Virbox User Manual

Software Developer Guide

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 and Architecture of Virbox Software protection & License Solution and the process to use Virbox Protector, Virbox Developer Utility (Local License Manager), or Virbox Developer Center (Virbox Cloud LM) to protect software and issue license to hardware Lock (Virbox Elite 5 Acme dongle), Cloud Lock (Cloud License) and Soft Lock (Soft License) and describes the operation process step by step for how to sign up in Virbox Developer Center (Virbox Cloud LM), how to protect software by use of Virbox Protector and issue the license.

Target User: R & D or Operation staff of software developer who responsible to protect software and license issuing;

Virbox Software Protection and License Solution (Virbox LM or Virbox Cloud) supports to protect and licensing to the software program running in **Windows, Linux and Mac** Environment:

Virbox support to protect/encrypt software application includes

Windows: .exe, dll;

Linux: executable file and .so

Program Language includes: **C/C++, C#, Java, .NET, VB6.0, VC6, VC2003, VS2005-VS2017, Delphi7 DeliphXE-XE10, BCB6.0, Unity 3D, UE4**

Plugin can be protected with Virbox Protector: **AutoCAD ARX, Revit** etc.

Objective: Software developer will understand to Virbox solution architecture, essential concept of "Product, Template, License, etc and understand the functionality of each ″**Component**″of Virbox Solution in software protection and licensing process; Developer will have competence to decide and select related Virbox SDK, and other software toolkits to protect the software, select the flexible license mode (according to software product sales strategy and different market segment) to issue the license to software user with suitable license repository: Hardware lock (Dongle), Cloud Lock or soft lock; etc.

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

Virbox System Instruction:

📖 *Virbox License System Architecture*;

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

User Manual:

📖 *Virbox Protector*;

For More detail information for how to protect the Data file or other digital resource by use of Virbox Protector DS (plugin), please refer to:

Virbox Product Description:

📖 *DS Protector & Use case;*

Virbox also Provide 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 Tool 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 Tool in user computer, please refer to:

User Manual:

Virbox User License Tool;

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1 Introduction to Virbox LM (Virbox Cloud)

Virbox LM (Virbox Cloud) is Cloud based Software protection, License Entitlement Solution and cloud service which provides to software developer with lowest total cost ownership, Top Security of Software Copyright Protection and Easy to use in whole software life cycle. By use of Virbox Cloud, Developers can achieve extremely protection to software copyright and IP and flexible to issue license to software user with minimal effort and investment.

Virbox One Stop Solution consist of following components: Virbox Cloud License Manager (Virbox Developer Center), Software Protection (Encryption) Tool (Virbox Protector), Local License Manger (Virbox Developer Utility) and Virbox Security Service Middleware and User License Tool (Virbox User License Tool).

Virbox License Type supports: hardware lock (Elite 5 Dongle), Soft Lock (Soft license) & Cloud Lock (Cloud license) and suitable to deploy in different Software implementation scenario, on line, offline, firewall isolated environment etc. Virbox provides flexible license mode to support ISV/software developer Software monetization which includes: Perpetual, trial, time based, feature on demand, subscription, concurrent; etc.

1.0.1 Key Advantage of Virbox Cloud

- **Top Security of Software Protection:** the State of Art Core Technolgoy has been integrated into Virbox Solution and reach Top level of Security to software be protected: Shell of Virtual Machine, Virbox Encryption Compiler and Code Snippet Execution (Code Fragmentation Execution).

- **Lowest Cost and Investment:** Developer may free signup in Virbox Cloud and use Virbox Cloud, Virbox Protector and other software tools free to protect software and issue license to software users, Developer will pay related license repository only.

- **Easy to Use:** Virbox Provides different protection mode and Analysis and Optimization features in software protection which help even the operation staff to protect software without additional code competence and workload needed.

- **Flexibility:** Multi Type of License Repository supports: Hardware based Lock: Virbox EL5 (dongle), Cloud Lock (Cloud License) and Soft Lock (Soft License). Developer just need one time protection to software and issue license to different software sales Scenario.

1.1 Architecture of Virbox LM (Virbox Cloud)
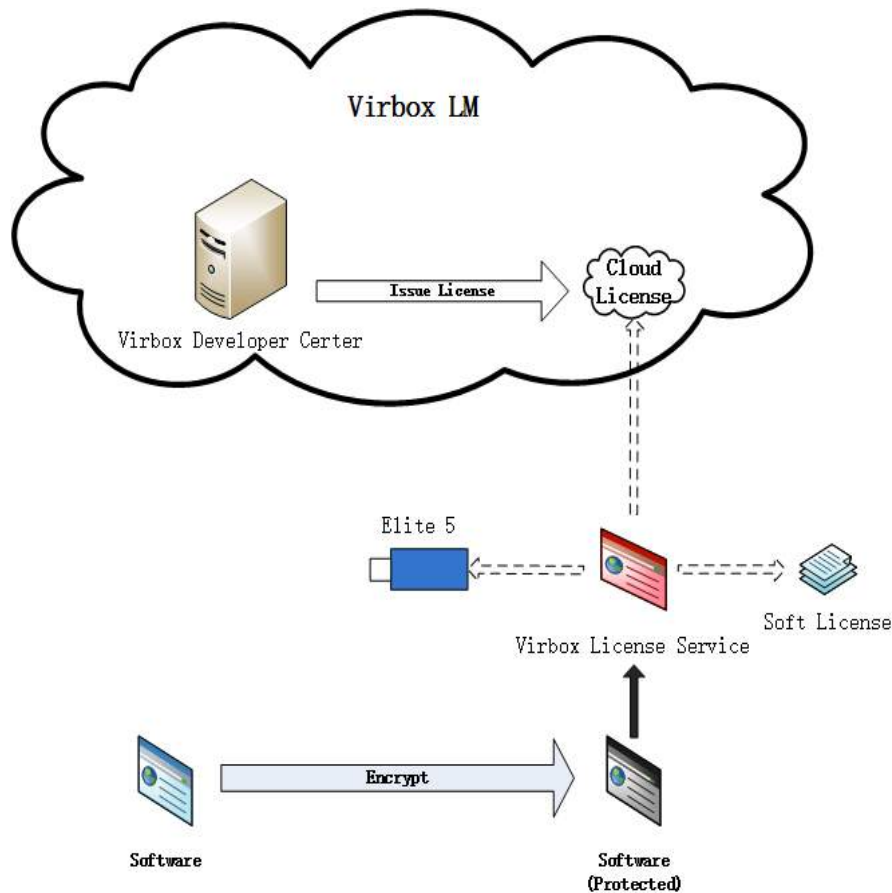
The diagram above describes the components and work process of the Virbox LM:

The Software **Developer** signup "Virbox Developer Center" of Virbox LM to download the SDK;

Developer encrypt and protect their software by using of Software Encryption/Envelop tools: Virbox Protector;

Developer distribute encrypted and protected software and related license to software user;

Software user install the protected software, Virbox License Service middleware and User License Tool in user operating environment, the License will be verified by User License Tool and "User Authorization Center" of Virbox LM, then software user can start and use the software;

Virbox LM supports developer to issue license to different license repository: Hardware lock, Cloud Lock and Soft Lock, Developer may flexible to switch License type from online to offline working environment to achieve software business agility.

Cloud Lock License Operation Process: Developer signin in Virbox Developer Center and issue cloud license to user account in the User Center of Virbox Cloud; software user login the Virbox Cloud account and then verify license in online environment;

Hardware Lock License Operation Process: Developer signin Virbox Developer Center of Virbox Cloud or Developer use local license tool (Virbox Developer Utility) to issue license to hardware user lock: Virbox El5 dongle; software user may execute protected software by insert hardware user lock in the USB slot of user desktop;

Soft Lock License Operation Process: Developer signin in Virbox Developer Center and issue 2 kinds of soft license to software user account in Virbox Cloud: Online soft license and Offline soft license, Developer may setup the limitation to maximum No. of Nodes bind with license and maximum time period of license

verification for Online and offline soft license, software user login the account in the User Center of Virbox Cloud and bind the used desktop/laptop and license before use the software. More details please refer to relate "*Quick Start Guide–Software Protection and Licensing with Virbox Soft License*"

1.1.1 Main Components of Virbox Cloud

1.1.2 Virbox Developer Center

Virbox Developer Center consists of Developer website and Open API and provides cloud based Service and website for License Issue and License Entitlement solution to software developer, Developer may use Virbox Developer Center (https://developer.lm-global.virbox.com/) to manage software product, user management, License Issue and Entitlement, Virbox Developer Center is online License solution for software developer, By use of Virbox Developer Center, it is not necessary for developer to build up in house License entitlement system and save the investment both in Capex and Opex.

Open API, Open API will be used for developer to integrate with existed ERP/CRM Enterprise system, More details for how to use "Open API" for system integration, please refer to related User Manual: "User Manual: Open API".

1.1.3 User Authorization Center

The User Authorization Center located in the Virbox Cloud which stores cloud user information and provides License Verification services to user's software. To verify the validity of the cloud license, users must use the software only when software officially authorized by developer and the license is valid within the validity period, user must keep online status during License verification period when use cloud lock (online mode).

1.1.4 Software Encryption and Protection Tool

Developer use Virbox Protector (The Encryption and Envelope Tool) to encrypt and protect software copyright and IP, Virbox Protector integrated multi security technology includes Virtual Machine, Code Snippet (Code Fragmentation) and other static and dynamic technology/Service and provides top secure protection level to developer's software, Developer may protect software automatically by select protection options without any coding competence and save lot of workload and effort in software protection.

Virbox Protector supports to protect software in 32bits, 64bits, exe, DLL, .Net programs.

1.1.5 Virbox License Service Middleware (Named as Senseshield Service previously)

Virbox License Service middleware consists of Virbox License Service and User License Tool, Virbox License Service is runtime service running in user premise and setup a bridge between protected software and license issued by developer. It is core component of Virbox Security System.

Functionality of License Service Middleware

- Virbox License Service buildup a security tunnel between the protected software and license, Virbox Provides dynamic protection, update service to protected software, so it will not necessary for developer take care about daily maintain for Security Service and release developer effort from software encryption in fundamental layer and focus to develop software feature, functionality and business only.

- with abstract API interface, Virbox License Service is independent with license repository, developer use API to protect software without any coding work and support to issue license to hardware lock, soft lock and cloud lock.

- In corporate with the technology of Secure API, Software Protection driver and other security technology, SS provides security service to developer with continuously and comprehensive update Service and cover whole software life cycle.

1.2 Separation of License and Software Protection

With Virbox LM Solution, developer can separate the process of software protection and License issue process which provides with more flexible license type and License mode after software protection. Developer may issue multiple license type and license mode to same protected software according to different business scenario or different market segment to achieve software business agility.

Software user can use protected software with different license type and freely switching license type without additional cost: hardware lock, soft lock and cloud lock.

It will strong support software developer for business transformation from traditional business mode to internet mode.

The Software Protection and License will totally split into 2 process after Developer completed the product planning and License Planning. The License Working Process in the Virbox Developer Center (include issue the license to Virbox EL5 dongle) are show as below:
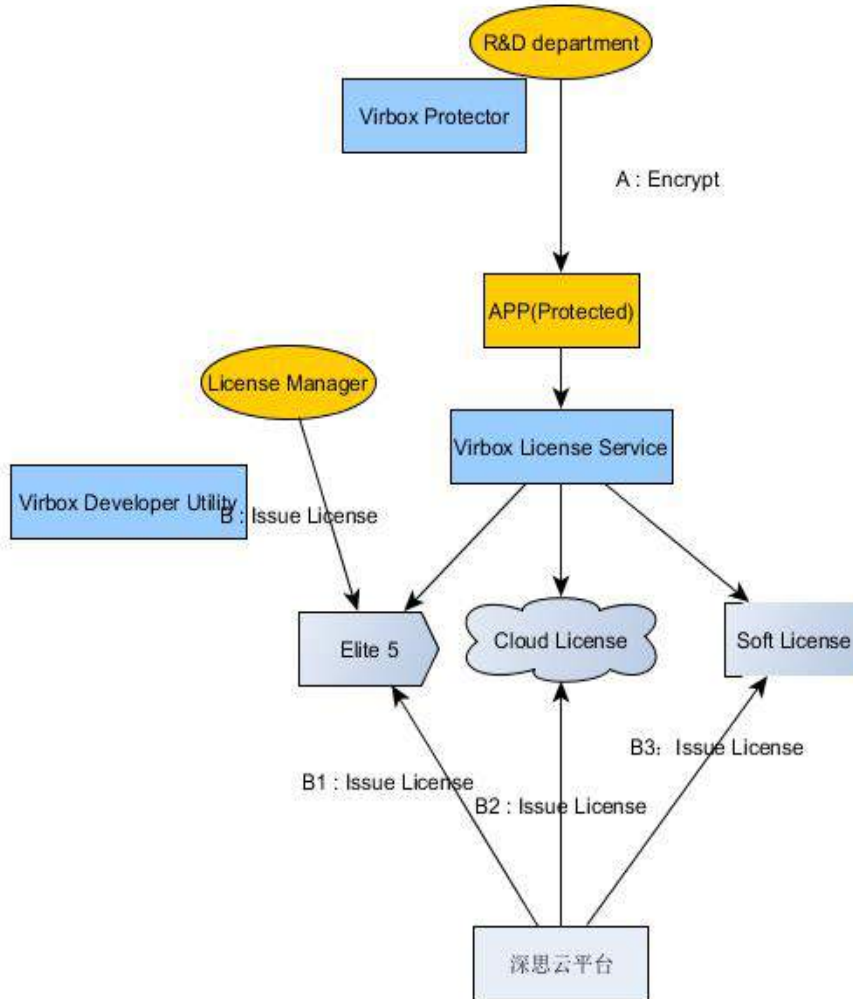
1.3 State of the Art & Future-Proof Security Technology

1.3.1 Virtual Machinery Shell

Virbox LM uses "Virbox Protector" for software protection which introduce Virtual Machine Shell (encryption) to protect and harden software. and also introduce Performance Analysis functions and Auto-Optimization Engines for developer to "Pre-Analysis" and Optimize the protected software before software protection, with above functions and features, Developer will makes best balance between security level of software and performance of software execution, it dramatically reduce developer workload in protection and testing process.

