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KEYnote 42

THE WIBU-MAGAZINE

CodeMeter Support for Docker

Highlights

- 30/90/365 Subscriptions
- AxProtector JavaScript
- Retrieving Information from CodeMeter License Central

WIBU SYSTEMS

Content

Dear Clients and Partners!

The Covid pandemic continues to govern our daily lives and public debates. I am convinced that the virus will be here to stay with us. But like the flu, we will learn to manage and live with it. With these prospects of a return to normality, I am personally looking forward to seeing you again, here in Karlsruhe, at your place of business, or at the upcoming fall shows and exhibitions, like Formnext in Frankfurt and SPS in Nuremberg. We are excited to be there at both events – and you are welcome to join us!

The great chip shortage and the slow supplies of components are making life hard for many manufacturers. I can reassure you that our CodeMeter Dongles are fully available for you. Our strong inventory of chips and other components and our long-term contracts with our suppliers give us that certainty. Naturally, we must accept higher costs, but our supply lines are stable. This means that you can trust us to deliver what you need, when you need it, as your reliable partner.

As always, we do our best work when we work together, as we did for our award-winning Blurry Box technology, developed in co-operation with the Karlsruhe Institute of Technology KIT and the FZI Research Center for Information Technology. This November, we will formally launch the "IT Security Club" in the second building of our new Wibu-Systems campus. We have envisioned it as a very special co-working space, dedicated to all things IT security. On top of the modern facilities with its closed offices and private, fixed and flex-desks, it gives its members access to a dynamic innovation network to support activities for arranging and securing funding for collaborative projects.

In this issue of our KEYnote magazine, you will read more about CodeMeter License Central, the License Portal, and our technology's integration into the SAP Entitlement Management System. There is also interesting news about protection in Docker containers and our CodeMeter Protection Suite's offerings for Python and JavaScript. I am looking forward to hearing from you and wish you all a safe, healthy, and rewarding end to the business year.

Best regards,

Oliver Winzenried

CEO

ALERT

One idea at the right time can change everything.

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A Holistic Solution for Entitlement Management

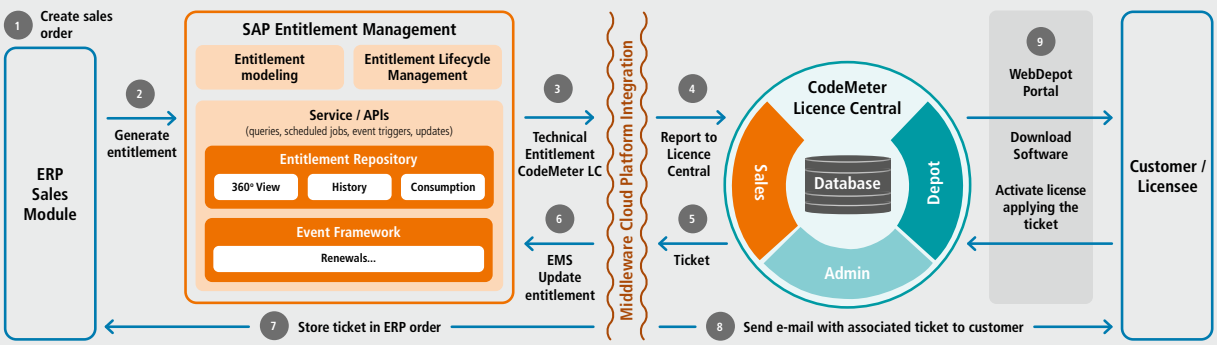
Entitlement – it is one of those words that carries so many meanings: People can feel a sense of entitlement or realize the benefit from a legal entitlement when they draw a pension or receive social security. The days we take off from work count against our leave entitlement. For our purposes, entitlement refers to the right to use certain objects in a pre-defined manner.

With its Entitlement Management System (SAP EMS) released in 2018, SAP set itself the ambitious goal of creating a scalable, cloud-based, and multi-client-capable SaaS repository for entitlements to different types of objects. These objects typically refer to products, but also to services. SAP EMS establishes transparency about the different entitlements to an object and automates how these rights are handled through the entire lifecycle of these objects. The more granular and customized the entitlement system, the more complex it is to handle. SAP EMS facilitates this by letting the administrator define specific entitlement models with details about how to treat the different incidents that may affect them. A custom dashboard is available to track the status of all entitlements through the object's lifecycle and assign special notifications or activities to different statuses.

One increasingly common type of object is intellectual property. For this valuable object, Wibu-Systems has added its tried-and-tested CodeMeter technology to SAP EMS to supercharge its capabilities with technical entitlements and technical enforcement.

Technical entitlements contain the properties that need to be enforced on the side of the user, such as the date at which a temporary right to use an object expires. Once that date is reached, the software should stop working and notify the user that the entitlement has expired and needs to be renewed. Alternatively, the user could be given due notice before that expiration date is reached to leave enough time to renew the entitlement before the term is reached. Technically, this is done by encrypting the software with CodeMeter Protection Suite, which takes care of the technical enforcement automatically and without needing any manual intervention. CodeMeter License Central then makes sure that the enforcement is brought to the user in the field.

In a nutshell: Integrating the CodeMeter technology is a perfect expansion to SAP EMS for handling intellectual property objects.



30/90/365 Subscriptions

In our last issue of KEYnote magazine, we looked at a selection of options for subscription models with CodeMeter License Central and the Internet extensions. How subscriptions are implemented in practice depends on the requirements of each case and the available third-party systems.

Most cases would use one of the following approaches:

- The subscription is managed by the established ERP, CRM, or e-commerce system. The necessary licenses are created to be valid to the next subscription payment (with a certain grace period), at which point they would be renewed automatically.
- The subscription relies on checkpoint licenses in CodeMeter License Central. These special licenses are created with a freely definable validity period and will renew automatically unless the subscription is cancelled.
- The subscription is activated with a ticket for a period of 365 days from the day of its activation. A new ticket is then needed to renew the subscription for another 365 days.

This final 365-day model is becoming increasingly popular and deserves another look at its strengths and advantages as well as its possible limitations. We will also see in detail how it is implemented.

Requirements

Like checkpoint licenses, the 365-day model is available in the CodeMeter License Central Internet Extension (from Version 21.11). The feature can be accessed via the License Portal, WebDepot, or the Gateways.

We recommend CodeMeter License Central Version 4.01b or newer for this feature.

Why 365 days?

Despite its name, the subscription period is not set in stone at 365 days. As a matter of fact, you can configure it for any number of days.

