CodeMeter Administrator Guide

Version 7.60d - October 2023

Wibu-Systems is member of:

PCMCIA since1993

USB Implementers Forum since 1997

SD Card Association since 2007

Bitkom, German Association of Information Technology, Telecommunications, and New Media since 2003

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OPC Foundation since 2012

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Navigation

There are many ways to turn pages in a PDF. Many people use the buttons on the **Page Navigation** toolba', but you can also use arrow keys, scroll bars, and other features to move forward and backward through a multipage PDF.

The **Page Navigation** toolbar opens by default. The default toolbar contains frequently used tools: the **Show Next Page**, **Show Previous Page**, and **Page Number**. Like all toolbars, the **Page Navigation toolbar** can be hidden and reopened by choosing it in the **Toolbars** menu under the **View** menu. You can display more tools on the **Page Navigation** toolbar by right-clicking the toolbar and choosing an individual tool, **Show All Tools**, or **More Tools** and then selecting and deselecting tools in the dialog box.

For more options see https://helpx.adobe.com/acrobat/using/navigating-pdf-pages.html

2 Manual

The following parts of this *CodeMeter* Developer Guide on installing and using many of the *CodeMeter* tools are also of interest for the administrator and thus part of a separate section.

The *CodeMeter* User Help supports you in the daily use of the *CodeMeter* protection and licensing technology of Wibu-Systems.

This help divides in several parts:

- [Installation][9]
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- [Import and Update licenses][47] ([*CmFAS Assistant*][47])
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2.1 Version

CodeMeter User Help 7.60d, 10/11/2023.

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2.2 Safety Instructions

The hardware of WIBU-SYSTEMS AG serves to protect and license digital products and has been developed, manufactured and inspected in accordance with state-of-the-art technology and recognized technical safety rules and regulations.

For further information on hardware certificates see the respective documents to be downloaded at the website of Wibu-Systems (https://www.wibu.com/support/certificates.html).

Before you use the hardware please observe the following safety instructions:

- If you follow the instructions regarding safety as described in this manual, the hardware will, in the normal case, neither cause personal injury nor damage to machinery and equipment. Connect the hardware only to matching intended interfaces. The use for other purposes, opening or own repair of the hardware may lead to damages of the product and its surroundings. Modifying the hardware affects the product safety. Caution: risk of injury!

- The hardware may warm up during operation - which is a normal operational parameter.

- Keep the hardware away from humidity and avoid strong vibration, dust, heat, and direct sunlight, in order to prevent operational interference.

- Depending on the used operating system the detection of the hardware device may take some seconds. Before disconnecting the hardware the user should wait several seconds to avoid loss of data during data saving.

- This product is not a toy, keep away from children!

Non-compliance with the safety instructions results in a loss of warranty.

2.3 Installing CodeMeter Runtime

The following section contains installing and uninstalling information of the *CodeMeter* for different operating systems.

While installing it is not required that a *CmContainer* is connected to the computer.

- Windows 32-bit/64-bit⌑ 9
- macOS⌑ 13
- Linux⌑ 15

2.3.1 Installation on Windows

For Windows 32- and 64-bit a *CodeMeter* Runtime Kit installation program is available:

For installing the *CodeMeter* Runtime Kit start the respective installation program and follow the installation wizard.
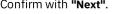
The relevant pages cover:

- Welcome⌑ 9
- End-User License Agreement⌑ 9
- Installation Scope⌑ 10
- Custom Setup⌑ 10
- Installing⌑ 12

Welcome
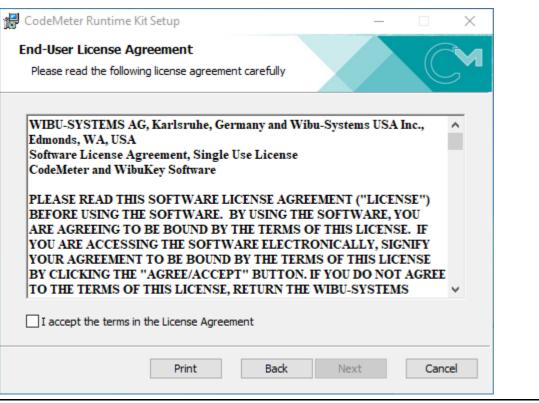
You will be prompted with the welcome dialog of the wizard.

Confirm with **"Next"**.

End-User License Agreement

In the next step, you must agree to the End User License Agreement. Please read it carefully and, if you accept the terms, select the **"I accept the terms in the License Agreement"** checkbox. Confirm this by clicking **"Next"**.

Installation Scope

Selecting the installation scope.

Confirm the selection by clicking on **"Next"**.

Custom Setup

The next wizard page lists installable program functions.

Besides the standard selected functions ⊟▾ you can select other functions for the installation.

Click on the icon ✖▾ in front of the respective entry. Then select **"Will be installed on local hard drive"** from the menu that displays.

For installed functions, the respective required hard disk space displays.

The following functions are offered for installation:

Function	Description
Network Server (optional)	*CodeMeter* licenses can be used from other computers. Port 22350 is used for TCP communication and is entered in the Windows firewall.
	During installation it can be decided whether *CodeMeter License Server* is set up as a server in a network environment and the associated TCP port 22350 is used. In the default case, *CodeMeter License Server* is only available locally (local host).
	This function can be selected in the installer and changed at any time by calling the installer again.
	Alternatively after the installation this is also possible via:
	• *CodeMeter WebAdmin*
	The **"Settings | Server | Server Access"** page allows for setting up [84] *CodeMeter* in server environments including ports.
	• Profiling (registry-entry [21])
	In the `General` section `IsNetworkServer` [21] allows to set whether *CodeMeter License Server* runs as a network server in the network or not.
	Please note, changes will only take effect when the *CodeMeter License Server* service is restarted. This can be done via the Windows Services Management or in *CodeMeter Control Center* [35] via the navigation entry **"Action"**.

Function	Description
WibuShellExtension	This feature installs the WibuShellExtension DLL. Library, which associates certain file extensions with *CodeMeter* and adds context menu commands to Windows Explorer.
User Help	CodeMeter User Help The user help for the *CodeMeter* Runtime Kit is installed.
Automatic server search	For responses to a broadcast, port 22350 is used on the network client and server for UPD communication and entered in the Windows firewall. In addition, an automatic search of network servers is set as standard during installation. This is implemented by a broadcast via UDP (User Datagram Protocol) (it is only 'listened' during the server search until the end of the UDP wait time is reached) and the release of the associated UDP port 22350 for communication in the Windows Firewall.
Remote access to WebAdmin (optional)	*CodeMeter WebAdmin* can optionally be set to allow remote access from other computers. Depending on the selected protocol, port 22352 or 22353 are used for TCP communication. This makes *CodeMeter WebAdmin* visible on the network and access can be allowed and set up. In the default case, the port 22352 is used for HTTP / TCP communication. In the installer this function can be selected and changed at any time by calling the installer again. Alternatively after the installation this is also possible via: • *CodeMeter WebAdmin* The page **"Settings | Server | Server Access"** allows for setting up [84] *CodeMeter* in server environments including ports. The page **"Settings | Basic | WebAdmin"** allows settings [78] that control local or remote access to *CodeMeter WebAdmin*, select the desired protocol (HTTP or HTTPS), and specify any required authentication data. • Profiling (`server.ini entry` [21]) The *CmWebAdmin* service reads values from the *CodeMeter* service at startup. Among others also the parameter `RemoteRead` from the `server.ini` file. If you make changes, both services <u>must</u> be stopped before and restarted after the changes. Please proceed as follows: 1. Stop the services: *CodeMeter* service (service managent or via **"CodeMeter Control Center | Action"**). *CmWebAdmin* service (service management). 2. Open the registry. Press key combination `[Windows]` + `[R]` to open the dialog **"Run"**. 3. Type command `regedit` and confirm using `[Enter]`. 4. Search for value `[HKEY_LOCAL_MACHINE\SOFTWARE\WIBU-SYSTEMS\CodeMeter\Server\CurrentVersion]`. 5. Set parameter in section `[HTTP]` `RemoteRead` [32] to a value of `2` and save. 6. Restart the services: *CodeMeter* service (service managent or via **"CodeMeter Control Center | Action"**). *CmWebAdmin* service (service management)

Installing

Confirm your selection by clicking **"Next"** and on the next page click **"Install"**.

> Changes to these settings can be made by calling up the installation package again. In the subsequent dialog, a change installation is then possible via the **"Change"** button.

After confirming that you want to allow changes to your computer by the installation, the *CodeMeter* Runtime Kit will be installed and on the last page you confirm this by clicking on **"Finish"**.

For quick access to some basic actions please use the quicklinks[20] .

2.3.1.1   Uninstalling on 32/64-bit Windows

1. Select the "**Software**" option in the Windows System control start menu item.

2. Select the "**CodeMeter Runtime Kit**" item and the "**Remove**" option

All *CodeMeter* files as part of an installations package and registry entries are deleted. Only the log and backup directories remain.

2.3.2   Installing on macOS

For macOS a *CodeMeter* Runtime Kit installation program is available:

File	Description
`CmRuntimeUser.dmg`	holds all required *CodeMeter* runtime components

1. Open the `CmRuntimeUser.dmg` file.
    In the window that opens you will see the icon of the program to be installed `CmInstall.pkg`.

2. Double-click the program and follow the instructions of the installation wizard.

This installs *CodeMeter Runtime* with the default settings on your computer.

Optionally, additional options can be configured:

Function	Description and Installation
Network Server	*CodeMeter* licenses can be used from other computers. Port 22350 is used for TCP communication.
	It can be decided whether *CodeMeter License Server* is set up as a server in a network environment and the associated TCP port 22350 is used. In the default case, *CodeMeter License Server* is only available locally (local host).
	After the installation this is possible via:
	• *CodeMeter WebAdmin*
	The **"Settings | Server | Server Access"** page allows for setting up[84] *CodeMeter* in server environments including ports.
	• Profiling (server.ini-entry[21])
	In the `General` section `IsNetworkServer`[21] allows to set whether *CodeMeter License Server* runs as a network server in the network or not. This can be done in *CodeMeter Control Center*[35] using the navigation entry **"Action"** or via the commandline.
	Please proceed as follows:
	1. Stop deamon for *CodeMeter*:

Function	Description and Installation
	o Open a terminal (**Finder | Applications | Utilities | Terminal**).
	o Type command `cd /Library/LaunchDaemons/`
	o Type command `sudo /bin/launchctl stop com.wibu.CodeMeter.Server`
	2. Open the file `com.wibu.CodeMeter.Server.ini` located at `/Libray/Preferences` in an editor.
	3. Modify entry `[General]` <u>`IsNetworkServer=1`</u> 🗋 21 and save.
	4. Start the deamon for *CodeMeter*:
	o Type command `sudo /bin/launchctl start com.wibu.CodeMeter.Server`
Remote access *CodeMeter WebAdmin*	*CodeMeter WebAdmin* can optionally be set to allow remote access from other computers. Depending on the selected protocol, port 22352 or 22353 are used for TCP communication. This makes *CodeMeter WebAdmin* visible on the network and access can be allowed and set up.
	In the default case, the port 22352 is used for HTTP / TCP communication.
	Alternatively after the installation this is also possible via:
	• *CodeMeter WebAdmin*
	The page **"Settings	Server	Server Access"** allows for <u>setting up</u>🗋 84 *CodeMeter* in server environments including ports.
	The page **"Settings	Basic	WebAdmin"** allows <u>settings</u>🗋 78 that control local or remote access to *CodeMeter WebAdmin*, select the desired protocol (HTTP or HTTPS), and specify any required authentication data.
	• Profiling (<u>`server.ini` entry</u>🗋 21)
	The *CmWebAdmin* deamon reads values from the *CodeMeter* deamon at startup. Among others also the parameter `RemoteRead` from the `server.ini` file. If you make changes, both services <u>must</u> be stopped before and restarted after the changes.
	Please proceed as follows:
	1. Stop the deamons for *CodeMeter* and *CodeMeter WebAdmin*:
	o Open a terminal (**Finder | Applications | Utilities | Terminal**).
	o Enter command `cd /Library/LaunchDaemons/`
	o Enter command `sudo /bin/launchctl stop com.wibu.CodeMeter.Server`
	o Enter command `sudo /bin/launchctl stop com.wibu.CodeMeter.WebAdmin`
	2. Open the file `com.wibu.CodeMeter.Server.ini` located at `/Libray/Preferences` in an editor.
	3. Modify the entry `[HTTP]` `RemoteRead=2` and save.
	4. Start the deamons for *CodeMeter* and *CodeMeter WebAdmin*:
	o Enter command `cd /Library/LaunchDaemons/`
	o Enter command `sudo /bin/launchctl start com.wibu.CodeMeter.Server`
	o Enter command `sudo /bin/launchctl start com.wibu.CodeMeter.WebAdmin`

For quick access to some basic actions please use the <u>quicklinks</u>🗋 20 .

2.3.2.1 Uninstalling on macOS

To uninstall the *CodeMeter* Runtime Kit, proceed as follows:

1. Re-open the file `CmRuntimeUser.dmg`.

2. Double-click the program `CmUninstall.mpkg` and follow the instructions of the wizard.
   Alternatively, in the command line enter the following command: `$ sudo installer -pkg /Volumes/CmRuntimeUser/CmUninstall.mpkg -target`. Please note that path specification may vary.

2.3.3 Installing on Linux

For Linux operating systems different installation packages are available in common formats:

Package	RPM (RedHat Package Format) Packages, e.g., for SuSe, Red Hat.		DEB (Debian Package Format) Packages e.g., for Debian, Ubuntu.			
	32 bit	64 bit AMD64 Basis	32 bit	64 bit AMD64 Basis	32 bit ARMHF	64 bit ARMHF
GLIBC and Kernel	GLIBC 2.17 or higher and Kernel 3.x or higher	GLIBC 2.17 or higher and Kernel 3.x or higher	GLIBC 2.17 or higher and Kernel 3.x or higher	GLIBC 2.17 or higher and Kernel 3.x or higher	GLIBC 2.13 or higher and Kernel 4.9 or higher	GLIBC 2.17 or higher and Kernel 4.15 or higher
CodeMeter **Runtime** contains all necessary files for the end-user	`CodeMeter-[CodeMeter-Version].[package number].i386.rpm` alternatively: *CodeMeter* Lite - driver installer only for systems without GUI `CodeMeter-lite-[CodeMeter-Version].[package number].i386.rpm`	`CodeMeter-[CodeMeter-Version].[package number].x86_64.rpm` alternatively: *CodeMeter* Lite - driver installer only for systems without GUI `CodeMeter-lite-[CodeMeter-Version].[package number].x86_64.rpm`	`codemeter_[CodeMeter-Version].[package number]_i386.deb` alternatively: *CodeMeter* Lite - driver installer only for systems without GUI `codemeter-lite_[CodeMeter-Version].[package number]_i386.deb`	`codemeter_[CodeMeter-Version].[package number]_amd64.deb` alternatively: *CodeMeter* Lite - driver installer only for systems without GUI `codemeter-lite_[CodeMeter-Version].[package number]_amd64.deb`	*CodeMeter* Lite - driver installer only for systems without GUI `codemeter-lite_[CodeMeter-Version].[package number]_armhf.deb`	*CodeMeter* Lite - driver installer only for systems without GUI `codemeter-lite_[CodeMeter-Version].[package number]_arm64.deb`

To install *CodeMeter License Server*, please proceed as follows:

1. Select the desired installation package, and

2. Install the package as usual, e.g. shell command or respective help programs.

rpm packages: `[rpm -ivh CodeMeter-[CodeMeter-Version].[Package Number].i386.rpm]`

deb packages: `[dpkg -i CodeMeter-[CodeMeter-Version].[Package Number]_i386.deb]`

This installs *CodeMeter Runtime* with the default settings on your computer.

Optionally, additional settings can be configured:

Function	Description and Installation
Network server	*CodeMeter* licenses can be used from other computers. Port 22350 is used for TCP communication. It can be decided whether *CodeMeter License Server* is set up as a server in a network environment and the associated TCP port 22350 is used. In the default case, *CodeMeter License Server* is only available locally (local host). After the installation this is possible via: • *CodeMeter WebAdmin* The **"Settings | Server | Server Access"** page allows for setting up[84] *CodeMeter* in server environments including ports. • Profiling (server.ini-entry[21]) In the `General` section `IsNetworkServer`[21] allows to set whether *CodeMeter License Server* runs as a network server in the network or not. This can be done in *CodeMeter Control Center*[35] using the navigation entry **"Action"** or via the commandline. Please proceed as follows: 1. Stop deamon for *CodeMeter*:

Function	Description and Installation

	o Open a terminal.
	
	  o Type command `/etc/init.d/codemeter stop`
	
	2. Open the file `com.wibu.CodeMeter.Server.ini` located at `/etc/wibu/CodeMeter/Server.ini` in an editor.
	
	3. Modify entry `[General]` [IsNetworkServer=1]⬜[21] and save.
	
	4. Start the deamon for *CodeMeter*:
	
	  o Type command `/etc/init.d/codemeter start`

Remote access to *CodeMeter WebAdmin*	*CodeMeter WebAdmin* can optionally be set to allow remote access from other computers. Depending on the selected protocol, port 22352 or 22353 are used for TCP communication. This makes *CodeMeter WebAdmin* visible on the network and access can be allowed and set up.
	
	In the default case, the port 22352 is used for HTTP / TCP communication.
	
	Alternatively after the installation this is also possible via:
	
	• *CodeMeter WebAdmin*
	
	The page **"Settings | Server | Server Access"** allows for [setting up]⬜[84] *CodeMeter* in server environments including ports.
	
	The page **"Settings | Basic | WebAdmin"** allows [settings]⬜[78] that control local or remote access to *CodeMeter WebAdmin*, select the desired protocol (HTTP or HTTPS), and specify any required authentication data.
	
	• Profiling ([server.ini entry]⬜[21])
	
	The *CmWebAdmin* deamon reads values from the *CodeMeter* deamon at startup. Among others also the parameter `RemoteRead` from the `server.ini` file. If you make changes, both services <u>must</u> be stopped before and restarted after the changes.
	
	Please proceed as follows:
	
	1. Stop the deamons for *CodeMeter* and *CodeMeter WebAdmin*:
	
	  o Open a terminal (**Finder | Applications | Utilities | Terminal**).
	
	  o Enter command `cd /Library/LaunchDaemons/`
	
	  o Enter command `sudo /bin/launchctl stop com.wibu.CodeMeter.Server`
	
	  o Enter command `sudo /bin/launchctl stop com.wibu.CodeMeter.WebAdmin`
	
	2. Open the file `com.wibu.CodeMeter.Server.ini` located at `/etc/wibu/CodeMeter/` in an editor.
	
	3. Modify the entry `[HTTP]` `RemoteRead=2` and save.
	
	4. Start the deamons for *CodeMeter* and *CodeMeter WebAdmin*:
	
	  o Enter command `cd /Library/LaunchDaemons/`
	
	  o Enter command `/etc/init.d/codemeter start`
	
	  o Enter command `/etc/init.d/codemeter-webadmin start`

For quick access to some basic actions please use the [quicklinks]⬜[20] .

2.3.3.1 Uninstalling on Linux

Execute the respective shell command for uninstalling of the *CodeMeter* Runtime Kit:

• for RPM based distributions, such as, Suse/RedHat/Fedora [rpm -e CodeMeter]
• for DEB based distributions, such as, Debian/Ubuntu [dpkg -r CodeMeter]

2.4 First important Information

First connection of *CmDongle*

Connect your *CmDongle* with a free USB interface of your PC. The light diode of the *CmDongle* alternatively flashes red and green for 1-2 seconds. Your PC shows that a new USB device has been found. *CmDongles* with additional Flash memory, e.g. *CmStick/M,* are able to permanently hold any data on this drive.

> With *CmDongles* with additional flash memory it can happen that the Windows message "Do you want to scan and fix 'XYZ'?" displays.
> This always happens when the connection was disconnected during access and the write process was not completed by closing a special flag at the same time.
> Solution:
> - Using the safely remove option, always log off the *CmDongle* before removing it from the system.
> - Click on "Scan and fix". Please save all important data first!

Alternatively to the mass storage device status, *CmDongles* can also display as HID (Human Interface Device) without a drive status (for more details see here⃞ 154).

> ⚠ *CmDongles* without Flash memory represent virtual drives, i.e. data you save on it will get lost once you disconnect the *CmDongle*!

By default, *CodeMeter License Server* is installed as service (Windows) or as daemon (Linux, macOS) and thus automatically starts on system startup. The behavior at system startup is optimized by using default values and prevents eventually occurring process access conflicts. In the case of problems, please contact Wibu-Systems Support.

If *CodeMeter License Server* should not be active, it can be manually started or stopped⃞ 35 . The following table shows you start options for different operating systems.

> *CodeMeter License Server* is registered as a Windows service and can be started with user privileges. For stopping the service, however, you need administrator privileges under Windows (System Settings | Management | Services).

Operating System	Menu Control	Name
Windows	[Start | All Programs | CodeMeter | CodeMeter Control Center]	`CodeMeter.exe`
	Press "Windows" key to open Start screen | Type "CodeMeter Control Center" | Press "Enter" key	
macOS	[Programs | CodeMeter | CodeMeter Control Center	`CodeMeterMacX`
Linux	[Applications | System | CodeMeter Control Center] or [Applications | Accessories | CodeMeter Control Center]	`CodeMeterLin`

> On Linux (graphic desktop environment KDE 4) eventually connected *CmSticks/BMC | CmCards* are not automatically detected.
> If removable devices are connected to Linux systems, they have to be mounted, i.e. making the filesystem on the device accessible. Some desktop environments do this automatically, some do not.
> Check the settings for general automatic mounting and also for the *CmStick/BMC | CmCard* using the menu item "System Settings | Hardware | Removable Devices".
> Of course you cannot mount a file system whose underlying device is not connected.
>
> If on Linux *CmSticks/BMC | CmCards* cannot be detected, please proceed as follows:
> 1. Start `codemeter` a root user.
>   If you use the `systemd-init` system, please enter the following shell commands:
>    ```
>    # mkdir /etc/systemd/system/codemeter.service.d
>    # printf '[Service]\nUser=root\n' > /etc/systemd/system/codemeter.service.d/as-root.conf
>    # systemctl daemon-reload
>    # systemctl restart codemeter.service
>    ```
>   If you use the `sysvinit/sysv-rc`, please enter the following shell commands:
>    ```
>    # sed -i '/^USER/cUSER=root' /etc/init.d/codemeter
>    # service codemeter restart
>    ```

> **2.** Read-Write mount the *CmStick/BMC | CmCard*.
> In the desktop environment either mount the filesystem in the `/etc/fstab` (using the service `udisks2`), or manually mount it.
>
> Eventually you must create an empty `'codemeter.io'` file: `<mntpnt>/CM-Device/codemtr.io`.
>
> If the mount takes place after the start of `codemeter`, either use *CodeMeter Control Center* "View | Refresh" - `CTRL+R` or restart using the shell command "`# service codemeter reload`".
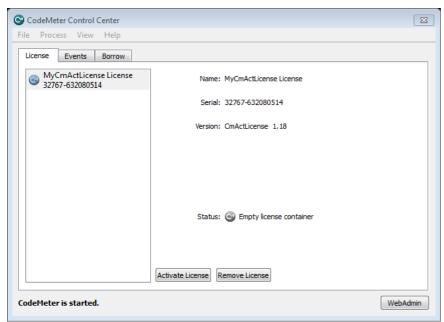
Activating *CmActLicense* licenses

CmActLicense the software- and activation-based *CodeMeter* variant requires no hardware token. Rather *CmActLicense* licenses are bound to hardware properties of the PC on which they are accessed.

⚠ Please make sure you activate a *CmActLicense* license <u>only</u> on the PC for which you want to use the license.

Before you are able to activate *CmActLicense* licenses for your PC you require a separate file you obtain from your software vendor. This licenses information file corresponds to an empty license container. It serves to collect hardware properties of your PC as a kind of 'finger print' for the subsequent activation. Please proceed as follows:

1. Drag & drop the `*.wbb` file, e.g. 📄 `MyCmActLicense.wbb`, you received from your software vendor onto *CodeMeter Control Center.*

The **"Status"** field shows that is file is only an empty license container and not a license. At the same time, the *CodeMeter* symbol changes to red.

2. Click the **"Activate License"** button to create a license request file (see [here](#)⬜[48]) and to send it to your software vendor. Subsequently, your software vendor will send you a license update file.

3. Drag&drop the `*.wbb` file, e.g. 📄 `MyCmActLicense.WibuCmLIF`, you received from your software vendor onto *CodeMeter Control Center.*
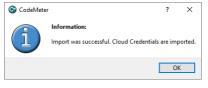
The **"Status"** field shows that the license has been activated. At the same time, the license has a serial number, and the *CodeMeter* symbol has switched to activated status.

Using *CmCloudContainer*

The cloud-based variant of *CodeMeter* allows to access licenses online in the cloud. The *CmCloudContainer* is bound to individual end users and is managed on *CodeMeter Cloud Server*. This means that the credentials reside on the local machine. End users with the appropriate credentials then access these licenses authenticated and can use them as if they corresponded to local licenses.

Before you can use *CmCloudContainer* licenses for your PC, you need a separate file that you get from your software vendor. This `*.wbc` file follows the serial number scheme "`140-...`" and contains the cloud access credential data.

1. Drag&drop the `*.wbc` file received from the software vendor into *CodeMeter Control Center.*

You will receive an import confirmation and *CodeMeter Control Center* will display the imported *CmCloudContainer* along with other cloud-related information.

You can then use the *CmCloudContainer* as usual to import and update licenses⌂ 47 .

CodeMeter FAQ

A comprehensive FAQ area on *CodeMeter* and on other additional products, you will find at our CodeMeter support page.

Please take a first look at the information on the *CodeMeter* support page before you contact our support team. In most cases, you will find quick answers to your questions and problems.

Support

You have several options to contact us:

E-Mail	Writes us an e-Mail at support@wibu.com
	Please describe your problem in detail and add the file `CmDust-Result.log` created with *CmDust*[114] .
Telephone	Contact our *CodeMeter* Hotline at +49-721-93172-15.
	We are available in Germany (local Baden-Wuerttemberg non-holiday) workdays (Monday through Friday) from 8 a.m. to 5 p.m.
	Wibu Systems USA support is available Monday through Friday from 8 a.m. to 5 p.m. PST by phone at 800-6-GO-WIBU (425-775-6900) or by e-mail (support@wibu.us)
	In China contact our Shanghai office per phone +86 (0) 21-55661790 or by e-mail (info@wibu.com.cn).

2.5 Quick links

For quick access to some basic actions, please use the following list:

How do I get information on the CodeMeter version installed on my computer?[116]

How do I open CodeMeter Control Center?[35]

How do I update the Firmware?[41]

How do I change the activation status of my CmDongle?[41]

How do I start and eventually stop the CodeMeter service / deamon?[35]

How do I start and stop the CodeMeter WebAdmin service /deamon?[54]

How do I create a license request?[48]

How do I get a license update?[51]

How do I activate a CmActLicense license?[18]

How do I use a CmCloudContainer?[19]

How do I open CodeMeter WebAdmin?[57]

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2.6 Profiling - CodeMeter License Server settings

The settings with which *CodeMeter License Server* is used are based on so-called 'profiling'. For Windows these settings are stored in the Windows registry, for macOS and Linux `*.ini` files contain this information.

Registry (Windows registry database)

> ⚠️ Please note that extensive problems might occur, if you modify the registry incorrectly. Thus, make sure that you change values very carefully. For added protection, back up the registry <u>before</u> you modify it. Then, you can restore the registry, if a problem occurs.

All settings for the administration of the system and all integrated system services and processes are stored here. Many application programs, such as the Wibu-Systems software, also store their settings here.

In order to check or edit registry entries, please proceed as follows:

1. Open Registry Editor.

   In the search box on the task bar, type **regedit**. Then, select the top result for Registry Editor (Desktop app). Alternatively, press and hold or right-click the **Start** button, then select **Run**. Enter `regedit` in the **Open:** box and select **OK**.

2. Advance to the node `[HKEY_LOCAL_MACHINE\SOFTWARE\WIBU-SYSTEMS\CodeMeter\Server\...]`.

   The following values and data types exist:

   - `REG_DWORD`: a binary data type in which 32-bit integer values are stored as 4-byte hexadecimal values.
   - `REG_SZ`: a string of Unicode characters. For names, descriptions, system paths, etc.

You can also create a local Windows `CodeMeter.ini` file holding the stored settings from the registry.

However, be aware that as soon as *CodeMeter License Server* starts, it checks if a `CodeMeter.ini` file exists. If there is a `CodeMeter.ini` file, all <u>default</u> information from the registry is stored there. From this moment on, *CodeMeter License Server* then will use <u>only</u> the information stored in `CodeMeter.ini`.

For creating the `CodeMeter.ini` file, please proceed as follows:

1. Create an empty file named `CodeMeter.ini` in the directory `C:\Program Files (x86)\CodeMeter\Runtime\bin`.

2. Stop and start the *CodeMeter* service in *CodeMeter Control Center* using the "**Action | ...**" navigation items.
   The `CodeMeter.ini` file is completed.

   > ℹ️ Changes made are saved only, if the *CodeMeter License Server* service has been stopped before and then restarted after modifications have been made.

🖥️🐧 `Server.ini` file

The settings of applications are stored here in configuration files separately for individual programs in respective directories (`*.ini` files).

> ℹ️ Changes made are saved only, if the *CodeMeter License Server* daemon has been stopped before and then restarted after modifications have been made.

On macOS this file locates at:
`/Library/Preferences/com.wibu.CodeMeter.Server.ini`.

On Linux this file locates at:

`/etc/wibu/CodeMeter/Server.ini`

In order to check or edit file entries open the file in a text editor of your choice.

2.6.1 General

ActionTimeInterval	
specifies the time interval the `ActionHandler` is to scan for an open task to perform.	
Value	Description
`[0, 1000]`	Interval between 0 and 1000 milliseconds (default: 10 milliseconds).

ApiCommunicationMode

specifies the communication mode between the `WibuCm.dll` library and *CodeMeter License Server* used by the library.

Modes may be combined.

Mode	Description
1	platform specific (default)
2	shared memory
4	IPv4
8	IPv6

Platform specific default:

Windows	IPv6, IPv4, shared memory
macOS / Linux	IPv6, IPv4
WinCE	IPv4, shared memory

ApiCommunicationModeServer

specifies the communication mode between the `WibuCm.dll` library and *CodeMeter License Server* used by *CodeMeter License Server*.

Modes may be combined.

Mode	Description
1	platform specific (default)
2	shared memory
4	IPv4
8	IPv6

Platform specific default:

Windows	IPv6, IPv4, shared memory
macOS / Linux	IPv6, IPv4
WinCE	IPv4, shared memory

> If `ApiCommunicationMode` is set to a communication mode that is excluded by `ApiCommunicationModeServer`, the communication between DLL and *CodeMeter License Server* will not work. For example, `ApiCommunicationModeServer` is set to '4' (IPv4) and `ApiCommunicationMode` is set to '8' (Ipv6).

BindAddress

specifies the IP Address of the network adapter used by *CodeMeter License Server*.

Typical examples are `0.0.0.0` which binds to all network adapter (default) or `192.168.0.1`.

BorrowIdentifyByIpAddress

specifies the IP Address (server identification) for a prepared borrowing.

CleanUpTimeOut

contains a timeout value (in minutes) used by *CodeMeter License Server* to clean up internal handles and threads. The default value is 120 minutes.

CleanUpTimeOut

Starting with *CodeMeter* Version 6.70a this value only affects LAN handles.

CmActPath

contains in the case of applied write filters the location (path information) to which the data of *CmActLicense* is to be saved persistently. If filters are used your software vendor is likely to inform you.

Please do not mix up this with the location of the default *CmActLicense* read and backup mechanism, e.g. `C:\ProgramData\CodeMeter\CmAct`.

> This configuration option applies only to *Universal Firm Codes* and must be explicitly set in conjunction with set write filter methods *EWF* (Enhanced Write Filter) or *FBWF* (File Based Write Filter). This is done using the *CmBoxPgm*-Option `/lopt:ewffbwf`.
>
> For *EWF*, please note to select the location on a non-write-protected partition. With *FBWF*, this can also be an excluded directory on the partition protected with a write filter.

CmInstanceUid

On starting, *CodeMeter License Server* calculates a unique ID used to discern client computers for station share accesses.

CmWANPort

specifies the port address for the *CmWAN* communication used by the server side only. The default value is the port address 22351.

CmWebSocketApi

specifies whether the *CmWebSocket* API is used or not.

> This entry only affects old versions of the *CmWebSocket API* prior to *CodeMeter* Version 7.10a that do not perform origin checks.

> Origin check
>
> The new *CmWebSocket API* from *CodeMeter* version 7.10a on requires a check for the origin of a request when information and data is exchanged via Web Components with *CodeMeter License Server*. This is done by a certificate issued by Wibu-Systems.
>
> At the same time, old versions of the *CmWebSocket API* prior to *CodeMeter* Version 7.10a due to security reasons are deactivated by default.
>
> The old versions can be activated by setting the profiling entry `CmWebSocketAllowWithoutOriginCheck'='1'`. Such activation, however, is <u>not recommended</u>.

If the value `0` (disabled) is set, the online activation in the *WebDepot* of *CodeMeter License Central* cannot be used. The Software Activation Wizard using the *CodeMeter License Central* Gateways and the file-based activation in *WebDepot* still work.

Value	Description
0	disable
1	enabled (default)

If the value `0` (deactivated) is set, the online activation in *WebDepot* of *CodeMeter License Central* cannot be used. However, the Software Activation Wizard, which uses the *CodeMeter License Central* Gateways, and the file-based activation in *WebDepot* still work.

CmWebSocketAllowWithoutOriginCheck

specifies since *CodeMeter* Version 7.10a whether the *CmWebSocket API* is additionally used without check of the origin of a request for the *CmWebSocket API* or not.

CmWebSocketAllowWithoutOriginCheck

By default, the check is not switched off and is performed (`0`).

> ℹ️ For a transition period, it may happen that a not yet completed exchange of web components (*WebDepot*) may require activation of the old *CmWebSocket API* of a *CodeMeter* version 7.10a or newer.
>
> Then setting the profiling entry '`CmWebSocketAllowWithoutOriginCheck`' to the value '`1`' after a *CodeMeter License Server* restart can reactivate the previous *CmWebSocket API* without origin check.
>
> The activation of the old *CmWebSocket API* on principle is **explicitly not recommended**.

Value	Description
0	disable (default)
1	enabled

DisableHostnameLookup

disables name resolution and thus prevents name resolution for logging (license tracking).

Value	Description
0	deactivated
1	acivated (default)

DisableWebSocketVersions

allows to explicitly disable certain WebSocket protocol versions.

To completely disable the WebSocket interface use `DisableWebSocketVersions = 0xFFFFFFFF`.

Optional disabling of a version of the WebSocket API from version 4: `DisableWebSocketVersions = <Matching Bit>`.

> ℹ️ This entry is intended for cases in which individual protocol versions should be deactivated for security reasons.

EnabledContainerTypes

specifies the *CmContainer Types* activated. Currently, four flags are defined which can be bit-wise combined.

This setting is used to avoid technical problems on some systems.

Value	Description
1	Mass Storage (USB mass storage device class)
2	*CmActLicense*
4	HID (USB human interface device class)
8	*CmCloud*

EnableWebAdmin

This parameter is available for CmEmbedded embedded systems only (🐧 Linux arm and Big Endian) and is ignored for all other platforms.

Value	Description
0	*CodeMeter WebAdmin* disabled (default).
1	*CodeMeter WebAdmin* enabled.

