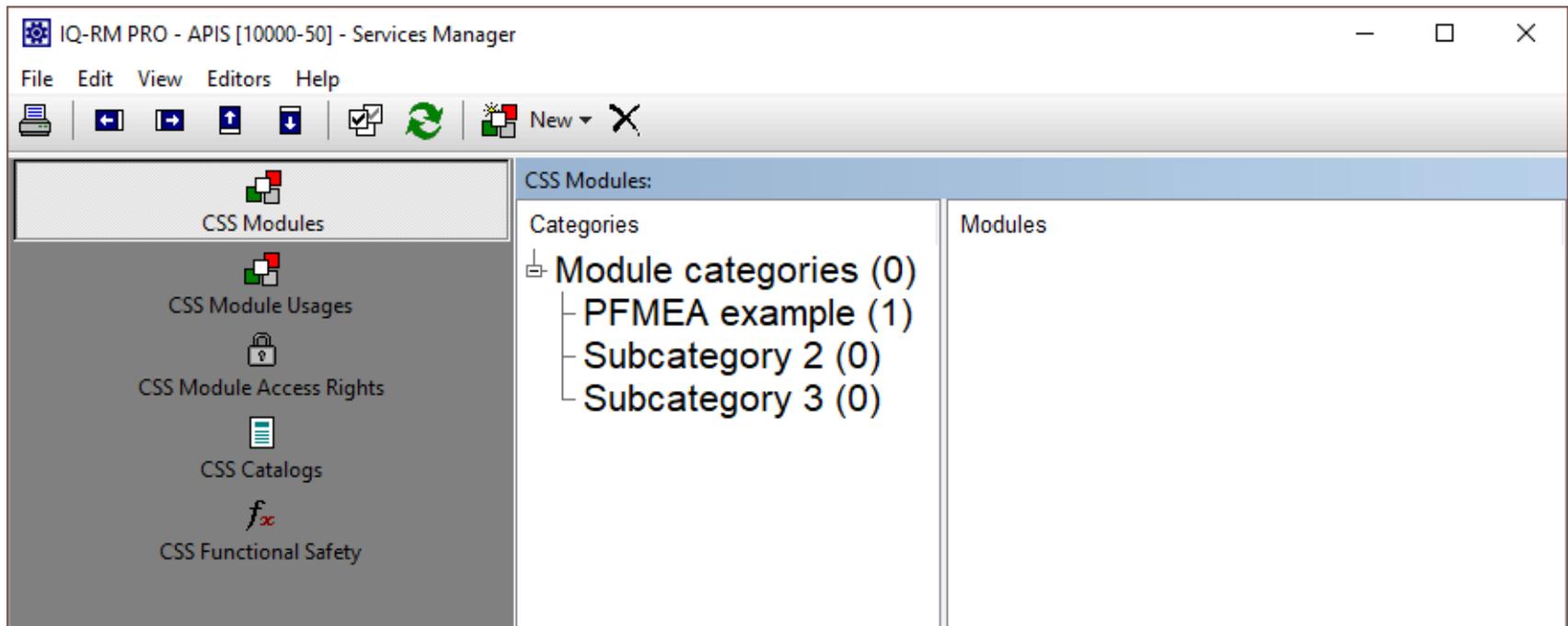


APIS
Informationstechnologien GmbH

The CARM Server



Across the world, more than 1500 customers use the APIS IQ Software to create robust FMEA's, implement DRBFM's and achieve Functional Safety. The range of editors from the Structure Tree, FMEA Form, to the Object Inspector allow the user to optimally view and edit important data efficiently. One not-so-obvious gem that is available from APIS is the [CARM Server](#). For IQ users who must coordinate with others to perform their FMEA's, this tool is a must have. So what is it?



