KEYnote 15

TITLE STORY
Software protection that really performs

FURTHER TOPICS
- CodeMeter Identity – Web authentication with CodeMeter
- AxProtector for .NET – Automatic Protection for .NET Assemblies
- CodeMeterAct – Software-based license management

WIBU SYSTEMS

Contents

Dear Customers and Partners,

Faster, bigger, newer, better… Why? Isn't it also possible to use established solutions for a long time? Yes and no!

Yes, a WibuBox, WIBU-SYSTEMS' classic protection hardware, first introduced 1989, can still be used with today's newest operating systems and development environments. And yet, the latest-generation WibuBox works with your old software without any modifications.

No, because securing applications is an engineering art and 100% security is not possible. Cracker tools, cracker knowledge, the power of PCs and the ability to exchange information across the Internet are on the rise. That's why protection methods need permanent development progress and why we are just a hair's breadth ahead of the attackers. Earlier WibuBox versions restricted the key length to 40 bit; due to cryptography export restrictions. Good enough; measured by yesterday's standards, but today, attackable with brute force methods! Since 2003, the WibuBox has supported a key length of 64 bit, which cannot be practically cracked today. CodeMeter uses much longer encryption keys and smartcard technology, both provide highest security.

Yes, because we are permanently enhancing our development tools. As a WibuKey user, you now get advantages from our latest protection tools, like AxProtector (automatic encryption) or WUPI (universal source code integration across our product line).

Faster, bigger, newer, better … for security products it is elementary: if you don't go forwards, you will go backwards, because the attackers are going forwards. The German signature law or the United States NIST and FIPS analyze and update encryption algorithms yearly – so we also continually check our products to make sure they meet your security needs, now and into the future. Our goal is to provide you with superior protection at the same time providing sophisticated tools that are much easier to use.

Please read in this edition of KEYnote about the universal WUPI tool; about controlling access with CodeMeter Identity; about our newest products, like CodeMeterAct and much, much more. If you don't find the solution you are looking for, please contact us!

Yours Oliver Winzenried (CEO)

CodeMeter Identity

With CodeMeter Identity, the complete access to a website can now be controlled with just a CmStick attached to your user's system (or any computer in the world your user finds himself in front of). You can also protect web services (software as a service, SaaS) from fraudulent use. The key features are (1) An easy integration on the server side with support for ASP.NET and PHP and (2) The convenient use of an ActiveX or Java applet on the user side.

CodeMeter Identity – the secure way to protect your Website

Many suggest that the movement of more and more useful applications to the Internet is one of the megatrends of the software industry. Developers started with simple interactive websites, and then progressed to complex web-installed services. To access such applications, the user simply opens a browser and enters a web address. But developers might want to earn money with a website or they might need to store user-specific data. If so, a way to authenticate the user will be a fundamental need. Usually, this need is met with a simple challenge, asking for a user name and secret password – awkward for the user – but even more important from the developer's point of view, very insecure. Instead of forcing the crackers to exchange floppy disks, as in the past, application crackers can now simply exchange passwords. Oh no! Piracy is getting much more convenient too!

Fortunately WIBU-SYSTEMS just finished the development of CodeMeter Identity - a system for authenticating access to websites, making passwords superfluous. The user simply attaches a CmStick containing a stored key as his or her authorization to call a protected website – the actual authentication process takes place automatically in the background. An optional password permits also a two-factor-authentication.

Only the website developer can change such authorizations inside the CmStick. And, since you know, duplication of such data in the CmStick is practically impossible; users will not be able to share authorization codes illegally. But, what about the user? CodeMeter Identity makes his

computing life, not only more secure, but more convenient as well. Or, with a single CmStick, he or she can store authorizations for many websites at the same time – and simultaneously he or she can use this same CmStick to run local software or view encrypted documents (Smart-Shelter). That's why the principle of CodeMeter – one storage location for all licenses – was an elegant solution for authenticating users on protected websites.

WIBU-SYSTEMS, from the very beginning, designed into the CodeMeter hardware (CmStick, CmCard) powerful methods to provide secure authentication. ECDSA (Elliptic Curve Digital Signature Algorithm) is completely implemented in the firmware. ECDSA has been officially certified by FIPS and NIST. And these private Elliptic Curve keys will never leave the hardware, not even for a short time. This process guarantees that every authentication exchange is unique and cannot be simulated by cracker recording tools. For the first time, Web designers and HTML coders will find it easy to implement secure authentication. Knowledge on how to call the CodeMeter Programming API (for example in C++, Java or Visual Basic) is not required. It is enough to know PHP or ASP.NET.

Here are some special features of CodeMeter Identity which ensure easy implementation:

- Nothing has to be programmed on the client side. The CodeMeter Runtime Kit automatically manages the authentication of a website via a Java applet or an ActiveX control – independent of the operating system. Currently CodeMeter Identity supports Windows 2000/XP/Vista, Mac OS, Linux and Solaris. In the future we plan support for

Windows CE and mobile systems.

- All required parameters are stored in the suitable CmStick; the required FirmCode and ProductCode are defined by the web programmer.

- It is possible to use either the always available (but randomly created and secret) Serial Key or a provider-defined Elliptic Curve key in a SecretData Product Item Option for authentication.

- If a symmetric encryption method is preferred, you can use AES encryption with a secret key on both sides.

- The server side will never need a CmStick – good news for all the developers who store their websites at large off-site server farms, without any physical access. A simple database (easiest as an XML file) containing the Elliptic Curve public key for each authorized customer must be stored on the server. The validation is then implemented by the described ECDSA method.

Are you curious to test CodeMeter Identity? We have a free-of-charge CodeMeter Identity SDK with a user manual for web programmers. Get started protecting your software future today!

AxProtector for .NET

The introduction of .NET has reduced the development time for software dramatically. Unfortunately .NET has a big drawback in the software protection world: You deliver your software more or less including the whole source code. As a result, trying to implement a software based authentication scheme – already, not very safe in a native Windows application – is an exercise in futility against piracy.

You don't believe us? Let's look into an example with a simple check of a serial number.

Traditional ("Unmanaged") Applications

Let's first look into a 32 bit application. In our test application a serial number should be entered in a registration dialog and checked.

As a hacker I load the software into a debugger, for example OllyDebug, and I feel the way to the critical challenge location. A good stop is an error message (MessageBoxA). With more or less effort I will find the suitable location and analyze this with a disassembler, for example IDA Pro.

A good disassembler can create running diagrams. This simplifies the work for the hacker, but he must still "listen and speak" fluent Assembler.

Luckily for the "good people", assembler language is not very popular among the young developer generation and is slowly disappearing from the basic programming knowledge base – despite the fact that the knowledge generated by such a tool is very useful in finding bugs.

