

Virbox Product Description

DS Protector & Use Case

Version 2.1





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Documentation Improvement

Any suggestion to this manual from you are welcome, We are glad to hear any feedback from you which will help us to continuously improve the documents quality and support and serve the developer to protect software products more efficiently.

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About this document

This document is designed to help Software developer to learn about the principle of Virbox DS Protector and the protection and encryption process to data file, digital resource, jar/war archive file, and provides the Use Case to protect source code of part of program language.

Target User: R & D staff of software developer who responsible to protect software, data file and source code of program language;

DS Protector supports to protect following data file, digital resource and source code of program language

Includes

Data file and resources: Audio, Video, PPT, PDF, Map and Picture file;

Source code of Program Language: Jar/War Archive, Web and client, Python, lua, perl, ruby, go, PHP, R (windows only), Unity3D, UE4, etc.

Objective: Software developer will learn the DS Protector operating process and Developer will have competence to protect data file and source code of program language step by step (please refer to those use case)

For essential concept to Virbox License System, please refer to:

Virbox License System Instruction:



[Virbox License System Architecture;](#)

For More detail information for how to protect the software program by use of Virbox Protector, please refer to:

Virbox User Manual:



[Virbox User Manual: Virbox Protector;](#)

Virbox also provides a series **Quick Start Guide** to help developer to quickly use Virbox solution to protect software and issue license to hardware lock (dongle), Cloud License and soft license, please refer these "quick start guide" documentation:

Virbox Provides Virbox User License Service and User License Tools which installed software user premise which for proactive software protection service (runtime service) to safeguard software copyright, IP, and license verification to software user, for more detail information how to install and use this Virbox User License Tools in user computer, please refer to:

User Manual:



[Virbox User License Tools](#);

Let's Start Your Software Protection and Licensing Journey!

Virbox will help you to protect your software copyright/IP Value and Create Revenue for you.

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1 Data Security Protection Plugin Unit (DS)

- Data Security protection plugin unit (Hereinafter referred to as DS Protector) is plugin unit provided by Virbox, software developer may use DS Protector plugin unit to protect data file and encrypt related data resources together with protected software program.
- Data file and data resources currently support to be protected by DS includes: Audio, Video, PPT, PDF, Map and Picture file;
- DS also can be used to protect the source code of some program language : Python, lua, perl, erland, ruby, go, php, R, jar and war archive and client end.
- This documents intents to describe the principle of data and resource protection by use of Data Security plugin unit and provides a series use case to software developer who want to use Data Security plugin unit to protect the data file together with the software program.

2 Data File and Data Resources Protection Principle and Implementation Method

File(Data/Resource) Reading Process in General

Read file to Memory

We need to add additional layer if we want to filter and process the content of "file"

File-->Filter Layer

Filter Layer-->Memory

This Filter Layer is what the DS Plug In Unit(DS Protector.exe) function designed and implemented. It is a Dynamic Link Library and will be plugin into the protected software (.exe or dll) when protection processed (encryption). It will be loaded into the memory when executed, then execute the initialization function and link to file operation. so all the operation to the file will be filtered by this plugin. For encrypted file content, it will decrypt the encryption file. For the file which not encrypted, it will not process it and follow the original file process.

Detail of File Operation and Process: - File Operation: Open File, Reading, Writing, Obtain attributes, Close File; - Use hooks to intercept open files, read, move pointers, get file size, close events; - When the file is opened, It will judge if the file be

encrypted or not and take a record in the list when open a file; - When reading file, read and decrypt the document, return; - When the file moves the pointer, make sure the pointer does not move beyond the original file size. - When getting the file size, return the original size of the file; - Remove it from the list when close file.

The Disadvantage of Protection/Encryption to Data and Resource if Implemented in Application Layer

Steps for Windos Reading Files

File-->Cache

Cache --> Memory

The contents of each layer may be different, we are now just hooking up between the File and memory

File --> Memory

The Challenge

when the application reads the file in a cache, then The Plug In cannot intercept the file and cannot decrypt it.