ExePath

specifies the current path information where *CodeMeter License Server* is stored.

On any start, *CodeMeter License Server* saves this path to the parameter allowing applications calling *CodeMeter* on request to start *CodeMeter License Server.*

HostNameResolveTimeout

specifies in milliseconds the maximum value of the timeout that is used to resolve the IP address to the host name.

This is used for optimization and adaptation to specific network properties.

The default value is `10` milliseconds. The value can also be set to a value between `0` and `0xffffffffffff` (49 days) milliseconds.

HelpFile

specifies the complete path information and file name of the *CodeMeter* online help file.

IsCmWANServer

specifies whether *CodeMeter License Server* is running as a *CmWAN* server or not.

Value	Description
0	*CodeMeter License Server* as *CmWAN* server disabled (default).
1	*CodeMeter License Server* as *CmWAN* server enabled.

IsNetworkServer

specifies whether *CodeMeter License Server* is running as a network server on the network or not.

Value	Description
0	*CodeMeter License Server* as network server on the network disabled (default). All network requests from other computers are blocked.
1	*CodeMeter License Server* as network server on the network enabled.

LastLogCleanup

specifies when all *CodeMeter* `*.log` files have been deleted using a time stamp value.

ListRejectedAllocations

allows users to list all rejected allocations for a specific *CodeMeter License Server* (local or remote) and retrieve them as log entries.

Value	Description
0	deactivates listing of rejected license allocations.
1	activates listing of rejected license allocations.

ListRejectedAllocationsFirmcode

allows to set restrictions on retrieving rejected allocations by specifying a single *Firm Code*, e.g. `6000010`.

By default, listing includes all available firm *Firm Codes*.

ListRejectedAllocationsMaxEntries

allows setting a maximum number of list entries when retrieving rejected allocations.

The specified number of list entries is kept until users actively retrieve the list entries via a corresponding *cmu* command.

`ListRejectedAllocationsMaxEntries`

By default, the listing covers 1000 entries. Optionally, an input interval between `[1..200000]` is supported..

`LogCleanupTimeout`

specifies how long the timeout value is for the log file deletion. The default value is 336 hours, i.e. 14 days.

`LogCmActDiag`

specifies whether *CmActLicense* diagnostic logging is activated or not.

Value	Description
0	*CmActLicense* diagnostic logging disabled.
1	*CmActLicense* diagnostic logging enabled (default).

`LogEventLogRotationTimeInMinutes`

specifies after how many minutes the event log file will be rotated.

Accepted values are in the range `1` to `525600` (`8760` hours, `365` days). Default value is `1440` (24h).

The default value is also used when the specified value is out of range or not specified.

`LogEventLogRotationSizeInMb`

specifies after which size in MegaByte the event log file should be rotated.

Accepted values are in the range from `1` to `3500` (`3.42` GigaByte, Gb). The default value is `10` (`10` MegaByte).

The default value is also used if the specified value is out of range or not specified.

`Logging`

specifies whether logging of the console or GUI output is activated or not.

Value	Description
0	Logging disabled (default).
1	Logging enabled.

`LogLicenseTracking`

specifies whether license tracking is activated or not.

Value	Description
0	License tracking disabled (default).
1	License tracking enabled.

`LogLicenseTrackingPath`

specifies the location to where the license tracking files are written to.

Default location is a directory "`Licensetracking`" parallel to the "`Logs`" directory specified in parameter [LogPath](#)[27] .

`LogLicenseTrackingLogRotationSizeInMb`

`[1..3500]`

If a license tracking log file exceeds a size of x MB, the rotation starts.

The input range of x is from 1 to 3500 MB.

LogLicenseTrackingLogRotationSizeInMb

The default value is 1000 MB.

If the specified value is outside the input range, automatically the default value applies.

LogLicenseTrackingLogRotationTimeInMinutes

`[0..525600]`

If the oldest entry of a license tracking log file is older than `n` minutes, the rotation should start.

The default value is 0 hours.

The input range of `n` is from 0 to 525600 minutes (approx. 1 year).

If the specified value is outside the input range, automatically the default value applies.

LogPath

specifies the location where the log files are written to.

Default location is the directory generated platform dependently by the Installer.

Windows	`C:\ProgramData\CodeMeter\Backup\Logs`
macOS	`/Library/Application Support/Logs/CodeMeter`
Linux	`/var/log/CodeMeter`

LtClientsCleanupTime

specifies the period how long License Transfer client data will be stored.

The time is stored in hours to be able to test using small periods. In *CodeMeter WebAdmin* it is stored in days. The default setting is 100 days, i.e. 2400 hours.

MaxMessageLength

specifies the maximum length of TCP/IP requests in bytes. Default is 64 MB which should be sufficient for all known API calls.

NetworkAccessFsb

specifies whether an access to a Firm Security Box (FSB) entry is allowed via network or not.

Value	Description
0	Access to a FSB entry via network is not allowed (default).
1	Access to a FSB entry via network is allowed.

> This value will be ignored if an Access Control List [31] (ACL) is used.

NetworkPort

specifies the network port address for the communication. The default value is the port address 22350.

The port 22350 is registered by Wibu-Systems at IANA (Internet Assigned Numbers Authority) and uniquely assigned for the *CodeMeter* communication. For a list of assigned ports see www.iana.org/assignments/port-numbers.

NetworkTimeout

specifies the TCP/IP network timeout value.

Values	Description

NetworkTimeout

`0`   No timeout will be used.

`[40, ∞]` Interval between minimum value of `40` and ∞ milliseconds (Default: 10 milliseconds).

ProxyPassword

specifies the password of the proxy server of the local network.

This must be set, if authentication is required through proxy or firewall.

Please note, that under 🐧 Linux, the environment variable `http_proxy` is considered as *system proxy*. `https_proxy` is not yet supported.

ProxyPasswordSecure

specifies the password for authenticated access to the proxy server.

Please note, that under 🐧 Linux, the environment variable `http_proxy` is considered as *system proxy*. `https_proxy` is not yet supported.

ProxyPort

specifies the port of the proxy server of the local network.

Please note, that under 🐧 Linux, the environment variable `http_proxy` is considered as *system proxy*. `https_proxy` is not yet supported.

ProxyServer

specifies the name of the proxy server of the local network.

Please note, that under 🐧 Linux, the environment variable `http_proxy` is considered as *system proxy*. `https_proxy` is not yet supported.

ProxyUser

specifies the user name of the proxy server of the local network.

This must be set, if authentication is required through proxy or firewall.

Please note, that under 🐧 Linux, the environment variable `http_proxy` is considered as *system proxy*. `https_proxy` is not yet supported.

StartAlways

specifies whether *CodeMeter License Server* immediately starts without any dialog request.

Value	Description
0	*CodeMeter License Server* will not start immediately.
1	*CodeMeter License Server* will be started immediately (default).

StartDaemon

specifies whether *CodeMeter License Server* will start as daemon on start [Linux only 🐧].

Value	Description
0	*CodeMeter License Server* will not start as daemon on startup.
1	*CodeMeter License Server* will start as daemon on startup (default).

SystemStartThreshold

specifies the threshold value in seconds after Windows start [Windows only ⊞].

If Windows has not been started since the specified value, the parameter <u>StartAlways</u>⧉ [28] is handled in a special way (see <u>WaitForServiceAfterSystemStart</u>⧉ [30]).

TimeServerTimeout

specifies the timeout for the time server request in seconds. The default value is 20.

TimeServerURL1, TimeServerURL2, …

specifies the URL of the time sever to update the *Certified Time* in the *CmContainer*. The standard installer sets the following default values:

```
TimeServerURL1 = cmtime.codemeter.com
TimeServerURL2 = cmtime.codemeter.fr
TimeServerURL3 = cmtime.codemeter.de
```

TrustedWebSocketOrigins1, TrustedWebSocketOrigins2, ...

sets local exceptions for checking trusted WebSocket Origins.

> ℹ Supported input formats are IPv4 and IPv6 addresses and port specifications, e.g. `"http://localhost:4040"`, `"http://[2001:db8::1%25eth0]"` `"https://[2001:db8::1]:4040"`.

```
 TrustedWebSocketOrigins1 = null
TrustedWebSocketOrigins2 = file://
TrustedWebSocketOrigins3 = http://example.com
TrustedWebSocketOrigins4 = https://example.com
TrustedWebSocketOrigins5 = http://example.com:33
```

UDPCachingTime

specifies the waiting time in seconds after a UDP (User Datagram Protocol) request is retried.

After a UDP search in the network the servers found are stored inside *CodeMeter License Server* for this time. The range of the parameter is `[1, 3600]`. The default value is 20 seconds.

UDPWaitingTime

specifies the waiting time in milliseconds in order to define the period in which a UDP (User Datagram Protocol) request for an existing *CodeMeter License Server* on the network has to reply.

This is the maximum time all other servers can answer to the request. The default value is 1000 milliseconds. The range of this parameter is `[100, 15000]`.

UseMobileHandling

specifies whether *CodeMeter* can be used mobile.

If enabled, a protected application and *CodeMeter License Server* can be started from a mobile disk and will terminate when the last handle of a protected application was released and the protected application has terminated.

Value	Description
0	*CodeMeter* Mobile Handling is disabled.
1	*CodeMeter* Mobile Handling is enabled.

UseMobileVars

specifies whether *CodeMeter* Mobile variables are used or not.

Value	Description
0	*CodeMeter* Mobile variables are disabled and absolute paths remain.
1	*CodeMeter* Mobile variables are enabled (default).

If *CodeMeter* uses a local `CodeMeter.ini`⧠[21] file, the following variables will be used:

o `$(CODEMETER_HOME)` - contains the absolute path of `CodeMeter.exe`.
o `$(CODEMETER_DRIVE)` - contains the drive letter of the *CmStick*.
For example, the `LogPath`⧠[27] may be set to "`$(CODEMETER_HOME)\logs`".

If set to a value `0`, these variables will not be inserted into `CodeMeter.ini` but the absolute paths remain.

UseSystemProxy

specifies whether *CodeMeter* applies the system proxy settings or not.

Please note, that under 🐧 Linux, the environment variable `http_proxy` is considered as *system proxy*. `https_proxy` is not yet supported.

Value	Description
0	*CodeMeter* does not apply the system proxy settings.
1	*CodeMeter* applies the system proxy settings.

UseUmsDA

specifies whether communication between *CodeMeter License Server* and *CmDongle* is direct or file I/O based.

Value	Description
0	Communication is based on file I/O.
1	Communication is based on direct access (PassThru) (default).

> ⓘ if the user starting *CodeMeter License Server* has no administrator privileges, then automatically file I/O applies.

WaitForServiceAfterSystemStart

specifies how long after system start `CodeMeter.exe` waits in seconds. After that, the `WibuCm.dll` library starts `CodeMeter.exe` as an application [Windows only ⊞].

WebSocketKeepAliveTimeout

specifies how long a WebSocket connection is kept open in seconds even though the client is not active.

The default maximum value for such possible inactivity is 300 seconds (5 minutes).

This timeout can be changed in seconds. The minimum value is 1 second.

The value zero is not valid and the default timeout (300 seconds) is used.

MaxBorrowDuration

specifies the global maximum period a license is blocked by an borrowing server in minutes.

> ⓘ Please note, that Prepared License Borrowing supports only *Firm Codes* smaller than 6,000,000.

MaxBorrowQuantity

specifies the global maximum number of licenses which can be borrowed from an borrowing server.

> ℹ️ Please note, that Prepared License Borrowing supports only *Firm Codes* smaller than 6,000,000.

2.6.2 AccessControl

Enabled

specifies whether Access Control Lists (ACL), i.e. using global and specific access rules for accessing licenses and reserving license access for single staff member or complete Active Directory groups, are used or not.

Value	Description
0	Use of ACL disabled (default).
1	Use of ACL enabled.

UsersMaximumNumber

specifies the maximum cache limit for the number of Active Directory (AD) server requests of users in the list of license access permissions. Default value is 10000.

GroupsMaximumNumber

specifies the maximum cache limit for the number of Active Directory (AD) server requests of groups in the list of license access permissions. Default value is 10000.

2.6.3 Backup

Interval

contains a time interval (in hours) when *CodeMeter License Server* should automatically create and save a backup of the connected *CmDongle*(s).

Value	Description
0	Automatic backup disabled
[1, ∞]	Automatic backup enabled for specified hours (default is 24 hours).

Path

contains the path of the location where the backup file of the *CmDongle*(s) is to be saved. The default location for backup files depends on the operating system in use:

🪟 Windows	`C:\ProgramData\CodeMeter\Backup`
🍎 macOS	`/Library/Application Support/CodeMeter/Backup`
🐧 Linux	`/var/lib/CodeMeter/Backup`

<serial_number>

contains a time stamp when the last backup of the specified *CmDongle* was created in seconds passed since `01.01.2000`.

UpdateCertifiedTime

specifies whether a *Certified Time* update takes place before a backup is executed.

Value	Description
0	*Certified Time* update disabled (default).

1	*Certified Time* update enabled.

2.6.4 HTTP

`DigestAuthentication`

CodeMeter Versions <u>smaller than 6.60</u>:

The parameter specifies, if authentication via "User Name / Password" is required to change settings.

Value	Description
0	Authentication via "User Name / Password" is disabled.
1	Authentication via "User Name / Password" is enabled.

CodeMeter Versions <u>equal to or newer than 6.60</u>:

This parameter specifies, if write authentication (via <u>WritePassword</u>◻[33]) is required to change settings.

Value	Description
0	Write authentication disabled. If disabled, remote write operations, e.g. changing the configuration from a remote host, are not allowed.
1	Write authentication enabled. If enabled, the user needs to enter the <u>WritePassword</u>◻[33] before being able to change configuration or perform other 'writing operations.

`Port`

specifies the port *CodeMeter WebAdmin* is listening for HTTP requests. The default value is 22352.

`PreparedBorrowingConfiguration`

specifies that the configuration of Prepared License Borrowing in *CodeMeter WebAdmin* is enabled or not.

> ⓘ Please note, that Prepared License Borrowing supports only *Firm Codes* smaller than 6000000.

Value	Description
0	Prepared License Borrowing configuration disabled (default).
1	Prepared License Borrowing configuration enabled. If enabled, the parameters <u>MaxBorrowDuration</u>◻[30] and <u>MaxBorrowQuantity</u>◻[31] can be specified.

`ReadAuthenticationEnabled`

specifies whether a read authentication is required or not.

Value	Description
0	Read authentication disabled (default). If disabled, remote write operations, e.g. changing the configuration from a remote host, are not allowed.
1	Read authentication enabled. If enabled, the user needs to enter the <u>ReadPassword</u>◻[32] before being able to see any *CodeMeter WebAdmin* page.

`ReadPassword`

contains the password required to be entered, if <u>ReadAuthenticationEnabled</u>◻[32] is set to a value of `1`(enabled).

`RemoteRead`

specifies whether it is possible to read from a remote host.

Value	Description
0	Remote reading is disabled (default).
2	Remote reading is enabled.

UserAuthentication

CodeMeter Versions smaller than 6.60:

contains the hashed *CodeMeter WebAdmin* password, if <u>DigestAuthentication</u>□[32] is enabled.

CodeMeter Versions equal to or newer than 6.60:

Obsolete parameter.

> Please use <u>WritePassword</u>□[33] instead.
> <u>UserAuthentication</u>□[33] is read only for transferring the configured password to <u>WritePassword</u>□[33] the first time the user enters it.

UserName

contains the *CodeMeter WebAdmin* user name, if <u>DigestAuthentication</u>□[32] has been enabled.

WritePassword

contains the password required to be entered, if <u>DigestAuthentication</u>□[32] has been enabled.

2.6.5   HTTPS

CertificateChainFile

specifies the path to the certificate chain file required for HTTPS communication. The default value is platform dependent:

Windows `C:\ProgramData\CodeMeter\WebAdmin\SelfSignedCert.pem`

Linux `/var/lib/CodeMeter/WebAdmin/SelfSignedCert.pem`

macOS `/Library/Application Support/CodeMeter/WebAdmin/SelfSignedCert.pem`

Enabled

specifies whether HTTPS communication is activated or not.

Value	Description
0	HTTPS is disabled (default).
1	HTTPS enabled.

Port

specifies the port the *CodeMeter WebAdmin* is listening for HTTPS requests. The default value is 22353.

PrivateKeyFile

specifies the path to the private key file required for HTTPS communication. The default value is platform dependent:

Windows `C:\ProgramData\CodeMeter\WebAdmin\key.pem`

Linux `/var/lib/CodeMeter/WebAdmin/key.pem`

macOS `/Library/Application Support/CodeMeter/WebAdmin/key.pem`

`MinimalTLSVersion`

specifies the minimal TLS version which used for HTTPS communication.
The value can range from "1.0" to "1.3". The default value is "1.3".

2.6.6 ServerSearchList

`UseBroadcast`

specifies whether automatically licenses on servers are searched for, first locally and then in the network (subnet), i.e. whether a so-called broadcast is performed.

Value	Description
0	Broadcast disabled.
1	Broadcast enabled (`255.255.255.255` is automatically added) (default).

`Server1, Server2, ...`

specifies the access to and order of *CodeMeter* network LAN and WAN (Wide Area Network) servers in separate list entries. By default, a broadcast (`255.255.255.255`) is specified.

For LAN network servers, the IP address or name entry are possible.

```
[ServerSearchList\Server1]
Address=184.45.89.5

[ServerSearchList\Server2]
Address=185.55.78.6
```

For WAN servers next to the required "`https:\\`" IP address also the 'User' and 'Password' credentials are required. The password will automatically be converted to PasswordSecure.

```
[ServerSearchList\Server3]
Address=https://my.product.com/cmwantest"
PasswordSecure=****
User=user1
```

2.6.7 TripleModeRedundancy

`TmrEnabled`

specifies whether Triple Mode Redundancy (TMR) is active or not.

Only to be used in a TMR Server Setup for using a CodeMeter Backend Server.

Value	Description
0	disable (default)
1	enable

Please note, that if enabled, at the same time, local and shared memory accesses to this *CodeMeter* instance except for *CodeMeter WebAdmin* and *CodeMeter Control Center* are disabled.

Also *CmLAN* is not supported for TMR Servers.

2.7 CodeMeter Control Center

CodeMeter Control Center serves to locally configure *CodeMeter License Server*. Software-sided, *CodeMeter License Server* as the runtime environment is at the heart of *CodeMeter*. It allows the access to *CmContainer*. In doing so, *CmContainer* can be locally connected or are available on a network. By default, *CodeMeter License Server* is installed as service or deamon (Linux, macOS) and automatically starts when the system starts.

When the service has been started, other programs are available to access licenses stored in *CmContainer* and use protected data areas in a *CmContainer*.
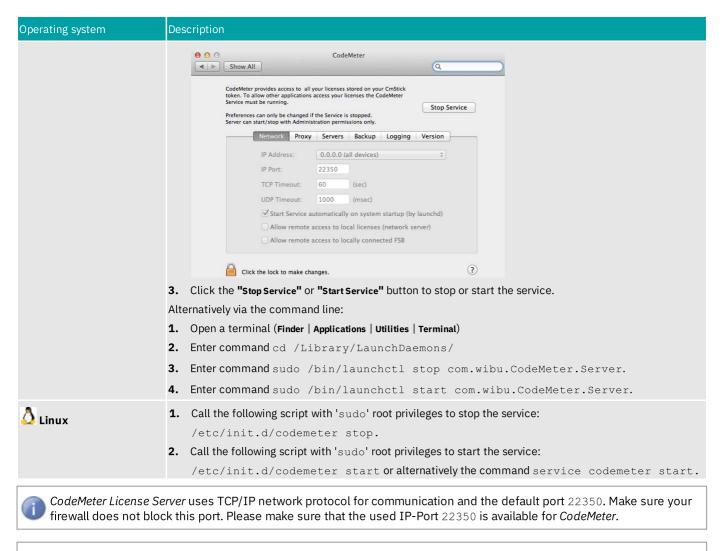
Operating System	Menu Control
Windows	[Start - All Programs - CodeMeter - CodeMeter Control Center]
	Press "Windows" key to open Start screen | Type "CodeMeter Control Center" | Press "Enter" key.
macOS	[Programs - CodeMeter - CodeMeter Control Center
Linux	[Applications - System - CodeMeter Control Center] or [Applications - Accessories - CodeMeter Control Center]

> *CodeMeter License Server* starts only one-time on each PC!

Start and Stop *CodeMeter*-service or daemon

The following table shows you for different operating systems how start or stop the *CodeMeter* service or daemon.

Operating system	Description
Windows	1. Navigate via **"Windows | Control Panel | Administrative Tools | Services"** to *CodeMeter License Server*. 2. Right mouse-click and **'Start'** or **'Stop'** the service. Alternatively, use the **"Action ▢39 "** menu of *CodeMeter Control Center*.
macOS	1. Navigate via **"System preferences | Other"** to the *CodeMeter* icon. 2. Click the *CodeMeter* Icon. The CodeMeter dialog displays

Operating system	Description
3. Click the **"Stop Service"** or **"Start Service"** button to stop or start the service. Alternatively via the command line: 1. Open a terminal (**Finder** | **Applications** | **Utilities** | **Terminal**) 2. Enter command `cd /Library/LaunchDaemons/` 3. Enter command `sudo /bin/launchctl stop com.wibu.CodeMeter.Server.` 4. Enter command `sudo /bin/launchctl start com.wibu.CodeMeter.Server.`

![Linux] **Linux**	1. Call the following script with '`sudo`' root privileges to stop the service:
	
	   `/etc/init.d/codemeter stop.`
	
	2. Call the following script with '`sudo`' root privileges to start the service:
	
	   `/etc/init.d/codemeter start` or alternatively the command `service codemeter start.`

> *CodeMeter License Server* uses TCP/IP network protocol for communication and the default port `22350`. Make sure your firewall does not block this port. Please make sure that the used IP-Port `22350` is available for *CodeMeter*.

> For functioning HTTP communication with a *CodeMeter Cloud Server* and using *CmCloudContainers*, port 80 must be enabled.
> Port 443 for HTTPS (Hypertext Transfer Protocol over TLS/SSL) where files are downloaded over an encrypted channel is not required as encrypted communication is part of *CodeMeter Cloud*. .

2.7.1   Structure and Navigation

Figure 2: *CodeMeter Control Center* - Overview

The *CodeMeter Control Center* user interface is divided in three separate areas:

- menu bar[38] (**1**)
- Tab areas (**2**)
- *Status and Open CodeMeter WebAdmin*[46] (**3**).

Starting *CodeMeter Control Center*

You access and start *CodeMeter Control Center* in several ways:

Open
• Double-click on the *CodeMeter* ⟳ or ⟳ symbols in the info area of the Windows task bar
• Right mouse-click on the *CodeMeter* ⟳ or ⟳ symbol there, and subsequently select the **"Show"** menu item.

The *CodeMeter Control Center* secondary menu (right mouse-click on the *CodeMeter* symbol) provides the additional menu items:

Item	Description
WebAdmin	Starts *CodeMeter WebAdmin* in the default Internet browser.
Eject all CmDongle(s)	Option to safely disconnect *CmDongles*.
Disable CmDongle	Prompt to insert the Cm*Dongle* Password.
Help	Opens the *CodeMeter* help.
About	Shows general information on *CodeMeter* components.
Quit	Exits but not shuts down the service *CodeMeter License Server*.

• Navigation by the **"Start | All Programs | CodeMeter Control Center"** start menu (⊞ Press "Windows" key to open Start screen | Type "CodeMeter Start Center" | Press "Enter" key).

In the info area of the Windows task bar, different colors of the *CodeMeter*® symbols represent different status conditions of connected *CmContainer.*

Color	Status
Grey ⟳	No *CmContainer* is connected, or *CodeMeter License Server* is not started.
Green ⟳	An activated *CmContainer* is connected.
Blue ⟳ **double**	Several *CmContainer* are connected and activated until disconnected.
Yellow ⟳	A *CmDongle* is connected and activated until it is disconnected.
Red ⟳	A deactivated *CmContainer* is connected.

Figure 3: *CodeMeter* Symbols Windows Task Bar

2.7.2 Menu Bar

File Menu

Element	Description
Import license	In order to import license contents using *CodeMeter Control Center*, proceed as follows:
	1. Select the ⟳ **"File	Import License..."** item.
	2. Select in the following **"Import CodeMeter License Contents ..."** dialog the *CodeMeter* files of the types `*.WibuCmRaU`; `*.wbb`; `*.wbc` and read in license data by clicking on the **"Import** button.
	Figure 4: *CodeMeter Control Center* - Import Licenses
	ⓘ Alternatively, you can also directly import the license file using the Windows Explorer. Simply drag & drop the file in the **License** tab area of *CodeMeter Control Center*.

Element	Description
WebAdmin	Opens *CodeMeter WebAdmin* in the default Internet browser. Alternatively, press the key combination `<CTRL>+W`.
Logging ✔	Saves all *CodeMeter* events to a log file. Alternatively, press the key combination `<CTRL>+L`.
	ℹ When you activate the logging, this also affects the logging display in *CodeMeter WebAdmin* on the "**Diagnosis**📄74 " page.
	The event log files are located in the following directories for the different operating systems:
	⊞ Windows `ProgramData/CodeMeter/Logs`
	🐧 Linux `/var/logs/CodeMeter`
	🍎 macOS `Library/Logs/CodeMeter`
	ℹ These log files are especially important for trouble shooting and rotate📄44 .
Preferences	Opens *CodeMeter WebAdmin* and is defaulted on the page where you are able to apply network settings📄84 .
Exit ✖	Exits *CodeMeter Control Center*. Alternatively, press the key combination `<CTRL>+Q`.
	ℹ The service*CodeMeter License Server* however is not shut down.

Processes Menu

Element	Description
Eject all CmDongles ⏏	Ejects all connected *CmDongles* in one go. Alternatively, press the key combination `<CTRL>+ALT+Q`.
Defragment License Memories	Defragments the license memory of the selected *CmContainer*. Alternatively, press the key combination `<STRG>+ALT+D`.
Update Time Certificates	Updates the time certificates in the selected *CmContainer*. All time stamps are refreshed.
Start CodeMeter Service ▶	Starts the service *CodeMeter License Server*.
	ℹ *CodeMeter License Server* is registered as a Windows service and can be started with user privileges. For stopping the service, however, you need administrator privileges under Windows (System Settings | Management | Services).
Repair Hardware Configuration 🔧	Repairs the hardware configuration of the *CmDongle* form factors SD Card and CF Cards. This tool is required if the *CmCard* hardware is not listed in the license list of *CodeMeter Control Center*.
Stop CodeMeter Service ⏹	Stops the service *CodeMeter License Server*.
	ℹ The stopping of the *CodeMeter License Server* service requires administrator privileges under Windows (System Settings | Management | Services).
Restart CodeMeter Service 🔄	Restarts the service *CodeMeter License Server*.
	ℹ *CodeMeter License Server* is registered as a Windows service and can be started with user privileges. For stopping the service, however, you need administrator privileges under Windows (System Settings | Management | Services).

View Menu

Element	Description
Hide Window	Minimizes and hides the *CodeMeter Control Center* window back into the info area of the Windows task bar. Alternatively, press the key combination `<CTRL+M>`.
Refresh	Refreshes the display of all connected *CmContainer*. Alternatively, press the key `<F5>`.
Zoom in	Enlarges the display in the **Events** tab area. Alternatively, press the key combination `<CTRL>++`.
Zoom out	Scales down the display in the **Events** tab area. Alternatively, press the key combination `<CTRL>+-`.
Copy Event Content	Copies the event actions in the **Events** tab area to the clipboard. Alternatively, press the key combination `<CTRL>+C`.
Clear Event Content	Deletes the event actions in the **Events** tab area. Alternatively, press the key combination `<ALT>+C`.
Show all connected CmContainer	Shows all connected *CmContainer* including details in the **Events** tab area. Alternatively, press the key combination `<ALT>+S`.
List all open Handles	Shows all open handles in the **Events** tab area. Handles work as references for the developer for further programming.
Show all available License Entries	Shows all *CmContainer* license entries in the **Events** tab area. Alternatively, press the key combination `<ALT>+E`.
Borrow visible	Toggles between a visible and not visible **Borrowing** tab area. By default, starting with *CodeMeter* Version 6.00a this tab area is not visible.

Help Menu

Element	Description
Help	Opens the *CodeMeter* online help. Here you access the help files on *CodeMeter License Server* and *CodeMeter Control Center*.
Register CmDongle	Opens the secure website https://my.codemeter.com to register *CmDongles*.
About	Informs on the started *CodeMeter Control Center* version.

2.7.3 License Tab

The **"License"** Tab shows you information on connected *CmContainer* and provides some options to configure connected *CmContainer*. Moreover, you are able to update licenses located in your *CmContainer* using the *CmFAS Assistant*[47] .
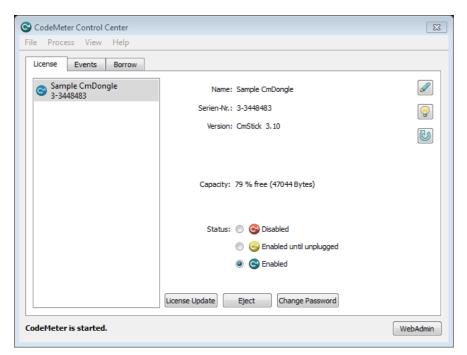
Figure 5: *CodeMeter Control Center* License Tab

Element	Description
Name	Changes and displays the name of the selected *CmContainer*. In the subsequent dialog you can edit the name. Figure 6: *CodeMeter Control Center* - Change Name of *CmContainer*
	Flashes the LEDs of the selected *CmStick*. This eases the identification of a *CmStick,* if several *CmSticks* are connected.
	Updates the firmware of the selected *CmDongles*. This guarantees the correct execution of essential functions, and solves eventually occurring problems. When you execute a firmware update, you require an Internet connection. Then *CodeMeter Control Center* automatically connects to the Firmware Update Server of Wibu-Systems. You are prompted to enter your *CmDongle* Password in order to confirm this action. The update may take a couple of minutes. You <u>must not</u> remove the *CmDongle* before this process is finished. Otherwise, irreparable damage of the *CodeMeter* SmartCard Chip may occur.
Capacity	Informs on the capacity of the *CodeMeter* SmartCard Chip of a selected *CmDongle*. The capacity is displayed in percent format, and by number of absolute bytes. Please note that this value tells nothings about the memory allocation of an eventual flash memory of a *CmDongle*.
Status	The status group informs on the activation status of the selected *CmDongle*.

Color	Status
	The connected *CmContainer* is disabled. No licensed application can use license information in the *CmContainer*. This is may be the case, if a *CmActLicense* license is 'broken'.

Element	Description	
	Color	Status
	  Then the **"Repair license"** button is available to eventually repair the license. If this is not successful, the following error message displays. In this case, only a reactivation is helpful. Please contact your software vendor. For information on eventual reasons for a 'broken' license als a look at the log on the Events□44 tab may be helpful.	
	The *CmDongle* is enabled as long as it is connected. If the *CmDongle* is removed from the PC, automatically the licensed access by applications is deactivated.	
	The *CmContainer* is fully enabled. In the case of a *CmDongle,* the licensed access of applications is still featured even if the *CmDongle* is removed.	

 Wibu-Systems recommends the activation status **"Enabled until plugged out".**

This ensures that even when a *CmDongle* is lost, unauthorized access to the licenses and personal data in the *CmDongle* is not possible.

Changing Activation Status

In order to change the activation status, please proceed as follows:

1. Select the radio button of the desired status option.

2. Enter the *CmDongle* Password in the following dialog.

 The default password for *CmDongle* is "`CodeMeter`".

Element	Description
	Figure 7: *CodeMeter Control Center* - Enter Password **3.** Click the **"OK"** button to confirm the status change.
License Update	Click this button to request new, or update existing licenses for selected *CmContainer*. The *CodeMeter Field Activation Service* (CmFAS) Assistant⌐47 opens. Figure 8: *CodeMeter Control Center* - CmFAS Assistant
Eject	Click this button to disconnect the selected *CmDongle*. The *CmDongle* logs off from the operating system, and can be safely removed from the PC.
Change Password	Click this button to change the password of the selected *CmDongle*. In the following **"Change Password"** dialog please complete the respective fields. Figure 9: *CodeMeter Control Center* - Change Password **1.** Enter in the **"Old Password"** field the currently used *CmDongle* password. ℹ The default password for *CmDongle* is "CodeMeter". **2.** Enter in the **"New Password"** field the new desired *CmDongle* password. **3.** Re-enter in the **"Retype Password"** field the new desired *CmDongle* password. ℹ If you forgot the *CmDongle* password, you have the option to set a new *CmDongle* password by using the *CmDongle* Master Password. **4.** Click the **"OK"** button to confirm your input.

Element	Description
	5. Activate the **"Input Master Password"** option and specify your *CmDongle* Master Password in the **"Old Password"** field.
	A Master Password you have received when you registered at the website my.codemeter.com.
	In order to register, use the **"Help	Register CmDongle"** menu item.
	A registration bears several advantages and serves to provide security when using *CodeMeter*. Only when you are registered loosing the own password can be remedied by requesting a Master Password.

2.7.4 Events Tab

This tab displays information at start and at runtime of *CodeMeter License Server* and comprises the following items:

- number of connected *CmContainer*
- number of *CmContainer* entries
- number of found license container at the *Firm Item* level
- accesses to *CodeMeter License Server*

You configure the display of the event list using the "**View | ...** 40 " menu item.

You log the content for the event view using the "**File | Logfile** 39 " menu item.

Rotation event log file

Starting with *CodeMeter* version 7.50 the event log files are rotated and written to different files one by one.

The naming of the file names follows the pattern:

```
CodeMeter<Date>-<Time>.log
```

`Date` is `UTC`
`Time hhmmss` without ":"

The event log files are located in the following directories for the different operating systems:

Windows	`ProgramData/CodeMeter/Logs`
Linux	`/var/logs/CodeMeter`
macOS	`Library/Logs/CodeMeter`

By default, the rotation is automatically performed after a period of 24 h or after a file size that exceeds 10 MB.

These default settings can be configured manually in profiling 26 . The parameters are only re-read when starting *CodeMeter License Server*.

2.7.5 Borrowing Tab

By default, starting with *CodeMeter* Version 6.10 this tab displays only, if borrowing clients entries exist programmed with the previous concept of borrowing using prepared *CmContainer*.

This tab informs on borrowable licenses as a feature of *CodeMeter* license borrowing. Then licenses can also be used when the access to license information does not require to be connected to the license server.

You can toggle the view of this tab using the "**View | Borrow visible**" menu item.

Figure 10: *CodeMeter Control Center* - Borrowing Tab

License Server

On the right, you see all licenses available for the 'License Borrowing' feature. The licenses are ordered by existing license server, *Firm Items*, and *Product Items*. The displayed licenses either are borrowable or inactive.

> You can borrow only active licenses. You recognize active licenses by the colored symbol and the activated **"Borrow"** button.
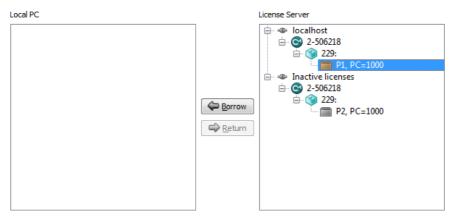
Figure 11: *CodeMeter Control Center* - Borrow Licenses

1. Click on the **"Borrow"** button to borrow licenses from the license server for the local PC.

Local PC

On the left, all licenses borrowed for the local use on a PC from a license server are displayed.

These licenses are deactivated according to the defined borrowing period. However, you also have the option to return borrowed licenses before the borrowing period expires.