Configuring the Item

To use this model, you first need to create an Item in CodeMeter License Central and choose the CmContainer types for your purpose. Usually, no license transfer scheme is chosen for subscription licenses of this type. You can then set the Product Code and other properties of the license to match your needs, remembering to use only one license entry or Product Code. Two settings are particularly important:

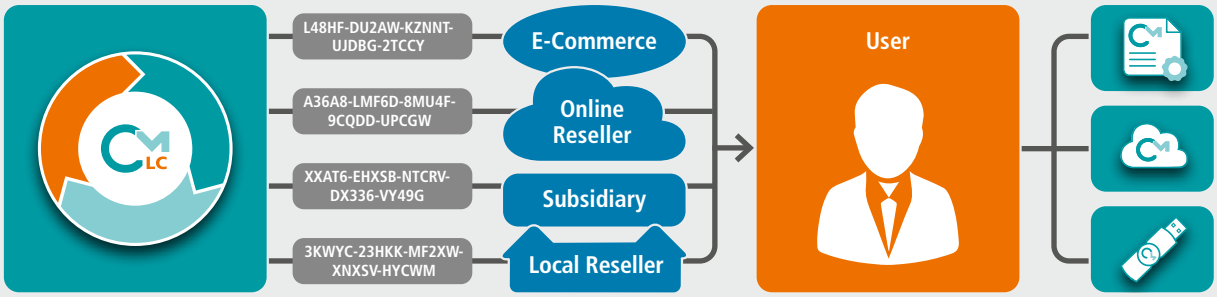
1. The action for the Product Code should be set to "Add".
2. You define the expiry date with the following settings:
   - Operation: "Set"
   - Value: This defines the length of the period in days
   - Allow value changes: "Upon activation"
   - Display name: The entry should start with "subscription"

30 days:	2000Jan30,00:00:00
90 days:	2000Mar30,00:00:00
365 days:	2000Dec31,00:00:00

The validity period is defined as the difference from the CodeMeter "base time". Typical values would be:

Multiple Items for one subscription

One common scenario is that subscriptions are offered with a choice of validity periods, such as 30 days, 90 days, or 365 days. If the customer already has a subscription running,



the additional days should be added to it, irrespective of which item underlies the original subscription. If your company offers multiple products on a subscription basis, you also want to make sure that the additional days that a user has bought will only be added to the one product in question, and not the others. A system needs to be in place to ensure that different Items can be assigned to a single product.

This is where the display name given in the Item's settings comes into play: All Items assigned to one product should have the same display name. This shows the License Portal, WebDepot, and Gateways whether the newly bought extension should be added to an existing subscription or a separate license be activated.

No backfill required

Gaps between subscriptions are a legitimate and indeed common occurrence. By contrast to maintenance contracts, which would typically have to go back in one uninterrupted period to the original purchase of the product, a subscription is more like a regular lease. The customer only pays for the agreed period of time and is not accountable for any periods between two subscriptions.

This is reflected in a simple mechanism: Old, expired subscriptions are deleted from the CmContainer once a new subscription is started for the same product. The new subscription would then start from the new activation date.

No turning back

One key transaction is the renewal of a subscription. This should usually happen before it expires, and the newly bought days are added to the remaining subscription period.

Technically, this is done by creating a new subscription and deleting its predecessor from the CmContainer. Once the old and new subscription periods have been added, there is no going back, as the two periods cannot be separated again. This is the standard procedure as modelled e.g. by Microsoft, Sony, and Adobe.

Moving subscriptions to a different CmContainer

Subscriptions can be moved into a different CmContainer by a simple merging feature. All the user needs is the ticket for the last activation, with which the subscription can be returned from the old container and then transferred into the new CmContainer.

Limitations

It has become standard practice for subscriptions to include a defined set of product features, usually the entire feature set that the product in question has on board. The original idea of offering different feature packages that could be changed while a subscription was already running has proven too complex and has virtually disappeared from the market. The usual route chosen for the selling of add-on features is to place these into separate subscriptions running concurrently to the main one.

Another common limitation is the inability to transfer additional subscriptions for the same product into the same CmContainer.

A final consideration is that subscription models are defined for a specific number of users. Typically, subscriptions are sold for single-user licenses, which makes this limitation hardly ever relevant in practice.

The limitations of subscriptions models can be summed up in a simple definition: 30/90/365-day subscriptions are offered for licenses with fixed feature sets and can be extended by one of several renewal options.

Resellers

One important aspect to consider when offering subscription licenses is how to integrate resellers as a key sales channel. Expecting your sales partners to only handle the first sale and then hand over the lucrative revenue stream from license renewals back to you is not a reasonable option.

Subscriptions allow you to create any number of tickets for any number of subscriptions and renewals. These tickets can be sold through all sales channels you employ. Whether a user already owns a subscription or needs a new one only comes into play upon the actual activation.

You can put in place individual customer or regional protections if you wish. The simplest way to do so is to create separate articles with custom display names. The rules are simple: Same display name, compatible licenses. Different display name, incompatible licenses.

License Portal

Users have a choice for accessing their licenses: WebDepot, a custom software activation wizard, or the License Portal. They can use the portal to log on and manage their licenses or subscriptions by self-service. One additional advantage of the portal is that users do not need to keep track of their tickets, because they only need their log-in details to get access to their licenses.

In a nutshell

30/90/365-day subscriptions are an excellent choice for selling subscription licenses with fixed feature sets. They can be sold via resellers, and they make it easy to combine subscriptions of different lengths, as two different subscription license tickets are only merged when the second ticket is activated.

The model is also a good option for delivering demo or trial versions, as it is possible to add a dynamic renewal option after a certain period of use.

CodeMeter Support for Docker

CodeMeter Version 7.30 introduced a number of new features to improve the experience of working with protected applications in container systems like Docker. With the changes, CodeMeter now stays true to the basic principle of "one container, one application" and also includes a special form of binding for CmActLicenses in Docker containers.

On conventional operating systems, CodeMeter works according to a simple rule: the CodeMeter functions built into an application's protection will find the necessary CodeMeter license server on the same system. But this straightforward setup is broken when working with Docker or similar container-based systems. An application running in one container could never find the CodeMeter license server in another container. The solution: Just create an additional network.

