A Trend Micro Research Paper

Operation Pawn Storm

Using Decoys to Evade Detection

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INTRODUCTION

Operation Pawn Storm refers to economic and political espionage attacks instigated by a group of threat actors primarily targeting military, embassy, and defense contractor personnel from the United States and its allies. Opposing factions to and dissidents of the Russian government, international media, and even the national security department of a U.S. ally were also targeted. The threat actors used three attack vectors—spear-phishing emails with malicious attachments, an advanced network of phishing websites, and exploits injected into legitimate Polish websites. Among the targets of the advanced phishing attacks were ACADEMI, a defense contractor formerly known as "Blackwater," SAIC, and the Organization for Security and Co-operation in Europe (OSCE). As discussed in this research paper, the attackers used a simple but clever JavaScript trick to target Microsoft™ Outlook® Web Access (OWA) users from the previously mentioned organizations. The OWA phishing attacks seemed effective and so could be particularly dangerous to any organization that allows employees to use OWA.

An in-depth look at six multistage attacks revealed one thing in common—the use of SEDNIT/Sofacy malware [1], [2]. The use of such multistage downloaders provided attackers additional protection against detection. We believe the threat actors aimed to confuse their targets' IT administrators by making it hard for them to string attack components together, thus evading detection.

This research paper details when certain attacks occurred, what tools were used in attempts to get in to target networks, and target profiles to form a general picture of Operation Pawn Storm.

TIES THAT BIND THE OPERATION PAWN STORM ATTACKS TOGETHER

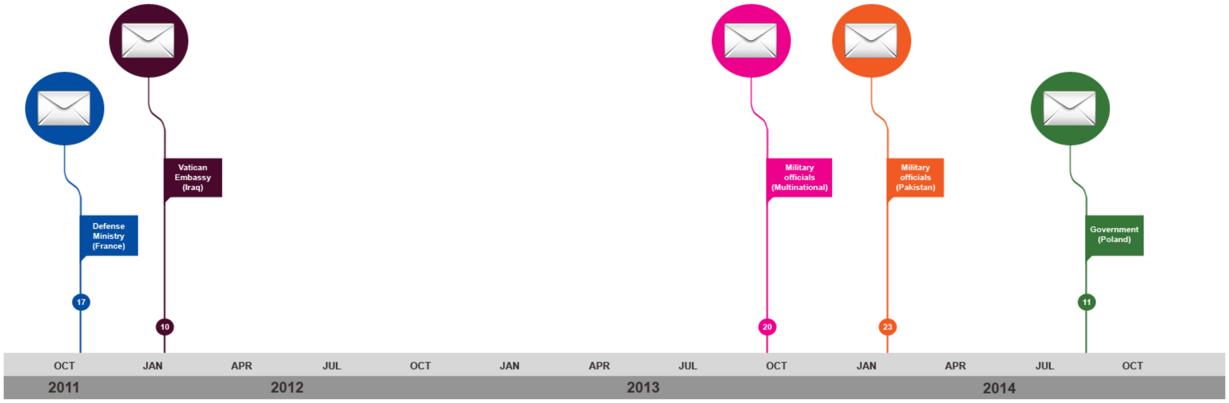
SEDNIT

SEDNIT malware are mostly backdoors [3], [4] and information stealers [5] that log affected users' keystrokes, steal system information, and send stolen information to remote command-and-control (C&C) servers.

Analyses of the SEDNIT infectors that arrived as email attachments in the attacks featured in this paper revealed six distinct chains [see diagram on page 3].

Attack Timeline

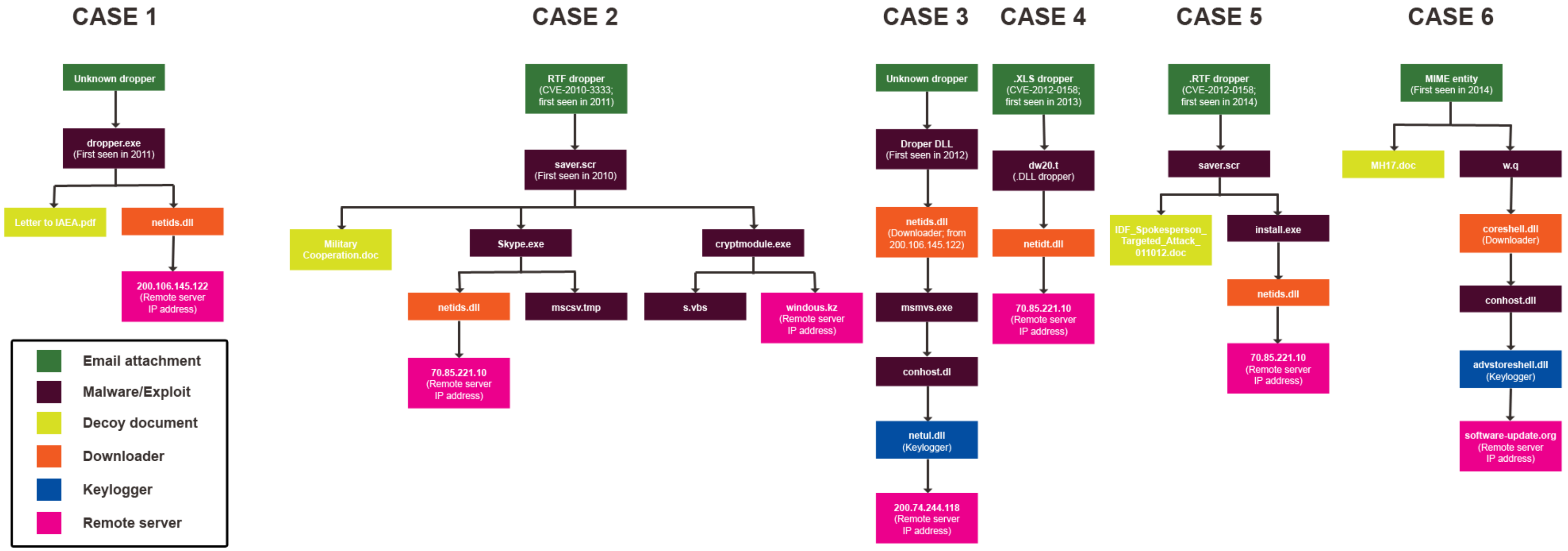
The investigation focused on a group of attacks that has been dubbed "Operation Pawn Storm" [6] due to the attackers' use of two or more connected tools/tactics to attack a specific target similar to the chess strategy it was named after. This paper illustrates how the Pawn Storm attacks were carried out with the aid of five spear-phishing emails, which used contextually relevant subjects to get specific targets from different countries to open weaponized attachments designed to compromise their systems.