1. Click on the **"Return"** button to return borrowed licenses, and make them available again for the license server.
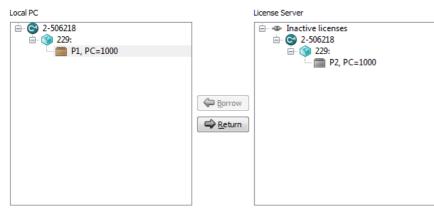
Figure 12: *CodeMeter Control Center* - Return Licenses

> For refreshing the display of the tab press the key `<F5>` or the **"Refresh"** button.

2.7.6 Status and Starting CodeMeter WebAdmin

Status

This area displays information on the *CodeMeter License Server* status, i.e. if this service is started or not. If you want to change the status, use the **"Process | Stop CodeMeter Service"** or **"Process | Start CodeMeter Service"** menu items.

WebAdmin

Click this button to open *CodeMeter WebAdmin*. Alternatively, you can use the **"File | WebAdmin"** menu item.

2.8 Importing and Updating Licenses

The _CmFAS Assistant_[47] supports you in importing and updating license files for your _CmContainer_. Alternatively[127] , you can also use the command line program _cmu - CodeMeter Universal Support Tool_.

Using various dialogs you manually create license requests, import license updates, and, optionally, create receipts for these operations the end-user then sends to the software vendor. Using license files also allows the activation of licenses on a PC which has no direct Internet access. The figure below illustrates this process.

> ⚠️ Please note that importing license updates files (`*.WibuCmRaU`) is currently <u>not</u> supported for a _CmContainer_ in operation.
> <u>Before</u> a license update, please save your work and close all other running _CodeMeter_© protected applications which access licenses on the target _CmContainer_.
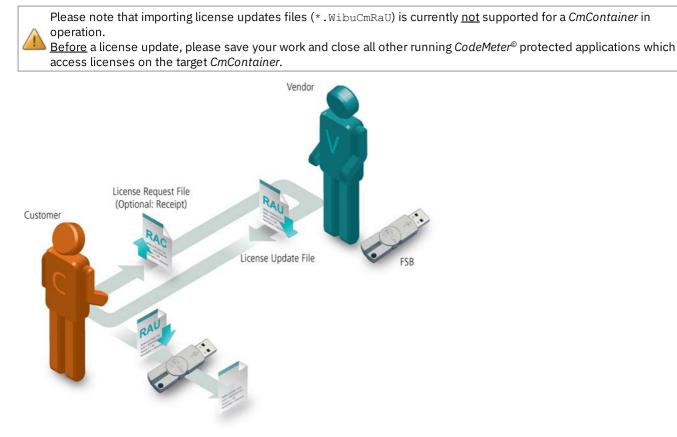
Figure 13: _CmFAS_ - File-based Remote Update

2.8.1 The CmFAS Assistant in CodeMeter Control Center

> ⚠️ Please note that importing license updates files (`*.WibuCmRaU`) is currently <u>not</u> supported for a _CmContainer_ in operation.
> <u>Before</u> a license update, please save your work and close all other running _CodeMeter_© protected applications which access licenses on the target _CmContainer_.

1. Open _CodeMeter Control Center_. If several _CmContainer_ are connected to the computer, select the desired _CmContainer_.
2. Click on the **"Update License"** button.
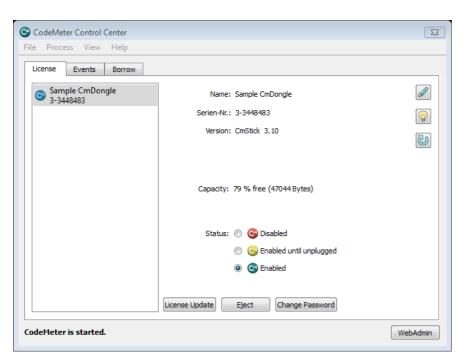
Figure 14: License Update - *CodeMeter Control Center*

The *CodeMeter Field Activation* (CmFAS) Assistant opens with a welcome dialog.

Figure 15: *CmFAS Assistant*

3. Click the **"Next"** button.

2.8.1.1 Create License Request File

The starting dialog prompts you to proceed. There you select from creating a license request, import a license update you received from the software vendor, or, optionally, create a receipt after an update to send it to the software vendor. After your selection click the **"Next"** button.

Figure 16: *CmFAS* - Create License Request

2.8.1.11 Extend Existing License

On creating a license request, you select whether you want to extend an existing license, or add a license of a new vendor. After your selection click the **"Next"** button.

Figure 17: *CmFAS* – Extend existing License

When you extend an existing license, select the software vendor(s) for which you want to create a license request. After your selection click the **"Next"** button.

Figure 18: *CmFAS* - License Extension - Select Vendor

The next dialog allows you to save the license request file to a desired location. Then click the **"Commit"** button to create the file. This file you then can send by e-mail to the software vendor.

Figure 19: *CmFAS* – License Extension – Save File

Finally, a dialog displays which confirms the successful creation of the license request file. Click the **"Finish"** button to close the dialog.

2.8.1.12 Add a License of a new Producer

On creating a license request you can decide to extend an existing license, or to add a license of a new vendor. Select **"Add license of a new vendor"** and click the **"Next"** button.

Figure 20: *CmFAS* – New License

In the next dialog, specify the *Firm Code* you received by the software vendor, and click the **"Next"** button.

Figure 21: *CmFAS* – *Firm Code*

The next dialog allows you to save the license request file to a desired location. Then click the **"Commit"** button to create the file. This file you then can send by e-mail to the software vendor.
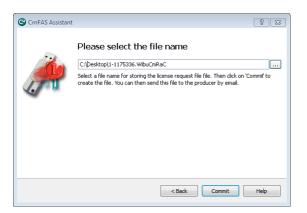
Figure 22: *CmFAS* - Save File

In both case, either when extending or adding a license you receive a confirmation the license request file has been successfully created. Click on the **"Finish"** button to complete this process.

Figure 23: *CmFAS* - Receipt

2.8.1.2 Import License Update

> Please note that importing license updates files (*.WibuCmRaU) is currently <u>not</u> supported for a *CmContainer* in operation.
> <u>Before</u> a license update, please save your work and close all other running *CodeMeter®* protected applications which access licenses on the target *CmContainer*.

In order to import a license update, in the start dialog select the respective option, then click the **"Next"** button.

Figure 24: *CmFAS* - Import License Update

In the next dialog, select the file name you used when saving the license update file you received. Then click the **"Commit"** button to import the license update file.

Figure 25: *CmFAS* - License Update - Save File

The following dialog confirms the successful import. Optionally, you can send a receipt to the software vendor. This option you also have in the start menu. Click the **"Finish"** button.

Figure 26: *CmFAS* - License Update - Receipt

2.8.1.3   Create Receipt

In the start menu, select the option **"Create Receipt"**, then click the **"Next"** button.

Figure 27: *CmFAS* - Create Receipt

In the next dialog, select the software vendor you want to send the receipt to, then click the **"Next"** button.

Figure 28: *CmFAS* - Create Receipt - Producer

Save the receipt file using the **"Commit"** button and send it to the software vendor.

Figure 29: *CmFAS* - Create Receipt - Save File

The successful creation of the receipt file is confirmed in the next dialog. Click on the **"Finish"** button to complete this process.

Figure 30: *CmFAS* - Create Receipt - Receipt

2.9 CodeMeter WebAdmin

With *CodeMeter WebAdmin* you obtain information on connected *CmContainer* and available licenses stored in them. In addition, you configure the service *CodeMeter License Server*. In detail, *CodeMeter WebAdmin* provides many configuration and analysis options in the following areas:

- status information: host ⬚ 59 , *CmContainer* ⬚ 60
- **configuration** ⬚ 74 : use as network server, proxy settings, access protection, remote access, time server, backup
- **display** ⬚ 68 : display of all existing licenses locally and on the network, view of license conditions, session information
- **management** ⬚ 70 : management of network licenses by manual allocation of licenses
- **diagnosis** ⬚ 74 : logging
- **backup** ⬚ 83 .

> *CodeMeter WebAdmin* has a separate service process. Two ports are available for the TCP communication. For the HTTP ⬚ 32 protocol the port 22352 (default) and for the HTTPS ⬚ 33 protocol the port 22353. The ports can be changed in profiling.
>
> By default, *CodeMeter WebAdmin* uses the encryption protocol TLS 1.3 for secure data transmission (Transport Layer Security).
>
> In justified individual cases, deviating versions can be set via profiling ⬚ 34 .

Start and Stop *CodeMeter WebAdmin*-service or daemon

The following table shows you for different operating systems how start or stop the *CodeMeter WebAdmin* service or daemon.

Operating system	Description
Windows	1. Navigate via **"Windows | Control Panel | Administrative Tools | Services"** to *CodeMeterWebAdmin*. 2. Right mouse-click and **'Start'** or **'Stop'** the service.
macOS	Via the command line: 1. Open a terminal (**Finder | Applications | Utilities | Terminal**) 2. Enter command `cd /Library/LaunchDaemons/` 3. Enter command `sudo /bin/launchctl start com.wibu.CodeMeter.WebAdmin.` 4. Enter command `sudo /bin/launchctl start com.wibu.CodeMeter.WebAdmin.`

Linux	1. Call the following script with '`sudo`' root privileges to stop the service:
	`/etc/init.d/codemeter-webadmin stop.`
	2. Call the following script with '`sudo`' root privileges to start the service:
	`/etc/init.d/codemeter-webadmin start` or alternatively the command `service codemeter-webadmin start.`

Terms used

The following list briefly describes terms which recur on single pages in *CodeMeter WebAdmin*.

Term	Description
Access Mode	see: Status
Activation Time	Informs on the activation time of a license, i.e. the start time of a valid license.
Borrow Licenses	Informs on existing borrowed licenses, the borrowing period, and a unique security identifier (SID) when used on a network.
Currently Borrows Licenses	Number of the currently borrowed licenses.
Expiration Time	Informs on the expiration date of a license, i.e. when the license expires.
Extended Protected Data	Additional entry field for binary data for the licensor.
Feature Map	Informs on licenses which the licensor delivers with different functionalities and modules, or in different versions. These are mapped by *Feature Maps* describing a special functional scope. The value specified here informs on the valid functionality or the activated module/version.
Firm Code	Number which identifies the separate license container of a licensor.
Hidden Data	Additional entry field for binary data for the licensor.

Term	Description
Implicit Firm Item (IFI)	The license container holding licenses the users are able to use only with their *CmDongle* Password. This license container is identified by the number of "0".
License Quantity	Informs on the total number of licenses available for a license.
Linger Time	Informs on the time how long the license lingers after the license is re-allocated after the protected application is closed.
Maintenance Period	Informs on the period in which a protected version of the software has to be released to represent a licensed version. The start and the end of the period displays.
n/a	Informs that no related entry exists for this license (not available).
Named User	informs about licenses that have Named User entries. Values are UserName, UserDomain, UserDefined, SingleAllocation for single NamedUser entries or name lists with ID (NameList(NameListId)).
Product Code	Number which identifies the license entry, i.e. a product, of a licensor.
Protected Data	Additional entry field for binary data for the licensor.
Secret Data	Additional entry field for binary data for the licensor.
Status	Informs on how the number of started instances of a protected software relates to the allocation of licenses (access modes). *User Limit*: here each started instance allocates a license. *Shared*: here several started instances of the same application on the same PC allocate only a single license. *Exclusive*: here a protected application runs only <u>once</u> on a PC. *No User Limit*: here any number of started instances of the protected application can be started on the network without allocating additional licenses.
Unit Counter	Informs on licenses which are billed by use (pay-per-use, pay-per-print, etc.). This is implemented by counters which are decremented on use of a product. The value specified here informs on remaining units for the use of a license.
Universal Data	informs on the different Universal Data types (keys, data, passwords) and permissions for read, write, and/or use access.
Usage Period	Informs on the usage period of a license. The value specified here informs on the use of a licenses in days. The value can also be bound to a starting time for the validity of a license.
User Data	Additional entry field for binary data for the licensee.

Table 2: *CodeMeter WebAdmin* - Terms in License Display

If *CodeMeter WebAdmin* should not start, please proceed as follows:

1. Check if the used Internet browser is not set to "offline mode".
2. Check the JavaScript support of your Internet browser.

> ℹ JavaScript must be activated for effective using *CodeMeter WebAdmin*.

3. Type in the URLs: http://localhost:22350 or http://127.0.0.1:22350 directly in the address field of your Internet browser.

The use of TCP/IP in *CodeMeter*

The communication between protected applications and *CodeMeter License Server* bases on the Transmission Control Protocol/Internet Protocol (TCP/IP). This is valid not only for locally existing licenses, but also for licenses which are provided via a network.

By default, *CodeMeter* uses the port 22350 registered by Wibu-Systems at IANA (Internet Assigned Numbers Authority) and uniquely assigned for the *CodeMeter* communication. The list of assigned ports can be viewed at www.iana.org/assignments/port-numbers.

In order to make available a client access to a *CodeMeter License Server* on the network, a communication using the *CodeMeter* port must be supported. If the server should locate in another network area, eventually the port must be made known and accessible as part of the infrastructure (router, firewall, etc.).

For the direct access to *CodeMeter License Server* on the network, the communication bases on TCP. For an automatic search of servers on the network, additionally a broadcast via UDP (User Datagram Protocol) is performed (it is listened only at server search time and only until the end of the UDP Waiting Time).

> The access using the *CodeMeter* port is performed only for the access to *CodeMeter License Servers* and this only within the organization which runs the network server.
>
> In particular, using this port **no** communication into the internet is performed.

In *CodeMeter* settings of *CodeMeter WebAdmin* an option exist to configure 🗋84 the *CodeMeter* port to a value other than the default of 22350. However, such a change should have plausible reasons, e.g. in the case of parallel test environments on the same network. In addition, such a change requires the same configuration of all affected *CodeMeter License Servers*.

2.9.1   Basics

TCP/IP based

Communication between *CodeMeter WebAdmin* and connected *CmContainer* is browser-based and uses network components. Thus the installation of the network protocol TCP/IP is required, and access must be granted to the `localhost`.

> However, an actual connection to the Internet is not established.

Network Server and Server Access

By default, *CodeMeter License Server* is only available locally (`localhost`).

> A change of the remote access to CodeMeter WebAdmin 🗋78 during operation requires a restart of the *CmWebAdmin* service. Please note the firewall settings.

Firewall Settings

Please also note that the settings of your firewall do not block communication.

> *CodeMeter License Server* uses a specific IP port (defaulted on `22350`) to communicate with your PC and the network. This network port is registered at IANA (Internet Assigned Numbers Authority) and uniquely assigned for *CodeMeter* communication.
>
> Make sure that your firewall is not blocking this port. Enable the used IP port `22350` and make sure it is accessible by *CodeMeter*, i.e. share the communication for this IP port.
>
> If the *CodeMeter WebAdmin* communication is required not only locally but also in server operation, you must also release port `22352` (in the case of HTTPS, port `22353`), since port `22350` is automatically forwarded.

Communication Mode

By editing registry or server entries you are also able to define which communication mode *CodeMeter License Server* uses.

The following table shows you where for which operating system you find the profiling to set the communication mode.

Operating system	Registry / Server Entry
Windows	`HKLM/SOFTWARE/WIBU-SYSTEMS/CodeMeter/Server/CurrentVersion`
macOS	`/Library/Preferences/com.wibu.CodeMeter.Server.ini`
Linux	`/etc/wibu/CodeMeter/Server.ini`

The parameter **ApiCommunicationMode.** is available for setting the mode. The following properties are available:

CodeMeter-Version	Properties
smaller than 4.40	`'1'` TCP/IP (Default)
	`'2'` Shared Memory
starting with 4.40	`'1'` Platform-specific (Default)
	Platform-specific defaults:
	• Windows: IPv6, IPv4; Shared Memory
	• Linux/macOS:IPv6, IPv4
	• WinCE: IPv4, Shared Memory

CodeMeter-Version	Properties
	'2' Shared Memory
	'4' IPv4
	'8' IPv6
	Single modi may be combined.

> ℹ️ Wibu-Systems recommends to use the relevant default settings, if no justified reasons suggest otherwise.

2.9.2   Open CodeMeter WebAdmin

CodeMeter WebAdmin is a web-based tool to be displayed with any standard internet browser.

The following table shows existing start options.

Operating System	Start
Windows	• via *CodeMeter* symbol in the task bar (right mouse-click) and selection of 'WebAdmin' item. • via the 'WebAdmin' option in *CodeMeter Control Center* • directly in your Internet browser when typing in the URLs: **http://localhost:22352** or **http://127.0.0.1:22352**.
macOS / Linux	• via *CodeMeter* in the task bar (right mouse-click) and selection of 'WebAdmin' item. • via the 'WebAdmin' option in *CodeMeter Control Center* • directly in your Internet browser when typing in the URLs: **http://localhost:22352** or **http://127.0.0.1:22352**.

If *CodeMeter WebAdmin* should not start, try the following:

1. Check if the used Internet browser is not set to "offline mode".
2. Check the JavaScript support of your Internet browser.

> ℹ️ JavaScript must be activated for effective using *CodeMeter WebAdmin*.

3. Type in the URLs: `http://localhost:22352` or `http://127.0.0.1:22352` directly in the address field of your Internet browser.

On all pages you are able to select from a list of available server.

Right to the display **"Current Server"** follows the name of the actual PC on which the service *CodeMeter License Server* is started. A search request using the port `22352` is sent to the network. For changing the server, please proceed as follows:

1. Click the 🔶 icon.

    A dialog displaying a list of all available server displays.

Figure 31: *CodeMeter WebAdmin* – Available Server

2. Select another PC on which *CodeMeter* is also started and the service *CodeMeter License Server* runs.

    The entry changes color to orange and the **"Apply"** button becomes operable.

3. Click the **"Apply"** button.

4. Check the **"Use IP Address"** check box, if you want to use the IP address.

2.9.3 Operating

CodeMeter WebAdmin uses the following elements covering the navigation through the pages, the display of information, and actions.

Navigation element	Description
License Monitoring ⌄ All Licenses Sessions License Tracking	Classical tab menu including dropdown controls.
Server Configuration ⟩ Server Access	Breadcrumb trail navigation area.
⌄ ⌄ ⌃ ⌃ or › ‹	Expand or collapse additional detailed information.
R W	The pictograms inform on **R**ead and **W**rite access. On mouse over tool tips display additional access mode details. A click on a pictogram opens - if required - the login on a separate page. Depending on the configured access modes a dropdown menu provides the following entries: • **Allow write access** • **revoke read access** • **Revoke read/write access** For access settings see [WebAdmin configuration page](#)⬚78 . A click on a pictogram opens - if required - the login on a separate page.

Display element	Description
	Image to show that the *CmContainer* is a *CmDongle*.
	Image to show that the *CmContainer* is a *CmActLicense*.
	Image to show that the *CmContainer* is a *CmCloudContainer*.
	Image to show that the *CmContainer* is a virtual *vCmContainer.*
	Information icon changing its color from orange to red informs on important information to read and respond, e.g. restarting of *CodeMeter License Server.*
O	Icon displaying license transfer options. Hover over control changes color to orange and displays information. A click advances to the *Product Item* detail page.
H	Icon displaying license transfer history. Hover over control changes color to orange and displays information. A click advances to the *Product Item* detail page.

Action element	Description
	Opens a dialog to select available server.
	Defragmenting of the *CmDongle* chip memory.
	Updating the *Certified Time* of the *CmContainers* using a *CodeMeter Time Server*.
	Adds a new entry to a list.

Action element	Description
🗑	Deletes a list entry.
⬆	Moves up a list entry a level higher.
⬇	Moves down a list entry a level lower.

2.9.4 Dashboard

The dashboard displays basic server information on the *CodeMeter* runtime.

Figure 32: *CodeMeter WebAdmin* – Dashboard

Element	Description
Current Server	Name of the machine on which the service *CodeMeter License Server* has been started.
IP Address	Shows information on the network address in use.
Operating System	Shows information on the operating system in use.
Server Startup	Shows information on the start time of the server.
Server Version	Shows information on the *CodeMeter* version on the server.
Runtime Version	Shows information on the *CodeMeter* runtime in use.
Certificate expiration time	Optionally shows details on certificates expiration times, if HTTPS has been selected as protocol and self-signed certificates are used as defined on the WebAdmin configuration page◻79 .
	Certificate expiration time: Used self signed certificate expires on 11 Nov 17 12:00 UTC. The certificate will be automatically renewed at first server restart after 10 Jan 18 12:00 UTC. This certificate renewal will trigger a browser warning.

2.9.5 Container

Using the **Container** navigation item finds information on connected *CmContainer*. This covers:

- licenses◻ 60 including detailed information on Firm Items◻61 and Product Items◻ 61 .
- CmContainer Info◻ 64
- User data◻ 65 including detailed information on Product Items◻ 66
- Backup and Restore◻ 66

> If you open a selected *CmContainer* using *CodeMeter Control Center*, only this single *CmContainer* displays. At the same time, the tab **Licenses** opens. This also is the case, if you select a single Container from the list of **All Containers**.
>
> Click **All Containers** to open a clear overview of all connected *CmContainer*.

2.9.5.1 Licenses

The expanding area **"Licenses"** displays all licenses the selected *CmContainer* holds.

Figure 33: *CodeMeter WebAdmin* – CmContainer Details - Licenses

The display of licenses is ordered by different vendors. A vendor is uniquely identified by number value, the *Firm Code*, and a name. For example, in the figure above this is the *Firm Code* "600010" of "Vendor 1".

All related products, i.e. the licenses, are listed below the single licensor holding the respective *Product Code*, defined by a unique number value.

> - If a license is expired or an *Unit Counter* has reached a value of 0, the license entry is in red writing.
> - If you see the ⓞ Ⓗ pictograms, then a license transfer🗋 100 is involved with the respective *Firm Codes* or *Product Codes*.
>
>   ⓞ inform on License Transfer Options
>
>   Ⓗ informs on the License Transfer History
>
>   On hovering the pictograms a separate popup informs, if clicking the pictogram, the **Firm Item Detail**🗋 61 - or **Product Item Detail**🗋 61 page opens.
> - Arrow symbols ↪ attached to sub-Product Code items indicate that *Module Items*🗋 111 exist.

In the figure above, this is, for example, the product "Spreadsheet Application" with the *Product Code* of 13 or the product "Chart Application" with a *Product Code* of 14. In addition, you obtain further information🗋 54 on existing **Unit Counter**, **Valid Until** (Usage Period, Expiration Time, Activation Time), **License Quantity** and **Feature Map**.

Click on the highlighted *Firm Code*🗋 61 entry for the display of more detailed information on the license conditions of products by a specific vendor.

Click on the highlighted _Product Code_□[61] ,entry for the display of more detailed information on the license conditions of products by a specific vendor.

2.9.5.2   Firm Item Details

This page displays detailed information on:

- _Firm Item_ options of the selected _CmContainer_

Element	Description
CmContainer	Name of the _CmContainer_ including mask and serial number.
Firm Access Counter	Displays the _Firm Access Counter_ reading. The _Firm Access Counter_ (FAC) locates at the _Firm Item_ level of a _CmContainer_. This counter allows to control whether a _Firm Item_ can be used for encryption purposes. By default, the FAC is deactivated and has a value of `65535 (0xFFFF)`. It can be programmed by the software vendor to any other value.
Firm Update Counter	Displays the _Firm Update Counter_ (FUC) reading. This counter is automatically incremented on programming.
Firm Precise Time	Displays the time of the _Firm Item_-programming.

- the licensing of products of a specific software vendor.

  In the following figure, for example, you see all licenses of "Vendor 1" (_Firm Code 600010_). Additional information□[54] covers **Product Code**, **CmContainer** serial number, **Name**, **Unit Counter**, **Valid Until** (Usage Period and/or. Expiration Time), **License Quantity** and **Feature Map**.

Figure 34: _CodeMeter WebAdmin_ – Firm Item Details

2.9.5.3   Product Item Details

This page displays detailed licensing information of products of a specific vendor.

The following figure shows all available information□[54] on the product "Word Processing Application" with a _Product Code_ "10" of the software vendor at the _Firm Item_ level with a _Firm Code_ of "6000010".

> The license properties as displayed in the figure above are not always set. The display of your license may differ.
>
> If license properties (Product Item Options) display in red, these properties are invalid.

Figure 35:*CodeMeter WebAdmin* – Product Item Details

Element	Description
Product Item Options	In the first column you see the *Product Item Options* and the display in the case of data fields the index field via the # character. These are license properties set by the licensor. For illustrative reason the figure lists all options. When listed in other cases, not all of these options[54] are always displayed. In the figure above you see that the license has been borrowed for the local use.
Size (Bytes)	The column the number of bytes a listed license property allocates.
Dependencies	The column informs whether a licensor has set dependencies for the programming sequence of the *CmContainer*.
Values	The final column displays the stored value of the single license property.

Display of *Universal Data* **(***UvD***)**

The detailed information of the Product Item Option *Universal Data* (*UvD)* informs on the *UvD* data types and respective access permissions for different access modes.

Figure 36: *CodeMeter WebAdmin* – Product Item Details -*Universal Data* (*UvD*)

Element	Description
Product Item Options	The column informs about the Product Item Option and displays the index field via the # character.
Size (Bytes)	The column the number of bytes a listed license property allocates.
Dependencies	The column informs whether a licensor has set dependencies for the programming sequence of the *CmContainer*.
Values	The column informs about the used *UvD* data type (Key, Data and Password).
Permissions	The column informs for each type of access (**read, write, use**) about the access permissions with the values **denied, unrestricted** or with **password required**. The field **index(es)** show which #-index field contains required passwords (a single password or additionally with master password).

2.9.5.4 CmContainer Info

The expanding area **"CmContainer Info"** displays information on the selected *CmContainer*.

Figure 37: *CodeMeter WebAdmin – CmContainer* Info

The following information and elements are available.

Element	Description
Name	Shows the `Name` of the selected *CmContainer*. If you want to change the name of your *CmContainer,* use *CodeMeter Control Center*.
Serial Number	Shows the `Serial Number` of the selected *CmContainer*.
CmContainer Type	Shows the `Type` of the selected *CmContainer*.
First Device	Shows the drive information of the selected *CmDongle* if configured as Mass Storage Device. Alternatively to the Mass Storage Device status, the *CmDongle* can display as HID without a drive status. Each status can be configured 154 . ⓘ The drive size is only displayed in the case of *CmDongles* with Flash memory.
Status	Shows the current activation status of the selected *CmContainer*. The following status settings are displayed: • **Disabled:** 🔴 The connected *CmContainer* is deactivated and not usable by any application. • **Enabled until Unplugged:** 🟠 The *CmDongle* is activated as long as it is connected and supplied by electrical energy. After removed from the PC the *CmDongle* is automatically deactivated. • **Enabled:** 🟢 The *CmContainer* is fully activated. If a *CmDongles* is removed, the license access is still possible after plug out. • **Empty:** ⚪ The *CmContainer* is empty and must yet be activated (*CmActLicense* - LIF). You change the activation status of a *CmContainer* using *CodeMeter Control Center* 38 .

Element	Description
	Wibu-Systems <u>recommends</u> the activation status **"Enabled until Unplugged"** when using *CmDongles*. This ensures that even when a *CmDongle* is lost, unauthorized access to the licenses and personal data in the *CmDongle* is lost, unauthorized access to the licenses and personal data is not possible.
System Time (PC)	Shows the **System Time** (local time on the PC) when the service *CodeMeter License Server* has started.
System Time (CmContainer)	Shows the saved **System Time** (internal time) of the *CmContainer*. These two system times may differ due to the pending synchronization process.
Certified Time (CmContainer)	Shows the *Certified Time* saved in the *CmContainer*. In order to update the *Certified Time* of your *CmContainer* using a *CodeMeter* Time Server, click the ⟳ button. This action is confirmed by a dialog. Figure 38: *CodeMeter WebAdmin* - Update Certified Time
Free Memory	Shows the **Free Memory** of the SmartCard chips of a *CmDongle*, i.e. how much space is available for the programming of additional license entries.
Defragment	Click the button to defragment the memory of the *CmDongle* chip.

2.9.5.5   User data

The expanding area **"User Data"** displays detailed <u>information</u> [54] on products (licenses) the user is able to use only explicitly with the personal *CmDongle* Password. The *Firm Code* in this case has a value of "0".

Figure 39: *CodeMeter WebAdmin* – User Data

2.9.5.6   User Data Details

The **"User Data Details"** page displays detailed Product Item information[54] on products (licenses) the user is able to use only explicitly with the personal *CmDongle* Password.

Figure 40: *CodeMeter WebAdmin* – User Data Details

2.9.5.7   Backup and Restore

The expanding area **"Backup and Restore"** allows you to save personal data located in your *CmDongle*, and restore them in the *CmDongle*.

> ℹ This area does not display for the *CmContainer Types CmActLicense* and *CmCloudContainer*.
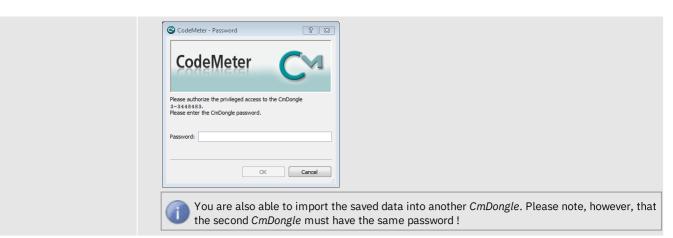
> ℹ Note, that the backup and restore mechanism only comprise the user data in the *CmDongle* but no license information of other licensors. Backup and restore exclusively relates to the license container with the *Firm Code* "0".
>
> In order to restore licenses which do not locate in the personal area (*Firm Item* levels unequal to *Firm Code* "0"), please contact Wibu Support.

Figure 41: *CodeMeter WebAdmin* - "Backup and Restore"

Area	Description
Backup	1. Click the **"Backup now"** button to apply an instant backup of your personal *CmDongle* data (user data). In addition, the time of the **Last Backup** is displayed. 2. Confirm the following dialog to create the backup file.
Restore	1. Click the **"Browse"** button to select the backup copy which is to be restored. The location of the backup file displays. 2. Click the **"Restore"** button to start the restoring process. 3. Confirm the following dialog and click the **"OK"** button. ⓘ If you import a backup into the *CmDongle*, all changes after the backup was created are lost. 4. Enter the Password of the *CmDongle* in which the backup file is to be imported.

	You are also able to import the saved data into another *CmDongle*. Please note, however, that the second *CmDongle* must have the same password !

2.9.6   License Monitoring

The **"License Monitoring"** page displays all existing licenses and their allocation ordered by licensors and related licenses.

Next to describing information on **Product Code**, **Name**, and **Feature Map**, the column **License Quantity** shows the respective total number of **available** licenses..

Shared and Available Licenses

In addition, an expandable area structures the licenses according to access modes (**User Limit (Borrowed)**, **No User Limit**, **Exclusive**, **Shared**) and shows **available** licenses.

Figure 42: *CodeMeter WebAdmin* – "License Monitoring | Available"

Element	Description
User Limit	Here each started instance allocates a single license. It does not make a difference if the *CmContainer* was found locally, or on a network. In brackets the number of borrowed licenses display, if existent.
Station Share	Here multiple instances can be started on a single PC but allocate only a single license. You use this setting, for example, when you want to provide the end-user with the option of starting the application several times. On a terminal server each session allocates a license. In virtual machines each machine allocates a license.

Element	Description
	StationShare avoids unnecessary duplication of license allocation by ensuring that license accesses - locally or over a network - and the defined allocation sequence do not overlap. For example, if a license access (handle) made via network (LAN) with StationShare will be detected, then no new license will be assigned locally despite the defined allocation sequence (first locally, then via network, i.e. LOCAL_LAN tag). In addition, if a license is already accessed locally, no new license access (handle) will be made via the network, if the local access could also be made via StationShare.
Exclusive	Here a protected application can be started only once on a PC.
No User Limit	Here any number of instances of the protected application can be started locally or in a network, and no additional licenses are allocated. Allocated licenses in this mode can be re-used.

2.9.6.1 License Monitoring Details

The **"License Monitoring Details"** page displays detailed information on the license allocation.

Figure 43: *CodeMeter WebAdmin* – "License Monitoring | License Monitoring Details"

For example, in the figure above you see:

- the licenses for the application derive from the licensor with the *Firm Code* 600010 and describe the product with the *Product Code* 14.

- the licenses are stored in the *CmContainer* with the mask and serial number `3-3448482`.

- in total 1 client, identified by **ID**, **Client** (`::1(WIBU \ fs`) and **Client Process ID** columns, 4 times accessed the application "Chart Processing" using Station Share. Here multiple instances can be started on a single PC but allocate only a single license. An access from another PC would be possible as the upper table (Total 2, Available 1) shows.
StationShare avoids unnecessary duplication of license allocation by ensuring that license accesses - locally or over a network - and the defined allocation sequence do not overlap.
For example, if a license access (handle) made via network (LAN) with StationShare will be detected, then no new license will be assigned locally despite the defined allocation sequence (first locally, then via network, i.e. LOCAL_LAN tag).
In addition, if a license is already accessed locally, no new license access (handle) will be made via the network, if the local access could also be made via StationShare.

- There is no expiration date.

- Client `::1(WIBU \ fs` for the first time accessed the application (**First** and **Last Access** columns are of same date).

- Using the pictogram of the **Action** column allows you to deallocate single accessed licenses..

ℹ️ You cannot deallocate and reallocate borrowed licenses before they have been returned.

For example, this is necessary when all licenses are allocated but an additional instance of the application needs to be started.

ℹ️ After deleting of an access the license is deallocated and available again. The client of the application receives a respective error message.

2.9.6.2 Sessions

The **"License Monitoring | Sessions"** page displays all existing licenses ordered by users actually logged on (**Clients**).

Figure 44: *CodeMeter WebAdmin* – "License Monitoring | Sessions"

Here you obtain all [describing information]⬚ 54 on the **CmContainer**, licensor (**Firm Item**), license (**Product Item**), and **Access Mode**.

2.9.6.3 License Tracking

The **"License Monitor | License Tracking"** page allows you to track who, when, from where, how often uses server licenses of *CodeMeter*-protected applications.

ℹ️ For Windows operating systems you find the profiling entries stored in the registry, for other operating systems entries are set in the file `server.ini`. The following table shows you the respective locations.
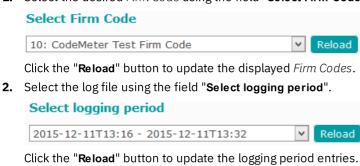
Operating system	Registry / Server.ini Entry
Windows	`HKLM/SOFTWARE/WIBU-SYSTEMS/CodeMeter/Server/CurrentVersion`
macOS	`/Library/Preferences/com.wibu.CodeMeter.Server.ini`
Linux	`/etc/wibu/CodeMeter/Server.ini`

There exist two relevant profiling entries for *License Tracking*.

Entry	Property	Value
`LogLicenseTracking`	`[DWord]`	`[0;1]`
		Default value is is `0` and Logging for License Tracking is disabled.
`LogLicenseTrackingPath`	`[SZ]`	`<path>`
		• Default path on Windows operating systems is `%ProgramData%\CodeMeter\LicenseTracking`.
		• For other operating systems the default path has the same value of the general profiling entry `LogPath`.

> ℹ️ Please note that you must stop the *CodeMeter License Server* service, make the change, and then restart the *CodeMeter License Server* service before the change can take effect.

On the basis of selectable *Firm Codes*, log files and licenses, accesses are displayed graphically and in detail. The created report may serve to use information on license requests and denials for saving license costs and create forecasts or prognoses.

Using a separate navigation the number and origin of allocated, rejected or released licenses can be tracked according to specified view modes (month, day, hour). Clicking on the displayed bars shows more details on the use of licenses.