In the past, the most of **Challenge for developer** is when developer use virtualization functions to protect software, the Protected software execution performance will dramatically decreased due to large amount of protection functions be used, sometimes, the performance of software execution decreases to total unacceptable level, so developer spent lot of time and resource to makes the balance of software security in high level and also not decrease software performance much. And such kind of "analysis and Optimization" requires high professional R & D staff involved and cost of time.

With "**Pre-Analysis**" and Selective functions and Protection Options features, Virbox Protector may simulate software execution performance with different protections options and select different functions to protect. It will provides developer with auto optimization and select best protection mode to each protected software.

With Virbox Protector, the protected software will kept best balance between performance and security level, and help developer to complete software protection easily and save workload and resource investment.

1.3.2 Virbox Encryption Compiling Engine

Virbox Encryption Compiling Engine integrates the Encryption Compiler, Obfuscation and other multi encryption technology to protect software copyright and IP, it provides maximum optimization to protected software since it start to protect software in compiling process. And protect the coding, variable with more security compare with traditional virtualization solution. It will not only protect the normal .exe, DLL program, but also protect any C/C++ code program in theory.

Compared the compiling result with the No.1 Security Virtual Machine Wrap/Protection solution which industry recognized, the sized of Software Protected by Virbox LM are much smaller than that of by the other compiling engine, and even up to several order of magnitudes smaller. And execution speed is much faster.

Virbox License Service (SS) Middleware, Anti-Hacker Driver, Licensed API Protection and Security in Fundamental Layer all are based the Virbox Encryption Compiling Engine, and supports developer business agility and not sacrificed the flexibility.

1.3.3 Code Snippet Execution (Code Fragmentation Execution)

The Most of Security and encryption solution to protect software copyright and IP recognized in recent years is "Code Transplantation which proposed by Senseshield and realized in last generation Elite 4 Dongle, means developer migrate the critical protected coding into the dongle and executed inside of dongle.

However, in practical case, code transplantation has not exerted its satisfied results. There are three main reasons behind:

Developer have to program the coding executed in the dongle, such kind of coding competence is much different from with normal coding competence and need developer to invest more resource to achieve coding competence in this area;

The Code which could be migrated and executed in the dongle are quite limited due to the limitation of dongle physical memory. Developer may not migrate complete functional coding module into the dongle;

It is quite difficult for developer to choose the "right and suitable" coding to migrate into dongle and keep balance between software execution performance and Security.

In Summary, Code transplantation are quite limited implemented in actual protection project except developer put lot of resource and workload and then get satisfy result. Recent years, Senseshield and some of other vendors propose the new concept of "Auto Code Transplantation" and also launch relevant solution to reduce developer workload in "Code Transplantation", but it still limited in practical project due to dongle hardware performance. The code which could be automatically migrated into dongle usually still limited within few of lines and security level improvement also quite limited. And protected software will be executed rely on hardware dongle only, it is difficult to support developer business agility such as to protect software with online trial mode without hardware.

Latest Revolution Concept and Solution proposed by Senseshield is "Code Snippet Execution" or we can named with more simple and easy understanding: "Code Fragmentation Execution". the "Code Snippet Execution" will solve the challenge face to developer mentioned above, Code Snippet Execution will utilized latest and mature technology in "Extracting the coding" and select and extract large amount of "coding" from orginal program code, and executed in the security virtual environment after encryption and obfuscation and integrated with

Virbox Encryption Compiling Engine, Virtualization and driving technology, all technology integrated together makes protected software in more security during execution process.

The Code Snippet Execution" can be simply understand as breaking down the functions or modules of software into code of fragments and execute these "fragments" into a secure environment, so that the crackers can't start to use hacker tool to analysis and get the original code and execution result. "Code Snippet Execution" is major milestone and breakthrough in the Software Encryption and Protection field. In addition to high Security, Code Snippet also rely on and work with "Virbox License Service" middleware to shield the interface from the fundamental layer and also compatible with Virbox Cloud Lock and Soft Lock, and help developer to realized business agility with different kind of license type.

1.3.4 Anti-Hacker Driver

Traditional Dongle solution supports to protect software with static mode, with more protection technology in used and additional effort invested by developer, more security level will be improved to protected software. with multi static protection technology integrated into the Virbox Solution, Virbox also integrated "Anti Hacker Driver" in the "License Service" Middleware and provides the developer with dynamic protection technology to the software, that means with Virbox Static and dynamic solution, the Developer will have strong ability not only protect software with API protection and Wrap/Envelope technology, but also extend to protect software in full area, deep level and proactive mode to against software piracy, tamper behavior by hacker.

1.4 Virbox Elite 5, with Latest and Top Security Hardware

Virbox El5 is latest Generation of Virbox hardware Lock which improved lot both in Hardware performance and Security Level. Virbox El5 is key component and License repository of Virbox Cloud LM solution. Virbox El5 can be used to be a standalone dongle without connect to Virbox Cloud, and also can be used seamless integrated with Virbox Cloud LM with additional and advance feature available.

Technical Features

- Top 32 bits ARM Smart Card Chipset;
- the More Fast execution speed, 400 times compare with last generation of Elite 4;
- The More Fast Communication speed, 15 times compare with last generation of Elite 4;
- Totally new designed COS and File Management System and support advance file management operation;
- inside Authentication interactively with the protected software;
- Secured communication tunnel inside, and setup secure bridge with protected software, no additional protection required for communication tunnel;
- Integrated with Virbox license service middleware, and license service support advance interface to coding and get rid of coding complex to hardware layer.
- Virtual Clock Inside;
- Flexible License mode Inside, and Compatiable with Virbox Cloud License and Soft License;
- Upgrading the Encryption Algorythm inside:
  - RSA 1024/2048
  - ECC 192/256/384
  - AES 128/192/256
  - DES/TDES

- SHA1/SHA256

More details to hardware please refer to Appendix: *Virbox El5 Technical Specification*

2 Virbox License Management System (Virbox LM)

With more than 20 year experience in software copyright and IP protection field, Senseshield launched Virbox LM Solution with latest technology integrated. Virbox LM adopts totally newest License Management Architecture to increase protection to software and license issue to authorized software user. following technology which represent latest protection technology has been integrated into Virbox LM solution and deliver to developer: Pro Active and dynamic License Service to against software piracy and tamper behavior to detect/defeat different kinds of crack tools, with adopted Anti hooks, Anti debugging and other proactive technology and solution, Virbox also provide with update anti hacker service to software which installed in software user premise and provide continuously protection to software and cover whole software life cycle.

License is the Core Concept of Virbox LM solution, all the Protection and License Issuing operation are related to the License in whole software lifecycle.

Here are introduction to those essential concepts for better understanding Virbox LM:

Virbox LM solution support developer to issue License to multi license Repository: Hardware Based Lock (Dongle): Virbox EL5, Virbox Cloud Lock (Cloud License and Virbox Soft Lock (Soft License).

When we talk about the "Lock", usually the Lock means the repository which save the license, include Hardware Lock (dongle), Cloud Lock and Soft Lock, if no special indication. When we mentioned the "Dongle" or hardware lock, usually it is Virbox EL5 series hardware based Lock. Include normal user lock and Network Lock. License can be issue and save in those license containers.

2.1 Virbox LM System

Software License, is a digital certificate that is signed by the software developer and issued to the software user which specify and limit the software user's rights to use the software (or its source code) and defined the developer's obligations to software.

The Principle of Virbox License Solution is control and manage the permission of user to use the software with "license" and also to use multi advance protection technology to protect the copyright and IP of Software, with Virbox LM solution, developer may have more flexibility and effective way to promote software sale, trial the software to potential user without traditional dongle protection, Virbox LM also help developer to effectively identify the dongle lost claim by software user and avoid developer and user potential profit lost.

Virbox LM is the software protection and licensing solution to software developer with top security protection and keeps licensing flexibility for both. It helps developer to design and maintains secured software Encryption and protection plan and no license leakage risk coming from internal.

Virbox LM is suitable to be deployed in different kind of software developer or software vendors, from freelancer, SME vendors or large size of software enterprise. Virbox LM supports with different license modes with different license repository: Node Locked, Network/Floating/Concurrent, Perpetual, Subscription, Usage Consumption, soft license and cloud license etc.

Virbox License consists of following contents: Product Information and setup a Limitation to product, Product Information may contains product ID, Product modules etc. Developer may setup limitation with following

criteria: setup license startup time, expire time, usage counts, the No. of the concurrent Nodes etc.

With Virbox LM solution and relate unique Digital Certificate endorsement, each developer may create/issue license to products/product modules more than 4 billion.

For Each Virbox EL5 Hardware Lock (standard version), maximum No. of license stored up to 3000 licenses, For Virbox EL5 Ultimate version, maximum License stored up to 6000 license; No maximum limitation for quantity of license stored for Virbox Cloud Lock and Soft Lock to each user account.

2.2 License Contents

License	Description	Note
version	License version	Current License Version
License ID	License ID	Developer can setup License ID which varies from 1 to 4294967295, and License 0 is set in manufacture period and reserved for management purpose for developer and can't be deleted and modified.
start_time	License valid start time	User can't use software before this "start time" set, which set varies from:"2000.1.1 00:00:00" to "2099.12.31 23:59:59"
end_time	License Expire time	User can't use software if later than this time , which set can be varies from：2000.1.1 00:00:00 to 2099.12.31 23:59:59
first_use_time	frist time to start to use software	The time of first time to login user account which will be used to issue time span based license
span_time	Tme Span	The Time span: start from License start time of first used
counter	Set the Counts of Software usage	decrement when every time to login and use software, and license will be invalid when counts to 0
concurrency	Maximum No. of concurrent user, Nodes of Network, Process	For Setup the No. of Concurrent Nodes or users for Network Lock and set a limitation of licenses to use software in Network environment.
module	Module	License to functions/modules of software, Maximum support to setup 64 indicators to the modules for each software which indicates the module available or not.
ROM	Read Only Memo	Data area which data saved can be read by software user (login license) via API but can't be write into this area when Login license, Data Modification to this area will only be possible by software developer to issue an update license.
RAW	Read and Write Memo	Data Area which supports to read and write data to this area via call API when login license, but the length of the write data cannot exceed the maximum size defined when the license is issued.
PUB	Public Memo	Data area of open for public access, data saved in this area could be read via API Interface.

More details to License Contents definition and setup, please refer to the document: "Virbox License System Architecture"

2.3 License Management

License management is the general term defined for License management and user management (issuing licenses, using licenses, revoking, or deleting licenses) in the license life cycle.

- 【Security】 The Algorithm of License and the operation to License remote update are executed within the Virbox EL5 hardware lock, Private key and algorithm are well protected inside of EL5 lock and can't be cracked, the core parts of software, such as data, algorithm, after bound with license, must call the relevant bound license and authorized then activate related functions or features, and all algorithms will be invalid if bound license expired. And hacker also can't be crack the whole software via crack related license or API.

- 【Easy to Use】 Virbox Split the software protection/encryption and License into 2 process, software developer just need to well plan and define the related module , functionality or feature which bind with license in the product planning period and not necessary to plan and process license relate factors. All License related process will be operated by Virbox LM later. So, it well support developer to issue license with more flexible mode and dramatically reduce workload.

- 【Future Proof】 Provide extremely large No. of License ID to each developer which up to 4 billion (1–0xFFFFFFFF) License ID can be setup for software product. For Virbox Cloud Lock even support more No. of Cloud License ID be issued which enough for development plan in coming decades.

- 【Upgrade】 Easy for license upgrade in software user premise and release developer from development of license upgrade tools. All data, program will smoothly upgrade and compatible.

The Idea of Virbox License Management:

- One times Software protection and Flexible to Issue multiple license separately.
- Secured License: Data (Module, feature) and Algorithm bind with License and executed within Virbox EL5 hardware lock, and License upgrade operation within hardware lock also.
- Future Proof Plan and License management: > 4 Billion License ID space and Role Assignment supported.
- Top Security: Build up Secured software and hardware environment with top performance, Algorithm bind with License directly.
- Easy to Use: Complete workflow and tool chain support; commercial API support; common interfaces for multi-type lock.
- Flexibility: Separation of Software Protection and License issue Process, flexible license mode and license type support and safeguard license upgrade.
- Scalability: Provides complete foundational interface platform supports secondary development.

