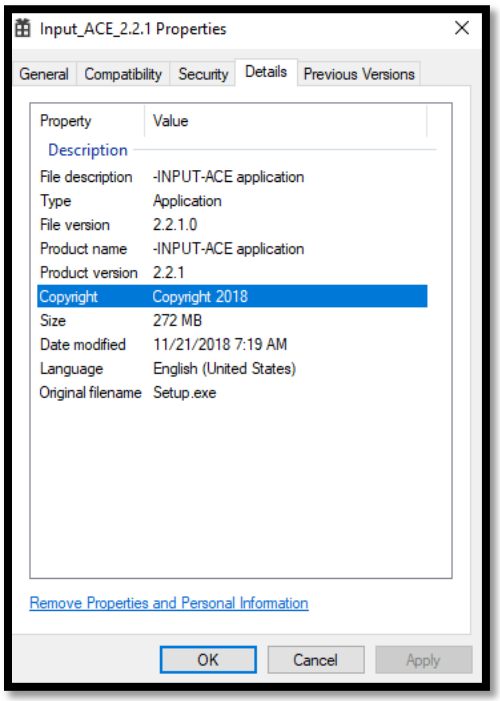
-INPUT-ACE Version 2.2.1

January 21st, 2019.

Description: This is an assessment of the –INPUT-ACE version 2.2.1. This evaluation found vulnerabilities related to a possible buffer overflow[1] and a denial-of-service (DoS) using a User Datagram Protocol (UDP) flood attack[2]. The UDP flood attack targeted the specific port in use by the software, instead of a flood around random ports on a remote host. As a result, the software achieved a status "suspended".

1. File identification:



[1] https://security.radware.com/ddos-knowledge-center/ddospedia/buffer-overflow-attack/
[2] https://en.wikipedia.org/wiki/UDP_flood_attack

2. General security indicators:

The dos-stub message is missing
The size of the resource (DATA.131) is bigger than the max (512000 bytes) threshold
The size of the resource (DATA.131) is bigger than the max (512000 bytes) threshold
The file contains another file (type: PKZIP, location: resources, file-offset: 0x0002B310)
The file references (1) blacklisted library
The file references (1) Windows built-in privilege(s)
The size (285944320 bytes) of the file is suspicious
The online scoring service is not reachable
The signature of the resource (FLAGS:132) is unknown
The file-ratio (99%) of the resources is suspicious
The file imports (5) anonymous function(s)
The file imports (34) blacklisted function(s)

2.1 The ASLR[3] and DEP[4] are enabled, however the CFG is disabled[5].

address-space-layout-randomization (ASLR)	**true**
Code Integrity	false
data-execution-prevention (DEP)	**true**
Image Isolation	**true**
structured-exception-handling (SEH)	**true**
Image Bound	**true**
windows-driver-model (WDM)	false
terminal-server-aware	**true**
control-flow-guard (CFG)	false

2.2 Resources shows a compressed file:

file-offset ...	signature	non-standard	size (285773616 byt	file-ratio (99.94%)	md5	entropy
0x110B3B4C	Version	-	788	0.00 %	103C00A3979359D321798AF5E8BFFD2B	3.396
0x110B3278	String-table	-	1048	0.00 %	B3929F22874681B61A010F8F75F65FD1	3.426
0x110B3690	String-table	-	1138	0.00 %	8A1122B792CB09A177BB9C04E0BE76B8	3.322
0x110B3E60	Manifest	-	999	0.00 %	CBF1999E86CC16EECF938CD04AF0D4C6	5.320
0x110B3B04	Icon-group	-	34	0.00 %	E9EF6E365B9E8C9654A9ECE0C4EA75D0	2.374
0x110B3B28	Icon-group	-	34	0.00 %	CF3085EA1B910041CAF08EDC245B714A	2.492
0x110B1B58	Icon	-	744	0.00 %	9672B12784736875DE8A7A86503B8D7D	2.933
0x110B1E40	Icon	-	2216	0.00 %	FD881FE96555C23177AEA9A3369E20A6	2.147
0x110B26E8	Icon	-	744	0.00 %	9672B12784736875DE8A7A86503B8D7D	2.933
0x110B29D0	Icon	-	2216	0.00 %	FD881FE96555C23177AEA9A3369E20A6	2.147
0x110B1B4C	unknown	x	12	0.00 %	B68200A712BCEAD87897DECA6A51F2B0	1.947
0x0002B310	PKZIP	x	285763643	99.94 %	AC49C2D1FB98C3A0EE2D5387D59A3747	7.999

