

# Smart Grid Technologies

End-to-End solution for utilities, from generation to customers



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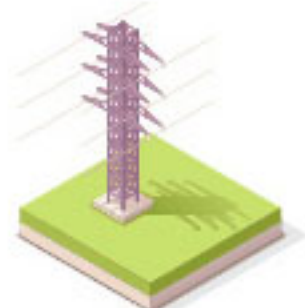
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Analytical Platform designed for Smart Grids



# CAS Hemera Commercial & Industrial



CAS Hemera C&I is the Utility main analytic tool to promote intelligent management of Large Customers energy consumption. Through continuous monitoring and control of metering equipment, it centralizes complete and real time updated information contributing significantly to loss reduction and revenue assurance.

## Metering Management

Intelligent and automated system for monitoring and real time data collection from any meter or communication protocol. Presenting information in a centralized way with full collected data history, it provides control and analysis resources through multiple reports and customizable charts.

By supporting utilities' processes, it provides resources to monitor metering data availability to assure customers billing. Other highlighted benefits are metering management, easiness for losses investigation, subsidies for communication diagnosis (signal level) and environment monitoring (temperature, geo reference and others), beyond helping to validate fieldwork and to access meter data.

### Examples of Hemera C&I compliant meters.

**ABNT** – Landis & Gyr, Elster, Nansen, ELO, ESB

**ANSI** – Elster Alpha 1, 1+, 2, 3

**ION** – Schneider Electric

**IEC** – ZIV

**DLMS** – ITRON

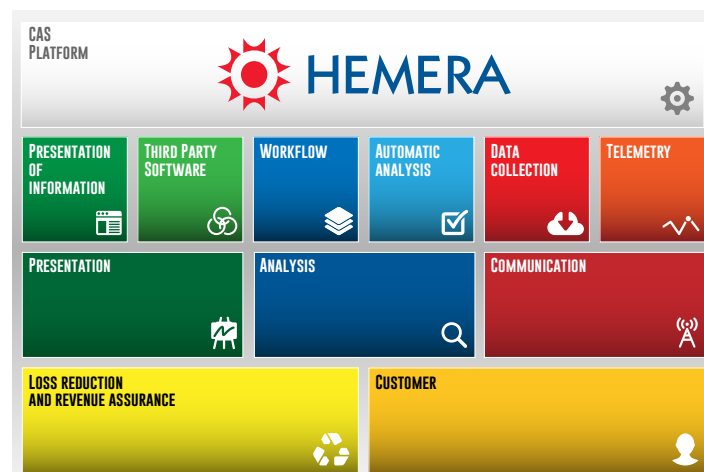
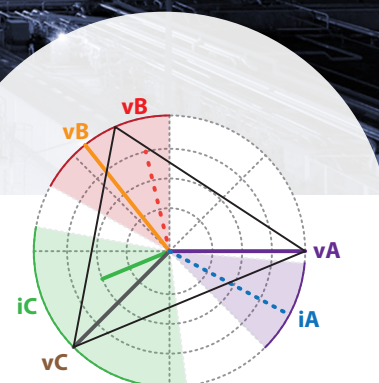
**MINI-DLMS** – Q1000, ITRON

**EIG Nexus** – NEXUS

## Phasor data: Used in loss recovery analysis

Based on field-collected data, the system presents phasorial graphs and reports that allow the dynamic visualization of phasorial variation every 15 minutes or according to the desired schedule.

Associated to the load and demand graphs and to the registered events and alarms, customer behavior analysis becomes complete, supporting frauds investigation and solution, meter malfunction diagnosis, parameterization errors and others issues that may cause commercial losses.



Complete platform with utilities' and customers' view:  
efficiency through metering process.

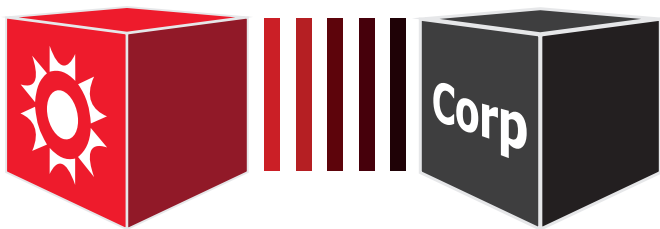
## Monitoring field events

Events information occurring in the monitored elements alerts about physical and logical conditions related to the metering point. Through events analysis, analysts are able to infer the existence of situations that require field inspections or regularizations.

## Systems Integration

CAS systems can be integrated with other systems of the utilities, allowing:

- To share information to create new data applications processed by CAS platforms.
- To enhance benefits of corporate systems already incorporated to the utilities routines.
- To add value to the Business through the availability of functionalities coming from integration.



## CAS Hemera Platform Integrations\*

- **Commercial systems:** billing process automation.
- **Operating systems:** information of power outage in customers shared through the DNP3 protocol.
- **Field service systems:** customer services automation.
- **Power outage management systems:** automated power outage information to anticipate restore actions.
- **Asset management systems:** allows information reliability about metering equipment asset control.