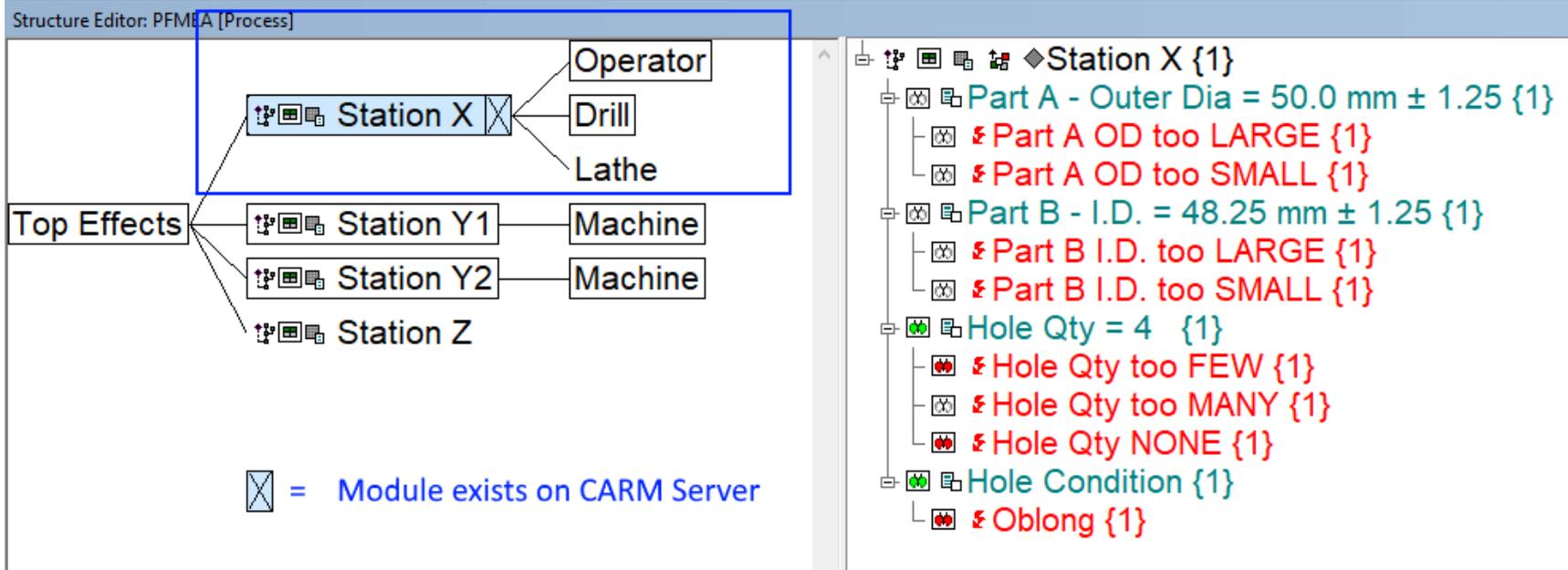


Since its introduction in 2002, The CARM Server (Computer Aided Risk Management) has served as an external location (server) to save modules and catalogs and enable users to always remain up-to-date with changes happening in multiple locations. “Modules” can be an entire structure of an FMEA (with or without its variants) or simply a part of that structure.

CSS Modules

In the image below, the process element “Station X” has been uploaded to the CARM Server. You can recognize a “module” by the icons  and .

When you upload a module to the Server (select IQ object -> right-click “CSS Modules” -> Module upload), all of its dependent objects (i.e. “Operator”, “Drill” and “Lathe”) are also transferred.



The module is then sorted into a subcategory on the server (for easier reference) and is assigned a version number.



IQ-RM PRO - APIS [10000-50] - Services Manager

File Edit View Editors Help

CSS Modules

CSS Module Usages

CSS Module Access Rights

CSS Catalogs

CSS Functional Safety

CSS Modules:

Categories

- Module categories (0)
 - PFMEA example (1)
 - Subcategory 2 (0)
 - Subcategory 3 (0)

Modules

- Version 1 Station X (approved)

Now that the module exists on the server, it can be downloaded by all users from any location (users with granted access only). Lets say that one of the users now makes some important changes to this module and subsequently uploads their version to the server.



CSS Modules:

Categories	Modules
[-] Module categories (0)	[-] Version 1 Station X (approved)
PFMEA example (1)	[-] Version 2 Station X (approved)
Subcategory 2 (0)	
Subcategory 3 (0)	

This new version is immediately available to all clients and they can be notified via email of the updated version. They can then decide whether to accept the newer version from the CARM Server or stick with the current one in their .fme file. Furthermore, it is also possible to compare the differences of the two versions by right-clicking on the module within the .fme file and selecting “CSS Modules -> Compare module”. If necessary, **Admin** can also choose to edit the status of the uploaded version, changing it to “not up-to-date”, “not approved” or even “rejected”: (select module version -> right-click “Properties”):



Module: Station X

Name Note Info User Module information

Language: English

Name:
Station X

Item code:

Number: Version 2

Status

- approved
- not approved
- rejected
- not up-to-date



Upload an entire FMEA structure as a Module

1. If necessary, an entire structure can be uploaded to- or downloaded from the server. A user with access can then download this into a new or existing fme file in just a few simple steps.
 2. A structure with its variants or simply a variant as its own module can be uploaded in the same respect.
- Note: When downloading a module variant into an .fme file, it becomes its own module and not a variant.



