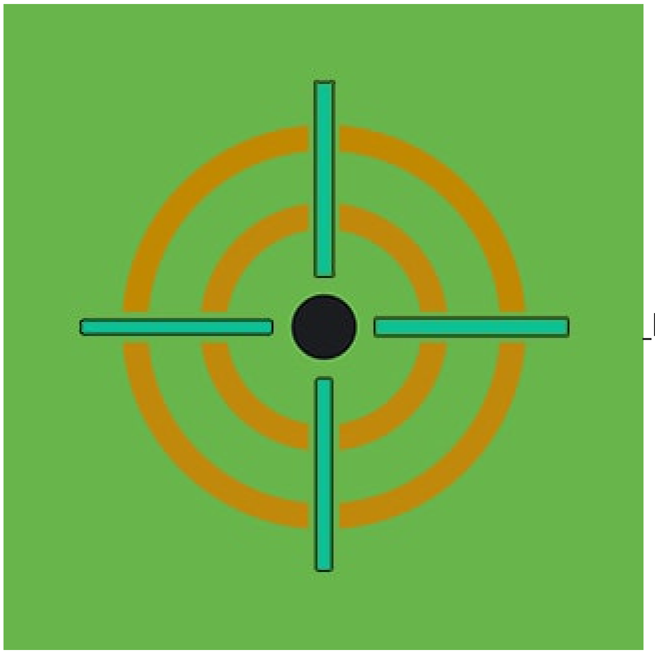
Threat Update DoubleZero Destructor

splunk.com/en_us/blog/security/threat-update-doublezero-destructor.html

March 28, 2022



By Splunk Threat Research Team March 28, 2022

The Splunk Threat Research Team is actively monitoring the emergence of new threats in the cyber domain of ongoing geopolitical events. As we have shown previously in several releases, including HermeticWiper and CaddyWiper, actors in this campaign are deploying, updating, and modifying stealthier malicious payloads. On March 17th, 2022, the Ukraine CERT discovered a new malicious payload named DoubleZero Destructor (CERT-UA #4243). This new malicious payload has the following features:

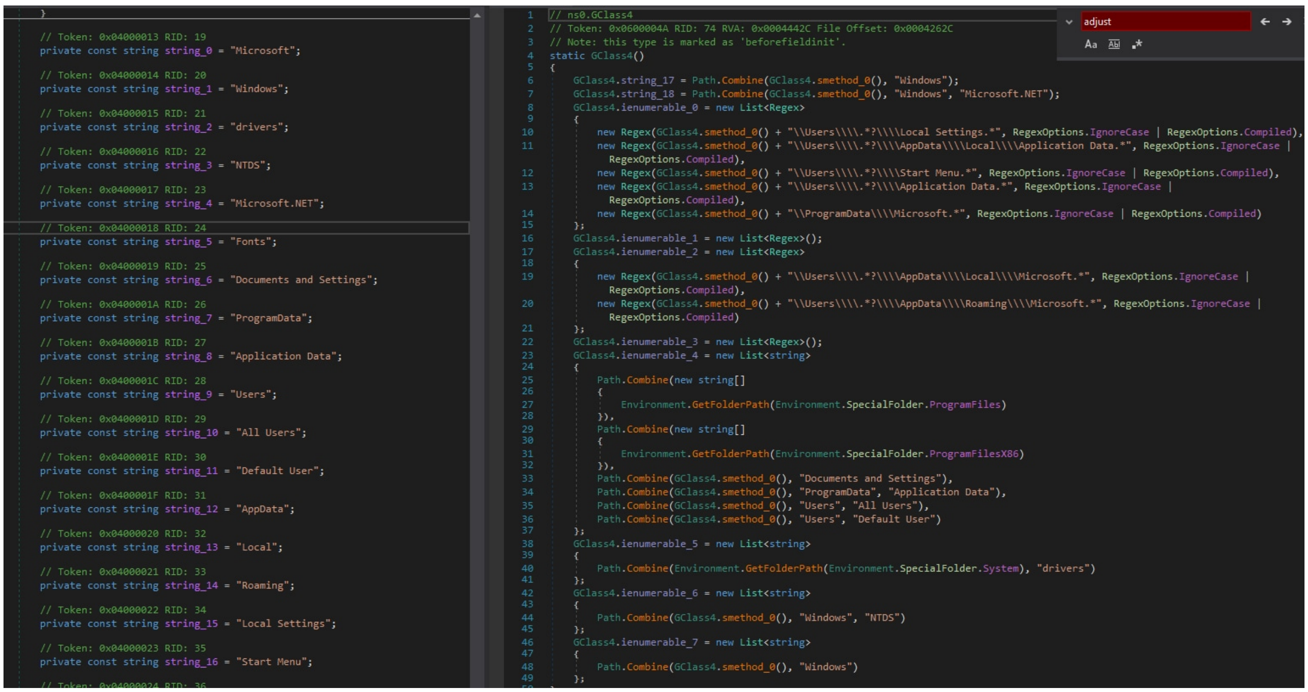
- Enumerates Domain Controllers and executes killswitch if detected. An automated *friend or foe*, like targeting function that avoids destroying Domain Controllers so attackers can maintain access or perform further elevation tasks (i.e GPOs) on compromised networks.
- The above feature also aims to help footprinting and identification of potential targets non-targets.
- Overwrites files with zero blocks of 4096 bytes. It may alternatively use API calls such as NtFileOpen, NtFSControlFile for the same purpose.
- Lists system files and then proceeds to destroy them.
- Deletes registry hives: HKCU (currently logged user), HKLM (configuration of currently installed software), HKU (information of all active users in the system), HKLM \BCD (Boot configuration data needed for UEFI, Legacy BIOS systems). Then shuts down the computer.

