Internet Security Threat Report

Hampton Roads Chapter
ISSA
Information Systems Security Association

ISSA-HR July 11, 2017 Meeting

Targeted Attacks

A Shift from Economic Espionage to Politically Motivated Sabotage and Subversion

Volume
22

Symantec

"If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle."

— Sun Tzu, *The Art of War*

Threat Landscape

A fundamental shift…

Old Motivation

Hacking

Cyber Crime

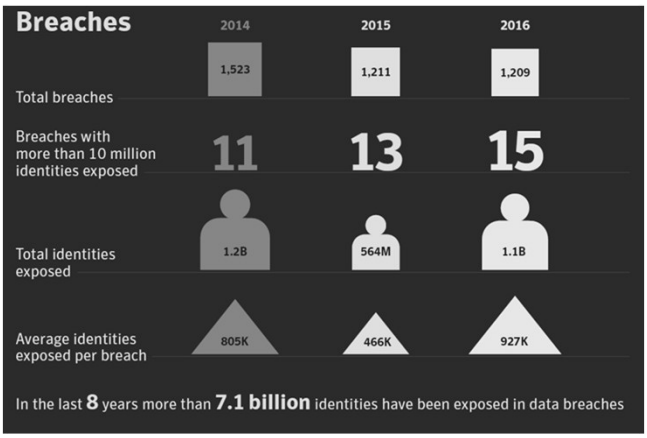
Cyber Espionage

Cyber Warfare

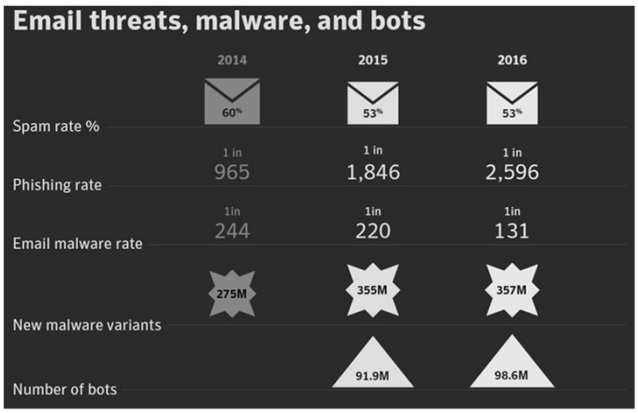
Top Messages:

- Big Numbers in 2016
- Targeted Attacks Shift from Economic Espionage to Politically Motivated Sabotage and Subversion
- Attackers Weaponize Common IT Tools
- Email Became The Weapon of Choice for 2016
- North Korea Had $1 Billion in Their Sights, Got Away With $94 Million
- Banner Health Breach
- WannaCry Deep Dive

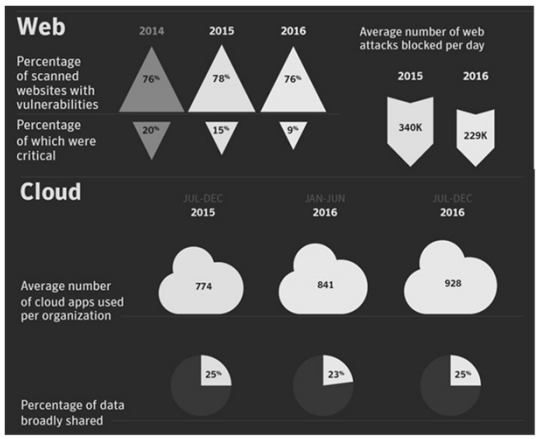
Big Numbers



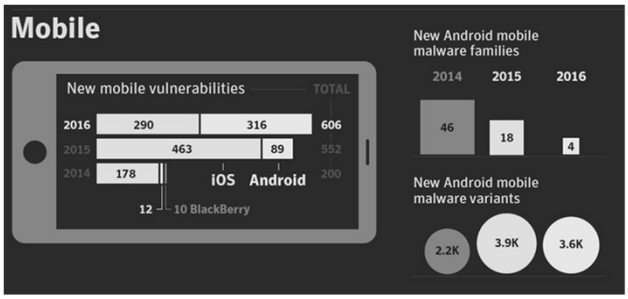
Big Numbers



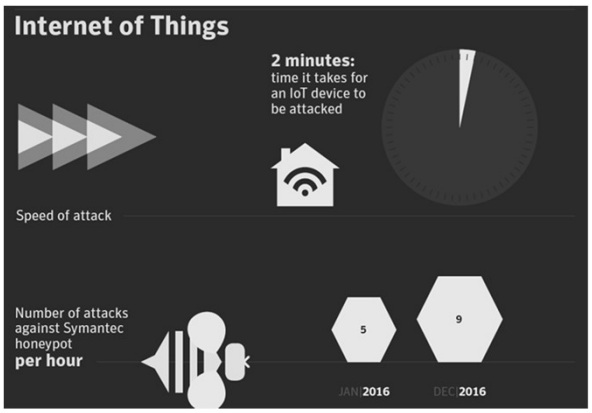
Big Numbers



Big Numbers



Big Numbers



Is This Ladder a Threat?