[3] https://en.wikipedia.org/wiki/Address_space_layout_randomization
[4] https://support.microsoft.com/en-ca/help/875352/a-detailed-description-of-the-data-execution-prevention-dep-feature-in
[5] https://docs.microsoft.com/en-us/windows/desktop/secbp/control-flow-guard

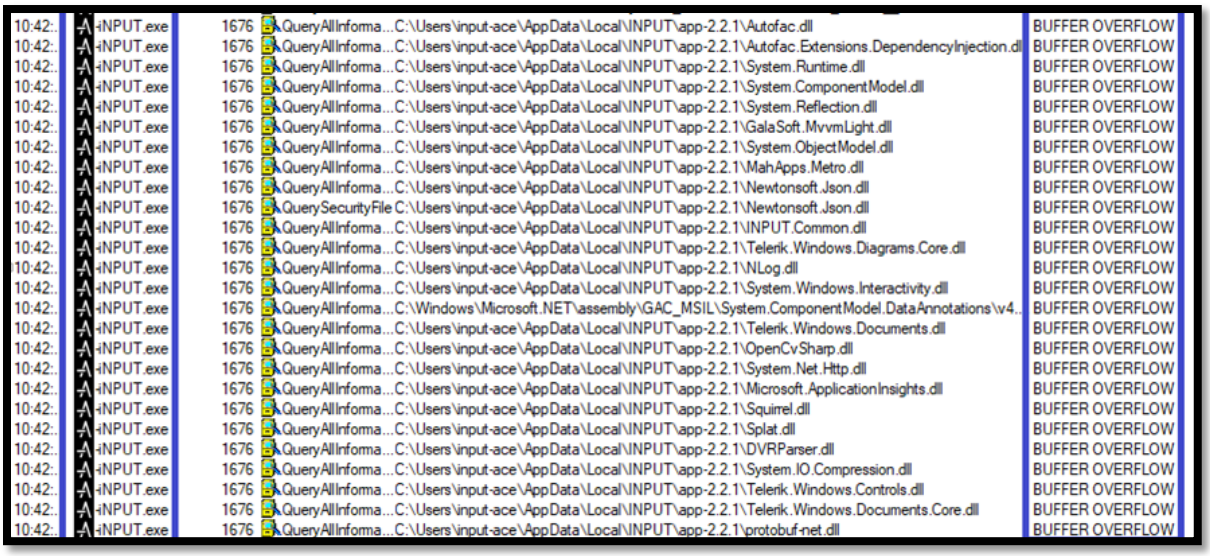
2.3 Windows built-in privilege

In the strings, it is possible to locate one possible Windows built-in privilege constant: SeShutdownPrivilege[6].

[6] https://docs.microsoft.com/en-us/windows/security/threat-protection/security-policy-settings/shut-down-the-system