The CodeMeter network

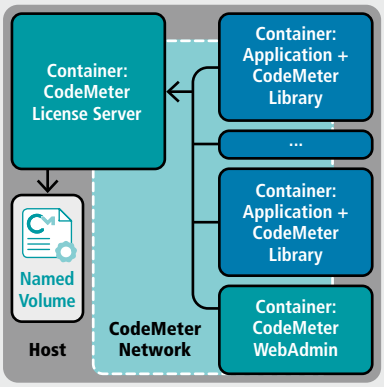
The CodeMeter network needs to be connected with all containers involved, and all containers need to know the address of the container storing the CodeMeter license server. This is done by configuring the CODEMETER_HOST variable, which the CodeMeter libraries can read to make contact with the CodeMeter license server. The connection is treated by the license server as a local, not a network connection, which means that the license server can also use licenses that are made available by another host with CodeMeter as a network server.

How could this work in practice? Imagine an application that adds an effect to an image file. For every image that the user wants to process, a new container is set up with the protected image processing application as its entry point and with the image data and all relevant parameters as parameters. Each copy of the image processing application and each container is closed again once the job is done and the image altered. This means that if multiple images are processed at the same time, multiple containers will also exist in parallel. If the image processing app needs a CodeMeter license to run, it will contact the CodeMeter license server defined in its configuration and use up one license. When the application is closed, the license will be released again. In the normal run of things, there would be one container with the CodeMeter license server that all active copies of the image processing application would use.

A separate container is also used for all CodeMeter-specific interactions with the CodeMeter license server, like running a (single) CodeMeter WebAdmin or using the cmu command line tool to load licenses or list license information. The sample configuration provided by Wibu-Systems uses the same image as the container with CodeMeter license server does, but with other entry points.

Bound licenses

Another important innovation for Docker is the introduction of a new type of binding for CmActLicenses. The normal procedure for CmActLicenses is that they check certain hardware traits of the target system when they are created. These are then combined by the patented SmartBind process to form a clever



fingerprint, so that the licenses would still work even if there are minor changes to the user's system, but stop working if the system is altered substantially (or the user tries to run the license on a completely different system).

The challenge with Docker systems is that licenses should not be illicitly duplicated when a second copy of the CodeMeter license server's container is created. The solution here lies in the use of a Named Volume. This Named Volume is placed in the container with the CodeMeter license server, and the CmActLicense then bound to that container and placed in the Named Volume. A special locking mechanism is added to stop the activated CmActLicense from being used multiple times, although it stays active when switching its container, e.g. when the container with the CodeMeter license server is switched to an image with a newer version of CodeMeter. Updating CodeMeter is made easy, as the user only needs to stop the old container and run one with the newer version. For the binding to work reliably and for CodeMeter to be able to check it, the container with the CodeMeter license server needs access to the Docker socket.

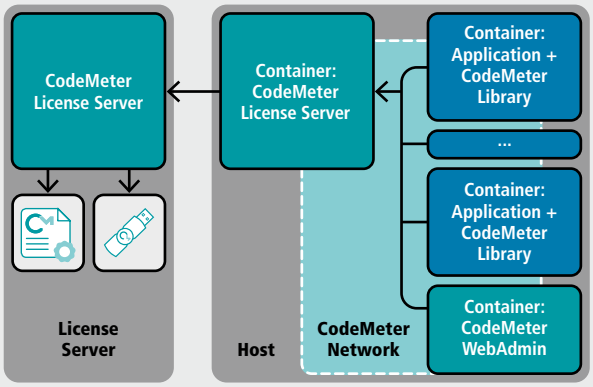
The malleability of a container environment means that CmActLicenses are not as easy to protect in a Docker container as they are on a physical system. This is why CmActLicenses still have to be activated explicitly for container environments (e.g. CmBoxPgm-Option -lopt:vm,container), and it makes sense to reconsider whether a license in a container is really needed.

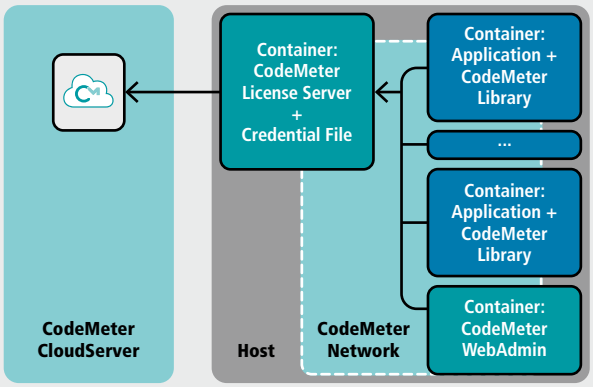
Licenses in the cloud

Licenses in the cloud can be accessed without much difficulty from the (required local) container with CodeMeter license server. The licenses in a CmCloudContainer seem to exist directly in the Docker container, but they offer the best precautions against fraud and abuse. The number of active licenses seems to be tracked in the Docker container, but the CmCloud also counts and manages these licenses. It is impossible to use multiple copies of CmCloud licenses. If the Docker container has constant Internet access, putting licenses in a CmCloudContainer is a great choice.

Licenses in networks

The CodeMeter license server in a Docker container treats all license queries as if they were local. This means that licenses could also be used in a network as an alternative option to using CmActLicenses in separate Docker containers or CmCloudContainers. This approach only needs a computer that is permanently connected to the network and that has either one or more CmDongles connected or CmActLicenses activated. These licenses could then be used by the other devices in the network, including the Docker container with CodeMeter license server. That license server would be set as a client and told the name or address of the physical CodeMeter license server (taking over the master server role). Any license queries from applications are sent first to the CodeMeter license server in the Docker container and then forwarded to the network license server. Even if the applications are separated from their license server in this sense, they will still run as expected.





Other considerations

The Docker image containing the CodeMeter components needs to use a glibc-based Linux system. The examples use a lean image based on Debian. The next versions of CodeMeter will drop this requirement for containers with CodeMeter-protected applications. Wibu-Systems is currently working on the CodeMeter library and expansions to CodeMeter Protection Suite, so that protected applications can also run on Alpine, the Linux flavor popular for Docker environments.

The IT Security Club – Where Innovation Meets Community

November 2021 was chosen as the perfect time for the grand opening of the IT Security Club. Breaking the mold of standard shared office spaces, this unique site is dedicated to one issue and one issue only: IT security. It gives enterprises, public institutions, and researchers in the field access to cutting-edge facilities in the stylish environs of the House of IT Security. One of the many exceptional features of the Club is the innovation network that also welcomes outside partners.

Co-operation

Innovation happens when competencies come together. The tenants of the House of IT Security form the backbone of a dynamic network of IT experts from across and beyond Karlsruhe's IT security ecosystem. Wibu-Systems is committed to advancing IT security research and practice by bringing together and actively supporting the work of leading research institutions and enterprises in the field.