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Living off the Land

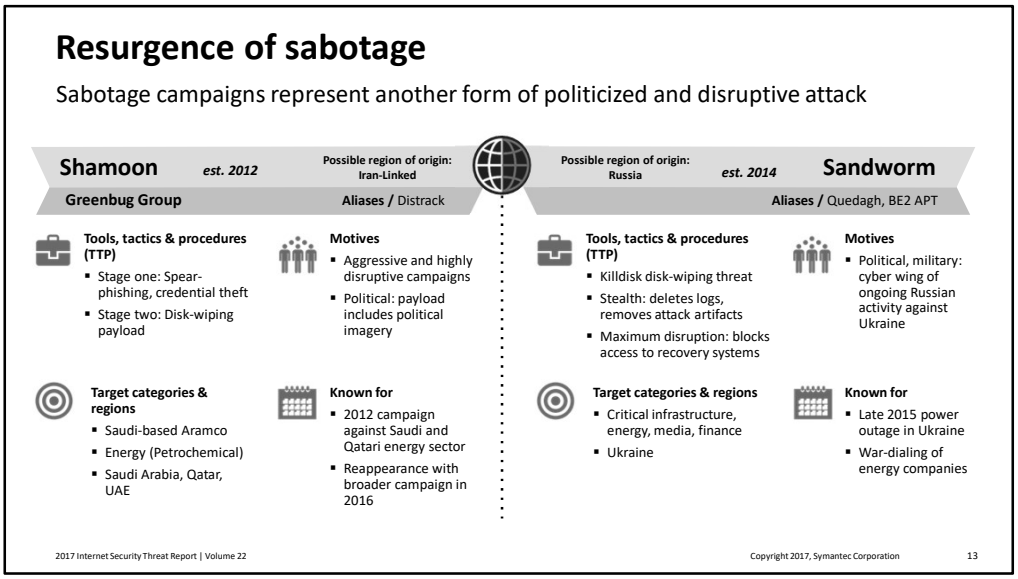
Attackers are using what's available to attack us

- These tools are ubiquitous
- These tools are easy to use for malicious purposes
- These tools don't arouse suspicion, and can be difficult to determine intent.




"living off the land" means using whatever tools are on hand, such as word documents, email, powershell, other legitimate network administration software and operating system features to attack. Its taking advantage of what users have in their environment. Even IoT devices have become a tool for attackers. Living off the land works to the attackers advantage because the tools are ubiquitous, most victims are running these programs, or can run them. They are easy to use for malicious purposes, much easier than finding and exploiting Zero-day vulnerabilities and writing sophisticated malware. And they allow attackers to hide in plain sight. End-users and IT expect these tools to be on a machine. And the intent of the tool, that it is being used for harm, can be hard to determine.

One thing we will see throughout the ISTR is examples of how these tools have been used and abused by attackers. It is a part of almost every other trend we'll talk about today.



Cyberattacks involving sabotage have traditionally been quite rare, but 2016 saw two separate waves of attacks involving destructive malware. Disk-wiping malware was used against targets in Ukraine in January and again in December, attacks which also resulted in power outages. Meanwhile the disk- wiping Trojan Shamoon reappeared after a four year absence and was used against multiple organizations in Saudi Arabia.

DeepSight Intelligence has observed several companies in Saudi Arabia potentially targeted by the attack:

A petrochemical firm

An international holding company

An electronic payment system company

An international technology company

Two financial organizations

Shamoon was first used in attacks against the Saudi Arabian energy sector in 2012, a new variant (W32.Disttrack.B) was used against targets in Saudi Arabia in November 2016 and January 2017. In the first wave of new attacks, the malware was configured to launch its disk-wiping payload at 8:45pm local time on Thursday, November 17. The Saudi Arabian working week runs from Sunday to Thursday. Thus, the attack was timed to occur after most staff had gone home for the weekend in the hope of reducing the of discovery before maximum damage could be caused.

In Jan 2017, The Greenbug group, which also targets the Middle East but predominantly Saudi Arabia, has been potentially linked to the Shamoon malware. Greenbug uses its custom Ismdoor remote access Trojan to steal credentials from compromised organizations in the aviation, energy, government, investment, and education sectors.

On 23 January 2017, cyber attacks using the Shamoon disk-wiping malware (detected by Symantec as W32.Disttrack and W32.Disttrack.B) were carried out simultaneously across several different industries and companies in Saudi Arabia including the aviation, biochemical, steel, and contracting and construction sectors

The Shamoon malware was configured with passwords that appeared to have been stolen from the targeted organizations. These passwords were likely used to allow the malware to spread across an organization's network.

The attacks were likely politically motivated. In the 2012 attacks, infected computers had their master boot records wiped and replaced with an image of a burning US flag. The latest attacks instead used a photo of the body of Alan Kurdi, the three year-old Syrian refugee who drowned in the Mediterranean in 2015.