It is not "rocket science" to find and to eliminate the checking location of a serial number in a 32-bit Windows application. It is not much more difficult to crack a 64-bit application; you simply need newer tools. But in the traditional C++ or Visual Basic world, the hacker must have a basic framework of experience, including assembler language knowledge and must also be creative in analyzing and exploiting compiled code.

Picture: Flow chart IDA Pro

Why is .NET different?

Our universal weapon (IDA Pro) can also be used with .NET applications. Microsoft even delivers ILDASM, an assembler, with the free .NET SDK. But there is a much better tool for .NET: Lutz Röder's Reflector.

This tool creates, just from an executable or DLL, the equivalent source file. And it can do this

in the programming language of your choice: Visual Basic, C# or Borland Delphi. This eliminates the most annoying cracker task: searching around in assembler code. Finding of the challenge location is very simple – the reflector lists all implemented functions, sorted by used dialogs and with their original names. Even a stupid "script kiddy" will discover the meaning of a CheckLicense function or the meaning of the edLicenseCode text field.

Let's examine our example again, write it in C#, use Reflector and …

Do you guess (and this is already the wrong word) the right license code? If so, you have a chance to win a Sony PlayStation 3! Send the correct license code matching this application to ps3@wibu.de. The closing date is the March 31, 2008. From among all correct entries we will raffle off one Sony PlayStation 3, without legal recourse. Employees of WIBU-SYSTEMS and our distributors and their relatives are not eligible.

Obfuscation

Of course, obfuscation helps a little bit. But, it is like using a helmet to drive a car. But what is the value of a helmet if you are ejected thru the windshield? Fastening a seat belt is much safer. For maximum security, professional racing drivers use both and they use a 5-to-6-point harness; not the seat-belt found in any passenger car.

Obfuscation replaces the "explaining" names for variables and functions by "enumerated" names; for example replacing ReadLicense and WriteLicense with aa and ab. This is only possible for names of types, methods and object used internally and which are not used from other assemblies or by the reflection technology. The
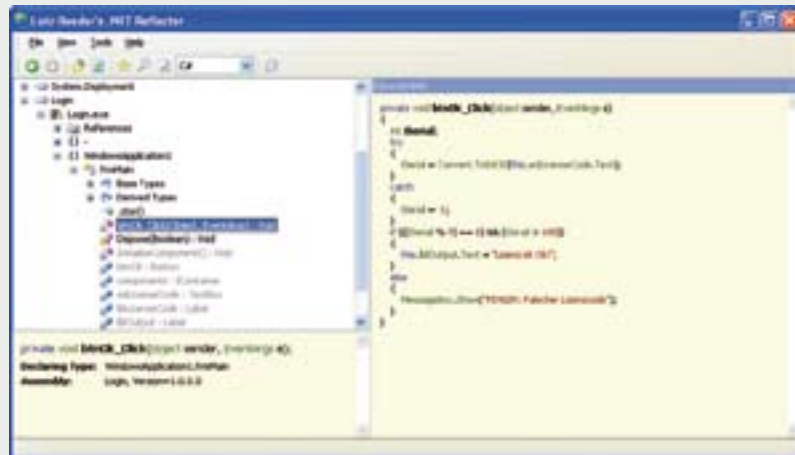
Picture: With AxProtctor protected .NET Assembly

algorithms and the structure of functions remain in readable text. In my own experience with Java, I can tell you that obfuscation makes the analysis more difficult, but it also stimulates hackers to discover the meaning of a variable or function.

Protection by Encryption

I compared the obfuscation with a helmet which does not protect efficiently in all situations. Encrypting code could be compared with the standard seat belt, which protects the whole application. And the AxProtector tool could be compared with the 5-to-6-point harness and is the best way to secure .NET applications.

The AxProtector analyzes and disassembles your application and then builds a new application which looks identical from outside (classes, methods, etc) but, fills it with AxEngine Loader Code and stores the resultant code completely encrypted.

During runtime a called function first executes the AxEngine Loader Code. This decrypts the actual code on demand, converts it into valid MSIL code and executes it. To increase the performance, such decrypted code can be cached or you can exclude specific methods from encryption. The final Assembly is a "true blue" .NET application. AxProtector supports version 1.1, 2.0, 3.0 and 3.5, for executables and DLL's.

Reflection and Remoting is not restricted due to the identical external interfaces between original and encrypted assembly.

The Bottom Line

AxProtector provides you with an easy-to-use, but powerful tool which creates safe code as good protection against piracy. This tool will also protect your algorithm (the intellectual property) from your competitors. The on-demand encryption does not remain in the assembly completely in the memory. Any attack with a memory dumping cracker tool results in non-executable code.

As a 100% .NET solution, the AxProtector provides the highest compatibility with all .NET assemblies – executables and dynamic link libraries and for all .NET versions.