Innovation Management

An innovation manager is available to support members of the IT Security Club with finding the right co-operation partners and applying for national and EU funding for their IT security endeavors. Innovation workshops are hosted to generate new visions and ideas. Concepts are prepared to help market the products born in the R&D work at the site. Pilot users are found, their requirements surveyed, and potential competitors identified and analyzed. An innovation network is born that brings together the members of the IT Security Club, but also external partners in return for a small financial contribution.

Facilities

A modern place to work with 12 desks in closed offices, 26 private desks, 36 fixed and 56 flex-desks for productive and confidential work and efficient co-operation. The 14,000 square foot facilities include a reception desk, meeting rooms, secure lockers, a work café, work lounges, the unique agora space, and much, much more. Short-term leases starting from three months offer great flexibility for different co-operation formats and allow breathing space with an adaptable number of workplaces. The all-inclusive, no-worries lease comes with reception and cleaning services, supply of mineral water, power, Internet and WLAN connections, a professional IT infrastructure with printers and scanners, personal lockers, showers, controlled and secure 24/7 access, high-end office facilities, and lots of amenities like stylish lighting, flowers, and more.

Membership

Non-tenants can get access to the work café and meeting rooms, with annual membership options available. The ZIM innovation network welcomes all SMEs – companies employing up to 250 people, with €50 million in annual turnover or €43 million in total assets – who are actively interested in IT security. Is this you? Then contact us at itsc@itsec.house.

Licensing Cluster Simulations

Massive simulations in the cloud are beginning to replace costly simulation hardware. The automotive industry has discovered the potential of the technology, and they are not alone. Whichever parameters and properties the software needs in order to simulate different environments or sensor and actuator systems can be modelled and run in Docker containers. The great freedom offered by the new technology does, however, pose new questions about the licensing and protection of cluster simulation software.

Regular gamers will fail to see the innovation: For them, simulations in the cloud, open-world games, with thousands or even millions of active systems, sound just like the massive multiplayer online role-playing games or MMORPGs they have been accustomed to since the 1990s. But the key difference lies in the business model: An MMORPG is run in the cloud, and gamers typically pay monthly subscription fees. For licensing purposes, the developer only needs to know that the gamers are who they say they are – the archetypal use case for a USB dongle like the CmStick.

With cluster simulations, as are common in the automotive industry and elsewhere, the business model is quite different. The developer would sell the simulation software to a car maker, who then runs it in their own cloud, e.g. AWS or Microsoft Azure. Now the developer wants to know that the software is not shared, by accident or by ill intent, with others and that the client only uses as many copies of the software as they have paid for.

One condition that often applies is that the cloud software must be identical with the on-premises software. Any compromise on the protections in the cloud would therefore mean weaker protection for the on-premises version, and vice versa. Another crucial condition to consider is that the cloud software would usually be running in numbers that are greater by an order of magnitude compared to the number of on-premises versions active at any given time. It is not unrealistic for the use case to demand 30,000 copies to be up and running within three minutes.

CodeMeter can accommodate all these conditions. The usual best practice would be to maintain a separate Docker container for the CodeMeter License Server, but this becomes unfeasible with the tough performance demands created by massive installations of the scale at stake here. The solution is to place the essential pieces of CodeMeter Runtime in the application's Docker container and then choose one of two options: For the first option, a CodeMeter Cloud Credential file would be included in each container. The software would then get its license checked by connecting with those credentials to the CodeMeter Cloud Server hosted by Wibu-Systems, which can scale up easily to manage millions of queries in such a scenario.

The alternative would be a custom binding to the environment of the client, e.g. the carmaker: The Wibu-Systems Professional Services team would work with the software developer to produce a special extension for CodeMeter Runtime that binds to a chosen combination of properties of the cloud, such as subscriber or client IDs. Bound to the cloud, the license could only be used in the specific carmaker's Azure cloud and nowhere else. This option is a perfect fit for enterprise-level contracts that depend on copy protection for the software, but do not need a usage counter.

Whichever option is chosen, the software developer will benefit from the full power of CodeMeter in protecting against piracy and license fraud. The simulation software would be the same, whether it is running as a cloud or an on-premises version, as only the CodeMeter license would need to be customized to the specific use case.

AxProtector JavaScript

JavaScript can look back on a long and storied history as a script language, originally for in-browser use or client-side processes, but now matured for complex frameworks for Rich Internet Applications (RIA). JavaScript also made the leap onto the server side several years ago and is now regularly used as a language for scripting applications, relying on Node.js or Electron as the development platforms that underlie many popular software packages like Visual Studio Code or Slack.

Wibu-Systems introduced the ability to encrypt JavaScript applications with Version 10.80 of CodeMeter Protection Suite.

The mechanism

AxProtector JavaScript operates just like its counterpart for Python: It encrypts functions directly in the source code, which does not need to be changed in any way. Simply by integrating AxProtector JavaScript in the build system, the original code can be encrypted and placed into a JavaScript file ready for execution.

This can take any one of three forms:

- Either the complete JavaScript application is encrypted, with license checks added automatically (basic configuration),
- The JavaScript application is encrypted in individual modules, allowing individual features to be activated by the user (custom licensing),
- or AxProtector JavaScript is used only as protection against reverse engineering without the user needing any license at all (IP Protection Mode).

The software developer can choose exactly which functions and classes are to be encrypted by means of a simple configuration file.

Secure execution

The functions are encrypted and signed in the script files created as part of the protection process. The new CodeMeter Protection Suite Runtime (CPSRT) is included to check these during runtime, decrypt, and execute the code in the machine's memory, and then remove it again for added security.