Oil and Gas Extraction

Industrial Building Construction

Commercial and Institutional Building Construction

Primary Metal Manufacturing

Other Chemical and Allied Products Merchant Wholesalers

Offices of Other Holding Companies

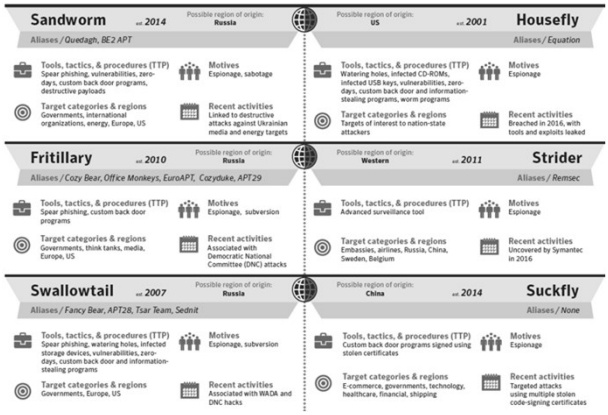
Colleges, universities, and professional schools

Aircraft inspection, government

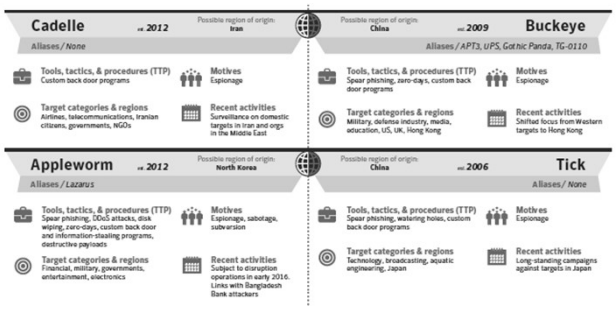
A number of attacks against Ukraine involving the use of disk-wiping malware in 2016. The attacks were linked to what is likely a Russian cyberespionage group. This group is known as Sandworm and involved a highly destructive Trojan (Trojan. Disakil). Attacks in late 2015 and early 2016 hit the energy sector in Ukraine, with the latter being linked to power outages in the country.

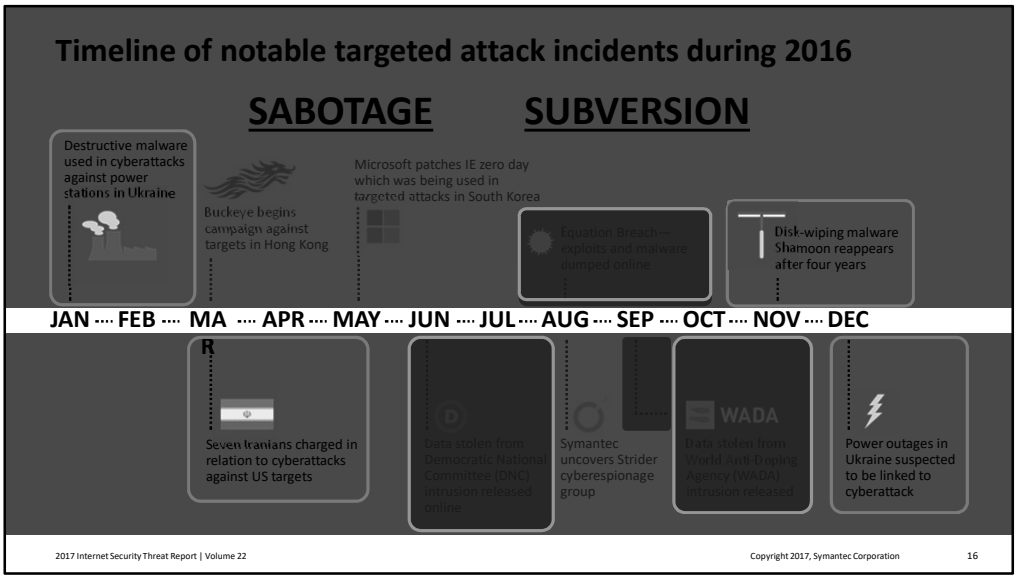
The malware was designed to run on Linux computers and, if run, rendered them unusable by encrypting key operating system files. Once the encryption has finished, it displayed a message demanding a ransom of 222 Bitcoin (approximately US$210,000 at the time of the attacks). Paying the ransom would not decrypt the affected files, with the encryption keys generated on the infected computer not saved locally nor to a command and control (C&C) server. The malware was likely disguised as ransomware in order to trick victims into not investigating attacks thoroughly.

Notable Target Attack Groups



Notable Target Attack Groups



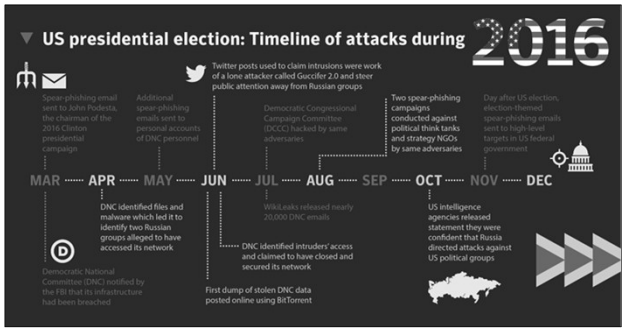


As we do every year in the ISTR, we review the most notable targeted attack incidents that happen in the year. These attacks are predominately cyber-espionage. Not in 2016. The shift in 2016 is that targeted attacks are being used for sabotage and subversion.

