
Summary

- The *APIS CARM-Server* is a supplement to the APIS IQ-Software. The IQ-Software also functions in the well-known way without the server.
- The Client-Server solution is a contemporary, robust solution and is nowadays part of the best practice in software engineering.
- The *APIS CARM-Server* has four central functionalities:
 1. Administration
 2. Web-Interface
 3. Interfaces
 4. Agents
- Information is always transferred into the knowledge database under the control of the person responsible for the project.
- The *APIS CARM-Server* is protected against unauthorized access.
- The *APIS CARM-Server* can be modularly equipped with Services (CSS) and Agents (CSA). Therefore, only the functionalities which are also needed have to be acquired.
- Normally, no additional hardware is needed.
- The availability of the clients is independent of the availability of the server.

APIS IQ-Client

Users of the APIS IQ-Client software (APIS IQ-FMEA, APIS IQ-RM, etc.) can store data in a file. This file or database is stored as an FME file under operating system control. Working on even complex interconnections of knowledge is possible by means of a comfortable and intuitive user surface.

Almost all requirements with regard to the re-use of knowledge, central controlling etc. can be fulfilled with the client software alone. For each task, there are specialized tools or views, by means of which a user can fulfill the tasks in question.

Nevertheless, there is the wish for functionalities which would not be positioned correctly on the client side. This is why the CARM-Server has been developed.

CARM-Server Functions

The APIS CARM-Server is a server aligned to communication with the APIS IQ-Client software. The APIS CARM-Server has four central functionalities with which the functionality of the client software is supplemented:

1. Administration
2. Web-Interface
3. Interfaces
4. Agents

The APIS CARM-Server is an active server. This means that the server software supplied by APIS is started on a server computer after installation and runs permanently. The server must naturally be available for the moment of the use from the work station on which the IQ-Client software is running.

However, there is no dependence on the server. The client software can be independently used itself, actions in connection with the CARM-Server can be started at times which the user defines.

The CARM-Server supports the following clients:

- IQ-Client: each extension level of the APIS IQ-Tools can obtain information from the CARM-Server and include it in documents
- IQ-Administration-Client: these are used for administration of the CARM-Server
- Web-Client: each Internet-Browser can call information from the CARM-Server

So that a client can make contact to the server, it only needs to know the web address of the server in the Internet / Intranet. Access authorizations to directory structures are not necessary. In order to protect the knowledge database against unauthorized access, a certification of the client is done in the first access to the server.

Note: If the client software is used alone, the "Administer" function is supported via the operating system or a document management system. The Web-Interface function can be realized by the HTML-exports or with the Web-Publisher. In the interface functionality, the variety of the existing export and import interfaces must be mentioned. Here, the server provides an additional support, which would not be possible otherwise, in all the areas.

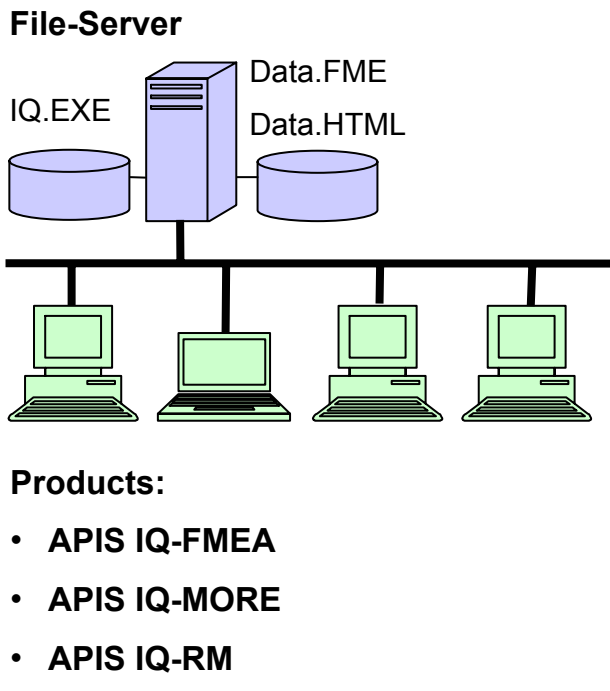


Fig. 1: The APIS-IQ client software

Advantages:

