URL: http://news.zdnet.co.uk/story/0,,t269-s2096745,00.html (8 Dec. 2001).

7) “2001-11-26 Security Note: File extensions spoofable in MSIE download dialog”. Oy Online Solutions Ltd. 11 Nov. 2001. URL: http://www.solutions.fi/index.cgi/news_2001_11_26?lang=eng (12 Dec. 2001).

8) “Organization to Propose Vulnerability-Handling Standards”. Microsoft. Nov. 2001. URL:http://www.microsoft.com/technet/treeview/default.asp?url=/technet/security/news/standard.asp (12 Dec. 2001).