Timeline of spear-phishing emails sent to specific targets

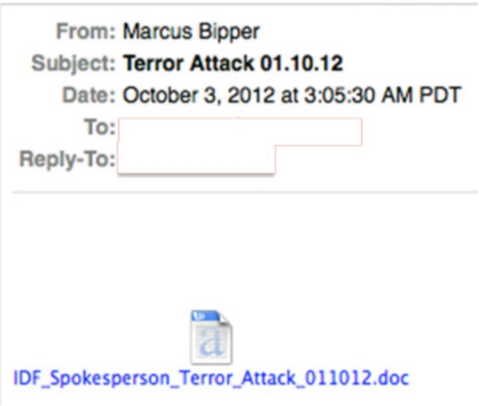
The attackers sent emails to potential victims, including military, embassy, and defense contractor personnel. The following emails were among those that were found related to this operation:

- An email sent to a potential victim from the Ministry of Defense in France had an exploit for CVE-2010-3333 [7] disguised as a document named *"International Military.rtf."* Trend Micro received a sample of this on October 17, 2011 and has been detecting it as TROJ_ARTIEF.AP [8] since then.
- An email sent to a potential victim working from the Vatican Embassy in Iraq used reports of a bombing incident [9] that occurred on January 9, 2012 as social engineering lure.


CASE 1
Unknown dropper
dropper.exe (First seen in 2011)
Letter to IAEA.pdf
netids.dll
200.106.145.122 (Remote server IP address)
CASE 2
RTF dropper (CVE-2010-3333; first seen in 2011)
saver.scr (First seen in 2010)
Military Cooperation.doc
Skype.exe
cryptmodule.exe
netids.dll
mscsv.tmp
s.vbs
windous.kz (Remote server IP address)
70.85.221.10 (Remote server IP address)
CASE 3
Unknown dropper
Droper DLL (First seen in 2012)
netids.dll (Downloader; from 200.106.145.122)
msmvs.exe
conhost.dl
netul.dll (Keylogger)
200.74.244.118 (Remote server IP address)
CASE 4
.XLS dropper (CVE-2012-0158; first seen in 2013)
dw20.t (.DLL dropper)
netidt.dll
70.85.221.10 (Remote server IP address)
CASE 5
.RTF dropper (CVE-2012-0158; first seen in 2014)
saver.scr
IDF_Spokesperson_ Targeted_Attack_ 011012.doc
install.exe
netids.dll
70.85.221.10 (Remote server IP address)
CASE 6
MIME entity (First seen in 2014)
MH17.doc
w.q
coreshell.dll (Downloader)
conhost.dll
advstoreshell.dll (Keylogger)
software-update.org (Remote server IP address)
🟩 Email attachment
■ Malware/Exploit
🟨 Decoy document
🟧 Downloader
🟦 Keylogger
■ Remote server

SEDNIT infectors attached to targeted attack campaign emails

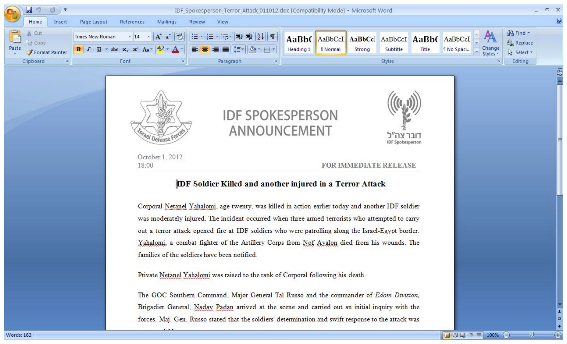
Sent a day after the incident, the email had a Microsoft Word® file attachment named *"IDF_Spokesperson_Terror_ Attack_011012.doc,"* which exploited CVE-2012-0158 [10].



From: Marcus Bipper
Subject: **Terror Attack 01.10.12**
Date: October 3, 2012 at 3:05:30 AM PDT
To:
Reply-To:

IDF_Spokesperson_Terror_Attack_011012.doc

Sample email sent to recipients from the Vatican Embassy in Iraq



IDF SPOKESPERSON ANNOUNCEMENT

October 1, 2012
18:00

FOR IMMEDIATE RELEASE

IDF Soldier Killed and another injured in a Terror Attack

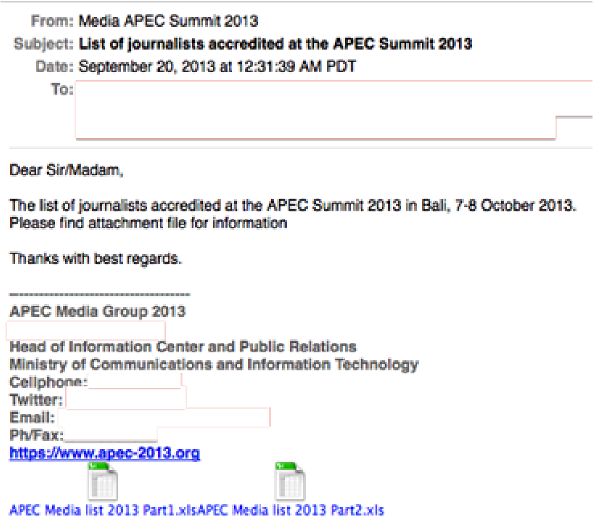
Corporal Netanel Yahalomi, age twenty, was killed in action earlier today and another IDF soldier was moderately injured. The incident occurred when three armed terrorists who attempted to carry out a terror attack opened fire at IDF soldiers who were patrolling along the Israel-Egypt border. Yahalomi, a combat fighter of the Artillery Corps from Nof Ayalon died from his wounds. The families of the soldiers have been notified.

Private Netanel Yahalomi was raised to the rank of Corporal following his death.

The GOC Southern Command, Major General Tal Russo and the commander of *Edom Division*, Brigadier General, Nadav Padan arrived at the scene and carried out an initial inquiry with the forces. Maj. Gen. Russo stated that the soldiers' determination and swift response to the attack was

Exploit for CVE-2012-0158 disguised as a Word (.DOC) file

- An email sent on September 20, 2013 to military officials from several countries used the then-upcoming “Asia-Pacific Economic Cooperation (APEC) Indonesia 2013” conference as bait. The email had two Microsoft Excel® file attachments named *“APEC Media list 2013 Part1.xls,”* which exploited CVE-2012-0158, and *“APEC Media list 2013 Part2.xls,”* which was nonmalicious.



From: Media APEC Summit 2013
Subject: **List of journalists accredited at the APEC Summit 2013**
Date: September 20, 2013 at 12:31:39 AM PDT
To: [redacted]

Dear Sir/Madam,

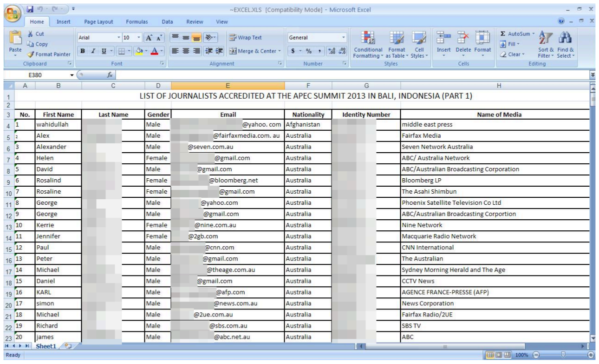
The list of journalists accredited at the APEC Summit 2013 in Bali, 7-8 October 2013.
Please find attachment file for information

Thanks with best regards.

