



Online Meter Services 2.1

WEB information system for monitoring and planning of electrical energy consumption by remote reading of electricity meters

Purpose

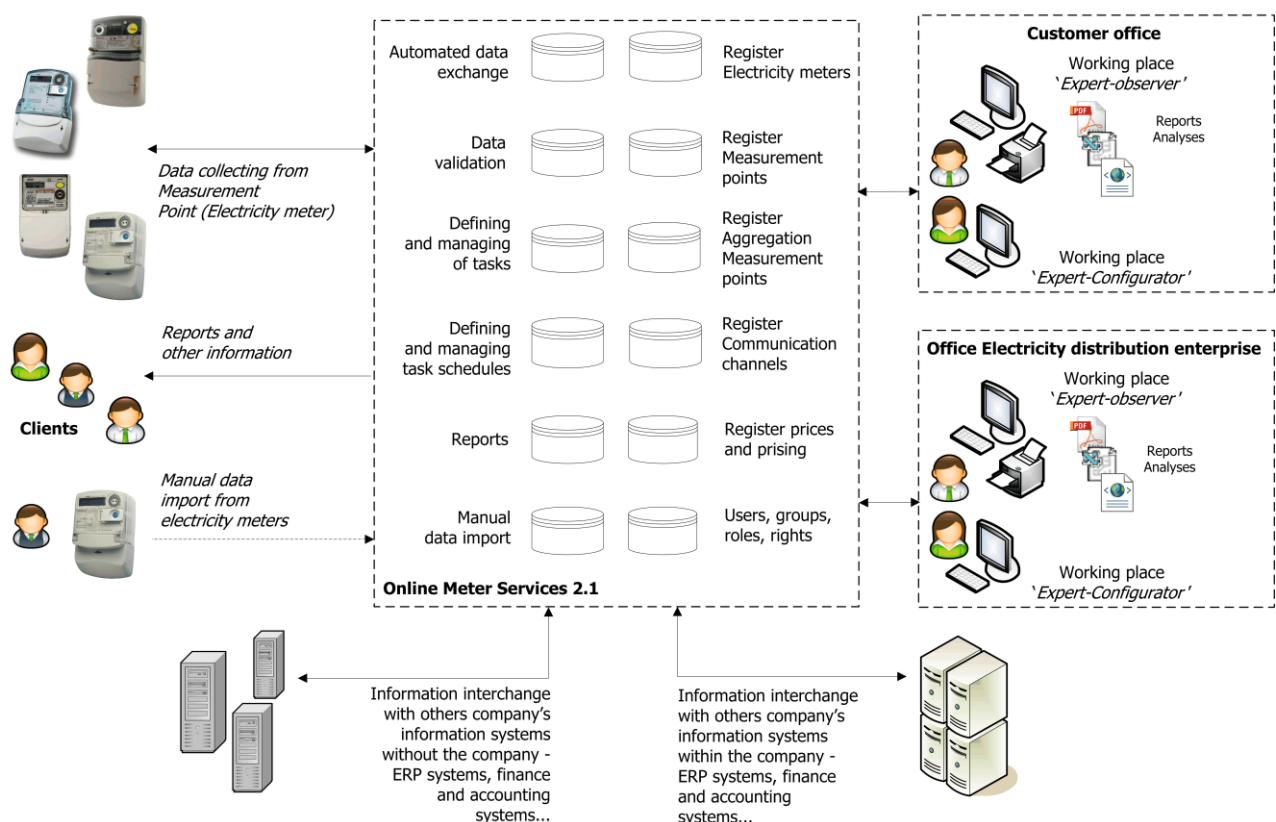
Online Meter Services 2.1 is a web-based information system designed for controlling and planning of electrical energy consumption.

The system helps to significantly reduce electricity cost by effective analysis and planning. It provides improved control and gives an opportunity for optimal demand management.