The newest AxProtector technology is used to stop would-be attackers from tampering with the native components, making it virtually im-

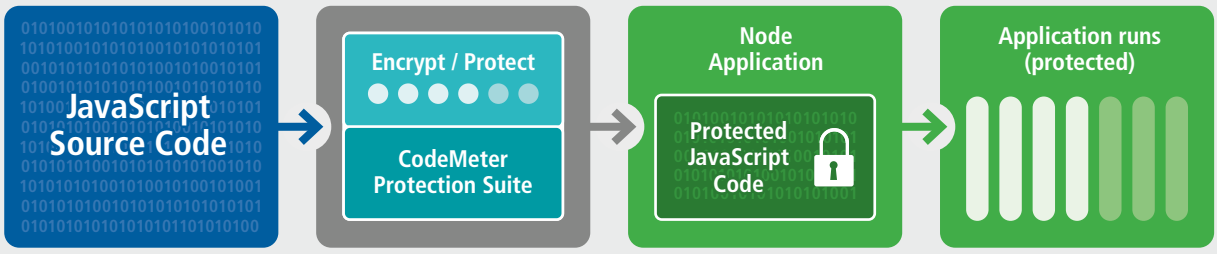


Figure 1: Code encryption

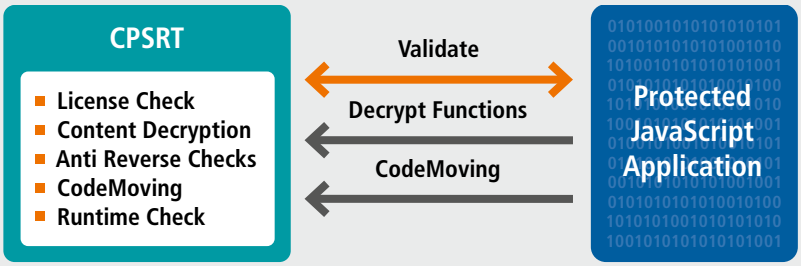


Figure 2: CPSRT & Encrypted Code

possible on the script and CPSRT library's side to manipulate the protected software before it is executed.

One great advantage of encrypting the source code itself is its ability to work on different operating systems: Encrypted scripts can be run, without any modification, on Windows, Linux, or macOS. The CPSRT is currently available for Windows, macOS, and Linux for x86 platforms, with further platforms to be added in the future.

```
/*
plain - hello.js
*/
function sayHello() {
    console.log("hello");
}

sayHello();
```

Figure 3: Code example > Plain code

```
/*
encrypted - hello.js:
*/

...

var __axe_data = "2AEfAuodumMQ8eGpy9M6HEZVpe62gAh\
...\
u2E1CfaSZm2nLVq9tj12bAH43VAqHwC7SLNcuTKC==";

function sayHello() {
  return __axe_get(0, c => eval(c), this, arguments);
}

sayHello();
```

Figure 4: Encrypted Code with AxProtector JavaScript

The certificate chain used for signing is based on the infrastructure first introduced for our Universal Firm Code (Firm Codes above 6.000.000).

Features

AxProtector JavaScript comes with all the security features on board that you will be familiar with from AxProtector for native and .NET applications.

AxProtector JavaScript supports the two licensing systems Universal Firm Code and IP Protection with their code encryption, runtime checks, anti-debugging, integrity protection, and class or function level protection capabilities included. With Universal Firm Code Licenses, you also have a choice of adding modular encryption (IxProtector), automatic license checks, and hidden traps as an added layer of security.
Code protected with AxProtector Javascript can be used with all common CodeMeter container types: CmDongles, CmActLicenses, and CmCloudContainers.

CodeMoving, our clever feature for running encrypted code in especially protected environments, will be available for CmDongles and CmCloudContainers from Version 11.0 of CodeMeter Protection Suite.

AxProtector JavaScript is included as part of the CodeMeter Protection Suite installer package.

Licensing

To protect JavaScript code, you need a license for AxProtector JavaScript. Contact sales@wibu.com to receive a free trial license.

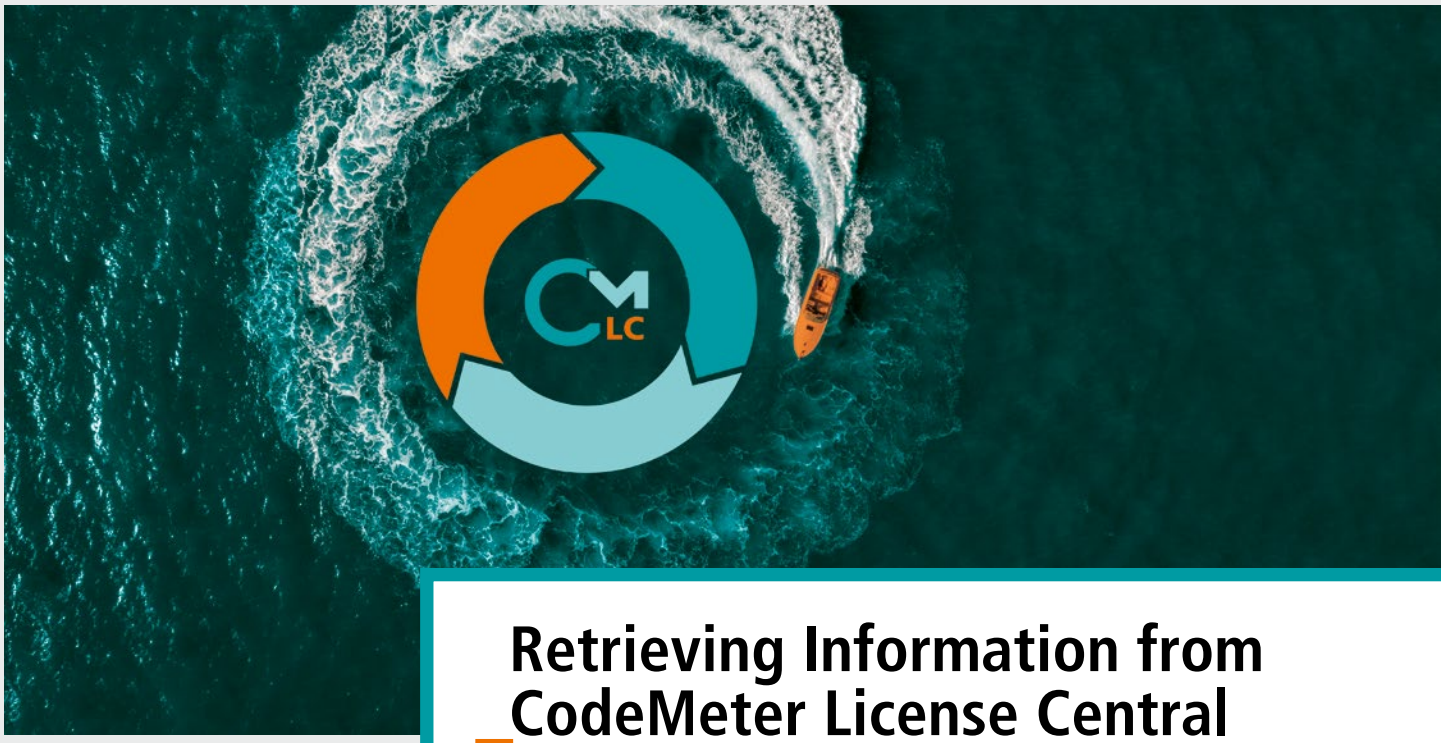
System requirements

The following operating systems and platforms are currently supported: Windows x86, Windows x86_64, Linux x86, Linux x86_64, macOS x86_64.

