

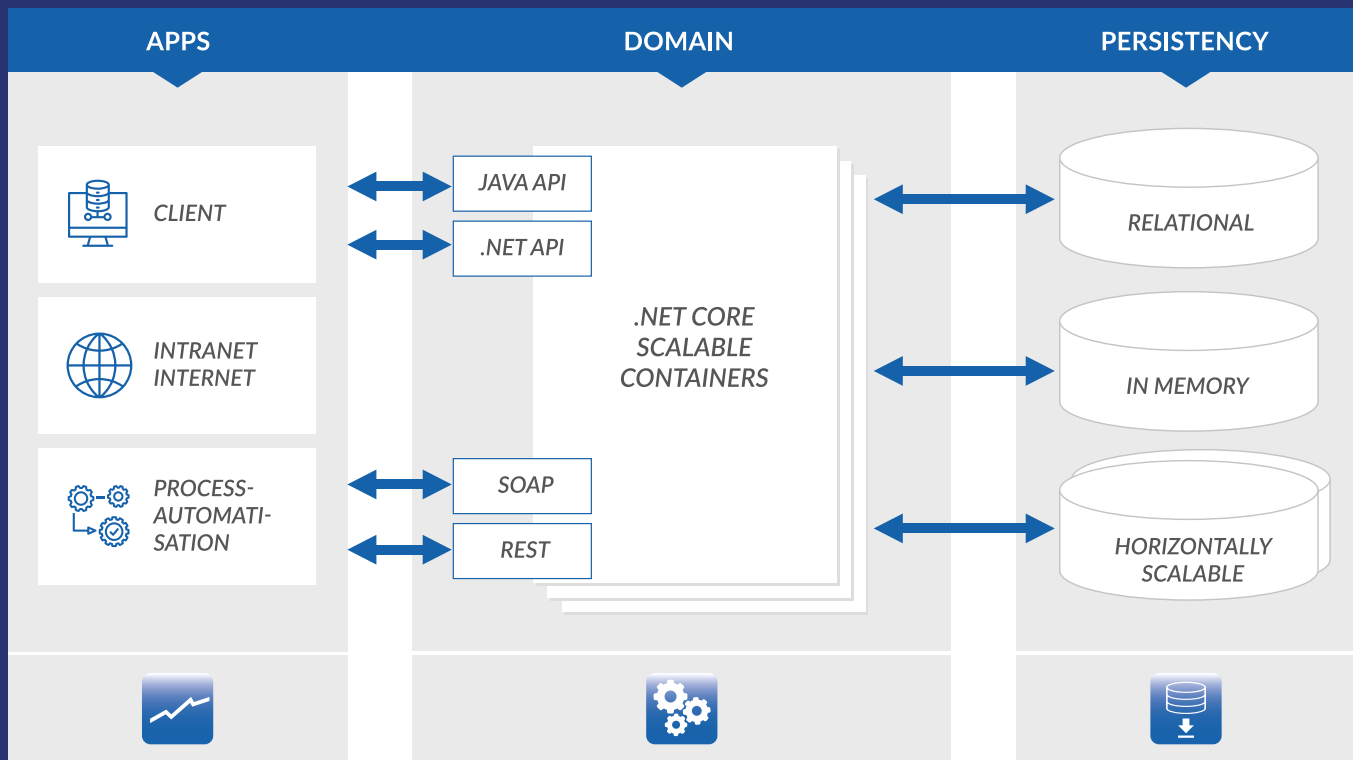
HAKOM

TECHNOLOGY & SOLUTIONS
for the energy industry



UNLIMITED

TIME SERIES MANAGEMENT



The HAKOM TSM Technology

The future-proof base technology for time series management



Decarbonization

Fluctuations in power production of renewable energy require a high performance information management, i.e. a **'near-realtime'** monitoring of a large number of measured data. Our technology uses **Big Data methodes** and supports **horizontal scalability** for the, **'near-realtime'** processing of large data volumes.