- An added layering of obfuscation via junk code to obfuscate and impair forensic analysis.

Analysis

Preparing Targeted File path

This malware is a .net compiled binary that has a customized obfuscation and a large amount of junk code that makes analysis harder to accomplish. Before performing its destructive functions it will list several directory names and paths where it will look for files it will wipe.



Domain Controller Kill Switch

It also has a function that will enumerate the list of domain controllers connected to the compromised host. This function was used to skip or as a kill switch if the compromised host is the domain controller machine. Below is the code snippet of how it enumerates all the domain controllers that are spread across the code because of the inserted junk code.

```
try
{
    Domain currentDomain = Domain.GetCurrentDomain();
    string text = string.Format(HiZ3SZT.ujVAeBrk1uK(new byte[]
    {
        117
```

```
            -1,
            30,
            180
        }, 0, 0)
    }), Dns.GetHostName().Split(new char[]
    {
        '.'
    })[RjhcjK9dt.cIdjj6vA(new int[]
    {
```

```
                        {
                        }
                    }
                    else
                    {
                        foreach (DomainController domainController in currentDomain.DomainControllers)
                        {
                            int m = 0;
                            object[] array5 = new object[]
                            {
```

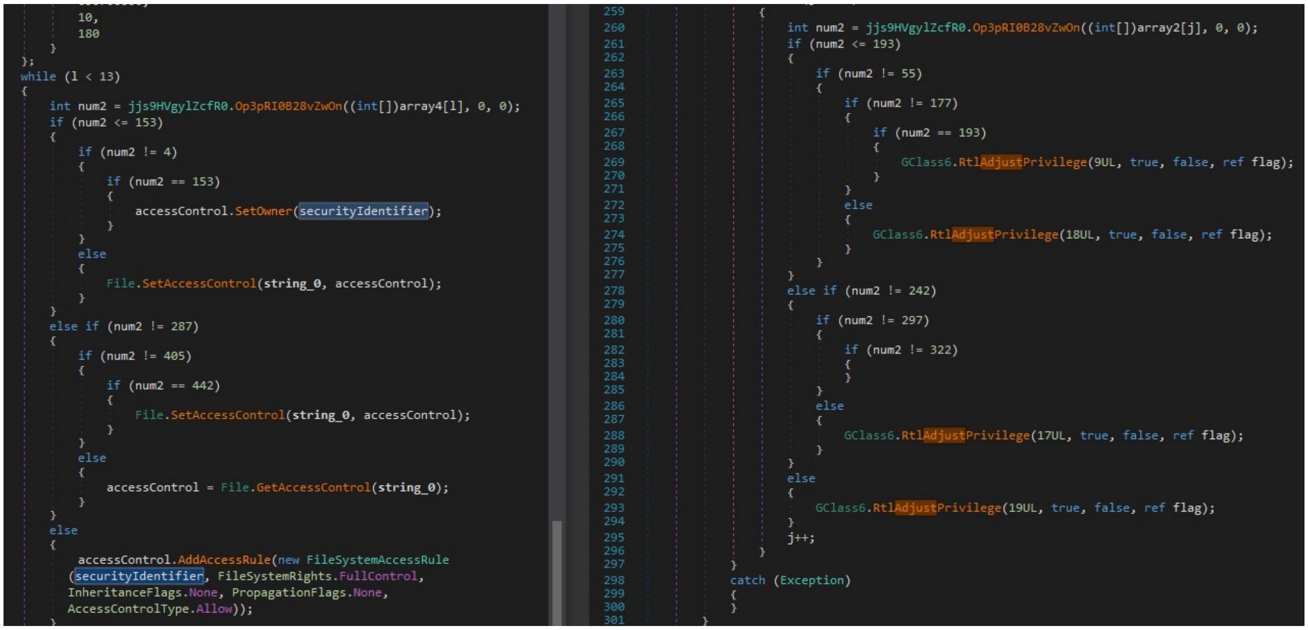
```
                                                if (num6 == 290)
                                                {
                                                    item = domainController.Name.ToLower();
                                                }
                                            }
                                            else
                                            {
                                                list.Add(item);
                                            }
                                        }
```

