BTC AG has developed an advanced meter management system for the energy industry that is based on InterSystems Caché® high performance database system.

With headquarters in Oldenburg, Lower Saxony, BTC Business Technology Consulting AG is a consulting firm that operates internationally. The company has more than 1,600 employees throughout the world that are active in a variety of areas – from process consulting, to system integration and system management, to IT system support in their outsourcing operation. One of the company’s focuses in the industry is the energy business. Here, BTC AG plans, develops, and operates software solutions that cover the complete process chain.

In 2009, BTC was searching for a powerful database for a new, innovative solution in the area of Smart Metering, the BTC AMM (Advanced Meter Management). “BTC AMM is part of the BTM Smart Metering Suite. The solution covers all requirements that will result through the future massive rollout of smart meters,” explained Dr. Stefan Baier, Management Consultant at BTC AG. “It enables the configuration, control, and monitoring of smart meters as well as the acquisition and high-performance preparation of mass data. One critical challenge we had to master up front dealt with the mass data efficiency in communicating with smart meters and the storage and processing of measured time series.” A cooperative arrangement between BTC and InterSystems began in the spring of 2009, with the objective of developing and testing a time series management system based on InterSystems Caché®.
The challenge: storing and processing mass data quickly and continuously
The draft of a European “Directive for Energy Efficiency” dated 6/22/11 intends to have every German citizen lower their energy consumption by 1.5% per year. The amendment to the Energy Industry Act (EnWG) and Metering Access Ordinance (MessZV) includes plans to provide German household energy consumers with functions comparable to those offered to special contract customers: through load-variable rates, load course acquisition, and the visualization of energy consumption, end consumers should be able to control their consumption patterns with greater awareness and lower energy consumption.

To implement the objectives of the EU and German Federal Government, 80 percent of all households in Germany will be equipped with smart meters by 2020, according to the EU single market directive. These plans have far-reaching consequences in terms of data processing. The fast and intelligent processing of large volumes of data will be necessary. For a medium sized city like Bochum, which currently has 240,000 conventional meters (as of 2011), quarter-hour meter readings would produce 960,000 sets of meter data to be processed and stored each hour. This means it has to be possible to process, archive, and select data provided with a time stamp. Calculations on time series (density, aggregation, etc.) are necessary as well.

Ideal for the requirements in time series management
For the Advanced Meter Management System from BTC AG, these requirements mean that the underlying database system has to be able to sort and process a large number of measured time series every fifteen minutes while simultaneously reading 1,000 time series per minute. To test the performance of InterSystems Caché®, a test version of the database was initially installed in Oldenburg.

With the test version installed under C++, BTC AG performed comprehensive stress tests. Processing 100,000 time series resulted in a rate of 12,000 processes per second, with a pause inserted between every two runs. Stefan Baier: “Caché proved to be ideal for the requirements in time series management. Compared to the relational databases we tested, Caché is currently outperforming them by a factor of two, which we may be able to further increase by expanding the global buffer.”
Very positive experiences with Caché
The installation of the test system alone provided BTC with an extremely positive impression of Caché. Stefan Baier: “Caché is very easy to install. Everything is Web browser-based and only a few questions have to be answered during installation, meaning that anyone with basic database experience can install Caché. It is fast with a shorter learning curve when compared to relational databases, where the installation generally requires a database administrator with extensive knowledge to answer all of the questions that have to be clarified in advance and in order to avoid nasty surprises later.” Particularly for customers who need a low-maintenance database and do not employ an administrator, Caché is a solution that can be highly recommended.

Stefan Baier also praised the technical support. “Cooperation with InterSystems support was excellent. Technical queries and error messages were always answered immediately.” The positive experiences with installation and support were fully confirmed by the good results from the Caché stress test. BTC AG therefore decided to present its new “BTC AMM” based on InterSystems Caché® to industry experts at the “E-world energy & water” trade show.