2.4 Linkage between License and Software

The Chart below shows the linkage between software and Virbox license:
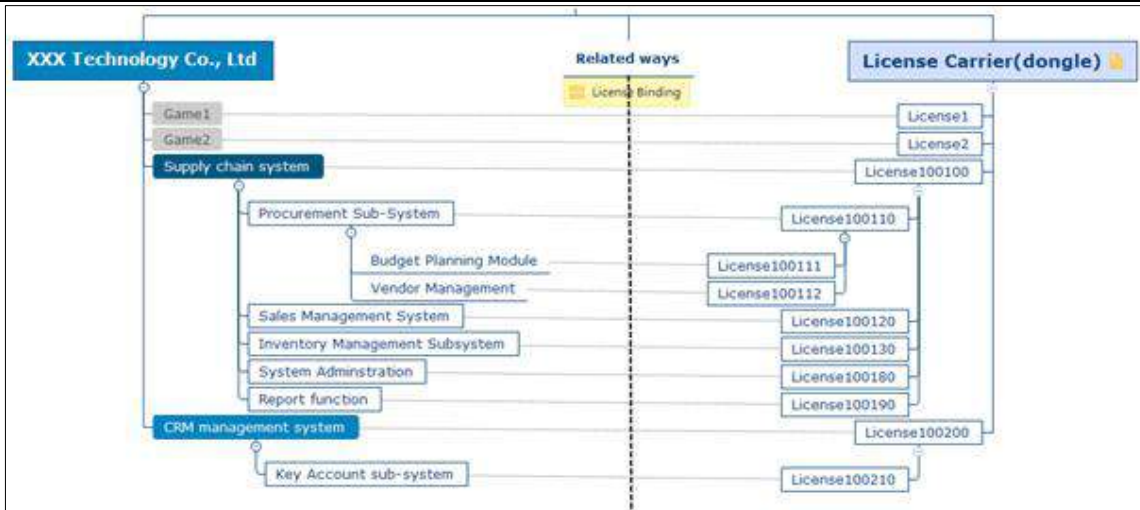
The Grey dot lines presents the binding linkage between the software, sub system/module and the license on the right. When the binding has been setup, the License 1 will represents the software "XXX"

Attention
1.the "Lock" in the chart means Hardware lock, Cloud Lock and soft Lock, and there are no difference for Virbox License stored in hardware lock, cloud lock and soft lock. They are saved in same format. 2. All the license stored in the "Lock" are independent with each other, there is no hierarchy or affiliation linkage among the license, and the licenses in the chart are displayed hierarchically (eg, licenses 100100 and 100111, 100112) just to make the license structure correspond to the software structure for easy understanding.

Developers may setup different License ID and binding with multi software application within the same lock.

- Usually, developer may simply setup one license binding with each specific software program. For example, the software "Game 1" was binding with License 1, and the software "Game 2" was binding with License 2. This kind of License Plan is suitable for simple software which no additional or separate feature or function need to be licensed.
- For License Planning to large-scale software (including multiple subsystems, functions) we can refer the example of License Plan and Binding to the system of Supply Chain System, which include 5 subs-system, Here are License ID Plan & assign principle: We assign 100100 for Full package of Supply Chain System, if customer purchased whole package, we can use this License ID to activate full functionality of Whole System; so all functionality available by use of this License ID; We assign dedicate License ID to each sub system: from License 100110,100120,100130,10080,100190; those License ID will be used to license to related subsystem if the sales functions is limited to sell based separate sub system.

For Licensing to Sub system or sub module and design License on demand Features, you need to add and edit sub Module when you create "Product". And call related API to setup linkage between Product and your Program via API calling. For API calling, you can find example via API assistant Tools. And insert those API calling commands into your program accordingly; Up to 64 sub system or sub module could be licensed for each software program.

3 SDK Toolkits Overview

Virbox provides SDK toolkits which consists of following tools for developer:

Virbox Protector;

Virbox Developer Utility;

API Assistant;

3.1 Virbox Protector

Virbox Protector is Encryption/Enveloper Tools to protect and harden your software with top security and complete protection process automatically without additional coding workload.

Virbox Protector is State of the Art software protection tools integrated multi security technology: Code Snippet (Code Fragmentation), Obfuscation, Encryption, CA, Data resource Encryption which work together with Virbox Cloud, Virbox User License Tool and Virbox Hardware License, cloud license and software license.

Virbox Protector supports following operation systems and programs

Windows, Linux and MAC OS.

- .exe and DLL
- Program support currently:

Virbox Protector supports developer to protect following program languages: C/C++, VB6.0, Delphi, BCB, C#, DotNet, Unity3D, ARX (Autocad).

- Virbox Protector is suitable to protect software and fast rollout without any coding workload. Developer just need to click and select related option button to complete the protection process.
- For how to use Virbox Protector to protect software, please refer to "Virbox Protector User Manual"

Open the Virbox Protector via shortcut of Windows start menu, the Main menu show as below:
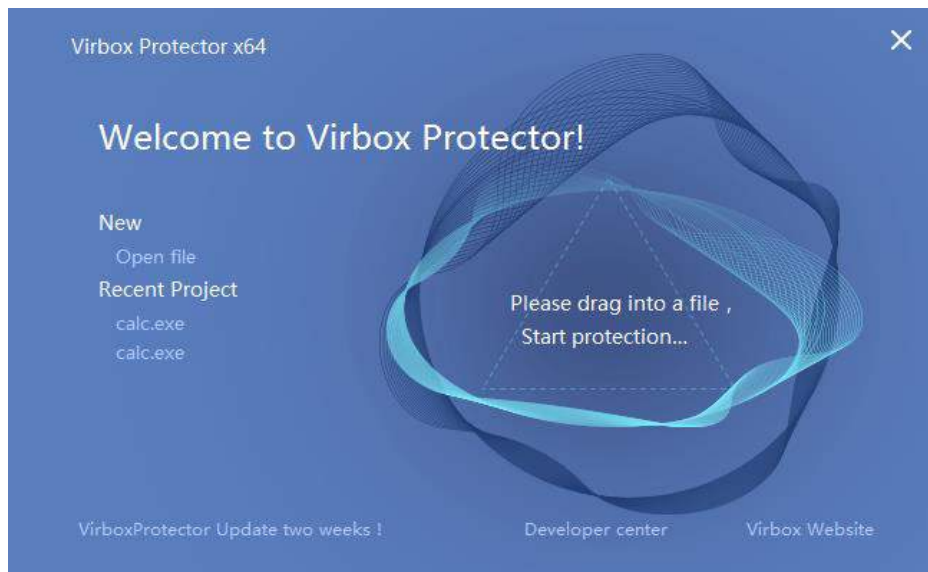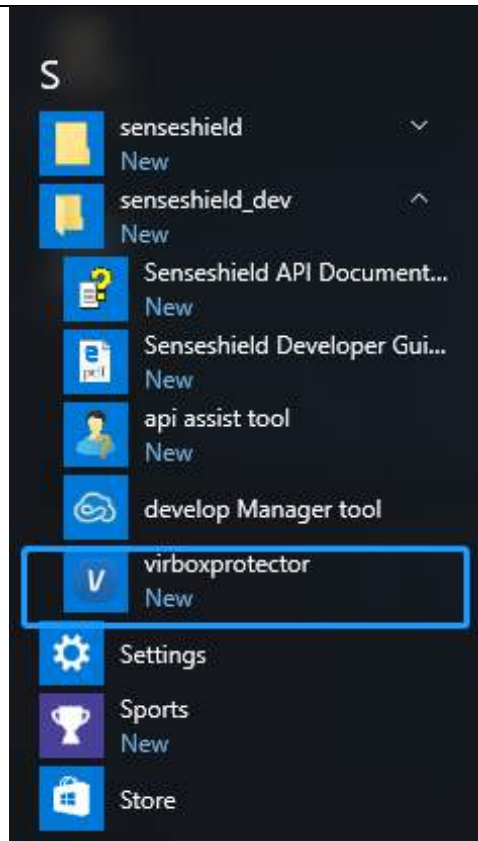
For more details to Operation, functionality and how to use Virbox Protector to protect software, please refer to "User Manual: Virbox Protector".

Developer may use Virbox Protector to protect software quickly with simply to "Select and Click" the protection Options and keep the software protection in higher level, Developer also may have more complicate protection option to their software, integrated with business logic of software sales, or add some specific protection to some features, code, algorithm by use of Calling "Runtime API" (Runtime API)

License API provides abstract API interface to developer with encryption inside of API, developer just call related API to achieve correspondent service requirement and not need to pay attention to security issue.

"Flexible, Easy to Use API + Powerful Protection and Harden Technology" has been recognized as the industry's best practice in software protection , Virbox Protector, combined with the advantage abstract API and

integrated Multi innovative Security Feature, provides the perfect solution to software developer.

3.2 API Assistant

API Assistant is a quick starter tool that helps software developers learn and understand the Virbox API. Execute the API via friendly GUI prompts message to view the API execution result. You can quickly familiarize with API and functions without coding.

API Assistant is suitable for developers to quickly learn and understand the usage/calling of the API and verify the feasibility of the encryption scheme.

Open the API Assistant via shortcut menu, the main GUI as shown below:
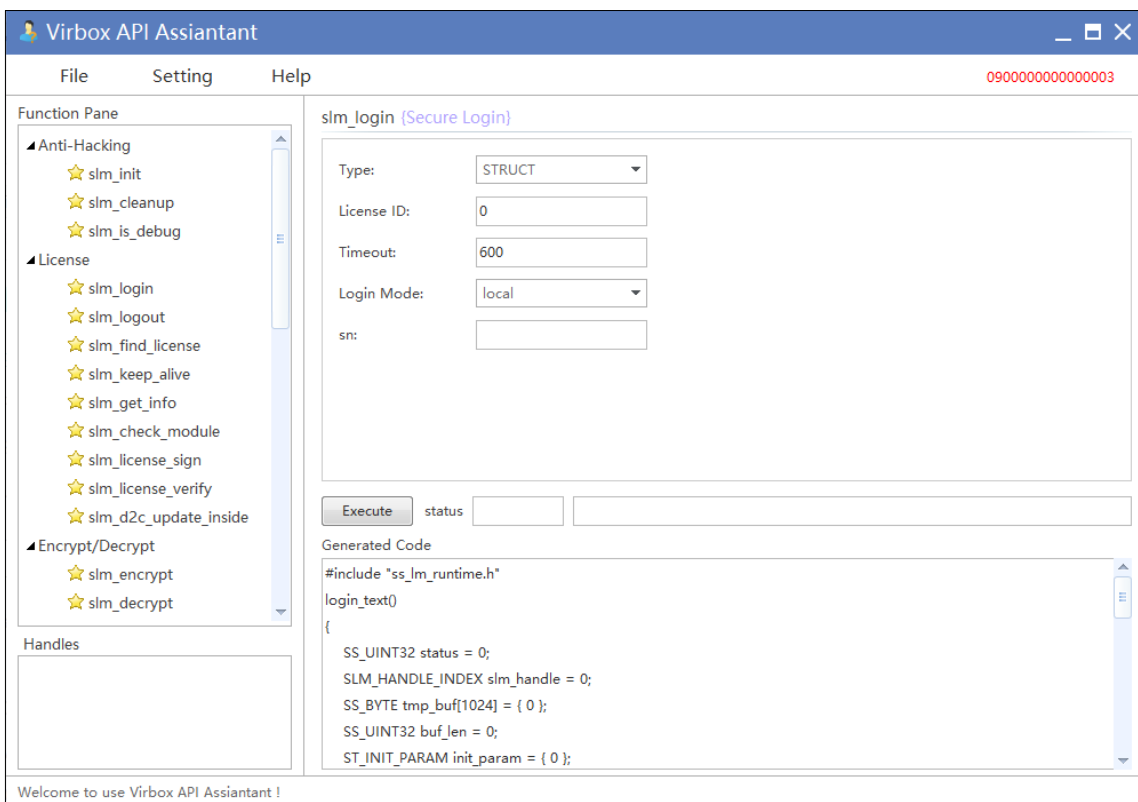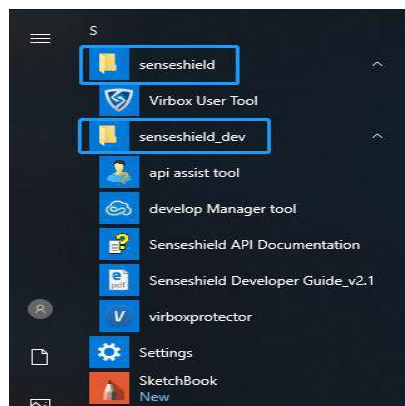
3.3 Virbox Developer Utility

Virbox Developer Utility is Local License manager for developer to issue the offline license to Virbox El5 hardware lock. Virbox Utility help developer to reduce workload when issue license with the function of

"Product Management", "Sales Template", with Virbox Developer Utility, developer may issue license to the hardware lock (Virbox EL5 Acme) which plug in the USB slot directly, and also support to issue the License upgrade package (d2c file) in remote, and supports to remote upgrade the license stored in the software user premise.

Virbox Developer Utility is suitable for small or middle sized developer for hardware lock related License issue and management. SME developer may use d2c API to integrate with existed system.

Note: It is mandatory to plug in the "**Master Lock**" into the USB slot of developer desktop when developer issue the license to hardware lock.

