



# Software Protection, Licensing and Security

# CodeMeter®

SECURITY  
LICENSING  
PERFECTION IN PROTECTION

**WIBU**  
SYSTEMS



# Software Protection

## Why software protection is important

Writing software is a time consuming and costly business. Regardless of whether the software is for a multitude of users, a niche product for a particular sector, a solution for the cloud, or an industrial controller application, in addition to the time and effort that's been put into its development, it also contains a large amount of the organization's intellectual property.

Software piracy and illegal copies cause substantial losses to software vendors and industry. In a worldwide study, published in 2018, the Business Software Alliance revealed that 37 per cent of software currently used is unlicensed.

The situation in the industrial sector is equally dramatic. According to the VDMA, the German Engineering Federation, 72 per cent of the companies surveyed in the German mechanical and plant engineering sector stated that they were affected by product or brand piracy. The estimated damage amounts to 6.4 billion euros annually.

## Solutions from Wibu-Systems

CodeMeter is a straightforward combination of state-of-the-art software protection and flexible software licensing, and is based on a wealth of longstanding international experience.

**CodeMeter protects:** CodeMeter helps you maintain your competitive edge by protecting your intellectual property.

**CodeMeter increases your profits:** CodeMeter increases your turnover by forcing users to exchange illegally acquired copies for licensed ones, and letting you get a foothold in new markets with modern license models.

**CodeMeter reduces your costs:** CodeMeter reduces your costs by automating the processes used to create, manage, and deliver licenses.

**CodeMeter is scalable:** CodeMeter optimally adapts to your market by offering hardware-based (CmDongle), software-based (CmActLicense), and cloud-based (CmCloudContainer) license containers.

## Software protection in four easy steps

CodeMeter is quick and simple to implement, and provides secure and long-term protection with appropriate license models. In just a few steps, unprotected software is converted into an encrypted application with a flexible license model based on your needs.

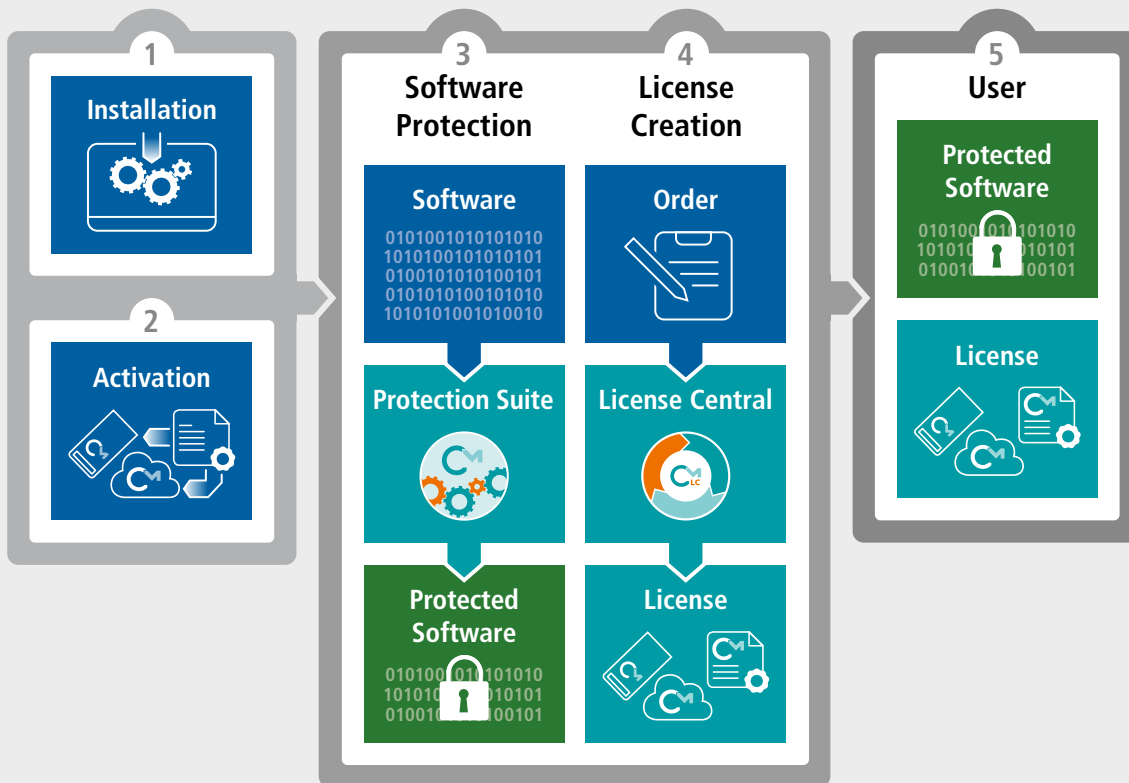
The overall process of software encryption comprises four simple steps. Wibu-Systems has the efficient tools for each step ranging from graphical user interfaces for interactive integration of the protection, through command line automation tools, to programming interfaces.

This means you can fully adapt the software protection and licensing process to your specific needs.

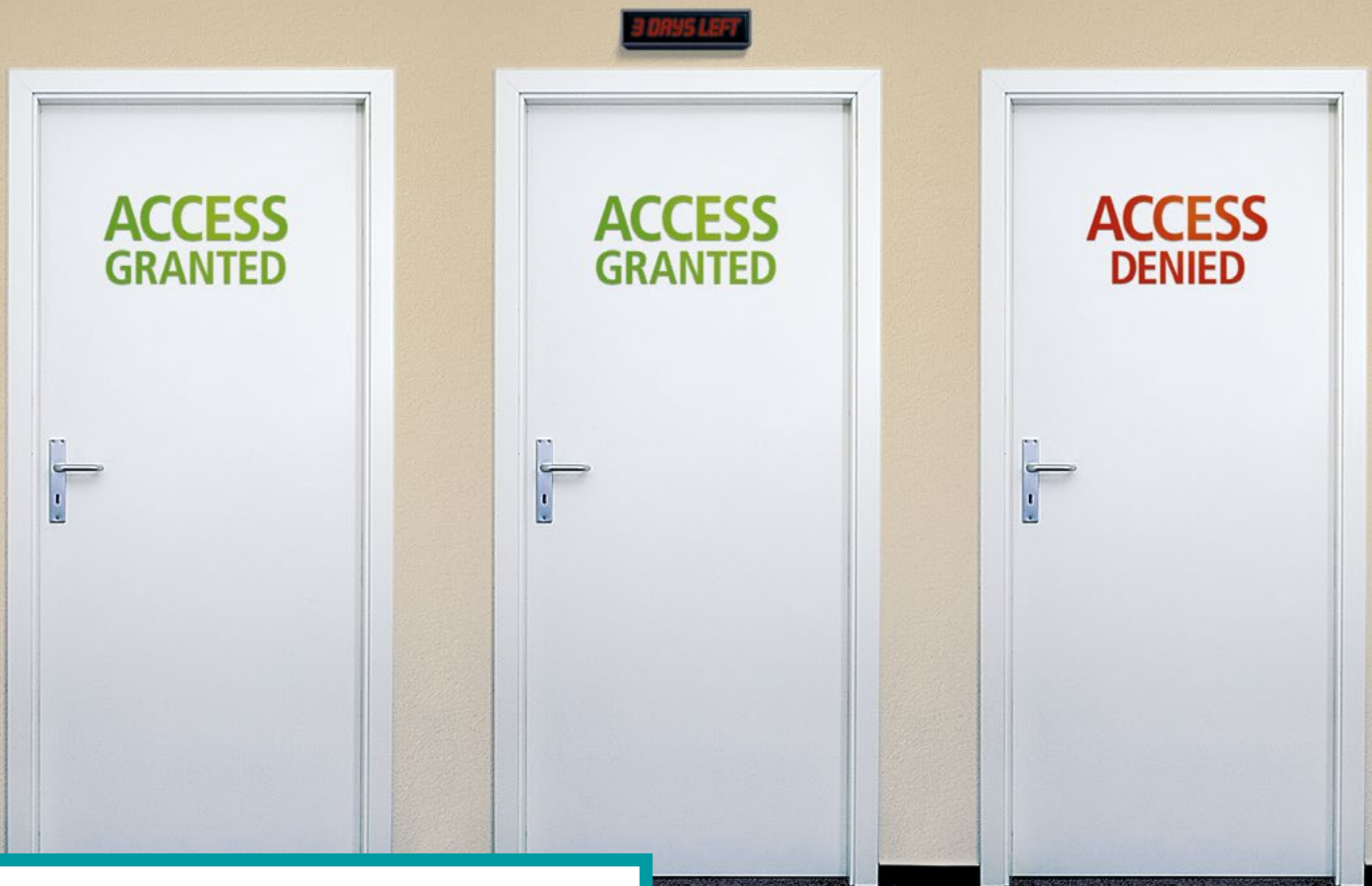
- 1. **Define your product features:** Which software modules do you want to individually market?
- 2. **Protect your software:** Use AxProtector and fully encrypt your software without changing the source code. IxProtector protects individual modules and hence adds an extra layer of protection.