- **Methodology according to QS-9000 and VDA**
- **Integrated approach without redundancy**
- **Integration Features**
 - Workflow
 - Document Management
 - OS Storage, Backup, ...
- **High performance Windows Application**
- **Robust, safe data handling**
 - OS based storage concept
- **Reusable knowledge module under user control**

Function 1: Administration

With the library functionality, information to be stored centrally is administered for decentralize use. The information can be various units:

- (knowledge) modules
- measures with responsible people and deadlines
- catalogues for functions, faults, consequences, causes, preventive and detection action.

Function 2: Web-Interface

The Web-Interface shows the information stored on the CARM-Server in a view which the user knows, without him having to start or operate an IQ-Software for looking at it.

Function 3: Interfaces

As a matter of principle, exchange of data to other applications can be via neutral data formats. The client software supports standardized interfaces (SGML and XML). Whenever exchange of data to other databases is to be automated over and above this, this functionality is no longer sensibly positioned on the client side. The exchange of data can be handled better via the CARM-Server. The user of the IQ-Client software will notice practically nothing or very little about the technical process. This has the advantage that one only has to concern oneself with the commissioning and support of the interface at one central place.

Function 4: Agents

Recurring tasks can be automated by agents. This is particularly important if a person-independent, reliable, error-free and close-to-the-moment processing of certain tasks has to be ensured.

A contemporary approach for knowledge management

The document-centered approach of the APIS IQ-Software has proven its worth in practice and provides many advantages for practical work. The APIS IQ-Software has now been supplemented by a further concept with the CARM-Server, which supports knowledge management in an equally optimal way without relinquishing the benefits of document-centered working.

Although the possibility of having drives and directory structures searched through for IQ-documents with certain FMEA knowledge has been in existence on the client side for some time with the IQ-Explorer, this approach does result in some limitations, because

- it also finds information which perhaps is not to be made accessible to the public at all
- it can only search paths to which the person searching has access in the network
- it does not support an active notification mechanism if relevant search results are amended.

APIS CARM-Server

Fig. 2: The APIS CARM-Server

All these limitations have been solved with the APIS CARM-Server. This contemporary architecture is based on the technologies of the Internet / Intranet (TCP/IP and HTTP), thus guaranteeing future security and also investment protection. In combination with the IQ-Explorer, the APIS IQ-Software thus opens up a new quality dimension in knowledge management.

Services (CSS) and agents (CSA)

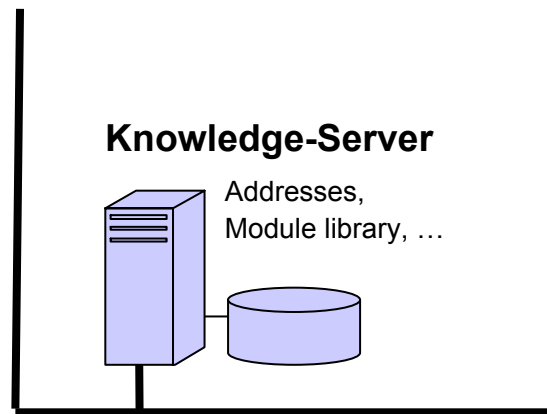
Something which sounds so mysterious is quite simple to explain:

Services or, completely, CARM-Server Services (CSS) are Server-Services which are waiting to be addressed from the IQ-Client. If the client makes contact, a CSS will attend to the task immediately and, for example, answer the question of whether there is a module for a part number and, if applicable, forward it to the IQ-Client.

Agents or CARM-Server Agents (CSA) are Server-Services which are given their tasks by an administrator and then work in the background on the basis of their task. For example, an agent can monitor a stock of data and inform actively if a deadline is exceeded.