For using license tracking, please proceed as follows:

1. Select the desired *Firm Code* using the field "**Select Firm Code**".

Click the "**Reload**" button to update the displayed *Firm Codes*.

2. Select the log file using the field "**Select logging period**".

Click the "**Reload**" button to update the logging period entries.

3. Select the license to be tracked using the field "**Select license**".
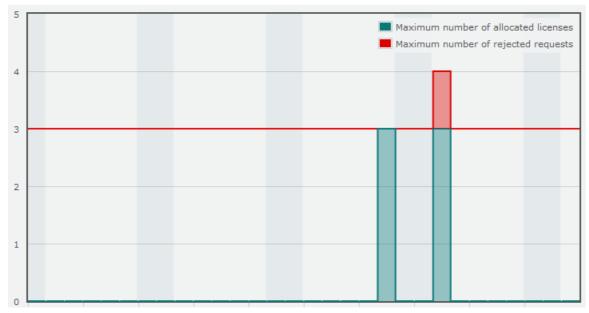
4. Click the button "**Create report**".

The separate area **Navigation**:

- informs on the view mode (Month, Day, Hour),
- shows the tracked period (From - To),
- allows to browse back and forward in time periods and switch back to the previous view mode.

Below the selection area a **bar chart** displays showing the maximum number of allocated licenses and rejected requests over time.

The default is set to the view mode month.

5. Move over a colored bar to open an over-layered dialog for information display.

From: 2013-10-10T00:00
To: 2013-10-10T23:59
Allocated Licenses: 3
<click left for day>

6. Click left to change to view mode **Day**.

For switching back to the view mode **Month** you may use the arrow symbol in the **Navigation** area.

7. Move over a bar again tom switch to the view mode **Hour**.

From: 2013-10-10T15:00
To: 2013-10-10T15:59
Allocated Licenses: 3
<click left for hour>

8. Move over a bar again and left click to open the separate **Details** area.

From: 2013-10-10T15:07:00
To: 2013-10-10T15:07:59
Allocated Licenses: 3
<click left for details>

Detailed information and separate tables for single bars list details on **Active Users**, **Rejected Requests** and **All Events**.

Details

Period: **2013-10-10T15:09:00 - 2013-10-10T15:09:59**
Maximum number of allocated licenses: **3**
Maximum number of rejected requests from different users: **1**

Active Users (ID, Client, User)

Active Users

ID	Client	User
57	10.49.12.17	wv
58	10.49.12.17	wv
59	10.49.12.17	wv
60	10.49.12.17	wv
61	10.49.12.17	wv
62	10.49.12.17	wv
63	10.49.12.17	wv
64	10.49.12.17	wv
65	10.49.12.17	wv
66	10.49.12.17	wv
67	10.49.12.17	wv
68	10.49.12.17	wv

Rejected Requests (Second, Event Type, Client, User)

Rejected Requests

Second	Event Type	Client	User
26	Denial	10.49.12.17	wv
28	Denial	10.49.12.17	wv
30	Denial	10.49.12.17	wv
34	Denial	10.49.12.17	wv
36	Denial	10.49.12.17	wv

All Events (Second, Event Type, ID, Client, User)

All Events

Second	Event Type	ID	Client	User
3	Denial		10.49.12.17	wv
5	Access	60	10.49.12.17	wv
5	Release	58		
5	Release	59		
7	Access	61	10.49.12.17	wv
7	Access	62	10.49.12.17	wv
11	Release	60		
13	Access	63	10.49.12.17	wv
13	Denial		10.49.12.17	wv
13	Release	62		
16	Access	64	10.49.12.17	wv
16	Access	65	10.49.12.17	wv
20	Release	63		
22	Access	66	10.49.12.17	wv
22	Release	64		
22	Release	65		
24	Access	67	10.49.12.17	wv
24	Access	68	10.49.12.17	wv
24	EOF			

The detail view uses the following elements:

Element	Description
ID	uniquely discerns requesting / accessing processes.
Client	identifies the IP address of the requesting / accessing machine.
User	identifies the user requesting / accessing the license.
Second	informs on the second time value.
Event Type	**Denial** describes that a user requested a license but did not get one because no more licenses could be allocated.

Element	Description
	It will not show license requests of licenses that do not exist on this server.
	Access describes that a license on a server is allocated to a user.
	Release describes that a user has released a formerly accessed license on a server.

2.9.7   Diagnosis

The **"Diagnosis"** page allows you to log all events related to the *CodeMeter License Server* service .

2.9.7.1   Events

The **"Diagnosis | Events"** page provides information which supports you in detecting eventually occurring errors by viewing events.

> *CodeMeter WebAdmin* displays a protocol only, if you previously [activated]⏷ 39 this function in *CodeMeter Control Center*. There you find further information on how to save the log file.

Figure 45: *CodeMeter WebAdmin* – Diagnosis | Events

2.9.8   Configuration

Using the **Configuration** navigation item allows you to configure the following settings:

- [Basic]⏷ 74
- [Server]⏷ 84
- [Advanced]⏷ 96

2.9.8.1   Server Search List

The **"Configuration | Basic | Server Search List"** page allows to define access to and order of [installed]⏷ 84 *CodeMeter* network LAN and WAN (Wide Area Network) server.

Figure 46: *CodeMeter WebAdmin* – "Configuration | Network"

The **Server Search List** is used to define the access to and order of *CodeMeter* network LAN and WAN (Wide Area Network) servers.

By default, the **Server Search List** holds the entry "**Automatic server search (255.255.255.255)**". Then licenses are sought first locally and then in the network (subnet). Using the entry "**add new Server**" allows you to decisively add single target server addresses.

Element	Description
Server Search List	You edit the **Server Search List** by using the respective ⊕ **add new Server**, 🗑 **remove"** buttons. You can also change the order by using the ⬆ **up** and ⬇ **down** buttons. You save the changes you made by using the **"Apply"** button. ℹ You set back the settings of the server search list using the **"Restore Defaults"** button. Alternatively, you are also able to set the Server Search List using the configuration files `CodeMeter.ini` or `Server.ini`. The table below shows you where to find the respective files. <table><tr><td>Operating System</td><td>Configuration File</td></tr><tr><td>Windows</td><td>%Program Files%\CodeMeter\Runtime\bin\CodeMeter.ini</td></tr><tr><td>macOS</td><td>\Library\Preferences\com.wibu.CodeMeter.Server.ini</td></tr><tr><td>Linux</td><td>\etc\wibu\CodeMeter/Server.ini</td></tr></table> In the separate section `[ServerSearchList]` define the server as the exampe below shows: ```[ServerSearchList]

[ServerSearchList\Server1]
Address=184.45.89.5

[ServerSearchList\Server2]
Address=185.55.78.6```

 When you define network settings, in some cases, this requires the restart of the *CodeMeter* service. However, you do not have to eject or deactivate the *CmContainer*. After you specified the settings you are able to stop and then restart the *CodeMeter* service in *CodeMeter Control Center*▯ 39 . For non-Windows operating systems see here▯ 35 .

 In order to check for a successful connection, on the **"Home"** page click the **"Host Name"** button and look for the successful appending of the PC as server. The check works also by opening *CodeMeter Control Center* on the clients and the server and looking for the communication status in the respective "Events" tabs. |

	(i) If a connection is still not established specify on the client PCs the server IP address.
	Using in a local area network (LAN):
	By specifying the PC names or IP addresses you define that the client requests exactly address the defined *CodeMeter* network server. This increases the performance on the network.
	(i) If the *CodeMeter* network server is located in another subnet, you should always specify the IP address in the server search list in order to preclude UDP broadcast problems. By default, *CodeMeter License Server* binds to the first network adapter found.
	Using in a wide area network (WAN):
	(i) Please note, that a WAN connection has to be provided by the Software Vendor.
	Specify the IP address(es) for client requests to the defined *CodeMeter License Server* in the WAN.
	(i) When specifying the IP address(es) please note that you are required to prefix a "`https:\` `\`"needed for the secured communication with a reverse proxy in the WAN.
add automatic server search	This entry allows to automatically search licenses on servers, first locally and then in the network (subnet). A so-called broadcast is performed.
	(i) If *CodeMeter WebAdmin* finds the entry 255.255.255.255, it is displayed as "**Automatic server search (255.255.255.255)**" on the list.
	The entry is added at the end of the list.
	If the list holds the entry as last entry, using "**add new Server**" the new Server is added as second last entry, i.e. without changes the entry "**Automatic server search (255.255.255.255)**" always remains at the end of the list.
	If the list holds the entry other than the last, using "**add new Server**" the new Server is added as last entry.

2.9.8.2 Proxy

On the **"Configuration | Basic | Proxy"** page you define settings when using a proxy server. You require a proxy server, for example, coupled with:

- Firmware update
- update of the *certified time* using a Wibu-Systems time server
- access via CmWAN on a remote *CodeMeter* server.

By default, the **system proxy settings** apply.

Please note, that under 🐧 Linux, the environment variable `http_proxy` is considered as *system proxy*. `https_proxy` is not yet supported.

Figure 47: *CodeMeter WebAdmin* - "Configuration | Proxy"

You have several configuration options:

a) No proxy
The client server network communication is direct.

If you use a proxy, the following alternatives exist:

b) using the **proxy system settings**
Please note, that under 🐧 Linux, the environment variable `http_proxy` is considered as *system proxy*. `https_proxy` is not yet supported.

c) Manual proxy configuration
Please proceed as follows:

1. Specify the **Proxy Server** as IP address or DNS name.

2. Specify the **Proxy Server** as IP address or DNS name.

Authentication is automatically handled.

For explicitly using credentials for authenticate access to the proxy server, please proceed as follows:

1. Check the **"Authenticate with user name /password"** box.

2. Specify the **User Name**.

3. Specify the **Password**.

You may also access these settings using <u>cmu</u>⃞ 117 and the <u>profiling</u>⃞21 .

Click the **"Apply"** button to save changes.

2.9.8.3 WebAmin

On the **"Configuration | WebAdmin"** page you defining settings to manage the access (local and remote), select the desired protocol (HTTP or HTTPS), and specify the eventually required authentication credentials for accessing *CodeMeter WebAdmin*.

Figure 48: *CodeMeter WebAdmin* - "Configuration | WebAdmin"

The pictograms ⓡ and ⓦ inform on **R**ead and **W**rite access. On mouse over tool tips display additional access mode details. A click on a pictogram opens - if required - the login on a separate page.

Depending on the configured access modes a dropdown menu provides the following entries:

- **Allow write access**
- **revoke read access**
- **Revoke read/write access**

Remote Read Access

By default, the remote read access is denied.

Element	Description
Allow	Activate this option to allow remote read access to *CodeMeter WebAdmin* (default).
Deny	Activate this option to deny remote read access to *CodeMeter WebAdmin*.

A change of this during operation requires a restart of the *CmWebAdmin* service. Please note that you also have to set the firewall accordingly.

Please proceed as follows to restart the *CmWebAdmin* service on Windows:

1. Enter "`Services`" in the Windows search field.
2. Find `CmWebAdmin` in open Services window.
3. Click right mouse button and select **Restart**.

On macOS first stop the service and than start it using the following command lines:

```
sudo launchctl stop com.wibu.CodeMeter.WebAdmin
sudo launchctl start com.wibu.CodeMeter.WebAdmin
```

On Linux for a restart of the service use the following command line:

```
sudo service codemeter-webadmin restart
```

Protocol Selection

This group allows you selecting the protocol used for accesses. Optionally, you can select between HTTP and HTTPS.

Figure 49: *CodeMeter WebAdmin* - "Configuration | Protocol Selection"

Element	Description
HTTP (sets authentication to none)	If you use HTTP (default), you do not require any authentication. The related "Required Authentication" radio button is automatically set to 'None'.
	If you use HTTPS, you can additionally decide whether using an automatically created self-signed certificate or a custom certificate you obtained from a separate certification authority (CA) provider.
HTTPS (with automatically created self-signed certificate)	Automatically self-signed certificate files, i.e. the Certificate Chain/File and the Key File will be created, if not already existing, at the displays location,
HTTPS with custom certificate	Here you enter path and file names of the certificate files you obtained from your certification authority (CA) provider. Please note that the *CmWebAdmin* Service now only runs under the "Local Service" account and not under the "System" account. This means that it is no longer allowed to access files/folders belonging to a user account, e.g. files of the currently logged in user (everything below `C:\Users\<username>`). Therefore, please store the certificates directly under drive `C:\` or another partition, e.g. `D:\`.

HTTPS Protocol and Web browser

After selecting the HTTPS protocol and opening *CodeMeter WebAdmin* the first time, the web browser issue warnings for not secure connections.

> If you use automatically generated, self-signed certificate files, you must nevertheless allow the access despite unsafe access information, and eventually define exceptions. The unsafe information refer only to the fact that certificates are self-signed and not issued by a certification authority (CA).
>
> If you have received certificate files from a certification authority (CA) provider, please follow the respective import instructions.

> If self-signed certificates expire and become invalid, a separate entry on the Dashboard⬚59 page will inform you displaying details on the certificate expiration time.

Please proceed for Firefox, Chrome, Internet Explorer, Microsoft Edge and Safari as follows.

⊟ Firefox
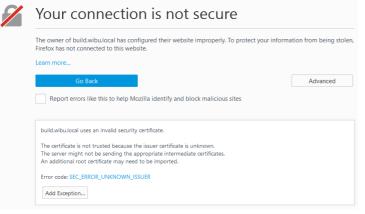
After selecting the HTTPS protocol and opening *CodeMeter WebAdmin* the first time, the following page displays.

Then please proceed as follows:
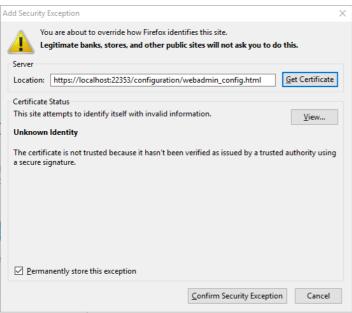
1. Click the button "**Advanced**".

A page displays asking you to import the certificate.
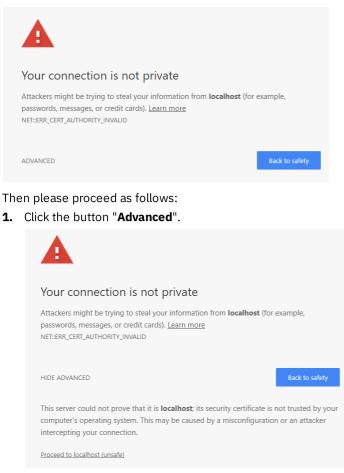
2. Click the button "**Add Exception**".

A dialog to confirm the exceptions displays.

3. Click the button "**Confirm Security Exception**".

CodeMeter WebAdmin opens.

⊟ Chrome

After selecting the HTTPS protocol and opening *CodeMeter WebAdmin* the first time, the following page displays.

Then please proceed as follows:

1. Click the button "**Advanced**".

2. Click the button "**Proceed to localhost (unsafe)**".

   The address line displays ⚠ Not secure | https: .

□ Internet Explorer

After selecting the HTTPS protocol and opening *CodeMeter WebAdmin* the first time, the following page displays.

Then please proceed as follows:

1. Click the button "**Continue to this website (not recommended)**".

   The address line displays 🛇 Certificate error .

□ Microsoft Edge

After selecting the HTTPS protocol and opening *CodeMeter WebAdmin* the first time, the following page displays.

Then please proceed as follows:

1. Click the button "**Continue to this web page (not recommended)**".

The address line displays .

☐ Safari

After selecting the HTTPS protocol and opening *CodeMeter WebAdmin* the first time, the following page displays.

Then please proceed as follows:

1. Click the button "**Continue**".

Required Authentication

This group allows you specifying the required authentication credentials for accessing *CodeMeter WebAdmin* with Write and/or Read privileges.

Element	Description
None (No remote write access possible)	No authentication is required but also no remote write access to *CodeMeter WebAdmin* is possible.
Write Access (requires HTTPS)	Activate this option to allow authenticated write access to *CodeMeter WebAdmin*. Please complete the necessary data in the fields **Password** and **Verify Password** for Write Access, and click the button "**Apply**". Then write access will require a login on a separate login page. Please click the button "**Login for write permission**". The login page displays.
Read and Write Access (requires HTTPS)	In order to organize read and write access even more fine-grained, you are able to use different credentials for different groups allowed for authenticated remote read and/or write access to *CodeMeter WebAdmin*.

Element	Description
	Please complete the necessary data in the fields **Password** and **Verify Password** for Read and Write Access. Then read access will require a login on a separate login page. Write access will additionally require a login on a separate login page. Please click the button "**Login for write permission**". The login page displays.

Click the "**Apply**" button to save all the changes you have made. By a previous click on the "**Restore Defaults**" button you save the default settings.

2.9.8.4 Backup

On the **"Configuration | Basic | Backup"** page you define settings for the location and intervals of *CmDongle* data backups.

Figure 50: *CodeMeter WebAdmin* - "Configuration | Backup"

Element	Description
Backup Path	Specify in the **Backup Path** field the location where the backup file of the *CmDongle* is to be saved. The default location for backup files depends on the operating system in use.
Backup Interval	Specify in the **Backup Interval** field the recurring time period for automatic backups. By default, automatically a data backup is executed every 24 hours. However, you are also able to create a backup for the *CmDongle* at any time.
Certified Time	Activate this option when a **Certified Time** update has to take place before a backup is executed.

Click the "**Apply**" button to save the changes you have made.

By a previous click on the "**Restore Defaults**" button you save the default settings.

2.9.8.5 Server Access

On the **"Configuration | Server | Server Access"** page you set up *CodeMeter*® in a network and/or a wide area network (WAN).

| Server Access | License Access Permissions |

Network Server
○ Disable
◉ Enable
  Network Port: `22350`

CmWAN Server
○ Disable
◉ Enable
  CmWAN Port: `22351`
  Port changes require restart of the CodeMeter service

[Apply] [Restore Defaults]

Figure 51: *CodeMeter WebAdmin – "Configuration | Server | Server Access"*

For activating the **Network Server** option, please proceed as follows:

1. Click the **"Enable"** radio button to use the PC as *CodeMeter* network server.
   Then this PC provides its *CodeMeter* licenses on the network using the service *CodeMeter License Server*.

2. Specify a **Network Port**. By default, the port 22350 is used for the *CodeMeter* communication.
   This network port is registered at IANA (Internet Assigned Numbers Authority) and uniquely assigned for the *CodeMeter* communication.

   > ⓘ You are able to customize this port value. However, make sure that all *CodeMeter License Server* use this port when a *CodeMeter* protected application is to be used on the network.

3. Click the **"Apply"** button to save the changes or **"Restore Defaults"** restoring the default settings.

For activating the **CmWAN Server** option, please proceed as follows:

1. Click the **"Enable"** radio button to use the PC in a wide area network (WAN) and allow license accesses.

   > ⓘ Please note, that a WAN connection has to be provided by the Software Vendor.

2. Specify a **CmWAN Port**. By default, the port 22351 is used for the *CodeMeter* communication via WAN.

   > ⓘ You are able to customize this value. In this case, make sure that:
   >
   > - all *CodeMeter License Servers* use this port, if *CodeMeter* protected applications access licenses via WAN.
   > - the configured reverse proxy has the same port setting.
   >   Please note, that under 🐧 Linux, the environment variable `http_proxy` is considered as *system proxy*. `https_proxy` is not yet supported.

3. Click the **"Apply"** button to save the changes or **"Restore Defaults"** restoring the default settings.

   > ⓘ Please note that changes made to the port settings require a [restart]◻35 of *CodeMeter License Server*.

2.9.8.6 License Access Permissions

On the **"Configuration | Server | License Access Permissions"** page you define settings managing all client accesses to *CodeMeter License Server*.

> Please note, that you previously must have configured *CodeMeter License Server* (`CodeMeter.exe`) as a network or a CmWAN server ("Server Access □ 84 ").
>
> At the same time, also the license access permissions for `localhost` are managed.

On access configuration you can select among a basic and an advanced mode.

The basic □ 85 mode allows adding client computer and IP addresses for accessing *CodeMeter License Server*.

The advanced □ 87 mode allows, for example, specifying global and specific access rules for accessing licenses and reserving license access for single staff member or complete Active Directory groups.
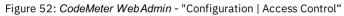
Please select the desired License Access Permissions mode.

> Please note that for the operating systems macOS 🖥 and Linux 🐧 the use of the advanced □ 87 mode for license access permissions is possible in principle, but that the configuration of group rules is not supported.
>
> However, the operation of Linux/macOS clients on *CodeMeter License Servers* under Windows is possible, if the clients are located in a Windows domain. Operation from Windows clients to *CodeMeter License Servers* under Linux/macOS is currently not possible.

Basic Mode

Figure 52: *CodeMeter WebAdmin* - "Configuration | Access Control"

Element	Description
Clients	Shows a list of all client PCs which have the privilege to use *CodeMeter License Server*, i.e. to allocate a license.
	When this list is empty, each *CodeMeter* client on the network is able to use *CodeMeter License Server*. This is the default setting.
	To add a new client to the client list, please proceed as follows:
	1. Click the **"Add"** button. A prompt dialog displays.

Element	Description
	Explorer User Prompt Script Prompt: Enter the Client's name or IP address OK Cancel **2.** Specify the PC name or the IP address of the client in the dialog. **3.** Click the **"OK"** button. The PC is now added to the client list. To remove a client from the list, please proceed as follows: **1.** Click the **"Remove"** button. The PC is now removed from the client list
Enable FSB Access	If you own a *CodeMeter Firm Security Box* (FSB), this option activates the sharing of the FSB on the network. Then the FSB is able to be used by several users, for example, to program *CmContainer* or automatically protect applications. ⓘ This option makes sense only for *CodeMeter* licensee with an individual *CodeMeter Firm Code.* Click the **"Apply"** button to save the changes you have made. By a previous click on the **"Default"** button you save the default settings. Then the client list is empty, and the FSB is not available on the network. ⓘ When you define access settings, in some cases, this requires the restart of the *CodeMeter* service. However, you do not have to eject or deactivate the *CmContainer*. After you specified the settings you are able to stop and then restart the *CodeMeter* service in *CodeMeter Control Center*🗋 39 . For non-Windows operating systems see here🗋 35 .

Additional access control of client list via whitelist and Blacklist

Alternatively, you also have the option to create a white or blacklist for the access of clients.

ⓘ Please note that on specifying subnet masks only input dividable by 8 is accepted.

This so-called profiling you conduct for different operating systems at the following locations:

Operating System	Profile Creation
Windows	Registry entry in `HKLM/SOFTWARE/WIBU-SYSTEMS/CodeMeter/Server/CurrentVersion`
macOS	`/Library/Preferences/com.wibu.CodeMeter.Server.ini`
Linux	`/etc/wibu/CodeMeter/Server.ini`.

The generation of the profile for *CodeMeter License Server* comprises the following versions (`CodeMeter.exe`, `CodeMeterMacX`, `CodeMeterLin`).

ⓘ When you edit the `*.ini` files in the case of macOS and Linux, you <u>must</u> stop the service *CodeMeter License Server* before. Otherwise, changes you have been made do not apply.

Parameter	Description
Client<index>=<Subnetz>[,<serial>[,FC[,PC]]]] (Whitelist)	**Whitelist**: These parameters hold the IP addresses of client PCs on the network which have the privilege to access the local *CodeMeter License Server*. When the IP address of a client is not on this list, the access is denied. If no whitelist exists, no other restrictions apply. The specification of subnets is possible. The syntax is as follows: `Client<index>=<Subnetz>[,<serial>[,FC[,PC]]]` The serial number has to follow the pattern `MaskByte-Serial Number` (e.g. `1-1179681`). Example: Client1=192.168.0.0/24,1-123456,10,13 this addresses all computer ranging from 192.168.0.0 to192.168.0.255 (Class C). Usually are also /8 (Class A) and /16 (Class B).

Parameter	Description
	The serial number, FC, and PC are optional.
	ℹ️ This whitelist corresponds to the client list in *CodeMeter WebAdmin*.
Blacklist\<index>=\<Subnetz>[,\<serial>[,FC[,PC]]]] [SZ, optional]	**Blacklist**: These parameters hold the IP addresses of client PCs on the network which have no privilege to access the local *CodeMeter License Server*. When an IP address of a client is on this list, the access is denied. If no blacklist exists, no other restrictions apply. The syntax is as follows: `Blacklist<index>=<Subnetz>[,<serial>[,FC[,PC]]]` The serial number has to follow the pattern `MaskByte-Serial Number` (e.g. `1-1179681`). Example: Blacklist1=192.168.0.0/24,1-123456,10,13 this addresses all computer ranging from 192.168.0.0 to192.168.0.255 (Class C). Usually are also /8 (Class A) and /16 (Class B). The serial number, FC, and PC are optional.

Advanced Mode

The advanced access control mode allows the controlling of license access using access rules. The license access by single staff members but also of complete [Active Directory]🗍88 groups can be organized. The detection of single staff members (user name) and groups happens automatically without any integration efforts. An [update control]🗍88 element is available.

Figure 53:: *CodeMeter WebAdmin* - "Configuration | Access Control" - Advanced Access Control Mode

The list of License Access Permissions (access control list) can be [exported]🗍126 or [imported]🗍126 in a `*.json` format using the command line tool *cmu32*.

Two types of access rules exist:

- [global access rules]🗍 88
- [specific access rules]🗍 89

The global access rules control the license access to **all** *CmContainer*. If specific access rules have been defined, then these are exempted from the global access rules.

The specific access rules control license access to separately specified license entries for ISV or applications (*Firm Code*, *Product Code*, *Containers*). Then the specific access rules are valid and for matching license entries the global access rules are ignored.
Coupled with a limitation of user here also the number of available licenses can be set for each rule, and licenses can be reserved. This can set specific limits e.g. for some departments, while keeping one license reserved for exclusive use.

In some cases, different *Product Items* with the same *Product Code* are present, for instance, if the same software was bought with different license options. In such instances, the *Product Items* can be identified using associated *Product Items Text*, and rules can be defined for each *Product Item*.

The following conditions hold true for access rules:

- access rules are created, edited and deleted in a separate area or dialogs.
- access rules may cover several rules. Rules are processed top-down, which means that the order of the rules is decisive for the result.
- access rules conclude with an area defining the default setting for all license accesses which are not covered by rules.
- If specific access rules are defined, the most specified available access rules apply. If no rules are configured for the *Product Code*, the rules for the *Firm Code* apply. If no *Firm Code* rules exist, the global rules apply.

Active Direcory

A separate refresh button supports retrieving and thus reading of complete Active Directory groups and users.

> Please note, that you previously must have configured *CodeMeter License Server* (`CodeMeter.exe`) as a network server ("[Server Access](#)▯⁸⁴ ").

The automatic filling of the drop-down list boxes **Users** and **Groups** is done by clicking the button ⟳. In combination with a mouse-over pointer to display the tooltip texts, information on the following states is available.

Status	Tooltip Text
Data not yet retrieved	Click button to retrieve data from Active Directory.
Data currently being retrieved for the first time	Retrieval from Active Directory in progress.
Data is available	{x} users / {y} groups retrieved from Active Directory.
Data is available and currently retrieved	{x} users / {y} groups retrieved from Active Directory. Retrieval from Active Directory in progress.
An error has occurred, e.g. Active Directory not reachable.	Error on retrieving data from Active Directory.

Creating the global access rules

In order to create the global access rules to control license access globally for all *CmContainer*, please proceed as follows:

1. Select the **"Global access rules"** item in the left tree view.
2. Click the **"Add new access rule"** button.
   A dialog for defining a new rule displays.

Add Rule

Action: ⦿ Allow   ○ Deny

⦿ Host   [   ]
○ Subnet   [   ]
○ User   [   ]
○ Group   [   ]

Reserved: [0 ⇕]   Limit: [0 ⇕]

[Add]   [Cancel]

3. Click the **"Allow"** or **"Deny"** radio button in the area **Action** to decide, whether the following license access by client is to be allowed or denied.

    A client access can be defined by one of the following parameter: **Host** name, **Subnet** address **User** or **Group** name.

4. Specify the desired parameter in the respective field.
    If an active directory is connected, a separate button enables automatic filling of the **User** and **Group** fields (see here⧉ [88]).

5. Click the **"Add"** button to add the new rule.
    A click on the **"Cancel"** button cancels the process.

    The new rule displays in the right rule view.

    If you defined several rules, you may change the rule sequence by using the arrow symbols ⬆ ⬇. Rules are processed top-down, which means that the order of the rules is decisive for the result.

    Using the **"Edit"** or **"Delete"** link allows you to modify a completely delete a rule.

6. Define the default setting for all license accesses which are not covered by rules.
    You have the option to set the **Default action** to allow or deny license access.

    Click the **"Allow"** or **"Deny"** button.

7. Click the **"Apply"** button in the lower part to save the changes made to the global access rules. Using the **"Undo Changes"** button reverts the global access rules prior to the modification, and the **"Restore Defaults"** button applies the default settings.
    If you apply the changes made, please restart⧉ [35] *CodeMeter License Server*.

    🖻 The figure below shows an example of global access rules. It allows the global license access additionally by a guest user. All other licenses accesses are also allowed, if no specific access rules specify otherwise.

Add new access rule		
Host: localhost Action: Allow	Edit Delete	⬇
User: WIBU\wibu-guest Action: Allow	Edit Delete	⬆
Default action ⦿ Allow ○ Deny		

Figure 54:: *CodeMeter WebAdmin* - "Configuration | Access Control" - advanced Mode- global access rules

Creating specific access rules

In addition to defining the global access rules, you have also the option to control the license access to specific separate license entries. Here you define specific access rules for separate defined *Firm Codes*, *Product Codes* or *Containers* (Serial Numbers).

Firm Code-**specific access rules**

In order to create specific access rules to control license access to separate *Firm Codes*, please proceed as follows:

1. Select the **"Specific access rules"** item in the left tree-view.

2. Click the **"Add Firm Code"** button.
    The dialog for selecting a *Firm Codes* displays.

Add Firm Code

6000010 - Sample Company

Add   Cancel

3. Select the *Firm Code* and click the **"Add"** button.
   New specific access rules valid for this *Firm Code* display in the right rule view.

Firm Code: 6000010 (Universal License Testkit)

Add new access rule

Default action ⊙ Allow ○ Deny

Clone FC rule set   Delete FC rule set

4. Click the **"Add new access rule"** button.
   A dialog for defining a new rule displays.

Add Rule

Action: ⊙ Allow   ○ Deny

⊙ Host
○ Subnet
○ User
○ Group

Reserved: 0   Limit: 0

Add   Cancel

5. Click the **"Allow"** or **"Deny"** radio button in the area **Action** to decide whether the following license access by client is to be allowed or denied.

   A client access can be defined by one of the following parameter: **Host** name, **Subnet** address **User** or **Group** name.

6. Specify the desired parameter in the respective field.
   If an active directory is connected, a separate button enables automatic filling of the **User** and **Group** fields (see here[88]).

7. Click the **"Add"** button to add the new rule.
   A click on the **"Cancel"** button cancels the process.

   The new rule displays in the right rule view.

   If you defined several rules, you may change the rule sequence by using the arrow symbols ↑ ↓. Rules are processed top-down, which means that the order of the rules is decisive for the result.

   Using the **"Edit"** or **"Delete"** link allows you to modify a completely delete a rule.
   If you delete *Firm Code*-specific access rules using the **"Delete rule list"** button, then also all *Product Code*-specific access rules - if existing - are deleted.

8. Define the default setting for all license accesses which are not covered by rules.
   You have the option to set the **Default action** to allow or deny license access.

   Click the **"Allow"** or **"Deny"** button.

9. Optionally, you are able to clone an existing rule set for a *Firm Code* (FC) 1:1 to another *Firm Code*.

   Click the button **"Clone FC rule set"** to open a dialog which allows to select a target *Firm Code*. Clicking the button **"Clone"** starts the process.

Clicking the button **"Delete FC rule set"** deletes **all** rules.

ℹ️ Please note that not only the *Firm Code* rule set is removed but <u>ALL</u> rules also for any subordinate *Product Codes*.

10. Click the **"Apply"** button in the lower part to save the changes made to the global access rules. Using the **"Undo Changes"** button reverts the global access rules prior to the modification, and the **"Restore Default"** button applies the default settings.

If you apply the changes made, please restart⬇ [35] *CodeMeter License Server*.

e.g. The figure below shows an example *Firm Code*-specific access rules. It allows the license access to the complete *Firm Code* 10 by a guest user and the complete support department. All other licenses accesses are also allowed, if no specific access rules specify otherwise.

Figure 55:: *CodeMeter WebAdmin* - "Configuration | Access Control" - Advanced Mode - Specific access rules - *Firm Code*

Product Code-specific access rules

Specific access rules which refer to *Product Codes* also offer the option to reserve license accesses to defined clients. This, for example, allows to organize license access for separate departments while at the same time reserving exclusive license access for the heads of departments.

In order to create specific access rules to control license access to separate *Product Codes*, please proceed as follows:

ℹ️ Creating a *Product Code*-specific access rules requires a previously created *Firm Code*-specific access rules.

1. Select the **"Specific access rules"** item in the left tree-view.
2. Click the **"Add Product Code"** button.
The dialog for selecting a *Product Code* displays.

Checkbox **"Distinction based on Product Item Text"** .
3. Select the *Product Codes* and click the **"Add"** button.
A new specific access rules valid for this *Product Code* displays in the right rule view.

At the same time, the entry displays information on the **License Quantity**, i.e. the number of concurrent licenses on a network.
This number is not to be exceeded, if later defining limits to the number of accesses.

**Product Code: 6000010:201002
(SampleNotePad - Hex View Module -
Floating User)**
License Quantity: 5

| Add new access rule |
| Default action ⊙ Allow ○ Deny |
| Clone PC rule set   Delete PC rule set |

4. Click the **"Add new access rule"** button.
    A dialog for defining a new rule displays.

Add Rule

Action: ⊙ Allow   ○ Deny

⊙ Host   [   ]
○ Subnet   [   ]
○ User   [   ]
○ Group   [   ]

Reserved: [0]   Limit: [0]

Add   Cancel

5. Click the **"Allow"** or **"Deny"** radio button in the area **Action** to decide whether the following license access by client is to be allowed or denied.

    A client access can be defined by one of the following parameter: **Computer** name, **Subnet** address **User** or **Group** name.

6. Specify the desired parameter in the respective field.
    If an active directory is connected, a separate button enables automatic filling of the **User** and **Group** fields (see [here]🗋[88]).

7. Specify the number of license accesses which can be optionally reserved for a defined client in the field **Reserved**. The field **Limit** states the allowed maximum of allocated license accesses by this client. The setting for a reserved license access always available for the client is: Reserved: 1; Limit: 1.

    > ℹ Please note that in the case of further specific access rules reservations and limits are added. The value of the License Quantity must <u>not</u> be exceeded.

    > ℹ If a rule applies but according to the limit set no licenses can be allocated by this rule, then it is assumed that the rule does not apply and the next rule is applied.

8. Click the **"Add"** button to add the new rule.
    A click on the **"Cancel"** button cancels the process.

    The new rule displays in the right rule view.

    If you defined several rules, you may change the rule sequence by using the arrow symbols ↑ ↓. Rules are processed top-down, which means that the order of the rules is decisive for the result.

    Using the **"Edit"** or **"Delete"** link allows you to modify a completely delete a rule.
    In order to delete a complete *Product Code*-specific access rules use the **"Delete rule list"** button.

9. Define the default setting for all license accesses which are not covered by rules.
    You have the option to set the **Default action** to allow or deny license access.

    Click the **"Allow"** or **"Deny"** button.