- 3. **Generate your licenses:** Define and create your license models in a straightforward and flexible manner using CodeMeter License Central. What do you want to sell? Single-user or network licenses, subscription or perpetual license models, leasing or pay-per-use? Or do you just want to distribute demo versions?

- 4. **Ship your products:** With CodeMeter you have a wide range of delivery options. You can choose between a hardware-based (CmDongle), a computer-specific (CmActLicense), and a user-bound (CmCloudContainer) license container, which is either pre-programmed or delivered as activation code.







## Flexible Licensing

### Monetize your software

The main reason for implementing a software protection product is to prevent your software from being illegally copied, manipulated, or reverse engineered. Wibu-Systems also provides easy-to-use tools for integrating a wide range of flexible license models into your software.

### Universal solution

Regardless of whether you're a vendor of PC applications, an intelligent device manufacturer, or a cloud service provider, CodeMeter is the perfect licensing solution for you.

With CodeMeter technology, you can use both traditional and modern pricing models for your products. It doesn't matter if you're implementing computer-specific activation, a secure dongle, single-user or network licenses, feature-on-demand, or a pay-per-use model, Wibu-Systems has the right solution for your needs. Expand into new international markets and combine different license strategies to create innovative models to boost your revenue even further.

### Comprehensive solution

CodeMeter technology allows individual licensing of up to 4 billion modules, of which up to 2,000 can be individually activated

in a CmDongle, a CmCloudContainer, or a CmActLicense. More than 20 license options are available for each license, which you can combine as you wish to map your license model.

CodeMeter's unique clock concept means you have a secure virtual real-time clock to protect time-limited licenses in all CmContainers: the secure CmDongle, the user-bound CmCloudContainer, and the software-based CmActLicense. The concept can be optionally extended to include a battery operated real time clock in a CmDongle. In the case of a CmCloudContainer the time of the secure Server in the cloud is used.

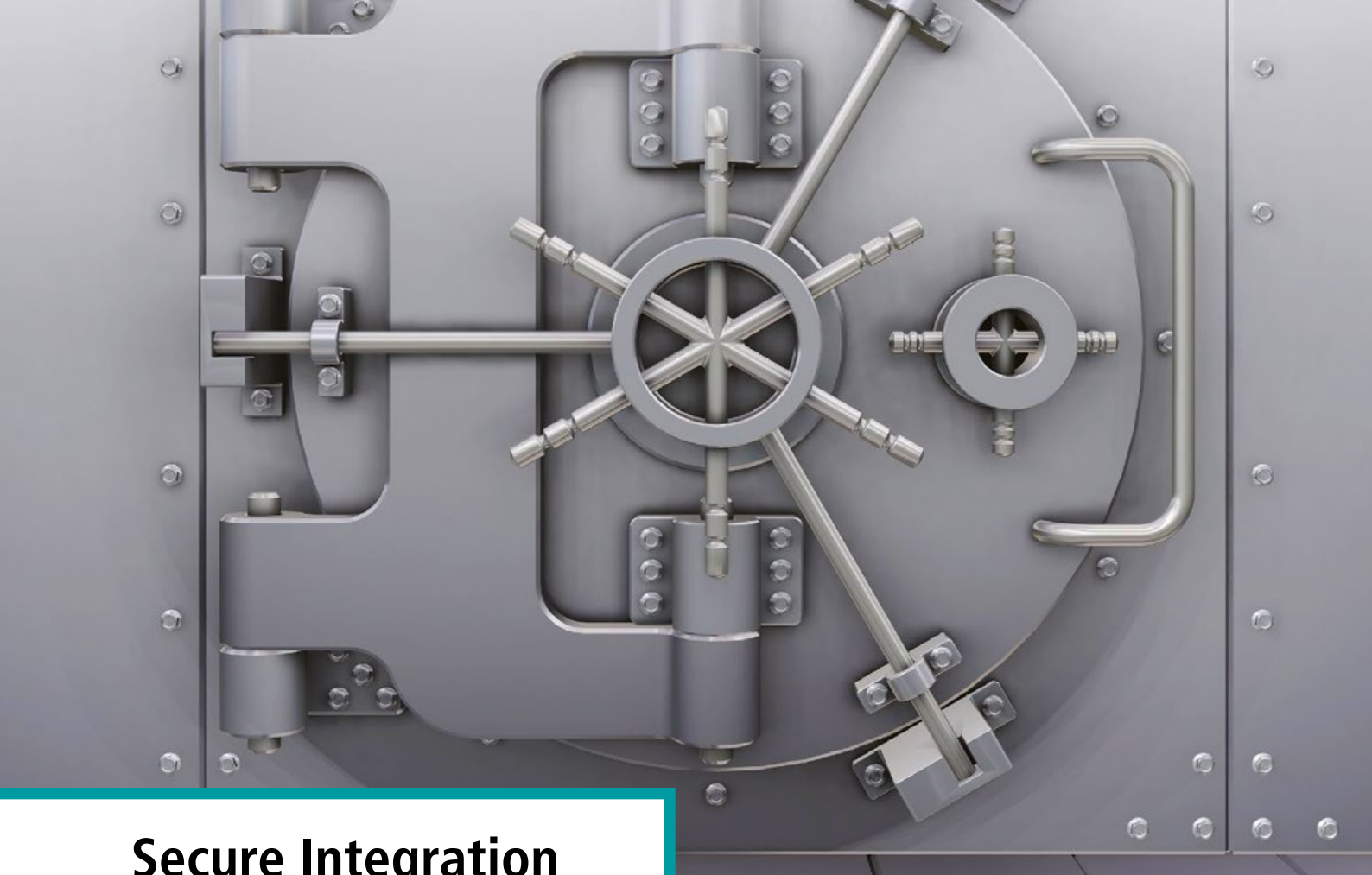
CodeMeter knows no boundaries: any type of license, including network, subscription, evaluation and pay-per-use licenses, can be easily implemented.