Applications protected with AxProtector JavaScript can be used with the following CodeMeter container types: CmDongles with Universal Firm Code, CmActLicenses with Universal Firm Code, and CmCloudContainers.

A runtime environment based on Node API (e.g. node.js, Electron) is required.

Artikelnummer	Name
1336-1800	AxProtector JavaScript (Subscription)
1336-1801	AxProtector JavaScript – Modular Licensing (Subscription)
1336-1802	AxProtector JavaScript – IP Protection (Subscription)
1336-1803	AxProtector JavaScript – CodeMoving (Subscription)
1336-1800-T60	AxProtector JavaScript (60-day test version)
1336-1801-T60	AxProtector JavaScript – Modular Licensing (60-day test version)
1336-1802-T60	AxProtector JavaScript – IP Protection (60-day test version)
1336-1803-T60	AxProtector JavaScript – CodeMoving (60-day test version)



Retrieving Information from CodeMeter License Central

Many software developers favor CodeMeter as a licensing system because of its easy and reliable integration with a vast range of software platforms and its ability to link up flexibly with different processes and back-office solutions. The essential solution provided by Wibu-Systems for this purpose is CodeMeter License Central, as the master tool for creating, delivering, and managing licenses in tandem with established ERP, CRM, and e-commerce solutions.

CodeMeter License Central also offers other simple means to transfer licenses to the end users' devices. In the normal run of things, this would be an asynchronous process, i.e. it would happen at a point in time chosen by the user. However, it is oftentimes essential for information about the activation status and the CmContainers of each license to also be known by the back-office systems of the software developer.

The challenge: How best to ensure that this information makes its way back from CodeMeter License Central?

Custom Internet Extensions

This approach works by calling an interface provided by the software developer whenever licenses are processed in WebDepot or Gateways. That interface would then report the new license status to the back-office system, although the reported data would be limited to the activation status and the serial number of the chosen CmContainer.

The necessary mechanisms are easily established, but they suffer from the lack of an integrated cache in the Internet extensions. To prevent any loss of data, the back-office system would have to provide a redundant and always available interface with integrated cache to receive the incoming data. Since this is not the norm, this mechanism is not overly popular among practitioners.

For most projects, we recommend querying the data directly from CodeMeter License Central to be safe and sure that the correct status for each license is reported to the back-office.

Pull Mechanism

One straightforward, but labor-intensive option would be to integrate a form of pull mechanism in the back-office system, which regularly contacts CodeMeter License Central to retrieve certain information to copy into the relevant internal objects.

If the back-office system in question uses direct SOAP communication to create licenses, it would already have all the details needed to access the other API interfaces of CodeMeter License Central. If, on the other hand, other PHP applications are placed in between, such as GenericConnector.php, the mechanism would need a suitable expansion to retrieve the necessary information from CodeMeter License Central and translate it into the right format.

In both cases, care must be taken to define precisely which information is needed and how it would be mapped to the data on the back-office system.

Push Mechanism

With push mechanisms, the system with CodeMeter License Central would run a process at regular intervals that defines which new data is available and then publishes it in a defined format, using a separate interface put in place by the developer. That interface could be a SOAP or REST interface or WebHooks, and its job would be to send the data back to the back-office system. The relevant data would usually be mapped with a defined criterion

that is identical on both origin and target system.

The Solution: NotificationDispatcher

NotificationDispatcher is a special expansion of CodeMeter License Central that springs into action at freely configurable intervals to retrieve the information you need and process it to your stipulations. The retrieved data is temporarily stored in a local database to ensure that everything is transmitted correctly to its destination, even if that target system is perchance not available at that specific moment. With this cache, queries to CodeMeter License Central can be limited to the new data added since the last cycle.

The data to be retrieved can be selected in the configuration to keep the number of queries to CodeMeter License Central to the minimum that is required. The configuration also lets you choose how the data is processed, with a choice of standard processing or transmitting the data further with a custom expansion to a separate service chosen for that purpose.

Orders

This module can process new orders, which is particularly relevant for software developers that have different ways to create orders in CodeMeter License Central. These would usually have to be brought together to be processed further in a lead system. One typical example of this would be a third-party e-commerce solution that is not structurally integrated with the vendor's ERP system.

Licenses

This module lets you process new licenses e.g. to assign the internal license numbers to each order item in the lead system. This can be the backbone for relevant sales processes, like retrieving or changing already delivered licenses.

There is also the option of transmitting individual license properties, such as expiry dates or license numbers. Expiry dates are a particularly interesting tool if they are calculated dynamically from the date of the first activation of a license.

Activations

The Activation module can be used to manage the current activation state of licenses, allowing the lead system to display accurately whether a license has been activated and which CmContainer it has been placed in.

The level of detail for the data can be configured precisely for this module:

- **All completed activations**
  This mode reports all completed license transactions to the lead system, creating a log of when licenses were placed in which CmContainers.
- **One transaction per ticket**
  If all licenses on a ticket are processed in a single transaction, this mode would only report back one set of data per license transaction. Even with this less granular data, this information suffices to keep a log of license transactions.
- **Current Status**
  In this mode, only the most recent transaction is reported back to the lead system. This information lets you see the current activation status and the serial number of the CmContainer in use, but it cannot be used to create a running log.

INFORMATICS SAP Module

NotificationDispatcher supports the automatic transmission of data to the SAP module provided by our partner INFORMATICS, Austria. This is a good choice of back-office integration, as it makes it very easy to create a back channel with the SAP system, with all settings easily configured without any additional adjustments.

WebHooks

WebHooks let you send the retrieved data to defined URLs in the JSON format. Software developers can then pick up and process the data in their own systems. All relevant settings can be easily added in the configuration, without any need for further adjustments to the system.

Custom Transmission

In this mode, the data is handled by a client-specific expansion e.g. to match custom templates, transmitted by another means of transmission. This could take the form of a web service called by the software developer or an additional web service provided by CodeMeter License Central to retrieve the relevant data.