10. Optionally, you are able to clone an existing rule set for a *Product Code* (PC) 1:1 to another *Product Code*.

    Click the button **"Clone PC rule set"** to open a dialog which allows to select a target *Product Code*. Clicking the button **"Clone"** starts the process.

Clicking the button **"Delete PC rule set"** deletes the **complete** rule set for this *Product Code*.

11. Click the **"Apply"** button in the lower part to save the changes made to the global access rules. Using the **"Undo Changes"** button reverts the global access rules prior to the modification, and the **"Restore Defaults"** button applies the default settings.
If you apply the changes made, please restart⃞ 35 *CodeMeter License Server*.

The figure below shows an example of a specific access rules with exclusive access rights (Reserved: 1; Limit: 1) to the *Product Code* 201000 of *Firm Code* 10 for a guest user, the complete support department and a Supervisor. 2 license accesses of a total of 5 license accesses (license quantity) remains available and the default license access is defined as allowed.

Figure 56:: *CodeMeter WebAdmin* - "Configuration | Access Control" - Advanced Mode - Specific access rules - *Product Code*

Container-specific access rules

Specific access rules which refer to *Containers* also offer the option to reserve license accesses to defined *Containers*. This, for example, allows to organize license access for separate departments while at the same time reserving exclusive license access for the heads of departments.

In order to create specific access rules to control license access to separate *Containers*, please proceed as follows:

1. Select the **"Specific access rules"** item in the left tree-view.

2. Click the **"Add new Container"** button.
The dialog for selecting a *Container* displays.

Add Container

3-3541282

Add   Cancel

3. Select the *Container* and click the **"Add"** button.
   New specific access rules valid for this *Container* display in the right rule view.

Container: 3-3541282

Add new access rule

Default action: ⊙ Allow ○ Deny

Clone Container rule set   Delete Container rule set

5. Click the **"Add new access rule"** button.
   A dialog for defining a new rule displays.

Add Rule

Action: ⊙ Allow   ○ Deny

⊙ Host
○ Subnet
○ User
○ Group

Add   Cancel

6. Click the **"Allow"** or **"Deny"** radio button in the area **Action** to decide whether the following license access by client is to be allowed or denied.

   A client access can be defined by one of the following parameter: **Host** name, **Subnet** address **User** or **Group** name.

7. Specify the desired parameter in the respective field.
   If an active directory is connected, a separate button enables automatic filling of the **User** and **Group** fields (see <u>here</u> [88]).

8. Click the **"Add"** button to add the new rule.
   A click on the **"Cancel"** button cancels the process.

   The new rule displays in the right rule view.

   If you defined several rules, you may change the rule sequence by using the arrow symbols ⬆ ⬇. Rules are processed top-down, which means that the order of the rules is decisive for the result.

   Using the **"Edit"** or **"Delete"** link allows you to modify a completely delete a rule.

9. Define the default setting for all license accesses which are not covered by rules.
   You have the option to set the **Default action** to allow or deny license access.

   Click the **"Allow"** or **"Deny"** button.

10. Optionally, you are able to clone an existing rule set for a *Container* 1:1 to another *Container*.

    Click the button **"Clone Container rule set"** to open a dialog which allows to select a target *Container*. Clicking the button **"Clone"** starts the process.

Clone to Container

3-3448483 - Sample CmDongle

Clone   Cancel

Clicking the button **"Delete Container rule set"** deletes **all** rules.

> This will delete ALL rules for this Container as well as all its subordinate Firm Code rule sets and remove the current Container from the configuration.
>
> OK   Cancel

> ℹ️ Please note that not only the *Container* rule set is removed but <u>ALL</u> rules also for any subordinate *Firm Code* rule sets and remove the current *Container* form the configuration.

11. Click the **"Apply"** button in the lower part to save the changes made to the global access rules. Using the **"Undo Changes"** button reverts the global access rules prior to the modification, and the **"Restore Default"** button applies the default settings.

    If you apply the changes made, please restart📄 35 *CodeMeter License Server*.

    📝 The figure below shows an example *Container*-specific access rules. It allows the license access to the *Container* for the complete *Firm Code* 10 by a guest user and the complete support department. All other licenses accesses are also allowed, if no specific access rules specify otherwise.

Figure 57:: *CodeMeter WebAdmin* - "Configuration | Access Control" - Advanced Mode - Specific access rules - *Container*

2.9.8.7   License Transfer Configuration

On the **"Configuration | Server | License Transfer Configuration"** page you define the settings for the license transfer. The license transfer can either be blocked completely, even if the programmed license allows it. Or the maximum borrowing period can be redefined without overwriting or exceeding the original programmed borrowing period.

Figure 58: *CodeMeter WebAdmin* - "Configuration | Server | License Transfer Configuration"

Element	Description
License Transfer blocked	Check the checkbox following the **License Transfer blocked** option to generally prevent a license transfer, although the programmed license allows a license transfer.
Maximum Borrowing Time	Specify in the **Maximum Borrowing Time** field in hours the maximum time allowed for borrowing a license as part of a license transfer. The originally programmed borrowing time is not overwritten, but another time check is added which however cannot exceed the originally programmed time.

Click the "**Apply**" button to save the changes you have made.

By a previous click on the "**Restore Defaults**" button you save the default settings.

2.9.8.8 Prepared License Borrowing

On the page **"Configuration | Server | Prepared License Borrowing"** you are able, if you require, to modify entry-specific settings of borrowed licenses, in order to change the number of borrowed licenses or the borrowing period to a value other than programmed.

> ℹ These settings display only, if activated at **"Configuration | Advanced Configuration | Extra"** in the group <u>**Additional WebAdmin Configuration**</u>⧠[100] .
>
> Please note, that Prepared License Borrowing supports only *Firm Codes* smaller than 6.000.000.

Figure 59: *CodeMeter WebAdmin* – "Configuration | Server | Prepared License Borrowing"

For the individual setting of License Borrowing paramete, please proceed as follows:

1. Activate the option **"Overwrite Entry Settings"** in order to allow modifying license options of the borrowed license.
2. Enter in the field **"Maximum Borrow Duration"** the maximum borrowing period in minutes, the license is to be borrowable.
3. Enter in the field **"Maximum Borrow Quantity"** the maximum number of borrowed license to be borrowable.
4. Select in field **"Server Identification"** how the server is identified: either by Server Name or IP address.
5. Click the **"Apply"** button to save the changes or **"Restore Defaults"** restoring the default settings.

2.9.8.9 CodeMeter Time Server

On the **"Configuration | Advanced | CodeMeter Time Server"** page you define settings for the *CodeMeter Time Server*.

> ℹ Please note that only Wibu-Systems *CodeMeter Time Server* may be specified here.
>
> You <u>cannot</u> specify your own NTP (Network Time Protocol) time servers here, as this time synchronization does not guarantee a *Certified Time*, which plays an important role, for example, when retrieving and subsequently validating time-based licenses.

Figure 60: *CodeMeter WebAdmin* - "Configuration | CodeMeter Time Server"

Element	Description
CodeMeter Time Server	Shows a list of *Wibu-Systems CodeMeter Time Server* allowing for an update of the *Certified Time*. *CodeMeter Time Server* are specified either as Internet address or IP address.

Element	Description
	You edit the *CodeMeter Time Server* list by using the ⊕ **"add"** or 🗑 **"remove"** buttons. You change the order of the list by using the ⬆ **"up"** and ⬇ **"down"** buttons.
Time Out	Defines the maximum response period for the *CodeMeter Time Server*. The default value is 20 seconds.
Use HTTPS	Activates HTTPS protocol for accessing *CodeMeter Time Server*.

Click the "**Apply**" button to save all the changes you have made. By a previous click on the "**Restore Defaults**" button you save the default settings.

2.9.8.10 Trusted WebSocket Origins

On the **"Configuration | Advanced | Trusted WebSocket Origins"** page you are able to set local exceptions for checking trusted WebSocket Origins.

Since *CodeMeter* Version 7.10a. by default, it is mandatory to check for the origin of a request when information and data is exchanged via web components with *CodeMeter License Server*. This is done by certificates issued for these purposes.

The list **Trusted WebSocket Origins** allows to specify local exceptions for this check. This means that no certificates are required for communication, or existing certificates are ignored.

Figure 61: *CodeMeter WebAdmin* - "Configuration | Trusted WebSocket Origins"

Element	Description
Trusted WebSocket Origins	Shows a list of local exceptions entries for checking trusted WebSocket Origins. You edit the list by using the ⊕ **"add"** or 🗑 **"remove"** icons.
add new trusted WebSocket Origin	Adds an entry for the list **Trusted WebSocket Origins**. 1. Enter the new trusted WebSocket Origin. Supported input formats are IPv4 and IPv6 addresses and port specifications, e.g. `"http://localhost:4040"`, `"http://[2001:db8::1%25eth0]"` `"https://[2001:db8::1]:4040"`. 2. Click the **Add** button. The entry displays in the list. In the list result you may delete entries using the 🗑 remove icon.

Click the "**Apply**" button to save all the changes you have made. By a previous click on the "**Restore Defaults**" button you save the default settings, i.e local exceptions entries for checking trusted WebSocket Origins will be removed.

2.9.8.11 Extra

On the **"Configuration | Advanced | Extra"** page you configure some additional advanced settings.

Figure 62: *CodeMeter WebAdmin* – "Configuration | Advanced | Extra"

API Communication Mode

Here you define which communication mode *CodeMeter License Server* uses. Please proceed as follows:

1. Click the **Edit** button.
2. Check the box to select the mode.

   The following parameter are available:

CodeMeter-Version	Properties
smaller than 4.40	`'1'` TCP/IP (Default)
	`'2'` Shared Memory
starting with 4.40	`'1'` Platform-specific (Default)
	Platform-specific defaults:
	• Windows: IPv6, IPv4; Shared Memory
	• Linux/macOS:IPv6, IPv4
	• WinCE: IPv4, Shared Memory
	`'2'` Shared Memory
	`'4'` IPv4
	`'8'` IPv6
	Single modi may be combined.

> ℹ️ Wibu-Systems <u>recommends</u> to use the relevant default settings, if no justified reasons suggest otherwise.

Alternatively, by editing registry or server entries you are also able to define which communication mode *CodeMeter License Server* uses. The following table shows you where for which operating system you find the profiling to set the communication mode. The parameter **ApiCommunicationMode**. is available for setting the mode.

Operating system	Registry / Server Entry
Windows	`HKLM/SOFTWARE/WIBU-SYSTEMS/CodeMeter/Server/CurrentVersion`
macOS	`/Library/Preferences/com.wibu.CodeMeter.Server.ini`
Linux	`/etc/wibu/CodeMeter/Server.ini`

3. Click the **"Apply"** button to save the changes or **"Restore Defaults"** restoring the default settings. Clicking the button **"Cancel"** cancels the configuration.

> ℹ️ Make sure you restart *CodeMeter* after changing the settings.

Network Advanced

Here you define some advanced network settings. Please proceed as follows:

1. Click the **Edit** button.
2. Enter the desired values in the respective fields.

   The following parameter are available:

> ℹ️ Please make sure you activated *CodeMeter License Server* for <u>running as network server</u>⌐84 .

Element	Description
Network Port	Define a network port other than the default port, if desired.
Network Timeout	Defines the maximum response period for the *CodeMeter* License Server if running on a network. By default, this value is 100 seconds.
UDP Waiting Time	Specify the **UDP Waiting Time** in order to define the period in which a UDP request for existing *CodeMeter License Server* on the network has to reply. By default, this value is 1000 milliseconds. ℹ️ Changing this time allows to customize the performance of the service. However, when no urgent need exists, you should keep that default.

3. Click the **"Apply"** button to save the changes or **"Restore Defaults"** restoring the default settings. Clicking the button **"Cancel"** cancels the configuration.

> ℹ️ Make sure you restart *CodeMeter* after changing the settings.

License Transfer Configuration

Here you define the period of how additional license transfer activities are stored allowing you to obtain information on the PC (host) to which the last transfer activity referred to.
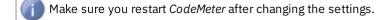
Please refer as follows:

1. Click the **Edit** button.
2. Enter the desired value in the respective field.

   The following parameter are available:

Element	Description
Storage of additional License Transfer information	Specifies the number of days license transfer information is saved. The default setting is 100 days.

4. Click the **"Apply"** button to save the changes or **"Restore Defaults"** restoring the default settings. Clicking the button **"Cancel"** cancels the configuration.

> ℹ️ Make sure you restart *CodeMeter* after changing the settings.

Additional WebAdmin Configuration

If you require, you are able to allow and activate modifying entry-specific settings of borrowed licenses.

> ℹ️ Please note, that Prepared License Borrowing supports only *Firm Codes* smaller than `6.000.000`.

Please proceed as follows:

1. Click the **"Edit"** button

   The checkbox **Enable Prepared License Borrowing Configuration** becomes editable.

2. Check the box **Enable Prepared License Borrowing Configuration** to trigger displaying the page "**Configuration | Server | Prepared License Borrowing**⃞ 96 ".

5. Click the **"Apply"** button to save the changes or **"Restore Defaults"** restoring the default settings. Clicking the button **"Cancel"** cancels the configuration.

2.9.9   Info

The **"Info"** page displays an overview of products and important Wibu-Systems addresses.

Figure 63: *CodeMeter WebAdmin – Info*

2.9.10 License Transfer

> ℹ️ The License Transfer is supported for only, if using *Universal Firm Codes* with a number range bigger than 6.000.000.
> - Of the Transfer Types only the types *Licenses* (moving 'n' from 'm' licenses) and *Borrow local license*.

CodeMeter WebAdmin on various pages displays License Transfer Options and a History. Following tables list potentials items.

For a brief example of a license transfer of type "Licenses" ('n' from 'm' licenses) see here⃞ 101 and for the type "Borrow local license" here⃞ 106 .

License Transfer Options

In the case of a license transfer activity, this table displays the actual values of the license transfer option.

Option	Description
License received from	Serial number of the *CmContainers* from which a license has been received.

Pulling allowed	Value	Description
	y e s	A license can be actively requested by a receiving *CmContainer* from a sending *CmContainer*.
	n o	A license cannot be actively requested by a receiving *CmContainer* from a sending *CmContainer*.

Returning allowed	Value	Description
	y e s	A previously transferred license can be returned from the receiving *CmContainer* to the sending *CmContainer*.
	n o	A previously transferred license cannot be returned from the receiving *CmContainer* to the sending *CmContainer*.

Firm Item at target required	Value	Description
	y e s	On the target *CmContainer* a *Firm Item* must exist before the transfer takes place (*CmActLicense*).
	n o	On the target *CmContainer* a *Firm Item* must not exist before the transfer takes place (*CmActLicense*).

Transfer Type	Display of Transfer Type	
	Value	Description
	Licenses	An existing *Product Item* with *License Quantity* is duplicated in two *Product Items* while the *License Quantity* is split over the two *CmContainer*.
	Borrow Local License	A license is borrowed for local use only (without connection to a license server) for a definable period from one *CmContainer* to another. After the period has expired, the licenses automatically reallocates to the server's license pool. A locally borrowed license can not be further transferred

Option	Description
Transfer Depth	This option specifies the number of license transfer levels involved
Borrow Expiration Time	Date at which the borrowing expires.
Borrow Source	Serial number of the Source-*CmContainers* from which a license has been borrowed.
Licensor Transfer Key	Key to create the required certificates.

2.9.10.1 Licenses

A brief example for performing a license transfer of type "Licenses" ('n' from 'm' licenses) covers moving[101] and returning[103] of licenses.

For a sender and a receiver the various *CodeMeter WebAdmin* views will display (*CmContainer*, *Firm Item*, *Product Item* Details, License Monitoring).

30 Licenses are moved and returned.

2.9.10.1.1 Move 'n' from 'n' licenses

CmContainer Details

Sender

Receiver

Firm Item Details

Sender

Firm Item Details

Firm Item 6000010 of CmContainer "Sender Licenses" (130-3356136053)

CmContainer	Firm Access Counter	Firm Update Counter	Firm Precise Time
Sender Licenses (130-3356136053)	65535	2	2000-01-01 01:00:00

Product Items

Product Code	CmContainer	Name	Unit Counter	Valid Until	License Quantity	Feature Map
2001	Sender Licenses (130-3356136053)	Transfer	n/a	n/a	70	n/a

License Transfer Options

Type	Value
Pulling allowed	1
Licensor Transfer Key	<32 Bytes>

Receiver

Product Item Details

Sender

Product Item Details

Product Item 6000010:2001 of CmContainer "Sender Licenses" (130-3356136053)

Product Item Options	Type	Size (Bytes)	Dependencies	Value
Text		8		Transfer
License Quantity		4		70

License Transfer Options

Option	Value
Pulling allowed	Yes
Returning allowed	Yes
Firm Item at target required	No
Transfer Type	Licenses
Transfer Depth	2

License Transfer History

#	Status	Type	Time	License Quantity	Transfer ID	Client (User)	CmContainer	Update Counter
1	Transferred & Receipted	Licenses	2016-01-20 16:24:59	30	efe325c6ef38814495c5	fs1 (WIBU\fs)	130-2995221873	0

Receiver

Product Item Details

Product Item 6000010:2001 of CmContainer "Receiver Licenses" (130-2995221873)

Product Item Options	Type	Size (Bytes)	Dependencies	Value
Text		8		Transfer
License Quantity		4		30

License Transfer Options

Option	Value
License received from	130-3356136053
Pulling allowed	Yes
Returning allowed	Yes
Firm Item at target required	No
Transfer Type	Licenses
Transfer Depth	1

License Monitoring

	6000010	Vendor 1							
Product Code	Name		Feature Map	License Quantity	User Limit (Borrowed)	No User Limit	Exclusive	Shared	Available
2001	Transfer		-	70	0 (-)	0	0	0	70
2001	Transfer		-	30	0 (-)	0	0	0	30

2.9.10.12 Return 'n' from 'm' licenses

CmContainer Details

Sender

Sender Licenses		130-3356136053		CmActLicense 3.00	●
∧ Licenses	∨ CmContainer Info	∨ User Data			

∧ 6000010	Sender Licenses			CodeMeter Evaluation License - not for commercial use!	Ⓞ
Product Code Name		**Unit Counter Valid Until**		**License Quantity Feature Map**	
2001 Transfer		Ⓞ Ⓗ	n/a n/a	100 n/a	

Receiver

Receiver Licenses		130-2995221873		CmActLicense 3.00	●
∧ Licenses	∨ CmContainer Info	∨ User Data			

∧ 6000010	Receiver Licenses			CodeMeter Evaluation License - not for commercial use!	Ⓞ
Product Code Name		**Unit Counter Valid Until**		**License Quantity Feature Map**	
No Product Items available					
Expired and/or returned Product Items					
2001 Transfer		Ⓞ	n/a n/a	0 n/a	

Firm Item Details

Sender

Firm Item Details

Firm Item 6000010 of CmContainer "Sender Licenses" (130-3356136053)

CmContainer	Firm Access Counter	Firm Update Counter	Firm Precise Time
Sender Licenses (130-3356136053)	65535	2	2000-01-01 01:00:00

Product Items

Product Code	CmContainer	Name	Unit Counter	Valid Until	License Quantity	Feature Map
2001	Sender Licenses (130-3356136053)	Transfer	n/a	n/a	100	n/a

License Transfer Options

Type	Value
Pulling allowed	1
Licensor Transfer Key	<32 Bytes>

Receiver

Firm Item Details

Firm Item 6000010 of CmContainer "Receiver Licenses" (130-2995221873)

CmContainer	Firm Access Counter	Firm Update Counter	Firm Precise Time
Receiver Licenses (130-2995221873)	65535	2	2000-01-01 01:00:00

Product Items

Product Code	CmContainer	Name	Unit Counter	Valid Until	License Quantity	Feature Map
	No Product Items available					
Expired and/or returned Product Items						
2001	Receiver Licenses (130-2995221873)	Transfer	n/a	n/a	0	n/a

Invalid

License Transfer Options

Type	Value
Pulling allowed	1
Licensor Transfer Key	<32 Bytes>

Product Item Details

Sender

Product Item Details

Product Item 6000010:2001 of CmContainer "Sender Licenses" (130-3356136053)

Product Item Options	Type	Size (Bytes)	Dependencies	Value
Text		8		Transfer
License Quantity		4		100

License Transfer Options

Option	Value
Pulling allowed	Yes
Returning allowed	Yes
Firm Item at target required	No
Transfer Type	Licenses
Transfer Depth	2

License Transfer History

#	Status	Type	Time	License Quantity	Transfer ID	Client (User)	CmContainer	Update Counter
1	0	Licenses	2016-01-20 16:24:59	30	efe325c6ef38814495c5	fs1 (WIBU\fs)	130-2995221873	0

Receiver

Product Item Details

Product Item 6000010:2001 of CmContainer "Receiver Licenses" (130-2995221873)

Product Item Options	Type	Size (Bytes)	Dependencies	Value
Text		8		Transfer
License Quantity		4		0, <no network>

License Transfer Options

Option	Value
License received from	130-3356136053
Pulling allowed	Yes
Returning allowed	Yes
Firm Item at target required	No
Transfer Type	Licenses
Transfer Depth	1

License Monitoring

6000010	Vendor 1								
Product Code	**Name**	**Feature Map**	**License Quantity**	**User Limit (Borrowed)**	**No User Limit**	**Exclusive**	**Shared**	**Available**
2001	Transfer	-	100	0 (-)	0	0	0	100
2001	Transfer	-	0	- (-)	-	-	-	0

2.9.10.2 License Borrowing

A brief example for performing a license transfer of type "Borrow Local License" covers borrowing[106] and returning[108] of licenses.

For a sender and a receiver the various *CodeMeter WebAdmin* views will display (*CmContainer*, *Firm Item*, *Product Item* Details, License Monitoring).

1 License is borrowed and returned.

2.9.10.2.1 Borrow

CmContainer Details

Sender

C	**Sender Borrowing**	130-3834989529	CmActLicense 3.00	●
	∧ Licenses ∨ CmContainer Info ∨ User Data			

∧ 6000010	Vendor 1			CodeMeter Evaluation License - not for commercial use!	O
Product Code	**Name**	**Unit Counter**	**Valid Until**	**License Quantity**	**Feature Map**
2001	Licenses to borrow	O H	n/a n/a	200	n/a

Receiver

C	**Receiver Borrowing**	130-3571548377	CmActLicense 3.00	●
	∧ Licenses ∨ CmContainer Info ∨ User Data			

∧ 6000010	Vendor 1			CodeMeter Evaluation License - not for commercial use!	O
Product Code	**Name**	**Unit Counter**	**Valid Until**	**License Quantity**	**Feature Map**
2001	Licenses to borrow	O	n/a n/a	1 (local)	n/a

Firm Item Details

Sender

Firm Item Details

Firm Item 6000010 of CmContainer "Sender Borrowing" (130-3834989529)

CmContainer	Firm Access Counter	Firm Update Counter	Firm Precise Time
Sender Borrowing (130-3834989529)	23	43	2000-01-01 01:00:00

Product Items

Product Code	CmContainer	Name	Unit Counter	Valid Until	License Quantity	Feature Map
2001	Sender Borrowing (130-3834989529)	Licenses to borrow	n/a	n/a	200	n/a

License Transfer Options

Type	Value
Pulling allowed	1
Licensor Transfer Key	<32 Bytes>

Receiver

Firm Item Details

Firm Item 6000010 of CmContainer "Receiver Borrowing" (130-3571548377)

CmContainer	Firm Access Counter	Firm Update Counter	Firm Precise Time
Receiver Borrowing (130-3571548377)	23	43	2000-01-01 01:00:00

Product Items

Product Code	CmContainer	Name	Unit Counter	Valid Until	License Quantity	Feature Map
2001	Receiver Borrowing (130-3571548377)	Licenses to borrow	n/a	n/a	1 (local)	n/a

License Transfer Options

Type	Value
Pulling allowed	1
Licensor Transfer Key	<32 Bytes>

Product Item Details

Sender

Product Item Details

Product Item 6000010:2001 of CmContainer "Sender Borrowing" (130-3834989529)

Product Item Options	Type	Size (Bytes)	Dependencies	Value
Text		19		Licenses to borrow
License Quantity		4		200

License Transfer Options

Option	Value
Pulling allowed	Yes
Returning allowed	Yes
Firm Item at target required	No
Transfer Type	Borrow Local License
Transfer Depth	1

License Transfer History

#	Status	Type	Time	Borrow Expiration Time	Transfer ID	Client (User)	CmContainer	Update Counter
1	Transferred	Borrow Local License	2016-01-21 11:49:21	2016-02-03 13:08:02	b75ae7e7f827e41313cd	fs1 (WIBU\fs)	130-3571548377	0

Receiver

Product Item Details

Product Item 6000010:2001 of CmContainer "Receiver Borrowing" (130-3571548377)

Product Item Options	Type	Size (Bytes)	Dependencies	Value
Text		19		Licenses to borrow
License Quantity		4		1 (local) (LocalOnly)

License Transfer Options

Option	Value
License received from	130-3834989529
Borrow Expiration Time	2016-02-03 13:08:02
Borrow Source	130-3834989529
Pulling allowed	Yes
Returning allowed	Yes
Firm Item at target required	No
Transfer Type	Borrow Local License
Transfer Depth	0

License Monitoring

6000010	Vendor 1								
Product Code	Name	Feature Map	License Quantity	User Limit (Borrowed)	No User Limit	Exclusive	Shared	Available
2001	Licenses to borrow	-	200	1 (1)	0	0	0	199
2001	Licenses to borrow	-	1 (local)	0 (-)	0	0	0	1

2.9.10.22 Return

CmContainer Details

Sender

Sender Borrowing	130-3834989529	CmActLicense 3.00	●

Licenses ⌃   CmContainer Info ⌄   User Data ⌄

⌃ 6000010   Vendor 1   CodeMeter Evaluation License - not for commercial use! ○

Product Code	Name			Unit Counter	Valid Until		License Quantity	Feature Map
2001	Licenses to borrow	○	Ⓗ	n/a	n/a		200	n/a

Receiver

Receiver Licenses	130-2995221873	CmActLicense 3.00	●

Licenses ⌃   CmContainer Info ⌄   User Data ⌄

⌃ 6000010   Receiver Licenses   CodeMeter Evaluation License - not for commercial use! ○

Product Code	Name		Unit Counter	Valid Until		License Quantity	Feature Map
No Product Items available							
Expired and/or returned Product Items							
2001	Transfer	○	n/a	n/a		0	n/a

Firm Item Details

Sender

Firm Item Details

Firm Item 6000010 of CmContainer "Sender Borrowing" (130-3834989529)

CmContainer	Firm Access Counter	Firm Update Counter	Firm Precise Time
Sender Borrowing (130-3834989529)	23	43	2000-01-01 01:00:00

Product Items

Product Code	CmContainer	Name	Unit Counter	Valid Until	License Quantity	Feature Map
2001	Sender Borrowing (130-3834989529)	Licenses to borrow	n/a	n/a	200	n/a

License Transfer Options

Type	Value
Pulling allowed	1
Licensor Transfer Key	<32 Bytes>

Receiver

Firm Item Details

Firm Item 6000010 of CmContainer "Receiver Licenses" (130-2995221873)

CmContainer	Firm Access Counter	Firm Update Counter	Firm Precise Time
Receiver Licenses (130-2995221873)	65535	2	2000-01-01 01:00:00

Product Items

Product Code	CmContainer	Name	Unit Counter	Valid Until	License Quantity	Feature Map
No Product Items available						
Expired and/or returned Product Items						
2001	Receiver Licenses (130-2995221873)	Transfer	n/a	n/a	0	n/a

Invalid

License Transfer Options

Type	Value
Pulling allowed	1
Licensor Transfer Key	<32 Bytes>

Product Item Details

Sender

Product Item Details

Product Item 6000010:2001 of CmContainer "Sender Borrowing" (130-3834989529)

Product Item Options	Type	Size (Bytes)	Dependencies	Value
Text		19		Licenses to borrow
License Quantity		4		200

License Transfer Options

Option	Value
Pulling allowed	Yes
Returning allowed	Yes
Firm Item at target required	No
Transfer Type	Borrow Local License
Transfer Depth	1

License Transfer History

#	Status	Type	Time	Borrow Expiration Time	Transfer ID	Client (User)	CmContainer	Update Counter
1	0	Borrow Local License	2016-01-21 15:22:58	2016-02-03 13:08:02	535bbf992153b3a7b26d	fs1 (WIBU\fs)	130-2034680140	0

Receiver

Product Item Details

Product Item 6000010:2001 of CmContainer "Receiver Borrowing" (130-3571548377)

Product Item Options	Type	Size (Bytes)	Dependencies	Value
Text		19		Licenses to borrow
License Quantity		4		1 (local) (LocalOnly)

License Transfer Options

Option	Value
License received from	130-3834989529
Borrow Expiration Time	2016-02-03 13:08:02
Borrow Source	130-3834989529
Pulling allowed	Yes
Returning allowed	Yes
Firm Item at target required	No
Transfer Type	Borrow Local License
Transfer Depth	0

License Monitoring

^ 6000010	Vendor 1								
Product Code	Name	Feature Map	License Quantity	User Limit (Borrowed)	No User Limit	Exclusive	Shared	Available
2001	Licenses to borrow	-	200	0 (-)	0	0	0	200
2001	Licenses to borrow	-	0	0 (-)	0	0	0	0

2.9.11 Module Items

> ⚠️ *Module Items* are supported for only, if using *Universal Firm Codes* with a number range bigger than 6.000.000.

Module Items allow the organizational grouping of different license entries required for a product. This is especially helpful when using the license transfer.

In the area "**Licenses**" of the **Container** navigation item existing *Module Items* display as arrow symbols (↰).

Product Code	Name	Unit Counter	Valid Until	License Quantity	Feature Map
2001	CAD Inc.	1000	2016-03-30 23:59:59	100	0x32168
↳ 20330101	CAD Inc. - Setup	52	2016-05-31 09:18:37	n/a	n/a
↳ 21000101	CAD Inc. - Components	n/a	n/a	n/a	n/a
↳ 20331103	CAD Inc. - Setup	52	2016-05-31 09:18:37	n/a	n/a
↳ 21000504	CAD Inc. - Components	n/a	n/a	n/a	n/a
↳ 20430105	CAD Inc. - Setup	52	2016-05-31 09:18:37	n/a	n/a
↳ 21000806	CAD Inc. - Components	n/a	n/a	n/a	n/a
↳ 20330307	CAD Inc. - Setup	52	2016-05-31 09:18:37	n/a	n/a
↳ 21000008	CAD Inc. - Components	n/a	n/a	n/a	n/a
↳ 20330909	CAD Inc. - Setup	52	2016-05-31 09:18:37	n/a	n/a
↳ 21008810	CAD Inc. - Components	n/a	n/a	n/a	n/a
9002	Module Items	1000	2016-03-30 23:59:59	100	0x32168
↳ 20330101	CAD Inc. - Setup	52	2016-05-31 09:18:37	n/a	n/a
↳ 21002102	CAD Inc. - Components	n/a	n/a	n/a	n/a
↳ 20331103	CAD Inc. - Setup	52	2016-05-31 09:18:37	n/a	n/a
↳ 21000504	CAD Inc. - Components	n/a	n/a	n/a	n/a
↳ 20430105	CAD Inc. - Setup	52	2016-05-31 09:18:37	n/a	n/a
↳ 21000806	CAD Inc. - Components	n/a	n/a	n/a	n/a
↳ 20330307	CAD Inc. - Setup	52	2016-05-31 09:18:37	n/a	n/a
↳ 21000008	CAD Inc. - Components	n/a	n/a	n/a	n/a
↳ 20330909	CAD Inc. - Setup	52	2016-05-31 09:18:37	n/a	n/a
↳ 21008810	CAD Inc. - Components	n/a	n/a	n/a	n/a

Figure 64:*CodeMeter WebAdmin – Container | Licenses - Module Items*

On clicking the *Product Code*, which holds the *Module Items*, the **Product Item Details** page opens and in the lower part existing *Module Items* displays.

Product Item Details

Product Item 6000010:2001 of CmContainer "ModuleIT" (130-535939122)

Product Item Options	Type	Size (Bytes)	Dependencies	Value
Text		9		CAD Inc.
Feature Map		4		0000 0000 0000 0011 0010 0001 0110 1000 (0x32168)
Unit Counter		4	data, serial	1000
Aktivierungsdatum		4	data, serial, counter	2015-04-01 00:00:00
Activation Time				. . .
Secret Data	124	48	data, serial, counter	<secret>

Module Items

Product Code	Name
20330101	CAD Inc. - Setup
20330307	CAD Inc. - Setup
20330909	CAD Inc. - Setup
20331103	CAD Inc. - Setup
20430105	CAD Inc. - Setup
21000008	CAD Inc. - Components
21000101	CAD Inc. - Components
21000504	CAD Inc. - Components
21000806	CAD Inc. - Components
21008810	CAD Inc. - Components

License Transfer Options

Option	Value
Pulling allowed	Yes
Returning allowed	Yes
Firm Item at target required	Yes
Transfer Type	Units
Transfer Depth	2

Figure 65:*CodeMeter WebAdmin* – Product Item Details - *Module Items*

On clicking a *Module Item* the usual **Product Item Detail**[61] page opens.

2.10 CmDust (CodeMeter Enduser Support Tool)

At times, it may necessary to receive help by our support when using *CodeMeter*. In order to ease identification of troubles, the program *CmDust* (**C**ode**M**eter En**du**ser **S**upport **T**ool) for the command line has been developed.

> ℹ️ No secret information is transferred to Wibu-Systems. You are able to check the information saved in plain text.

CmDust on Windows

🪟 Open *CmDust* using the **"Start | All Programs | CodeMeter | Tools"** menu item.

🪟 Press "Windows" key to open Start screen | Type "CmDust" | Press "Enter" key.

The result of the program execution is written to the text file `CmDust-Result.log` and saved to the user directory which automatically opens when starting *CmDust*.

Alternatively, you are able to use the command line application [cmu]📄 117 to create a log file.

For analyses this file can be sent to Wibu-Systems.

🖥️ CmDust on macOS

For macOS you create the *CmDust* file using the [cmu]📄 116 command line program. Calling *cmu* is stored in the search path.

To create a *CmDust* log, please proceed as follows:

1. Open *cmu* command line
2. Type in the following command
   `cmu --cmdust`
   Using the option `--file` allows to add a name and a saving location.
   By default, the file is written to the directory from which you accessed *cmu*.
3. Send this file for analyzing to Wibu-Systems.

CmDust on 🐧 Linux

For the operating systems Linux you create the *CmDust* file using the [cmu]📄 116 command line program. Calling *cmu* is stored in the search path.

1. Open *cmu* command line
2. Type in the following command
   `cmu --cmdust`
   Using the option `--file` allows to add a name and a saving location.
   By default, the file is written to the directory from which you accessed *cmu*.
3. Send this file for analyzing to Wibu-Systems.