AxProtector supports both CodeMeter and WibuKey: two very sophisticated and flexible software protection and license management systems.
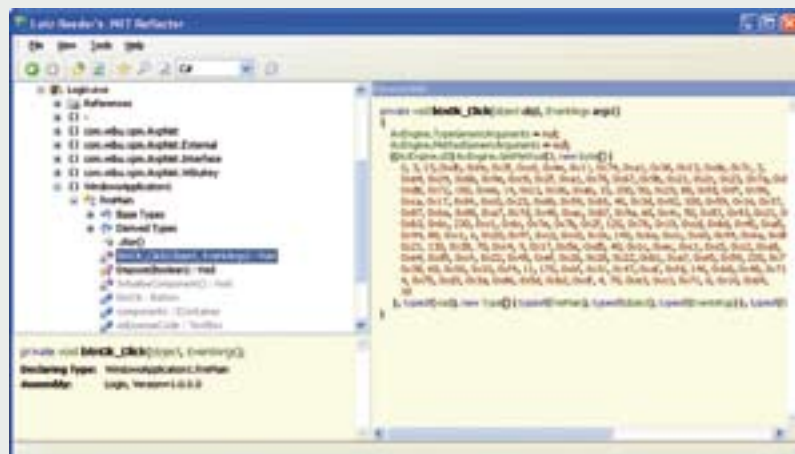
Picture: Unprotected .NET Assembly in plain text
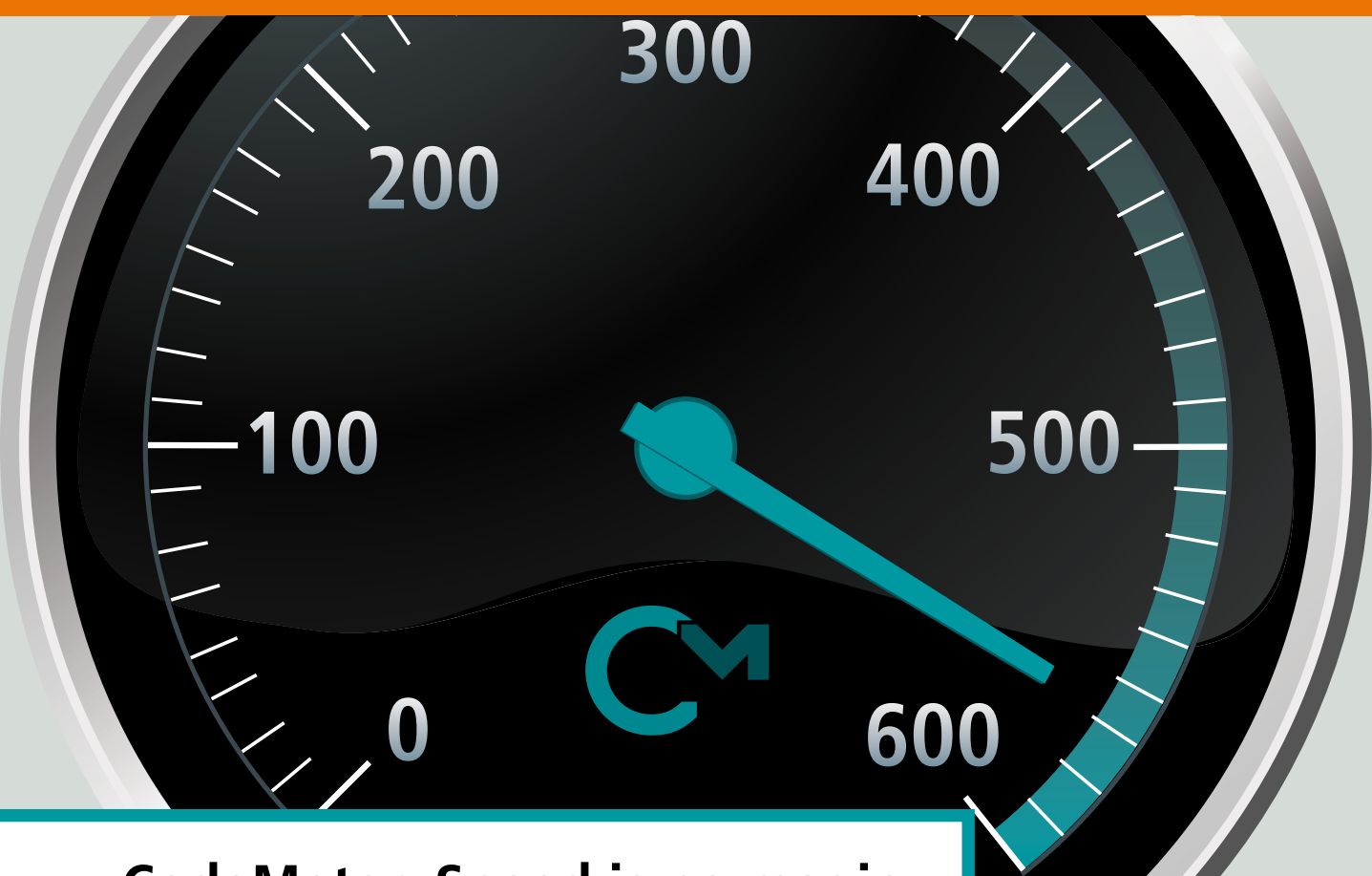
CodeMeter: Speed is no magic

Software Protection must provide high security but it must not interfere with the use of the software. Beyond a simple installation process, performance is an important issue. The following discussion with Dr. K from Aalen, Germany, shows typical questions from developers who chose CodeMeter as the best anti-piracy solution.

In contrast to the CodeMeter API which lets you decide what you do, the AxProtector is like a black box where you can influence behavior in only a limited way, but which is difficult to measure.

The AxProtector influences your application in three ways:

- By the decryption during the start
- By the runtime check during the execution
- By the on-demand decryption of data

We will analyze what happens during start in this issue of KEYnote.

The Test Scenario

We have two applications. A shell application starts the original and the protected test application. The start application then reports the start time and the test application writes directly after the start the time into a log file. The difference in the timing between original and protected application is the time which is used by the AxProtector to decrypt the protected application:

Typical Workstation PC *	227 ms
Typical Laptop **	307 ms

Picture: Performance dependant on the test system for an application file of 8 Mbytes

We made this test with different computer configurations, encryption settings, access methods and also different applications.

The size of the executable file influences the required time linearly:

Time = Base time + file size * factor

The base time and the factor depend on the used PC.

Configuration	Base Time	Factor
Typical Workstation PC*	92ms	17ms/MB
Typical Laptop**	150ms	20ms/MB

*Pentium D 2.80 GHz, 1 GByte RAM
**Mobile Dual Core 1.83 GHz, 1 GByte RAM

Dr. K.: So far I use another hardware-based software protection. Now I want to change to CodeMeter. How do you recommend integrating CodeMeter into my software?

Kügler: I recommend AxProtector as your main tool. It builds a protection envelope around your software. Your software will be delivered encrypted and not be decrypted until the program starts. And then, only if the correct CmStick with the suitable license is found.

Beyond the easy integration with an automatic tool you will be happy to note that the anti-debug features are very powerful. If typical attack patterns are detected, you can even lock the CmStick. These features are far beyond what you know from your previous dongle.

Dr. K..: Oh yes, I had evaluated a similar tool from my former protection product. But then the start of my software was delayed by more than 30 seconds. This is definitely too much and I have not used this tool. If your tool protects even more, I expect that it is even slower!

Kügler: No, the AxProtector is much faster. A typical application is decrypted in less than one second in system memory. We have found the perfect balance between performance and paranoia and use a mix of hardware access and encryption in the memory.

This will be extended by the permanent enhancement of the detection of cracking tools and of the automatic modification of your application. For example, the AxProtector retains some parts of the application in encrypted form in memory and does not decrypt them until they are really used.

Dr. K.: And how do these decryption processes influence my software product during runtime?

Kügler: Of course these modifications will influence the run of the program. But you will not feel any difference because we use a mix of encryption in the memory and hardware access. For example, the decryption of a 1024 byte data block is much faster than 20 milliseconds.

Admittedly, sometimes there can be unique situations, which can result in definitely slower software execution. But, we provide you with some options allowing you to fine-tune your special configuration. You can include further security checks using the CodeMeter API or the new "Wibu Universal Protection Interface" (WUPI). These options give you complete control over which functions you will call at which time.

Dr. K.: Which calls do you recommend? Today I read an ID during the start of the application, which activates specific modules in my software. Do I use the same principle again with CodeMeter?