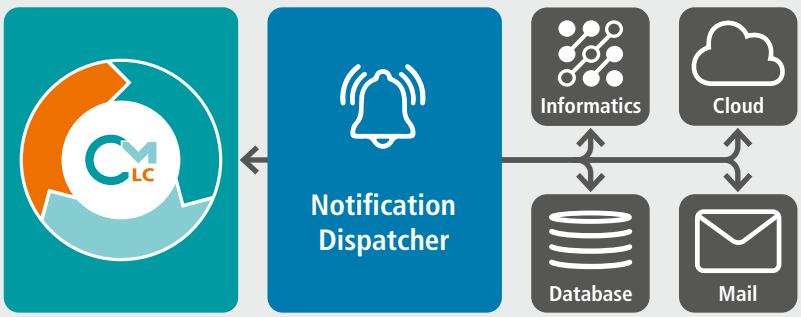
Modular Design

NotificationDispatcher uses a modular design to handle a variety of modules and options.

- **Core**
  The Core module is responsible for all communications with CodeMeter License Central and stores all retrieved data in an internal database to make sure that all the data only must be processed once and can indeed be processed even if the chosen target system is not available. The module also provides all the functions needed for the established means of transmission.
- **Common**
  The Common module provides all internal structures required for the custom processing of the data.
- **Custom**
  The Custom module handles the custom processing of the data itself.
- **Reporting**
  On top of these means for transmitting data, a reporting interface will be added at a later point. Its job is to prepare automatic overview reports for defined periods of time, e.g. tracking the number of new licenses or license transactions, and to publish these reports e.g. by email.

Conclusions

The NotificationDispatcher represents the perfect addition to CodeMeter License Central processes, creating a return channel to retrieve relevant data. For more information, please contact our Professional Services Team.



ALERT

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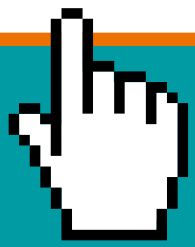


News in Brief

Windows 11 Support

The newest versions of CodeMeter 7.30a and WibuKey 6.60 are officially ready for Windows 11. Older versions are already Windows-11-compatible, so that many users will not need to update their runtime.

AxProtector Python

AxProtector Python, first announced in the last issue of KEYnote, was officially released with CodeMeter Protection Suite 10.80 in the summer of 2021. The tool makes it easy to automatically license and protect Python applications against reverse engineering.

AxProtector JavaScript

Another new addition to CodeMeter Protection Suite 10.80 is AxProtector JavaScript, designed for the automatic protection and licensing of JavaScript applications running in node-based environments. These include desktop applications using Electron and server-side JavaScript applications using node.js.

CodeMeter 7.21b

Clients with extended Windows 7 support contracts can now download CodeMeter version 7.21b, which includes all security patches for CodeMeter 7.21a, the final version of CodeMeter with standard free support for Windows 7. Should any of your users still operate Windows 7, we recommend contacting our service team to receive the version you need.

CodeMeter 7.30a

CodeMeter 7.30 introduced new versions of CodeMeter Runtime and CodeMeter SDK and included CodeMeter Protection Suite 10.80. The highlights of this version provide improved support for Docker systems (see the article in this issue of our KEYnote) and the new support for Windows 11.A bugfix version 7.30a was released in October.

CodeMeter License Central Internet Extension 21.04

In May, we released the License Central Internet Extensions 21.04, including many new highlights like a fresh renewal concept, new sample models of different Software Activation Wizards, and new connectors to link up with ERP, CRM, and e-commerce systems. The renewal concept works by creating unrestricted licenses that are given technical expiration times but are automatically renewed as long as the licenses are not withdrawn. This approach ensures that lost licenses cannot be used indefinitely by the – legitimate or illicit – "finder".

CodeMeter Cloud Lite 2.2

CodeMeter Cloud Lite 2.2 was released with expanded support functions to facilitate failure analytics.

CodeMeter Cloud 2.1

CmCloudContainers hosted in the Wibu Cloud offer a degree of security that can be compared with our secure hardware elements, CmDongles. CodeMeter Cloud 2.1 gives software developers the ability to use CodeMoving with CmCloudContainers, previously restricted to CmDongles only. The dashboard has been given a facelift, and the automatic clearing of unused licenses has been improved.

License Portal

In November, CodeMeter License Central Extension 21.11 will introduce a new license portal that allows users to manage their licenses and CmContainers themselves. This self-service capability reduces the support burden for software developers, especially when combined with CmCloudContainers.

CodeMeter Embedded 2.52

CodeMeter Embedded 2.52 was released in June 2021 and now includes the ability to return moved or borrowed licenses.

WibuKey 6.60

Long-standing clients of Wibu-Systems are not forced to switch to CodeMeter and can continue to buy and use the WibuKey first introduced in 1989. Version 6.60 is a maintenance release of the WibuKey runtime, officially made available to support Windows 11.

CmDongles Fully Available

Despite the supply problems affecting chip and component makers, CmDongles are fully available for our clients – invaluable certainty and reliability in these difficult times, made possible by our long-term supply contracts and strong inventories.

German Innovation Award 2021 Goes to CmCloud

Wibu-Systems was chosen among the winners of the German Innovation Award 2021 for CmCloud, the system that allows all users to access their licenses and software wherever they are.