For detailed functions and operating instructions of the Developer Utility, please refer to "**User Manual**" and "Quick Start Guide-Software protection and License with Virbox El5 Acme"

Open the "Virbox Developer Utility" via shortcut menu, the main GUI as shown below:
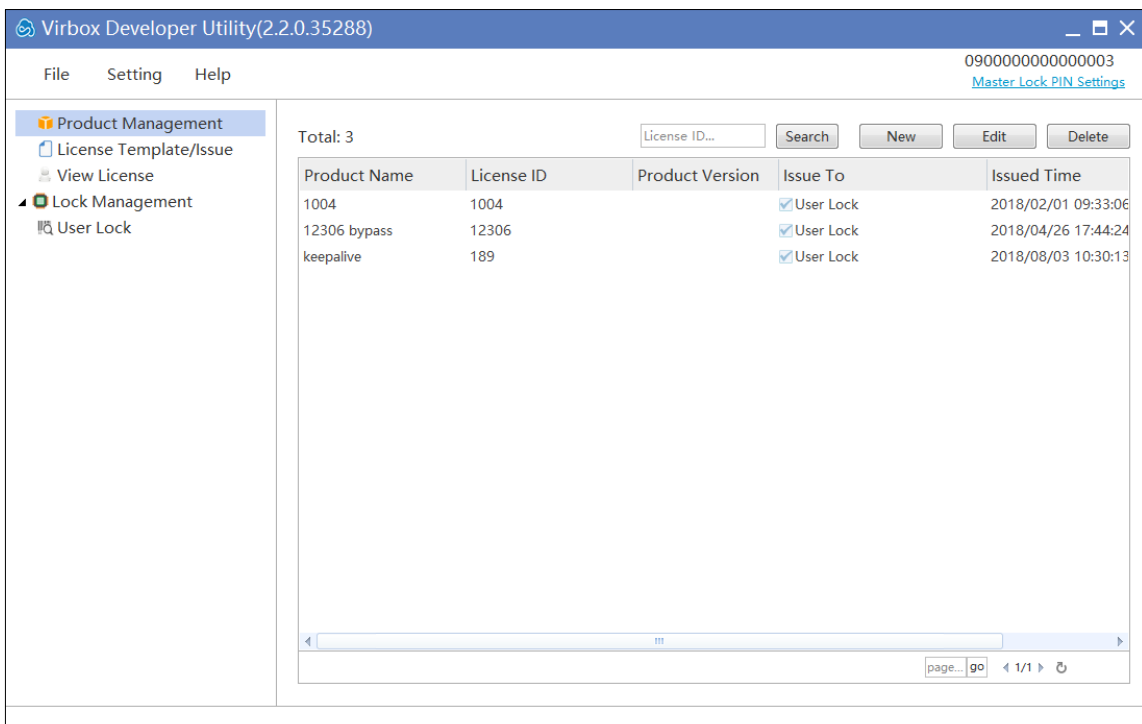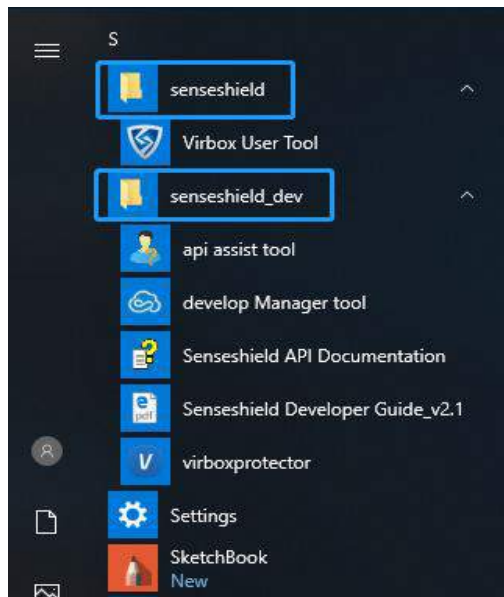
4 Quick Start

In this section, we will introduce how to use Virbox Protector to protect a software application and bind the software with software user account in Virbox Cloud, the software user who want to use this software must login the "**User Account**" which licensed by Developer, then the software user can use the protected software within the limited feature and functions licensed.

License ID is the unique indicator which used in the software protection and license issuing/distribution process in the Virbox LM system, which presents the License No. for software. For details introduction to Virbox License Management and License concept, please refer to "*Virbox License System Architecture*"

A series License IDs setup in line with each software product, Developer use Software product to be the Core Concept in Software Management and Software sales, every software product consists of sub modules, and subsidiary of each sub module may consists of functions or lower level sub modules accordingly. So software can be sell and charge to software use based following sales mode: charge by per software package, by software modules or functions, by No. of software users, by subscription time or service etc., to meet requirement of different market segment. From developer point of view, software sale provides to software user should support different sales modes and payment accordingly by software user: charging by year/month, by usage, besides of traditional sales modes in the past: one time to pay for whole software package for perpetual usage/license.

Next, we will **brief** in following section for how to setup linkage between license and product and help developer to accomplish the software protection and licensing for a concrete software product.

Create Product Developer must assign associate License ID to the product created. And the License ID must not be duplicated assigned and used for other product. The License ID associated with specific product will be use unique ID No. and Indicator to presents for this product in all protection and license process. Developer must assign the license ID during software protection process for the protected product. The protected software will verify the associated License when software user execute the software.

The Sales mode for mature commercial software should support different sale mode and charging policy to meet the requirement of software users: pay per year, per usage, or pay for perpetual license. Above charge policy is independence with Product functions but depends on sales strategy to each market segment. So, Virbox designed the following "**Concept**" in Virbox License system to reduce duplicate workload for developer in protection and license process:

Sale Template Module, developer may setup the different limitation in the Sales Template related to each License for different sales strategy.

Developer may Issue License (In line with Product+ Charging Policy) to software user through existed "**Sales Template**" which created in advance when software user purchase software. Developer will reduce lot of workload in license issuing process via "Management of Sales Template".

Software user need to login the user account (which developer has issued the license ID to this user account) in Virbox Cloud, then software user may start to use the protected software according to the time or modules limitation which defined in the sales template by software developer.

License ID may be used to represent a software package, a component, a module or even to be concrete functionality (i.e. Printing, Save etc.)

4.1 Sign in the Virbox Developer Center

First, please open the Virbox Developer Center, input your signup account email and password to login the Developer Center.
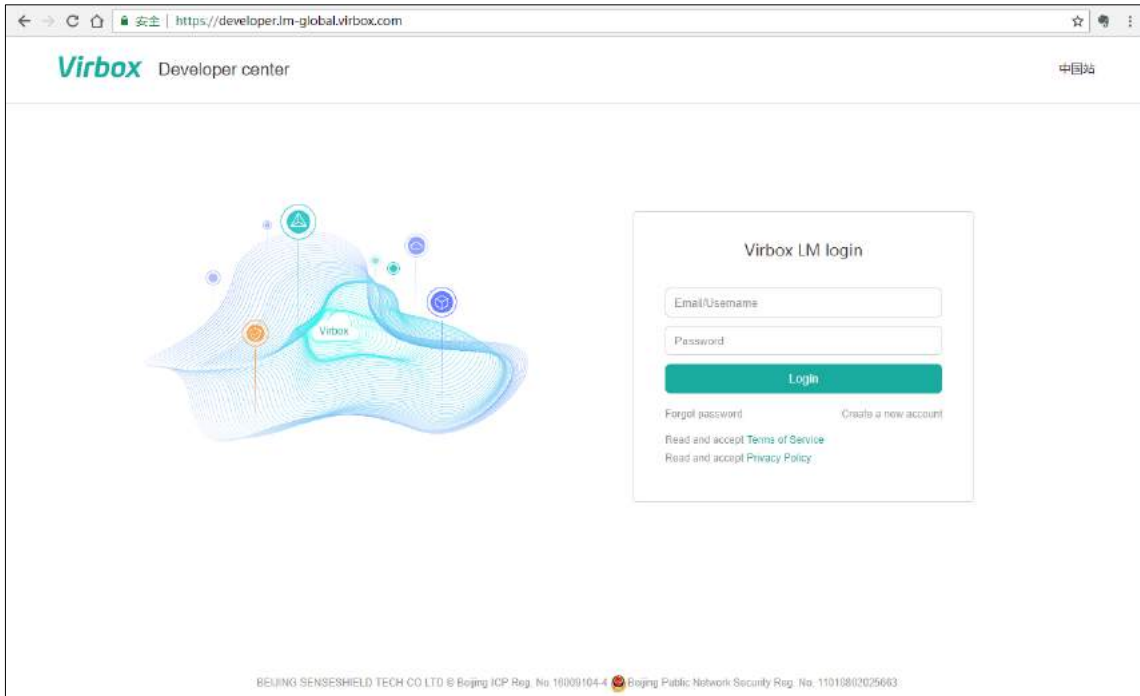
If you have not sign up in the Virbox Cloud, please open signup(web-link)，and signup account in the Virbox Cloud with necessary information for signup, click register Now and complete Account Signup process.

We use trial Version SDK for this demo case.

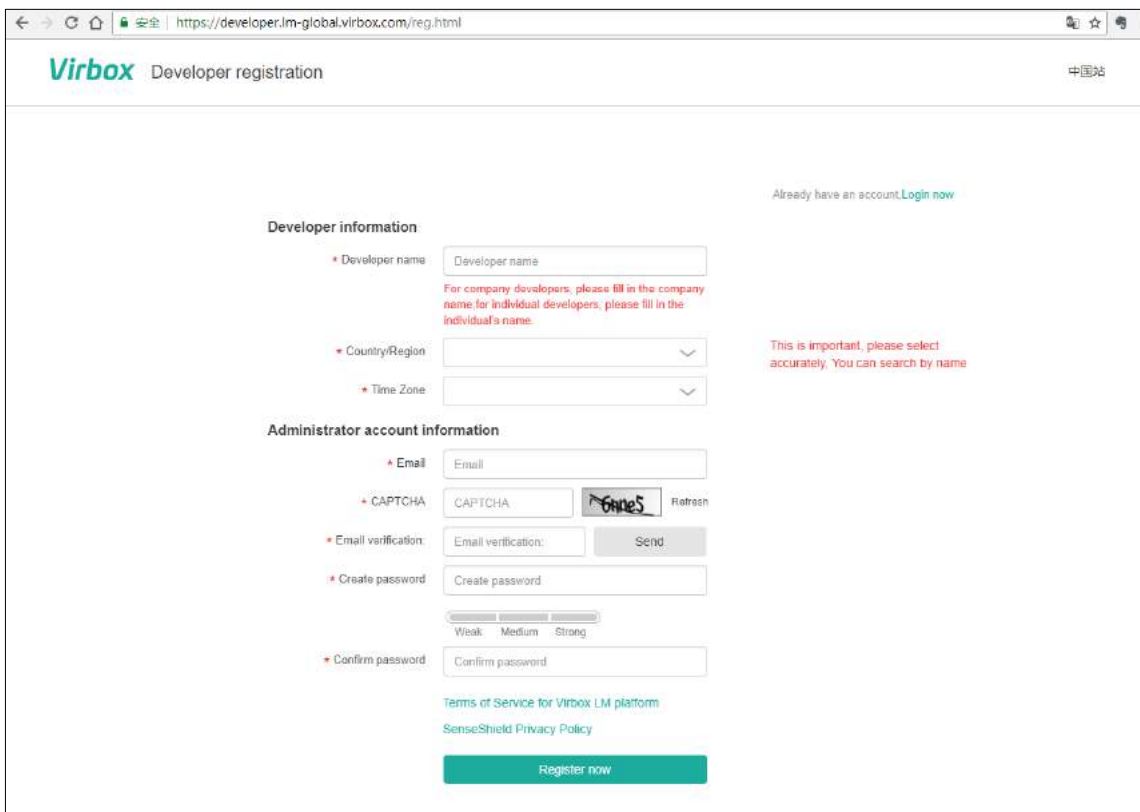**Note:** For Trial Developer who use trial version SDK: the trial SDK will only be used for Trial Developer to evaluate Virbox Software protection and License Solution; All Trial Developer will use same trial SDK, so Trial Developer can't use this trial version SDK to protect software and official launch software product and sell the protected product by use of trial SDK.

Signin the Virbox Developer Center and the main GUI show as below:

4.2 Create New Product
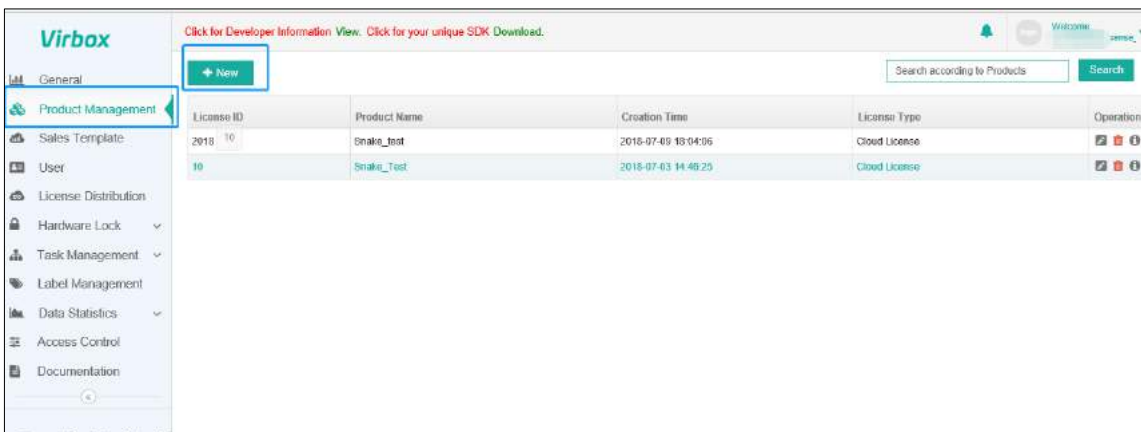
Software Developer may have several software product need to be protect, so It is necessary for Developer to well plan related License ID and assign the license ID (Which introduced in previous chapter) to each product before protect product which avoids confusion in product management later.