This is highly reliable enterprise-class information system, which is suitable for a wide range of customers operating in regulated and free market for electricity. Such as small and medium-sized enterprises, industrial factories, holiday villages, apartment buildings, gas stations, supermarkets, shopping centers.

Online Meter Services 2.1 Enterprise version is especially valuable for corporate customers with many branches, sites and territorial distributed structure - large companies, holdings, etc. Analysis and planning can be made in real time for every measurement point (electricity meter), office, daughter company, group of sites. This is the corporate grade information system which combines all the necessary technical, administrative and financial information and means for effective analysis and planning of electricity consumption.

Common structure of Information system Online Meter Services 2.1



Online Meter Services 2.1 Distribution Enterprise version is specially designed for distribution companies. In addition to the functions of the basic version, here are taken into account specific tasks of accounting and distribution of electricity from trading companies operating on regulated and free market for

electricity. This version of the system helps to precisely control the actual consumption of individual customers and facilitates the correct relationship between the supplier and consumer of electricity.

Information system Online Meter Services 2.1 complies with current legislation regulating trade in electricity, as well as contracts for the supply and consumption of electricity.

Main functions and system overview

- **Maintaining a Electricity meters register**

Electricity meter is a modern microprocessor device for measurement of power consumption, as well as other additional electrical parameters such as voltage, current, power, cosφ and others.

- **Maintaining a Measurement points register**

Measurement point is a point in the electrical system, in which the measurement of electrical parameters takes place. Each Measurement point have related *Electricity meter* for remote reading. The Meter can be changed in the process of operation of the system. Information system exchanges data with the Meters over *Communication channels* according to predefined *Schedule*.

- **Maintaining a Aggregation Measurement points register**

Aggregation Measurement points is "virtual" point, that combines data from one or more *Measurement points* and/or *Aggregation Measurement points*. For each *Aggregation Measurement point* different mathematical operations between the elements of the contained measurement points can be set. It is a flexible mechanism for grouping and processing of information from the individual meters by different criteria, such as electricity meters in one or more sites of a particular customer, electricity meters measuring consumption in a particular geographic area, etc.

- **Maintaining a Communication channels register**

Communication channels is the link between *Electricity meter* for remote reading and the information system. The system supports different types of communication standards for remote reading, e.g. RS232, RS422, RS485, Ethernet, GSM/GPRS, Ethernet, Wi-Fi, etc.

Frodexim Trade LLC offers a full range of different communication converters, for example: RS485/RS232-Ethernet, GSM-Ethernet, GSM/GPRS-RS485/RS232 modems, RS232-RS485.

- **Maintaining a Clients register**

Client is person or organization, consumer of electrical energy with one or more *Measurement points*.

- **Maintaining a Prices and Pricing register. Financial reports**

The system supports pricing algorithms in accordance with current legislation, valid for:

- Regulated market. The system supports tariffs and tariff plans. Based on them and the real consumption there are daily and period financial reports.
- Free market. The system facilitates the planning and creation of an Load Profile forecast and compares with current Load Profile for actual consumption of electricity. There are daily and period financial reports.

- **Defining and managing of tasks**

The system allows to define *Tasks* - set of consecutive actions with controlled result (eg. Reading data from *Measurement point*, data validation, etc.). During the execution of each task, system creates log records describing the result of the executed task actions. This allows you to have a structured information on the execution of individual tasks. Each task can be started manually or by predefined one or more Schedules. The capability to define

tasks, check the log records with results of the execution of individual tasks is defined for each user according to their roles and rights.

- **Defining and managing task schedules**

The User can define time intervals to perform tasks. Following types of schedules can be defined: minutely, hourly, daily, weekly and monthly.

- **Data validation of stored information for measured electrical quantities**

The system provides a variety of mechanisms to set different conditions and mathematical actions executed on time schedules for validation of the stored system data, read from electric meters with remote reading. Can be set:

- *Validation condition* - for selected *Measuring points* define the data, which will be processed, and the way they are processed.
- *Validation set* - set of *Validation conditions* and actions, which are executed depending on result of examination of each *Validation condition* for the *Measurement point*.