### Separate protection and licensing

Integrate protection into your software once and flexibly license it later on. This has been Wibu-Systems' motto for over 30 years and its effect is two-fold: It makes the process of integrating protection into your software less complex and allows your sales team to react promptly and dynamically to changing markets. And all of this is without having to make changes to your software as CodeMeter automatically does everything for you!

License model	PC software	Embedded	Cloud	Description
<b>Single-user</b>				The license is stored on a PC, a local device or in a CmDongle plugged into a local PC. The software runs on the same computer/machine.
<b>Network</b>				The license is stored on a central server in the network. It is used by PCs as a floating license. In embedded applications its main use is as an emergency license. It has little significance in the cloud.
<b>Feature-on-demand</b>				Individual licenses are used to activate specific products and modules. This allows you to generate extra turnover through the sale of add-ons. In embedded applications, service technicians can connect a suitable CmDongle to access hidden service functions.
<b>Perpetual license</b>				The license is issued permanently and never expires.
<b>Demo version</b>				The user can only access the functionalities you specify for a limited time.
<b>Rental, leasing, subscription</b>				You specify for how long the license is valid. CodeMeter License Central can automatically extend the license.
<b>Pay-per-use</b>				Billing is based on the number of units used. You can decide whether the billing unit is based on time or function. In the cloud, billing with this type of license is usually volume-based.
<b>Software assurance</b>				This is a perpetual license, which includes a service level agreement. Users have automatic access to updates as soon as they are available.
<b>Downgrade right</b>				The license covers the right to optionally use older versions of a program. With this license a customer can keep the same version of a program throughout the company and migrate all clients to the new version at a later date
<b>Grace period license</b>				The license covers the right to optionally use the next version of a program. This means you can still sell the current version even though a new version has been announced.
<b>Volume license (with control)</b>				You specify the number of licenses a customer can activate.
<b>Volume license (without control)</b>				The customer is sent an activation code, which they can use as often as they want. The number of licenses appears in the contract but is not controlled through CodeMeter technology. This license is applicable to CmActLicense only.
<b>Version licensing</b>				It is possible to choose whether the license, covers one or several versions of the same software.
<b>Cold standby</b>				The user owns a spare license, which they can use if there is a problem with their current license. They have to activate the license before it can be used.
<b>Hot standby</b>				The user owns a spare license, which they can use immediately if there is a problem with their current license.
<b>High availability license</b>				The user owns a redundant license server ("2 out of 3" principle).
<b>Overflow licenses</b>				The user can activate more licenses than they own. Usage is monitored and can be subsequently billed.
<b>License borrowing</b>				The user can borrow a license from a license server to use on a local computer (CmActLicense) or in a CmDongle for a fixed time. When the license expires, it is automatically returned to the license server and can no longer be locally accessed. It is also possible to manually return the license before the expiration date.
<b>User-specific licenses</b>				The license is associated with a specific user name.
<b>Computer-specific licenses</b>				The license is associated with a specific computer name.
<b>Time zone licenses</b>				The license can only be used in the geographical region (time zone) specified by you.

Key: ● low relevance, ●● moderate relevance, ●●● high relevance



## Secure Integration

### The solution to a dilemma

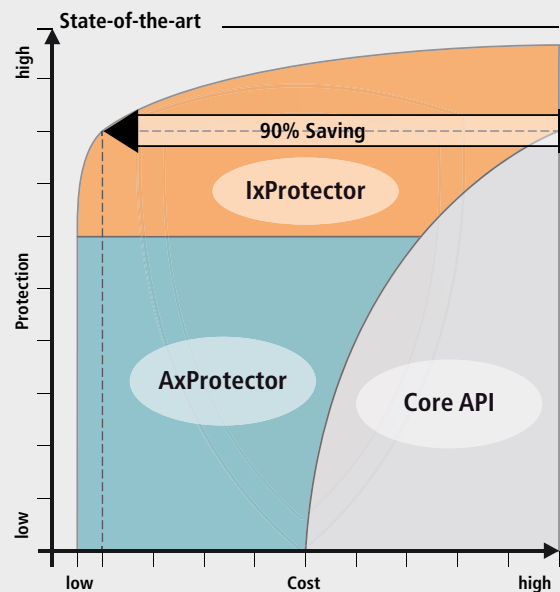
Every developer faces the dilemma of quickly and simply integrating software protection into their software, while at the same time ensuring it is sufficiently complex and embedded to meet security standards. Only CodeMeter solves this dilemma by providing a sophisticated solution, which is implemented with a minimum of effort.

Integrating CodeMeter into your software using AxProtector and IxProtector can be 90 per cent quicker than manually integrating it via the API. The unique IxProtector helps you quickly and reliably implement on-demand decryption of the source code in your application.

As a protection tool, AxProtector has no equal. All it takes is a few mouse clicks to achieve high-level protection without having to change your application's source code. AxProtector fully encrypts the application and automatically implements protection methods such as anti-debugging, changing keys, intrusion detection, and secret locking codes, which invalidate the license as soon as an attack is detected.

AxProtector and IxProtector are state-of-the-art. Communication between all components is always encrypted. AxProtector and

IxProtector use changing keys and P2P encryption to add secure second level protection. The result is communication with triple protection, which no other product offers.



### Automatic licensing and security

Regardless of whether you use AxProtector/ IxProtector in combination, or just one of the tools, you always profit from CodeMeter's unique concept. By clearly separating the ideas of "integrating software protection once" and "flexible licensing later on," you can adapt license models to your market needs at any time without incurring additional development costs.

### Acceptance through performance

To stay ahead of hackers, our Security Think Tank Team is continually developing new protection methods. Our adage of "maximum security, minimum performance loss" means only the best ideas are implemented in our products. As a result, AxProtector generates the least impact on the performance of the protected application.

The standard practice is to protect your software using AxProtector, which means you don't have to worry about performance issues. Applications protected by this tool take on average one second longer to boot and aren't noticeably slower afterwards. In individual cases, special settings can be adjusted to further enhance performance.

With IxProtector, the code is always decrypted and encrypted at runtime. It uses intelligent caching to maximize performance and security. You can define when a native application is decrypted. With .NET applications, IxProtector automatically makes this decision for you. Here you can individually specify encryption options as far down as the method level. This allows you to map "features on demand" in an easy and straightforward manner.