APEC Media Group 2013
[redacted]
Head of Information Center and Public Relations
Ministry of Communications and Information Technology
Cellphone: [redacted]
Twitter: [redacted]
Email: [redacted]
Ph/Fax: [redacted]
https://www.apec-2013.org

APEC Media list 2013 Part1.xlsAPEC Media list 2013 Part2.xls

Sample email sent to military officials across countries using the “APEC Indonesia 2013” conference as bait



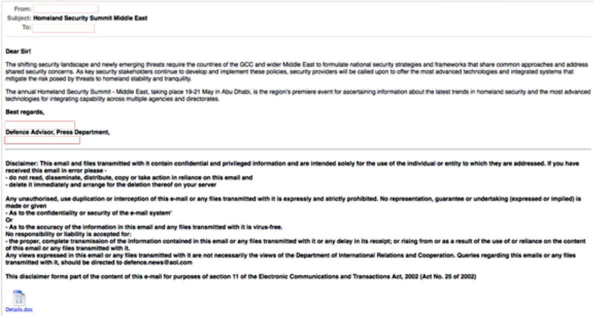
~EXCEL.XLS [Compatibility Mode] - Microsoft Excel

LIST OF JOURNALISTS ACCREDITED AT THE APEC SUMMIT 2013 IN BALI, INDONESIA (PART 1)

No.	First Name	Last Name	Gender	Email	Nationality	Identity Number	Name of Media
1	wahidullah	[redacted]	Male	[redacted]@yahoo. com	Afghanistan	[redacted]	middle east press
2	Alex	[redacted]	Male	[redacted]@fairfaxmedia.com. au	Australia	[redacted]	Fairfax Media
3	Alexander	[redacted]	Male	[redacted]@seven.com.au	Australia	[redacted]	Seven Network Australia
4	Helen	[redacted]	Female	[redacted]@gmail.com	Australia	[redacted]	ABC/ Australia Network
5	David	[redacted]	Male	[redacted]@gmail.com	Australia	[redacted]	ABC/Australian Broadcasting Corporation
6	Rosalind	[redacted]	Female	[redacted]@bloomberg.net	Australia	[redacted]	Bloomberg LP
7	Rosaline	[redacted]	Female	[redacted]@gmail.com	Australia	[redacted]	The Asahi Shimbun
8	George	[redacted]	Male	[redacted]@yahoo.com	Australia	[redacted]	Phoenix Satellite Television Co Ltd
9	George	[redacted]	Male	[redacted]@gmail.com	Australia	[redacted]	ABC/Australian Broadcasting Corportion
10	Kerrie	[redacted]	Female	[redacted]@nine.com.au	Australia	[redacted]	Nine Network
11	Jennifer	[redacted]	Female	[redacted]@2gb.com	Australia	[redacted]	Macquarie Radio Network
12	Paul	[redacted]	Male	[redacted]@cnn.com	Australia	[redacted]	CNN International
13	Peter	[redacted]	Male	[redacted]@gmail.com	Australia	[redacted]	The Australian
14	Michael	[redacted]	Male	[redacted]@theage.com.au	Australia	[redacted]	Sydney Morning Herald and The Age
15	Daniel	[redacted]	Male	[redacted]@gmail.com	Australia	[redacted]	CCTV News
16	KARL	[redacted]	Male	[redacted]@afp.com	Australia	[redacted]	AGENCE FRANCE-PRESSE (AFP)
17	simon	[redacted]	Male	[redacted]@news.com.au	Australia	[redacted]	News Corporation
18	Michael	[redacted]	Male	[redacted]@2ue.com.au	Australia	[redacted]	Fairfax Radio/2UE
19	Richard	[redacted]	Male	[redacted]@sbs.com.au	Australia	[redacted]	SBS TV
20	james	[redacted]	Male	[redacted]@abc.net.au	Australia	[redacted]	ABC

Exploit for CVE-2012-0158 disguised as an Excel (.XLS) file (APEC Media list 2013 Part1.xls)

- An email sent to Pakistani military officials on January 23, 2014 used the “Homeland Security Summit Middle East” [11] conference as bait. It had a Word file attachment named *“Details.doc,”* which exploited CVE-2012-0158.



From: [redacted]
Subject: **Homeland Security Summit Middle East**
To: [redacted]

Dear Sir!

The shifting security landscape and newly emerging threats require the countries of the GCC and wider Middle East to formulate national security strategies and frameworks that share common approaches and address shared security concerns. As key security stakeholders continue to develop and implement these policies, security providers will be called upon to offer the most advanced technologies and integrated systems that mitigate the risk posed by threats to homeland stability and tranquility.

The annual Homeland Security Summit - Middle East, taking place 19-21 May in Abu Dhabi, is the region's premiere event for ascertaining information about the latest trends in homeland security and the most advanced technologies for integrating capability across multiple agencies and directorates.

Best regards,

[redacted]
Defence Advisor, Press Department,
[redacted]

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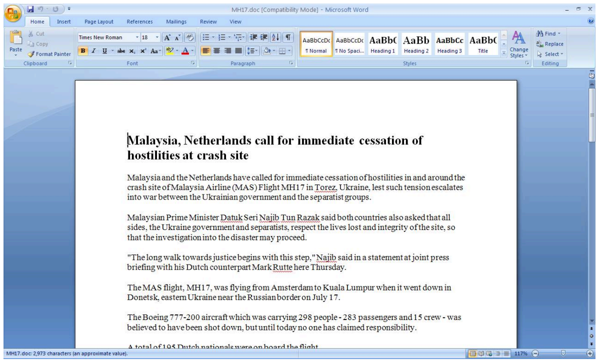
Details.doc

Sample email sent to military officials from Pakistan using the “Homeland Security Summit Middle East” conference as bait

- An email sent to Polish government employees [12] on August 11, 2014 had a MIME HTML (.MHT) file attachment named *“MH17.doc,”* which exploited CVE-2012-0158.



MH17.doc [Compatibility Mode] - Microsoft Word

Malaysia, Netherlands call for immediate cessation of hostilities at crash site

Malaysia and the Netherlands have called for immediate cessation of hostilities in and around the crash site of Malaysia Airline (MAS) Flight MH17 in Torez, Ukraine, lest such tension escalates into war between the Ukrainian government and the separatist groups.

Malaysian Prime Minister Datuk Seri Najib Tun Razak said both countries also asked that all sides, the Ukraine government and separatists, respect the lives lost and integrity of the site, so that the investigation into the disaster may proceed.