To paraphrase Clausewitz, cyber-attacks are politics by other means.

We'll look at examples of attacks representing both sabotage and subversion.

Subversion



- Carried out by known Russian groups, active for almost a decade
- Subversive activities represent shift away from previous low-profile espionage
- US intelligence community has stated that campaigns were an attempt to influence elections
- **Reflects a broader shift towards highly-publicized, overt campaigns**

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The US intelligence community's report into the DNC data thefts and subsequent public disclosures assessed that they were part of an influence campaign conducted by the Russian Government aimed at the 2016 US presidential election. This is a group we have been tracking for over a decade. Their pervious attacks were classified as cyber-espionage. So this is a shift from previous attacks.

The US intelligence community reports that the attacks were an attempt to influence the US election and also concluded that the campaign would have been seen as a success in Russia and that these activities will likely be used to inform future influence operations.

Given the proven potential for sowing discord and confusion, there is a strong likelihood that these tactics may be used again in a bid to destabilize other countries. France and Germany are both holding elections this year and already Bruno Kahl, the head of Germany's foreign intelligence service, has said the same kind of attacks have already begun against Germany. "We have evidence of cyberattacks that have no other purpose than triggering political uncertainty," he said. "The perpetrators are interested in delegitimizing the democratic process as such, no matter who that subsequently helps."

These types of attacks reflect a broader shift towards highly-publicized, overt campaigns

2016 Banner Health Breach

Highlights

- Compromised PoS system
  - Credit Card data stolen
- Infiltrated the primary Data Center
  - Doctor's and other hospital employee's personal data stolen
- Made their way into the Electronic Medical Records database
  - 3.7M Patient Records Compromised
- This is their 2nd breach in 2 years
  - SSN on 55k Mailers

Anatomy of a Targeted Phishing Attack

John Podesta

From Wikipedia, the free encyclopedia

John David Podesta (born January 8, 1949) is a columnist and former chairman of the 2016 Hillary Clinton presidential campaign.[1] He previously served as chief of staff to President Bill Clinton and Counselor to President Barack Obama.[2]

He is the former president, and now Chair and Counselor, of the Center for American Progress (CAP), a liberal think tank in Washington, D.C., as well as a Visiting Professor of Law at the Georgetown University Law Center. Additionally, he was a co-chairman of the Obama-Biden Transition Project.[3][4]

Increased use of cloud services also helps facilitate a trend where attackers opting to “live off the land” instead of developing their own attack infrastructure. Lets look at the example of John Podesta. In 2016 John Podesta was the Chairman of the Hillary Clinton presidential campaign.

Anatomy of a Targeted Phishing Attack

- The branding looks consistent (Google logo, shield logo)
- The email is addressed to the recipient (not “Dear Sir”)
- The English is not broken

In what may be the world’s most famous phishing attack, the Gmail account of John Podesta was compromised. According to the FBI, this spear-phishing email sent to campaign chairman John Podesta’s email account on March 19, 2016.

The email was crafted to appear as though it originated from an official Gmail administrative account. The branding looks consistent (Google logo, shield logo). The email is addressed to the recipient (not “Dear Sir”). The English is not broken. It appears to be very well crafted.

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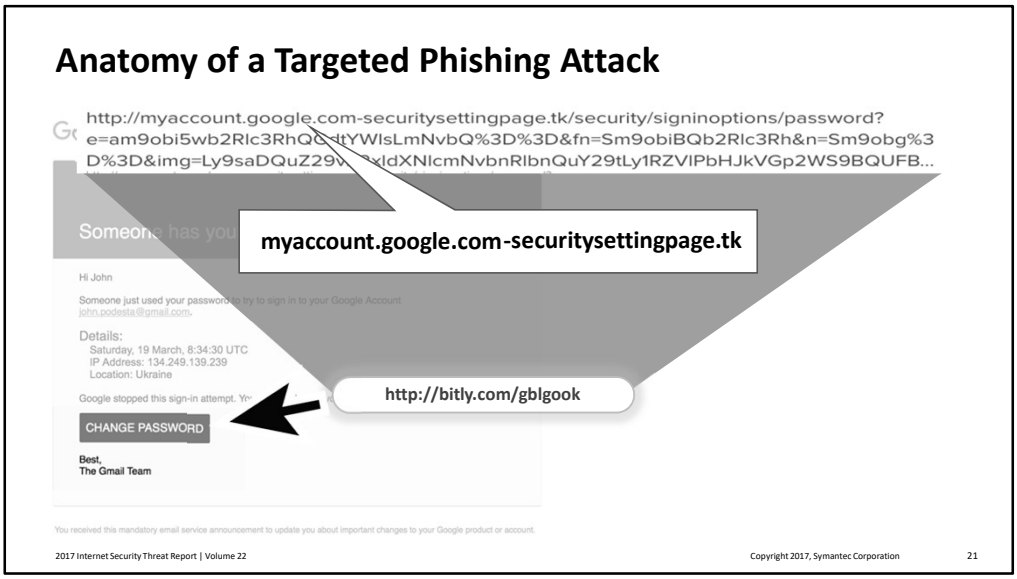
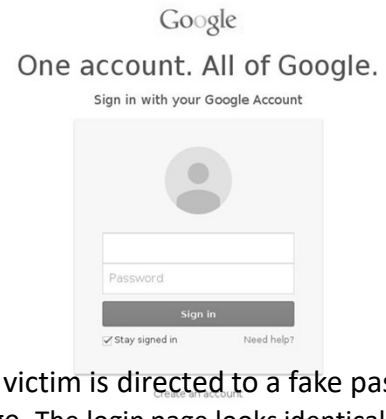