The screenshot shows the APIS software interface. The menu bar includes File, Edit, View, Administration, Editors, CARM Server, Consolidation, Tools, Window, and Help. The 'Administration' menu is open, showing options like 'Remote configuration', 'CSS modules', and 'Disconnect from CARM server'. The 'CSS modules' sub-menu is also open, highlighting 'Upload structure as module'. The main workspace shows a 'Structure Editor: PFMEA [Process]' with a diagram. The diagram consists of a central box labeled 'Top Effects' connected to three boxes: 'Station Y1', 'Station Y2', and 'Station Z'. 'Station Y1' and 'Station Y2' are connected to a box labeled 'Machine', which is in turn connected to a box labeled 'Lathe'. The interface also includes a toolbar with various icons and a left-hand sidebar with additional tool icons.

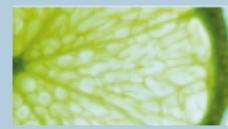


CSS Catalogs

The CARM Server is also used as a decentralized storage location for saving Catalog entries. The reasoning behind the “Catalogs” is to create a library of terms that users can reuse any time without having to think of new names for objects. This also means that within a company, there is a certain uniformity when it comes to all their FMEA documents. Naturally, this leads to less confusion when reading and interpreting a file and less money wasted on unnecessary translations. The CARM Server allows users to upload and download the names of e.g. process/product elements that already exist across departments/company locations. Furthermore, this applies to all the languages that are used within the FMEA.

Example 1: Select the product characteristics available from the CSS Catalogs (on the Server) and import them into the local .fme file.

1. Highlight one or more elements in the list on the server (Ctrl + left mouse button).



IQ-RM PRO - APIS [10000-50] - Services Manager

File Edit View Editors Help

Product character

CSS Modules

CSS Module Usages

CSS Module Access Rights

CSS Catalogs

CSS Functional Safety

CSS Catalogs:

Server: Product characteristics types

- Hole Condition
- Hole Qty
- Part A - Outer Dia
- Part B - I.D.
- Screw Quantity

Client: Product characteristics types

2. Drag and drop them into the “client” side and release the mouse button.



IQ-RM PRO - APIS [10000-50] - Services Manager

File Edit View Editors Help

Product character

CSS Modules

CSS Module Usages

CSS Module Access Rights

CSS Catalogs

CSS Functional Safety

CSS Catalogs:

Server: Product characteristics types

- Hole Condition
- Hole Qty
- Part A - Outer Dia
- Part B - I.D.
- Screw Quantity

Client: Product characteristics types

- Hole Condition {0}
- Hole Qty {0}
- Part A - Outer Dia {0}
- Part B - I.D. {0}
- Screw Quantity {0}

3. Close the Services Manger and from within the .fme file, go to “Administration -> Catalogs”.



IQ-RM PRO - APIS [10000-50] - Data Manager

File Edit View Editors Tools Help

Catalog: Product characteristics type: ▾

Catalogs: Product characteristics types [Document1]

Product characteristics types

- ▢ Hole Condition {0}
- ▢ Hole Qty {0}
- ▢ Part A - Outer Dia {0}
- ▢ Part B - I.D. {0}
- ▢ Screw Quantity {0}

Teams and persons

Symbolic responsibilities/...