Let's take following case to be the Example, charging by software modules, this case shows how to protect a software.

Trial Developer can't setup customized License ID and use existed License ID assigned to create new Product only.

There will be no limitation in License ID definition for Standard Developer, they may setup and define customized License ID.

Select Product Management on the left pane and Click +New
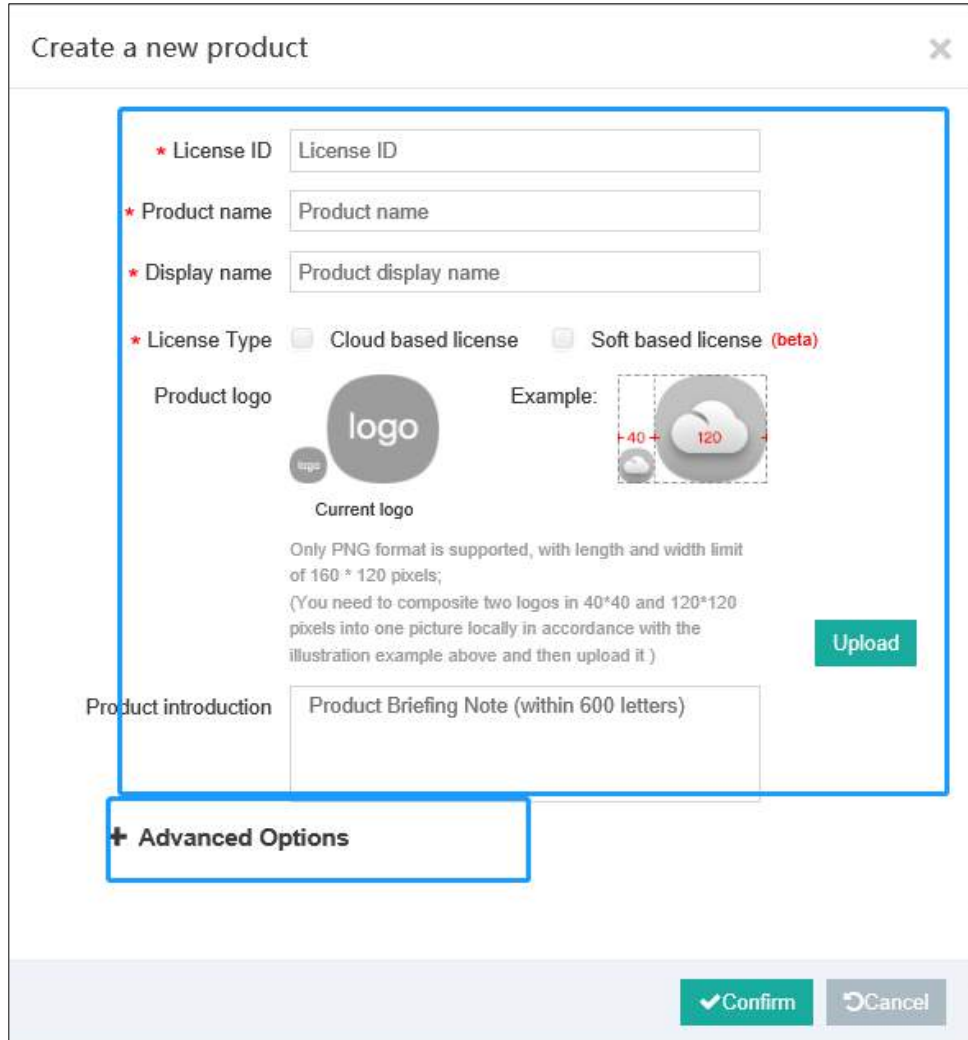
Please input following message into the popup pane:

1. License ID
2. Product Name
3. Display Name
4. Select and Click "Cloud Based License" from the License Type;
5. Upload your logo by click Upload

Fill out Product information in the "**Product Introduction**" pane and click Confirm to save it.

4.3 Create a New Sales Template

Developer may create new sales template according to product sales strategy, such as perpetual license, license based time limitation or usage counts etc. Sales Template is limitation setup to the protected software product by developer. There will be multi sales template could be created for same product. Developer may issue and distribute different licenses according to different sales template.

Select and Click Sales Template and then click +New
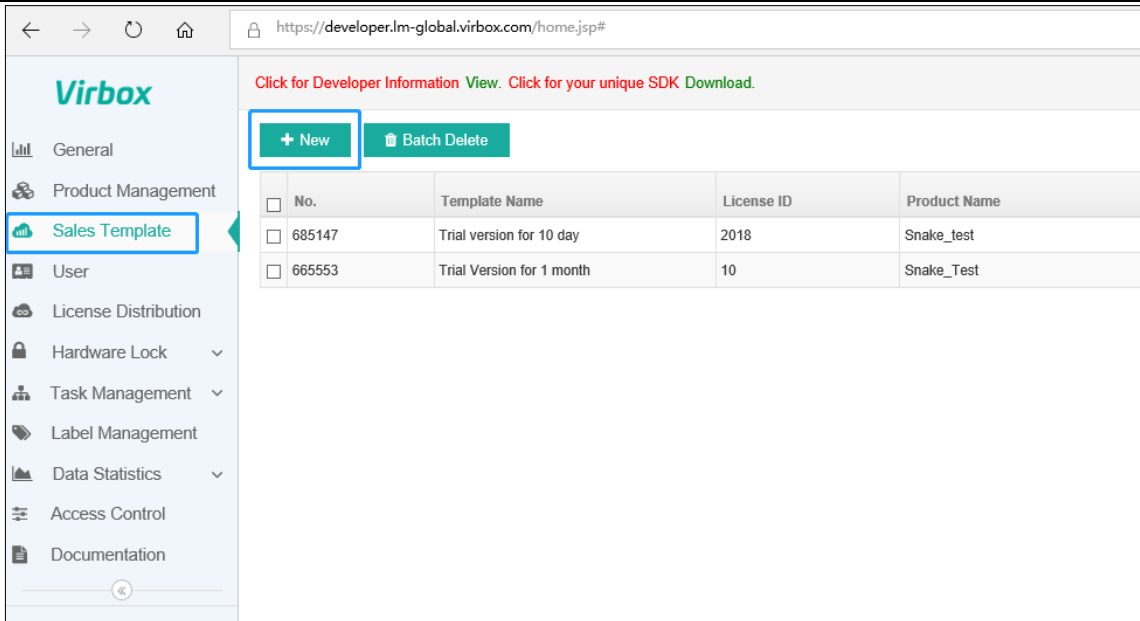
Fill out following information in the popup pane

1. Fill out Template Name.
2. Select the product which created in last step (Every sales template is correspondence with on product).
3. Setup Limitation criteria for this license: Time Limitation and usage limitation.

There are 4 kinds of Limitation criteria can be setup here:

Perpetual License, Software user may open and use the software without time limitation;

End Time, the licensed software can be used in the period from license start time to end time and can't be used when license expire.

Time Span, Software can be used in the period of time after the software user first runs the software, and is unavailable when license expires.

Usage Count, Usage decrement when user run the software every time to time, and license will be invalid when counts to 0.

Except Perpetual License, the other three License can be combined use. But if you select Perpetual License, the other license will be invalid.

The "End Time" is setup to be the license limitation to the software in this sample case.
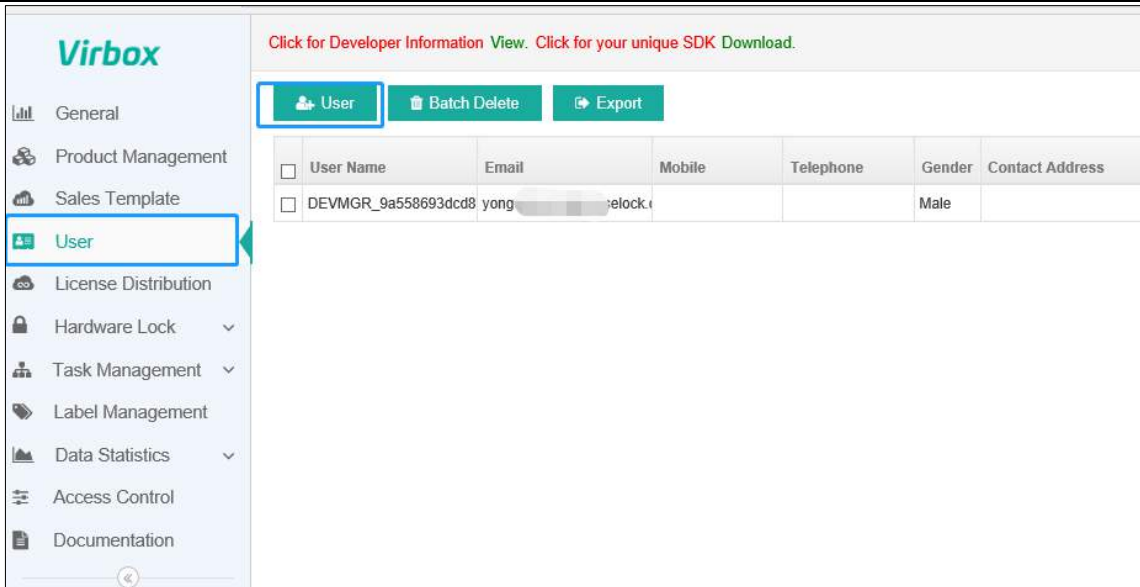
Fill out Template information and click "**Confirm**" to save the Template.

4.4 Add User

Virbox Cloud License will only license to the user which has signup an account in Virbox Cloud. When Developer issue the license to software users, the way to issue the license is select the existed User in the User Modules of Virbox Developer Center and accomplish license to this user. We will add the software user into the Virbox Cloud User Account through "add user" in the User Module of Virbox Developer Center. And we will use this "**User Account**" when issue the license to this "**user**" Later.

Select User in the left pane of Main Men of Virbox developer Center and click +User to create a new user in the Virbox Cloud (Virbox Developer Center).

- Select Account Type, user email is mandatory input if the developer select account type is email.
- The rest will be the optional for developer to input, include user mobile, gender, telephone, address, description etc.
- Developer may add a "Tag" to each user for future filtering and user management. Add a "Tag" to the user may only use existed "Tag" created earlier, Developer may create a new tag in the Tag Management in the Left Pane of Virbox Developer Center.
- Activation is required when login first time, select this option for Activation and Verification to new user.

Fill out the user information and click Save to save it.

4.5 License Issue

We will complete the process to issue the license to designated Virbox Cloud User which has signup account in Virbox Cloud.

Only the software user which signup in the Virbox Cloud and licensed will be authorized to use the protected software.

Developer select designate user or user group to issue license according to Sales Template created. The license will be valid immediately when license issued.

The Cloud Licenses issued are binding with User Cloud Account by Virbox Cloud. And software user will get the issued license when login the Virbox Account.

Select ·License Distribution and click ·Issue License, show as below.
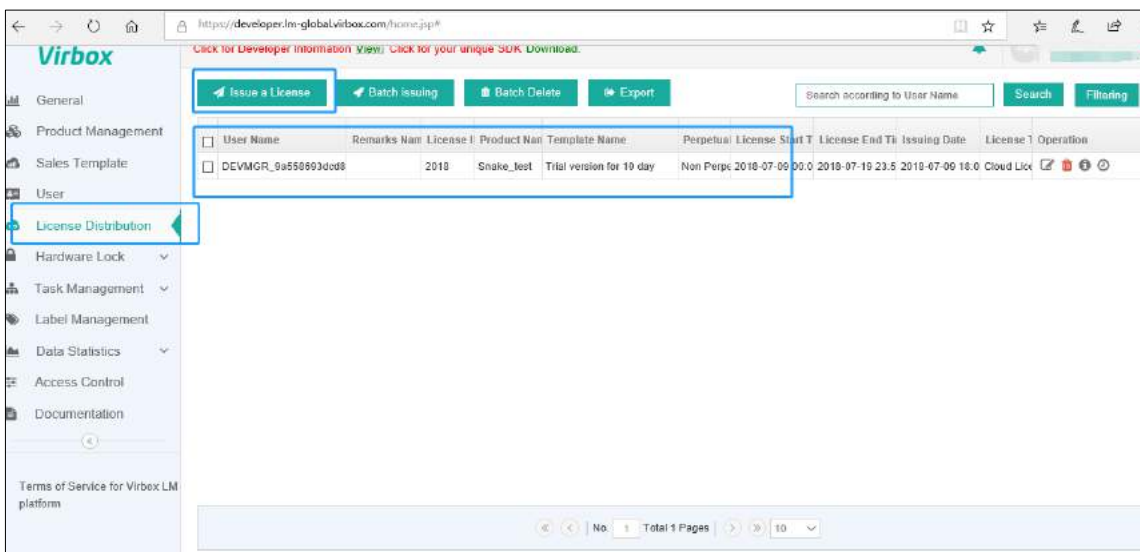
Select Sales Template and User

1. Select Sales Template, Select correspondent sales template according to user charging policy;

2. Select the user (Virbox User Account).

License issue support "**Volume issue license**" to multi users, i.e. select multi user at same time.