- **Integrations with other information systems**

The system supports different types of automatic exchange of information with other information systems. There are:

- **Export data on request to an external information system.** There is mechanism for receiving an automated request for exchange of information between Online Meter Services 2.1 and other information systems. Upon receipt of such a request, it is processed automatically and system creates the requested reports (eg. Load schedule or Readout for selected measurement point or aggregation measurement point). XML or CSV files are created and they are sent to the querying information system. On request can be implemented and links to other similar systems.
- **Import file with data from meter.** Used for data import when there is problem in connection with a meter.

- **Various reports**

Various reports with ability to set user's criteria. Variety of graphs, charts for analyzing processes. Chronological, analytic and summaries reports. Correlation between the planned and the actual load profile can be analyzed. Output in various formats - XML, CSV, XLS and others.

- **Protection and access control system**

Definition and management of users, roles, access rights for the system. Division of roles and Consumer Rights is a modern approach for managing information systems that allow precise definition, protection and control access to system resources, according to the powers and competence of personnel. The administrator can flexibly define access rights for experts to certain functionality and information objects.

For each user can be assigned one or more roles, each characterized by access to certain functionality of the system.

Access rights for different types of users to certain *Measurement points* / *Aggregation measurement points* and related information can be set.

The system supports integration with MS Active Directory.

User features username, password, e-mail. Additionally for each user can be defined custom profiles for readings and schedules and clients to which it has access.

Depending on the rights and access functionality there are pre-defined types of *Workplaces* are their *Roles*.

- *Administrator* - register users and assigns rights to them to perform certain roles;
- *Configurator* - describes the structure of the system, create, modify, delete *Aggregation measurement points*;

- *Dispatcher* - describes the schedule for reading *Measurement points*;
 - *Observer* - has the right to review the readings for permitted *Measurement points*;
 - *Support* - used only for reading service information;
 - *Registrar* - used only for manual *Measurement point* data entry.
- **System maintenance.**
Flexible definition and maintenance of nomenclatures, backup and recovery of information.

Information system structure

Online Meter Services 2.1 is a modern WEB-based software designed for multi-user, multitasking in enterprise networks and the Internet.

Online Meter Services 2.1 is based on **MS Windows** platform.