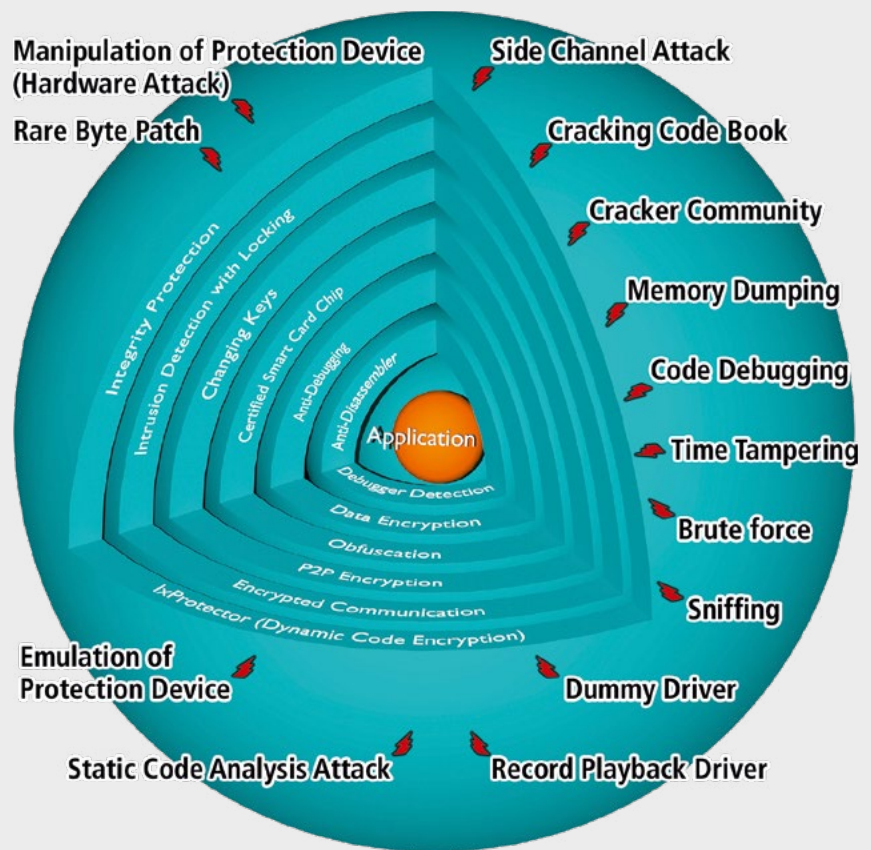
### Individual user messages

You have a free hand in deciding how to generate license-specific error messages. You can use the already existing error messages, edit them, send them to an error log file, or implement your own error handling strategy.

The choice is completely yours: If the license is missing, you can start the application in demo mode or suggest the customer purchases it. If your software doesn't have a user interface, you might decide to redirect errors, for example, to a log file or generate a message.

### Multiple platforms

AxProtector and IxProtector are unique in the number of operating systems and runtime environments they support. AxProtector and IxProtector were the first software automatic protection tools for Windows, macOS, Linux, VxWorks and Windows CE, and for



some operating systems, they are still the only ones available, e.g. for native Java, JavaScript, Python, and .NET applications. Make sure you too benefit from Wibu-Systems' many years of experience in fighting software pirates, imitators and saboteurs around the world.

### Proven security

In the ever-changing world of IT, it is essential for software vendors to anticipate highly adept and well organized hacker teams. Home-grown solutions are not capable of doing so anymore. Even commercially available products sometimes fail to adequately protect your software from hackers.

Who is a better judge of a secure program than a hacker himself? The security of Wibu-Systems, products has been demonstrated time and again at various international hacker contests around the world. What more proof do you need of the high quality of Wibu-Systems products?

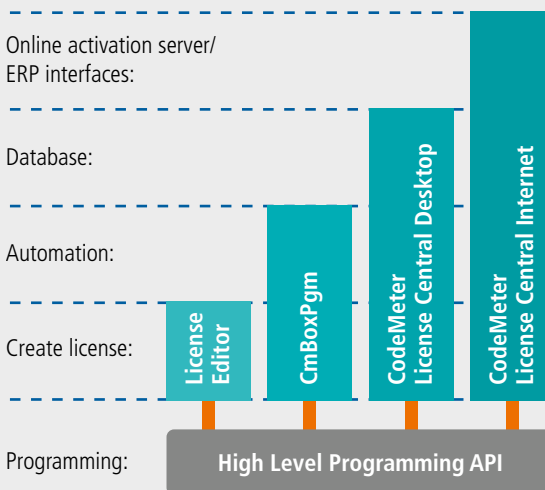




# License Management

## An application for every occasion

Besides securely protecting your software from piracy, reverse engineering and manipulation, the provision of flexible license models plays a key role in further increasing your software revenue. Prerequisites are efficient internal license management as well as straightforward and cost-effective customer distribution



channels. CodeMeter provides the license model that works perfectly for your business, ranging from a few licenses per year to several thousand a day.

**CodeMeter License Editor** is an easy-to-use tool for quick programming of CmDongles licenses.

The **CmBoxPgm** command line tool can be used to automatically generate licenses via batch processes.

**CodeMeter License Central Desktop** is a database application to generate licenses for your Intranet.

**CodeMeter License Central Internet** can be integrated into ERP, CRM and e-commerce systems, and can also be used as an online activation server.

All programming tools are based on the main high level programming API, which makes customized integration into your applications possible.

## Remote programming

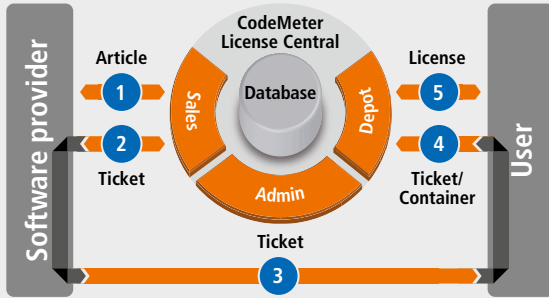
Regardless of whether you use a computer-specific CmActLicense, a user-bound CmCloudContainer, or a CmDongle, remote



programming via file exchange can be used to generate, change, and delete your licenses. It is supported by all programming tools.

### Process-oriented approach

Generally speaking, a license is sold first and then created. This is the approach used by CodeMeter License Central. As a result, license sale and license generation are usually two separate processes carried out by different people at different times. This is where CodeMeter License Central comes into action by issuing a joint ticket for the two processes.



### Selling the license

CodeMeter License Central hides details about CodeMeter from the ISV (Independent Software Vendor). The item number and customer number are entered into the system as part of the license order process. The item number contains the information required by CodeMeter License Central to generate the correct license. CodeMeter License Central also issues a ticket for the process.

### License Deployment

The license is automatically generated when the ticket is collected by either the user or the software vendor. The procedure

is identical for a CmDongle, a computer-specific CmActLicense, and a user-bound CmCloudContainer. The ticket and a remote context file containing a fingerprint of the CmContainer is sent to CodeMeter License Central. The latter generates a remote update file, which activates the license for this specific CmContainer, and can only be used once. If the procedure is carried out online, the file exchange can take place in the background. Otherwise, files are exchanged offline via email. Telephone activation is also possible for CmActLicense.