Requestors

Catalogs

Example 2: Select the product characteristics via the Input Collector

1. Open the Input Collector and select “Catalog | Load CARM Server catalog” or click on the icon in the toolbar.

Product characteristics - Input collector with catalog

Input Edit Catalog Help

Load CARM Server catalog

- ⚙️ Provide supply voltage and ground to the vacuum sensor
- ⚙️ provide circuit functionality
- ⚙️ Provide short to GND/VBAT and OPEN detection for sensor supply
- ⚙️ Provide short to GND/VBAT/Neighbor Pins and OPEN detection for SENT1/2 signal
- ⚙️ Provide SENT interface for Vacuum value raw
- ⚙️ Provide short to GND/VBAT/Neighbor Pins and OPEN detection for analog1/2 signal
- ⚙️ Provide analog interface for Vacuum value raw
- ⚙️ Acquire Value of Vacuum Sensor

>> All structures <<

DetermineVacuumValue Match off 0

2. Select the elements and drag and drop them above.

Product characteristics - Input collector with catalog

Input Edit Catalog Help

✕ ⬆ ⬇ Catalog: 📄 📁 ⚙️ { } 📄 T 🗑️

- ⚙️ Provide supply voltage and ground to the vacuum sensor
- ⚙️ provide circuit functionality
- ⚙️ Provide short to GND/VBAT and OPEN detection for sensor supply
- ⚙️ Provide short to GND/VBAT/Neighbor Pins and OPEN detection for SENT1/2 signal
- ⚙️ Provide SENT interface for Vacuum value raw
- ⚙️ Provide short to GND/VBAT/Neighbor Pins and OPEN detection for analog1/2 signal
- ⚙️ Provide analog interface for Vacuum value raw
- ⚙️ Acquire Value of Vacuum Sensor

- 📄 Hole Condition {0}
- 📄 Hole Qty changed {0}
- 📄 Part A - Outer Dia {0}
- 📄 Part B - I.D. {0}
- 📄 Screw Quantity {0}

>>> APIS CARM-Server - Product characteristics types

DetermineVacuumValue Match off 5



CSS Functional Safety

This part of the CARM Server runs slightly differently to that of CSS Modules. Here, Admin can upload Functional Safety strategies to the CARM Server. See example of multiple strategies in the below image along with their components, calculation formulars, descriptions and other information:

Note: These strategies are Siemens SN 29500 and can be purchased as a license.



- CSS Modules
- CSS Module Usages
- CSS Module Access Rights
- CSS Catalogs
- CSS Functional Safety

CSS Functional Safety:

Calculation strategy

- SN29500-02: Expected values for integrated circuits (Edition 2005-11)
- SN29500-03: Expected values for discrete semiconductors (Edition 2005-11)
- SN29500-04: Expected values for passive components (Edition 2005-11)
- SN29500-05: Expected values for electrical connections, electrical components (Edition 2005-11)
- SN29500-07: Expected values for relays (Edition 2005-11)
- SN29500-09: Expected values for switches and buttons (Edition 2005-11)
- SN29500-10: Expected values for signal and pilot lamps (Edition 2005-11)
- SN29500-11: Expected values for contactors (Edition 2007)
- SN29500-12: Expected values for optical components (Edition 2005-11)
- SN29500-15: Expected values for electromechanical protection devices (Edition 2005-11)

Component

- bipolar
 - CMOS, BICMOS
- Operational amplifiers, comparators and voltage monitors
 - bipolar, BIFET
 - CMOS
- Power amplifiers and regulators (all technologies)
 - <= 1 Watt
 - > 1 Watt
- Reference elements (all technologies)
- Switched regulators (all technologies)
- Application-specific integrated circuits (ASICs)

Calculation formula

Calculation formula

$$\lambda_{ref} \exp(C3 \cdot ((U/U_{max})^{C2} \cdot U_{ratio}^{C2})) \cdot ((A \cdot \exp(Ea1 \cdot 11605 \cdot (1/T_{Uref} - 1/T2))) + (1-A) \cdot \exp(Ea2 \cdot 11605 \cdot (1/T_{Uref} - 1/T1))) / ((A \cdot \exp(Ea1 \cdot 11605 \cdot (1/T_{Uref} - 1/T1))) + (1-A) \cdot \exp(Ea2 \cdot 11605 \cdot (1/T_{Uref} - 1/T1)))) \cdot \pi D$$

Material constant definition

Constant	Definition list	Description
C2	4.4	
C3	1.4	
Uratio	0.7	Voltage ratio Uref / Umax (reference voltage / rated voltage)

Variable definition

Variable	Unit	Description
U	V	Operating voltage
Umax	V	Rated voltage

Possible values of the selection variable

	No data available
--	-------------------



A client now has access to all of these calculation strategies from within their .fme document. In the example below, the Failure in time rate will be calculated for a system element.