Best practice for end-users is to hover their mouse over a link to view the real URL of a link. This used shortened URL which obfuscated a malicious URL.

Even if the end-user could length the URL the true domain is obfuscated. A first glance the domain appears to be myaccount.google.com. But if you look closely you can see that the actual domain is myaccount.google.com-securitysettingpage.tk That's not Google. But it's a lot more social engineering than a cyber-criminal puts into a phishing attack.

Anatomy of a Targeted Phishing Attack



- The login page looks identical to the actual login page (HTML was cloned)
- Once the user submits the username/password combination, it doesn't matter what happens next
  - Typically, the phishing page redirects users back to Google.com

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Once clicked, the victim is directed to a fake password reset page masquerading as a legitimate Gmail account reset page. The login page looks identical to the actual login page (HTML was cloned). Once the user submits the username/password combination, it doesn't matter what happens next.

Typically, the phishing page redirects users back to Google.com

No malware or exploits were needed to perform the attack. Instead, simple social engineering was used to obtain a password.

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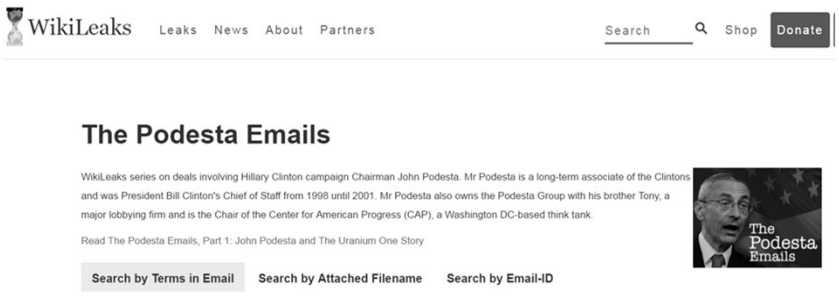
But luck, or a typo also played its part in the success of this attack.

Mr. Podesta asked about the email he received. He didn't just click it. His assistants forward a letter from their IT. You can see that the advice is good. He was urged to change his password. HE was urged to use 2-factor authentication. All good.

He was given the correct URL to go to.

But the message contained a single typo. The word NOT was left out. This changed the meaning of the message. And Mr. Podesta clicked on the link in the email.

The Outcome of a Targeted Phishing Attack



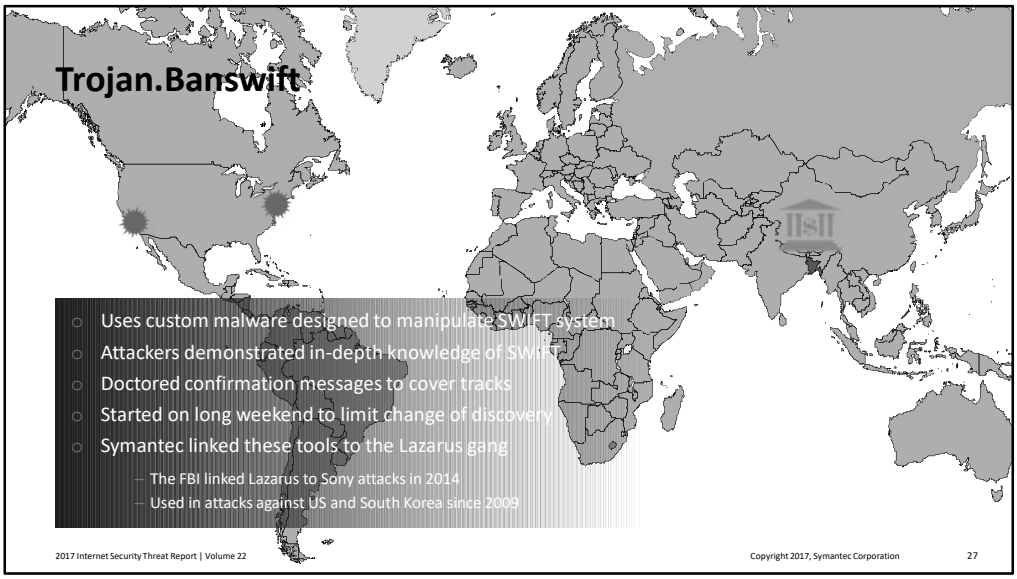
French Elections: Targeted Phishing Attack

- Macron campaign under heavy Targeted Attack
- Forward (creative) thinking may have saved his campaign
- 44 hour candidate and media blackout didn't hurt either