Wiping Files

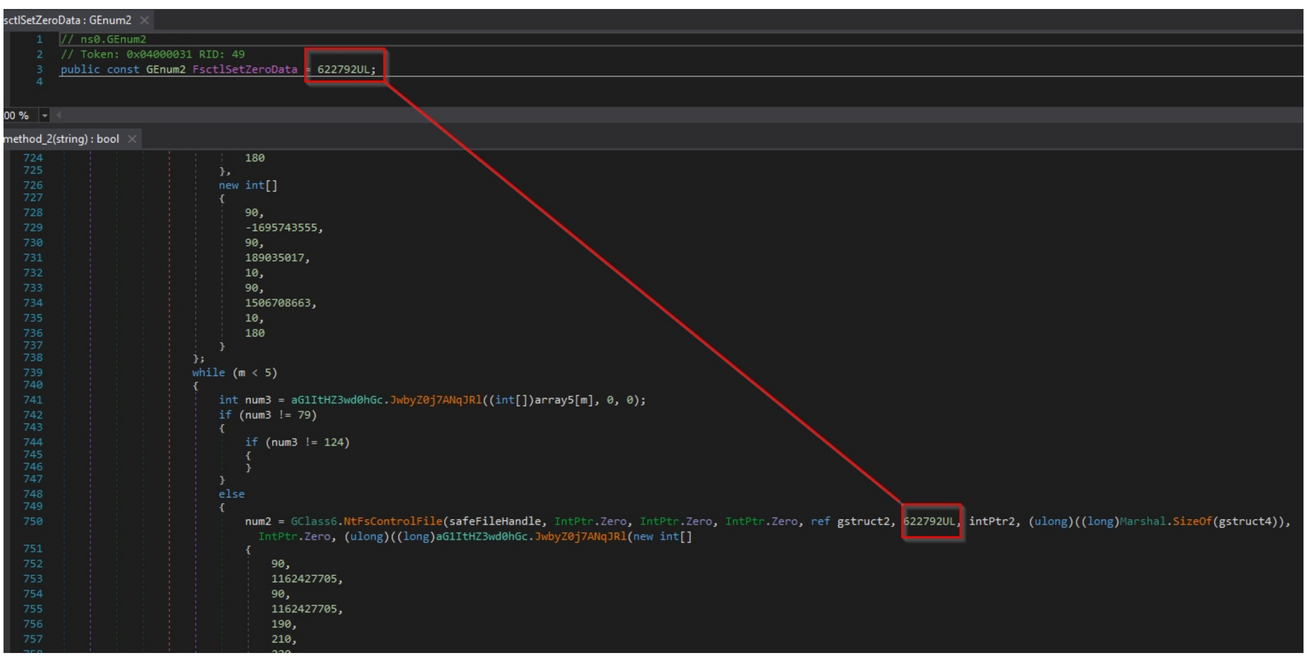
Aside from the directory names it lists, shown earlier in its code, this malware will enumerate all the drives mounted to the machine to look for more files to wipe. The code below shows how it gets the drive's information within the compromised host machine.

```
// Token: 0x0600004C RID: 76 RVA: 0x0002C5CD File Offset: 0x0002A7CD
public static IEnumerable<string> smethod_1()
{
    return DriveInfo.GetDrives().Select(new Func<DriveInfo, string>(GClass5.<>c.<>9.method_4));
}
```