Decentralisation

The amount of measuring points is increasing exponentially – the intelligence of all systems must be available **locally**. Components of our TSM technology are available in **containers**, as **PaaS** and thus comply with the latest implementation trends of distributed intelligence.



Digitization

New business processes require systems based on a **flexible and database-independent base technology** to cover future requirements. Our technology allows the usage of available data by means of **machine learning** algorithms.



Democratisation

The role swap in the energy trading sector between consumer and producer requires **new, easily accessible and adaptable technologies** and procedures. Our time series technology offers **APIs** for accessing information and varied data like **blockchain** and also supports **low code / no code** developments via **microservices**.

CUSTOMERS BASED ON REGIONS

- Austria
- Germany
- Hungary
- Czech Republic
- Poland
- Switzerland
- Denmark
- Sweden
- Macedonia
- Bulgaria
- Israel
- Estonia
- Netherlands
- United Kingdom
- Russia



COMPANY

30 years HAKOM

Since 1991 HAKOM has had a clear focus: time series management for the energy industry.

150+ successful projects

We have developed a time series technology that enables us to create high-performance solutions for the retail, network, production and sales sectors within extremely short time to market.

250+ person-years experience

We use our many years of experience to continuously develop our technology and improve our services.

100+ companies from 15 countries rely on our technology

Unlimited time series management is our uncompromising claim - this has made us the technology leader in Austria and a successful player in Germany and the emerging markets. Numerous software manufacturers rely on our technology.

We create added value through higher precision, higher speed and highest flexibility in data processing. Our partners concentrate on the essentials - their core competence - and leave time series management with its complex requirements to us.

Our solutions are in use throughout Europe and every year more enterprise customers and manufacturers choose our technology, our professional services and our fast, flexible support.



TECHNOLOGY

Our technology is uniquely easy to use. **FeasyUse®** is the principle underlying our technology - it delivers usable results under all circumstances.

All time series data can be processed intuitively without having to know details of the time series in advance.

No matter what properties a time series has, its data is automatically transformed as required during processing and thus made available to the user simply and quickly in a usable form - **FeasyUse®**

Unlimited Scalable

The HAKOM TSM technology scales according to your requirements simply by adding additional application or database nodes. The excellent performance already with single instances can be scaled according to data volume and runtime requirements. The scaling can be carried out during operation by IT operations management.

Unlimited Available

The HAKOM TSM technology transforms different time series by means of **FeasyUse®** simply as requested and makes them available. The transformation of units, intervals, time zones, status information and time ranges is performed automatically and correctly at every request.

Unlimited Shareable

The HAKOM TSM technology offers countless connectors and interfaces to directly access data from external systems and to make own data available to others in the requested formats. These connectors allow you to access external data in real time and make your own data or calculation results available to others in real time. This gives the customer the opportunity to manage all time series centrally across all applications and to take over the operation of the technology himself if required.



SOLUTIONS

Experience

Our solution competence is based on comprehensive experience along the entire value chain of energy management.

Partnerships

Nothing lives in isolation - we work according to this principle in a network of partners from which everyone benefits.

HAKOM solutions are always based on our own software products and those of partners with whom we have been working successfully for years.

Focus

Every one of our projects was successful - and we want to keep it that way. We have a clear focus on results.

We combine standardized software with a standardized process model - on this basis we create customized solutions that meet even the highest quality requirements.

Custom development

We have learned to listen and to respond to your special wishes.

Based on our proven time series technology and many specific extensions for trading, portfolio management and network processes, we create tailor-made solutions based on the unique **FeasyUse®** principle.

Operations support

We offer comprehensive concepts for professional services and support for the maintenance and further development of your solution according to your special needs.



TSM Time Series Management & Integration

TSM Time Series Manager - TSM is a software tool for the analysis and processing of time series with relevance to the energy industry. Conveniently integrated into MS Excel, TSM provides useful and reliable results under all circumstances by means of **FeasyUse®**.