Kügler: The concept of CodeMeter is a little different. Yes, you can also write information into a CmStick and read it back during the runtime. But it is much better to use encryption to activate a usable module. For example select require data (for example the number Pi) and store it as encrypted information into your software. If you need this data, you call the decryption of this stored information, use the result and overwrite it again after use. You could also encrypt a feature map to control modules or features.

Beyond data, you can also encrypt executable Code with WUPI – easily and securely. And as I already mentioned, such an encryption takes less than 20 milliseconds. An important difference between CodeMeter and your former protection product is that you can change the encryption key during runtime. With the CodeMeter API you do this manually; WUPI and AxProtector do it for you automatically.

Dr. K.: I want to also use network licenses. How is the performance in a network environment?

Kügler: Normally our runtime searches for a suitable license first locally, then, if no local license is found, a broadcast search into the network will be started. Depending on the network configuration and CodeMeter version, the first access can be delayed by up to one second.

But the end user can replace the broadcast by an individual CodeMeter server search list; which speeds up the network access. After you have your handle to a license item, there is no network delay that you will really feel. A decryption will also be executed in less than 20 ms over a network as long the latter is fast enough.

If you need another access to the same license item, you can speed up the process with the CodeMeter API by reading the IP address in use and use this for the new access. This also increases the speed, if the user does not use a specific server search list.

Dr. K.: Thank you so much for all this information. I'm very excited to work together with you.

Security Settings

The performance is also dependent on the security settings. We have compared "minimum", "default" and "maximum".

The security settings had an influence on the base time, but were not a factor for the size of the application file. This sounds logical because the time involved for finding cracker tools is independent of the size of the application file.

Minimum	227 ms
Default	246 ms
Maximum	294 ms

Picture: Performance is dependent on the security settings with an 8 MByte application.

The difference between Maximum and Minimum is just about 60 ms!

You see: Performance issues are not the reason to activate all options to search for cracking tools. But if your customers are developers who have to also run some debuggers while using your software, you have to be careful with the setting of some options.
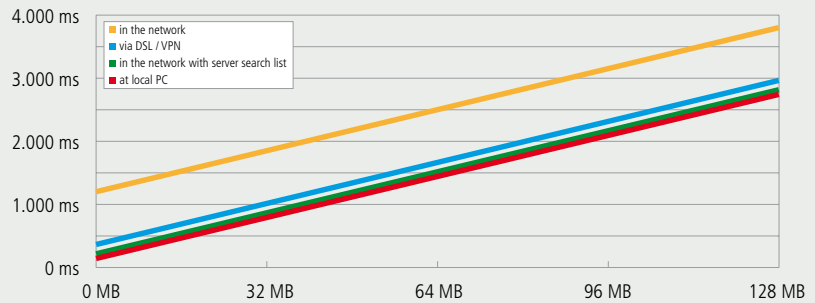
Performance in the Network

In the network there are two modes:

- Automatic search of a license server
- Setting up the IP address via the server search list

With CodeMeter Runtime version 3.20c, the automatic search of the license server needs about 1 second (exactly 1.040 ms) longer than with the local access. We will reduce this delay with the next version 3.30 (this "speed-up" version will be available by the time you read this article).

Access via the server search list in the local network with +10 ms is only slightly slower than if the direct access to the CmStick is at the local computer. Also the work via a VPN access over DSL is possible without problems. During the start you will need 190 ms more with the "slow" network. A call via GRPS/EDGE is not recommended: On average, the start was delayed by 5.050 milliseconds; but with high variations up to 22.000 milliseconds. In such cases, it is better to give a user another CmStick to attach to his local PC.

Picture: Performance is dependent on the security setting with an 8 MByte application

Comparison with Other Tools

We repeated the test also with wrappers of other companies. Some were up to 39 times slower than AxProtector, depending on the size of application file. You could interpret this as "slower equals more secure". But this is not true, because the security level of such tools is difficult to compare.

Our AxProtector went thru a true "baptism of fire" with the 2007 Hacker's Contest. And you have available today even new, extended and enhanced security features. Which competitor tool can make this same claim?

Mr. Gloomy uses a software product which is protected with a dongle A.

Mr. Lucky uses a similar software product but his is protected with CodeMeter.

9:00 AM Start of Work: Mr. Gloomy starts his application and and goes to pick up a coffee.

Mr. Lucky already has his coffee, starts his application and is already working.

Mr. Gloomy returns with his coffee, but he still waits for his software product to start.

6 PM Finishing Work: Mr. Lucky switches off his computer and goes home relaxed.

7:30 PM: Mr. Gloomy is still working and the coffee machine is empty.

CodeMeter reduces your customers' down-time, keeps them healthy and conserves the environment.

CodeMeterAct

Hardware-based copy protection with a dongle provides the best protection against piracy, abuse of licenses or reverse engineering. But there are situations, in which a dongle is not really required. Sometimes the presence of a dongle will be used as an excuse to select another software product. In the future, life will be easier – simply use WIBU-SYSTEMS' software-based protection system!

What is CodeMeterAct?

CodeMeterAct expands the hardware-based software protection system with a software-based alternative. With CodeMeterAct your customer can use your protected software without a CmStick. Instead the license is locked to a specific computer system.

Who will use CodeMeterAct?

The software-based protection permits the use of protected software in areas where using protection hardware is not required, for example, in enterprise companies for whom you have a deep trust and who may use self-controlled license management.

Another example is low-price consumer software with simple security requirements and needing a simple license model.

Software-based Protection? But this is not safe!

True! Software-based protection can never reach the security level of a good hardware-based protection system. With software-based protection, an attacker has an unlimited number of tries to unlock a program by starting again and again with a different defined status. In contrast, CodeMeter allows you to lock the CmStick permanently after the first attack. Therefore, a CodeMeterAct-protected application is always more vulnerable than a CmStick-protected application.

The protection mechanism of CodeMeter and CodeMeterAct will be differently implemented – an attack to CodeMeterAct will not compromise the security of CodeMeter. The world has not changed: The highest security will only come with a hardware-based system, like CodeMeter.

And how does it work?

To bind a CodeMeterAct license to a computer, some individual hardware parameters and settings must be read and sent to the software developer's license server. The license server returns license data, which are only valid for this computer. The transfer of this data can be done online (via a web service) or via a file.

The hardware parameters used and the minimum agreement level (hand shake requirements) can be specified by the licensor individually for different products according to the desired security level.

Do you have a license?

Additionally it will be possible to "borrow" or "check out" a license from a server. For example: A license could be borrowed by the traveling salesman or by an employee for use at his home office. This borrowing is limited to a user defined, specific time interval; after that, the license is returned automatically to the server, making it available for other network users. The borrowing process can be targeted by hardware binding to a specific computer or by transfer into a specific CmStick. For example it would be possible to use software-based license protection at the enterprise headquarters. But the borrowed licenses could be individually locked to a mobile user's CmStick for use on any computer.