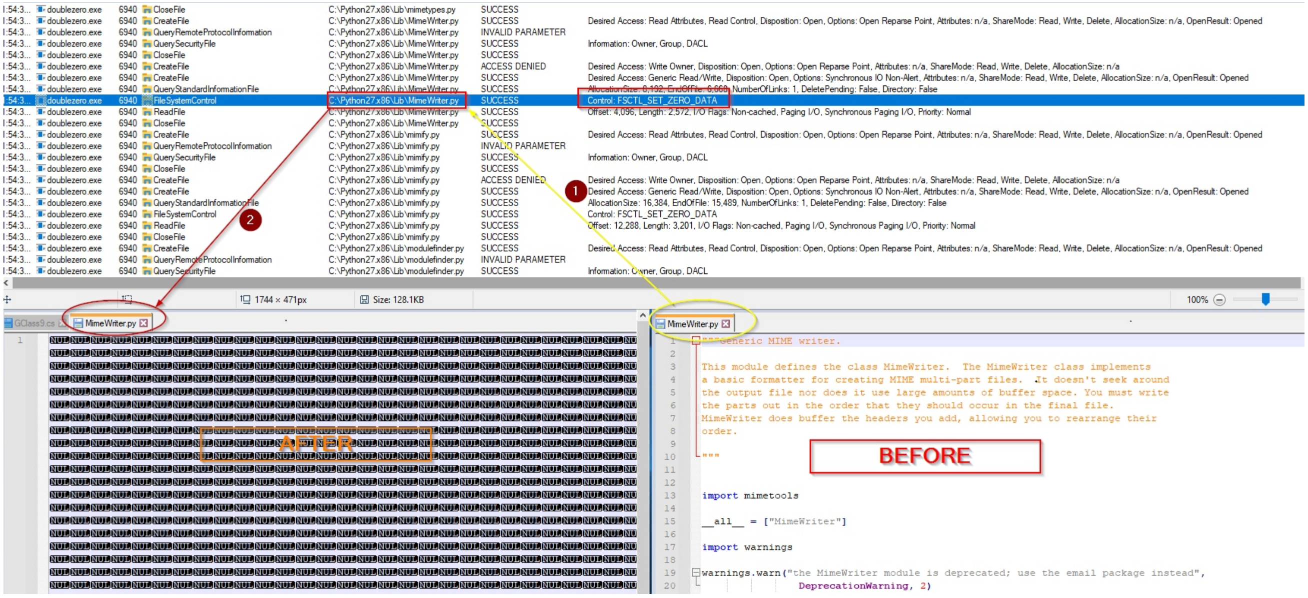
Then it will adjust the token privilege and the securityIdentifier of its process to have "**full control**" file system rights to avoid error or access denied while wiping the normal or system files it found in the compromised host. Below is the code, how it adjusts the privilege, and how it sets the access control for files with full control and allow control type.



Then It will open the target file using **NtOpenFile()** native API to zero or wipe it using a native API **NtFsControlFile()** that sends an IOCTL control code **FSCTL_SET_ZERO_DATA** directly to a specified file system. The wiper can wipe system files that make the compromised host unbootable after the restart. Below is the code screenshot of how this API was used in this wiper to do its destructive function.



Below is an example of the event that happened to the compromised test lab while it wipes the file. We can see how the “MimeWriter.py” file was wiped with zero bytes after calling the IOCTL code FSCTL_SET_ZERO_DATA.