FMEDA form: Structure: ??? (created by Xml-Import) [System]

No.	System element	FIT	Function	Failure mode	C	% Distr.	FM FIT
			FMEDA form C:\Users\daadam10\Desktop\Circuit_				
Total FIT: 0.0000				Total FM FIT: 0.0000			
No.	System element	FIT	Function	Failure mode	C	% Distr.	FM FIT
1.1.1	◆ Components {6}	0.0000	  provide circuit functionality {6}	[Components] 1.1.1.a.1   Capacitor_121 failure {1}		0.00	0.0000
				[Components] 1.1.1.a.2   IC_XXX failure {1}		0.00	0.0000
				[Components] 1.1.1.a.3   Capacitor_122 failure {1}		0.00	0.0000



With the system element selected, right-click and select “Determine component type and fit value...” (Ctrl + T).

Total FIT: 0.0000		Total FM FIT: 0.0000					
No.	System element	FIT	Function	Failure mode	C	% Distr.	FM FIT
1.1.1	◆ Components (6)	0.0000	provide cir-	[Components]		0.00	0.0000
						0.00	0.0000
						0.00	0.0000
1.2.1	◆ Component:					0.00	0.0000
						0.00	0.0000

New >

- Functions...
- Product characteristics...
- Process characteristics...

Properties... Alt+Enter

Delete... Delete

Copy Ctrl+C

Paste Ctrl+V

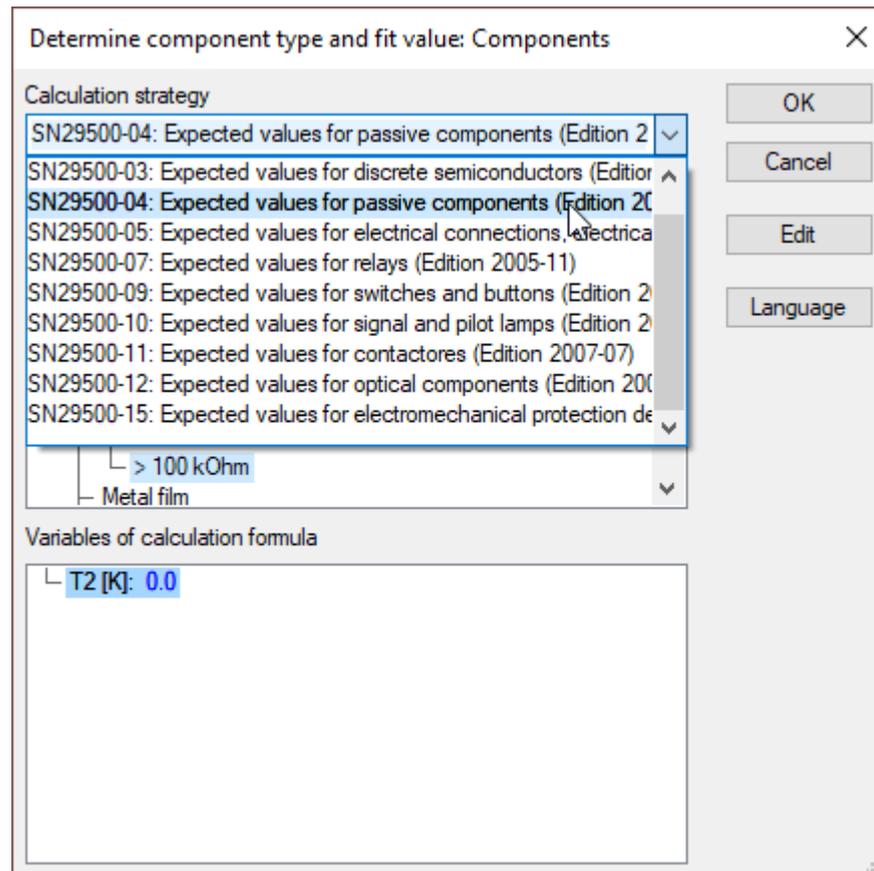
Determine component type and fit value... Ctrl+T

Classification...