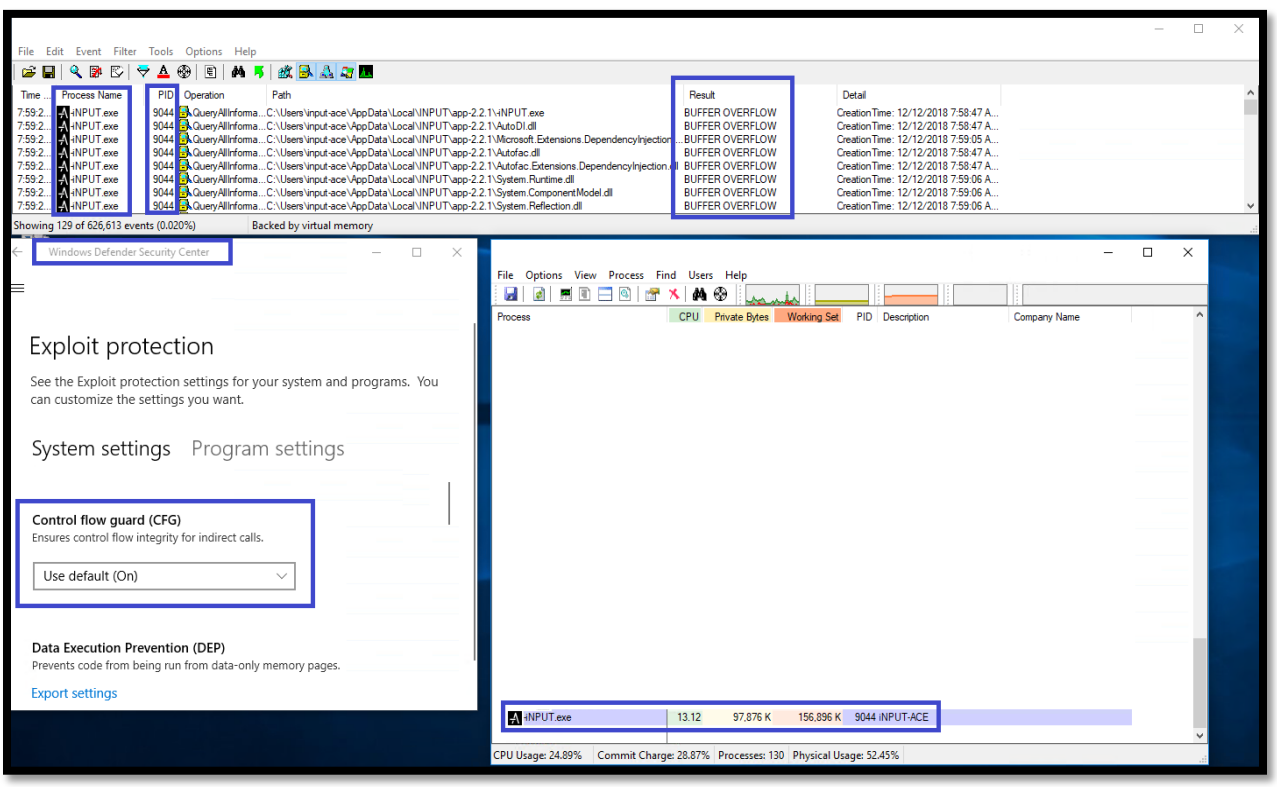
3. Buffer Overflow

3.1 The buffer overflow was observed as following:



10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\Autofac.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\Autofac.Extensions.DependencyInjection.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\System.Runtime.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\System.ComponentModel.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\System.Reflection.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\GalaSoft.MvvmLight.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\System.ObjectModel.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\MahApps.Metro.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\Newtonsoft.Json.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QuerySecurityFile	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\Newtonsoft.Json.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\INPUT.Common.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\Telerik.Windows.Diagrams.Core.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\NLog.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\System.Windows.Interactivity.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Windows\Microsoft.NET\assembly\GAC_MSIL\System.ComponentModel.DataAnnotations\v4...	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\Telerik.Windows.Documents.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\OpenCvSharp.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\System.Net.Http.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\Microsoft.ApplicationInsights.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\Squirrel.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\Splat.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\DVRParser.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\System.IO.Compression.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\Telerik.Windows.Controls.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\Telerik.Windows.Documents.Core.dll	BUFFER OVERFLOW
10:42:..	iNPUT.exe	1676	QueryAllInforma...	C:\Users\input-ace\AppData\Local\INPUT\app-2.2.1\protobuf-net.dll	BUFFER OVERFLOW

Even with the CFG enabled.