"The long walk towards justice begins with this step," Najib said in a statement at joint press briefing with his Dutch counterpart Mark Rutte here Thursday.

The MAS flight, MH17, was flying from Amsterdam to Kuala Lumpur when it went down in Donetsk, eastern Ukraine near the Russian border on July 17.

The Boeing 777-200 aircraft which was carrying 298 people - 283 passengers and 15 crew - was believed to have been shot down, but until today no one has claimed responsibility.

A total of 195 Dutch nationals were on board the flight.

MH17.doc: 2,973 characters (an approximate value).

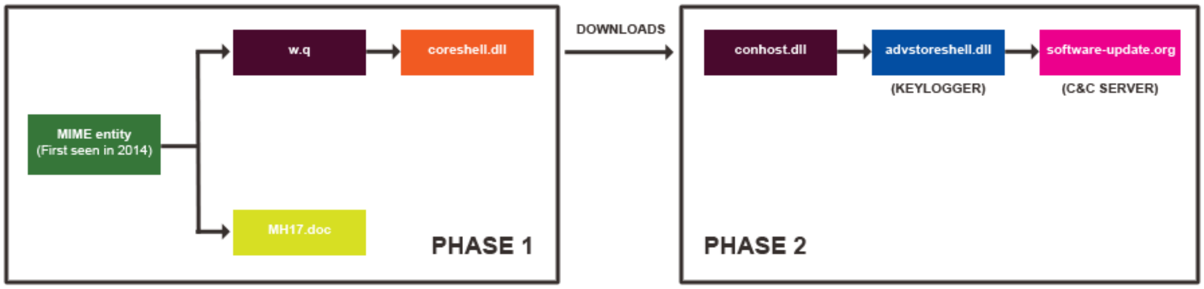
Exploit for CVE-2012-0158 disguised as a MIME HTML (.MHT) file

Attack Details

All of the observed Operation Pawn Storm attacks comprised several stages. Each attack had at least two phases:

- In phase 1, opening the email attachment displays a decoy document while the exploit runs in the background. The exploit drops a downloader component (.DLL file) named *“netids.dll,” “netidt.dll,”* or *“coreshell.dll.”*

- In phase 2, the downloader component communicates with a C&C server and downloads a dropper that ultimately installs a keylogger. After capturing information from infected systems, the keylogger sends data back to the C&C server.



Phases 1 and 2 in an Operation Pawn Storm attack

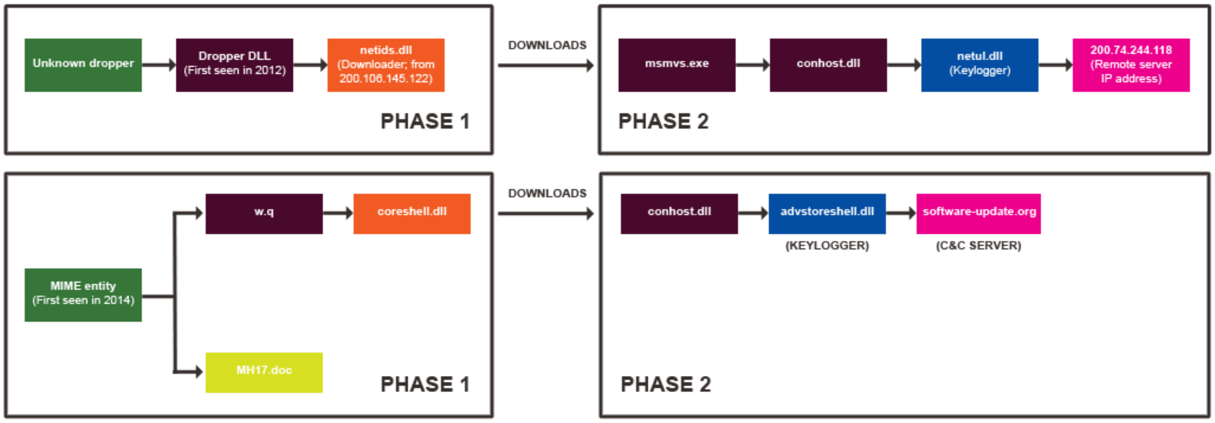
We only managed to collect latter-stage payloads for two out of the six aforementioned attacks. The C&C servers tied to the other four attacks refused to serve the rest of the files to complete the attack chains.

Multistage attacks are a double-edged sword. If one link in the attack chain, aside from the end node, is detected and removed in the initial infection stage, the entire attack fails. On the other hand, having several links in the attack chain makes detecting the final component more difficult. Tracing the previous and next links is also difficult when any of the components is inspected on its own outside the attack chain.

Although some of the C&C servers were still alive at the time of investigation, they did not respond to our infected systems. Repeated attempts to trick the C&C servers into serving the next files in the incomplete attack chains failed. The attacks they were tied to could be time sensitive and it is possible that they no longer hosted the files for succeeding stages.

Attack Evolution

Even though the filenames used for different components remained fairly consistent from 2010 to the present, earlier attacks were more elaborate and complex compared with those seen this year. The 2014 attacks we have seen were more streamlined.



Comparison of an Operation Pawn Storm attack in 2011 and another in 2014

Although variations in past and current attack chains exist, both are still being used by threat actors to date to ensure one thing—detection evasion. The following table compares and contrasts the six Operation Pawn Storm attacks in greater detail.

Operation Pawn Storm Attack Comparison

Case 1	Case 2	Case 3 [13]	Case 4	Case 5	Case 6
Unknown exploit, possibly disguised as a .PDF, .DOC, or .RTF file, carries the top-level dropper *(dropper.exe;* SHA-1: *72cfd996957bde06a02b0adb2d66d8aa9c25bf37)*	.RTF file exploits CVE-2010-3333 (SHA-1: *956d1a36055c903cb570890da69deabaacb5a18a)* and drops *saver.scr* (SHA-1: *e8b55d9aeff124df4008b0d372bf2f2d3e5e5ae7)*	Unknown exploit carries a dropper (Dropper DLL; SHA-1: *9c622b39521183dd71ed2a174031ca159beb6479)*	Two .XLS files come with spear-phishing emails: • First file *(APEC Media list 2013 Part1.xls;* SHA-1: *a90921c182cb90807102ef402719ee8060910345)* exploits CVE-2012-0158 • Second file *(APEC Media list 2013 Part2.xls;* SHA-1: *b3098f99db1f80e27aec0c9a5a625aedaab5899a)* is a decoy document	.RTF file (SHA-1: *78d28072fdabf0b5aac5e8f337dc768d07b63e1e)* exploits CVE-2012-0158 and drops *saver.scr* (SHA-1: *7FBB5A2E46FACD3EE0C945F324414210C2199FFB)* into *<Local Settings>\Temp\*	.MHT file drops: • *MH17.doc* (SHA-1: *DAE7FAA1725DB8192AD711D759B13F8195A18821),* a decoy document, into *<Local Settings>\Temp\* • *W.q* (SHA-1: *8DEF0A554F19134A5DB3D2AE949F9500CE3DD2CE),* a dropper, into *<Local Settings>\Temp\*