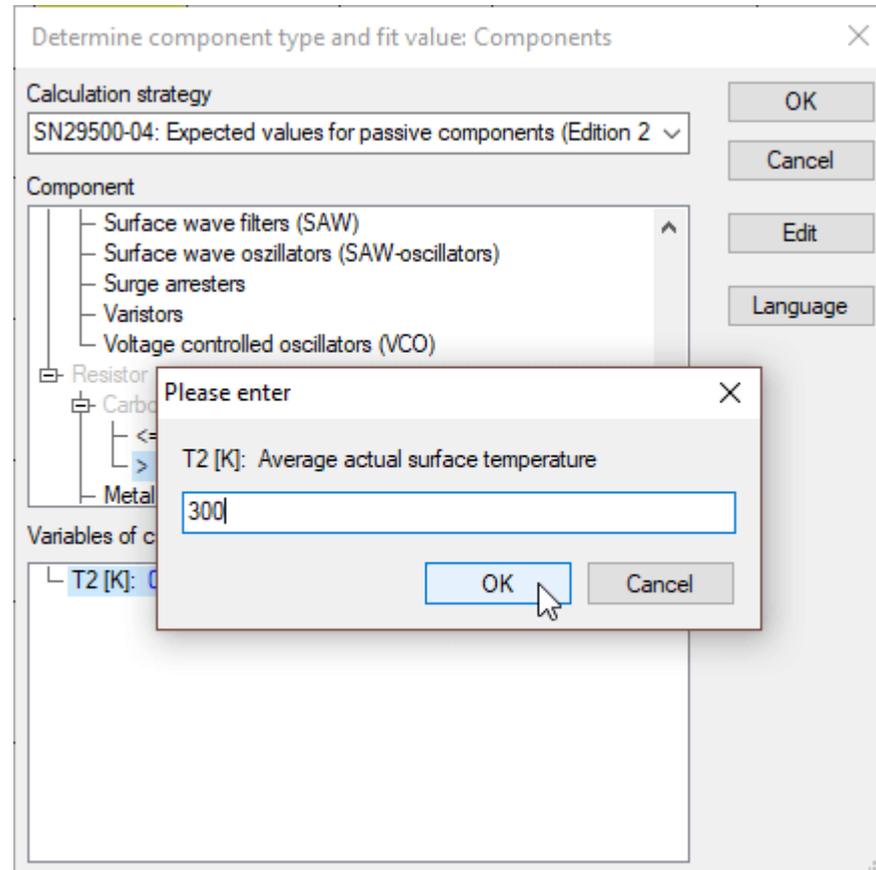
Edit notes... Ctrl+B

Functional Safety parameters...

The required calculation strategy can be selected



And a value entered for the e.g. surface temperature. Then click “OK”.





The FIT value has now been calculated.

Total FIT: 0.5222			Total FM FIT: 0.0000				
No.	System element	FIT	Function	Failure mode	C	% Distr.	FM FIT
1.1.1	◆ Components {6}	0.5222	🔧 provide circuit functionality {6}	[Components] 1.1.1.a.1 🚫 ⚡ Capacitor_121 failure {1}		0.00	0.0000
				[Components] 1.1.1.a.2 🚫 ⚡ IC_XXX failure {1}		0.00	0.0000
				[Components] 1.1.1.a.3 🚫 ⚡ Capacitor_122 failure {1}		0.00	0.0000
1.2.1	◆ Components {6}	0.0000	🔧 provide circuit functionality {6}	[Components] 1.2.1.a.1 🚫 ⚡ Resistor_120 failure {1}		0.00	0.0000



Administrator settings:

Only one administrator can be set for each CARM Server License. The Administrator determines certain settings including

- email notifications of updated modules
- the status of module versions (i.e. approved, not approved, rejected, not up-to-date)
- creation of backups
- Email settings
- more....



CARM-Server: CARM Server configuration

General E-mail CSS modules CSA Web Publisher CSA PDF Publisher CSA PDF Reporting Backup

Notify module users on updated module by e-mail

no e-mail notification
 Notify module users of previous version
 Notify module users of all previous modules

Set previous version to 'not up-to-date' when a newer approved module is uploaded
 Allow branching of module version chain

Default status for uploaded modules

Use default status

approved
 not approved
 rejected
 not up-to-date

Change WEB password...

CSS Module Access Rights

Access rights for module categories (requires restart of server and clients)

Certificate e-mail default text

Create certificate immediately on request

OK Cancel Help



Security

Only users who have been granted certificates from the Administrator can gain access to the modules, categories or FS strategies on the CARM Server. They must use a valid password to login.

For more information on the CARM Server and how your company can benefit from using it, please contact us at info@apis.de