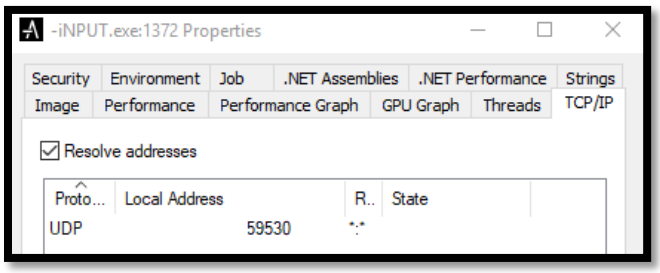


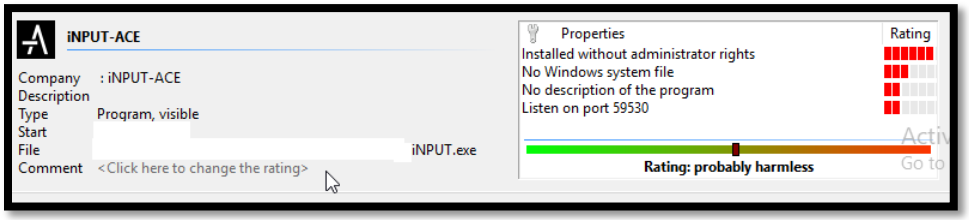
3.2 By checking the memory dump was observed some possible concerns that could be related to the buffer size[7]:

```
:~/          $          Input_ACE_2.2.1.exe
dump: bad read buffer size
```