Operation Pawn Storm Attack Comparison					
Case 1	**Case 2**	**Case 3** [13]	**Case 4**	**Case 5**	**Case 6**
Dropper.exe drops: • Decoy file *(Letter to IAEA.pdf;* SHA-1: *6ada11c71a5176a82a8898680ed1eaa4e79b9bc3)* into *<Local Settings>\Temp*\ • Downloader *(netids.dll;* SHA-1: *c5ce5b7d10accb04a4e45c3a4dcf10d16b192e2f)* into *<Local Settings>\Application Data*\	*Saver.scr* drops: • Decoy document *(Military Cooperation.doc;* SHA-1: *0E12C8AB9B89B6EB6BAF16C4B3BBF9530067963F)* into *<Local Settings>\Temp*\ • *Skype.exe* (SHA-1: *550ABD71650BAEA05A0071C4E084A803CB413C31),* a SEDNIT variant, into *<Local Settings>\Temp*\ • *Cryptmodule.exe* (SHA-1: *4B8806FE8E0CB49E4AA5D8F87766415A2DB1E9A9)* into *<AppData>\Microsoft\Crypt*\	Dropper DLL drops *netids.dll* (SHA-1: *dd61530076152dae568b4834b1899212c96c1a02)* into *<Local Settings>\Application Data*\	*APEC Media list 2013 Part1.xls* drops *dw20.t* (SHA-1: *ac6b465a13370f87cf57929b7cfd1e45c3694585),* a .DLL file	*Saver.scr* drops: • *IDF_Spokesperson_Targeted_Attack_101012.doc* (SHA-1: *F542C5F9259274D94360013D14FFBECC43AAE552),* a decoy document, into *<Local Settings>\Temp*\ • *Install.exe* (SHA-1: *BC58A8550C53689C8148B021C917FB4AEEC62AC1)* into *<Local Settings>\Temp*\	*W.q* drops: • *Coreshell.dll* (SHA-1: *A8551397E1F1A2C0148E6EADCB56FA35EE6009CA)* into *<Program Files>\Common Files\System*\ • *Tmp64.dat,* a copy of *coreshell.dll,* into *<Program Files>\Common Files\System*\

Operation Pawn Storm Attack Comparison					
Case 1	Case 2	Case 3 [13]	Case 4	Case 5	Case 6
Netids.dll communicates with a C&C server *(200.106.145.122)*	• *Military Cooperation.doc* has been encoded using Cyrillic characters and opens in Word • *Skype.exe* drops: • Downloader *(netids.dll;* SHA-1: *6b875661a74c4673ae6ee89acc5cb6927ca5fd0d),* a SEDNIT variant, into *<Windows>\system32\* • Copy of *netids.dll (mscsv.tmp)* into *<Windows>\system32\* • *Cryptmodule.exe* drops *s.vbs* (actually a .PE and not a .VBS file) and communicates with a C&C server *(windous.kz)*	*Netids.dll* downloads and saves *msmvs.exe* (SHA-1: *88f7e271e54c127912db4db49e37d93aea8a49c9)* in *<Local Settings>\Temp\*	*Dw20.t* drops *netids.dll* (SHA-1: *3814eec8c45fc4313a9c7f65ce882a7899cf0405)*	*Install.exe* drops *netids.dll* (SHA-1: *14BEEB0FC5C8C887D0435009730B6370BF94BC93)* into *<Windows>\system32\*	*Coreshell.dll* downloads *conhost.dll* (SHA-1: *B49FAD3E5E6787E96373AC37ED58083F7572D72A),* a dropper, from a C&C server

Operation Pawn Storm Attack Comparison					
Case 1	**Case 2**	**Case 3** [13]	**Case 4**	**Case 5**	**Case 6**
C&C server confirms receipt of communication from infected systems then stops further interactions	- *Netids.dll* communicates with a C&C server (*70.85.221.20)* - *S.vbs* (SHA-1: *0A3E6607D5E9C59C712106C355962B11DA2902FC)* runs *CreateFile C:\\DOCUME~1\\ADMINI~1\\LOCALS~1\\Temp\\update.exe* but does nothing else	*Msmvs.exe* drops *conhost.dll* (SHA-1: *55318328511961EC339DFDDCA0443068DCCE9CD2)* into *<Local Settings>\Temp\*	*Netids.dll* communicates with a C&C server *(70.85.221.10)*	*Netids.dll* communicates with a C&C server *(70.85.221.10)*	*Conhost.dll* drops *advstoreshell.dll* (SHA-1: *E338A57C35A4732BBB5F738E2387C1671A002BCB),* a keylogger
		Conhost.dll drops *netui.dll* (SHA-1: *5A452E7248A8D3745EF53CF2B1F3D7D8479546B9),* a keylogger, into *<Windows>\system32\*			*Advstoreshell.dll* sends logs of stolen data to a C&C server *(software-update.org)*
		Netui.dll sends logs of stolen data to a C&C server *(200.74.244.118)*			

Exploits Spread SEDNIT Malware in Poland

The threat actors behind Operation Pawn Storm spread SEDNIT malware via exploits on legitimate Polish websites. In September 2014, for instance, the Power Exchange website in Poland, *www.irgit.pl,* was compromised. The attackers rigged it with an iframe that pointed to *http://defenceiq.us/2rKYZ_BGxPM* and *http://api.akmicdn.com/gpw?key=1072726955.* The first link led to an exploit kit [14] that was responsible for spreading SEDNIT malware. The ESET paper did not mention that an earlier incident occurred in mid-July 2014 wherein a malicious iframe pointing to *yovtube.co* was injected into Polish government websites though. And that the same domain, *defenceiq.us,* was used against Japanese targets in September 2014.

It is remarkable that a mass infection methodology was used by the Pawn Storm actors even though the actual SEDNIT samples were only served to particular targets. Actual exploitation was only triggered when certain criteria that had to do with OS, language settings, time zone, and installed software were met.

Next-Level Phishing Targets

The attackers used specially crafted emails to redirect targets to any of several phishing websites with domain names that were very similar to those of well-known conferences and media outfits. These websites did not host malicious content but visiting them did lead to the automatic execution of a nonmalicious JavaScript. Links to these fake websites were then embedded in spear-phishing emails and sent to selected targets.

Opening such an email and clicking the link in OWA redirected victims to legitimate websites. The JavaScript made it appear that the victims' OWA sessions ended while at the same time, tricked them into reentering their credentials. To do this, the attackers redirected victims to fake OWA log-in pages by setting their browsers' open windows property. The victims' credentials thus ended up in the attackers' hands.