Information Push / Pull

The APIS IQ-Software supports project-orientated working in that a piece of information is always under the control of the clerk responsible. That is to say, if a new piece of information is to become a standard in the company, either the person who produces this information can transfer it to the server or a central function (this



More advantages:

- **Controlled, central stored and managed knowledge modules**
- **Web-Interface**
- **Interface to external systems**
- **agents**

could also be an agent working automatically) transfers the information to the server. However, this is only possible if the access limitations of the operating system do not put a block on here. If the information is actively transferred to the server, we talk about an information push; if the information, e.g. FMEA, is analysed, filtered from the amount of information stored and then taken to the server, this is an information pull. The important thing is that the original information never disappears or is amended if this is not required.

If there are a number of users of a centrally administered information unit, amendments mean that:

- users / interested parties are informed,
- project status are checked as regards their topicality and
- current information is included in projects.

Here too, work can also be done according to the push or pull principle, just like in real life. If something new is available, this information can be distributed (push principle) or collected (pull principle). Easy-to-understand analogies in the customary environment are:

- Wall clock and alarm clock: you look at the wall clock if the "time of day" information is to be collected (= pull principle) and by signaling, the alarm clock gives us the information that waking time has been reached (= push principle).
- Bulletin board and circular by e-mail: information put on the bulletin board is read deliberately (= pull principle) and the e-mail circular appears in the mailbox without request (= push principle).

Modular equipment of the server

As not every user wishes to have the same functionality or to pay for the entirety of all the functionalities, the CARM-Server has been given a modular structure. In principle, there are two components, the CARM-Server and the functionalities to be found in the CSS and CSA (CSS = CARM-Server Service, CSA = CARM-Server Agent). The following CARM-Server modules are available:

- CSS Administration
- CSA Notification
- CSS Module
- CSS Action Tracking
- CSS List
- CSA Web-Publisher

CSS Administration

After the installation of the CARM-Server, certain basic settings can and must be done on the server. Amongst other things, password protection can also be set, with the result that the available administration functionalities can no longer be used by an arbitrary IQ-Client. Further tasks in connection with the administration are:

- certification of client computer in first access
- stipulation of the password for access via the Web-Interface
- basic setting of the module library (approval, blocking and deletion)
- basic setting of the CSA Notification
- basic setting of the CSA Web-Publisher

CSA Notification

The central notification agent ensures that the information-push works. For example, the responsible employees can be asked for a feedback on a measure before a deadline is exceeded.

CSS Module

The APIS CARM-Server Service Module (CSS Module) is a service with which knowledge modules are administered and their use in projects is organized. In the module library, there can be a number of generations of modules in various states, in particular in the unprocessed, approved and withdrawn (blocked) states.

The configuration of the Web-Interface stipulates which information from the "module library" is available for viewing and in which form.

CSS Action Tracking

The APIS CARM-Server Service Action Tracking (CSS Action Tracking) is a service with which measure deadlines are administered and their control is enabled. In this

way, there is the possibility of a central follow-up of measures.

The configuration of the Web-Interface stipulates which information from the central deadline data stock is available for viewing and in which form.

CSS List

Access to catalogues for all possible object types required in working with clients is supported by the CSS List. Here, approved collections of, for example, error causes with avoidance and discovery measures etc. can be found.

These selection lists can be used in the IQ-Client via the collect input. In this way, a connection of company-wide catalogues is guaranteed.

CSA Web-Publisher

If a defined set of web sites is to be placed on an Intranet server already in existence in the company, the analysis of the documents in question can be automated, as can the transfer to the Intranet. Unlike the web interface, not only information placed on the CARM-Server is made accessible via a Web-Browser, but all the documents which can be evaluated by the agent are scanned. Also, some views not contained in the standard web interface are also available.

System prerequisites

The APIS CARM-Server is a software which can run on a server already in existence. For specific requirements, the use of a dedicated server is recommended.

- Operating system Windows NT, Windows 2000, Windows XP
- Pentium III processor better than 500 MHz
- Working memory 512 MByte
- Hard disk data-dependent (typ. 1 GByte)
- TCP/IP network connection

Server capacity is dependent on accesses (a dedicated server is typically not necessary)