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

Cyber Bank Heists

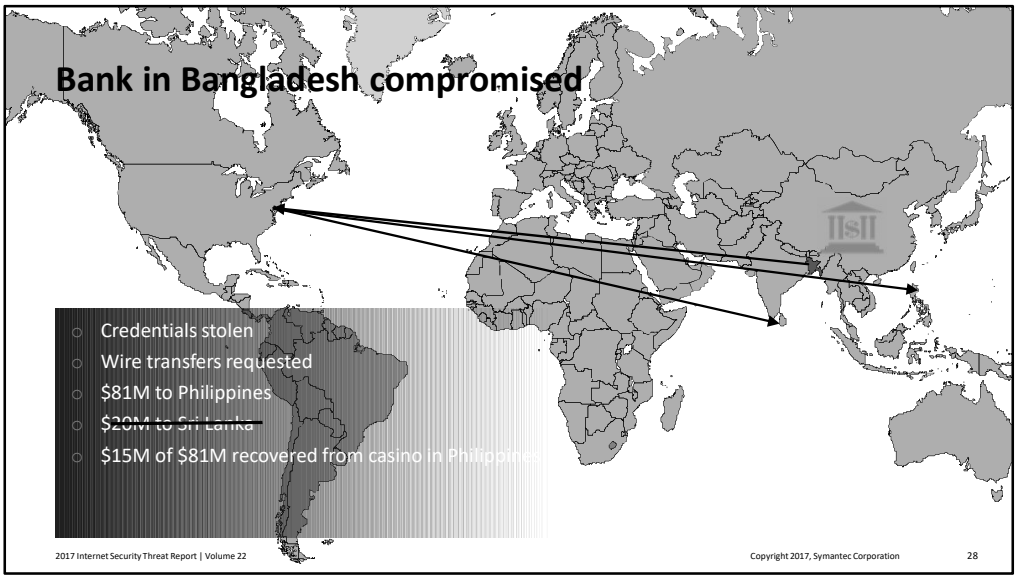
North Korea Had $1 Billion in Their Sights, Got Away With $94 Million



The methods used in this attack, in particular the in-depth knowledge of the SWIFT systems and the steps taken to cover tracks, are indicative of highly proficient actors. This was an incredibly audacious hack, and was also the first time strong indications of nation state involvement in financial cyber-crime had been observed..

Symantec's analysis of the malware (Trojan.Banswift) used in the attack on the Bangladesh bank found evidence of code sharing between this malware and tools used by Lazarus – which the FBI claims has links to the North Korean government. The Lazarus group was associated with the infamous Sony hack in 2014, and has been linked to a string of attacks against the US and South Korea since 2009.

This same group was also linked to two other bank heists targeting banks that make transfers using the SWIFT network, though the SWIFT network itself was not compromised in any of these attacks.



The criminals exploited weaknesses in the Bangladesh bank's security to infiltrate its system and steal the bank's SWIFT credentials, which allowed them to make the fraudulent transactions. The criminals then used malware to cover their tracks. The malware was able to doctor the Bangladesh bank's printed transaction confirmation messages in order to delay discovery of the fraud. The attackers also carried out the attack at the start of a long weekend in Bangladesh, to further reduce the chance of the thefts being discovered.

Using the stolen SWIFT credentials from the Bangladesh bank, the criminals made several transfer requests to the Federal Reserve Bank of New York for it to transfer the Bangladesh bank's money, primarily to locations in the Philippines and Sri Lanka. Four requests to transfer a total of $81 million to entities in the Philippines successfully went through, but a request to transfer $20 million to a non-profit foundation in Sri Lanka raised suspicions because foundation's name was spelled incorrectly. This led to the transfers being suspended and clarification being sought from Bangladesh, which uncovered the fraud. However, by then the $81 million had disappeared, primarily into accounts related to casinos in the Philippines.

Most of that $81 million remains unrecovered, however, $15 million was returned by a casino in the Philippines to the Bangladesh Central Bank in November.

There were about 30 more transactions, totaling up to $850-870 that were blocked before they went through, which could have made the total loss almost 1 billion dollars.