Note that two special conditions need to be met for the attacks to succeed—victims should use OWA and click the embedded links via the web portal's preview pane. The attacks worked on any popular browser such as Firefox®, Safari®, Chrome™, and Internet Explorer®. No vulnerabilities need to be exploited for the JavaScript to work.

Because many companies allow employees to use webmail services to access their mailboxes while on business travel or at home, these attacks are likely to succeed. Once they do, attackers can gain access to compromised mailboxes that they can then use to gain a foothold in target networks.

Throughout the course of investigation, several targets have been identified, including:

- ACADEMI, formerly Blackwater (United States)
- Broadcasting companies in various countries
- Military attachés from various countries
- Ministry of Defense (France)
- Ministry of Defense (Hungary)
- Multinational company based in Germany
- OSCE (Austria)
- Pakistani military officials
- Polish government employees

- SAIC (United States)
- U.S. Department of State
- Vatican Embassy (Iraq)

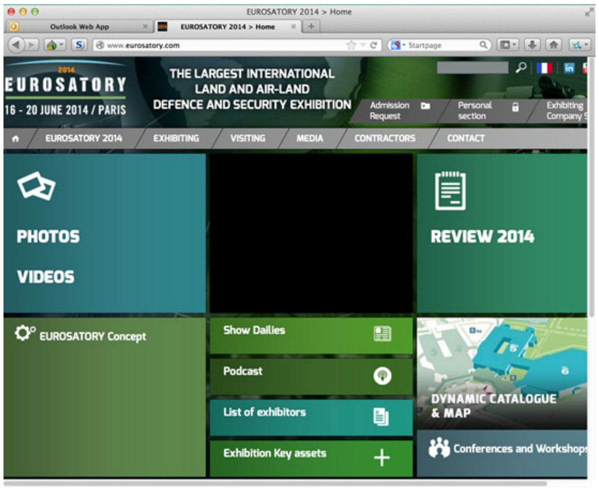
The following case studies reveal more in-depth details on four specific attacks.

CASE 1: MINISTRY OF DEFENSE, HUNGARY

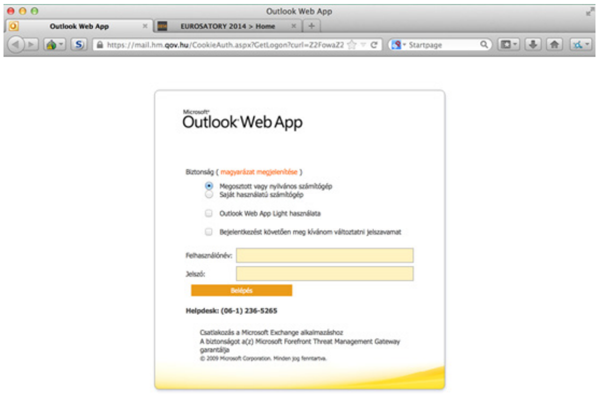
- **Malicious conference domain:** *eurosatory2014.com*
- **Real conference domain:** *eurosatory.com*
- **Phished OWA domain:** *mail.hm.qov.hu*
- **Real OWA domain:** *mail.hm.gov.hu*

The attackers created a domain that was very similar to *eurosatory.com* [15], a website for an international land and air-land defense and security exhibition. They then sent emails with the link, *http://eurosatory2014.com,* to selected employees of the target defense ministry who might actually have been expecting to hear from the conference staff members.

Clicking the link embedded in the email via the OWA preview pane opens the real conference website in a new tab. The victims' OWA session in the other tab, meanwhile, is redirected to a phished log-in page that makes it look like the session has ended.



Real "EUROSATORY 2014" conference website opens in a new tab after clicking the link in a spear-phishing email viewed in OWA


Outlook Web App
Outlook Web App
EUROSATORY 2014 > Home
https://mail.hm.qov.hu/CookieAuth.aspx?GetLogon?curl=Z2Fowa22
Startpage

Microsoft Outlook Web App

Biztonság (magyarázat megjelenítése)

● Megosztott vagy nyilvános számítógép
○ Saját használatú számítógép

□ Outlook Web App Light használata

□ Bejelentkezést követően meg kívánom változtatni jelszavamat

Felhasználónév:

Jelszó:

Belépés

Helpdesk: (06-1) 236-5265

Csatlakozás a Microsoft Exchange alkalmazáshoz
A biztonságot a(z) Microsoft Forefront Threat Management Gateway garantálja
© 2009 Microsoft Corporation. Minden jog fenntartva.

"Closed" OWA session page (fake) victims will see, forcing them to reenter their credentials

In reality, the victims' OWA session did not end. The previously mentioned JavaScript just redirected them to a fake OWA log-in page that looks just like the Ministry of Defense in Hungary's real one.

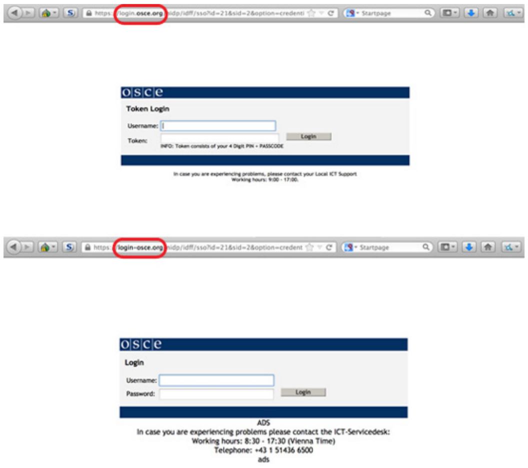
Apart from "EUROSATORY 2014," other conferences were also used to target employees of the Ministry of Defense in Hungary as shown in the following table.

Similar Attacks Against the Ministry of Defense, Hungary		
Conference	**Target Domain**	**Malicious Domain**
"Africa Aerospace and Defence 2014"	*aadexpo.co.za*	*aadexpo2014.co.za*
"The 10th Special Operations Forces Exhibition & Conference"	*sofexjordan.com*	*sofexjordan2014.com*
"ITEC"	*itec.co.uk*	*itec2014.co.uk*

CASE 2: OSCE, AUSTRIA

- **Malicious news domain:** *vice-news.com*
- **Real news domain:** *news.vice.com*
- **Phished OWA domain:** *log-in-osce.org*
- **Real OWA domain:** *log-in.osce.org*

This attack targeted OSCE employees in Austria. Although the attackers used similar tactics, they did not spoof a conference website. They instead used a fake version of the news website, *news.vice.com.*



https://login.osce.org/nidp/idff/sso?id=21&sid=2&option=credenti

osce

Token Login

Username:

Token:

INFO: Token consists of your 4 Digit PIN + PASSCODE

Login

In case you are experiencing problems, please contact your Local ICT Support
Working hours: 9:00 - 17:00.