The tool can be used universally - for metering data as well as for meteorological data or price information. Developers use it for rapid prototyping to build test environments and test the results of their time series implementations.



mP Energy Energy Forecasts

mP Energy forecasting system - meta Predictor Energy is a forecasting tool that has established itself in recent years as a universal tool for accurate forecasts of consumption, generation, network and prices. mP Energy masters structural breaks as well as automation requirements and complex and confusing customer or producer structures.



Visuals Visual Exploration of Energy Data

TSM Visuals - TSM Visuals are dashboards for the visual exploration of large and complex data sets in the energy industry. Simultaneous visualization techniques help with the validation of input data, the selection of the right prediction model, but also with completely open hypotheses when it comes to large and heterogeneous data.

VENDORS

EXXETA AG

EXXETA offers both standardized and custom solutions for all market roles in the energy market, covering a broad range of processes from market access to power exchanges and brokers to portfolio management, balancing group management and billing.

Its innovative Energy Portfolio and Risk Management System EPRM impresses with its modern modular service-oriented architecture, which covers the complex individual requirements of energy trading and combines them with the high-performance HAKOM time series service.

Fronius International GmbH

Fronius International GmbH has been researching new technologies for converting electrical energy since 1945. That is more than seven decades of experience, progress and constant innovation. 24 hours of sunshine is Fronius Solar Energy's big goal and the company works every day to realize this vision of a future in which the world's energy requirements are met from 100 percent renewables.

Kapsch Business Com AG

Kapsch BusinessCom is a company of the Kapsch Group and your partner for digital transformation. With a unique ecosystem of specialists and world-leading technology partners, Kapsch guides you safely through the world of digitization. Kapsch supports and accompanies you to leverage the value of your data: Future knowledge, corporate values and productivity. For demanding time-series-based requirements, Kapsch relies on HAKOM time-series technology.

ProCom GmbH

The ProCom GmbH from Aachen, specializes in planning and optimization of energy production and energy trading. The solutions are based on BoFIT, the IT platform for these areas, which is in more than 60 solutions in use in Europe. The HAKOM Framework is used successfully in the new version of the solution BoFIT and is therefore also integrated into the products of the leading manufacturer of optimization software available.

Quaternity AG

Quaternity helps energy trading and distribution companies meet today's and tomorrow's technology challenges. With offices in Walchwil, Switzerland and Vienna, Austria, Quaternity covers both the commercial and technical requirements of energy trading and sales organizations. The Quaternity Suite - a modular software platform with sales and PFM functionality - is based on HAKOM TSM technology for sophisticated time series functionality.

Seven2One GmbH

Seven2One supports energy suppliers, industrial companies and infrastructure operators in mastering the challenges of digitization towards the new energy system. With tailor-made software solutions, the company integrates and automates complex (energy) data processes for its customers along the energy value chain and networks systems. Seven2One relies on HAKOM TSM technology for demanding requirements in the area of Big Data.

Twingz Development GmbH

Twingz is a Viennese company specialising in predictive analytics services and solutions. The core of Twingz's technical competence is the analysis of flow quantities and the detection of anomalies, primarily for electricity (activity of electrical devices) and water (leakage) from meter or sensor data streams. Thus, Twingz provides B2B customers with valuable insights into the recorded flow variables and their significance for business models.

The unique Twingz disaggregation technology is used for this purpose. Building on HAKOM's time series technology, it reliably provides a precise overview of device-specific activities and consumption in households, commerce and industry.

Virtimo AG

Virtimo AG from Berlin supports you in the realization of complex, process-based energy management applications. Virtimo helps meet these challenges with world-class products for market communications, regulatory publishing requirements, and process monitoring and control. HAKOM time series technology is available to Virtimo customers as an integrated part of the Virtimo Business Process Center.