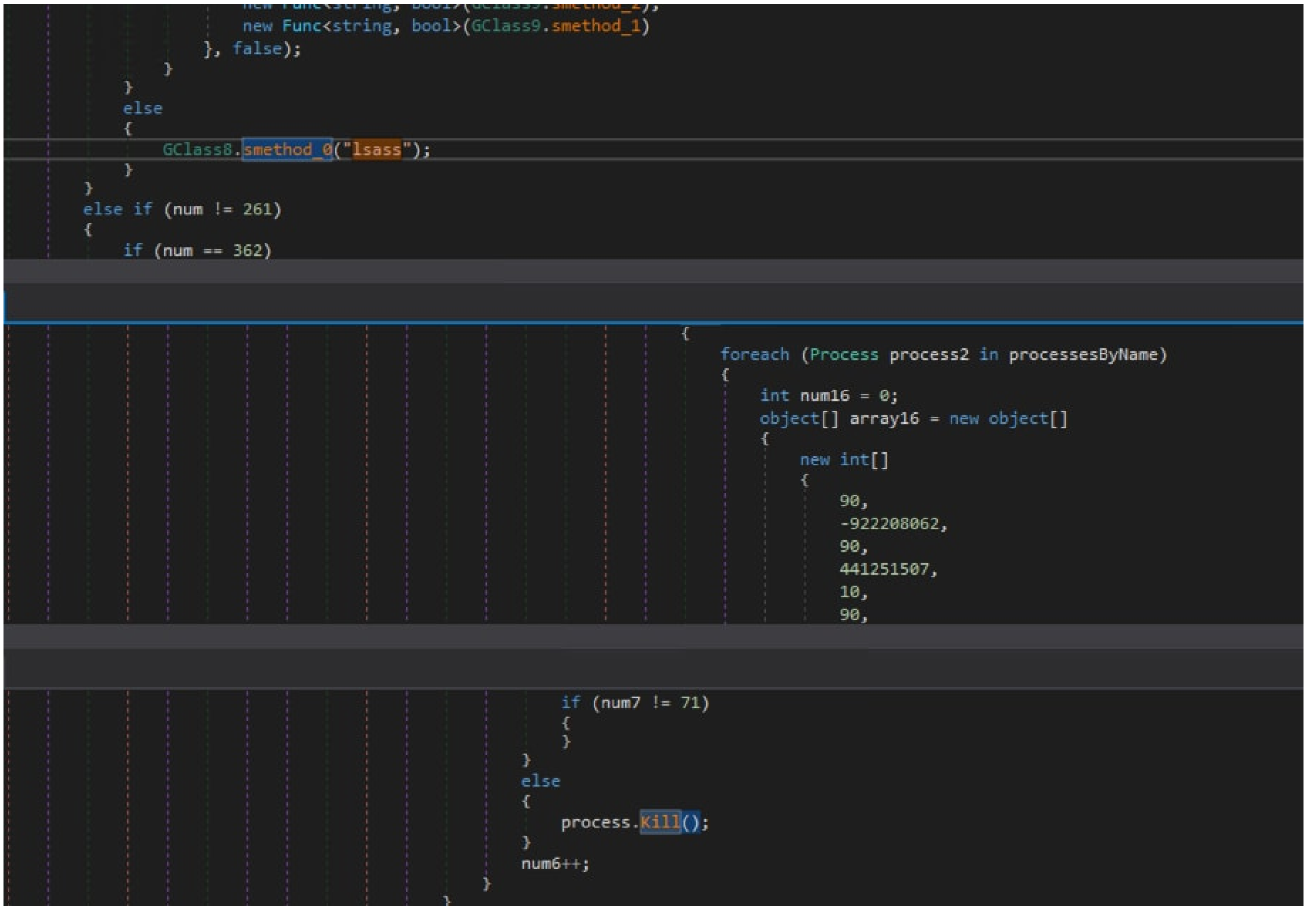


We also identified another wiping function. This additional function works by writing a zeroed buffer to the target file using filestream.write .net function. Below is the screenshot of its code after removing some of its junk code.