Mix it up

A dynamic mixing between software-based and hardware-based protection is possible. AxProtector for automatic protection and WUPI for explicit protection currently support both WibuKey and CodeMeter and in the future there will be support for CodeMeterAct. That's why we recommend that for new software projects or for upgrading existing projects that you use AxProtector for generation protection of applications and use WUPI for individual protection (module-based, demonstration versions etc.). Both work perfectly together – with a guarantee of also working in the future.
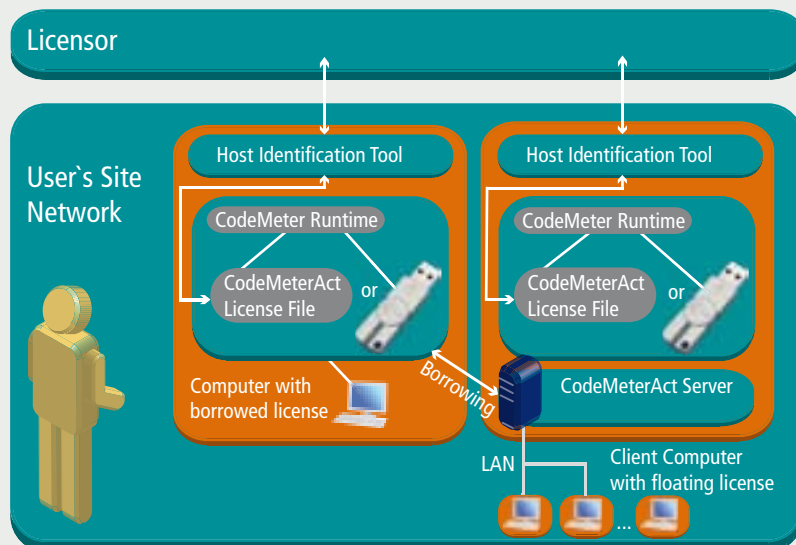
Picture: Functionality of CodeMeterAct

WUPI – Examples with the API of the Future

WUPI

The Wibu Universal Protection Interface (WUPI) is a great tool: Always containing the latest security-technology, always supporting all of WIBU-SYSTEMS software protection systems and always is easy to use. How easy is it really? Read here!

WUPI – What was this again?

WUPI is the API, which you should use for new projects or planned renovation on existing applications. It is universal, because it supports the current as well the future software protection systems. The additional support of CodeMeter-Act will be as easy as child's play with WUPI: Normally, even without recompilation. During implementation you define a framework and the IxProtector embeds security checkpoints at defined locations in the program. The quality of such checkpoints will be permanently increased by WIBU-SYSTEMS. Just before you deliver the next release of your software, download the latest release of the AxProtector SDK and use it – you will immediately profit by our security enhancements – without recompilation of your software.

With just 12 API functions, WUPI is a very slim API. But contains everything that you need! And for special purposes, you can use *WupiGetHandle()* to grab an item handle and continue your work with the native protection system API.

There are two alternatives: A pointer-based for programming languages like C++ and an index-based for all languages which cannot be used with pointers. In the latter case, this simple programming language must be able to at least create code, to load a DLL and call their functions – this is possible for nearly every programming language.

An additional advantage for the index-based API is the ability to separate development and license models. The developer must simply assign each module a continuous index number – the item in the CmStick which is actually required to activate this module can be defined later by the product management; it can be for example another bit in the Feature Map or a new Product Code.

We have explained WUPI and its features already in detail in our last KEYnote (online see http://
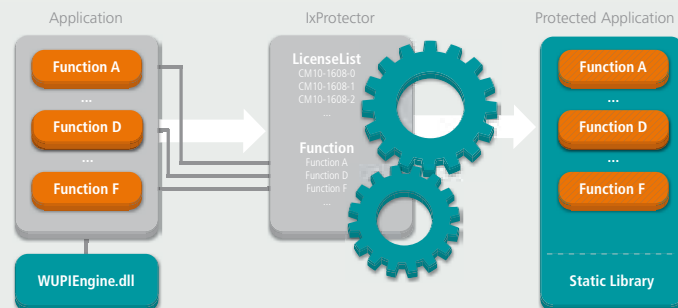
wibu.com/files/news/KEYnote_0714_EN_Low.pdf). In this edition you will learn more about an example in C++ with the index-based WUPI.

Let's Start

What do you have to do to implement protection of various modules or features into an application? Let's focus on a small calculator application which is already protected by AxProtector and CodeMeter with a license 10:1608 in the NoUserLimit mode. This protection avoids reverse engineering, but does not allocate a user license. Such a license is not used until the calculator is actually started.

Picture: How WUPI works

The different modules with the different functions, for example memory use or trigonometric commands are coded with different bits in the FeatureMap: Switching on the calculator should provide all supported modules.

Allocating a License

During the start of the application a basic license will first be allocated with *WupiCheckLicenseId(1)* – this time with user limitation, therefore for each instance of the program there must be a license available in the CmStick. As the function name describes, a license will be checked. If there is not already a license allocated, it will be done automatically in the background, in our situation always because it is the first call. At the same time a first runtime-check is done. This check can be done later at anytime

to again prove that the allocated license is still available.

With the same function, but with another index to another license description we use the existence of the licenses for the other modules. Just take a look at the listing on the next side: *WupiCheckLicenseId(2)* for the memory commands and *WupiCheckLicenseId(3)* for the trigonometric commands. All these settings do not actually allocate additional licenses ("NoUserLimit"). As a result, for each started calculator application we will allocate exactly one user license.

To release a license, you can use the *WupiFreeLicenseId()* function. This means you can explicitly "return" a user license for a specific module. In most cases, WUPI manages the releasing of the licenses automatically if the application is terminated.

Decrypt Function Code

By specifying the suitable entry in the AxProtector control file we define which function should be protected and with which license. While protecting the application with IxProtector (as part of AxProtector) these functions will be automatically encrypted. If we want to use such a function, we have to decrypt it. By calling *WupiDecryptCode(1)*, the first function in our list will be decrypted and we can call it. After the call returns, we should encrypt it

```
; „General" license
[LicenseList 1]
CM10-1608-0

; „Memory" license
[LicenseList 2]
CM10-1608-1

; „Angle" license
[LicenseList 3]
CM10-1608-2

[License CM10-1608-0]
Type=CodeMeter
FirmCode=10
ProductCode=1608
SubSystem=Local
Access=UserLimit

[License CM10-1608-1]
Type=CodeMeter
FirmCode=10
ProductCode=1608
FeatureCode=1
SubSystem=Local
Access=NoUserLimit

[License CM10-1608-2]
Type=CodeMeter
FirmCode=10
ProductCode=1608
FeatureCode=2
SubSystem=Local
Access=NoUserLimit

[Function 1]
; RVA CalcSimpleOperation
MapAddress = 0x29b0
LicenseList = 1
Length = 32

[Function 2]
; RVA OnButtonCalcMem-
Clear
MapAddress = 0x3490
LicenseList = 2
Length = 0

[Function 3]
; RVA CalcAngle
MapAddress = 0x3ae0
LicenseList = 3
Length = 100%
```

Excerpt from Axp-WupiCalculator.wbc

again. This avoids the situation where after calling all protected functions, the complete application code is decrypted in system memory. Using *WupiEncryptCode(1)* the function will be encrypted again.