Click issue to submit "**issue License**" request after selection, and Virbox LM will complete license issuing in background.

System will back to Main menu and popup License issuing record and history after license issued. Show as following picture:

	User Name	Remarks Nam	License I	Product Nan	Template Name	Perpetual	License Start T	License E
☐	DEVMGR_9a558693dcd8		2018	Snake_test	Trial version for 10 day	Non Perpe	2018-07-09 00:0	2018-07-1

So far, we have completed the process of "add new product", "**Create Sales Template**", "**Add new user**" and "**issue the license**", next, we will show how to use "**Virbox Protector**" for Software Protection.

4.6 Software Protection

We have introduced the process to issue the license to Virbox Cloud User in previous section, in this section, we will brief how to use "Virbox Protector" to protect software.

4.7 Open the "Virbox Protector"

Open the Virbox Protector via shortcut way via startup menu of windows
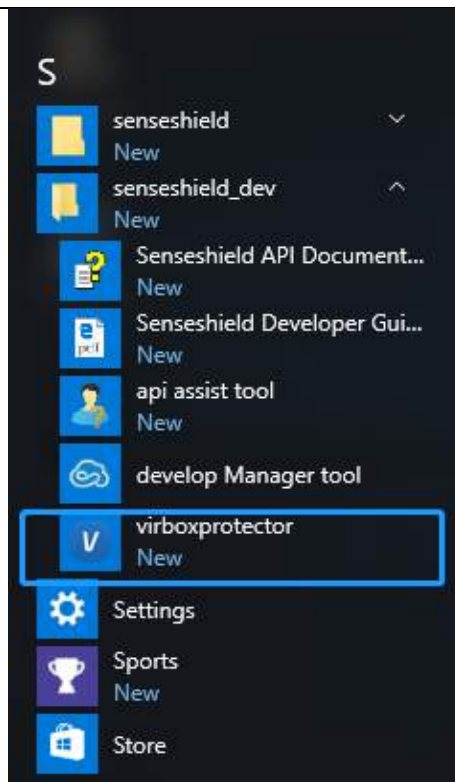
4.7.1 Select the Protection Option to protect software

Note: Developer will have two ways to use Virbox Protector to protect the software: sign in Virbox Developer center and use the "Developer Hosted Lock" to protect the software or use the Master Lock (Hardware lock in local) which plug in the USB slot in local computer to protect the software (PIN verification process is required if developer use master lock in local).

1. Sign in your Virbox Developer Center Account (click the button in the Right Top of in Virbox Protector): Use your account ID and password in Developer Center to sign in;
2. Select the Cloud license (for description to each license type, please see next paragraph);
3. Fill in the License ID,
4. Fill in API password (sign in the Developer Center, get the API password

5.   Click the "Protect", start to protect the software (onlince environment)

License Type (Support multi Selection)

Local: The protected software will only be executed with local hardware lock inserted into local desktop.

Remote: The Protected software will be executed when license be detected and available in the remote hardware lock in the local LAN environment.

Cloud: The Protected software will be executed only when user use "**Virbox User License Tool**" to login the Virbox User Account in the cloud.

Soft: The Protected Software will be executed in offline only when user use "**Virbox User License Tool**" to login the Virbox User Account in the Cloud and bind the soft license into local desktop.

If the developer select multi "license Type", then the protected software will search valid license by following sequence, if valid license has been found in one of license type, then return success and execute the protected software otherwise it will return fail.

Sequence of Multi License Type selection

Protected Software will first search if hardware lock available in local desktop, if not, then;

Continue to search if remote hardware lock (hardware lock in Network mode) available in LAN environment, if Not, then;

Continue to search the cloud license of user account login on default, if not, then；

Continue to search the soft license of user account login on default, if not then return with error message.
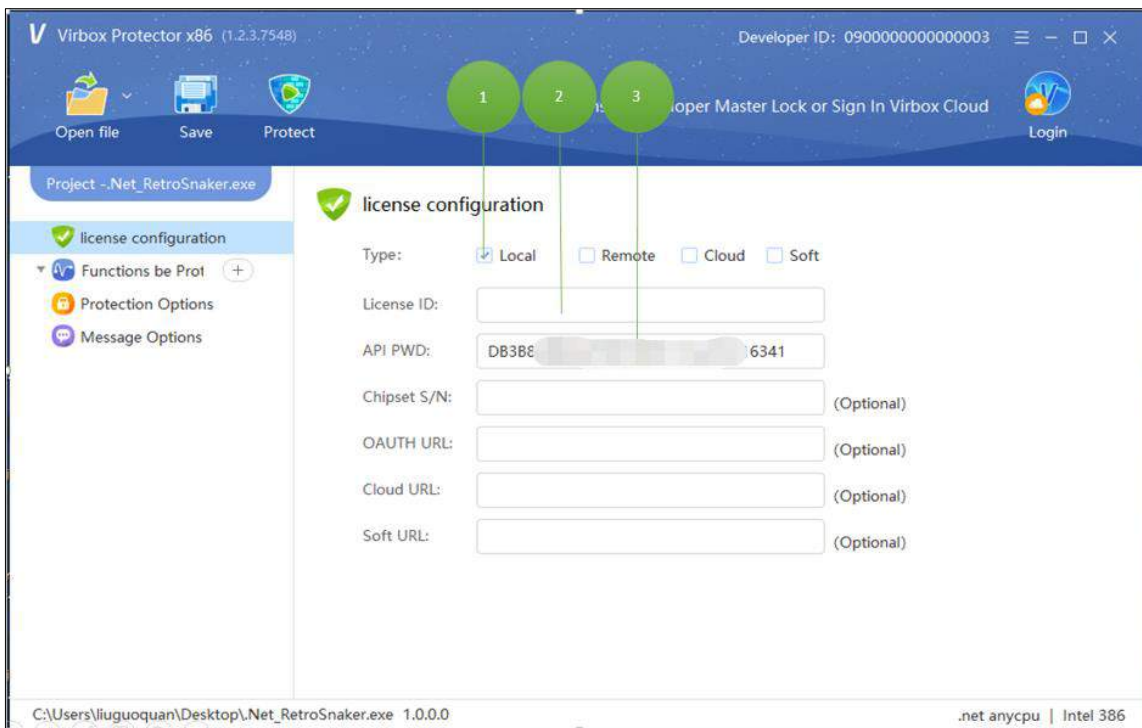
When software protection completed, the protected software program (*.ssp.exe) will be created in the original program folder.

Description of protected software

Mine.exe: the original source program. Mine.exe.ssp: The configuration file of Protection project saved after modified protection option, this configuration file saved with original source program in same folder. And it is no need to input Developer password if developer change the protection option and protect software next time.

Mine.ssp.exe: Protected software program after protection, license needed to execute this program.

4.8 Launch and test the protected Software in software user premise

4.8.1 Login the Virbox User Account in the Cloud

Find the Virbox User License Tool Icon from the system tray in the right bottom of your desktop or click the shortcut start menu and open the Virbox User License Tool, the Icon of Virbox User License Tool show as below.

1. Click the Account in left top of User License Tool, show as in the position which marked with No.1.
2. Fill out email and password in the popup menu to login the Virbox User Account show as in the position which marked with No.2.
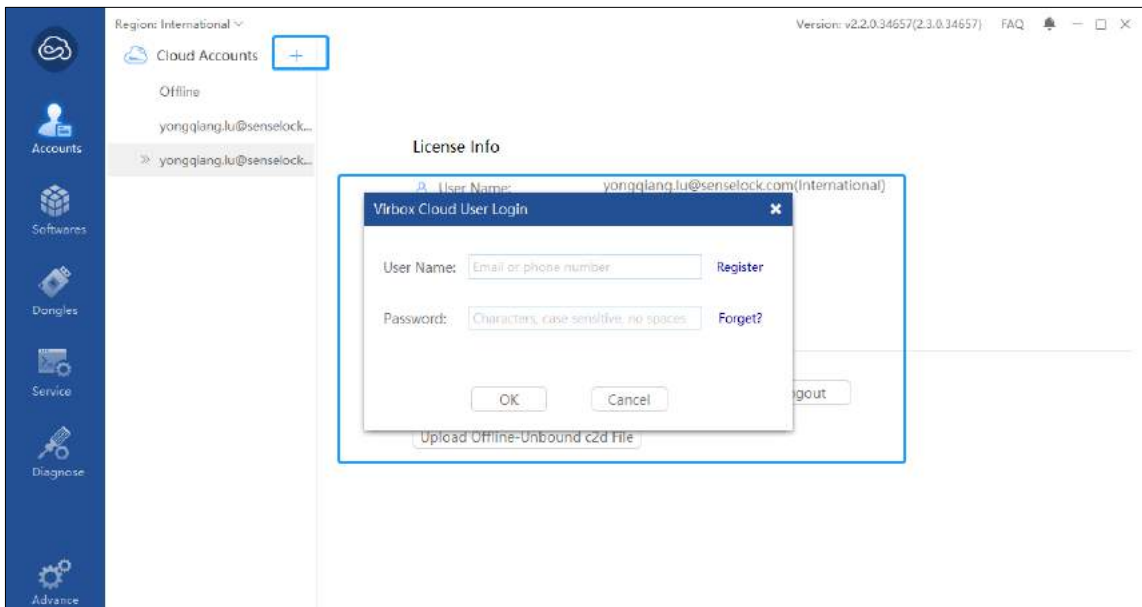
3. Click Virbox Cloud Accounts and check if the license with **ID** 1063 available in your User account from right panel. Shown as in the position which marked with No.3.
4. Check if License Service start successfully or not, show as in the position which marked with No.4.
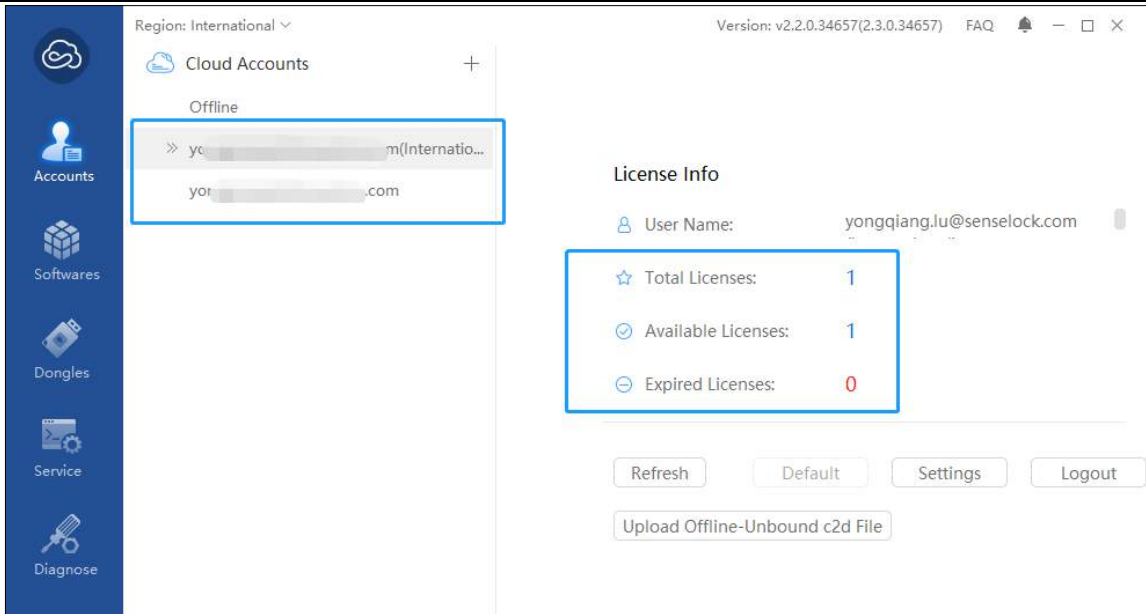
4.8.2 Launch and Test the Protected Software Program

Launch the protected Software program, check if the protected software start successfully, if the software running for normal use.

If the User Account login present is not same as user account which added in Add User, or there is no License ID 1063 in default User Account, then execute the protect software and it will return with wrong message " Can't find the license".
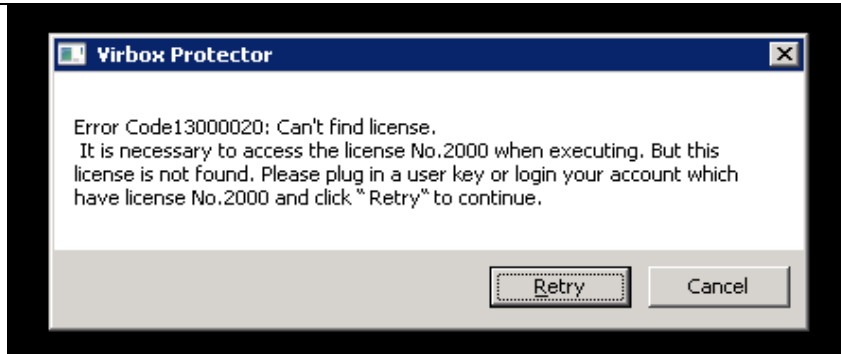
If the user start to execute protected software without login the account, then it will return the message with "User did not Login the Account"
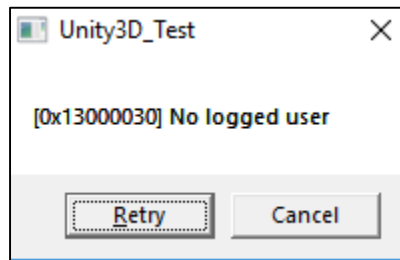
Till now, we have completed the protection to one software application by use of Virbox Protector, Cloud License will be used in online environment; Software users need to install the Virbox User License Tool before use the protected software, otherwise user can not verify the license without User License Tool.