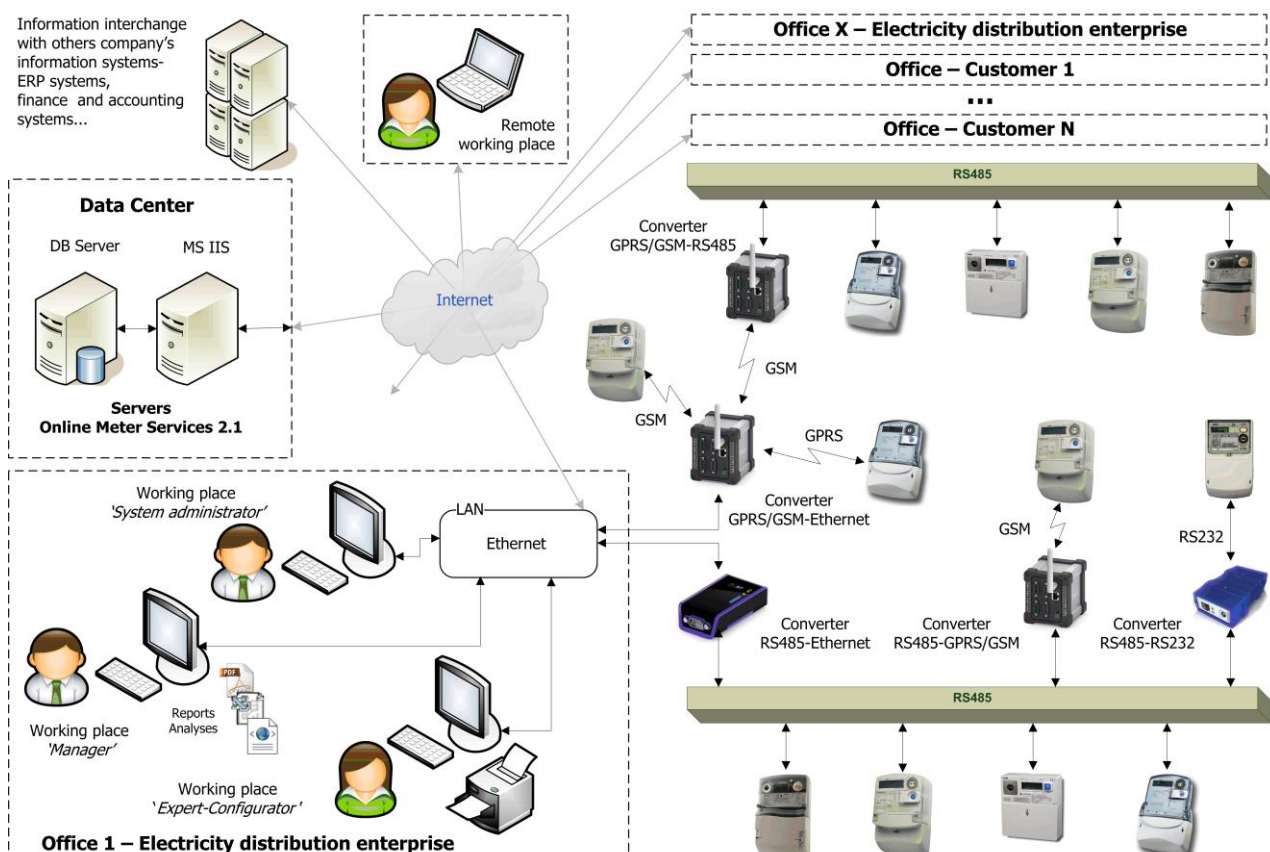
The information is stored and managed by **MS SQL Database Server**.

The system **Online Meter Services 2.1** is centralized and consist of 3 main components:

- Central Database **MS SQL Server**;
- Application server **MS IIS**;
- Client workstations with Web Browser, such as **MS Internet Explorer, Mozilla Firefox, Opera** or any other, running on **MS Windows, Linux, MacOS, Android**.

User access to system information is restricted according to their predefined Roles and rights. The system can be accessed through *HTTP* or *HTTPS* protocol over Internet.

Structure of Information system Online Meter Services 2.1 - example



Described structure is indicative and may vary depending on customer needs. Structure has the following main characteristics:

- The system is centralized. DB Server and Application server can run on one or different servers. The servers can be real or virtual machines.
- On the basis of precisely defined mechanism for data protection, user-based rights, roles, access to information and functionality can be controlled according to qualifications and position of individual users. For example, this allows the employees of the electricity company to control the distribution of electricity to all its customers. Authorized employees of their customers can monitor their consumption, the parameters of consumed energy, deviation of forecasted demand, etc.
- Clients can access **Online Meter Services 2.1** system through HTTP or HTTPS protocol. Client computers can be located in different territorial offices.
- There is lot of varieties in the possible ways for **Online Meter Services 2.1** system to connect with Meters. The system supports different types of communication standards for remote reading, e.g. RS232, RS422, RS485, Ethernet, GSM/GPRS, Ethernet, Wi-Fi, etc. Using a wide range of Electricity meters and interface converters, offered by Frodexim Trade LLC, **Online Meter Services 2.1 system** can satisfy all the customer needs.