Payday

Our small calculator also uses the pay-per-use model: For each calculator command a specific number of units will be "spent". Before the corresponding function is called, the unit counter, which is stored in the main license, should be reduced. For a trigonometric function, 5 units will be needed. These units will be reduced by calling *WupiDecreaseUnitCounterId(1, 5)*. We have to check the return value of course, which tells us if the license is still there and enough units were available for the reduction.

General Knowledge

To show the user the current balance of the units, we want to read this and display it after each command. To read the different properties of a license you can use the *WupiQueryInfoId()* function. The Unit Counter which is stored in the main license will be returned by the call of *WupiQueryInfoId(1, WupiQIUnitCounter)*.

Defense against Attacks

With WUPI you have access to the powerful anti-debugging protection of the AxProtector and you can control when to use it. Calling the *WupiCheckDebuggerId()* function, you can check before you call an important function to see if a debugger is present. And if in six months, you download the latest version of the AxProtector, you immediately profit from the enhancements we added to the debugging detection technology; just by using the IxProtector features, without any source modifications, even without recompiling or the necessity to re-link your application. A permanently updated "debugger detection" is an important feature in the war against crackers.

Do you want a little more?

If the WUPI function does not provide information which you find in a native API function of your used protection technology, you can easily switch to this API. If you support several software protection technologies at once (for example WibuKey and CodeMeter), you have to implement the native API function calls separately for each technology, of course. With *WupiGetLicenseTypeId()* you can discover, whether the used license was coming from WibuKey, CodeMeter or CodeMeterAct. With this knowledge you can then use the suitable native API implementation. *With WupiGetHandleId()* you will return the native handle of the specified license: For WibuKey this is of type HWKBENTRY, for CodeMeter and CodeMeterAct of type HCMSysEntry. With these handles you can do all the special operations which are provided by the native API – for example to read the added entries of a WibuBox item or

Did you know that …

⌐ you can debug the unprotected variant of WUPI applications by using the WupiEnigne32/64.dll?

⌐ you can use WUPI in combination with AxProtector as well as without it?

⌐ you can specify NULL or 0 as pointer res. index and then address the license which is already allocated and used by AxProtector?

⌐ you can define the WUPI license mode completely in the AxProtector as long as you just want to use the dynamic selection of protection technology via a License List without encrypting any function?

⌐ after encryption by AxProtector, the calls to our native CodeMeter and WibuKey API are also linked statically and that this eliminates a favorite attack point of the hackers?

in a CmStick the stored Customer or License Information (COLI).

We will support you

The AxProtector SDK contains a WUPI help file which describes the single API functions and also includes an introduction to and tips for practical use of WUPI. You will find it in the Windows start menu in Programs – AxProtector – Help – WUPI Online Help.

The described example WupiCalculator which shows a dynamic license switch between CodeMeter and WibuKey is available on your hard disk on %Program Files%\WIBU-SYSTEMS\AxProtector\Samples\IxProrector\C++\WupiCalculatorIndex. For C++ you find the sample example for the pointer-based WUPI and another pointer-based example with name NumConvertIx.

More Questions?

If you have questions about WUPI, or if you want to start using, or if you just want to know more details, do not hesitate and call us via phone or send us an email. The WIBU-SYSTEMS support team is eager to help you with learning the basics and begin using the features.

WibuConcepts –
Consulting Custom-Made

With WibuConcepts, WIBU-SYSTEMS supplements its service offer by consulting on how to realize solutions for protection of software, documents, media and access, based on its CodeMeter, WibuKey and SmartShelter technologies.

Our goal is to present our clients a path, to use our solutions with high efficiency, high security and optimized for a specific area of application. In close cooperation, we want to evaluate concepts with you, which reduce your training period and protect your investments.

> This page describes a service of the WIBU-SYSTEMS headquarters in Germany, focused on Germany and middle-Europe. The other WIBU-SYSTEMS offices and most of our distributors provide similar services; please check their websites for details.

WibuConcepts offers …
WibuConcepts continues the type of consultation, familiar to those who make standard requests to our support team. WibuConcepts extends this normal support and tailors it individually and strictly focuses on your project, your favorite license schema and your need for product information..

We offer the following services:
- Extensive modifications and expanding of existing example applications – they are adapted to your wishes and requirements and can be reused in your projects without further modification.
- Conceptual implementations in a textual report form – as a result you will receive a concept of implementation which is not focused like an example to a programming language.
- Implementation and adaptation of concept to your existing project. This requires of course to disclosure of specific project modules. WibuConcepts strictly guarantees confidence for all exchanged information.
- Seminars and presentations at WIBU-SYSTEMS AG headquarters (in Karlsruhe, Germany) in German or English. Or - if you prefer – at your location. Topics can be basic or include advanced training on individual areas which fit your specific requirements.
- It would also be our pleasure to visit you at your location. If several of your employees want to attend one of our seminars, a combination of a standard topic and an individual project-orientated consultation could be useful.

For concrete implementations we support the usual programming languages and platforms, for example C++, Visual Basic, Delphi, .NET, ASP. NET, PHP on Windows, Unix, Solaris and MacOS. But also for "exotic" languages like Fortran or Cobol, we can offer you our support.

The first concept is for free!
The first consultation is free-of-charge via phone or email: We want to hear your ideas, we check if wishes can be realized and then offer you a first cost estimation. Then it is your choice, on how we continue our cooperation.

Security Check
Suppose you have already implemented one of our solutions into your project and want it examined by one of our security experts? No problem! We check your protected application with the latest methods for security against hacking.

It would be our pleasure to offer you also a subscription – we will then analyze all of your updates. Ask us about Details of the security check and the subscription option.

