

Client Application Manager for IBM i

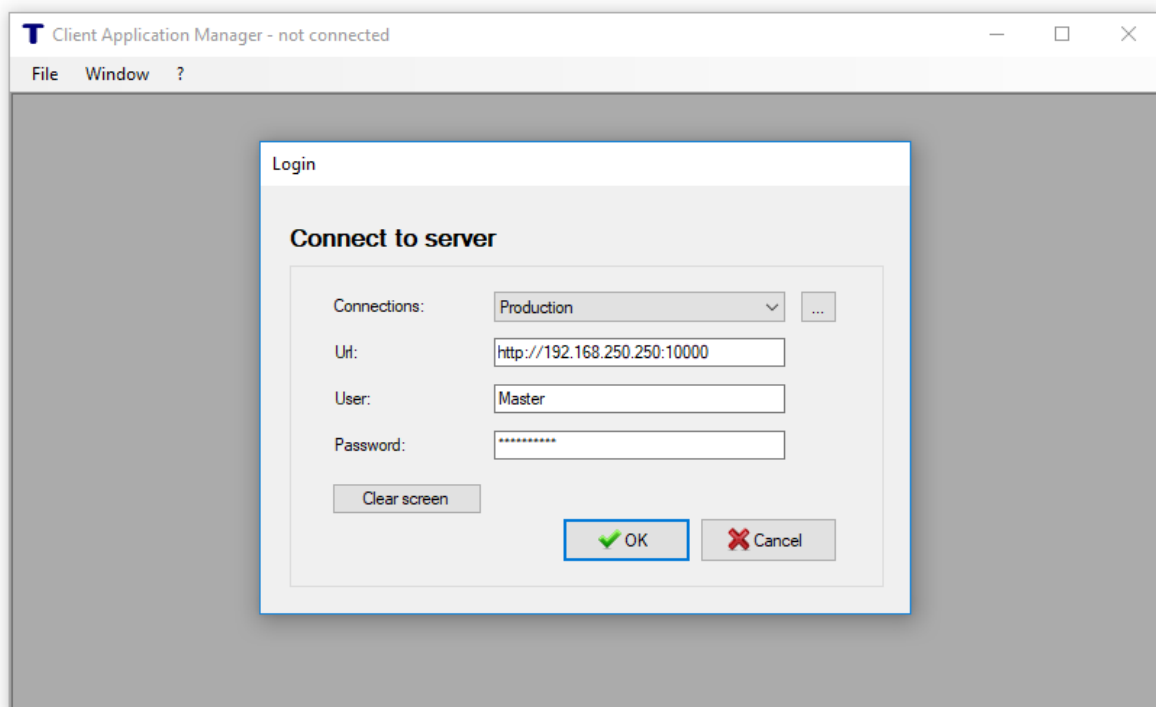
The modernization of legacy applications on the IBM i (AS/400) is a central topic for all IT managers who are active in this environment. A central focus is the modernization of the client applications, with a strong desire for a more modern graphical user interface.

The majority of products and solutions on the market employs the browser as the new frontend. But is this really appropriate for business applications like an ERP system? The complex and multilayered technology stack for such an application can be very challenging to implement, while introducing multiple points of failure and new security risks.

A technological alternative is the implementation of client applications using the .Net Framework and C# as a programming language. With these technologies we have built a base-application which we would like to introduce to you.

An overview of CAM4i

- The **Client Application Manager** is a modularly extensible client-server-application
 - The Windows Client offers a modern GUI.
 - Basic functionalities like Session-, User-, and Rights- Management are already implemented.
 - For further tasks plugins can be developed. CAM4i administrates the customers plugins.
 - The communication with business logic on the IBM i is handled by webservice.
 - It is possible to integrate existing functionality on the IBM i.



CAM4i in detail

The main purpose of CAM4i is offering a frame application into which new functionality, in the shape of form based dialogues, can be easily integrated. Basic functionality like Login-, or Rights Management are handled by CAM, the customer can concentrate on implementing plugins.

The most important features are:

- A Windows application for executing and managing plugins
- Communication with the server through webservices
- Server components implemented in RPG (no Java necessary)
- Integration and re-use of existing RPG programs
- IBM i user accounts can be used for authentication
- LDAP connection
- Session Management