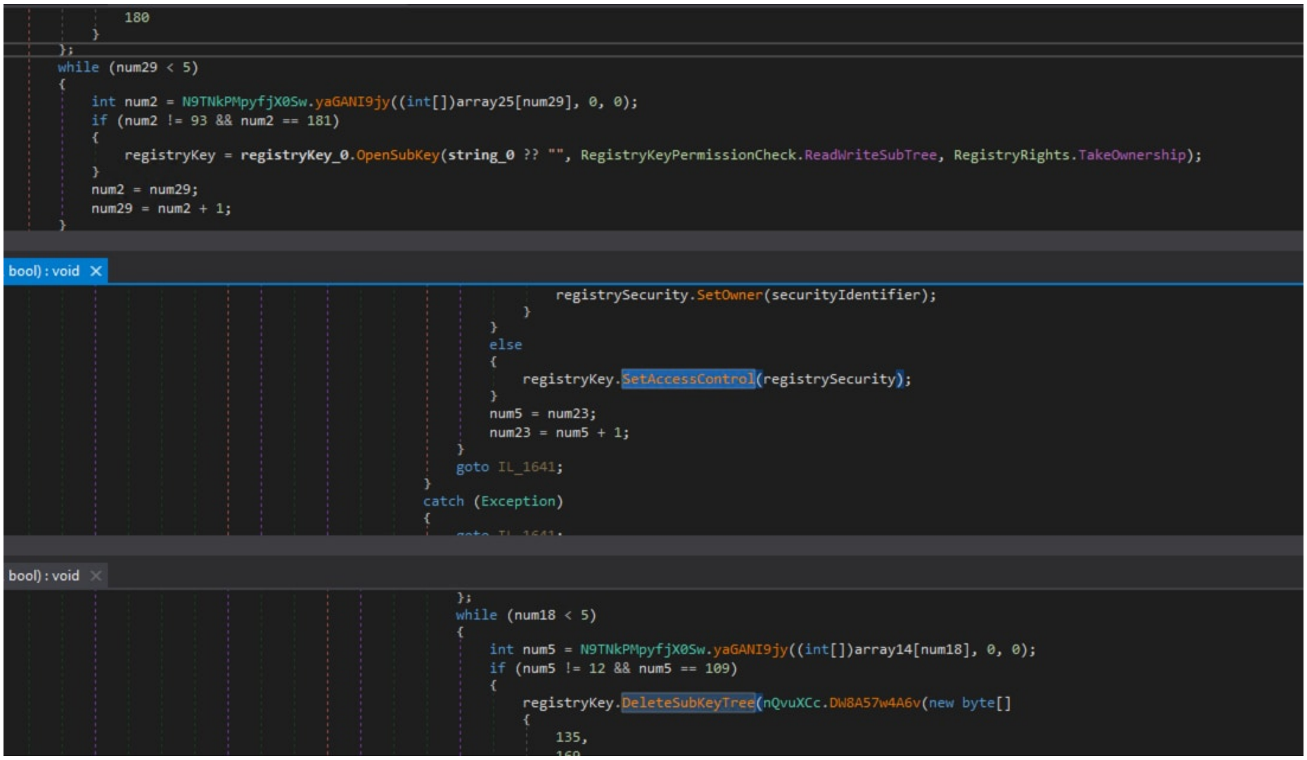
```
while (fileStream.Position < fileStream.Length)
{
    long num6 = fileStream.Length - fileStream.Position;
    if ((long)array2.Length > num6)
    {
        fileStream.Write(array2, aG1ItHZ3wd0hGc.JwbyZ0j7ANqJR1(new int[]
                                                                            {
                                                                                90,
                                                                                1162427705,
                                                                                90,
                                                                                1162427705,
                                                                                190,
                                                                                210,
                                                                                220,
                                                                                190,
                                                                                210,
                                                                                220,
                                                                                270,
                                                                                230,
                                                                                180
                                                                            }, 0, 0), (int)num6);
    }
    else
    {
        fileStream.Write(array2, aG1ItHZ3wd0hGc.JwbyZ0j7ANqJR1(new int[]
                                                                            {
                                                                                90,
                                                                                1162427705,
                                                                                90,
                                                                                1162427705,
                                                                                190,
                                                                                210,
                                                                                220,
                                                                                190,
                                                                                210,
                                                                                220,
                                                                                270,
                                                                                230,
                                                                                180
                                                                            }, 0, 0), array2.Length);
    }
```

Deleting Registry Subkey

This wiper will also wipe known registry hives as part of its destructive payload. First, it will kill the enumerated process to look for a process with the name “lsass” and kill it. Below is the code screenshot of how it enumerates all processes and executes **process.Kill()** function if the “lsass” process was found.



Then it will change the ownership of the registry to the current logo user and change the access control to full access to delete each of the subkeys in each HKLM, HKCU, HKU registry hive. Below is the code snippet spread out in one of its classes that modifies the owner and access control to the registry to delete all of its registry subkeys.