https://login-osce.org/nidp/idff/sso?id=21&sid=2&option=credent

osce

Login

Username:

Password:

Login

ADS
In case you are experiencing problems please contact the ICT-Servicedesk:
Working hours: 8:30 - 17:30 (Vienna Time)
Telephone: +43 1 51436 6500
ads

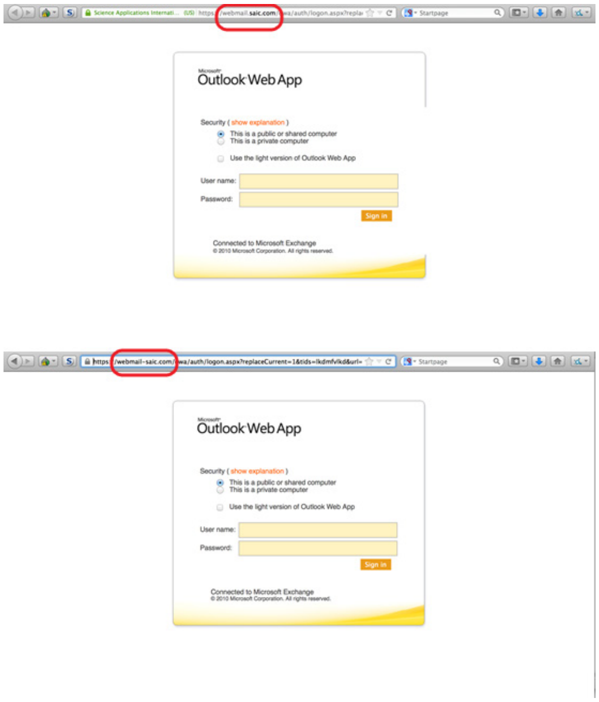
Comparison of the legitimate (top) and spoofed (bottom) OWA log-in pages of OSCE

Even though OSCE provides better security for webmail users compared with the other targets via one-time session token use during log-in, attackers can still steal highly sensitive data from victims by hijacking a single session.

CASE 3: SAIC, UNITED STATES

- **Malicious conference domain:** *natoexhibitionff14.com*
- **Real conference domain:** *natoexhibition.org*
- **Phished OWA domain:** *webmail-saic.com*
- **Real OWA domain:** *webmail.saic.com*

This attack targeting SAIC was very similar to the first case. The attackers spoofed the website of the "Future Forces 2014" conference to trick email recipients into handing over their webmail credentials.

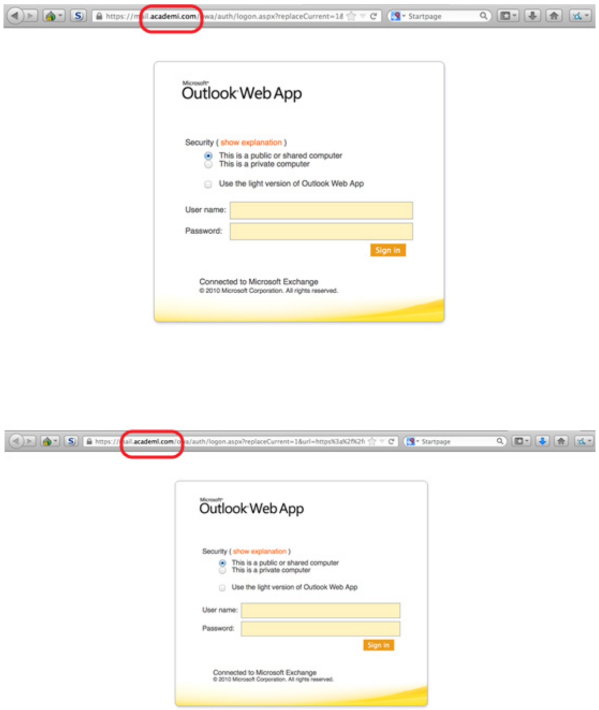

Science Applications Internati... (US) https://webmail.saic.com/owa/auth/logon.aspx?repla
Startpage
Microsoft Outlook Web App
Security (show explanation)
This is a public or shared computer
This is a private computer
Use the light version of Outlook Web App
User name:
Password:
Sign in
Connected to Microsoft Exchange
© 2010 Microsoft Corporation. All rights reserved.
https://webmail-saic.com/owa/auth/logon.aspx?replaceCurrent=1&tids=lkdmfvlkd&url=
Startpage
Microsoft Outlook Web App
Security (show explanation)
This is a public or shared computer
This is a private computer
Use the light version of Outlook Web App
User name:
Password:
Sign in
Connected to Microsoft Exchange
© 2010 Microsoft Corporation. All rights reserved.

Comparison of the legitimate (top) and spoofed (bottom) OWA log-in pages of SAIC

CASE 4: ACADEMI

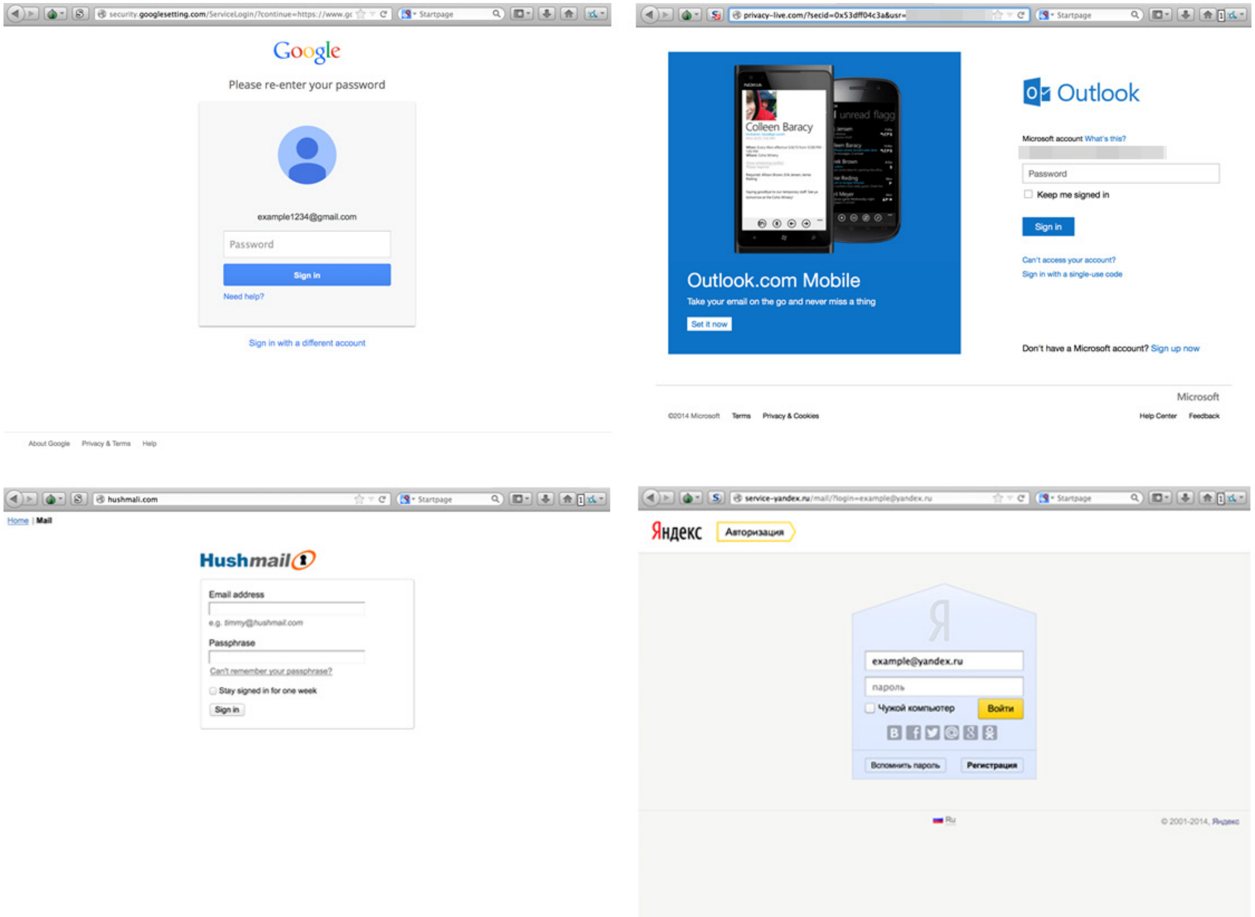
- **Malicious news domain:** *tolonevvs.com*
- **Real news domain:** *tolonews.com*
- **Phished OWA domain:** *academl.com*
- **Real OWA domain:** *academi.com*