Functionality, Technology and Architecture

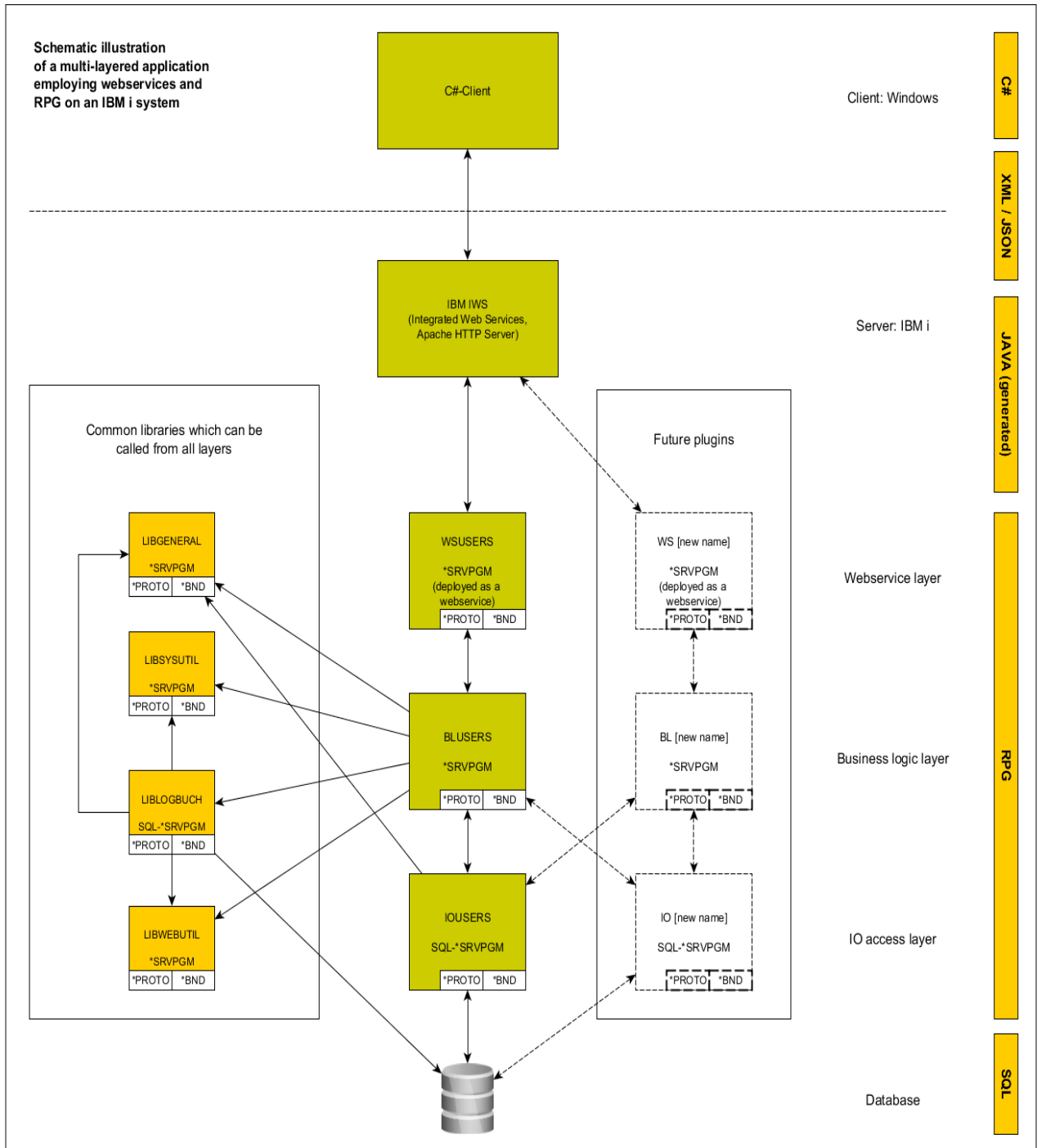
The „Client Application Manager“ (CAM4i) is in principle a typical MDI-Application, where Cam.exe, as the frame application, makes the MDI container available and loads the MDI-Children (plugins) dynamically out of .dll files. The plugins are developed in C#.

The CAM4i server on the IBM i has a database in which descriptive information for the functionalities (system preferences), user management, as well as Plugin- and Rights- management are stored.

The framework application and the plugins use webservices to communicate with the server. To allow this, the corresponding endpoints must be handled by an application server on the IBM-i. The application server used is the Integrated Web Services Server by IBM, which is delivered together with the IBM i. The main advantage of using an IWS-Server is that the webservice programs can be built in RPG. Therefore the entire server-side infrastructure can be programmed in RPG, which eases the integration and communication with existing RPG applications .

The RPG programs are all implemented as service programs (*SRVPGM), so their procedures can be called from the entire application. This approach enables the use of a multi-tiered architecture. The highest layer handles communication through webservices, while the lowest layer accesses the database using SQL.