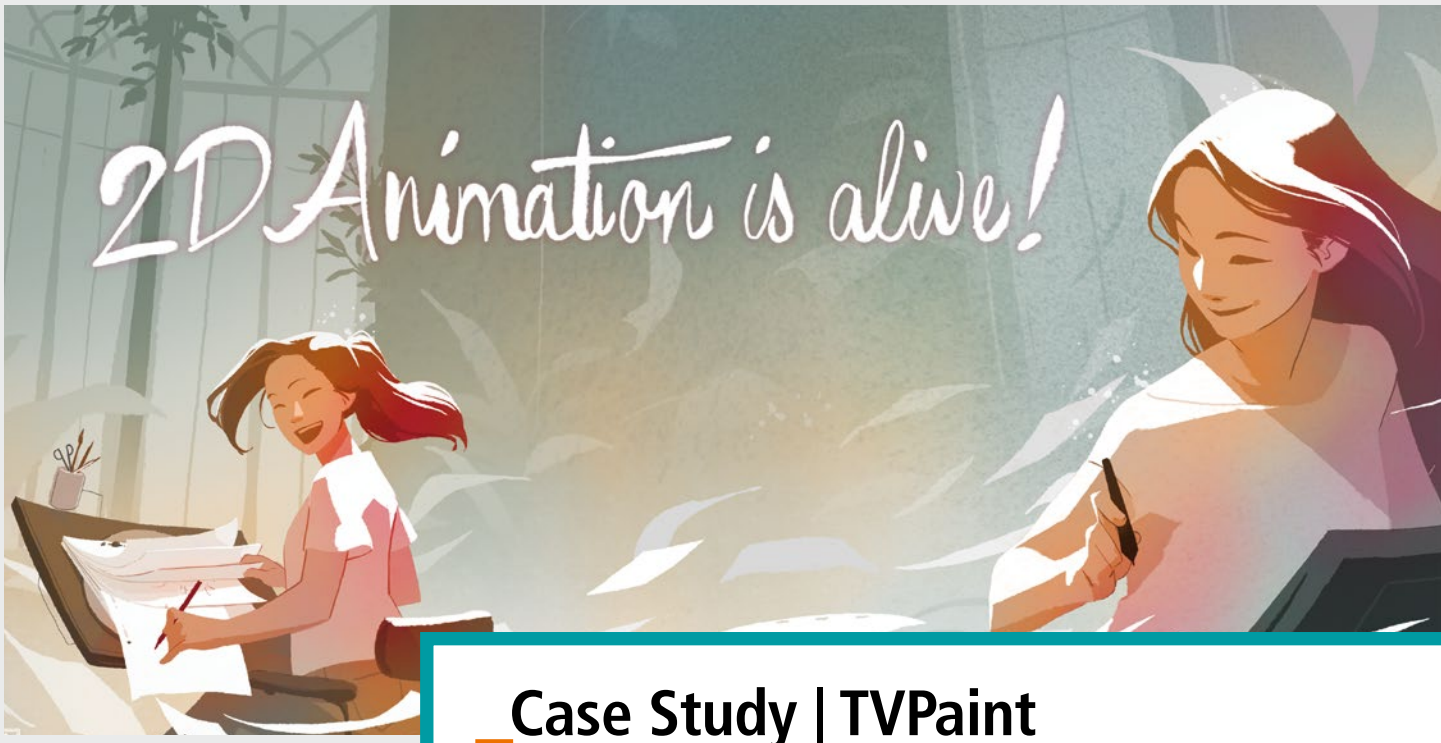
GERMAN INNOVATION AWARD '21 WINNER

New Expertise for Wibu-Systems' Management

In April, Thomas Oberle joined our management board as our newest executive officer with responsibility for organizational development, process optimization, tools and methods, and program and product portfolio management.

Support for Artists and Children in Need

We care about our business – but we also care about our society. That is why Wibu-Systems is supporting the newly set-up Foundation of the Karlsruhe University of Music as well as the "Pasos Pequenitos" daycare center in Honduras and the "1000 Schools for Our World" project of nph Latin America, Germany.



Case Study | TVPaint

The Challenge

TVPaint Développement, the creative minds behind France's market-leading bitmap animation technology, has been serving the art, animation, and design world since 1991. Their 2D animation software is a firm favorite among users ranging from established studios and ambitious freelancers to aspiring students and lovers of the art. In a market as diverse as theirs, including virtually every budget level and enterprise size, TVPaint needed a solution to protect and license its IP that was both reliable and easy to implement for all users.

The Solution

The company originally relied on different generations of dongles from other vendors for simple copy protection, but their chosen setup quickly spiraled into a logistics challenge with software distribution by DVD and dongle assignment taking up more and more of the company's precious resources. Looking for a nimbler and more versatile solution, TVPaint turned to CodeMeter for a secure and reliable licensing system.

The Success

Switching over to the CodeMeter licensing system turned out to be the commercially and operationally best choice for TVPaint and a comfortable experience for everyone involved. With initial support for the company's legacy dongle system and assistance with realigning TVPaint's IT landscape, the technical switchover was finalized in a matter of hours, and CodeMeter's license distribution and management processes quickly integrated with a rebuilt ERP system using Odoo. TVPaint's products are now sold and licensed in a cleanly integrated and efficiently automated online process, leaving the company the time to concentrate on what it does best: Creating exceptional animation software.

The Company

TVPaint is a raster-based 2D animation software, developed by TVPaint Développement, a French company based in Metz. Since its very first version developed for Amiga computers in 1991, TVPaint has continually gained traction and is now regarded as one of the industry standards for 2D animation, used by numerous studios and taught in many schools around the world. Not only does the vibrant TVPaint community provide suggestions for constant improvement, but it is also active in the creation of scripts and brushes and trading advice on how to leverage the maximum potential from the software.

Dean C., Technical Sales Agent, TVPaint Développement
"There's a benefit for everyone. Customers who purchase our software online can start using it within a matter of minutes. They don't have to wait for a parcel containing a dongle. We don't just save time and effort that was needed to ship thousands of dongles, but also realize important savings on shipping costs, customs, and taxes."

TVPaint

Wibu-Systems Training

Wibu-Systems offers custom training to get you off to a running start with CodeMeter software protection and licensing. The training is offered in the form of company courses, typically hosted as in-house classes on your premises. The standard training program includes three days of courses, which can be adjusted to your needs and level of expertise. You can pick and choose the contents you need and shorten the program to 1 or 2 days. Alternatively, you can add a hands-on workshop to allow your participants to try out their own practice cases.

www.wibu.com/tr

Available Courses

CodeMeter Core Features
- CodeMeter at a glance
- Configuring licenses
- The components of CodeMeter Runtime
- Use as a network server

Software Integration for .NET Assemblies with AxProtector .NET and API
- Encrypting .NET assemblies
- Encrypting individual classes and methods
- Integrating Wibu Universal Protection Interface (WUPI)
- Using CodeMeter Core API

Back Office Integration with CodeMeter License Central
- Configuring products
- Creating licenses
- Integrating license activation in applications
- Setting up and configuring license portals

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Join Wibu-Systems and its subsidiaries at the following events:

Formnext
16-19 November 2021
Frankfurt, Germany

SPS – smart production solutions
23-25 November 2021
Nuremberg, Germany

Embedded World
15-17 March 2022
Nuremberg, Germany

MedtecLive with T4M
3-5 May 2022
Stuttgart, Germany

3D-Print Showcase at Formnext

Wibu-Systems will be exhibiting a special 3D-printing showcase at Formnext to show in practice how intellectual property, including 3D designs, can be protected from theft and unauthorized use. Only users and service companies with the right licenses can use the protected designs to produce the number of pieces allowed by their licenses. Print designs and licenses are kept separate to simplify processes and streamline the data logistics. The showcase covers the entire lifecycle for both the print designs and the licenses.

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