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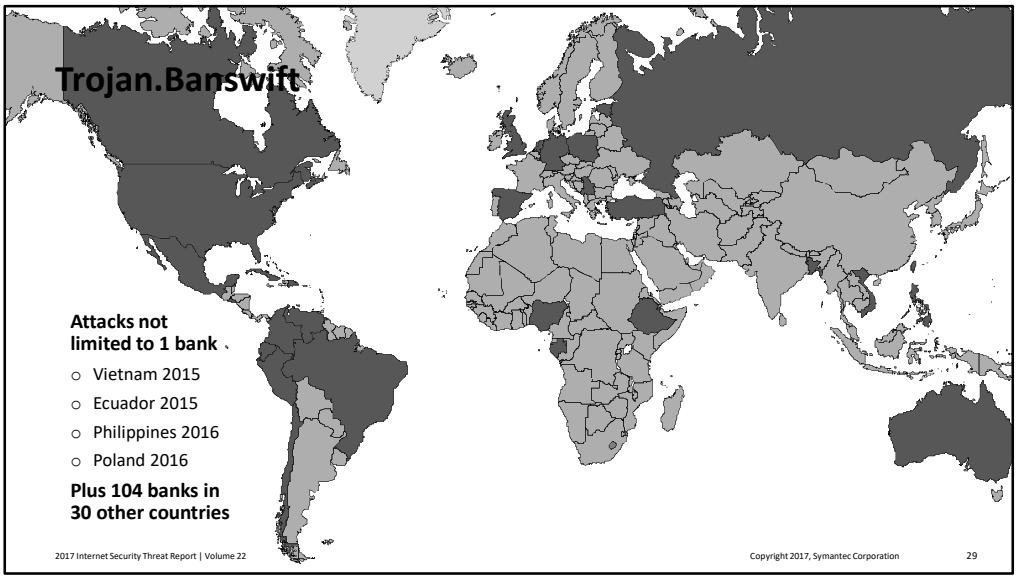

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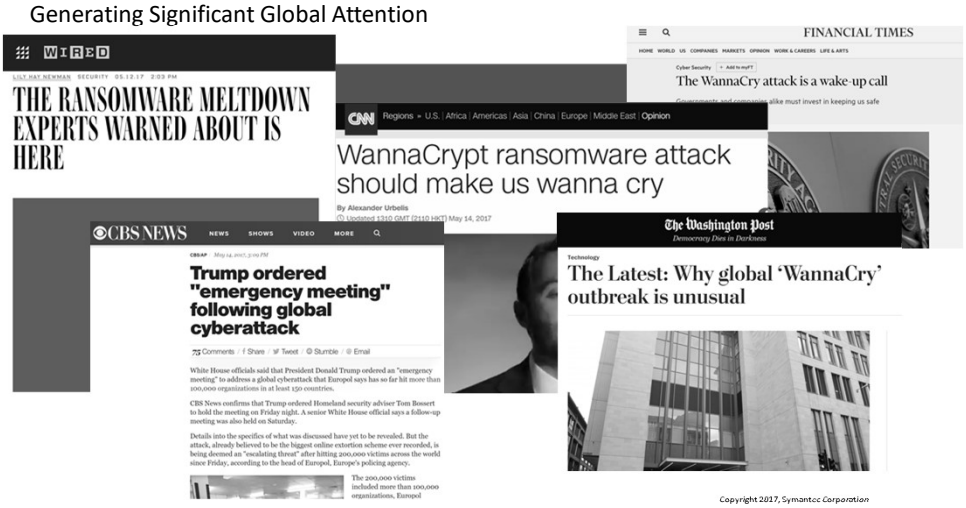
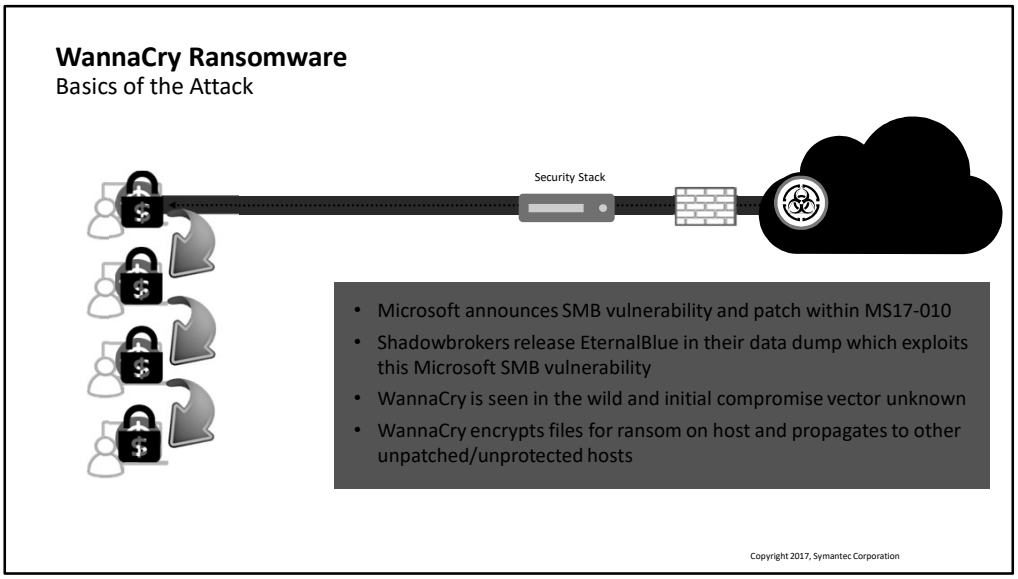
Vietnam's Tien Phong Bank revealed that it had intercepted a fraudulent transfer of more than $1 million in the fourth quarter of 2015. Research by Symantec also uncovered evidence that another bank was targeted by the same group in October 2015. A third bank, Banco del Austro in Ecuador, was also reported to have lost $12 million to attackers using fraudulent SWIFT transactions, although no definitive link could be made between that fraud and the attacks in Asia.

Symantec has evidence that these attacks targeted at least 30 other countries.