CmDust output

CmDust reads out the following settings:

- Information on the operating system: version, installed service packs, language settings.
- *CodeMeter* relevant registry entries: installation path, settings of *CodeMeter License Server* and *CodeMeter WebAdmin*, backup and HTTP settings.
- AddOns: information on all *CodeMeter* AddOns.
- Information on *CodeMeter* and *CmContainer*: software and hardware version and all entries of connected *CmContainer*.

```
================================================================================
***************************** General Information ******************************
================================================================================
CmDust Version 4.40 Build 660 of 2011-11-10
Copyright (C) 2005-2011 by WIBU-SYSTEMS AG. All rights reserved.

CmDustLog created at 2011-11-17 15:24:40 (UTC)
CmDust was started from: C:\Program Files\CodeMeter\Runtime\bin
Current User has administrator rights
================================================================================
***************************** System Information *******************************
================================================================================
OS: Microsoft Windows 8 Business Edition, 32-bit Service Pack 1 (build 7601)
Computer Name:    FS2.wibu.local
Found IP address: 10.49.12.16 | 192.168.243.1 | 192.168.204.1 | 127.0.0.1
Not running inside Virtual Environment.

Language Settings:
  Machine:       English
  Current User: English

DataExecutionProtection state:
  OPTIN (Only Windows system components and services have DEP applied.)
Current User has administrator rights

Overview of available drives:
  C:\ = Fix Drive  (304336 MB)
  D:\ = CDROM
  E:\ = Removable Drive Bus=Usb;WIBU -  CodeMeter-StickM (7832 MB), contains codemtr.io
  ==============================================================================
*********************** Relevant registry entries *****************************
==============================================================================
[HKEY_LOCAL_MACHINE\SOFTWARE\WIBU-SYSTEMS\CodeMeter] <All>
RuntimeVersion <All> = "4.40.660.500"
```

2.11 CMU - CodeMeter Universal Support Tool

You have also the option to alternatively execute some *CodeMeter Control Center* functions by the command line based *CodeMeter Universal Support Tool* (*cmu*).

cmu supports you in:

- listing of *CmContainer* contents
- creating a simple test environment for *CmContainer*
- executing a certified time update, and creating and importing of license request and update files (Context Files and Update Files, `*.WibuRaC` and `*.WibuRaU`).

Call *cmu* in the directory `%\Program Files%\CodeMeter\Runtime\bin` using the command `cmu[32].exe`.

Alternatively, on Windows call *cmu* by the start menu item **"Start | All Programs | CodeMeter | Tools | CodeMeter Command Prompt"**.

Press "Windows" key to open Start screen | Type "CodeMeter Command Prompt" | Press "Enter" key.

For the operating systems macOS and Linux this command is provided by the usual search path parameter.

The following list shows all existing *cmu* commands. A short example section is appended.

- [General settings]📄 116
- [*CodeMeter Time Server* settings]📄 118
- [License transfer options]📄 118
- [Named User licenses]📄 120
- [Additional cmu options]📄 125
- [Examples]📄 127

General settings

Command	Description	
`/h` or `--help`	shows this help in the command line window.	
`/v` or `--version`	shows the versions of all available *CodeMeter* components.	
`/l` or `--list`	lists all connected *CmContainer* by way of their serial numbers.	
`/x` or `--list-content`	lists the contents of all connected *CmContainer*.	
`/k` or `--list-server`	lists all available network license server.	
`/n` or `--list-network`	lists the network license information of the own server. For explanations of terms, e.g. access modes, please see information on [license monitoring]📄68 and [terms in license display]📄 55 in *CodeMeter WebAdmin*.	
	lists network license information also of remote *CodeMeter* server. `-list-network [--server <servername>|--all-servers] [--serial <serial>] [--firmcode <firmcode> [--productcode <productcode> [--featuremap <featuremap>]]]`	
	`--all-servers`	lists the network license information for all found servers.
	`--server <servername>`	lists the network license information for the specified server `<servername>`.
	`--serial <serial> --firmcode <firmcode> --productcode <productcode> --featuremap <featuremap>`	specified parameter configure the output according to criteria selected.
`--add-server`	adds a server to the end of your server search list. As an argument pass the server's name, IP or CmWAN URL. Examples: `server.domain.local` `192.168.0.72` `fe80::ea06:88ff:fecf:df6f`	

Command	Description
	`https://user:secretpassword@server.domain.local/cmwan`
`--delete-server`	deletes a server from the server search list. As an argument pass the server's name, IP or CmWan URL as it is listed.
`-- clear-serversearchlist`	deletes all the entries from the server search list. To reactivate automatic server broadcast, please add broadcast using option "`--add-server 255.255.255.255`".
`--show-serversearchlist`	shows the entries in the server search list.
`/c <FI>` or `--context <FI>`	creates a license request file (Context File) for *Firm Item* <FI> (see [here]📄127). Using option `--file` specifies the output file. If no option is set the standard output is used (stdout).
`/i` or `--import`	imports a license update file (Update File) for the available *CodeMeter* license (see [here]📄127). Using option `--file` specifies the file name. The update can cover a *CmDongle* or a *CmActLicense* license file.
`/d` or `--firmware-update`	starts the firmware update of a *CmContainer*.
`/u` or `--time-update`	starts the update of the Certified Time in each connected *CmContainer*.
`/e <s>` or `--enable <s>`	allows the activation or deactivation of the selected *CmContainer*. Specifying the *CodeMeter* password is required. The required new *Enabling* status is specified by the parameter `<s>`. Parameter values cover 1 (disable), 2 (temporary enable), 3 (enable).
`/t <no>` or `--test<no>`	starts some simple tests for each connected *CmContainer*. The number of tests is specified by parameter <no>. It is required that the *CmContainer* must be (temporarily) enabled.
`/vv` or `--cmdust`	creates a *CmDust* report. This report is useful and required when requesting support. Wibu-Systems recommends to create a *CmDust* report before contacting the support. Using the option `--file` writes the result into a text file.
`--borrow`	allows the borrowing of licenses from a license server to the local PC. You have to specify the *Firm Code* and the *Product Code* of the license using the options `--firmcode` and `--productcode`. As an additional option you may specify the *Feature Map* using the option `--featuremap`. Moreover, you have to specify the serial number of the client *CmContainer* and the server name using the options `--serial` and `--server`.
`--return`	returns the borrowed license to the license server. You have to specify the *Firm Code* and the *Product Code* of the license using the options `--firmcode` and `--productcode` and the serial number of the client *CmContainer* and the server name using the options `--serial` and `--server`.
`--borrowlist`	lists the borrowed licenses for the client and the server.
`--transferlist`	creates a listing of the license transfer relevant data.
`--enabling`	lists the enabling stati of all connected *CmContainer*. Combined with the command `-x` you can also display additional enabling information of the *CmContainer* content.
`--create-io`	is used in combination with the option `--file` and makes sense only when using the hardware form factors *CmCard/SD* or *CmCard/CF*. A new `codemtr.io` file is created. Please call this command only if the `codemtr.io` file is deleted.
`--detect-proxy`	prints the system proxy to standard output.. Please note, that under 🐧 Linux, the environment variable `http_proxy` is considered as *system proxy*. `https_proxy` is not yet supported.
`--delete-cmact-license`	deletes a *CmActLicense* license you specify using the command `--serial`. ℹ️ Once you delete a *CmActLicense* license it cannot be restored.
`--set-access-data`	activates *WebAdmin* write authentication and saves the password. Use with option `--password` to define password.
`--set-proxy`	sets *CodeMeter* proxy configuration. As argument pass the name or IP address of the proxy server. A port different to the default port (80) may be defined by `--port` followed by the port number. A user password authentication may be set by `--username` <name of the user> `--password` <password>.

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Command	Description
	To remove the authentication use **--username** followed by **""**.
	--use-system-proxy — on setting the proxy the system proxy is used. In the profiling or the `server.ini` file then the entry `UseSystemProxy` is set to a value of **1**. The entry has the value `0`, if **--set-proxy** is used. Please note, that under 🐧 Linux, the environment variable `http_proxy` is considered as *system proxy*. `https_proxy` is not yet supported.
	Examples: **cmu --set-proxy** proxy.company.com --username `johndoe` **--password** mypassword **--port** 90 **cmu --set-proxy** proxy.company.com **--username** **""**
--reset-access-data	deletes both passwords for *WebAdmin* authentication (read- and write-passwords) and sets default (no read authentication, no write authentication). "Local Access only" will be set.
--device-id	sets this parameter on import of WibuCmLiF files (`--import`) with binding scheme "Binding Extension". The input of the `device-id` is as 128 hex digits preceeded by "0x".
--hid	sets the USB communication standard to the Human Interface Device (HID) class specification. Shortcut for **--set-config-disk HidCommunication**. May be used with or without specifying a serial number via **--serial**. Without specifying the command will be executed for all connected CmDongles.
--msd	sets the USB communication standard to the Mass Storage Device (MSD) class specification. Shortcut for **--set-config-disk MsdCommunication**. May be used with or without specifying a serial number via **--serial**. Without specifying the command will be executed for all connected CmDongles.

CodeMeter Time Server Settings

> ℹ️ Please note that only Wibu-Systems *CodeMeter Time Servers* may be specified here.
>
> You <u>cannot</u> specify your own NTP (Network Time Protocol) time servers here, as this time synchronization does not guarantee a *Certified Time*, which plays an important role, for example, when retrieving and subsequently validating time-based licenses.

--add-timeserver	appends a single *CodeMeter Time Server* to your Time Server list. As argument, pass the Server name or IP address (IPv5 or IPv6).
--delete-timeserver	deletes a single *CodeMeter Time Server* from your Time Server list. As argument, pass the Server name or IP address (IPv5 or IPv6).
--clear-timeserver-list	removes all entries from the *CodeMeter Time Server* list.
--set-timeserver-default	sets the *CodeMeter Time Server* settings to default parameters. • *CodeMeter Time Servers*: `cmtime.codemeter.com`, `cmtime.codemeter.de`, `cmtime.codemeter.us` • Timeout: `20` seconds • Protocol: `http`
--show-timeserver-info	shows the entries in the *CodeMeter Time Server* list.
--set-timeserver-timeout	sets the timeout of the *CodeMeter Time Server* in seconds. Value range is between `1` and `120`. Default value is `20` seconds.
--set-timeserver-protocol	sets one of the protocols HTTP or HTTPS for *CodeMeter Time Server*.

License transfer options

All calls existing in CodeMeter Core API for the licenses transfer feature can also be called using *cmu*. Here the respective files are used (`WibuCmLIF`/`WibuCmRaC`/`WibuCmRaU`). The following *cmu* calls exist:

Command	Description
`--create-lt-context <parameters>`	Enables to create a license transfer context. Used with `--lt-push` parameters to specify the nature of the transfer - license update with FSB if omitted. Additional parameters:
	`--lt-request-file <file>` — is a mandatory parameter. It is used to specify the file `<file>` where the result of the license context creation should be written.
	`--lt-context-file <file>` — It is used to specify the file `<file>` containing the license context to be created.
	`--serial <serial> or -s <serial>` — selects the *CmContainer* with the specified *Serial Number.*
	`--firmcode <fc>` — sets the *Firm Code* of the transferred license.
	`--productcode <pc>` — sets the *Product Code* of the transferred license.
`--create-lt-update <parameters>`	Enables to transfer a license transfer context. Used with one of following parameters to specify the nature of the transfer:
	`--lt-move-licenses <licenses>` — the specified number of licenses wil be transferred.
	`--lt-borrow-local-license <expiration time>` — expiration time as `<YYYY>-<MM>-<DD>[T<hh>:<mm>:<ss>]` (one license will be transferred for the specified time limit).
	`--lt-renewborrow <expiration time>` — time validity of an already borrowed license will be extended.
`--import-lt-update <parameters>`	Updates license transfer data on the target side. Used with either `--lt-push`, `--lt-pull`, `--lt-fsb` or `--lt-return` parameters to specify the nature of the transfer. Additional parameters:
	`--lt-update-file <file>` — is a mandatory parameter. It is used to specify the Update File `<file>` where the result of the license update should be written.
	`--serial <serial> or -s <serial>` — optionally selects the *CmContainer* with the specified *Serial Number.*
	`--firmcode <fc>` — optionally sets the *Firm Code* of the transferred license.
	`--productcode <pc>` — sets the *Product Code* of the transferred license (optional, only with `--firmcode`).
`--create-lt-receipt <parameters>`	Creates a signature with a defined private key and gives it back as a receipt to specify the nature the transfer. Additional parameters:
	`--lt-receipt-file <file>` — is a mandatory parameter. It is used to specify the Context File `<file>` where the receipt will be transferred to.
	`--serial <serial> or -s <serial>` — selects the *CmContainer* with the specified *Serial Number.*
	`--firmcode <fc>` — sets the *Firm Code* of the transferred license.
	`--productcode <pc>` — sets the *Product Code* of the transferred license.
`--import-lt-receipt <parameters>`	Checks the receipt with a defined public key confirming the validity of a transaction. Used with one of following parameters to specify the nature of the transfer. Additional parameters:
	`--lt-receipt-file <file>` — is a mandatory parameter. It is used to specify the Context File `<file>` where the data will be transferred from.
	`--serial <serial> or -s <serial>` — selects the *CmContainer* with the specified *Serial Number.*

Command	Description	
	`--firmcode <fc>`	sets the *Firm Code* of the transferred license.
	`--productcode <pc>`	sets the *Product Code* of the transferred license.
`--lt-cleanup <parameters>`	Possible cleanup action	
	`--deleted`	clean deleted licenses
	`--disabled`	clean disabled (dangerous)
	`--hiddenhistory`	clean history of given product item
	`--container`	removes whole license container (dangerous)
	Additional parameter	
	`--serial <serial> or -s <serial>`	selects the CmContainer with the specified Serial Number.
	`--firmcode <fc>`	selects the *Firm Code* of the transferred license.
	`--productcode <pc>`	selects the *Product Code* of the transferred license.
	`--lt-product-ref <number>`	It is used to specify the Product Item Reference `<number>`. The default input for the `<number>` is in decimal unless it begins with `0x` or `0X`.

Creating and importing a `namelist` of *Named User*

To restrict access to licenses to so-called named users, external *namelist* files <u>must</u> be used. This process is done in two steps:

1. Creating the namelist file

   A *namelist* file includes a list of authorized users in plain text entries and must conform to a JSON[120] format. The format is specified by Wibu-Systems.

2. Mandatory importing of the namelist file [123]

   Cmu converts the plaintext entries of the *namelist* file into a list of hash values

   ⚠️ After importing and converting the plaintext entries into hash values by *cmu*, the hash values <u>cannot</u> be exported back to the original plaintext entries: recovery is <u>not</u> possible in any case.

   You are therefore responsible for saving the data yourself!

Creating a namelist

To create the *namelist* file you need information from software vendors about

- the *Firm Code* used,
- the JSON format version and
- the unique identifier of the *name list* (`NamelistId`).

The following applies to a namelist:

- There is a format version that is easy to edit and extend.
- It is possible to change the *namelist* file without restarting *CodeMeter*.
  That is importing a changed *namelist* file is possible at any time without a restart, which then becomes valid, but this does not mean that it is possible to change the file in *CodeMeter* itself.
- For security reasons no plain names are kept in memory.
- The file can be assigned to one or more product items via `NameListId` and *Firm Code*.
- Case sensitivity: using `"IgnoreCase": true` the names are first converted to lower case before hashing. Currently only ASCII characters are affected by this entry.
- A maximum of 5000 named users are allowed per `namelist`.
- *CodeMeter* uses a maximum of 250 `namelists`.

It is possible to add users to the `namelist` multiple times, whereby the total frequency, the entry position and the *License Quantity* are taken into account and allow list control.

With a number of licenses `n` and a number of `m` entries applies:

- If the number of entries `m` is greater than the number n of available licenses, only the first `n` entries are used.

- If, on the other hand, the number of entries `m` is less than the number `n` of available licenses, only the `m` entries are used; if the license is created with the `singlealloc` option, the remaining `n-m` licenses cannot be used.

Please find example files for each credential type with parameters and descriptions below.

- [Credential type: *UserName*](#)⬜ [121]

- [Credential type: *UserDomain*](#)⬜ [121]

- [Credential type*: UserDefined*](#)⬜ [122]

Credential type: *UserName*

```
{
    "NameList": {
        "FirmCode": 6000010,
        "IgnoreCase": true,
        "FormatVersion": 1,
        "Mode": "User",
        "NameListId": 1234,
        "Users": [
            {
                "Name": "Jane"
            },
            {
                "Name": "Alice"
            },
            {
                "Name": "Bob"
            }
        ]
    }
}
```

Parameter	Description
`FirmCode`	holds the *Firm Code* to which the *namelist* refers.
`IgnoreCase`	contains the selection about switching off the upper/lower case criterion. By default, **true** ignores the case and converts the names to lower case. Currently only ASCII characters are affected by this entry.
`FormatVersion`	holds the valid version of the JSON format.
`Mode`	holds the credential type and the respective check mode. Here the mode "`User`".
`NameListId`	holds the unique identification number of the *namelist*.
`Users`	holds the array of elements of type "`Users`".
`Name`	holds the respective name of the user eligible for an authorized license access as *NamedUser*.

Credential type: *UserDomain*

```
{
    "NameList": {
        "FirmCode": 6000010,
        "IgnoreCase": true,
        "FormatVersion": 1,
        "Mode": "UserDomain",
        "NameListId": 5678,
        "Users": [
            {
                "Domain": "MyCompany",
                "Name": "Jane"
            },
            {
                "Domain": "MyCompany",
                "Name": "Alice"
            },
```

```
            {
                "Domain": "MyCompany",
                "Name": "Bob"
            }
        ]
    }
}
```

Parameter	Description
FirmCode	holds the *Firm Code* to which the *namelist* refers.
IgnoreCase	contains the selection about switching off the upper/lower case criterion. By default, **true** ignores the case and converts the names to lower case. Currently only ASCII characters are affected by this entry.
FormatVersion	holds the valid version of the JSON format.
Mode	holds the credential type and the respective check mode. Here the mode "UserDomain".
NameListId	holds the unique identification number of the *namelist*.
Users	holds the array of elements of type "Users".
Domain	holds the respective name of the domain eligible for an authorized license acccess as *NamedUser*.
Name	holds the respective name of the user eligible for an authorized license acccess as *NamedUser*.

Credential type: *UserDefined*

```
{
    "NameList": {
        "FirmCode": 6000010,
        "IgnoreCase": true,
        "FormatVersion": 1,
        "Mode": "UserDefined"
        "NameListId": 91011,
        "Users": [
            {
                "UserDefinedText": "ABCSoftwareModule1"
            },
            {
                "UserDefinedText": "ABCSoftwareModule2"
            },
            {
                "UserDefinedText": "ABCSoftwareModule3"
            }
        ]
    }
}
```

Parameter	Description
FirmCode	holds the *Firm Code* to which the *namelist* refers.
IgnoreCase	contains the selection about switching off the upper/lower case criterion. By default, **true** ignores the case and converts the names to lower case. Currently only ASCII characters are affected by this entry.
FormatVersion	holds the valid version of the JSON formatv.
Mode	holds the credential type and the respective check mode. Here the mode "UserDefined".
NameListId	holds the unique identification number of the *namelist*.
Users	holds the array of elements of type "Users".
UserDefinedText	holds the respective user-defined text eligible for an authorized license acccess as *NamedUser*.

Importing a namelist of named users

Using external *namelist* files requires an import via the following *cmu* command after their creation.

Options	Description
`--import-namelist -f <NameList.txt>`	imports a list of of name user (`namelist`) in the JSON format to allow using the feature *Named User*. Using `-f` allows to specify path information and file name, e.g. `NameList.txt`.

Cmu converts the entries of the *namelist* file into a list of hashes. Using another *cmu* command allows the [hash output](#)⎙[123] of this *Namelist* to `stdout`.

> ⚠ After importing and converting the plaintext entries into hash values by *cmu*, the hash values <u>cannot</u> be exported back to the original plaintext entries: recovery is <u>not</u> possible in any case.
>
> You are therefore responsible for saving the data yourself!

The cryptographic hash function Secure Hash Algorithm `sha256` is used to ensure the integrity of the data.

Only the first 8 bytes are used for the user hash values, but the full 32 bytes are used for the hash value of the entire file.

If an empty *namelist* file is imported, i.e. without specification of named users, *CodeMeter* deletes the associated file if it exists.

If a *namelist* file is re-imported, occupied license accesses are not released. If users suddenly no longer have authorization due to a change in the *namelist* file, they will also no longer be assigned new license accesses. However, previous license accesses can still be used.

The locations of the imported *namelist* then generated by *cmu* for the different operating systems are:

Operating system	Location
Windows	`%ProgramData%/CodeMeter/NamedUser`
macOS	`/Library/Application Support/CodeMeter/NamedUser`
Linux	`/var/lib/CodeMeter/NamedUser`

The notation bases on *Firm Code* and `NameListId`, e.g. `6000010-2222.txt`.

Subsequently, *CodeMeter* handles license accesses of users on the *namelist*.

Hash output of a *namelist* file

Option	Description
`--show-namelisthashes -f <filename>`	outputs the hashes of a *namelist* file into file **<filename>**.. Each line outputs a single *Named User* entry of the *namelist*. Each line contains exactly two fields separated by a tab.

Field	Description
1	contains the credential type entry (`modes`), i.e. either `User`, `UserDomain` or `Userdefined`. The strings are shortened here to the lengths that are specified internally by the `CMCREDENTIAL` structure and over which hashing is performed.
2	represents the credential type entry as an 8-byte hash in hex string format.

The output is in UTF-8 format on `stdout` and can be further processed from there with appropriate applications, e.g. programming language awk for processing and evaluation of any text data.

e.g.
```
cmu[32].exe --show-namelist-hashes -f NamedUserHashing_user.json
```
Output is:
```
abcdefghijklmn\abcdefghijklmnopqrstuvwxyz01234    8094ca566d14d155
abcdefghijklmn\abcdefghijklmnopqrstuvwxyz01234    8094ca566d14d155
abcdefghijklmn\abcdefghijklmnopqrstuvwxyz01234    8094ca566d14d155
abcdefghijklmn\abcdefghijklmnopqrstuvwxyz01234    8094ca566d14d155
abcdefghijklmn\abcdefghijklmnopqrstuvwxyz01234    8094ca566d14d155
abcdefghijklmn\abcdefghijklmnopqrstuvwxyz0123     f25227d24bb65ac4
abcdefghijklmn\abcdefghijklmnopqrstuvwxyz0123     f25227d24bb65ac4
abcdefghijklmn\abcdefghijklmnopqrstuvwxyz012ä     de77086674e55409
abcdefghijklmn\abcdefghijklmnopqrstuvwxyz012      a1c4b5951eb70a1f
```

Listing rejected license allocations

The `List-Rejected-Allocations` feature allows to track all [rejected license allocations](#)[133] for a specific *CodeMeter License Server* (local or remote) and retrieve them as a list of log entries.

The log entries listed cover the following information: `timestamp` (UTC), `LicenseID`, *Firm Code*, *Product Code*, *Product Item Reference*, *License Quantity*, and client and user information.

Configuring allows the data output either for individual *Firm Codes* or for all *Firm Codes* (default). In addition, specifying the maximum number of log entries is supported. The current status of the log entries may be retrieved at any time.

If the data is not retrieved, it will no longer be available after restarting *CodeMeter License Server*. However, if only the feature is deactivated, the data remains and can be retrieved later. Only after a later reactivation, all not retrieved data of the previous recording will be lost.

The use of this feature is independent of [license tracking](#)[128] .

> Users <u>must actively</u> retrieve the data via *cmu*. The data is then written to the command line (`stdout`) or to a user-defined file.
>
> Recorded data is <u>not automatically</u> written to a log file at a central location, as is the case with the license tracking log, for example.

The feature can also be activated, disabled and configured via [profiling entries](#)[25] in the registry (Windows) / Server.ini (Unix).

For efficient or effective use of listed rejected license assignments two different strategies can be followed. Either a high number of log entries can be set with potentially higher memory consumption and not so frequent data retrievals. Or a low number of log entries can be set with potentially lower memory consumption and the need to retrieve data more frequently to avoid missing rejections when the limit of the maximum number of log entries is reached.

Command	Description
`--list-rejected-allocations`	
Options	
`--activate`	activates logging of rejected allocations.
	> Please note, that when activating via *cmu* without explicitly specifying the '`--firmcode`' or '`--max-entries`' parameters, no values that may already exist in profiling are loaded. Rather, these are set to their defaults ([Firmcode](#)[25] = '0', [MaxEntries](#)[25] = '1000').
	Additional parameter:
`--firmcode <fc>`	specifies a single *Firm Code* via **`<fc>`** for which logging is to be activated.

`--max-entries <num>]`	specifies the maximum number of log entries via **`<num>`**.
	
	 The default is 1000. Values between 1 and 200000 can be selected.
	
	 If the maximum number of log entries is reached, an additional log entry is issued when the data is retrieved, informing about the time window in which no 'rejections' were recorded. This corresponds to the difference between the timestamps of the last two entries.
	
	 Example:
	
	 …
	 `2021-06-16T15:45:17 Denial LicenseID:3-5430061-6001494-16, FC:6001494, PC:999, LQ:5, Client:"::1", User:"WIBU\apri"`
	 `2021-06-16T15:45:17 Denial LicenseID:3-5430061-6001494-16, FC:6001494, PC:999, LQ:5, Client:"::1", User:"WIBU\apri"`
	 `2021-06-16T15:45:18 Denial LicenseID:3-5430061-6001494-16, FC:6001494, PC:999, LQ:5, Client:"::1", User:"WIBU\apri"`
	 `2021-06-16T15:45:30 MAXIMUM NUMBER OF ENTRIES REACHED. SOME REJECTIONS MAY NOT HAVE BEEN RECORDED SINCE THE LAST WRITTEN ENTRY.`

`--deactivate`	deactivates logging of rejected allocations.
`--status`	queries the current status of logging.

Command		Description	
`--get-data`		queries all data logged by *CodeMeter License Server* and issues them in order of occurrence of rejected license assignments as a time-sorted list in the console (`stdout`).	
		Additional parameter:	
		`[--file <filename>]`	Optionally, the data can also be written to a file. The `--file` parameter is used either to extend an existing file by appending the data until the maximum number of log entries is reached, or to create a new file with the specified name if none already exists.
`Optional`			
`--server <ip` or `hostname>`		allows to execute the above commands also for a remote computer. For this, the remote computer on which *CodeMeter License Server* is running as a service must be set up as a LAN server. This either in profiling (`IsNetworkServer`[21]) or in *CodeMeter WebAdmin* (Configuration | Server | Server Access[84]).	

The console output for the `--activate`, `--deactivate` or `--status` commands might look as follows:

```
List-Rejected-Allocations - Activated


Started recording at: 2021-07-05T15:49:55
Stopped recording at:


Tracked Firmcode: All
Maximum number of entries: 1000


Total rejections: 324


Entries ready for retrieval: 77
```

The output of a data query might look as follows.

```
cmu --list-rejected-allocations --get-data
2021-05-10T10:11:32 Denial LicenseID:3-5430061-6001494-16, FC:6000010, PC:999, LQ:1,
Client:"192.168.2.200", User:"VM\ap"
2021-05-10T11:00:01 Denial LicenseID:3-5430062-6001494-54, FC:6000010, PC:42, LQ:3,
Client:"192.168.2.55", User:"ABC\db"
2021-05-10T11:20:19 Denial LicenseID:3-5430061-6001494-18, FC:6000010, PC:999, LQ:1,
Client:"10.49.205.3", User:"ABC\cd"
2021-05-10T12:01:33 Denial LicenseID:3-5430063-6001494-99, FC:6000010, PC:123, LQ:1,
Client:"192.168.2.106", User:"ABC\ap"
2021-05-10T12:10:00 Denial LicenseID:3-5430061-6001494-17, FC:6000010, PC:999, LQ:1,
Client:"10.49.205.3", User:"ABC\cd"
2021-05-10T13:59:59 Denial LicenseID:3-5430062-6001494-54, FC:6000010, PC:42, LQ:3,
Client:"192.168.2.55", User:"ABC\dabu"
2021-05-10T14:05:48 Denial LicenseID:3-5430062-6001494-54, FC:6000010, PC:42, LQ:1,
Client:"192.168.2.55", User:"ABC\db"
2021-05-10T14:49:53 Denial LicenseID:3-5430063-6001494-99, FC:6000010, PC:123, LQ:1,
Client:"192.168.2.106", User:"ABC\ap"
```

Additional *cmu* options

The following list shows additional *cmu* options:

Options	Description
`/f <file>` or `--file <file>`	Additional option which writes the command result into a file `<file>`. This option is used in combination with the commands `--context`, `--import`, `--cmdust`.
`/s <serial>` or `--serial <serial>`	Additional option which defines that a command is valid only for a *CmContainer* specified by its serial number `<serial>`, e.g. "1-10234242".

Options	Description
`/p <pwd>` or `--password <pwd>`	Additional option in combination with the commands `--enable` and `--firmware-update`. This option defines the required *CodeMeter* Password for this command.
`--firmcode <fc>`	Additional option in combination with the commands `--borrow` or `--return` specifying the *Firm Code* of the borrowed license.
`--productcode <pc>`	Additional option in combination with the commands `--borrow` or `--return` specifying the *Product Code* of the borrowed license.
`--featuremap <fm>`	Additional option in combination with the commands `--borrow` or `--return` specifying the *Feature Map* of the borrowed license.
`--server <servername>`	Additional option to borrow a license from another server. Is used in combination with command `--borrow`.
`--write`	Additional option used in combination with the command `--detect-proxy` which saves the setting using the *CodeMeter* profiling. These settings are written only if no proxy has been previously set in the profiling. For overwriting the settings use the option **--force**.
`--force`	Additional option used in combination with the command `--detect-proxy` which overwrites already existing proxy settings in the *CodeMeter*®profiling.
`--show-config-disk`	Shows the current settings of removable/fixed drives or of the type of the defined Master Boot Record (MBR). This option concerns the behavior of virtual flash memory partitions. Use only for *CmStick* and *CmStick/M*.
`--set-config-disk <parameter>`	Allows to define a special behavior of virtual flash memory partitions, e.g. drive settings, boot code or activations (*CmDongle* only). ℹ Please note that replugging of the *CmDongle* is required.

Description	Parameter
Drive settings	`RemovableDisk,LocalDisk`
Boot Code	`Int18Boot,ZeroBoot,LoopBoot,SwapBoot,VbrBoot`
Activation	`ActivePartition,InactivePartition`
FAT	`Fat16,Fat32`
USB-Communication Device Class	`HidCommunication; MsdCommunication`

|
| `--check-cm-integrity` | Allows to check the *CodeMeter* signature. |
| `--export-acl` | allows you to export the list of License Access Permissions[85] (ACL, Access Control List).

Please use the `--file`[116] option to specify the file name.

The specification of absolute paths is supported. If no path is specified, the file is located in the local directory.

The export is possible during operation, the *CodeMeter WebAdmin* service does not have to be stopped or started separately.

The list is exported in `*.json` format. No file extension must be specified. The file is editable. For information about format conventions to be used please contact Wibu-Systems Support.

ℹ To varying degrees, License Access Permissions[85] are available for all operating systems.
Under macOS and Linux, Windows-specific configurations, e.g. Active Directory and groups, are not available.
However, the operation of macOS and Linux clients on *CodeMeter License Servers* under Windows is possible, if the clients are located in a Windows domain. Operation from Windows clients to *CodeMeter License Servers* under Linux/macOS is currently not possible.
Under macOS and Linux the import works like under Windows.
However, the JSON documents may only contain elements that the respective *CodeMeter License Servers* can process. In case of an error, the entire export is denied and an error message is displayed.

ℹ A support of Triple Mode Redundancy (TMR) is currently not implemented. |

Options	Description
`--import-acl`	allows you to import the list of <u>License Access Permissions</u>□85 (ACL, Access Control List).
	Please use the <u>`--file`</u>□116 option to specify the file name.
	The specification of absolute paths is supported. If no path is specified, the file is located in the local directory.
	The import is possible during operation, the *CodeMeter WebAdmin* service does not have to be stopped or started separately.
	The list is imported in `*.json` format. No file extension must be specified. The file is editable. For information about format conventions to be used please contact Wibu-Systems Support.
	ℹ️ To varying degrees, <u>License Access Permissions</u>□85 are available for all operating systems. Under macOS and Linux, Windows-specific configurations, e.g. Active Directory and groups, are not available. However, the operation of macOS and Linux clients on *CodeMeter License Servers* under Windows is possible, if the clients are located in a Windows domain. Operation from Windows clients to *CodeMeter License Servers* under Linux/macOS is currently not possible. Under macOS and Linux the export works like under Windows. However, the JSON documents may only contain elements that the respective *CodeMeter License Servers* can process. In case of an error, the entire export is denied and an error message is displayed.
	ℹ️ A support of Triple Mode Redundancy (TMR) is currently not implemented.
`--delete-cmcloud-credentials`	Allows you to delete the *CodeMeter Cloud* credentials belonging to the *CmCloudContainer* specified with --serial.
	ℹ️ If you delete the credentials, you can no longer access your *CmCloudContainer*. The license within *CodeMeter Cloud* itself is not affected by this action.

Application examples

Action	Parameter
Displaying *cmu* options	`Cmu[32].exe -h`
Creating a *CodeMeter* Remote Activation Context File (here:`1-1040870.WibuCmRaC`) for the *Firm Code* 10 (*Firm Item level*)	`Cmu[32].exe -c10 -f1-140870.WibuCmRaC`
Importing a *CodeMeter* Remote Activation Update File (here:`1-1040870.WibuCmRaU`) --> reprograms the connected *CmContainer*	`Cmu[32].exe -i -f1-1040870.WibuCmRaU`
Showing the versions of current *CodeMeter* components.	`cmu[32] --version`
Listing all available *CodeMeter* network license server and if existing all related licenses.	`cmu[32] --list-server --list-content`
Starting 100 simple tests. The tests are executed only for the *CmContainer* specified by the serial number of `1-233232`.	`cmu[32] --test 100 --serial 1-233232`
Changing the enabling status to "temporarily enabled" for the *CmContainer* `1-2345` by using the *CodeMeter* password "SECRET".	`cmu[32] --enable2 --serial 1-2345 --password SECRET`

2.12 CodeMeter License Tracking

Starting with Version 4.50 *CodeMeter* introduces license tracking allowing for the evaluation of licensing data based on structured logfiles. With it the actual use of licenses is recorded.

However, Wibu-Systems does not offer a separate application for license tracking but suggests that software vendors who want to evaluate how their licenses are used refer to tools by third parties able to aggregate information from real-time requests or logfiles.

> License tracking includes *CmWAN* licenses but not license transfer (transfer types: move licenses, borrow local license).

Secure Licence Tracking

Starting with Version 5.20 *CodeMeter* supports Secure License Tracking. This ensures that license access log data is written manipulation-safe. Manipulation is prevented by authenticated check of data integrity using signatures.

For analyzing license access data not a single log file is created but separate logfiles for each *Firm Code*. Integrity and authenticity of the log files preventing tampering is ensured by signatures and a subsequent signature check.

Validation

In order to validate either the contents of a given signed *CodeMeter* log file or a sequence of log files located in a given directory use the option   in *CmBoxPgm* the developer tool for local programming of *CmContainer* using a command line (console).

Command	`/vslf` - Validation Of Signed Log Files
	Validates either the contents of a given signed *CodeMeter* log file or a sequence of log files located in a given directory.
	Expects the path to the file that contains the public keys to use for validation and the path to the log file respectively log directory as arguments.
Syntax	`/vslf:<public key file>,<log file>|<log directory>` The `<public key file>` musst be created as comma separated file (CSV). > For this file the following notation is valid: > `<major version>,<minor version>, <firm code>, 0x<public key>` > You can specify several different values and public keys for separate runtime versions. You obtain the required values from one of the created *CodeMeter* log files.

e.g.	From the *CodeMeter* log file:
	`2014-06-24T06:06:19 SignedLogfile FirmCode:10,`
	`PublicKey:a809304778d517c44a22d65e1fcedd51a4e2a956fa89e93bb1a24e2100000000a2ad17e685306d`
	`6e15eb6b7ebc8cc72ebc97c0f52721b584836696de00000000, Runtime-Version:5.20.1432.500,`
	`LogfileID:1`
	the following `<public key file>` is derived:
	`5,20,10,0xa809304778d517c44a22d65e1fcedd51a4e2a956fa89e93bb1a24e2100000000a2ad17e685306d`
	`6e15eb6b7ebc8cc72ebc97c0f52721b584836696de00000000`

Currently, the logfile content is saved locally but for future version its is planned that contents may also be retrieved using HTTP access and calls (real-time history).

