



Albany Division



CYBER SECURITY ADVISORY

DATE ISSUED:

28 July 2010

SUBJECT:

Windows Zero Day Exploit Targeting Siemens SIMATIC WinCC and PCS7 Platforms

EXECUTIVE SUMMARY:

This technical advisory is being provided as an information resource in response to the malware that was discovered on 14 July 2010, which exploits an un-patched Microsoft vulnerability and is targeting the Siemens SIMATIC WinCC and SIMATIC PCS 7 platforms used by SCADA and process control systems (PCS). Technical information, recommendations, and a list of further resources are provided below.

The exploit and the malware used in this attack has been detected on USB sticks, but may be passed through any removable media including CDs, DVDs, floppy disks, and network connections. The malware is known to affect any Windows XP or later system; however, the exploit is believed to work on all Windows operating systems. The exploit runs when a user views the contents of the folder containing the exploit through Windows Explorer or any other program that displays icons. If the icons are displayed, the malware is able to infect the computer without any further user interaction. The malware gathers information from the SCADA/PCS system's SQL database.

Reports indicate that numerous critical infrastructure systems both inside and outside of the US are exhibiting symptoms of malware leveraging this vulnerability. The Siemens' 19 July 2010 advisory states that the latest versions of TrendMicro, McAfee and Symantec Anti Virus programs detect this malware. Siemens is currently analyzing the runtime effects of these antivirus programs, to the SCADA systems. Currently Siemens has approved using the Sysclean tool from TrendMicro for detecting and removing the malware.

Microsoft acknowledges this vulnerability and as of the date of this bulletin, has not issued any patches.

While this exploit is currently used with malware that targets the Siemens SCADA and PCS software, it is likely that this exploit will be used in future malware packages targeting Microsoft Windows systems.

If your system is compromised, please report the incident to FBI Albany, the New York State Police or the United States Secret Service.

TECHNICAL DESCRIPTION:

A vulnerability has been discovered in Windows Shell in the way it processes shortcut 'LNK' and Program Information File 'PIF' files that could allow automatic file execution. Exploitation may occur when the user views the displayed icon of a specially crafted LNK shortcut or PIF file. No user interaction is required other than viewing the folder where the specially crafted file is displayed. Successful exploitation may result in an attacker gaining the same privileges as the logged on user. Depending on the privileges associated with the user, an attacker could then install programs; view, change, or delete data; or create new accounts with full user rights. Current reports indicate that this vulnerability is being exploited through USB and other removable media. It is also possible for this vulnerability to be exploited through network shares and web folders using Web-based Distributed Authoring and Versioning (WebDAV). Within Microsoft Systems, the web client service, enables the system to connect to a WebDAV server using this built in service. This can allow an attacker to alter the web folders made available. Microsoft has also stated an attacker could embed an exploit in a document that supports embedded shortcuts or hosted browser controls, such as, Microsoft Office documents, e-mail attachments, or web sites.

This vulnerability is being exploited in targeted attacks and currently being detected as W32.temphid (Symantec), Troj/Stuxnet-A (Sophos), or Rootkit.TmpHider (VirusBlokAda). The malware created to exploit this vulnerability is targeting SIMATIC WinCC and SIMATIC PCS 7 systems. WinCC is a PC-based operator control and monitoring system for visualizing and operating processes, production flows, machines and systems in all sectors.

The malware attempts to install a rootkit by utilizing Windows device drivers signed with a digital signature of Realtek Semiconductor Corp. This certificate expired on June 12, 2010 and was revoked by Verisign on July 16, 2010. Once successfully installed on a system, mrxnet.sys and mrxcls.sys files are placed in the %SystemRoot%\System32\drivers folder. Additionally, two files (oem6c.pnf and oem7a.pnf, content of which is encrypted) are placed in the %SystemRoot%\inf directory according to the analysis performed by VirusBlokAda. Once the malware is executed, it will hide the malware files as well as the appropriate LNK files.

This malware appears to be trying to steal sensitive information from the infected systems. Specifically, the malware uses the Siemens default password of the MSSQL account WinCCConnect to log into the PCS7/WinCC database and extract process data and possibly HMI screens. A backdoor to the infected computer is opened. Siemens does not recommend removing this default account at the current time as it is unknown what Siemens software services rely on this account. Siemens recommends that appropriate users reach out to Siemens for further recommendations.

It should be noted that although having AutoPlay disabled will prevent automatic file execution on removable disks, this feature is not disabled on Windows operating systems by default. Disabling the Autorun feature (which AutoPlay is a feature of) will limit the potential attacks, however, the attack could still be successful if the user browses to the folder containing the LNK or PIF file of the removable disk

WORK AROUNDS:

Microsoft has not released a patch for this vulnerability at this time, but is currently providing a workaround to stop LNK and PIF icons from displaying and disabling the use of WebDAV which are the current attack vectors.