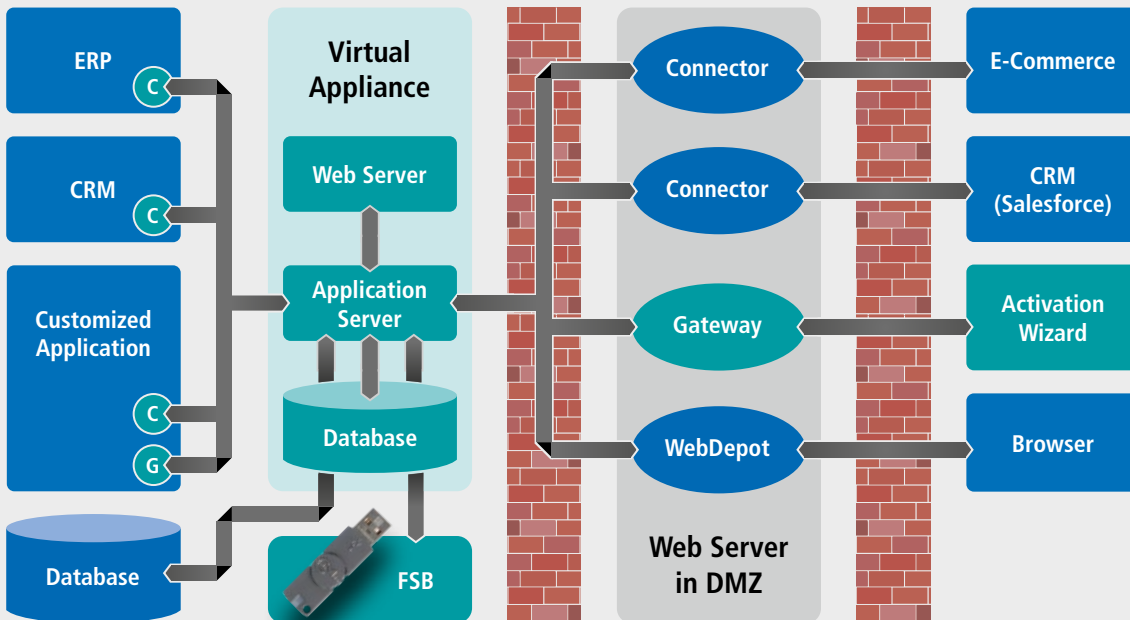
### Extensive reporting

All data is recorded in a database, which means you can measure the success of your licensing strategy and modify it for the future, if need be.

### Integration into your processes

Integration and automation reduce your licensing costs. CodeMeter License Central Internet Edition provides numerous interfaces for this purpose. ERP, CRM and e-commerce systems can automatically issue tickets via connectors (C). Gateways (G) allow CodeMeter License Central to be used as an online activation server to directly activate licenses from within your software. With a configurable WebDepot, you can activate licenses directly or via data exchange in the browser.

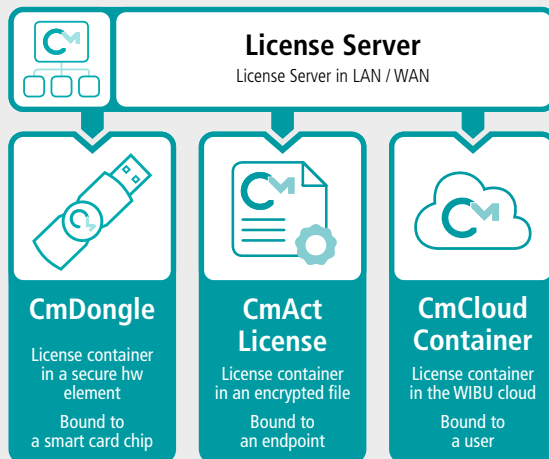
CodeMeter License Central can access existing databases (MySQL, MSSQL) adapting to your needs and not the other way round.



Integration of CodeMeter License Central into your processes



## CodeMeter – The all-rounder



### Transparent runtime environment

With CodeMeter, you are placing your money on a tried and tested product that enjoys user acceptance and minimizes your support costs. CodeMeter contains a transparent runtime environment from which you profit twice over: first, you take advantage of the protection protection it gives, and second, you gain from the convenience it provides your users.

To provide your user with transparent license management, you just need to integrate the runtime environment into your installer. This has two indispensable benefits for you. First, your customer's IT administrator optimally uses the CodeMeter runtime environment tools, as they are already familiar with them, which increases their acceptance of the protection product. Secondly, you don't have to spend time and money implementing and maintaining your own license management tools.

### License management by the user

A full set of network functions are implemented in the CodeMeter runtime environment. As a software vendor, you can use any CmDongle, CmActLicense, or CmCloudContainer to store network licenses. A network server can be easily set up by the user. They install the CodeMeter runtime environment on the computer and enable the "Run as server" option. CodeMeter is particularly suitable for use in heterogeneous networks. Windows applications can access license servers running on Linux.

CodeMeter license management can be scaled for small or large networks. While a small network only needs basic functions for transparent operation, in a large network the license administrator can assign licenses to specific computers, and monitor and evaluate license usage.

### CodeMeter in a virtual environment

Virtual environments and terminal servers were popular long before the advent of cloud computing. CodeMeter is particularly suitable for use in this field as its architecture already takes into account such scenarios.

While other products would just detect a terminal server and prevent execution of your software, CodeMeter always correctly counts the number of licenses on a terminal server.

It's no problem either for CodeMeter to count the corresponding numbers of licenses if your software is executed in a virtual machine. CodeMeter prevents license violation by prohibiting simultaneous use of a single user license in a CmDongle on multiple virtual machines.

When you generate a CmActLicense, you specify whether a user can activate it in a virtual machine. The option to install a license on a network server always exists.

Regardless of whether your software runs in a virtual environment or on an actual machine, CodeMeter automatically makes sure the correct licenses are available.

### Automatic license release

There is the concern among users that network licenses in particular won't be released when the software crashes. The user finds themselves in a frustrating situation: they have legally acquired a license but can't use it.

Here too CodeMeter offers automatic assistance. CodeMeter monitors all running processes and locked licenses, and passes this information on to the server. If the process belonging to a locked license stops, CodeMeter automatically releases the license. The administrator does not have to do anything. This saves the user's time and money, and makes life easier for staff.

### CodeMeter Embedded

Wibu-Systems provides CodeMeter Embedded for embedded devices, which replaces the CodeMeter runtime environment and allows direct access to the CmDongle or CmActLicense from within your software.

CodeMeter Embedded is available as ANSI C source code or as a static library and can be compiled for your target system. An important feature of CodeMeter Embedded is its modular design, which allows you to streamline it to your project. It is the ideal alternative when installed in your own operating system or an embedded operating system.

### Ready-to-use tools

The CodeMeter runtime environment contains a diversity of user and administrator tools, which can be used immediately. For example, the CodeMeter command center allows licenses to be subsequently activated and installed.

PC/Tablet Systems	Server Systems	Embedded Systems*	PLC Systems*
.NET	Linux Server	.NET	B&R Automation Studio
Android	Sun Solaris	Android	CODESYS
Java	Windows Server	Java	Siemens TIA Portal
Linux		Linux Embedded	
macOS		QNX	
Windows		RTLinux	
		Wind River VxWorks	
		Windows Embedded	

\*More on request







## 360° Services



### Lifetime support

Wibu-Systems provides assistance throughout the entire product life cycle of your software. We are committed to our customers beyond the sale of our software encryption and license management tools. Already in the evaluation phase, as part of the pre-sales consultation, we create a user profile and gather information about your system environment to decide with you how best to implement Wibu-Systems' products.