> If the logfiles need to be read from other systems, you must share the folder where the logfiles are stored as read-only in your local area network.

The following sections briefly:

2.12.1 Requirements and Configuration

Using the *CodeMeter* feature License Tracking requires at least *CodeMeter License Server* Version 4.50.

Using the feature Secure License Tracking requires at least *CodeMeter License Server* Version 5.20.

Configuration

The logging of licensing data must be activated together with *CodeMeter License Server*. This you do by direct activation in the *CodeMeter* Profiling environment.

Profiling

For Windows operating systems you find the profiling entries stored in the registry, for other operating systems entries are set in the file `server.ini`. The following table shows you the respective locations.

Operating system	Registry / Server.ini Entry
Windows	`HKLM/SOFTWARE/WIBU-SYSTEMS/CodeMeter/Server/CurrentVersion`
macOS	`/Library/Preferences/com.wibu.CodeMeter.Server.ini`
Linux	`/etc/wibu/CodeMeter/Server.ini`

The following relevant profiling entries for *License Tracking* exist.

Entry	Property	Value
`LogLicenseTracking`	`[DWord]`	`[0;1]` ℹ Default value is is `0` and Logging for License Tracking is disabled.
`LogLicenseTrackingPath/` `[Firm Code]/`	`[SZ]`	`<path>` ℹ Default path on Windows operating systems is `%ProgramData% \CodeMeter\LicenseTracking`. For each Firm Code a separate directory is created. For example, the log file for *Firm Code* `10` is saved to the directory `<LogLicenseTrackingPath>/FC10/`. For other operating systems the default path has the same value of the general profiling entry `LogPath`.
`LogLicenseTrackingLogRot ationSizeInMb`	`[DWord]`	`[1..3500]` If a license tracking log file exceeds a size of `x` MB, the rotation starts. The input range of `x` is from `1` to `3500` MB. The default value is `1000` MB. If the specified value is outside the input range, automatically the default value applies.
`LogLicenseTrackingLogRot ationTimeInMinutes`	`[DWord]`	`[0..525600]` If the oldest entry of a license tracking log file is older than `n` minutes, the rotation starts. The input range of `n` is from `0` to `525600` minutes (approx. 1 year). Please note that after specifying `n`, the log file starts to rotate after a time delay of about 1 minute. The default value is `0` minutes. Then time-based log rotating is deactivated. If the specified value is outside the input range, automatically the default value applies.

ℹ Please note that you must stop the *CodeMeter License Server* service, make the change, and then restart the *CodeMeter License Server* service before the change can take effect.

ℹ *CodeMeter License Server* is registered as a Windows service and can be started with user privileges. For stopping the service, however, you need administrator privileges under Windows (System Settings | Management | Services).

Logfile Rotation

In order to manage the constant growth of log files efficiently, *CodeMeter* offers a rotating system in the area of license tracking.

This system can be set via two parameters in profiling.

- `LogLicenseTrackingLogRotationSizeInMb`

  If a license tracking log file exceeds a size of x MB, the rotation starts.

  The input range of x is from 1 to 3500 MB.

- The default value is 1000 MB.

  If the specified value is outside the input range, automatically the default value applies.

- `LogLicenseTrackingLogRotationTimeInMinutes`

  If the oldest entry of a license tracking log file is older than n minutes, the rotation should start.

  The input range of n is from 0 to 525600 minutes (approx. 1 year).
  Please note that after specifying n, the log file starts to rotate after a time delay of about 1 minute.

  The default value is 0 minutes. Then time-based log rotating is deactivated.

  If the specified value is outside the input range, automatically the default value applies.

2.12.2 Logfile Format

The following logic applies to the format of the logfile.

1. Each line in the logfile can be handled separately. There exist separate lines for different entry types⬚[131] .
2. Each line that does not match to the described formats has to be ignored.
   This will allow us to enhance the output in future versions without causing trouble in working solutions.

> ℹ️ It is also recommended to do a parsing of the different arguments of a line and simply to ignore arguments that are not known.
>
> This allows us to enhance the output in future versions without causing trouble in working solutions.

2.12.2.1 Definitions and Value Ranges

For the logfile and single entry types the following definitions and value ranges are used:

Definition	Value Range
access ID	string ℹ️ The `<access ID>` is given by the server and extends the `<license ID>` by an index describing the slot, i.e. `<license ID>-<slot ID>`.
application ID	`[0..4294967295]`
application text	string
enabling block index	`[0..31]`
expiration time	`["never"|UTC Timestamp]`
feature map	`[0..4294967295]`
firm code	`[0..4294967295]`
hash	string
license ID	string ℹ️ The `<license ID>` is automatically derived as `<mask>-<serial number>-<firm code>-<product item reference>`, e.g. "2-1500002-100532-18". The `<license ID>` is a unique identifier for a license entry.
license quantity	`[0..4294967295]`
list of hashes	string

`logfileID`	`[0..4294967295]` ID value of the log file. In order to prevent that a single or several log files can be deleted each log file must have a separate ID.
`mask`	`[0..65535]`
`namelist id`	`[1..4294967295]`
`number of users`	`[0..5000]`
`product code`	`[0..4294967295]`
`product item reference`	`[0..4294967295]`
`product item text`	`string`
`serial`	`[0..4294967295]`
`server`	`string`
`slot ID`	`[0..4294967295]`
`timestamp`	`UTC Timestamp` UTC Timestamp sample: "`2012-12-24T08:32:59`".

> Since the strings may contain quotation marks (") but may also be bracketed expressions, any quotation marks that are part of the string are quoted by a backslash (\). For example, the *application text The best of "John Doe."* will be issued as
>
> ```
> ...AppText: "The best of \"John Doe.\""
> ```

2.12.3 Entry Types

The *CodeMeter* license tracking logfile knows the following listed entry types.

List of Licenses[131]

License[132]

Access[132]

Release[132]

Borrow Access[132]

Borrow Return[133]

Denial[133]

UpdateNameList[133]

Administrative[134]

SignedLogfile[134]

Signature[134]

2.12.3.1 List of Licenses Entry

Entry type	*List of Licenses* entry
Description	A list of *License* entries is preceded by a *List of Licenses* entry. This indicates that in the following lines all existing licenses of this server are listed. A previously retrieved list of *License* entries becomes invalid.
Writing time	The *List of Licenses* entry is written immediately before the list of *License* entries is written.
Syntax	`<timestamp> ListOfLicenses`

2.12.3.2 License Entry

Entry type	*License* entry
Description	The *License* entry describes an existing license.
Writing time	All *License* entries are written to the logfile: • on startup of *CodeMeter License Server* • each time when an entry is changed, e.g. by plugin / plugout or remote programming. ℹ In the cases mentioned above, all *License* entries of the current server are written preceded by a *List of Licenses*🗋 ¹³¹ entry.
Syntax	`<timestamp> License Server:"<server>", LicenseID:<license ID>, SN:<mask>-<serial>, FC:<firm code>, PC:<product code>, FM:<feature map>, ET:<expiration time>, LQ:<license quantity>, PT:"<product item text>"`

Before all *License* entries are re-written on changing entries all allocated licenses are released by a *Release* entry. Immediately after issuing the *License* entries the previously released licenses are again allocated by an *Access* entry.

This is necessary because `license ID`s can change on re-programming or on plugout and the subsequent rebooking. Moreover, the `access ID` may change by automatic rebooking after plugout.

> ℹ Licenses with a *License Quantity* value of `0` (license for local use use) are not listed.
>
> The *Expiration Time* contains the minimum of the Product Item Option *Expiration Time* and the value of an activated Product Item Option *Usage Period*. If neither an *Expiration Time* is set nor a *Usage Period* exists or is activated the value is "`never`".

2.12.3.3 Access Entry

Entry type	*Access* entry
Description	An *Access* entry describes that a license on a server is allocated to a user.
Writing time	The *Access* entry is written at the moment a license is accessed.
Syntax	`<timestamp> Access Server:"<server>", LicenseID:<license ID>, AccessID:<access ID>, Client:"<computer name>", User:"<user name>", AppID:<application ID>, AppText:"<application text>"`

> ℹ The *application ID* and *application text* are derived from `CMCREDENTIAL` structure using `mulUserDefinedID` and `mszUserDefinedText`.

2.12.3.4 Release Entry

Entry type	*Release* entry
Description	A *Release* entry describes that a user has released a formerly accessed license on a server.
Writing time	The *Release* entry is written at the moment a license is released.
Syntax	`<timestamp> Release Server:"<server>", AccessID:<access ID>`

2.12.3.5 Borrow Access Entry

Entry type	*Borrow Access* entry
Description	A *Borrow Access* entry describes that a user has borrowed a license from a server.
Writing time	The *Borrow Access* entry is written at the moment a license is borrowed. In addition, the *Borrow Access* entry is written when *CodeMeter License Server* is started and there already exist borrowed licenses.

Syntax	`<timestamp> Borrow Server:"<server>", LicenseID:<license ID>, BorrowID:<borrow ID>, Client:"<computer name>", User:"<user name>", Expires:<expiration time>, BorrowSn:< mask>-<serial>`

2.12.3.6 Borrow Return Entry

Entry type	*Borrow Return* entry
Description	A *Borrow Return* entry describes that either a user has returned a borrowed license on a server or the borrow duration has expired and the license was returned automatically.
Writing time	The *Borrow Return* entry is written at the moment a license is returned.
Syntax	`<timestamp> Return Server:"<server>", BorrowID:<borrow ID>`

2.12.3.7 Denial Entry

Entry type	*Denial* entry
Description	A *Denial* entry describes that a user requested a license but did not get one because no more licenses could be allocated. It will not show license requests of licenses that do not exist on this server.
Writing time	The *Denial* entry is written at the moment a license access has failed.
Syntax	`<timestamp> Denial Server:"<server>", LicenseID:<license ID>, Client:"<computer name>", User:"<user name>", AppID:<application ID>, AppText:"<application text>"`

> ℹ️ A *Denial* entry is only logged if error 212 (`CMERROR_NO_MORE_LICENSES`) occurs.

2.12.3.8 UpdateNameList entry

Entry type	*UpdateNameList* entry.
	ℹ️ If license tracking is not activated, an error message is displayed when loading the *NameList* files, when starting *CodeMeter* and when importing a new *NameList* file.
Description	The *UpdateNameList* entry shows describes a change in the *NameList* of *NamedUsers*.
Writing time	The *UpdateNameList* entry is written after a *NameList* has been imported, e.g. by *cmu*. Additionally the *UpdateNameList* entry is written when *CodeMeter License Server* is started and there are *NameLists*. In this case *OldHash* and *NewHash* are the same.
Syntax	`<timestamp> UpdateNameList NameListId:<namelist id>, Users:<number of users>,Added:<number of users>, Removed:<number of users>, [IgnoreCase:True, ] [HashedAddedUsers:"<list of hashes>", ][HashedRemovedUsers:"<list of hashes>", ] OldHash:"<hash>", NewHash:"<hash>"` *Users* describes the new total number of entries of the *NameList*. *Added* describes the number of added entries to the *NameList* regarding this import. *Removed* describes the number of removed entries from the *NameList* regarding this import. *IgnoreCase* informs that before hashing all names were converted to lowercase. Please note that only ascii characters are converted. In *HashedAddedUsers* and *HashedRemovedUsers* the first 8 bytes of the hash of the added / removed *NameList* entries are listed, separated by comma. If no *NameList* entry is added or removed, the corresponding value is an empty string, e.g. *HashedAddedUsers*:"". *OldHash* represents that hash value of the internal format of the *NameList* that was used prior to the update. This internal format is also stored as backup for next start of *CodeMeter*. If the *NameList* is created first time, *OldHash* is an empty string.

> *NewHash* represents that hash value of the internal format of the new *NameList* after the update. If the *NameList* is deleted, which is done by sending no entries in the *NameList* on import, *NewHash* is an empty string.

2.12.3.9 Administrative Entry

Entry type	*Administrative* entry
Description	An *Administrative* entry describes some event on the *CodeMeter License Server*.
Writing time	The *Administrative* entry is written at the moment the described event occurred.
Syntax	`<timestamp> Admin Server:"<server>" CodeMeter_started <timestamp>` is written only on start of the TMR Setup and also only in the first logfile for each *Firm Code.*
	`<timestamp> Admin Server:"<server>" CodeMeter_stopped`

> ℹ️ If *CodeMeter License Server* is stopped, all *Access* entries are automatically canceled. Only *Borrow Access* entries remain valid and will be restored on next start of *CodeMeter License Server*. Usually, the *Release* entries are automatically added to the log, but in some circumstances this is not possible, e.g. killing *CodeMeter License Server*.

2.12.3.10 SignedLogfile Entry

Entry type	*SignedLogfile* entry
Description	The *SignedLogfile* entry corresponds to the header and holds the Public Key.
Writing time	The *SignedLogfile* entry is written at the moment the logfile is created.
Syntax	`<timestamp> SignedLogfile FirmCode: <FirmCode>, PublicKey: <PublicKey>, Runtime-Version: <Version>, LogfileID: <LogfileID>`

`<timestamp>` UTC time stamp: `<YYYY>-<MM>-<DD>-<hh><mm><ss>`.

`<FirmCode>` *Firm Code* of the content of this logfile.

`<PublicKey>` Public Key belonging to the Private Key used to sign the logfile.

`<Version>` *CodeMeter License Server* Version which generated the logfile. The version specification follows the short format: (`<Major>.<Minor two-numbered>.<Build>.<Count>`)

`<LogfileID>` ID value of the logfile.
In order to prevent that one or several logfiles are deleted, each logfile must have an ID. Each logfile created during a single running instance of *CodeMeter License Server* has the same `LogfileID`.

The latest `LogfileID` is written from the profiling value "`SignedLogfileID`" and is incremented on the next start of *CodeMeter License Server*. If no profiling entry "`SignedLogfileID`" is found an initial value of 1 is assumed.

📝 `2014-02-07T10:34:33 SignedLogfile FirmCode:10, PublicKey:b4342ec15183992be75ee5e702ea7d118ebb489046df1b15393cdf8d000000007b3a92afaf e35f6505222841d65610e75749bf9d572a0eea83d1d6be00000000, Runtime-Version:5.11.1343.201, LogfileID:13`

2.12.3.11 Signature Entry

Entry type	*Signature* entry

Description	The *Signature* entry hold the signature of the section last written.
Writing time	The *Signature* entry is written at the moment the section is signed.
Syntax	`<timestamp> Signature Signature: <Signature>`

`<timestamp>` UTC time stamp: `<YYYY>-<MM>-<DD>-<hh><mm><ss>`.

`<Signature>` Calculated signature value of the logfile using the secret signature key (Private Key). This value allows anybody to check the integrity of the logfile using the public verification key ([Public Key][134]).

📅 `2014-02-07T10:34:43 Signature`
`Signature:75998652881c0c56ce7b391c3638c1a5540e12cab282e2c3c82a0a0a000000008cf46fd7a025939b7d`
`86dfff8b4bdc01073da2eed7326bc351a335cb00000000`

2.13 License Access Permissions: Access Control List (ACL)

CodeMeter offers the feature to control license accesses with the help of a list of license access permissions: the so-called Access Control List (ACL).

The rulesets that control these license accesses can be created, for example, in *CodeMeter WebAdmin*. For detailed information about [rulesets]🗋 85 see the *CodeMeter* Administrator Manual and/or the *CodeMeter* User Help.

In addition, an import/export interface allows these rules to be edited externally. Using the *CodeMeter* command line tool [*cmu*]🗋 116 , ACLs corresponding to a defined JSON format can be imported and/or exported.

A specification of the grammar is a prerequisite for automated generation or validation.

This document is intended for people with basic *CodeMeter* and JSON knowledge. The goal is to provide the necessary basics to implement the following use cases:

- Import and export of lists
- (automated) creation of lists
- (automated) validation of lists

Structure of the documentation

This documentation is divided into different sections.

The following sections describe the [system requirements]🗋 136 and provide an overview of [ACL terms]🗋 136 as an introduction.

Subsequently, the section [Creating ACL sample lists]🗋 137 cover step-by-step instructions on how to create an ACL with *CodeMeter WebAdmin* and import and export with cmu. Rulesets for different levels (*CmContainer*, *Firm Code*, *Product Code*) are created and the corresponding JSON representations are explained.

The section [The JSON format of ACL]🗋 145 provides a reference about the contents and structure of the JSON format as well as its semantics.

Finally, the [appendix]🗋 148 includes:

- further examples
- a formal grammar specification (EBNF) of the ACL.
  This section addresses requirements for automated processing of the format.

2.13.1 System requirements

The following system requirements apply for using extended license access permissions (ACL, Access Control List):

- Windows 10 operating system (recommended)

> ℹ Under macOS 🍏 and Linux 🐧, Windows ⊞ -specific configuration elements, e.g. Active Directory and groups, are not available.
> However, the operation of Linux/macOS clients on *CodeMeter License Servers* under Windows is possible, if the clients are located in a Windows domain.
> Operation from Windows clients to *CodeMeter License Servers* under Linux/macOS is currently not possible.
>
> Under Linux and macOS the import / export of extended license access permissions works like under Windows. However, the JSON documents may only contain elements that the respective CodeMeter License Server can process. In case of an error, the entire export is denied and an error message is issued.

- *CodeMeter* installation (at least version 7.20)
- Active Directory (when using group and user rules)

2.13.2 Terms and definitions

For a better understanding, please refer to the following list of terms.

Term	Description
ACL	Access Control List (ACL): List of license access permissions with rules to control *CodeMeter* license accesses.
All-Container-Ruleset	Rule set at *CmContainer* level without restriction to a single container
ContainerRuleset	Rule set at *CmContainer* level

Term	Description
FC	*Firm Code*
FcRuleset	Rule set at *Firm Code* level
FirmItemText	Text of a *Firm Item*
Global Ruleset	Most general rule set
PC	*Product Code*
PcRuleset	Rule set at *Product Code* level
ProductItemText	Texts of a *Product Item* - can be used for specification
Rule	Rule definition - applicable rule
Ruleset	Rule set - may contain rules and further specializing rule sets

2.13.3 Creating ACL example lists

The following section shows as an example the creation of a simple list using *CodeMeter WebAdmin* and its associated JSON representation. For more information, especially on the use of *CodeMeter WebAdmin*, please refer to the *CodeMeter* Developer Guide (topic: License Access Permissions).

The manual describes the procedure for the Windows operating system.

Requirements

The following steps require:

- *CodeMeter* version greater than or equal to version 7.20 is installed.

- The services *CodeMeter License Server* and *CodeMeter WebAdmin* are started.

- At least one license with *Firm Code* and *Product Code* (FC:PC) is displayed in *CodeMeter WebAdmin*.

2.13.3.1 Step 1: Creating an enpty ACL

1. Open the *CodeMeter WebAdmin* interface via *CodeMeter Control Center*.
2. Navigate to "**Configuration I Server Configuration I License Access Permissions**".
3. On this page, the "**Advanced**" mode should be selected, if the "**Basic**" selection displays.
    Defined rules in the **Advanced Mode Configuration** group should be deleted.
4. Any necessary changes must be confirmed by clicking the "**Apply**" button.

5. Exporting an empty ACL with the *cmu* command line tool.

```
> cmu32 --export-acl -f01_ACL_Empty.json

SUCCESS: License Access Permissions (Access Control List) were exported to: 01_ACL_Empty.json
```

List output using *cmu*

```
> type 01_ACL_Empty.json
```

The output shows the global parameters `Enabled`, `GroupsMaximumNumber` and `UsersMaximumNumber` as well as the `AccessControlList` object with a `Default` rule and an empty list of container rule sets.

```
{
  "AccessControlList": {
  "ContainerRulesets": [
],
  "Rules": [
  {
  "Action": "Allow",
  "Allocated": 0,
  "Limit": 0,
  "Reserved": 0,
  "RuleId": 0,
  "Type": "Default",
  "Value": "",
  "__type": "Rule"
}
],
  "__type": "AccessControlList"
},
  "Enabled": true,
  "GroupsMaximumNumber": 10000,
  "UsersMaximumNumber": 10000
}
```

2.13.3.2 Step 2: Creating an ACL with specific Container rule set

Based on the empty ACL created in step 1, a rule is next created for a *CmContainer*. Exemplary with the serial number 130-729831162. The state after can be established by importing the created (empty) ACL.

1. Importing the empty ACL.

```
> cmu32 --import-acl -f01_ACL_Empty.json

SUCCESS: License Access Permissions (Access Control List) were imported from: 01_ACL_Empty.json
```

The result can be checked on the *CodeMeter WebAdmin* interface. It may be necessary to reload the page in the browser.

2. Adding a new container in the specific rule set, e.g. 130-729831162, and clicking the "**Apply**" button.

Exportng the ACL using *cmu*:

```
> cmu32 --export-acl -f02_ACL_Container.json

SUCCESS: License Access Permissions (Access Control List) were exported to:
02_ACL_Container.json
```

Output the list result with cmu (line numbers added):

```
> type 02_ACL_Container.json
```

```
 1 {
 2   "AccessControlList": {
 3   "ContainerRulesets": [
 4   {
 5   "FcRulesets": [
 6 ],
 7   "Rules": [
 8   {
 9   "Action": "Allow",
10   "Allocated": 0,
11   "Limit": 0,
12   "Reserved": 0,
13   "RuleId": 0,
14   "Type": "Default",
15   "Value": "",
16   "__type": "Rule"
17 }
18 ],
19   "Text": "FB52232",
20   "Value": "130-729831162",
21   "__type": "ContainerRuleset"
22 }
23 ],
24   "Rules": [
25   {
26   "Action": "Allow",
27   "Allocated": 0,
28   "Limit": 0,
29   "Reserved": 0,
30   "RuleId": 0,
31   "Type": "Default",
32   "Value": "",
33   "__type": "Rule"
34 }
35 ],
36   "__type": "AccessControlList"
37 },
38   "Enabled": true,
39   "GroupsMaximumNumber": 10000,
40   "UsersMaximumNumber": 10000
41 }
```

The rule set defined in *CodeMeter WebAdmin* is part of the `ContainerRulesets` (line 3-23).
Following is a slightly differently formatted representation:

```
 3   "ContainerRulesets": [
 4   {
 5     "FcRulesets": [],
 6
 7     "Rules": [
 8     {
 9       "Action": "Allow",
10       "Allocated": 0,
11       "Limit": 0,
12       "Reserved": 0,
13       "RuleId": 0,
14       "Type": "Default",
15       "Value": "",
16       "__type": "Rule"
17     }],
18
19     "Text": "FB52232",
20     "Value": "130-729831162",
```

```
21      "__type": "ContainerRuleset"
22    }],
23
```

The snippet shows:

- No further specialization exists for this *CmContainer* at *Firm Code* level (list in line 5 is empty).

- No rule has been defined. Lines 7-17 contain only the *Default* rule that is always present.

- The name of the container is FB52232 (Key "`Text`", line 19).

- The serial number is 130-729831162 (Key "`Value`", line 20).

- It is a container object (Key "`__type`", line 21)

2.13.3.3 Step 3: Creating an ACL with a Firm Code ruleset (without Container assignment)

Starting from the empty ACL created in <u>step 1</u> [137] , this step adds a rule to a *Firm Code*, e.g. 6000010 with *Firm Item Text* "Test FC"). The state after step 1 can be established by importing the created (empty) ACL.

1. Importing the empty ACL.

```
> cmu32 --import-acl -f01_ACL_Empty.json

SUCCESS: License Access Permissions (Access Control List) were imported from: 01_ACL_Empty.json
```

The result can be checked on the *CodeMeter WebAdmin* interface. It may be necessary to reload the page in the browser.

2. Adding a new *Firm Code* in the specific rule set, e.g. 6000010 with *Firm Item Text* "Test FC"), and clicking the "**Apply**" button.

Exporting the ACL using *cmu*:

```
> cmu32 --export-acl -f03_ACL_FC_Only.json

SUCCESS: License Access Permissions (Access Control List) were exported to: 03_ACL_FC_Only.json
```

List output result using *cmu*:

```
> type 03_ACL_Container.json
```

```
{
  "AccessControlList": {
  "ContainerRulesets": [
  {
  "FcRulesets": [
  {
  "PcRulesets": [
],
  "Rules": [
  {
  "Action": "Allow",
  "Allocated": 0,
  "Limit": 0,
  "Reserved": 0,
  "RuleId": 0,
  "Type": "Default",
  "Value": "",
  "__type": "Rule"
}
```

```
],
  "Text": "Test FC",
  "Value": 6000010,
  "__type": "FcRuleset"
}
],
  "Rules": [
  {
  "Action": "Allow",
  "Allocated": 0,
  "Limit": 0,
  "Reserved": 0,
  "RuleId": 0,
  "Type": "Default",
  "Value": "",
  "__type": "Rule"
}
],
  "Text": "All Containers",
  "Value": "All",
  "__type": "ContainerRuleset"
}
],
  "Rules": [
  {
  "Action": "Allow",
  "Allocated": 0,
  "Limit": 0,
  "Reserved": 0,
  "RuleId": 0,
  "Type": "Default",
  "Value": "",
  "__type": "Rule"
}
],
  "__type": "AccessControlList"
},
  "Enabled": true,
  "GroupsMaximumNumber": 10000,
  "UsersMaximumNumber": 10000
}
```

No rules have been defined yet, only a set of rules at "*Firm Code*" level.

Default rule

In this case, however, an ACL object is assigned a (Default) rule. This always has the following content:

```
{
  "Action": "Allow",
  "Allocated": 0,
  "Limit": 0,
  "Reserved": 0,
  "RuleId": 0,
  "Type": "Default",
  "Value": "",
  "__type": "Rule"
}
```

In the following, this rule is replaced by the entry. After an insertion of line numbers and some reformatting, the result looks as follows:

```
1  {
2      "AccessControlList": {
3          "ContainerRulesets": [
4              {
```

```
 5          "FcRulesets": [
 6          {
 7            "PcRulesets": [],
 8            "Rules": [<Default-Rule>],
 9            "Text": "Test FC",
10            "Value": 6000010,
11            "__type": "FcRuleset"
12          }],
13          "Rules": [<Default-Rule>],
14          "Text": "All Containers",
15          "Value": "All",
16          "__type": "ContainerRuleset"
17        }],
18        "Rules": [<Default-Rule>],
19        "__type": "AccessControlList"
20      },
21      "Enabled": true,
22      "GroupsMaximumNumber": 10000,
23      "UsersMaximumNumber": 10000
24    }
```

The object `AccessControlList` covers the lines 2-20 and holds a list with a `ContainerRuleset` (i.e. `AllContainer-Ruleset`):

```
 3        "ContainerRulesets": [
 4        {
 5          "FcRulesets": [
 6          {
 7            "PcRulesets": [],
 8            "Rules": [<Default-Rule>],
 9            "Text": "Test FC",
10            "Value": 6000010,
11            "__type": "FcRuleset"
12          }],
13          "Rules": [<Default-Rule>],
14          "Text": "All Containers",
15          "Value": "All",
16          "__type": "ContainerRuleset"
17        }]
```

The `AllContainer ruleset` is selected if no matching rule set is found for a container. The rule set defined for *Firm Code* 6000010 of the example can be found in lines 5-12:

```
 5          "FcRulesets": [
 6          {
 7            "PcRulesets": [],
 8            "Rules": [<Default-Rule>],
 9            "Text": "Test FC",
10            "Value": 6000010,
11            "__type": "FcRuleset"
12          }],
```

No rule has been defined at *Product Code* level for this *Firm Code*. For this reason, the `PcRulesets` list (line 7) is empty. Lines 9-10 contain the *Firm Code* and the *Firm Item Text*. The `type` of the object is in line 11.

2.13.3.4 Step 4: Creating an ACL with a Firm Code rule set (with Container assignment)

Based on the ACL with `Container-Ruleset` created in (for 130-729831162), this section defines a rule set for a *Firm Code* 6000010 in this container.

1. Importing the ACL.

```
> cmu32 --import-acl -f 02_ACL_Container.json


SUCCESS: License Access Permissions (Access Control List) were imported from:
02_ACL_Container.json
```

The result can be checked on the *CodeMeter WebAdmin* interface. It may be necessary to reload the page in the browser.

2. Adding a rule set to a *Firm Code* 6000010 in *CodeMeter WebAdmin* to container 130-729831162 and clicking the "**Apply**" button.

3. Exporting the ACL using *cmu*:

```
> cmu32 --export-acl -f04_ACL_Container_FC.json

SUCCESS: License Access Permissions (Access Control List) were exported to:
04_ACL_Container_FC.json
```

Output the list result (line numbers added and default rules replaced):

```
> type f04_ACL_Container_FC.json
```

```
 1 {
 2    "AccessControlList": {
 3      "ContainerRulesets": [
 4      {
 5        "FcRulesets": [
 6        {
 7          "PcRulesets": [],
 8          "Rules": [<Default-Rule>],
 9          "Text": "",
10          "Value": 6000010,
11          "__type": "FcRuleset"
12        }],
13        "Rules": [<Default-Rule>],
14        "Text": "FB52232",
15        "Value": "130-729831162",
16        "__type": "ContainerRuleset"
17      }],
18      "Rules": [<Default-Rule>],
19      "__type": "AccessControlList"
20    },
21    "Enabled": true,
22    "GroupsMaximumNumber": 10000,
23    "UsersMaximumNumber": 10000
24 }
```

Lines 3-17 show entries for the defined container rule set. Within the area is also the definition of the single *Firm Code* rule set (lines 6-17).

2.13.3.5 Step 5: Creating an ACL with a Product Code rule set (with Container assignment)

Based on the ACL with Container and *Firm Code* rule set created in step 4⌓ 142 , this section defines a rule set for a *Product Code* in it. In contrast to the previous examples, a concrete rule for `localhost` is defined in it. The state after step 4 is established and then the ACL created there is imported:

1. Importing the ACL.

```
> cmu32 --import-acl -f 04_ACL_Container_FC.json

SUCCESS: License Access Permissions (Access Control List) were imported from:
04_ACL_Container_FC.json
```

The result can be checked on the *CodeMeter WebAdmin* interface. It may be necessary to reload the page in the browser.

2. In the *CodeMeter WebAdmin* interface, the corresponding *Firm Code* rule set is selected and a *Product Code* (rule set) is added. A new rule is added to the (*Product Code*) rule set. In the dialog that opens, the following is entered under Computer `localhost`.

Add Rule

Action: ⊙ Allow   ○ Deny

⊙ Host   `localhost`
○ Subnet
○ User
○ Group

[Add] [Cancel]

Exporting the ACL using *cmu*:

```
> cmu32 --export-acl -f 05_ACL_Container_FC_PC_Rule.json

SUCCESS: License Access Permissions (Access Control List) were exported to:
05_ACL_Container_FC_PC_Rule.json
```

Output of the result list (line numbers added and [default rules](#)▯141 reduced):

```
> type f05_ACL_Container_FC_PC_Rule.json
```

```
 1 {
 2   "AccessControlList": {
 3     "ContainerRulesets": [
 4       {
 5         "FcRulesets": [
 6           {
 7             "PcRulesets": [
 8               {
 9                 "ActivePiText": 0,
10                 "AllocatedLicenses": 0,
11                 "LicenseQuantity": 1,
12                 "Rules": [
13                   {
14                     "Action": "Allow",
15                     "Allocated": 0,
16                     "Limit": 0,
17                     "Reserved": 0,
18                     "RuleId": 1,
19                     "Type": "Host",
20                     "Value": "localhost",
21                     "__type": "Rule"
22                   },
23                   <Default-Rule>],
24                 "Text": "Test FC",
25                 "Value": "6000010:2000",
26                 "__type": "PcRuleset"
27               }],
28             "Rules": [<Default-Rule>],
29             "Text": "",
30             "Value": 6000010,
31             "__type": "FcRuleset"
32           }],
33         "Rules": [<Default-Rule>],
34         "Text": "FB52232",
35         "Value": "130-729831162",
36         "__type": "ContainerRuleset"
37       }],
38     "Rules": [<Default-Rule>],
39     "__type": "AccessControlList"
40   },
41   "Enabled": true,
42   "GroupsMaximumNumber": 10000,
43   "UsersMaximumNumber": 10000
44 }
```

The rule set defined in this section (in *CodeMeter WebAdmin*) for container 130-729831162, FC 6000010, PC 2000 is represented in lines 7-27. The rule defined for `localhost` fills lines 13-22:

```
13                {
14                   "Action": "Allow",
15                   "Allocated": 0,
16                   "Limit": 0,
17                   "Reserved": 0,
18                   "RuleId": 1,
19                   "Type": "Host",
20                   "Value": "localhost",
21                   "__type": "Rule"
22                },  Access Permissions (Access Control List) were exported to:
05_ACL_Container_FC_PC_Rule.json
```

A rule has been defined for a computer. This includes the entry for the key "`Type`" in line 19. In line 20, the name "`localhost`" is found for the "`Value`".

2.13.4 The JSON format of the ACL

The `AccessControlList` defines a hierarchical structure of (access) rules with increasing specialization. If several rules of different specialization match a license access (Access), the most special rule is selected.

The following hierarchy levels exist:

- without container assignment
- *CmContainer*
- *Firm Code*
- *Product Code*

Rules or rule sets can be defined for each of these levels. These have a JSON object representation.

Each object is specified by its type (key "`__type`"). According to the hierarchy levels the following types exist:

- `AccessControlList`
- `ContainerRuleset`
- `FcRuleset`
- `PcRuleset`
- `Rule`

2.13.4.1 Semantik
2.13.4.1.1 General ACL parameter

General ACL parameters are part of the top level of the hierarchy.

```
{
"AccessControlList": […],
"Enabled": bool,
"GroupMaximumNumber": number,
"UserMaximumNumber": number
}
```

Parameter	Description
Enabled	Activation (true) / deactivation (false) of the ACL
GroupMaximumNumber	Maximum number of groups to be kept in the cache (default: 10000).
UserMaximumNumber	Maximum number of users to be kept in the cache (default: 10000).

2.13.4.12 ACL objects

The following ACL objects exist:

- General ACL parameter□ 145

2.13.4.1.2.1 AccessControlList

```
{
  "__type":"AccessControlList",
  "ContainerRulesets": [...],
  "Rules": [...]
}
```

`AccessControlList` is the base object of the ACL. This object can contain the following properties::

Key	Value	Description
"__type"	"AccessControlList"	Type identifier
"ContainerRulesets"	ContainerRuleset	List of rule sets, specialized for containers
"Rules"	Rule	Global rules

2.13.4.1.2.2 ContainerRuleset

```
{
  "__type": "ContainerRuleset",
  "Value": "string",
  "FcRulesets": [...],
  "Rules": [...]
}
```

With the help of the `ContainerRuleset` object a specialization for a *CmContainer* (via serial number) can be made. A special feature is the "`All-Container`" ruleset. Rule sets contained there are provided for selection, if no rule set with matching serial number exists.

Key	Value	Description
"_type"	"ContainerRuleset"	Type identifier
"FcRulesets"	FcRuleset	List with rule sets, further specialized for *Firm Codes*
"Rules"	Rule	Rules for this container

2.13.4.1.2.3 FcRuleset

```
{
  "__type": "FcRuleset",
  "Value": FC,
  "Text": "FirmItemText",
  "PcRulesets": [ ],
  "Rules": [ ]
}
```

`FcRuleset` objects allow to restrict rule sets to a *Firm Code*.