So, Whether or Not if successful implements resource encryption and decryption in Application Layer will much depends on how the application Programmed

3 Show Case/Test Scope and Support Language (Program Language Supported)

Following use cases are introduced to software developer which help to protect the data file with the protected software. includes to protect source code of following program language.

No.	Program or Language	Type	Support or Not
1	python	Language	Y
2	lua	Language	Y
3	perl	Language	Y
4	erlang	Language	Y
5	ruby	Language	Y
6	go	Language	N
7	php	Language	Y
8	R	Language	Y

9	Unity Game	Gaming	Y
10	UE4 Game	Gaming	Partial Support
11	Potplayer	Media Player	Y
12	Baofeng(Installation Version)	Media Player	Y
13	Baofeng (Free Installation Version)	Media Player	N
14	jar,war web or Client	Develop Environment	Y

4 Show Case of Data/Resource Protection for above Program or Language

4.1 Show Case of Data/Resource Protection for Program Language

4.1.1 Python

1. First to install python in your desktop

Installation Version: 3.4

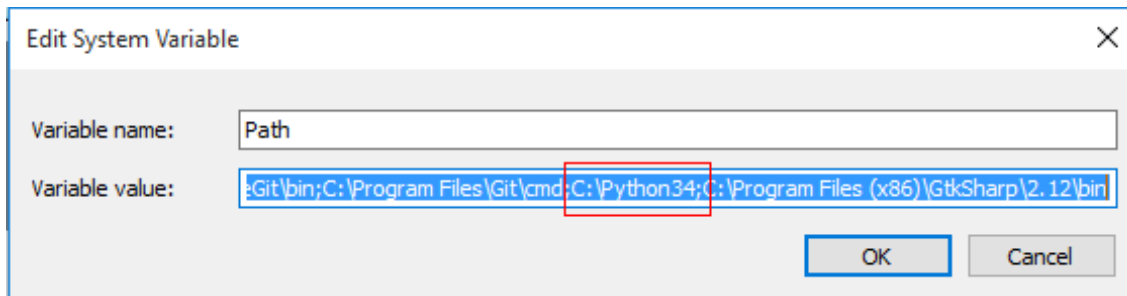
```
C:\Windows\system32\cmd.exe - python
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\T_T>python
Python 3.4.0 (v3.4.0:04f714765c13, Mar 16 2014, 19:25:23) [MSC v.1600 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

2. Add Environment Variables: Add Environment Variables: On My Computer
-> Properties -> Advanced -> Environment Variables;

3. Variable Name: path Variable value: C:\Python34 (python installation directory);

4 Open the command line, enter python, Enter, if the version number showed in the display then configuration is successful.




5. Protect (by use of Virbox Protector) the python.exe in C:\Python27 in the installation directory

6. Open DS Protector.exe, import the configuration tool that was just protected, add the demo file need to be protected, and click "Protect" Button.

7. Go to the directory where the demo is located and execute the file e.g python demo.py

4.1.2 Lua

First to install lua in your desktop, Installation Version: 5.3.1

 lua.exe

```
D:\work\DS>lua.exe
Lua 5.3.1 Copyright (C) 1994-2015 Lua.org, PUC-Rio
>
```

1. After the installation completed, Open the command line, input "lua", Enter, if the version number showed in the display then configuration is successful.

2. If the prompt is not an internal command, it needs to be setup "Environment Variables" in my computer -> Properties -> Advanced -> Environment Variables, variable name path variable value: Lua installation directory

3. Enter "lua" again on the command line, if the version number showed in the display then the configuration was successful.

4. Protect the lua.exe (By use of Virbox Protector) under the installation directory.

5. Open DS Protector.exe, import the configuration tool that was just protected, add the demo need to be protected, and click "Protect" Button.

6. Go to the directory where the demo file is located, execute the file, eg. lua demo.lua.

4.1.3 Perl

First to install perl in your desktop, Installation Version:5.26.2

```
C:\Windows\system32\cmd.exe
C:\Users\T_T\Downloads\strawberry-perl-5.26.2.1-64bit\perl\bin>perl.exe --version
This is perl 5, version 26, subversion 2 (v5.26.2) built for MSWin32-x64-multi-thread
Copyright 1987-2018, Larry Wall

Perl may be copied only under the terms of either the Artistic License or the
GNU General Public License, which may be found in the Perl 5 source kit.