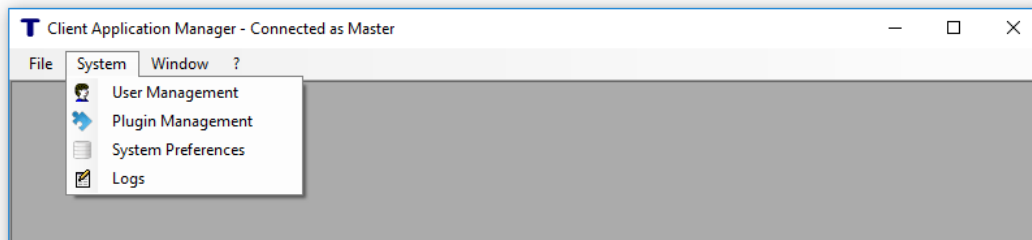
The following illustration shows the individual layers. The green boxes and their connections represent webservice calls which are passed through the layers. The three lowest green boxes together, form the server-side plugin. On the right margin the corresponding programming languages or communication protocols are marked. Relevant for the developers are the central languages RPG and C#.



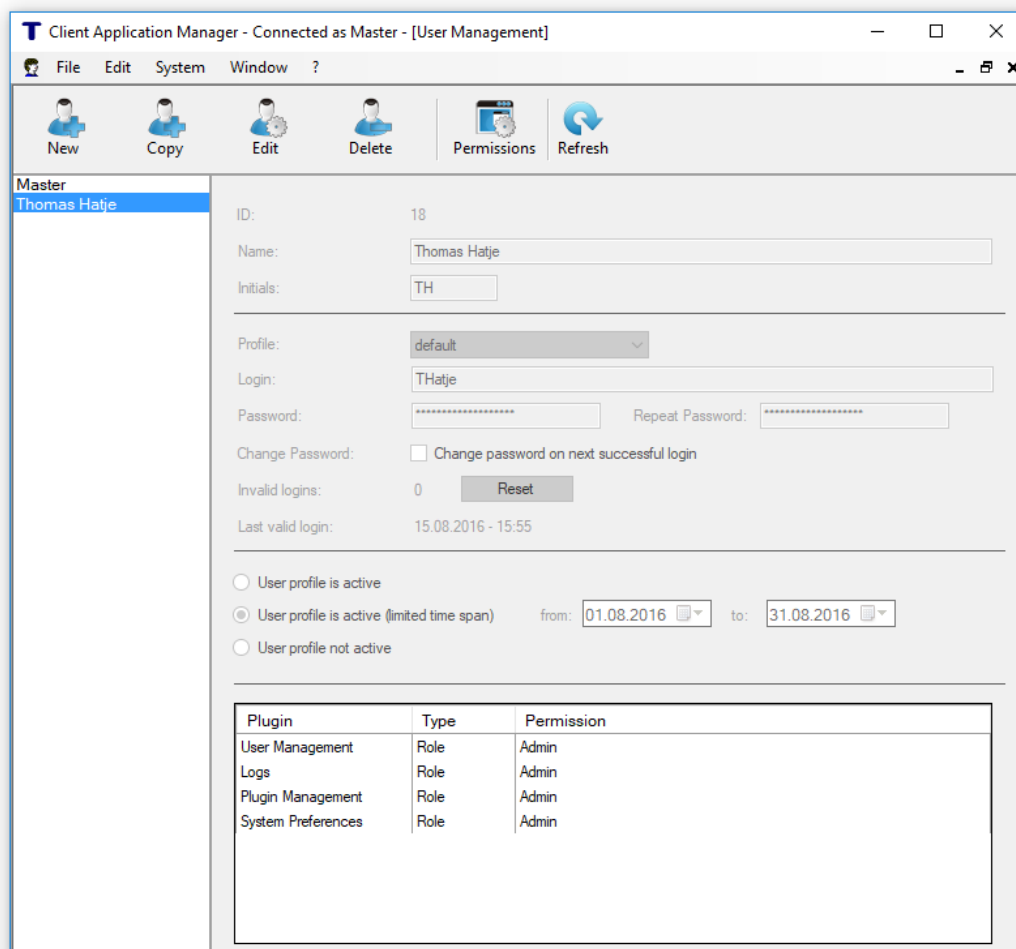
Enhancing functionality through plugins

The functionality of CAM4i can be extended modularly through plugins. These can cover all imaginable requirements towards Windows- or IBM i applications. Some typical examples would be management of data, order entry or data visualization. The communication with the server (IBM i) happens through pre-defined interfaces.

The installed plugins are arranged neatly in the main menu:



Example: The Plugin „User Management“



Due to the Client running on Windows it is possible to develop plugins which do not communicate with the IBM i, but handle tasks in the Windows environment (for example: displaying PDF documents, processing local data, communication with external systems through FTP, HTTP, etc.).

Scope of delivery

- a) Client: Windows application
- b) Server: IBM i Objects and Database
- c) Plugins:
 - **User and Rights Management:** The authentication of users is possible through the internal CAM4i Database, as well as by using already existing IBM i user accounts or an external LDAP server.
 - **Plugin Manager** for easy integration of new plugins
 - **Logs** allows administrators to supervise processes happening inside the plugins
 - Global configuration options for **System preferences**
- d) Extensive documentation to support the development of plugins.