Key	Value	Description
"_type"	"FcRuleset"	Type identifier
"Value"	FC	*Firm Code*
"Text"	FirmItemText	Display parameter (see *CodeMeter*)
"PcRulesets"	PcRuleset	List with rule sets, further specialized for *Product Codes*
"Rules"	Rule	Rules for this *Firm Code*

2.13.4.1.2.4 PcRuleset

```
{
  "__type": "PcRuleset",
  "Value": "FC:PC",
  "Text": "ProductItemText",
  "ActivePiText": number,
  "Rules": [ ]
}
```

`PcRuleset` objects can be used to restrict the selection to a *Product Code*. An additional specialization on this level can be done via the *Product Item Text*.

Key	Value	Description
`"_type"`	"PcRuleset"	Type identifier
"Value"	"PC:FC"	*Product Code* and *Firm Code* - *Firm Code* must correspond to the parent object
"Text"	ProductItemText	Additional specialization property
"PcRulesets"	PcRuleset	List with rule sets, further specialized for *Product Codes*
"ActivePiText"	Zahl	(Internal) flag for display control in *CodeMeter WebAdmin*
"Rules"	Rule	Rules for this *Product Code* or *Product Code + Product Item Text*

2.13.4.1.2.5 Rule

```
{
  "__type": "Rule",
  "RuleId": number,
  "Action": "string",
  "Type": "string",
  "Value": "string",
  "Reserved": number,
  "Limit": number,
}
```

This object defines the actual rule to be applied.

Key	Value	Description
`"_type"`	"Rule"	Type identifier
"RuleId"	Zahl	ID of the rule - communication with *CodeMeter WebAdmin* (0 for Default rules)
"Action"	String	Action: Allow or Deny
"Type"	String	Rule type (default, group, host, subnet, user)
"Value"	Zahl	Current number of licenses (for display)
"Reserved"	Zahl	Number of reserved licenses
"Limit"	Zahl	Maximum number of licenses for this rule

2.13.4.2 General constraints

- There is only one "`AccessControlList`".
- Each rule set contains exactly one *Default* rule.
- The *Firm Code* specified in the `PcRuleset` must match the *Firm Code* of the parent `FcRuleSet`.

2.13.4.3 Comtent of single objects
2.13.4.31Default rules

Rules of type "`Default`" always have the following content:

```
    "Type": "Default"
    "RuleId": 0
    "Value": ""
    "Limit": 0
    "Reserved": 0
  "Action": "Allow" | "Deny"
```

> ℹ️ Here, only the value of the action to be executed is freely selectable.

2.13.4.32The All-Container-Ruleset

The `All-Container-Ruleset` has the following content. Especially "`Text`" and "`Value`" have these predefined values (see below).

```
{
    "FcRulesets": [...],
    "Rules": [...],
    "Text": "All Containers",
    "Value": "All",
    "__type": "ContainerRuleset"
  }
```

2.13.5 Annex
2.13.5.1 Examples

The following section contains some examples that were created with the help of *CodeMeter WebAdmin* and then exported.

2.13.5.11Export

The export of a defined ACL can be performed with the help of the program *cmu*:

```
cmu32 --export-acl --file acl.txt
```

2.13.5.12Import

Corresponding to the export, *cmu* also offers the possibility to import an ACL into *CodeMeter*.

> ⚠️ Please note that a defined ACL will be overwritten in this case.

```
cmu32 --import-acl --file acl.txt
```

2.13.5.13Globale rule for local host

```
{
  "AccessControlList": {
  "ContainerRulesets": [
],
  "Rules": [
  {
  "Action": "Allow",
  "Limit": 0,
  "Reserved": 0,
  "RuleId": 1,
  "Type": "Host",
  "Value": "localhost",
  "__type": "Rule"
},
  {
```

```
    "Action": "Allow",
    "Limit": 0,
    "Reserved": 0,
    "RuleId": 0,
    "Type": "Default",
    "Value": "",
    "__type": "Rule"
  }
],
  "__type": "AccessControlList"
},
  "Enabled": true,
  "GroupsMaximumNumber": 10000,
  "UsersMaximumNumber": 10000
}
```

2.13.5.2 Simple ACL for Container

```
{
  "AccessControlList":
  {
    "ContainerRulesets": [
    {
      "FcRulesets": [],
      "Rules":
      [
        {
          "Action": "Allow",
          "Limit": 0,
          "Reserved": 0,
          "RuleId": 0,
          "Type": "Default",
          "Value": "",
          "__type": "Rule"
        }
      ],
      "Text": "RECEIVER",
      "Value": "3-2050810",
      "__type": "ContainerRuleset"
    },
    {
      "FcRulesets": [],
      "Rules":
      [
        {
          "Action": "Allow",
          "Limit": 0,
          "Reserved": 0,
          "RuleId": 0,
          "Type": "Default",
          "Value": "",
          "__type": "Rule"
        }
      ],
      "Text": "All Containers",
      "Value": "All",
      "__type": "ContainerRuleset"
    }
    ],
    "Rules":
    [
      {
```

```
        "Action": "Allow",
        "Limit": 0,
        "Reserved": 0,
        "RuleId": 0,
        "Type": "Default",
        "Value": "",
        "__type": "Rule"
      }
    ],
    "__type": "AccessControlList"
    },
    "Enabled": true,
    "GroupsMaximumNumber": 10000,
    "UsersMaximumNumber": 10000
}
```

2.13.5.3 More complex ACL

```
{
  "AccessControlList": {
    "ContainerRulesets": [
    {
      "FcRulesets": [
      {
        "PcRulesets": [
        {
          "ActivePiText": 0,
          "Rules": [
            {
              "Action": "Allow",
              "Limit": 0,
              "Reserved": 0,
              "RuleId": 1,
              "Type": "Host",
              "Value": "localhost",
              "__type": "Rule"
            },
            {
              "Action": "Allow",
              "Limit": 0,
              "Reserved": 0,
              "RuleId": 2,
              "Type": "User",
              "Value": "WIBU\\user",
              "__type": "Rule"
            },
            {
              "Action": "Allow",
              "Limit": 0,
              "Reserved": 0,
              "RuleId": 0,
              "Type": "Default",
              "Value": "",
              "__type": "Rule"
            }
          ],
          "Text": "",
          "Value": "6000010:4987",
          "__type": "PcRuleset"
        }],
        "Rules": [
        {
          "Action": "Allow",
```

```
              "Limit": 0,
              "Reserved": 0,
              "RuleId": 1,
              "Type": "Host",
              "Value": "localhost",
              "__type": "Rule"
            },
            {
              "Action": "Allow",
              "Limit": 0,
              "Reserved": 0,
              "RuleId": 2,
              "Type": "Host",
              "Value": "pb.wibu.local",
              "__type": "Rule"
            },
            {
              "Action": "Allow",
              "Limit": 0,
              "Reserved": 0,
              "RuleId": 0,
              "Type": "Default",
              "Value": "",
              "__type": "Rule"
            }
            ],
            "Text": "Test FC",
            "Value": 6000010,
            "__type": "FcRuleset"
          }
          ],
          "Rules": [
          {
            "Action": "Allow",
            "Limit": 0,
            "Reserved": 0,
            "RuleId": 0,
            "Type": "Default",
            "Value": "",
            "__type": "Rule"
          }
          ],
        "Text": "RECEIVER",
        "Value": "3-2050810",
        "__type": "ContainerRuleset"
      },
      {
        "FcRulesets": [],
        "Rules": [
        {
          "Action": "Allow",
          "Limit": 0,
          "Reserved": 0,
          "RuleId": 0,
          "Type": "Default",
          "Value": "",
          "__type": "Rule"
        }
        ],
        "Text": "All Containers",
        "Value": "All",
        "__type": "ContainerRuleset"
      }
```

```
  ],
  "Rules": [
  {
    "Action": "Allow",
    "Limit": 0,
    "Reserved": 0,
    "RuleId": 1,
    "Type": "Host",
    "Value": "localhost",
    "__type": "Rule"
  },
  {
    "Action": "Allow",
    "Limit": 0,
    "Reserved": 0,
    "RuleId": 2,
    "Type": "Host",
    "Value": "XYZ.wibu.local",
    "__type": "Rule"
  },
  {
    "Action": "Allow",
    "Limit": 0,
    "Reserved": 0,
    "RuleId": 0,
    "Type": "Default",
    "Value": "",
    "__type": "Rule"
  }
  ],
  "__type": "AccessControlList"
},
  "Enabled": true,
  "GroupsMaximumNumber": 10000,
  "UsersMaximumNumber": 10000
}
```

2.13.5.4 Formal ACL specification (EBNF)

In the syntax description language *Extended Backus-Naur Form* (EBNF) the following terminal symbols apply.

```
ACL = '{' AccessControlList ',' Enabled ',' MaxGroups ',' MaxUsers '}'


Enabled = '"Enabled": ' Boolean

MaxGroups = '"GroupsMaximumNumber": ' Number

MaxUsers = '"UsersMaximumNumber": ' Number


AccessControlList = AccessControlListKey ':' '{' ContainerRuleSets ',' Rules ','
AccessControlListType '}'
AccessControlListKey = '"AccessControlList"'
AccessControlListType = '"__type":"AccessControlList"'

ContainerRuleSets = ContainerRuleSetsKey ':' ('[' ContainerRulesetList ']' | '[]')
ContainerRuleSetsKey = '"ContainerRulesets"'
ContainerRulesetList = ContainerRuleset | ContainerRulesetList ',' ContainerRuleset
ContainerRuleset = '{' FcRuleSets ',' Rules ',' ContainerName ',' ContainerValue ','
ContainerRuleSetType '}'
ContainerRuleSetType = '"__type": "ContainerRuleset"'
ContainerName = '"Text": ' '"' String '"'
```

```
ContainerValue = '"Value": ' '"' String '"'

FcRuleSets = FcRuleSetsKey ':' ('[' FcRuleSetList ']' | '[]')}
FcRuleSetKey = '"FcRulesets"'
FcRuleSetList = FcRuleset | FcRuleSetList ',' FcRuleset
FcRuleSet= '{' PcRuleSets ',' Rules ',' FcName ',' FcValue ',' FcRuleSetType '}'
FcRuleSetType= '"__type": "FcRuleset"'
FcName = '"Text": ' FcFirmItemText
FcValue = '"Value": ' FcFirmCode
FcFirmItemText = '"' String '"'
FcFirmCode = Number

PcRuleSets = PcRuleSetsKey ':' ('[' PcRuleSetList ']' |'[]')
PcRuleSetKey = '"PcRulesets"'
PcRuleSetList = PcRuleset | PcRuleSetList ',' PcRuleset
PcRuleSet= '{' ActivePiText ',' Rules ',' PcName ',' PcValue ',' PcRuleSetType '}'
PcRuleSetType= '"__type": "PcRuleset"'
PcName = '"Text": ' PcProductItemText
PcProductItemText = '"' String '"'
PcValue = '"Value": ' '"'PcFirmCode':'PcProductCode '"'
PcFirmCode = Number
PcProductCode = Number
ActivePiText = '"ActivePiText": ' Number

Rules = RulesKey ':' ('[' RulesList ']' |'[]')
RulesKey = '"Rules"'
RulesList = Rule | RulesList ',' Rule
Rule = '{' RuleId ',' RuleAction ',' RuleType ',' RuleValue ',' RuleReservation ',' RuleLimit '
',' RuleObjType '}'
RuleObjType = '"__type": "Rule"'
RuleAction = '"Action": ' '"'('Allow' | 'Deny')'"'
RuleType = '"Type": ' '"'('Default' | 'Host' | 'Subnet' | 'User' | 'Group' | 'Container') '"'
RuleValue = '"Value": ' '"' String '"'
RuleLimit = '"'Limit" :' Number
RuleReservation = '"Reserved": ' Number
RuleId = '"RuleId": ' Number

Boolean = 'true' | 'false'
```

2.13.5.41 Information

When exporting the ACL, there is the (unspecified) key-value pair `"Allocated":0` for `Rules`.

This entry contains only runtime information and should not be generated automatically. This parameter should also be ignored during validation.

2.14 HID Support

Starting with Version 5.0 *CodeMeter* supports devices that conform to the USB's Human Interface Device (HID) class specification.

The installation of a special USB host driver is <u>not</u> required since the communication via the USB HID class is standardized and the operating systems provide respective classes. Currently, the operating systems Windows, macOS, and Linux are supported.

Alternatively to the Mass Storage Device status, thus *CmDongles* can display as HID without a drive status.

> ℹ️ The communication class HID is available for many *CmDongle*. Please consult the respective <u>data sheet</u> for support details.

Requirements

- Minimum *CodeMeter* Firmware 2.02
- Minimum *CodeMeter* Runtime 5.0

The USB communication standard can be switched any time from Mass Storage Device (MSD) to Human Interface Device (HID) or vice versa.

2.14.1 Set from Mass Storage to HID

To switch the USB communication standard from Mass Storage Device (MSD) to Human Interface Device (HID), please proceed as follows:

1. View the status in *CodeMeter WebAdmin* on page "**Content | CmContainer**".

   A drive is assigned and no flash memory is available.

Sample CmDongle		3-3448483	CmStick 2.05	🟢
⌄ Licenses	⌃ CmContainer Info	⌄ User Data	⌄ Backup and Restore	
Name		Sample CmDongle		
Serial Number		3-3448483		
CmContainer Type		CmStick 2.05		
First Device		F: (No Flash)		
Status		🟢 Enabled		
System Time (PC)		2016-01-29 14:32:08		
System Time (CmContainer)		2016-01-29 14:32:06		
Certified Time (CmContainer)		2015-10-08 08:26:15		
Free Memory		94 % (315.272 Bytes)		

2. Call *cmu* 📄 116 .

   For Windows OS call *cmu* call *cmu* by the start menu item **"Start | All Programs | CodeMeter | Tools | CodeMeter Command Prompt"** (⊞ Press "Windows" key to open Start screen | Type "CodeMeter Command Prompt" | Press "Enter" key). For the operating systems macOS and Linux this command is provided by the usual search path parameter.

3. Enter the following command line:

   ```
   cmu32 /s [Box mask-Serial number] --set-config-disk HidCommunication
   ```

   > ℹ️ Alternatively, you may also use the *cmu* command --hid 📄 118 .

   The current status displays in the following command line output:

   ```
   cmu32 - CodeMeter Universal Support Tool.
   Version 5.00 of 2013-Jan-30 (Build 1039) for Win32
   Copyright (C) 2007-2013 by WIBU-SYSTEMS AG. All rights reserved.

   - CmStick/C with Serial Number 2-2251132 and version 2.01
     Version:            2.01
     Flash Size:         no real flash available
     Virtual Drive:      E:
     Configuration:      LocalDisk with ActivePartition
     File System:        FAT32
     Communication:      Mass Storage Device
     Boot-Code:          Int18 Boot Code
     Mdfa:               0x539
   ```

```
        Please replug your CmDongle to apply the changes.
```

4. Unplug and replug the *CmDongle*.

5. View logging in *CodeMeter Control Center* tab "**Events**".
The information for the switch to HID displays.

5. Check in *CodeMeter WebAdmin* page "**Content | CmContainer**".
No drive is assigned.

2.14.2 Set from HID to Mass Storage

To switch the USB communication standard from Human Interface Device (HID) to Mass Storage Device (MSD), please proceed as follows:

1. View the status in *CodeMeter WebAdmin* on page "**Content | CmContainer**".
A drive is not assigned.

2. Call _cmu_ [116]

For Windows OS call _cmu_ call _cmu_ by the start menu item **"Start | All Programs | CodeMeter | Tools | CodeMeter Command Prompt"** (Press "Windows" key to open Start screen | Type "CodeMeter Start Center" | Press "Enter" key). For the operating systems macOS and Linux this command is provided by the usual search path parameter.

3. Enter the following command line:

```
C:\Users\fs>cmu32 /s [Box mask-Serial number] --set-config-disk MsdCommunication
```

> Alternatively, you may also use the _cmu_ command --msd [118] .

The current status displays in the following command line output:

```
cmu32 - CodeMeter Universal Support Tool.
Version 5.00 of 2013-Jan-30 (Build 1039) for Win32
Copyright (C) 2007-2013 by WIBU-SYSTEMS AG. All rights reserved.

- CmStick/C with Serial Number 2-2251132 and version 2.01
  Version:            2.01
  Flash Size:         no real flash available
  Virtual Drive:      No drive assigned (HID)
  Communication:      Human Interface Device (HID)

  Please replug your CmDongle to apply the changes.
```
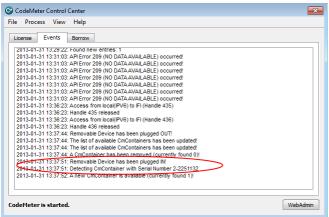
4. Unplug and replug the _CmDongle_.

5. View logging in _CodeMeter Control Center_ tab "**Events**".

The information for the switch to MSD displays.

5. Check in *CodeMeter WebAdmin* page "**Content | CmContainer**".

A drive is assigned and no flash memory available.

Sample CmDongle	3-3448483	CmStick 2.05 ●
∨ Licenses ∧ CmContainer Info ∨ User Data ∨ Backup and Restore		
Name	Sample CmDongle	
Serial Number	3-3448483	
CmContainer Type	CmStick 2.05	
First Device	F: (No Flash)	
Status	● Enabled	
System Time (PC)	2016-01-29 14:32:08	
System Time (CmContainer)	2016-01-29 14:32:06	
Certified Time (CmContainer)	2015-10-08 08:26:15	
Free Memory	94 % (315.272 Bytes)	

2.14.3 Linux Kernel Settings

CodeMeter requires a working USB hotplugging infrastructure for the detection of a *CmDongle*. Thus make sure that the hotplug is working properly.

If hotplugging seems not to work on a new Linux distribution, please check if the new "udev" mechanism is used. If "udev" is used, the problem can be fixed by copying the file `/usr/share/CodeMeter/52-codemeter.rules` into the directory `/etc/udev/rules.d/`.

For the communication between *CodeMeterLin* and the *CmDongle*, *CodeMeterLin* requires a Linux kernel (Kernel 2.4.x or Kernel 2.6.x) with support for USB mass storage, human interface (HID) and scsi-generic devices. If you use a self compiled Linux Kernel, please check if you have activated usb-storage and sg-device support (as modules).

General Kernel configuration display settings including USB mass storage or HID (Human Interface Device):

CmDongle via USB as MSD (CmStick, CmStick/M, CmCard):
```
CONFIG_SYSFS
CONFIG_USB_SUPPORT
CONFIG_USB_*_HCD*          (respective Host Controller)
CONFIG_USB_STORAGE
CONFIG_BLK_DEV_SD
CONFIG_BLK_DEV_SG          (for passthrough communication)
CONFIG_*_FS                (for file I/O, the respective file system)
```

CmStick via USB as HID:
```
CONFIG_SYSFS
CONFIG_USB_SUPPORT
CONFIG_USB_*_HCD*          (respective Host Controller)
CONFIG_HID
CONFIG_HIDRAW
CONFIG_USB_HID
```

CmCard via internal card reader (e.g. SDHCI):
```
CONFIG_SYSFS
CONFIG_MMC
CONFIG_MMC_BLOCK
CONFIG_MMC_*               (for the respective card reader)
CONFIG_BLK_DEV_SG          (for passthrough communication)
CONFIG_*_FS                (for file I/O, the respective file system)
```

CmCard via ATA:
```
CONFIG_SYSFS
CONFIG_BLK_DEV_SD
CONFIG_ATA                 + respective ATA Host adapter/controller
CONFIG_BLK_DEV_SG          (for passthrough communication)
CONFIG_*_FS                (for file I/O, the respective file system)
```

If your Linux Kernel is configured properly, use the command:

```
codemeter-info -L
```

to get a list of all *CmDongles* connected to your system. If this is not the case, you have probably a general problem with your Linux Kernel or a Kernel module could not be loaded correctly.

2.15 Open Source Software used in the products CodeMeter 7.60d, CodeMeter Protection Suite 11.20d, CodeMeter Embedded 2.62a as of 2023_10_11

Open Source Software used (embedded in this local help system)

3 Glossary

Term	Description
AxProtector	Automatic protection of applications using *AxProtector* as secure basic protection without changing the source code including runtime checks, effective anti-debug mechanisms, modification of resources, and locking of *CmContainer* if crack attempts are detected. As tool of *CodeMeter Protection Suite* available for different project types and as a commandline version.
CmActLicense	Completely software-based variant of the protection and licensing technology *CodeMeter*. Licenses are bound to an individual computer.
CmBoxPgm	Commandline tool to create, edit, and delete licenses and their components (*Firm Item*, *Product Item*, and *Product Item Options*) in *CmContainer*. You can also apply scripts and batch files for mass production and test automation. Programming is simultaneously applied in one passe to several *CmContainer*.
CmCloudContainer	Cloud-based variant of the protection and licensing technology *CodeMeter*. End users can access this *CmCloudContainer* from their local computer with appropriate credentials. This also means that only the credentials are on the local computer, while the *CmCloudContainer* and the licenses are in the cloud.
CmContainer	Summarizing notion for describing the license carriers of all *CodeMeter* variants. *CmDongle* in the case of the hardware-based licensing system, *CmActLicense* n the case of the software-based licensing system, and *CmCloudContainer* in the case of the credential-based licensing system.
CmDongle	Hardware-based variant of the protection and licensing technology *CodeMeter*. Available in many form factors for a variety of interfaces.
CmDust	The *CodeMeter* Enduser Support Tool logs important system and *CodeMeter* settings and helps Wibu-Systems Support to find remedies for eventually occurring errors.
CmFAS	see *CodeMeter Field Activation Service*
cmu	Commandline alternative to perform many *CodeMeter Control Center* functions (*CodeMeter Universal Support Tool*).
CodeMeter API Guide	Graphical tool to generate source code fragments. You create and test API functions with all related parameters and necessary structures for the programming language of your choice. Currently, the programming languages C, C++, C#, CB6, VB.NET, Delphi, and Java are supported.
CodeMeter Certificate Vault	works as a PKCS#11 compliant token provider, integrating with the Microsoft Cryptographic API Next Generation (CNG) as a Key Storage Provider (KSP), and working with OpenSSL API e.g. to keep and use the keys for TLS certificates. It is fully integrated with many essential applications including browsers, VPNs, and email.
CodeMeter Field Activation Service	see *File-based Remote Programming*
CodeMeter Control Center	*CodeMeter Control Center* provides the protected software to access the *CodeMeter* runtime environment. It displays information on connected *CmContainer*, and presents options to configure connected *CmContainer*. Moreover, an assistant creates license request files and imports license update files (*CmFAS Assistant*).
CodeMeter Keyring	Protection solution based on user and password credentials created in the *Password Manager* component and supplied by the *Password Provider* component. *Password Manager* connects to *CodeMeter License Central* after startup and retrieves the configured users and passwords from it. There is no local data storage. Created passwords and users are used in *Password Provider*, e.g. for implementing the feature of protecting the source code.
CodeMeter License Central	Ticket-based system for creating, managing, and delivering licenses for software and digital content. Available in a *Desktop* and an *Internet* Edition.
CodeMeter License Editor	Graphical tool allowing you to create, edit or delete licenses and their components (*Firm Item*, *Product Item*, and *Product Item Options*) in *CmDongles*. Next to programming of locally connected *CmCongles* also file-based remote programming (*CodeMeter Field Activation Service*, CmFAS) is supported. Suitable for testing license strategies.
CodeMeter License Server	Runtime environment (`CodeMeter.exe`) for the protection and licensing technology *CodeMeter*.
CodeMeter Start Center	Start screen tool to access and open most of the *CodeMeter* applications and tools.
CodeMeter Protection Suite	Toolbox for the automatic encryption of applications and libraries. The individual tools have been tailored specifically to work with each platform or environment (see *AxProtector*, *IxProtector*).
CodeMeter WebAdmin	Graphical *CodeMeter* tool displaying information on connected *CmContainer* and related license entries in a browser. In addition, configuration and analyzing options for the *CodeMeter* runtime environment (*CodeMeter License Server*) are provided.

Term	Description
CodeMeter	Wibu-Systems' technology for protecting and licensing of software and digital content.
File-based Remote Programming	Remote updating a *CmContainer* requires some information on the *CmContainer* to be reprogrammed. This information is safely stored and transferred in a Context File, i.e. `*.WibuCmRaC` file (license request file). Based on this license request file use the *CodeMeter* programming tools to create an Update File (`*.WibuCmRaU`) (license update). Subsequently, this file is safely transferred into the *CmContainer*. In addition, on creating the `*.WibuCmRaU` file automatically also a `*.WibuCmRaM` file (Modified Context File) is created which maps the *CmContainer* content at the time the licenses have been updated.

An CmFAS *Assistant* in *CodeMeter Control Center* supports the licensee when updating licenses. |
Firm Code	The *Firm Code* presents a unique number each licensor receives from Wibu-Systems. It ensures that each licensor is individually identified when protecting and licensing software or digital content.
Firm Item	Logical and hierarchical item level in the *CmContainer*. The *Firm Item* level holds entries which are unique for each licensor and includes the individual *Firm Code*.
Firm Key	Secret key which influences almost all encryption and decryption processes of licenses, their authentication, and the creation, editing and deleting of license entries at the level of *Product Items*. The *Firm Key* is initially shipped with the *Firm Security Box*.
Firm Security Box	Master *CmDongle* which allows to program other *CmContainer*. The FSB is unique for each licensor.
FSB	see *Firm Security Box*
HIP	*High Level Programming API* see *Programming API*
IFI	see *Implicit Firm Item*
Implicit Firm Item	The *Implicit Firm Item* level in the *CmContainer* features the same characteristic as usual *Firm Items*). It simply has some distinct features. While all other level are characterized by the existence of an exclusive *Firm Code* which is unique for each licensor, the *Implicit Firm Item* level has the *Firm Code* of 0. This implies that each owner of the *CmContainer* has licensor privileges for the *Implicit Firm Item* level including write access.
IP Protection	Protection solution of *CodeMeter Protection Suite* without licensing, i.e. reverse engineering is prevented, but not copying the application. This makes this solution suitable for test versions, demo software and freemium business models, since protected applications do not require runtime components of *CodeMeter*. The key for decrypting the application is hidden in the application itself. Not to be confused with *Protection Only* licenses. These works similar to *IP Protection*, but always require a *CodeMeter Runtime* installed with administrator rights.
IxProtector	Individual advanced protection technology applied for software and digital content as tool of *CodeMeter Protection Suite*. 'Real' source code fragments are encrypted and decrypted by interfaces (*Software Protection API*, WUPI) and security mechanisms. Suited to implement modular software protection.
Core API	Powerful interface to communicate with *CmContainer* at runtime of *CodeMeter License Server*. All other APIs and protection mechanisms (*AxProtector*, *IxProtector*, *Software Protection API* WUPI) base on *Core API* functions. Thus using this interface complements existing protection options (encryption and decryption of data, personalization, reading additional data).
License Activation	see File-based Remote Programming
License Information File (`*.WibuCmLiF`)	This file corresponds for *CmActLicense* to an empty license container however holds specifications on binding schemes and additional activation options to be used for unique binding of a license to the computer or the device.
Update File (license update) (`*.WibuCmRaU`)	The Update File for a *CmContainer* valid only for a single unique *CmContainer* can be imported only once.
Context File (license request) (`*.WibuCmRaC`)	The Context File of a *CmContainer* mirroring the as-is status of license entries serves as basis for license updating in the process of file-based (remote) programming.
CodeMeter SmartBind	Binding scheme used in *CmActLicense* licensing system optimizes assuring the validity of *CmActLicense* licenses, if hardware properties of the PC change to which the licenses are bound.
PIO	see *Product Item Options*
Product Code	The *Product Code* represents a number free to choose and identifies the products to be protected and licensed.
Product Item Options (PIO)	License entries at the *Product Item* level. They hold the *Product Code* also further options defining the actual characteristics of a license, such as, how many licenses may be simultaneously used in a network, how long a license is valid, which functions are accessible and billed, etc. Moreover, several other data fields are available holding additional binary information and differ in their access privileges.

Term	Description
	These optional characteristics are combinable in a variety of ways, and constitute the basis for the mapping of any imaginable license strategy.
Product Item	Logical hierarchical entry level in a *CmContainer* below the *Firm Item* level. At the *Product Item* level you find the single license entries, i.e. the *Product Codes* and further *Product Item Options*.
Programming API	This class-oriented interface allows you to access any object or process required to program or organize license entries in a *CmContainer*, and features extended customizing for the integration of *CodeMeter* into own applications. The *Programming API* is available for many programming languages.
Software Protection API	Interface which decrypts segments protected by *IxProtector* at runtime available as WUPI (WIBU *Universal Protection Interface*). It is lean, comprises only a few but essential functions, and is standardized and applicable for a variety of programming languages.
Soft license	see *CmActLicense*.
Translocated Execution	*AxProtector* supports the technique to translocate, i.e. shift the execution of selected functions to other arbitrary processing areas. At the same time, the data at the original location is not changed.
Wibu Universal Protection Interface	see *Software Protection API*
WUPI	see *Wibu Universal Protection Interface*

4 Open Source Software verwendet in den Produkten CodeMeter 7.60d, CodeMeter Protection Suite 11.20d, CodeMeter Embedded 2.62a Stand 2023_10_11

Open Source Software used in the products CodeMeter 7.60d, CodeMeter Protection Suite 11.20d, CodeMeter Embedded 2.62a as of 2023-10-11

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2.1. Flot

Version:	0.8.1
Homepage:	http://www.flotcharts.org/

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Link to the product license:	https://github.com/flot/flot/blob/v0.8.1/LICENSE.txt
Change date of the license text:	2013-03-05
Source code modifications:	as is
Use in the software:	Runtime component CodeMeter WebAdmin
Operating system	Windows, macOS, Linux

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2.2. jQuery

Version:	3.5.0
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Change date of the license text:	2018-04-17
Source code modifications:	as is
Use in the software:	Runtime component CodeMeter WebAdmin
Operating system	Windows, macOS, Linux

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2.3. jQuery-ui

Version:	1.13.2
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Link to the product license:	https://github.com/jquery/jquery-ui/blob/1.13.2/LICENSE.txt
Change date of the license text:	2014-12-21
Source code modifications:	as is
Use in the software:	Runtime component CodeMeter WebAdmin
Operating system	Windows, macOS, Linux

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This software consists of voluntary contributions made by many
individuals. For exact contribution history, see the revision history
available at https://github.com/jquery/jquery-ui

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====

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2.4. FlatBuffers

Version:	1.12.1
Homepage:	https://google.github.io/flatbuffers/
OSS license:	Apache License 2.0
Link to the product license:	https://github.com/google/flatbuffers/blob/v1.12.1/LICENSE.txt
Change date of the license text:	2019-11-05
Source code modifications:	as is
Use in the software:	Runtime component, SDK component AxProtector
Operating system	Windows, macOS, Linux

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2.5. go-macaron/macaron

Version:	1.3.4
Homepage:	https://go-macaron.com/
OSS license:	Apache License 2.0
Link to the product license:	https://github.com/go-macaron/macaron/blob/v1.3.4/LICENSE
Change date of the license text:	2017-10-17
Source code modifications:	as is
Use in the software:	Runtime component CodeMeter WebAdmin
Operating system	Windows, macOS, Linux

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2.6. golang/crypto

Version:	1.17.7
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Change date of the license text:	2012-03-17
Source code modifications:	as is
Use in the software:	Runtime component CodeMeter WebAdmin (CodeMeter License Server), TMR Server
Operating system	Windows, macOS, Linux

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2.7. libcurl

Version:	8.4.0
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Change date of the license text:	2023-01-03
Source code modifications:	as is
Use in the software:	Runtime component CodeMeter License Server
Operating system	Windows

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2.8. inet_ntop / inet_pton (as contained in libcurl)

Version:	(8.4.0)
Homepage:	https://curl.haxx.se/libcurl/
OSS license:	ISC License
Link to the product license:	https://github.com/curl/curl/blob/curl-8_4_0/lib/inet_ntop.c https://github.com/curl/curl/blob/curl-8_4_0/lib/inet_pton.c
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Operating system	Windows

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2.9. libsodium

Version:	1.0.13
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2.10. nlohmann JSON

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Source code modifications:	as is
Use in the software:	Runtime component
Operating system	Windows, macOS, Linux

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2.11. Protocol Buffers

Version:	3.20.1
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Change date of the license text:	2018-03-27
Source code modifications:	as is
Use in the software:	Runtime component, SDK component AxProtector
Operating system	Windows, macOS, Linux

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2.12. Open Source ASN.1 Compiler

Version:	0.9.21
Homepage:	http://lionet.info/asn1c/compiler.html
OSS license:	2-clause BSD
Link to the product license:	http://lionet.info/soft/asn1c-0.9.21.exe
Change date of the license text:	2006-09-26
Source code modifications:	as is
Use in the software:	Runtime component CodeMeter License Server, SDK component Programming API (HIP)
Operating system	Windows, macOS, Linux

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2.13. dotNetInstaller

Version:	2.3
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Change date of the license text:	2014-01-06
Source code modifications:	as is
Use in the software:	Runtime component dotNetInstaller, SDK component dotNetInstaller
Operating system	Windows

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2.14. capstone

Version:	4.0.2
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Change date of the license text:	2014-02-20
Source code modifications:	as is
Use in the software:	Runtime component cpsrt SDK component AxProtector
Operating system	Windows, macOS, Linux

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This is the software license for Capstone disassembly framework.
Capstone has been designed & implemented by Nguyen Anh Quynh <aquynh@gmail.com>

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2.15. LLVM (partly, as contained in capstone)

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Source code modifications:	as is
Use in the software:	Runtime component cpsrt SDK component AxProtector
Operating system	Windows, macOS, Linux

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Source code modifications:	as is
Use in the software:	Runtime component CodeMeter Server
Operating system	Windows, macOS, Linux

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2.17. Data Compression Library (zlib)

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Operating system	Windows, macOS, Linux

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Jean-loup Gailly   Mark Adler
jloup@gzip.org   madler@alumni.caltech.edu

2.18. BoringSSL

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Homepage:	https://boringssl.googlesource.com/boringssl/
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Operating system	Windows, macOS, Linux

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  27287880
  27287883

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Version:	0.8.1
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Change date of the license text:	2014-06-29
Source code modifications:	as is
Use in the software:	SDK component AxProtector
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Source code modifications:	as is

Use in the software:	SDK component AxProtector
Operating system	Windows, macOS, Linux

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Operating system	Windows, macOS, Linux

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3.5. ASM

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Use in the software:	SDK component AxProtector
Operating system	Windows, macOS, Linux

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3.12. yaml-cpp

Version:	0.7.0
Homepage:	https://github.com/jbeder/yaml-cpp
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Link to the product license:	https://github.com/jbeder/yaml-cpp/blob/yaml-cpp-0.7.0/LICENSE
Change date of the license text:	2015-03-31
Source code modifications:	as is
Use in the software:	SDK component AxProtector
Operating system	Windows, macOS, Linux

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Source code modifications:	as is
Use in the software:	Runtime component CodeMeter Control Center
Operating system	Windows, macOS, Linux

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PCRE2 JUST-IN-TIME COMPILATION SUPPORT

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4.6. PCRE2 – Stack-less Just-In-Time Compiler, version 10.40

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4.10. LibJPEG-turbo, version 2.1.4

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4.11. FreeType 2, version 2.12.1

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o freetype-devel@nongnu.org

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Our home page can be found at

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4.12. FreeType 2 - Bitmap Distribution Format (BDF) support

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4.15.   HarfBuzz

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4.16.   HarfBuzz-NG, version 1.7.4

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4.20. Unicode Character Database (UCD), version 26

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5. Embedded Components

5.1. musl

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6.1. go-systemd

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6.3. gopkg.in/ini.v1

Version:	0.2.0
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Use in the software:	TMR Server
Operating system	Linux

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