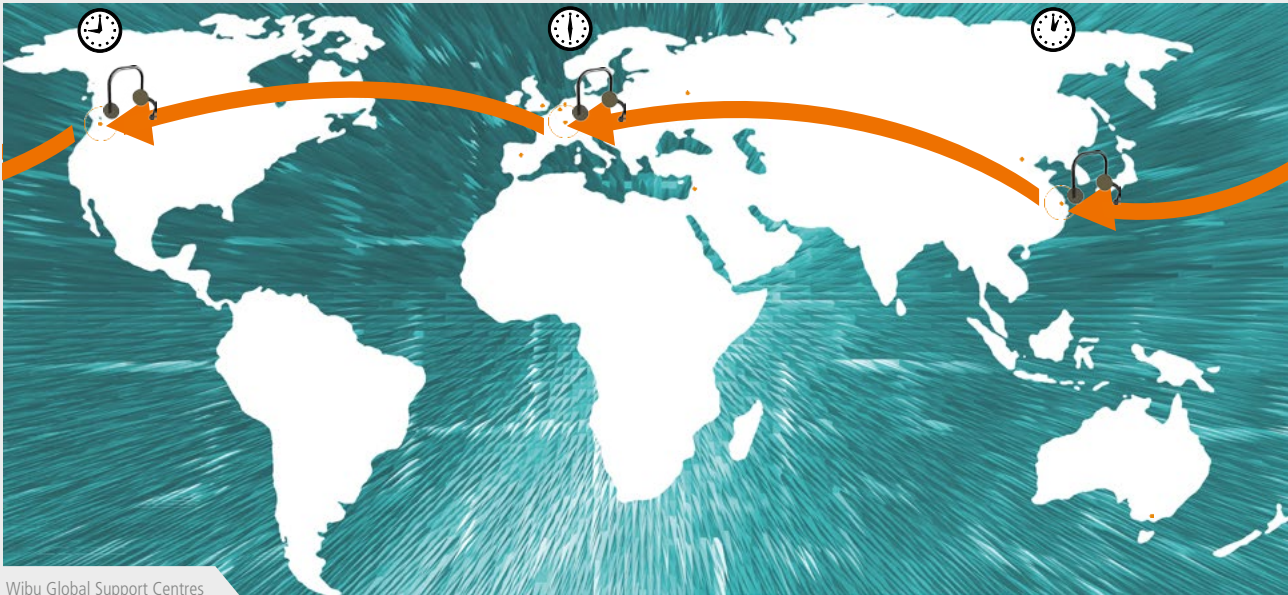
### Wibu Consulting Services

Wibu Consulting Services assist you during the follow-on design phase, by creating, for example, a detailed specification of your solution. Our experts make sure you find the right concept for protecting and licensing your software.

Regardless of whether your aim is to boost turnover by adding secure protection to your products, or to cut costs by optimizing processes and integrating your back office systems, our trained specialists, with their many years of experience and in-depth knowledge, provide the support you need.

### Wibu Professional Services

Wibu Professional Services team also helps you put your concept into practice, which saves you valuable time during train-



ing and implementation. Let our experts use their know-how and experience to quickly and cost-effectively adjust the system to your needs. Use your time to concentrate on your core competencies instead.

### Wibu Training Services

During the training phase, Wibu Training Services make sure you quickly become familiar with the concepts of software protection and licensing. This saves you valuable time and provides you with the know-how to successfully and securely integrate CodeMeter into your software and processes. We can provide specialist training at your company or you can attend an open house workshop at locations near you.

### Wibu Support Services

Wibu Support Services provide assistance during the utilization phase of your solution. Our team of service technicians can be contacted via email, telephone, or a remote connection whenever you or your users need help with troubleshooting.

We provide three levels of support to meet any need or budget. Support Level Free, as its name suggests, provides free support. With Support Level Silver and Gold, you will be allocated your own personal service technician who is familiar with your project and can therefore provide quick and expert assistance whenever you need it. If you are using CodeMeter License Central, high availability of the server will of course be important to you. Here, Support Level Silver and Gold include guaranteed response times.

### Wibu Operating Services

The operation of CodeMeter License Central, particularly as an online activation server in the Internet, requires trained staff, constant monitoring, regular updates, and a disaster recovery plan. CodeMeter License Central is usually assigned "mission critical" or possibly even "business critical" status.

Our Wibu Operating Services team can host CodeMeter License Central either locally on your system or in the secure Wibu Cloud. This saves you the trouble of setting up CodeMeter License Central, training your staff on how to securely use products in the Internet, installing a monitoring system and backup strategy, and dealing with day-to-day problems. And your IT manager can sleep peacefully at night.

#### Benefits of the Wibu Cloud

Specially trained personnel

Configuration and installation management

Choice of dedicated server

Guaranteed response time

Cyclic backups

Automatic monitoring of hardware and software

High availability architecture

Redundant Internet connection

Service level agreements

Disaster recovery plan

Redundant Firm Security Box (FSB)

Use of database clusters for reliability





## Unified Solution

### Scalable product

You can freely decide whether to ship user licenses in dongles (CmDongle), as computer-specific soft licenses (CmActLicense), or in CmCloudContainers. You only need to protect your software once. You can then decide later about which license model provides the best protection in each market.

All license models can be mapped into the CmDongles, CmActLicense, and CmCloudContainers e.g. single user licenses, network licenses and time-limited licenses, which use the internal clock.

### Additional flash memory in CmDongles

The CmDongle can be used in a diversity of areas such as PCs, embedded devices, mobile applications, as well as in the cloud, and is available in various form factors. In most cases, secure software protection and licensing is combined with industrial standard flash memory, which allows your software, or in the case of an embedded device, the whole operating system to be stored in the CmDongle. This solution only uses one of your device's interfaces.


























































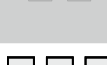














CodeMeter Cloud is the newest member of the CodeMeter product family and a great choice for protecting and licensing software on devices with a permanent Internet connection. This

includes software on office or home office workstations, on IoT or IIoT devices, and on virtual machines in proprietary data centers or elsewhere in the cloud.

CodeMeter Cloud is fully compatible with CodeMeter Runtime, CodeMeter License Central, and CodeMeter Protection Suite and includes virtually all of the protection and licensing capabilities offered by hardware-based (CmDongles) or software-based (CmActLicenses) license containers.

CodeMeter Cloud includes access to the highly secure and extremely scalable cloud servers operated by Wibu-Systems that offer not just top-notch security, but also peak performance for your licenses.