Symantec believes the Lazarus group may have reappeared in 2017 with further attacks against financial institutions.

WannaCry Ransomware
Generating Significant Global Attention





Remember Shadow Brokers is the group that hacked Equation and stole their tools. In addition to the

Symantec has uncovered two possible links that loosely tie the WannaCry ransomware attack and the Lazarus group:

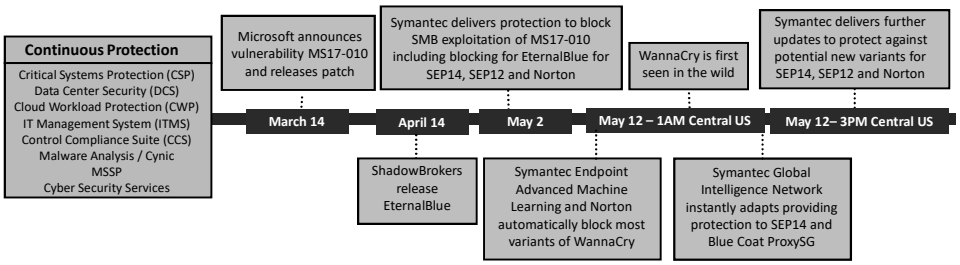
Co-occurrence of known Lazarus tools and WannaCry ransomware: *Symantec identified the presence of tools exclusively used by Lazarus on machines also infected with earlier versions of WannaCry. These earlier variants of WannaCry did not have the ability to spread via SMB. The Lazarus tools could potentially have been used as method of propagating WannaCry, but this is unconfirmed.*

Shared code*: As tweeted by Google's Neel Mehta, there is some shared code between known Lazarus tools and the WannaCry ransomware. Symantec has determined that this shared code is a form of SSL. This SSL implementation uses a specific sequence of 75 ciphers which to date have only been seen across Lazarus tools (including Contopee and Brambul) and WannaCry variants.*

Symantec has "Medium Confidence" in regards to Appleworm and WannaCry connections.

Symantec's Timeline of WannaCry

Symantec Blocked 22M Attempted Attacks Over Hundreds of Thousands of Endpoints



Appleworm / Lazarus Ties

- **Appleworm and WannaCry linked infection activity**
- **(same server/time/code)**

[5]

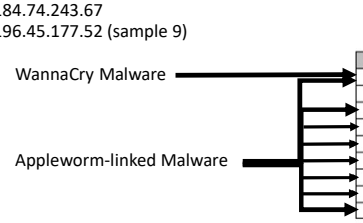
Sample #	MD5	Identification	First Observed
1	485082540d7b97c64b1b89cf2d2711ce	WannaCry dropper, drops Samples 2 and 3	8 May 2017
2	55dd9b0af2a263d215cb4fd48f16231a	WannaCry payload, dropped by Sample 1	28 April 2017
3	5c7fb0927db37372da25f270708103a2	WannaCry payload, dropped by Sample 1	28 April 2017
4	7076d5db7d7e1b146666529f02a2e537	WannaCry dropper, drops Sample 5	5 April 2017
5	59815ca85fa772753ca37fa0399c668c	WannaCry payload, dropped by Sample 1	5 April 2017
6	e86c2f4fc88918246bf697b6a404c3ea	Brambul	16 September 2011
7	e6724f877ecc50d5b07acb52a7aea396	Malware containing worm functionality	6 February 2017
8	e8c6acc1eb7256db728c0f3fed5d23d7	**Malware containing worm** functionality	5 April 2017

Connections to Appleworm

Table 1. WannaCry and collocated samples from three hosts

Appleworm / Lazarus Ties

- **Shared Command & Control Infrastructure**
  - 58.185.197.210
  - 84.92.36.96
  - 203.69.210.247
  - 184.74.243.67
  - 196.45.177.52 (sample 9)



C&C 196.45.177.52

Sample #	MD5
9	2950a9097b00c75b986802ec50a2506e
10	5448f2f896c9297bc53dd6ac23ded7d1
11	e9d7c214d068054e2a7ac5e102b66608
12	b95131f15871c67b95f7fd2962a9b0b9
13	8d7bfd4c671af5de703d76ebabb9da46
14	594fa7a6724019fdd183a21c24c8df7d
15	9394078671922de6b5cd194e3581ec46
16	0b7c74af5b199c9389137736b50b378d
17	2c213bc2b7887d6687bd063152aef748

Table 2. Malware connected to Sample 8

Appleworm / Lazarus Ties

- **Shared Code**
  - Unusual custom implementation of the TLS/SSL protocol
  - Specific sequence of 75 ciphers
  - This implementation of TLS/SSL has only been observed in Appleworm tools including Contopee

Sample #	MD5	Identification	Internal Compile Date	First Observed
18	9c7c7149387a1c79679a87dd1ba755bc	WannaCry	9 February 2017	10 February 2017
19	ac21c8ad899727137c4b94458d7aa8d8	Contopee	23 February 2015	27 December 2016

Table 3. An early WannaCry sample that shares code with Appleworm malware (e.g., Contopee)

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Thank You!

Kevin McPeak, CISSP, ITILv3

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