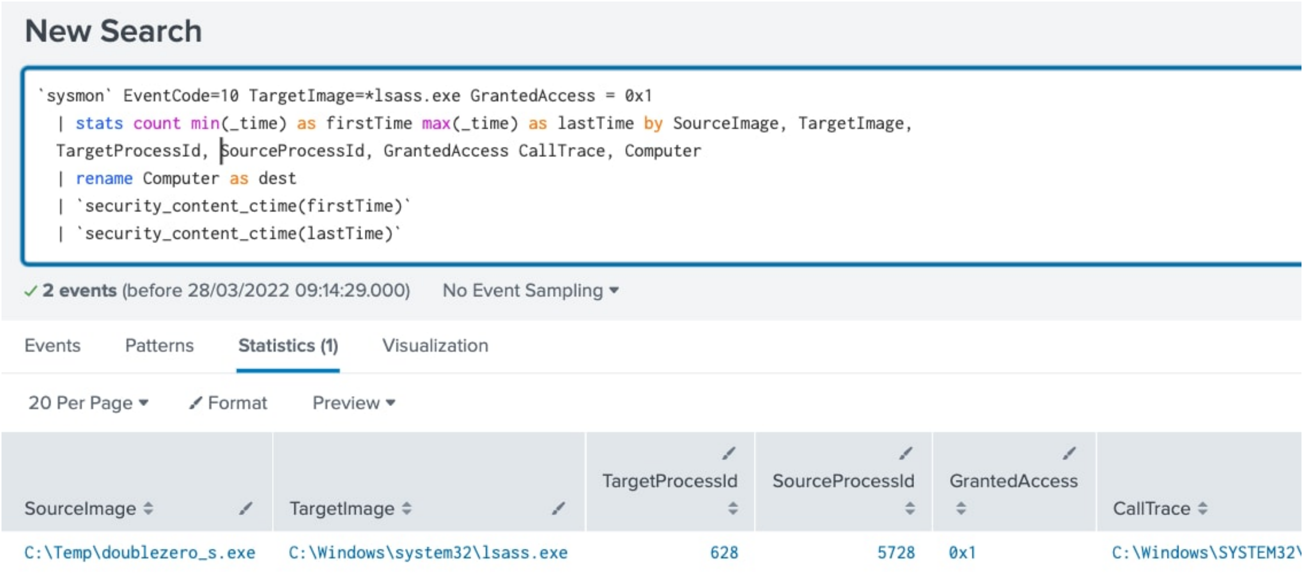
Detections:

The Splunk Threat Research Team (STRT) has developed the following detections specifically targeting this payload and produced several Analytic Stories (WhisperGate, HermeticWiper, CaddyWiper) targeting destructive software. These previous Analytic Stories can also help in the detection of this payload.

Windows Terminating Lsass Process

This analytic is to detect a suspicious process terminating Lsass process. Lsass process is known to be a critical process that is responsible for enforcing security policy. This technique was seen in double zero malware that tries to wipe files and registry in compromised hosts.

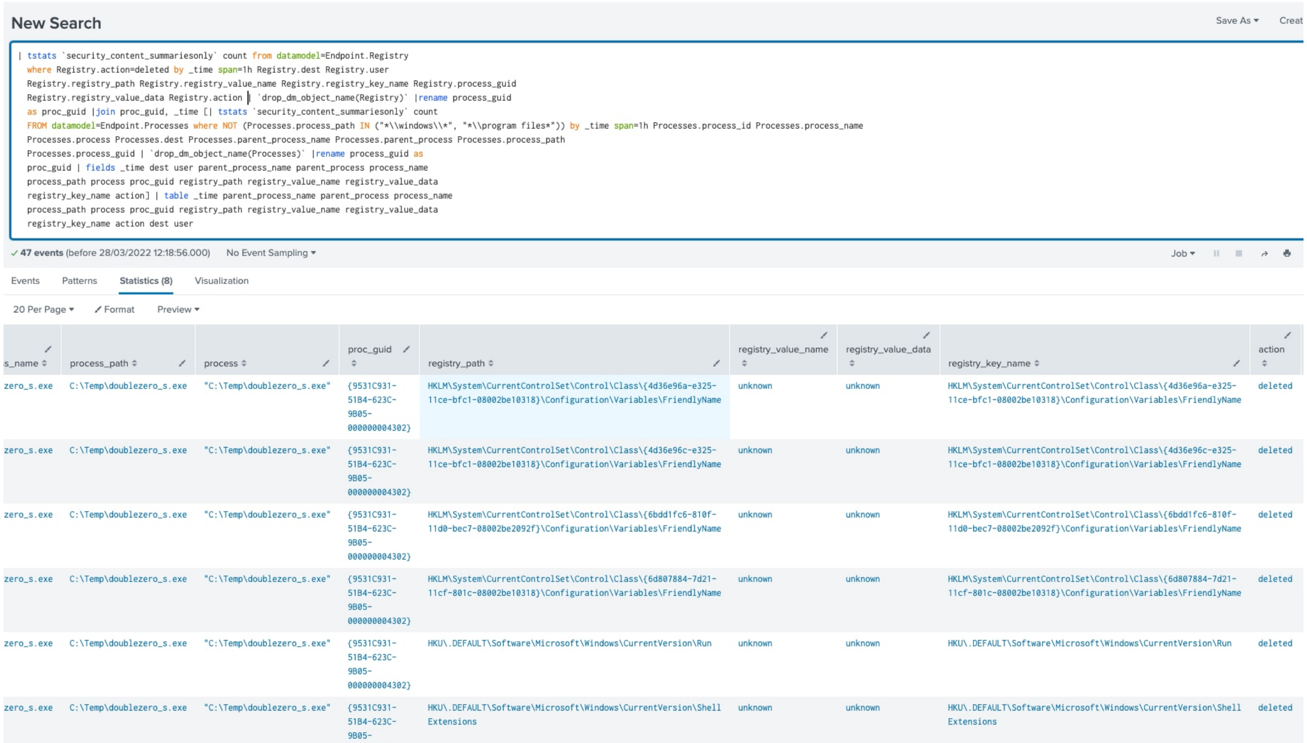
```
`sysmon` EventCode=10 TargetImage=*lsass.exe GrantedAccess = 0x1
  | stats count min(_time) as firstTime max(_time) as lastTime by SourceImage,
TargetImage,
  TargetProcessId, SourceProcessId, GrantedAccess CallTrace, Computer
  | rename Computer as dest
  | `security_content_ctime(firstTime)`
  | `security_content_ctime(lastTime)`
```