5 API Overview

This section describes the classification and basic functions of the Virbox SDK API. For detailed API interfaces and parameter descriptions, see "User Manual: Virbox API Interface".

5.1 Runtime API

Runtime API is the key API interface for developer to use and call API, the software of Developer will use this API to access license.

File presents in the SDK

FileName	Function	Description
ss_lm_runtime.h	Headfile of RuntimeAPI	Description of each interface functions.
slm_runtime_api.lib	The Static Libs of RuntimeAPI	Includes Anti Debugging functions, to import this lib for developer's software official launched;
slm_runtime_api_dev.lib	Develop Static lib of RuntimeAPI	Excluded anti debugging functions, developer may import this lib during developing process;
slm_runtime.dll	DLL Lib of RuntimeAPI	Includes anti debugging functions which import this lib by developer for software official launch;
slm_runtime_dev.dll	Develop DLL Libs of	Excludes Anti-Debugging functions which imported this

	RuntimeAPI	lib by developer during developping process;
slm_runtime_easy.dll	DLL of RuntimeAPI	The interface to be called by other program language;
slm_runtime_easy_dev.dll	the developed DLL of RuntimeAPI	Same functions as above

Note: "Developing Lib"（with suffix:_dev), the libs excludes anti-debug functions, is the libs only used for developer in developing process which is convenient to debug and test the software during developing process and not be used for official software launch. Otherwise anti-debug function of the launched software will be disable and be easier for hacker to crack the protected software.

Please use developing libs (_dev) in software developing process, otherwise the software program will be abnormal in execution and quit when use compiler to debug the coding process.

5.2 Control API

Controal API is management interface of Virbox LM, which mainly used for inquiry to the hardware lock information, license content and status, inquiry to license session etc.

FileName	Functions	Description
ss_lm_control.h	Head File of ControlAPI	Description to each Interface functions
slm_control_api.lib	Static Libs of ControlAPI	the called related libs for the implementation of Control API
slm_control.dll	DLL libs of ControlAPI	the called related libs for the implementation of Control API

5.3 D2C API

Virbox Developer Utility is local License Manager provided by Virbox LM, this Utility helps developer to issue the license to hardware lock (Virbox EL5) quickly.
Developer may issue cloud license via Virbox Developer Center if developer want to issue the cloud license to user.
D2C API provides developer with the API interface to issue the license to hardware lock.
Developer may call d2cAPI to issue license more flexible and combine the different license terms/modes.

File Presents in the SDK

FileName	Function	Description
d2c.h	Headfile of d2cAPI	Description to each Interface functions
libd2c.dll	DLL Libs of d2cAPI	The called related libs for the implementation of API

Note: Calling d2c API is quite complicate process, more details, please refer to sample file.

5.4 Update API

This Interface provides the functions to update d2c package, developer may call d2cAPI to create d2c License update package and upgrade this d2c update package into the hardware lock by call "slm_update" and increase the flexibility to issue and update the license in the hardware lock, more details please refer the sample file.

6 #FAQ

6.1 Virbox Cloud (Virbox LM)

6.1.1 Will Virbox Cloud charge to software developer when developer use Virbox Cloud to issue License or not? Or how to charge relevant features to developer?

Virbox Cloud will not charge to software developer when developer use the Virbox Developer Center or use Virbox SDK to protect the software and issue license, Virbox will charge to developer only according to the No. of cloud licenses or soft licenses issued to user and charge the cost to hardware lock (Virbox EL5, Virbox EL5 Acme) when Developer purchase the hardware lock to protect their software.

Virbox will charge reasonable cost to developer who want to build up in house license platform or want to have tailor made soft protection scenario.

6.1.2 What will happen in case the Virbox Cloud system down and crash?

The deployment and Architecture of Virbox Cloud are designed with the principle of Redundancy, Load balancing, Hot Standby and Geographically Redundancy which makes the Virbox Cloud operations efficiency and Service Availability in 99.9% yearly.

6.1.3 Will Virbox Cloud Support to build up the "in House Cloud platform" in developer premise?

Developer may Choose Virbox Cloud to build up the "In House Cloud Platform" in their premise, but we don't recommend to do that because of following reasons:

1. Large investment (Capex)to deploy and build up in house cloud platform;
2. Opex coming from operation and maintenance of this "In house cloud platform";
3. Without high availability of local infrastructure due to weakness local data security, lack of hot backup and geographical redundancy to build up the in house cloud platform, and it will cause bad user experience when system down or crash.

6.2 Developer

6.2.1 What is the difference between trial developer and standard developer？

Trial Developer uses trial SDK to evaluate and test all the basic functions of Virbox LM, but developer may only create one product and has limitation to the No. of License issued, and the Statistic functions and partial functions of standard developer are not available for trial developer.

6.2.2 From security point of view, how does the Virbox LM isolate the license and license data from different software developers?

License and License Data Isolation is fully into consideration when design the Principle and Architecture of Virbox LM, Virbox LM utilize unique private key and private package designate to each developer to isolate the license and license data among to different developers, Encryption machine in banking level introduced for all data and business flows in software encryption and authorization, with secured cryptography to guarantee the uniqueness and privacy of data.

6.3 Cloud Lock (Cloud License)

6.3.1 What is cloud lock?

Cloud License is the license stored in the cloud Lock, the relation between cloud lock and cloud license can be compared with the logical relation between the hardware lock and the license stored in the hardware lock.
Cloud License is secured electronic license based on online network environment, and stored in the secured Virbox container (repository), Virbox Cloud License is bound with Virbox User Account, Developer use Virbox Developer Center to issue and manage the license, and user may only use the protected and licensed software when successful login the Virbox User account.
Compared with Hardware Lock license, the advantage of cloud license includes: Same security level , zero cost of container, license available at any time and valid immediately, easy to issue to multiple software user and dramatically reduce the cost in licensing and management

6.3.2 What is the advantage of Cloud Lock/license, compare with traditional license stored in the hardware lock?

- Best User Experience
- Faster Performance
- Zero Cost in Secured Container
- Verify the license imediately when login user account
- Issue the license to multiple user without hardware lock

6.3.3 How to make sure the security of Virbox Cloud license data?

The License Data, Program data stored in Virbox Cloud used hardware based encryption, there will no possibility for data leakage and cause to profit lose to developer in case "database leakage" happened.

6.4 License

6.4.1 What is License No. 0, is there any special purpose to define License 0?

1. License No. 0 is the license stored on default in the user lock when deliver the user lock to developer and License 0 can't deleted；
2. License 0 must be enable and valid then the other license can be used;

3. Developer may setup expire time (via license update), so developer may control the other license stored in the lock via license No. 0

4. Usually the advanced functions, such as "Code Transplantation", can be bound with license No. 0, then the software functionality related can be executed if user lock existed.

6.4.2 How to create a customized license?

Generally, Developer can issue the license for most of license criteria limitation by use of Developer Utility, such as setup License limitation terms based on time, usage counts and concurrency/No. of Nodes etc.

The other limitation to license can be setup by utilize of data area if special license terms required, each license has included 3 configurable data area (ROM, RAW and Public area), developer can use API to access/operate these data area to increase business logic to meet the special request to license terms.

6.4.3 Is the concurrent No. input means for the set the limitation of Nodes or set the limitation of process when setup the No. of concurrent?

Developer may setup the concurrent limitation either according to the quantity of process or according to the quantity of Nodes (Session) in the LAN environment, which based on practical project for flexible selection.

6.4.4 How to design and accomplish a software protection scheme with more security?

Virbox El5 provides powerful programmable capability for software encryption and protection to software developer and be easily integrated with license, a generall process listed below:

1. Developer use C language for coding program executed in the hardware lock (Virbox EL5), refer to "User Manual: El5 Coding Program"

2. Use the "Master Lock" to issue the coding program and bind with license ID (please bind with License 0 if it is the general functions coding for)

3. User login the related license and the coding program will be executed and return with executed result.

6.4.5 What will be done if developer want to shift license from hardware lock to cloud lock?

The protected software will verify the license with the sequence from hardware lock to cloud lock without any coding if the developer select both Local and Cloud when developer use the Virbox Protector to bind the license.

6.5 Developer Hosted Lock (this Hosted Master lock located in the Virbox Cloud)

6.5.1 What is the difference between Developer Hosted lock and hardware based Master lock?

Every Developer signup in the Virbox Cloud has owned 2 separated and dedicated "Master Lock": the hardware based Master lock in hand and the Developer hosted lock in the cloud, the functionality for these 2 master lock is same, both of master lock can issue license to hardware user lock and cloud lock. The security tunnel in base layer for both Master lock are totally separated and not affect each other.

6.5.2 How to make sure and guarantee the developer hosted lock in security?

Virbox use special security hardware equipment and strictly process which guarantee the security and confidential of Developer Hosted Lock in Virbox Cloud. The security level of Developer Hosted Lock is same as the security of hardware based Master Lock, the administrator of Virbox Cloud also can't access and use Developer Hosted Lock to operate the license.

6.6 Master Lock (Hardware based Master Lock)

6.6.1 What is the Master Lock?

The Master Lock is the identifier to each software developer, Master Lock will be used for decryption/encryption, issue the license and issue the update license package to the user lock. Master lock must be used in cooperated with the user lock which belongs to same developer, the update package issued by the master lock belongs to other developer will be invalid and cannot be used.

6.6.2 What is functionality for Master Lock?

1. Encryption and protection the critical data in software protection process;
2. Issue the coding program in the lock (Manual Code transplantation);
3. Issue the license.

6.6.3 What will do for developer if he lost the master lock?

Please contact with Virbox Sales Representative immediately if developer lost the master lock to avoid potential profit lose.

6.7 User Lock (Hardware based User Lock)

6.7.1 How to use the User Lock?

Developer who signup with Standard developer can use the User lock without any additional operation, all security, protection work has been completed before shipment, developer can use the user lock to issue license directly.

6.8 Software Encryption and Protection

6.8.1 How to create the Map File which required by Virbox Protector?

Let's Use the Visual Studio 2013 as an example, select with the sequence as follows:
Menu->Properties->Linker->Debugging,
Setting the Generate Map File to be the "True", and fill out the file name of Map file (Map File Name).

6.8.2 How does the Virbox Software Protection process works?

1. Create the "Product", and Fill out the Product information and binding with specified license ID;
2. Create the "Sales Template" to reduce the duplicated workload in license issuing process;
3. Download SDK and install it;
4. Use the Virbox Protector to protect the software.

6.8.3 How to use the protected software?

1. Developer issue the license to software user by use of the function of License Distribution in the Virbox Developer Center;
2. Software user login the User Account via "Virbox User License Tool" which developer has issued the license to this account
3. Then the Software user use the protected software as normal.

6.9 Security Technology

6.9.1 What is Virtualization technology?

Virtualization is convert the coding or instructions in the original program into the encrypted coding program block which executed in the Virtual Machine Environment, it will make sure to keep the realized logic in original program can't be recognized with the debugging and tracing technology be used and keep the protected software in security. Till now, virtualization is recognized as the best protection technology to protect coding logic.

6.9.2 What is the Code Snippet Execution (Code Fragmentation Execution)?

Code Snippet Execution (also named with Code Fragmentation Execution) is one of critical protection technology developed by Virbox, the Concept of Code Snippet execution is breakdown the targeted function module of software program into large amount of code fragment automatically and execute these code of fragments in the secured virtual environment with valid License. The protected software and the protected program fragments will only be executed with the valid license and return the result, otherwise the protected program can't be used due to failure to execute the fragmented code or modules in the secured environment. Code Snippet Execution will be binding with Specified License automatically, all protection process will proceed without manual work and extremely increase the security level when hacker try to crack and analyze the protected software.

6.9.3 What is the Virbox Compiler?

Virbox Compiler is compile engine of Secured Virtual Machine developed by Virbox, with the functions includes multi type of obfuscation, Anti-Debugging and data protection, Virbox Compiler provides virtualization protection with high security level to C/C++ Language. Compared with other traditional Enveloped/Wrapping tools, Virbox Compiler compile the source code directly with following advantage:

1. The protected software presents as same as normal program presents to anti-virus software, and avoid to intercepted by Anti-Virus software;
2. Compare with other "**Shell**" or "Envelop Tools" the size of protected software is smaller than

protected by other tools in same protection level. and execute more quickly;

3. With more information contained; Virbox compiler increase the security level and extend the protection range.

Almost all APIs, Security Service and Anti-Hacker driver in the Virbox Solution use the Virbox Compiler to protect software.

6.10 Virbox License Service (Named SenseShield Service previously)

6.10.1 What is Virbox License Service?

Virbox License Service is the runtime service running in the software user premise, License service build up the bridge between the protected software and license and it is core component of Virbox License System.