Complete documentation for Perl, including FAQ lists, should be found on
this system using "man perl" or "perldoc perl". If you have access to the
Internet, point your browser at http://www.perl.org/, the Perl Home Page.
```

1. After installation completed, Open the command line, input "perl --version", Enter, if the version number showed in the display then configuration is successful.
2. If the prompt is not an internal command, it needs to be setup "Environment Variables" in my computer -> Properties -> Advanced -> Environment Variables, variable name path variable value: Perl installation directory;
3. Enter "perl --version" again on the command line, if the version number showed in the display then the configuration was successful.
4. Protect the perl.exe (By use of Virbox Protector) under the installation directory: eg. C:\Strawberry\perl\bin;
5. Open DS Protector.exe, import the configuration tool that was just protected, add the demo need to be protected, and click "Protect" Button.
6. Go to the directory where the demo file is located, execute the file, eg. perl demo.pl.

4.1.4 Erlang

First to install erlang in your desktop, Installation Version: 9.3

```
cmd.exe erl.exe --version

C:\Program Files (x86)\erl9.3\bin>erl.exe --version
Eshell V9.3 (abort with ^G)
1>
```

1. After installation completed, Open the command line, input "erl", Enter, if the version number showed in the display then configuration is successful.
2. If the prompt is not an internal command, it needs to be setup "Environment Variables" in my computer -> Properties -> Advanced -> Environment Variables, variable name path variable value: Erlang installation directory;
3. Enter "erl" again on the command line, if the version number showed in the display then the configuration was successful.
4. Protect the erl.exe (By use of Virbox Protector) under the installation directory: eg. C:\Program Files\erl9.1\bin;
5. Open DS Protector.exe, import the configuration tool that was just protected, add the demo need to be protected, and click "Protect" Button.
6. Go to the directory where the demo file is located, execute the file, eg. erl demo.erl.

4.1.5 Ruby

First to install ruby in your desktop and installation version : 2.5.1

```
cmd.exe C:\Windows\system32\cmd.exe

C:\Users\T_T\Downloads\rubyinstaller-2.5.1-2-x64\bin>ruby.exe --version
ruby 2.5.1p57 (2018-03-29 revision 63029) [x64-mingw32]