To stop shortcut LNK icons from displaying, perform the following steps:

1. Click **Start**, click **Run**, type **Regedit** in the **Open** box, and then click **OK**.
2. Locate and then click the following registry key:
HKEY_CLASSES_ROOT\lnkfile\shell\IconHandler
3. Select the value (Default) on the right hand window in the Registry Editor. Press Enter to edit the value of the key. Remove the value, so that the value is blank, and press Enter.
4. Restart explorer.exe or restart the computer.

To stop PIF icons from displaying, files perform the following steps:

1. Click **Start**, click **Run**, type **Regedit** in the **Open** box, and then click **OK**.
2. Locate and then click the following registry key:
HKEY_CLASSES_ROOT\piffile\shell\IconHandler
3. Select the value (Default) on the right hand window in the Registry Editor. Press Enter to edit the value of the key. Remove the value, so that the value is blank, and press Enter.
4. Restart explorer.exe or restart the computer.

To disable the WebClient service perform the following steps:

1. Click **Start**, click **Run**, type **Services.msc** and then click **OK**.
2. Right-click **WebClient** service and select **Properties**.
3. Change the Startup type to **Disabled**. If the service is running, click **Stop**.
4. Click **OK** and exit the management application.

RECOMMENDATIONS:

We recommend the following actions be taken:

- Ensure that all anti-virus software is up to date with the latest signatures.
- Run TrendMicro's Sysclean tool which is approved by Siemens to detect and remove virus.
- Follow Siemens latest recommended procedures.
- Blocking outbound SMB connections on the perimeter firewall will reduce the risk of remote exploitation using file shares.

- Disable the displaying of icons for shortcuts and PIF files until a patch becomes available.
- Disable the WebClient service where possible.
- Install the appropriate vendor patch as soon as it becomes available, after appropriate testing.
- Establish policies for the use of removable media on all enterprise and control system networks. Where possible, restrict the use of removable media on control system networks and disable ports/drives.
- Implement Group Policy Objects that restricts where software may be executed, where possible.
- Disable Autorun functionality.
- Separate business networks and control system networks. If possible, install a second firewall between the two networks and block all reasonable connections between the two networks.
- Prevent control system networks from obtaining any Internet access.
- Check certificate warning messages for the names "Realtek Semiconductor Corp." and use appropriate caution when installing other drivers with expired or invalid certificates.
- Employ strict egress and ingress filtering and implement filtering rules for types of traffic that does not have a documented business need to reduce the impact of a successful attack.

REFERENCES:

US-CERT:

<http://www.kb.cert.org/vuls/id/940193>

Microsoft:

<http://support.microsoft.com/kb/2286198>

<http://www.microsoft.com/technet/security/advisory/2286198.mspx>

[http://technet.microsoft.com/en-us/library/cc781337\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc781337(WS.10).aspx)

<http://support.microsoft.com/kb/967715/>

<http://blogs.technet.com/b/mmpc/archive/2010/07/16/the-stuxnet-sting.aspx>

Siemens:

<http://www.automation.siemens.com/WW/forum/guests/PostShow.aspx?PageIndex=1&PostID=225811&Language=en>

<http://support.automation.siemens.com/WW/llisapi.dll?func=cslib.csinfo&lang=en&objid=43876783&caller=view>

VirusBlokAda:

<http://www.anti-virus.by/en/tempo.shtml>

SANS:

<http://isc.sans.edu/diary.html?storyid=9199>

<http://isc.sans.edu/diary.html?storyid=9181>

CVE:

<http://www.cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2010-2568>

Krebs on Security Blog:

<http://krebsonsecurity.com/2010/07/experts-warn-of-new-windows-shortcut-flaw/>

F-Secure:

<http://www.f-secure.com/weblog/archives/00001986.html>

http://www.f-secure.com/weblog/archives/new_rootkit_en.pdf

<http://www.f-secure.com/weblog/archives/00001987.html>

<http://www.f-secure.com/weblog/archives/00001989.html>

<http://www.f-secure.com/weblog/archives/00001991.html>

<http://www.f-secure.com/weblog/archives/00001992.html>

<http://www.f-secure.com/weblog/archives/00001993.html>

Security Focus:

<http://www.securityfocus.com/bid/41732>

Sophos:

<http://www.sophos.com/blogs/chetw/g/2010/07/15/windows-day-vulnerability-shortcut-files-usb/>

<http://www.sophos.com/blogs/chetw/g/2010/07/16/windows-day-attack-works-windows-systems/>

<http://www.sophos.com/blogs/chetw/g/2010/07/20/shortcut-mitigation-certificate-revocation/>

<http://www.sophos.com/blogs/chetw/g/2010/07/20/certified-uncertainty/>

Recommended Distribution:

This CTICG Cyber Security Advisory may be distributed without restrictions. It is recommended especially for owners and operators of control systems; however, since this relates to an unpatched vulnerability in Microsoft Windows, widespread exploitation could occur potentially impacting anyone running Microsoft Windows, therefore, large scale dissemination of this CTICG Cyber Advisory is recommended.