You reach WibuConcepts on Germany by:
WIBU-SYSTEMS AG
Contact: Stephan Süptitz
Rueppurrer Strasse 52-54, D-76137 Karlsruhe
Tel. +49-721-93172-16
Fax +49-721-93172-22
Email: concepts@wibu.com

Standard Seminars: The seminars are one day long and are frequently held in our modern training rooms.		
WibuKey Starter	The quick way to understand the usage possibilities of WibuKey.	€ 399,- / Attendee
WibuKey Software Protection	An extension of the WibuKey Starter: it will explain several sophisticated security schemas and how they will be implemented.	€ 699,- / Attendee
WibuKey Content Protection	An overview how to use WibuKey to protect contents.	€ 499,- / Attendee
CodeMeter Starter	The quick way to understand the usage possibilities of CodeMeter.	€ 399,- / Attendee
CodeMeter for System Integrators	Special knowledge for system integrators, who have to install instances of CodeMeter Talk at licensor, collector and broker web services.	€ 699,- / Attendee
CodeMeter Software Protection	An extension of the CodeMeter Starter: it will explain several sophisticated security schemas and how they will be implemented.	€ 699,- / Attendee
CodeMeter Content Protection	An overview how to use CodeMeter to protect contents.	€ 499,- / Attendee
Combination Seminar	A seminar will be combined from standard contents and is strictly orientated on concrete requirements of the attendee.	€ 150,- / Hour
Daily Rate	Consulting by one of our consultant / senior consultant.	€ 1.200,- / Day and € 1.500,- / Day
All prices are without VAT and without probable cost for travel and overnight. Further details and appointment for 2008 you can find at http://www.wibu.de/trainings.php - you can also book your seminar there.		

Support Tips

CodeMeter Installer

We often get requests on whether it is possible to deactivate or activate this or that function in the CodeMeter installer. One helpful tool is Orca – a software product that is part of the Microsoft Windows Installer SDK to create and edit MSM and MSI packets. An alternative is the freeware Inno Setup.

If you just need some smaller modifications in the installer, for example removing the shortcut in the start menu or suppressing the installation of some specific files, Orca will be the right tool for you: Just open the CodeMeter msm file and delete the reference or file in the submenu Shortcut.

Orca lists the table structure of the Windows Installer (the former Microsoft Installer) which needs deeper knowledge on how such installer files work. We recommend reading the Orca documentation.

> **Hotline**
> **Germany: +49-721-93172-14**
> **USA: +1-800-6-GO-WIBU ext 31**

The tool Inno Setup (see www.jrsoftware.org/isinfo.php) is an open-source program which can be used to create installation files by defining scripts. This software is also free-of-charge for commercial use. The package contains a text editor for the script files with script language coloring and also contains many third party plug-ins.

Another very useful tool is the MSM/MSI 2 SS converter from Christopher J. Demers – it converted the CodeMeter installer file CmRuntimeMerger.msm into Inno Setup script file which explains all components. But it does not create a graphic user interface version for the Windows installer – this requires manual modifications in the script.

New CodeMeter API Functions

The latest CodeMeter version, 3.30, has some new functions in the CodeMeter API. Many fulfill wishes from our clients. For example, the well-known *CmAccess* function now has a new powerful sister function. It permits overwriting the "auto-cancel feature" global value for a specific protected application. This new time is then independent of the value, which the user could manually set, instead the 120 minute standard value. You can also restrict the lifetime of the handle to the license item in order to restrict the maximum runtime of an application.

The assignment of a license to a server can now be handled by a string in new credential structure.

The new *CmGetLastErrotText2* function returns the error text in ASCII or Unicode format; the auxiliary function CmConvertString permits the conversion of such texts into another format.

The new functions *CmGetRemoteContext2*, *CmSetRemoteUpdate2* and *CmListRemoteUpdate2* support ASCII and Unicode to specify file names. A flag controls the precise format of a string. The functions *CmGetRemoteContextBuffer*, *CmSetRemoteUpdateBuffer* and *CmListRemoveUpdateBuffer* have the same meaning as their counterparts *CmGetRemoteContext*, *CmSetRemoteUpdate* and *CmListRemoveUpdate* but use memory blocks instead file names.

Portable Use of CodeMeter-Protected Applications

Our CodeMeter technology allows you to start your application directly from the CmStick without any driver installation. Using the CodeMeter.ini configuration file, no "traces of usages" remain on the PC after the call and no CodeMeter specific registry entries are added or modified.

To use this portable option, you simply need the CodeMeter API client dynamic link library WibuCm32.dll (in windows\system32) and the CodeMeter Runtime Server CodeMeter.exe (in %ProgramFiles%\CodeMeter\Runtime\bin). Just copy both together with your protected application into the flash memory of a CmStick/M. If you start the protected application, CodeMeter.exe will be started automatically and the protected application can communicate with the CodeMeter Runtime Server.

WibuCm32.dll	CodeMeter API client library
WibuCm32.l**	Localization files for WibuCmd32.dll
CodeMeter.exe	CodeMeter Runtime Server
CodeMeter.l**	Localization files for CodeMeter.exe
CodeMeterCC.exe	CodeMeter Control Center
CodeMeterCC_**.qm	Localization files for CodeMeterCC.exe
CodeMeter**.wbb	ControlMeter WebAdmin for different localizations
CodeMeter.Ini	Configuration file of the CodeMeter Runtime Server

For a complete CodeMeter setup, you should also store a CodeMeter.ini file to the CmStick flash memory.

CodeMeter.ini

The CodeMeter.ini configuration file contains all CodeMeter Runtime Server settings.

To create a new CodeMeter.ini file, just create an empty text file with this name and store it in the same folder as CodeMeter.exe. If you start CodeMeter.exe, the standard settings will be written into the CodeMeter.ini file. The CodeMeter.ini file also contains all configuration changes from the CodeMeter Control Center or the CodeMeter WebAdmin.

Pay-per-Print with CodeMeter

VOGEL ♥
VERLAG HEINRICH VOGEL

The German publisher Heinrich Vogel Verlag was founded in 1935 and is today part of Springer Transport Media GmbH. It is one of the leading publishers for traffic control in Germany.

Mr. Stiegler, you decided to use CodeMeter one year ago. Would you make this same decision today?

It was the right decision then and we would do it again today. The trouble-free integration and the detailed and competent support from WIBU-SYSTEMS were very convincing for us.

Which facts were especially important during the selection of a software protection system?

Security and flexibility had the highest priority during the selection process. Also, WIBU-SYSTEMS was the only company in the branch which had done several Hacker's Contests – that says something for it. And during the feasibility analysis we detected the enormous flexibility of CodeMeter and enlarged the originally planned application area.

Beyond security and flexibility there is also the important fact that we work together with a German company which sells a reliable product with support as developer and producer.

How do you use CodeMeter today?

The use of CodeMeter proved exceptional with our product series "PC-Professional-MULTI-SCREEN", an education software product for driver schools.

CodeMeter was also predestined as pay-per-print solution for our product "Mobilform".