C:\Users\T_T\Downloads\rubyinstaller-2.5.1-2-x64\bin>
```

1. After installation completed, Open the command line, input "ruby--version", Enter, if the version number showed in the display then configuration is successful.
2. If the prompt is not an internal command, it needs to be setup "Environment Variables" in my computer -> Properties -> Advanced -> Environment Variables, variable name path variable value: ruby installation directory;

3. Enter "ruby --version" again on the command line, if the version number showed on the display then the configuration was successful.
4. Protect the ruby.exe (By use of Virbox Protector) under the installation directory: eg. C:\ruby24-X64\bin;
5. Open DS Protector.exe, import the configuration tool that was just protected, add the demo need to be protected, and click "Protect" Button.
6. Go to the directory where the demo file is located, execute the file, eg. ruby demo.rb.

4.2 Show Case of Data/Resources Protection for Game Application based UE4 and U3D development engine

4.2.1 Unity Game

File Directory is as follows

C:) > Users > Public > Public Documents > Unity Projects > 4-0_AngryBots5-5pc > 5-5-pc			
Name	Date modified	Type	Size
Game_Data	8/20/2018 10:36 AM	File folder	
Game.exe	8/20/2018 10:36 AM	Application	17,786 KB

Protect the exe in the above directory

Script directory, to Protect Assembly-CSharp.dll, by use of Virbox Protector,

:) > Users > Public > Public Documents > Unity Projects > 4-0_AngryBots5-5pc > 5-5-pc > Game_Data > Managed			
Name	Date modified	Type	Size
Assembly-CSharp.dll	8/20/2018 10:35 AM	Application extens...	19 KB
Assembly-CSharp-firstpass.dll	8/20/2018 10:35 AM	Application extens...	5 KB
Assembly-UnityScript.dll	8/20/2018 10:35 AM	Application extens...	95 KB
Assembly-UnityScript-firstpass.dll	8/20/2018 10:35 AM	Application extens...	2 KB
Boo.Lang.dll	1/6/2017 7:51 AM	Application extens...	124 KB
Mono.Security.dll	1/6/2017 7:51 AM	Application extens...	287 KB
mscorlib.dll	1/6/2017 7:51 AM	Application extens...	2,439 KB
System.Core.dll	1/6/2017 7:51 AM	Application extens...	260 KB
System.dll	1/6/2017 7:51 AM	Application extens...	1,044 KB
UnityEngine.dll	1/6/2017 8:01 AM	Application extens...	1,173 KB
UnityEngine.dll.mdb	1/6/2017 8:01 AM	MDB File	405 KB
UnityEngine.Networking.dll	1/6/2017 7:57 AM	Application extens...	246 KB
UnityEngine.PlaymodeTestsRunner.dll	1/6/2017 7:57 AM	Application extens...	30 KB
UnityEngine.UI.dll	1/6/2017 7:57 AM	Application extens...	237 KB
UnityScript.Lang.dll	1/6/2017 7:51 AM	Application extens...	14 KB

Open DS Protector.exe, import the configuration tool that was just protected, add the Assembly-CSharp.dll need to be protected, and click "Protect" Button.

Data Directory, to Protect *.resS, by use of Virbox Protector,

C:) > Users > Public > Public Documents > Unity Projects > 4-0_AngryBots5-5pc > 5-5-pc > Game_Data

Name	Date modified	Type	Size
Managed	8/20/2018 10:36 AM	File folder	
Mono	8/20/2018 10:36 AM	File folder	
Resources	8/20/2018 10:36 AM	File folder	
app.info	8/20/2018 10:36 AM	INFO File	1 KB
globalgamemanager	8/20/2018 10:36 AM	File	31 KB
globalgamemanager.assets	8/20/2018 10:36 AM	ASSETS File	31 KB
level0	8/20/2018 10:35 AM	File	6 KB
level1	8/20/2018 10:36 AM	File	13,668 KB
level2	8/20/2018 10:36 AM	File	385 KB
resources.assets	8/20/2018 10:36 AM	ASSETS File	45 KB
sharedassets0.assets	8/20/2018 10:36 AM	ASSETS File	5 KB
sharedassets0.assets.resS	8/20/2018 10:36 AM	RESS File	819 KB
sharedassets1.assets	8/20/2018 10:36 AM	ASSETS File	2,568 KB
sharedassets1.assets.resS	8/20/2018 10:36 AM	RESS File	33,680 KB
sharedassets1.resource	8/20/2018 10:36 AM	RESOURCE File	1,843 KB
sharedassets2.assets	8/20/2018 10:36 AM	ASSETS File	11 KB
sharedassets2.assets.resS	8/20/2018 10:36 AM	RESS File	21 KB

Open DS Protector.exe, import the configuration tool that was just protected, add the data file *.resS need to be protected, and click "Protect" Button.

4.3 Show Case of Data/Resources Protection for Media Player Application

4.3.1 Potplayer

Here we take PotPlayer, a media player, as an example to show how to protect video file and play the protected video file with PotPlayer,

First to select a free installation version of PotPlayer, open and execute PotPlayerMini.exe.

Protect PotPlayer, by use of Virbox Protector Open DS Protector.exe, import the configuration tool that was just protected, add the video file need to be protected, and click "Protect" Button. And execute protected PotPlayerMini.exe to play the protected video file.

4.3.2 Baofeng (Storm) Media Player (Installation Version)

Baofeng (StormPlayer.exe) is a popular used media player in China and Asia Area, Here we take Baofeng (Installation version), as an example to show how to protect a video file and play the protected video file with Baofeng media Player

Installation Version: 5.72.921.1111, Execute: StormPlayer.exe

Protect this .exe with Virbox Protector;

Open DS Protector.exe, import the configuration tool that was just protected, add the video file need to be protected, and click "Protect" Button.

ton, and execute protected PotPlayerMini.exe to play the protected video file.

4.4 Development Environment

4.4.1 Protection to war Archive and jar Archive of Java Program

4.4.1.1 Protect the war archive by use of Virbox Protector

1. Protect the main program (java.exe or tomcat program) with Virbox Protector, if the service started by execution of tomcat, you can find the tomcat execution program, then use Virbox Protector to protect this program, if the service start via script. You can find the java.exe program and use Virbox Protector to protect this java.exe (you can locate the directory of java.exe by view the "Task Manager")

shutdown.bat	5/4/2017 11:43 PM	Windows Batch File	2 KB
shutdown.sh	5/4/2017 11:43 PM	Shell Script	2 KB
startup.bat	5/4/2017 11:43 PM	Windows Batch File	2 KB
startup.sh	5/4/2017 11:43 PM	Shell Script	2 KB
tcnative-1.dll	5/4/2017 11:43 PM	Application extens...	2,058 KB
tomcat9.exe	5/4/2017 11:43 PM	Application	108 KB
tomcat9w.exe	5/4/2017 11:43 PM	Application	108 KB
tomcat-juli.jar	5/4/2017 11:43 PM	JAR File	41 KB
tomcat-native.tar.gz	5/4/2017 11:43 PM	GZ File	391 KB
tool-wrapper.bat	5/4/2017 11:43 PM	Windows Batch File	4 KB
tool-wrapper.sh	5/4/2017 11:43 PM	Shell Script	5 KB

2. Protect the war archive: Stop the tomcat service or java program, and find the war which need to be protected from the installation directory of tomcat service, and release the war archive, use DS Protector to protect the class file, delete the original war file (please make sure to backup file first before delete the war file)

Name	Date modified	Type	Size
Hello.class	7/30/2007 4:26 PM	CLASS File	2 KB

3. Restart the tomcat service or start the script and check if war (protected) works well or not.