TECHNOLOGY PARTNERS

Crate

Crate.io is the developer of CrateDB, the simply scalable real-time SQL database. CrateDB makes it easy to process massive amounts of dynamic machine and IoT data in real time by combining the best of SQL and NoSQL technologies into a modern cloud-native architecture.

ECONS Consulting GmbH

ECONS puts energy efficiency, ecological and financial sustainability and auditability at the center of its services. The company proportionally supports with client-specific solutions encountering customer's actual and future challenges by incorporating existing and planned reporting and management systems. In the course of its holistic approach HAKOM's systems for unlimited time series management are applied to guarantee customer success.

metallogic GmbH

HAKOM is an authorized „Value Added Reseller“ for the Munich based metallogic GmbH. This includes Consulting, Sales, Deployment and Support of the mP Energy Forecasting Software in the central and east European Market region.

VRVis - Research Center for Visual Computing

VRVis is Austria's leading research center in the field of Visual Computing. Together with the Institute for Computer Graphics at the Vienna University of Technology, VRVis forms one of the largest computer graphics research groups in Europe. HAKOM is partner of VRVis in the field of Visual Analytics of time series data in the energy sector. In combination with the HAKOM Time Series Manager (TSM), VRVis technology enables intuitive in-depth analyses of data with energy relevance.

HAKOM

HAKOM SOLUTIONS GMBH

Lemböckgasse 61
Staircase 2 | 6th Floor
A-1230 Vienna • Austria

Tel. +43 (1) 8157980-112
FAX: +43 (1) 8157980-400

E-Mail: office@hakom.at
Web: www.hakom.at



CUSTOMERS

50Hertz Transmission GmbH
A&B - Ausgleichsenergie & Bilanzgruppen-Management AG
AGGM Austrian Gas Grid Management AG
Austrian Power Grid AG
Bayerngas Energy Trading GmbH
Bayerngas GmbH
CISMO Clearing Integrated Services and Market Operations GmbH
Umdasch Group Ventures GmbH
EDF DÉMÁSZ Hálózati Elosztó Kft.
enercity (Stadtwerke Hannover AG)
Energie AG Oberösterreich
ENERGIEALLIANZ Austria GmbH
ENGIE Energie GmbH
EVN AG
EVN Bulgaria Elektrorazpredelenie AD
EVN Macedonia AD
EVN Netz GmbH
EVN Trading South East Europe EAD
EXXETA AG
Fernwärme Wien GmbH
GASAG Berliner Gaswerke Aktiengesellschaft
GASCADE Gastransport GmbH
Gas-Union GmbH
IKB - Innsbrucker Kommunalbetriebe AG
KELAG-Kärntner Elektrizitäts-Aktiengesellschaft
Linz AG
Mainova AG
MANAGEMENTSERVICE LINZ GmbH
Mosenergosbyt

Naturkraft Energievertriebsgesellschaft m.b.H.
NESS Czech s.r.o.
ÖBB Infrastruktur AG
OMV Gas Marketing & Trading GmbH
OMV Refining & Marketing GmbH
OMV Solutions GmbH
ProCom GmbH
Quantum GmbH
Quaternity GmbH
RHI AG
Salzburg AG
Schoeller-Bleckmann Oilfield Technology GmbH
Seven2one GmbH
Stadtbetriebe Steyr GmbH
Stadtwerke Ingolstadt Beteiligungen GmbH
Stadtwerke Judenburg AG
Statkraft Germany GmbH
Steirische Gas-Wärme GmbH
Syneco Trading GmbH
TIWAG - Tiroler Wasserkraft AG
Twingz Development GmbH
Verbund Management Service GmbH
Verbund Trading AG
Virtimo AG
Wien Energie GmbH
Wiener Erdgasspeicher GmbH
Wiener Netze GmbH
Wien Energie Vertrieb GmbH & Co KG
WienIT EDV Dienstleistungsgesellschaft mbH & Co KG
WINGAS GmbH