This attack targeted the employees of U.S. defense contractor, ACADEMI, using the same phishing tactics as in the second case.


https://mail.academi.com/owa/auth/logon.aspx?replaceCurrent=1&
Startpage
Microsoft Outlook Web App
Security (show explanation)
This is a public or shared computer
This is a private computer
Use the light version of Outlook Web App
User name:
Password:
Sign in
Connected to Microsoft Exchange
© 2010 Microsoft Corporation. All rights reserved.
https://mail.academl.com/owa/auth/logon.aspx?replaceCurrent=1&url=https%3a%2f%2f
Startpage
Microsoft Outlook Web App
Security (show explanation)
This is a public or shared computer
This is a private computer
Use the light version of Outlook Web App
User name:
Password:
Sign in
Connected to Microsoft Exchange
© 2010 Microsoft Corporation. All rights reserved.

Comparison of the legitimate (top) and spoofed (bottom) OWA log-in pages of ACADEMI

Apart from the four specific cases presented above, evidence pointing to a fake OWA server for a multinational company based in Germany was also discovered. The threat actors registered a domain that looked very similar to the target's real domain and purchased a Secure Sockets Layer (SSL) certificate for the fake domain as part of preparations for a targeted attack. Trend Micro was able to warn the target early on, which helped thwart the threat.



security.googlesetting.com/ServiceLogin/?continue=https://www.gc

Google

Please re-enter your password

example1234@gmail.com

Password

Sign in

Need help?

Sign in with a different account

About Google Privacy & Terms Help

privacy-live.com/?secid=0x53dff04c3a&usr=[redacted]

Outlook.com Mobile

Take your email on the go and never miss a thing

Set it now

Outlook

Microsoft account What's this?

[redacted]

Password

□ Keep me signed in

Sign in

Can't access your account?

Sign in with a single-use code

Don't have a Microsoft account? Sign up now

Microsoft

©2014 Microsoft Terms Privacy & Cookies Help Center Feedback

hushmali.com

Home | Mail

Hushmail

Email address

e.g. timmy@hushmail.com

Passphrase

Can't remember your passphrase?

□ Stay signed in for one week

Sign in

service-yandex.ru/mail/?login=example@yandex.ru

Яндекс Авторизация

example@yandex.ru

пароль

□ Чужой компьютер Войти

Вспомнить пароль Регистрация

Ru

© 2001-2014, Яндекс

Sample Gmail, Live Mail, Hushmail, and Yandex account phishing websites

We leaked specific credentials to the threat actors in a couple of cases to see if the fake webmail service log-in pages were indeed intended for attack use. Within minutes of leaking the test credentials, unauthorized log-ins were recorded. The first log-in was usually an automated log-in check from the same IP address as the phishing website's owner. The succeeding log-ins were made from the IP addresses, *46.166.162.90* (Latvia) and *192.154.110.244* (United States), via Internet Message Access Protocol (IMAP). No other forms of abuse such as sending spam via the compromised accounts were witnessed. This showed that the attackers were indeed trying to obtain sensitive data from their targets instead of using their accounts for fraud and other financially motivated scams.

CONCLUSION

Operation Pawn Storm used next-level spear-phishing tactics to obtain the email credentials of primarily military, embassy, and defense contractor personnel from the United States and its allies. The threat actors used a mix of spear-phishing emails and specially crafted webmail service phishing websites to gain access to victims' inboxes in hopes of getting better footholds inside target organizations. So as not to raise suspicion, the attackers used well-known events and conferences as social engineering bait. They have been quite persistent as well, as we have seen evidence that attacks have been going on since 2007.

Apart from effective phishing tactics, the threat actors used a combination of proven targeted attack staples to compromise systems and get in to target networks—exploits and data-stealing malware. SEDNIT variants particularly proved useful, as these allowed the threat actors to steal all manners of sensitive information from the victims' computers while effectively evading detection.

Trend Micro has notified the targets that have been identified in this paper. Individuals and their respective organizations, meanwhile, should use solutions that can help protect against the various attack vectors that the threat actors behind Operation Pawn Storm used.

Messaging security solutions such as Trend Micro™ InterScan™ Messaging Security [16] and the ScanMail™ Suite for Microsoft Exchange [17] can send suspicious email attachments to a sandbox for analysis, thus protecting recipients from threats. Other products such as OfficeScan™ [18] for endpoints and InterScan Web Security Virtual Appliance [19] for gateways can also block user access to known phishing websites.

For overall protection against targeted attacks, Trend Micro™ Deep Discovery [20] can help protect potential targets by sandboxing and analyzing suspicious attachments to identify phishing emails via Email Inspector. Via 360-degree monitoring of network traffic to get networkwide visibility and intelligence, Deep Discovery allows users to detect and respond to targeted attacks and advanced threats. It also monitors all ports and more than 80 protocols, giving users the broadest protection available. Even more, specialized detection engines and custom sandboxing help identify and analyze malware, C&C communications, and evasive attacker activities that are invisible to standard security solutions. Along with in-depth threat intelligence, it allows for rapid response and automatic sharing with other security products to create real-time custom defense against attacks.

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