```

n directory [E:\WXWork\1688851409296804\WXWork Files\File\2018-09\ap
[277] ms
06-Sep-2018 18:47:04.486 INFO [main] org.apache.catalina.startup.Ho
rectory [E:\WXWork\1688851409296804\WXWork Files\File\2018-09\apac
06-Sep-2018 18:47:04.769 INFO [main] org.apache.catalina.startup.Ho
n directory [E:\WXWork\1688851409296804\WXWork Files\File\2018-09\ap
in [283] ms
06-Sep-2018 18:47:04.769 INFO [main] org.apache.catalina.startup.Ho
next... [E:\WXWork\1688851409296804\WXWork Files\File\2018-09\apac

```

Name
java.exe
lsass.exe
MpCmdRun.exe
MsMpEng.exe
NisSrv.exe

Note:

1、 If the service does not find tomcat, you need to switch to the tomcat\bin directory, execute the command "service install service name" (my Service name is 9, service install tomcat9), if no Service name, there is no need to add it into service.

2、 Protection to jar Archive

Usually, protect the java.exe which located in jre directory of java.

Protect javaw.exe or java.exe by use of Virbox Protector, and then, open DS Protector, import the configuration tool just be protected, add the jar which need to be protected, click "Protect" Button, and then run the jar Archive, then execute the command: javaw -jar bounce.jar or java - Jar bounce.jar