Windows Deleted Registry by a Non-Critical Process File Path

This analytic is to detect the deletion of a registry with a suspicious process file path. This technique was seen in Double Zero wiper malware where it will delete all the subkeys in the HKLM, HKCU, and HKU registry hive as part of its destructive payload to the targeted hosts.

```
| tstats `security_content_summariesonly` count from datamodel=Endpoint.Registry
  where Registry.action=deleted by _time span=1h Registry.dest Registry.user
  Registry.registry_path Registry.registry_value_name Registry.registry_key_name
Registry.process_guid
  Registry.registry_value_data Registry.action | `drop_dm_object_name(Registry)`
|rename process_guid
  as proc_guid |join proc_guid, _time [| tstats `security_content_summariesonly`
count
  FROM datamodel=Endpoint.Processes where NOT (Processes.process_path IN
("*\\windows\\*", "*\\program files*")) by _time span=1h Processes.process_id
Processes.process_name
  Processes.process Processes.dest Processes.parent_process_name
Processes.parent_process Processes.process_path
  Processes.process_guid | `drop_dm_object_name(Processes)` |rename process_guid as
  proc_guid | fields _time dest user parent_process_name parent_process process_name
  process_path process proc_guid registry_path registry_value_name
registry_value_data
  registry_key_name action] | table _time parent_process_name parent_process
process_name
  process_path process proc_guid registry_path registry_value_name
registry_value_data
  registry_key_name action dest user
  | `windows_deleted_registry_by_a_non_critical_process_file_path_filter`
```



Name	Technique ID	Tactic	Description
Executables Or Script Creation In Suspicious Path	T1036	Defense Evasion	This analytic will identify suspicious executable or scripts (known file extensions) in a list of suspicious file paths in Windows.
Suspicious Process File Path	T1543	Persistence, Privilege Escalation	This analytic will detect a suspicious process running in a file path where a process is not commonly seen and is most commonly used by malicious software.
Windows Terminating Lsass Process (New)	T1562.001	Defense Evasion	This analytic is to detect a suspicious process terminating Lsass process. Lsass process is known to be a critical process that is responsible for enforcing a security policy. This technique was seen in double zero malware that tries to wipe files and registry in compromised hosts.

Windows Deleted Registry By A Non Critical Process File Path (New)	T1112	Defense Evasion	This analytic is to detect deletion of registry with suspicious process file path.

Filename - description	Sha256
Double Zero malware	3b2e708eaa4744c76a633391cf2c983f4a098b46436525619e5ea44e105355fe

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Contributors

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Posted by

Splunk Threat Research Team

The Splunk Threat Research Team is an active part of a customer's overall defense strategy by enhancing Splunk security offerings with verified research and security content such as use cases, detection searches, and playbooks. We help security teams around the globe strengthen operations by providing tactical guidance and insights to detect, investigate and respond against the latest threats. The Splunk Threat Research Team focuses on understanding how threats, actors, and vulnerabilities work, and the team replicates attacks which are stored as datasets in the Attack Data repository.

Our goal is to provide security teams with research they can leverage in their day to day operations and to become the industry standard for SIEM detections. We are a team of industry-recognized experts who are encouraged to improve the security industry by sharing our work with the community via conference talks, open-sourcing projects, and writing white papers or blogs. You will also find us presenting our research at conferences such as Defcon, Blackhat, RSA, and many more.

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