	Container	Photo	PC software	Embedded	Cloud	Description
Hardware-based	<b>CmStick CmStick/ME</b>					Standard-sized USB CmStick, computer-independent, housed in plastic or metal, embeds a smart card chip.
	<b>CmStick/MC xGB</b>					Standard-sized USB CmStick, computer-independent, housed in metal, embeds a smart card chip, available with MLC flash memory (2-bit eMMC).
	<b>CmStick/T ME</b>					Standard-sized USB CmStick, computer-independent, housed in metal, embeds a smart card chip and a battery-operated real time clock.
	<b>CmStick/C Basic</b>					Compact-sized USB CmStick, computer-independent, housed in plastic, embeds a smart card chip.
	<b>CmStick/C</b>					Compact-sized USB CmStick, computer-independent, housed in plastic, embeds a smart card chip. Available with USB connector cap and keyring.
	<b>CmStick/B CmStick/BMC CmStick/BMI</b>					Compact-sized USB 3.1 CmStick, SiP-based design (seamless union between USB connector and the body of the unit), computer-independent, housed in aluminium, embeds a smart card chip. /BMC available with MLC flash memory (2-bit eMMC). /BMI available with pseudo-SLC flash memory.
	<b>CmStick/D CmStick/DMC CmStick/DMI</b>					This series comes with a USB type-C connector. All other specifications are identical to the CmStick/B product range.
	<b>CmStick/IV</b>					Naked (PCB only) CmStick with internal USB interface, 2x5 socket of 2.54 mm grid size, computer-independent, embeds a smart card chip.
	<b>CmCard/CF CmCard/CFast</b>					CmCard in a Compact Flash form factor, computer-independent, embeds smart card chip, SLC flash memory and CF or CFast connector.
	<b>CmCard/SD</b>					CmCard in a Secure Digital form factor, computer-independent, embeds smart card chip and SLC flash memory.
	<b>CmCard/ microSD</b>					CmCard in a Micro Secure Digital form factor, computer-independent, embeds smart card chip and SLC flash memory.
	<b>CmASIC</b>					Smart card chip as ASIC to use on own PCB.
Software-based	<b>CmActLicense powered with SmartBind</b>					Computer-specific license file, features SmartBind technology for binding the license to the digital footprint of the target device with a choice of three tolerance levels.
	<b>CodeMeter Binding Extension</b>					Flexible computer-specific license file. CodeMeter Runtime environment can be extended to use your own locking scheme. Mainly for embedded devices and migration of dongles from other manufacturers.
	<b>CodeMeter Trial License</b>					Computer-independent time-limited license file.
	<b>CodeMeter Protection Only License</b>					Computer-independent and time-unlimited license file for AxProtector-based protection against reverse engineering only.
	<b>CodeMeter Cloud</b>					User-bound cloud-licensing storage, ideal for on-premise applications with user-based licenses running with multiple asynchronous instances. Compatible with CodeMeter Runtime.
	<b>CodeMeter Cloud Lite</b>					User-bound cloud-licensing storage, ideal for SaaS, server, and mobile applications. Lean web-service API for easy integration into ISV's software. Requires CodeMeter License Central that is fully compatible with. Supports a subset of the available license options.

NOTE: All CmContainers support the virtual real-time clock.

Key: ● low relevance, ●● moderate relevance, ●●● high relevance



## Cloud Licensing

In the cloud, protection and licensing come in many shapes and guises:

- Software developers want to enable their users to access local software with a license kept in the cloud.
- Software developers supply their users with SaaS solutions operated in the cloud. The required licenses might be tied to a single user or a given number of devices.
- Software developers want their users to have a reliable means of authentication for using their SaaS applications.
- Users might want to install and run software independently on their own private clouds.

### Cloud Licenses for Local Applications

In this scenario, your software is a classic desktop application, which you sell to your users either on a traditional CD or as a download. Your user receives not only the software itself, but also an activation code in the form of a ticket that you create with CodeMeter License Central. When creating that ticket, you can determine how many devices the software can operate on at the same time and for how long it can be used without a permanent connection to the Internet.

Your user installs the software on a PC. When it is started for

the first time, he or she is asked to enter the ticket. The software contacts CodeMeter License Central and sends the ticket and a fingerprint of the computer (in the form of a WibuCmRaC file) up to the cloud. CodeMeter License Central checks whether the ticket is valid and, if it is, creates a temporary license for an offline cache. The license is returned to the user (by WibuCmRaU file) and imported locally into the CodeMeter Runtime. The ticket is also stored locally, e.g. in the license. Your software then launches and works perfectly without any need for a permanent Internet connection. Shortly before the temporary license expires in the offline cache, the application phones home to CodeMeter License Central and renews the license.

### Cloud Licenses for SaaS Applications

You can offer your users a SaaS application with unrestricted or temporary licenses for different features. CodeMeter Cloud Lite offers you a simple and lean way of reconciling the online and offline worlds, especially when you are already using CodeMeter for on-premise software and have integrated the license creation processes with your SAP, Salesforce, or any other ERP, CRM or e-commerce system.

The licenses for SaaS applications are created in the same manner that is used for on-premise licenses; they only differ in the

binding scheme, using CodeMeter Cloud Lite in the place of CodeMeter SmartBind or CmDongles. A license is created and assigned to a user in a process that does not differ from the activation of a local license – you can even combine both forms. You can integrate your user admin processes with Single-Sign-On solutions like OAuth2 or SAML.

## Authentication for SaaS Applications

On top of its comprehensive licensing and powerful software protection capabilities, CodeMeter comes equipped with a third key trait: The private keys used for authentication can be stored securely on a CmDongle or a computer-bound CmActLicense. This makes CodeMeter the right choice for user authentication in SaaS scenarios.

The solution can be integrated via the CodeMeter API, specifically when you supply your users with a dedicated local application that works in tandem with a SaaS application in the cloud. The SaaS software creates a challenge that the local application responds to by signing it with the private key kept in the local license. Up in the cloud, the SaaS application uses the public key to verify the identity of the user, with the users' identities managed and recorded in the cloud according to your specific needs.

For browser applications, client certificates have established themselves as the standard solution. A middleware is used to transfer standard x.509 certificates on a CmDongle. Two standardized interfaces (PKCS#11 and Microsoft CSP) are available for applications like Internet Explorer, Firefox, Chrome, Safari, Outlook, or VPN clients to use these certificates.

## Standard Applications in Private Clouds

Imagine the scenario: You have created a standard desktop application that needs a lot of computing power. In such cases, your users might be thinking about moving the application to their own private clouds.