The Function of Virbox License Service：

1. It provides the abstract interface by isolate the based layer of hardware lock, cloud lock;
2. It provides security tunnel, authorization of security and Anti-Crack service to protected software.

6.10.2 How to maintain the Virbox License Service for Developer?

Virbox License Service doesn't link with business logic of protected software and it will be maintained and updated by Virbox LM, Virbox LM will update "**License Service**" by introduce latest technology to against cracking technology and provides continuously protection service to the software. And the user only need to update License Service according to prompt message by Virbox license service.

6.10.3 Is there any potential security risk existed when the client of hardware lock in network mode status start to search the Server automatically?

There are no security risks existed. All operations of the developer software are based on license verification, and whether the software can be executed is only related to whether the license is valid or not, regardless of the device or network architecture.

6.11 Virbox Developer Center

6.11.1 How to obtain the API password?

Signin the Virbox Developer Center, **Click the Developer Information on the right top of Main Menu and Click View on the right side of ·API Password**.
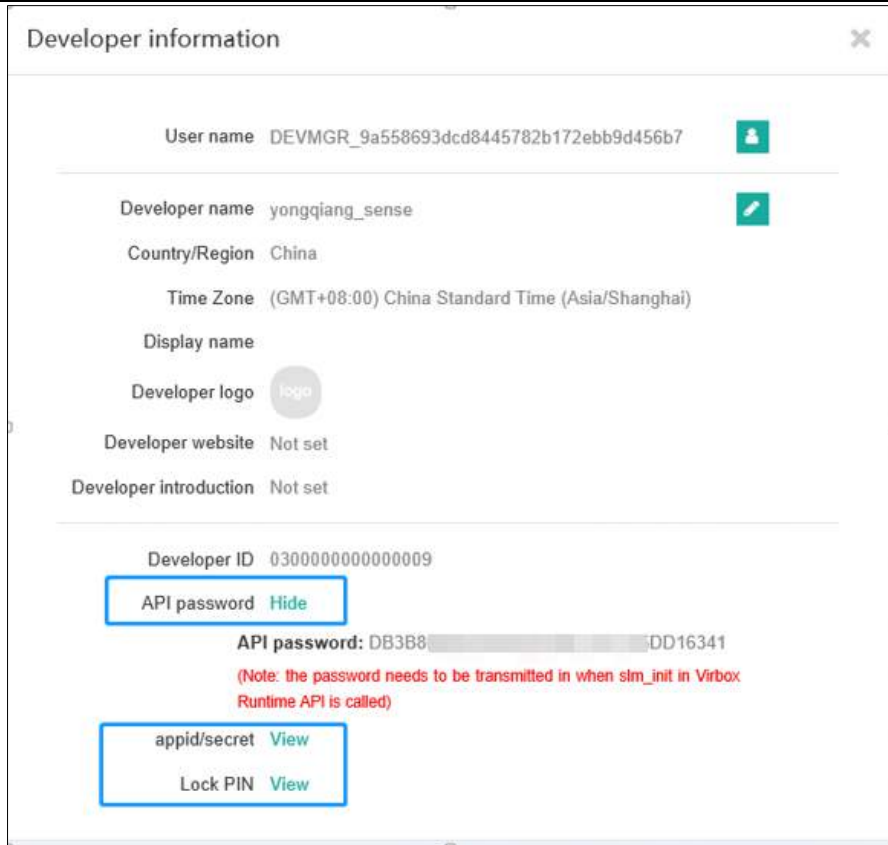
6.12 Developer Utility {#faq_LicMgr}?

6.12.1 Developer failed to open the Master lock

Please check if the Master Lock status in "Available", (the Light of Master Lock switch on)

7 Conclusion

Thank you for Choosing Virbox Software Copyright/IP Protection & License Solution to protect your software products. We will continuously to provide you with quickly response and services.

If you have any inquiry, questions or any kind of Suggestions to Virbox Solution, Please contact with us without any hesitate with following ways:

Website: https://lm-global.virbox.com/

Phone: +86 10-56730936 Ext: 8038
Email: support@senselock.com

8 Appendix A

Virbox El5 Technical Specification

Item	Parameter
CPU	32 Bits ARM Smart Card Chipset
Security	CC EAL 5+
Encryption Algorithms	RSA1024/2048 ECC192/256/384 AES128/192/256 DES/TDES SHA1/SHA256
Interfac	USB 2.0 Full Speed
Programmable Memory	256/512KB
Data Retention	> 10 Years
Writing Cycles	> 16.5 M
Page Writing Cycles	> 500 K
Power Consumption	100mw
Working Voltage	4.5V~5.5V
Working Temperature	-25℃~85℃

9 Appendix B

Glossary

Virbox Elite 5 Acme	Virbox El5 Acme is latest Generation of Virbox hardware Lock which are improved both in Hardware performance and Security Performance. Virbox El5 Acme is key component and License repository of Virbox LM solution. Virbox El5 Acme can be used to be a standalone dongle without connect to Virbox LM, and also can be used seamless integrated with Virbox LM with additional and advance feature available. Virbox El5 Acme support and suitable to deploy in tough industry environment. Software Developer can use this product to protect the Software copyright and IP. It will supports developer to protect software with most security technology, best performance and easy to use. For detail Specification of Virbox El5 Acme, please refer to the Virbox EL5 Acme datasheet.
Virbox LM	Virbox LM is Cloud based Software protection, License Entitlement Solution and cloud service which provides to software developer with lowest Total cost ownership, Top Security of Software Copyright Protection and Easy to use in whole software life cycle. By use of Virbox LM, Developers can achieve extremely protection to software copyright/IP and flexible to issue license to software user with minimal effort and investment. Virbox LM One Stop Solution consist of following components: Virbox license Manager (Virbox Developer Center), Software Protection (Envelope) Tools (Virbox Protector), Local License Manger (Virbox Developer Utility) and Virbox License Service and User License Tool (Virbox User License Tool) and other supported tools and documents. Virbox License Type supports: hardware lock(Elite 5 Acme Dongle), Soft Lock (Soft license) & Cloud Lock (Cloud license) and suitable to deploy in different Software implementation scenario, on line, offline, firewall isolated environment etc. Virbox provides flexible license mode to support ISV/software developer Software monetization which includes: Perpetual, trial, time based, feature on demand, subscription, concurrent; etc.
Virbox Developer Center	Virbox Developer Center consists of Developer website and Open API, It provides cloud based Service and website for License Issue and License Entitlement solution to software developer, Developer may use [Virbox Developer Center] (https://developer.lm-global.virbox.com/) to manage software product, user management, License Issue and Entitlement, Virbox Developer Center is online License solution for software developer, By use of Virbox Developer Center, it is not necessary for developer to build up in house License entitlement system and save the investment both in Capex and Opex.
Virbox Protector	Virbox Protector is the latest envelope tools for software protection and

	encryption, Virbox Protector integrated multi security technology includes Virtual Machine, Code Snippet (Code Fragmentation) and other static and dynamic technology/Service and provides top secure protection level to developer's software, Developer may protect software automatically by select protection options without any coding competence and save lot of workload and effort in software protection process.
Virbox Developer Utility	Virbox Developer Utility is local License Manager provided by Virbox LM, this Utility helps developer to issue the license to hardware lock (Virbox EL5 Acme) quickly. With Virbox Developer Utility, Developer will save Capex and Opex and not necessary to spend money to build up the In House License System.
Virbox User License Tool	A software installed in software user site that can be used for license verification, update and transfer service, Virbox User License Tool works with Virbox License service and provides static and dynamic protection service to software installed in software user site.
Product	Virbox Use "Product" refer to the Software application developed by software developer, software publisher which need to encrypt, protect the "product" by use of Virbox Protector.
Sales Template	The Sales mode for mature commercial software should support different sale mode and charging policy to meet the requirement of software users: pay per year/month/day, per usage, or pay for perpetual license. Above charge policy is independence with Product functions but depends on sales strategy to each market segment. so, Virbox designed the following "Concept" in Virbox License system to reduce duplicate workload for developer in protection and license process: *Sale Template*, developer may setup the different limitation to same product in different Sales Template to meet the different sales and marketing strategy.
License ID	License ID is the unique indicator which used in the software protection and license issuing/distribution process in the Virbox LM system, which presents the License No. for software. For details introduction to Virbox License Management and License concept, please refer to "Virbox License System" Developer must assign associate License ID to the product created. and the License ID must not be duplicated assigned and used for other product. The License ID associated with specific product will be use unique ID No. and Indicator to presents for this product in all protection and license process. The protected software will verify the associated License when software user execute the software.
Account	Account sign up by "user" in Virbox developer Center or Virbox User Center, For software developer, they can sign up account in Virbox developer center to evaluate and test the Virbox Solution for software protection and licensing to their product; For Software user, they can sign up a account or assign a account in Virbox User center by software developer, this user account will be the unique identifier for user to use and verify license issued by developer;

Master Lock	Virbox Solution provides 2 kinds of hardware lock for software developer: **Master Lock** and **User lock**; master lock is the unique Identity for each Software developer to protect software and issue license, it is mainly used for software encryption , protection, issue license and issue upgrade package to EL5 Acme user lock.
User Lock	User lock is the hardware based lock deliver to software user which contains the license file issued by Software developer, Virbox Provides following Virbox EL5 user lock to developer: EL5 Acme, EL5, EL5 RRTC, EL5 Genii.
Soft Lock	Soft Lock contains software license , saved in local safety environment. Which used to verify the protected software. Software developer may issue the Soft license from Virbox Developer Center to licensed software user account, Soft lock supports both online mode and offline mode.
Cloud Lock	The cloud license (cloud lock) is one of license type supported by Virbox LM, , Cloud License issued by developer from Virbox Developer Center and stored in Virbox Cloud and used to verify the protected software. The cloud license must be bound with the software user account. Users can use the protected software in online status (Access internet) and successfully logged in Virbox User Account.
API	Virbox SDK provides a complete package of APIs for license management and licensing that will help software developer get the most out of the Virbox licensing system. Developers can flexibly implement their own encryption scheme by calling these APIs, and combine the functions of encryption, decryption and data area provided by Virbox license to realize deeply protection scheme and further increase the difficulty of cracking.
Control API	This API is the management interface of Virbox License Manager, here referred to as Control API. Control API will mainly used and provides the inquiry to the hardware lock(dongle)'s information, inquiry to license terms and status, inquiry to license session etc. More details to how to use Control API and use case, please refer to Virbox License Architecture.
Runtime API	The API interface to access Virbox license , referred to as Runtime API, is the most critical interface for the Virbox licensing system. Runtime API is the key API interface for developer to use and call API, the software of Developer will use this API to access license. More details to how to use runtime API and use case, please refer to Virbox License Architecture.
d2c API	Virbox SDK provides "Developer Utility", the local License Manager, for developer to issue the license to hardware lock (Virbox El5) quickly. d2c API provides the interface to developer to issue license to hardware lock. Developer may call the "D2C API" to issue license with more flexible operation and flexible to combine different license terms. the d2c package created by d2cAPI is the only license update package which can be recognized and identified by Virbox EL5 hardware lock, d2c package includes digital signature and encryption to the license terms which will

	guarantee the integrity and security of license data, on the other hands, the Virbox EL5 hardware lock provides the function to anti-replay, all d2c license update package will be used one time in the hardware lock only.
	Note: Calling d2c API is quite complicate process, more details, please refer to sample file.
Open API	Open API is the API that Virbox LM provides to developers to access the Virbox Developer Center. Open API can be used for integration with existed third party system in developer site, such as CRM or ERP system.
	Developers may use and call this OPEN API for user sign up, license issue, license distribution and other operations via third party system. For details, please refer to [**Open API Guide** V2.0**/Virbox Developer Center**]
API Assistant	API Assistant is a quick starter tool that helps software developers learn and understand the Virbox API. Execute the API via friendly GUI prompts message to view the API execution result. You can quickly familiarize with API and functions without coding.
	API Assistant is suitable for developers to quickly learn and understand the usage/calling of the API and verify the feasibility of the encryption scheme.
Code Fragmentation Execution	"Code Snippet Execution" or we can named with more simple and easy understanding: "Code Fragmentation Execution". Code Snippet Execution will utilized latest and mature technology in "Extracting the coding" and select and extract large amount of "coding" from original program code, and executed in the security virtual environment after encryption and obfuscation and integrated with Virbox Encryption Compiling Engine, Virtualization and driving technology, all technology integrated together makes protected software in more security during execution process.
	The Code Snippet Execution" can be simply understand as breaking down the functions or modules of software into code of fragments and execute these "fragments" into a secure environment, so that the crackers can't start to use hacker tools to analysis and get the original code and execution result. "Code Snippet Execution" is major milestone and breakthrough in the Software Encryption and Protection field. In addition to high Security, Code Snippet also rely on and work with "Virbox License Service" middleware to shield the interface from the fundamental layer and also compatible with Virbox Cloud Lock and Soft Lock, and help developer to realized business agility with different kind of license type.
Anti Hacker Service	Anti Hacker Service, usually, software will be protected in static way by use of traditional protection technology: obfuscation, Virtualization, it will not be update after software delivery to customer side, Virbox use "Anti Hacker Service" and associated tools installed in customer side which provides pro active detect hacker behavior when software execution, with anti hook, anti reverse engineering, anti debug, update hacker database functionalities and features, it comprise a series anti hacker technology to protect your software

with dynamic and pro active way.

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.