With the software we provide companies in the transportation industry several forms for printouts. The required usage units can be easily downloaded via CodeMeter from our online shop – and this 24 hours a day, 7 days a week, of course. That's why we get very positive feedback from our customers; especially the fact that the licenses are stored in the stick and are very portable was well accepted. By discontinuation of the online registration we could reduce 40,000 support calls on our site in the past year – that says something for it.

Especially to realize an online shop many different requirements have to be evaluated – was the integration difficult for you?

Absolutely not – we were very positively surprised. Due to very organized documentation, several prepared components and the competent support by WibuConcepts we could get quick results. An individual training day in the headquarters of WIBU-SYSTEMS did the rest.

Do you plan further projects with CodeMeter?

Absolutely! The extensive introduction of CodeMeter for our education program "PC-Professional-MULTISCREEN" will be completed soon. So far we have also offered an alternative product registration by phone, but due to our positive experience with CodeMeter we will drop this registration soon. The use with further product groups is planned.

Last but not least: We "detected" CodeMeter also for our internal use – our service and sales representatives use it for authentication into our database system and with few efforts we have also integrated CodeMeter into our enterprise resource planning system. For example, between the plug-in of CodeMeter to the printout of a packing slip we need only a couple of seconds.

"The trouble-free integration and the detailed and competent support of WIBU-SYSTEMS were very convincing for us".

Josua Stiegler
Project and Product Manager
Verlag Heinrich Vogel – Software Services

Briefly Presented

WIBU-SYSTEMS in USA

WIBU-SYSTEMS USA moved into its new office in "Harbor Square", a high-tech/service center park located in Edmonds, north of Seattle. The new office is at a central location and easy to reach.

The new address in USA:
110 W Dayton Street
Edmonds, WA 98020-7245, USA

WIBU-SYSTEMS in Spain

We are expanding our presence in Europe by opening an office in Girona, Spain in February. The successful Secure Code Seminars will be continued in March 2008 in Girona, followed by Lissabon, Madrid and Barcelona. We will attend the Infosec Iberia fair in June 2008 and will be an exhibitor at the SIMO 2008 fair in November, in Madrid. You can find all the events for Spain, the UK, Belgium and the Netherlands for 2008, on the Internet at www.wibu.co.uk/news-events.

The address in Spain:
C. Josep M. Gironella 1-3,
17003 GIRONA, Spain

WIBU-SYSTEMS in England

The office of WIBU-SYSTEMS Lt.d in England is moved from Stansted to Bletchley Park in Milton Keynes.

The new address in England:
The Mansion, Bletchley Park
Bletchley, MK3 6EB
Milton Keynes, United Kingdom
www.bletchleypark.org.uk

CodeMeter on all platforms

CodeMeter and Fortran

No problem. Do you have called out of your programming environment ever a function in another DLL? Then you can also integrate CodeMeter into your software. Anyway if Cobol, FoxPro, Fortran or … Last but not least: One of our customers uses CodeMeter with Salford FTN95 Fortran.

CodeMeter for Leopard

CodeMeter supports now Mac OS X 10.5 Leopard.

CodeMeter under Sun Solaris 86

CodeMeter supports now Sun Solaris 10 for Sparc and x86 platforms.

CodeMeter goes 64-bit Linux

64 Bit CodeMeter supports now 64-bit Linux with different distributions. You find details in the download area of our website or ask our technical support (+49-721-93172-14).

CodeMeter License Editor

The new CodeMeter License Editor shows FirmItems and ProductItems within a CmStick now in a graph, in a window. All programmable parameters of a CmStick can now be changed by this tool. The intuitive graphic user interface simplifies significantly the evaluation of the different Product Items and is an easy-to-use alternative to CmProducer and CmBoxPgm for small quantity or individual programming operations.

Picture: CodeMeter License Editor screenshot

Mittelstandsprogramm 2008

GOLD-SPONSOR
2008 **Mittelstands Programm**

The goal of the German Mittelstandsprogramm is to significantly increase the competiveness of small business companies through innovation. To further that goal, WIBU-SYSTEMS donates valuable awards with CodeMeter protection for standard software, for critical PDF documents, for selling of information as audio and video files or for the authentication in the Internet and to access of web services (Software as a Service, SaaS).

New WibuAsic 3507
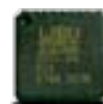
For integration on proprietary hardware and in industrial applications, the new WibuKey ASIC is available which supports a USB interface by default and which is compatible with WibuBox/U+. A tiny 32-lead QFN package with 7mm x 7 mm x 0.9 mm, the industrial temperature area of -40 to 85 °C and optional further interfaces, permits the use in many applications.

Pro-Protect: Innovation to Protect Against Product Piracy

Product piracy is becoming a bigger and bigger problem. Because software is such an integral part of the production process and the fact that the amount of software dedicated to handling innovation in process control and controlling production equipment is growing every year, product manufacturers are finding that whole production facilities are being illegally reproduced, with the sole purpose of producing counterfeit products. Pirates start with faked replacements parts then move to the rebuilding of complete production plants. A serious effort aimed at protecting such software and the increasingly digital production facilities from industrial espionage and outright theft is paramount.

The goal of the Pro-Protect project is to transfer existing solutions for software protection from the desktop computing arena into the production arena in order to achieve universal protection against the attacks of product piracy. This includes inhibiting not only the rebuilding of machines and components but also the production of faked products with original product files.

Förderkennzeichen 02PU1130

The German Federal Ministry of Education and Research (BMBF) supports a consortium of the FZI Forschungszentrum Informatik (research center) at University of Karlsruhe, the GIS Gesellschaft für Informatik und Steuerungstechnik mbH, the HOMAG Holzbearbeitungstechnik AG, the WIBU-SYSTEMS AG and the ZSK Stickmaschinen GmbH working on this project.

Further partner are invited to attend in this consortium. Application and further information see at the Internet www.pro-protect.de

Secure Code Seminar on the CeBIT fair in Hannover/Germany

2 hours full of know-how. Visit one of our seminars during CeBIT on March 6, 2008 from 14:00 to 16:00 (2 to 4 PM) in the Heidelberg room in the Convention Center.

Protection of .NET Assemblies by hard protection (45 minutes)
- Comparison of .NET and Windows applications
- Crack for everyone: How we find a serial number in .NET
- How the AxProtector for .NET works

License Management with CodeMeter (60 minutes)
- Difference License Models (single seat, per PC, per user, pay-per-use)
- Tips to realize with CodeMeter (backup licenses, overflow licenses and much more)
- "Share your key – share your costs": More than just a dongle

Questions and Answers

Visit us: Hall 6, K46

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We want to demonstrate to you solutions for your copy protection requirements. We want to answer your questions. Our experts are available for discussing all topics concerning the protection of software, documents, media and access. It will be our pleasure to talk with you!

5060-002-01/20080301

PERFECTION IN SOFTWARE PROTECTION

WIBU SYSTEMS