A private cloud would typically be a farm of virtual machines operated in a company's own data center or at a specialized provider on other hardware known neither to you nor to the user. It might not even have USB interfaces to connect to. Again, CodeMeter has the capabilities needed to handle this scenario and protect your rights as the developer of the software. You have several options at your disposal:

- 1. USBoverEthernet:** Your user is given a license in the form of a CmDongle. Common USBoverEthernet products can now be used to connect that CmDongle to the virtual machine in question – many data centers have this technology as standard practice. You do not have to make any changes to your software or to your established distribution methods.
- 2. Network Server:** Your user operates a network server in the data center. CodeMeter offers a special lean CodeMeter Runtime for such servers, designed to operate even on Raspberry Pis. The CmDongle is hooked up by USB to that server. Your software only has to support the CodeMeter network-
- 3. CmCloud:** With CmCloud, the licenses are placed in a CmCloudContainer on the CodeMeter Cloud Server that is securely bound to a known user. That user only needs an Internet connection and a set of credentials to access the licenses in CmCloudContainers, which function just like local licenses on any device of the user's choosing.
- 4. SmartBind with VM Move:** You create a SmartBind license with a "loose" level of tolerance. This makes sure that the license remains intact when the virtual machine it is kept on is relocated in the cloud. It would be invalidated when the virtual machine is copied. Alternatively, you could define the machine SID as the binding property. You do not need to change anything in how you integrate the system in your application; all you need to do is create special licenses for the users who will run your software in their private clouds.
- 5. Licensing with CodeMeter Cloud Lite:** You can leave the licensing of your software to CodeMeter Cloud Lite. Your application would be given a Protection Only license to prevent reverse engineering and regularly check the Wibu cloud to see whether the license is still valid or whether it is being used elsewhere. This type of licensing requires some changes to your software and a permanent Internet connection between the user's private cloud and the Wibu cloud. The creation of the license itself is not made more difficult: all it needs is the addition of CodeMeter Cloud Lite as another binding property.





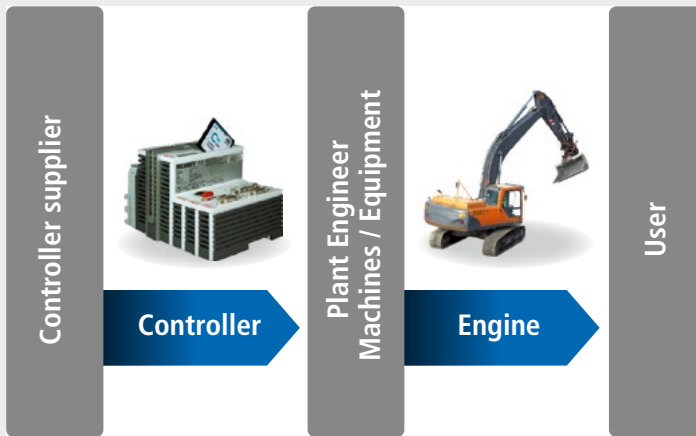
# Embedded Security

## Protection for everyone

CodeMeter provides protection for everyone in the embedded systems business, from the controller manufacturer through the equipment manufacturer and manufacturing/plant engineer to the user. CodeMeter is unique in its ability to simultaneously and separately store the licenses of controller manufacturers, third-party library providers, and equipment manufacturers in an industrial standard CmDongle.

## Integrity and manipulation protection

Integrity and manipulation protection are of primary importance to all. The user wants to be sure their assets are protected against sabotage attempts. Integrity protection means safety and security go closely hand in hand too. Networked embedded system, so-called cyber physical systems in critical infrastructures and metropolitan solutions all require integrity protection, mutual authentication of systems as well as encrypted communication. These functions are all provided by CodeMeter.



For the plant engineer, integrity protection implies operation within the specified parameters to ensure warranties are not jeopardized because of excessive wear and tear.

For the controller supplier, integrity protection is added value, which they can sell to their customers, but more importantly it provides protection against illegal copies of their software components.

## Secure equipment log book

CodeMeter allows tamper-resistant storage of production data in the CmDongle. If a fault occurs, the data can be analyzed. This facilitates understanding of the fault and helps prevent it from occurring again.

### Protection of intellectual property

CodeMeter allows the application to be fully encrypted before being downloaded to the machine. Combined with other methods, this hampers attempts to reverse engineer the code and hence protects the intellectual property in both the runtime environment of the controller manufacturer and in the plant engineer's application. This makes it much more difficult to build replicas and imitations. In fact, it might not be possible at all.

ExProtector from Wibu-Systems provides controller manufacturers and plant engineers with a set of ready-to-use tools, which function in all popular runtime environments such as Windows Embedded, Real Time Linux and VxWorks, as well as in IEC61131 programming.

### Protection from piracy

CodeMeter can prohibit operation of the application and runtime environment without a valid license and hence protect plant engineers' and controller manufacturers' products from reverse engineering. Different levels of protection can be integrated into the product. For example, hard encryption completely prevents replicas being made, whereas soft protection just shows a message reminding the user that they are using an illegal copy of the application.

As a controller manufacturer, you can sell this piracy protection as added value to the plant engineer. Wibu-Systems provides support with the encryption of applications in your development environment, their decryption in the runtime environment and the development of the licensing API.

### Features-on-demand

As a controller supplier or plant engineer your devices and instruments have different functionalities depending on the market they operate in. Quite often, the only difference between them is the software.

CodeMeter allows you to create various versions of the same software. The versions only differ in terms of the functions that are licensed for each market. This saves time and money during quality assurance and production. Individual functions can be sold later as on-demand activation features. Increase your turnover and boost your profits by selling add-ons.

### Project protection

The plant engineer can use CodeMeter to prevent illegal access to their application's source code. Access protection can be implemented on an individual basis for employees and customers. Project protection thus safeguards the plant engineer's intellectual property. They also protect their customer from analysis of the project code by saboteurs. As a controller manu-

facturer you can integrate project protection into your development environment as added value.

### Authentication

Everyone can use CodeMeter for authentication purposes. Controller manufacturers and plant engineers can provide their service technicians with access to internal functions. Plant engineers can protect their customers from manipulation by saboteurs or faulty configurations generated by untrained staff.

### License transfer

You can use CodeMeter to transmit licenses via file transfer to a CmDongle or a CmActLicense in the controller. This makes offline transfer possible as well.

As a controller manufacturer, CodeMeter allows you to integrate license transfer both into the development environment and the configuration components of the runtime environment (e.g. the web interface). Licenses for controller runtime environment functions can thus be accessed from your own CodeMeter License Central. You can also integrate access to the plant engineer's licenses via their CodeMeter License Central into your system.

Protection needed	Controller supplier	Equipment manufacturer	User
Integrity protection (tampering)	✓	✓	
Intellectual property protection (anti-reverse engineering)	✓	✓	
Piracy protection	✓	✓	
Feature-on-demand	✓	✓	
Manipulation protection (production data)		✓	✓
Secure equipment log book		✓	✓
Project protection		✓	✓
Authentication		✓	✓

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Wibu-Systems is an innovative technology leader in the global software license lifecycle management market. In its mission to monetize the business of software publishers and intelligent device manufacturers, Wibu-Systems has developed a secure, unique, versatile, and award-winning suite of interoperable solutions that protect the integrity of digital assets, technical know-how, and intellectual property against piracy, reverse engineering, tampering, sabotage, and cyberattacks.

CodeMeter, Wibu-Systems' flagship technology, encrypts software, firmware, and sensitive data with the strongest cryptographic algorithms and methods. The licenses generated are stored in secure elements, including industry-grade portable hardware containers (USB dongles, secure memory cards, ASICs, TPMs), soft containers bound to the digital fingerprint of the endpoint device, and cloud containers.

CodeMeter is available for PC, mobile, embedded, PLC, and microcontroller systems; its seamless integration with existing back-office processes, such as ERP, CRM, and e-commerce platforms, provides an additional boost to operational performance and logistics cost savings.

Ultimately, with CodeMeter, established sales processes can be redesigned to enable new customer-centric business schemes that truly respond to the regional needs of the market.

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**SYSTEMS**

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