The system meets the highest requirements for typical corporate environment:

- Taking into account the circumstances of the operation of large organizations with territorially distributed structures with many electricity meters.
- Openness, adaptability. Rich settings of operating environment and the performance of the software system. Possibilities for implementation of different technological schemes specific to the organization. Flexible definition of classifications and nomenclatures.
- Simplified operation, convenience for users to work in common graphical Windows, Linux, MacOS, Android environment. Conveniently presenting information through graphics and nomograms.
- Reliable operation under high loads of the system. Flexible scalability.
- Security. Protection of the system information.
- Flexible definition of user, access rights and roles.
- Security, safety, traceability of the occurred events and user actions with the possibility of precise audit on the basis of log records for each action of each user of the system.
- The system complies with all national and international standards, as well as the legal basis regulating trade with electrical energy.

Frodexim Trade LLC has a wide range of activities in the field of energetics. The company is the market leader for energy measuring equipment and energy management systems. Frodexim Trade LLC provides designing, delivery, integration and support of energy management systems and all its components:

- Meters with remote reading of the world's leading manufacturers.
- Controllers and interface converters.
- GPRS/GSM modems.
- Servers and Personal computers.
- Communication infrastructure, providing LAN and Internet connectivity.
- Software - operating systems, database management.
- Application software Online Meter Services 2.1, developed by Frodexim Trade LLC.

All components of the **Online Meter Services 2.1** meet strict standards for highly reliable devices for industrial application. This ensures reliable trouble-free operation of all components of the system and easy integration with existing and future devices from different manufacturers.

All activities carried out Frodexim Trade LLC, are based on the current Quality management standard ISO 9001:2008.

More technical information about devices, developed by Frodexim Trade LLC, can be seen at www.frodexim.com.

Benefits of implementing the system **Online Meter Services 2.1**

Implementing the system **Online Meter Services 2.1** leads to the following advantages for the organization:

- Significantly reduce electricity cost by effective analysis and planning.
- Improved control of characteristics of consumed electricity.
- Possibility to load reports for previous periods or to monitor current consumption. The current consumption can be compared with the demand forecast, thus optimal technical and management decisions can be made.
- Ability to direct and remote control of the condition of electrical measurement devices and communication channels for remote connection with them.
- Control and improve the quality of service delivery of electricity and improved accountability in the relationship between electricity distribution companies and their customers.
- Increased control over the compliance of the legal basis regulating the trade of electricity on the free and regulated market, and contracts for delivery.
- Automated collection on pre-defined schedules and validation of information from meters with remote reading. Structuring the information in a database.
- Specially developed technology for operation of information system that helps to dramatically reduce errors, taking into account the parameters of consumed electricity. Taken into account any specific potential errors and problems due to technical reasons, subjective human errors, etc.
- Enables automated exchange with other information systems - financial accounting, organization controlling as well as external systems.
- Opportunity for various reports and analyzes, according to the role and access rights of users.
- Opportunity for in-depth reporting and analysis, grouped by different criteria.
- Decreased need for additional investment, because:
 - This is an open system that can work with various models of electricity meters from different manufacturers in a diverse communications environment.
 - There are no major equipment requirements. Existing computers, network and communication equipment can be used.

Clients of **Frodexim Trade LLC** using **Online Meter Services 2.1** are

ENERGO-PRO Networks PLC	Topaz Mel Ltd.
ENERGO-PRO Energy Services Ltd.	Pipelife Bulgaria Ltd.
AES Galabovo Thermal Power Plant	Metacom Ltd.
EDC Zlatni Piasaci Ltd.	Svilosa PLC

Technical requirements

Server: **MS Windows Server 2008** or newer.

DBMS: **MS SQL Server 2008 Standard Edition** or newer. For small systems, reading data from small number of electricity meters the free version **MS SQL Server 2012 Express Edition** can be used.

Workstations: **MS Windows XP Pro, Windows Vista, Windows 7, Windows 8, Linux-based OS, MacOS, Android, any other system with compatible browser.**