4. UDP Flood Attack

4.1 The software relies in the use of an UDP port:

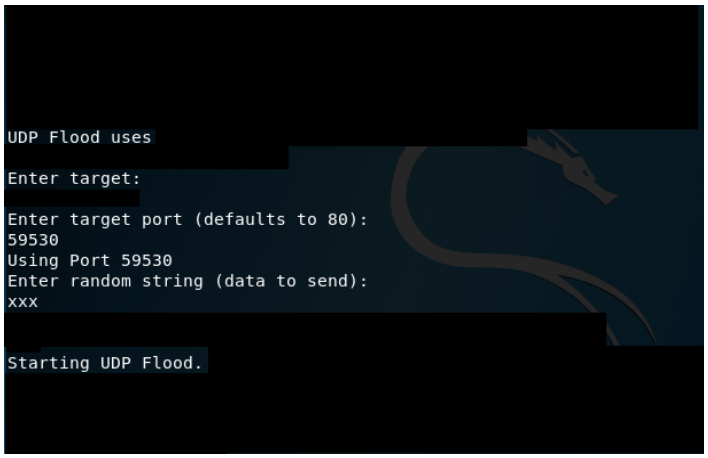




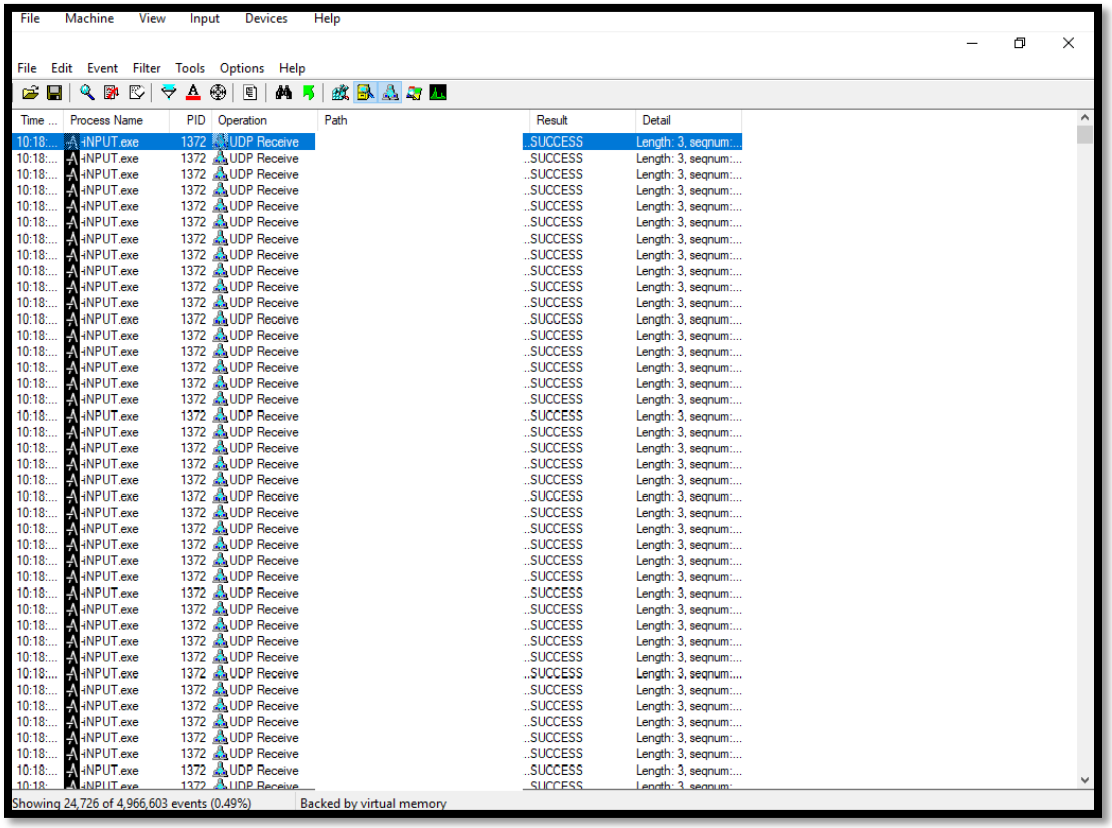
4.2 The port has an open status:

[7] https://cwe.mitre.org/data/definitions/131.html

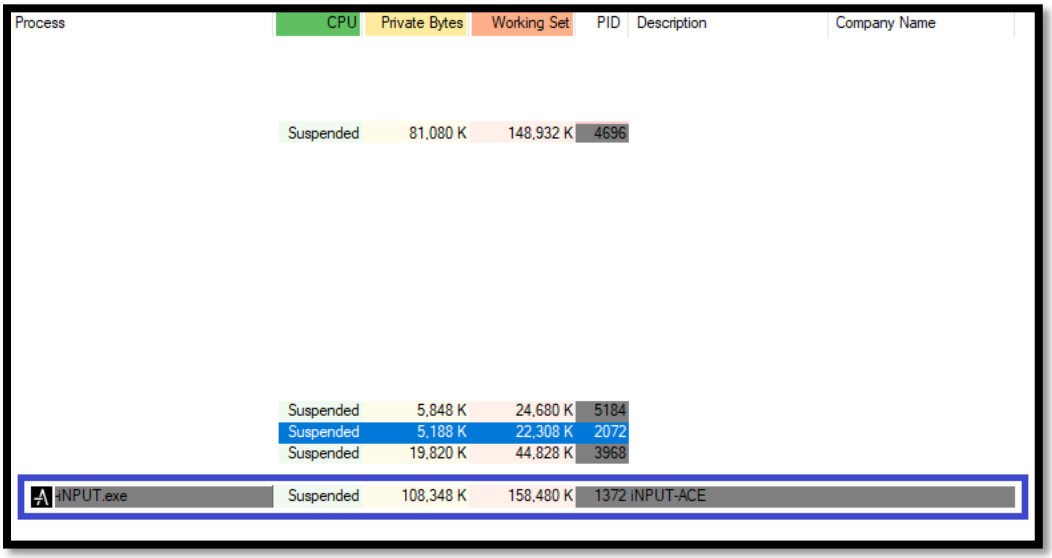
4.3 Then it is possible to send packages to this port:



4.4 Confirm the flood in the victim machine



4.5 To finally, suspend the software process in the victim machine.



4.6 There is the possibility also to replicate the attack over a Transmission Control Protocol (TCP) as well by using the Remote Address and Remote Port information.