*\* Integrations depend on specific customizations to each single corporate system.*

## Advanced Tools:



**Configurable schedules** enable activities automation, such as billing, reporting, meter reading and parametrization.



**Acquires metering data through CAS telemetry** hardware, conventional modems, direct access to a meter with ethernet output and file import.



**Generates and exports** FK7 and public formats (for ABNT meters), CSV and TXT files.



**Meters geographic location** through Google Maps.



**User administration and access with privilege levels.** User actions registers for audit purposes.



**Offers billing** and mass-memory simulations.



## Contingency and Performance

High data availability and scalability to meet the utility needs due to the telemetry points increase.

- Maintenance easiness in the servers' physical architecture - allowing another one to perform when a server is under maintenance.
- High storage availability and flexibility using smaller servers with balanced load.
- Effective improvement in messages processing, speeding up data recovery in unavailability events.
- Independent processes to allow prioritization of the utility's most critical activities.
- Compatibility with different operating systems, adaptable to any computational structure.



# Customer Database

## Database for Utilities' Web Portals

**C&I Customer Database is an API** - Application Programming Interface - for a Customer Portal, created to provide internet access of detailed energy consumption information to C&I Customers.

**Energy Regulatory Agency** regulation requires that utilities disclose clients' detailed consumption, and it is **possible to market some of this information**.

**The Automation of** this process can bring **real gains** to utilities, from **additional revenue** to **relationship improvement** with captive customers.

## Operation

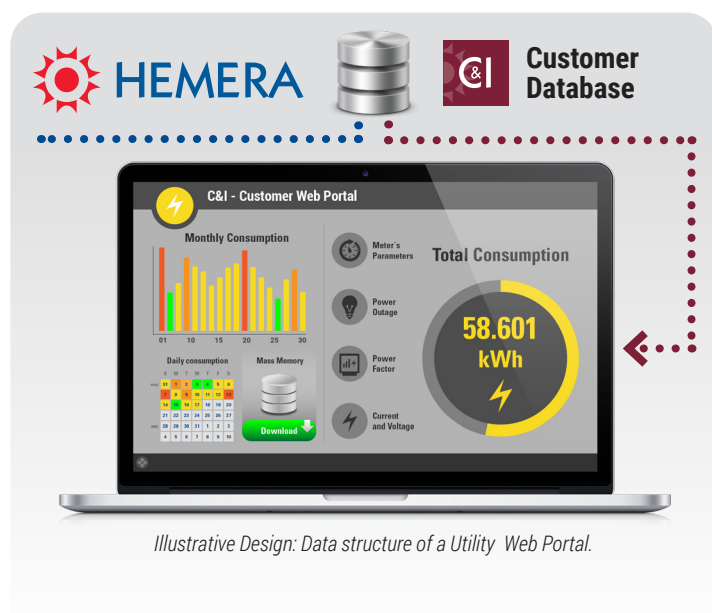
**Hemera C&I** utilities users may request the optional **C&I Customer Database**.

The *on demand* application has **independent intelligence and architecture**, which guarantee flexibility in choosing how to present this information to the Customer in the Utility own Web Portal.

## Characteristics

**C&I Customer Database** has no graphical interface and is based on information presented by **Hemera C&I** automatically and with synchronized data at a configurable frequency:

- Registration data.
- Parameters of Customers' meters.
- Electrical metering information, such as current and voltage.
- Power outage.
- Active and reactive power consumption.
- Power demand.
- Power factor.
- Mass memory.



## Product & Services

Database separated structure, synchronized with **Hemera C&I** module.

- Systems deployment.
- Training by CAS team.
- Remote support.

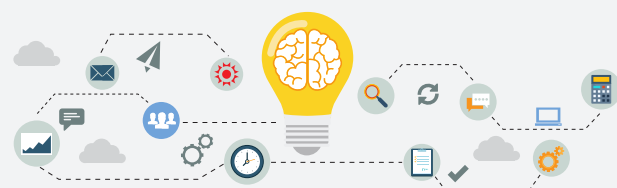
The drawing below explains Customer Database deploying process:



## Advantages for the Utility

With **C&I Customer Database**, it is possible to automate the process, keeping transparency to clients with free access to energy supply and consumption information:

- Data integrity assurance.
- High-speed information availability.
- Flexibility in presenting information to final Customer.
- Independent architecture: Guarantee of non-interference to the utility operational processes.
- Increasing profitability by providing services to final Customer - Revenue from annual systems maintenance fees.
- Improvement of the utility reputation and benefit, through greater data transparency.



## Implementation Possibilities

CAS Tecnologia offers Utilities with no Web Portal Access or Smartphones application the opportunity of development and integration **C&I Customer Database**

Possibility of implementing the **Customer Database** for **Hemera Residencial** in utilities that have low voltage clients with telemetry.

# CAS Hemera MOBii

## Mobility and Intelligence



**MOBii** is an Android application with a Web management module that provides significant time reduction field operations, with online service orders update in the collector, in addition to meters parametrization automatic execution with no personal intervention.



### Metering reading:

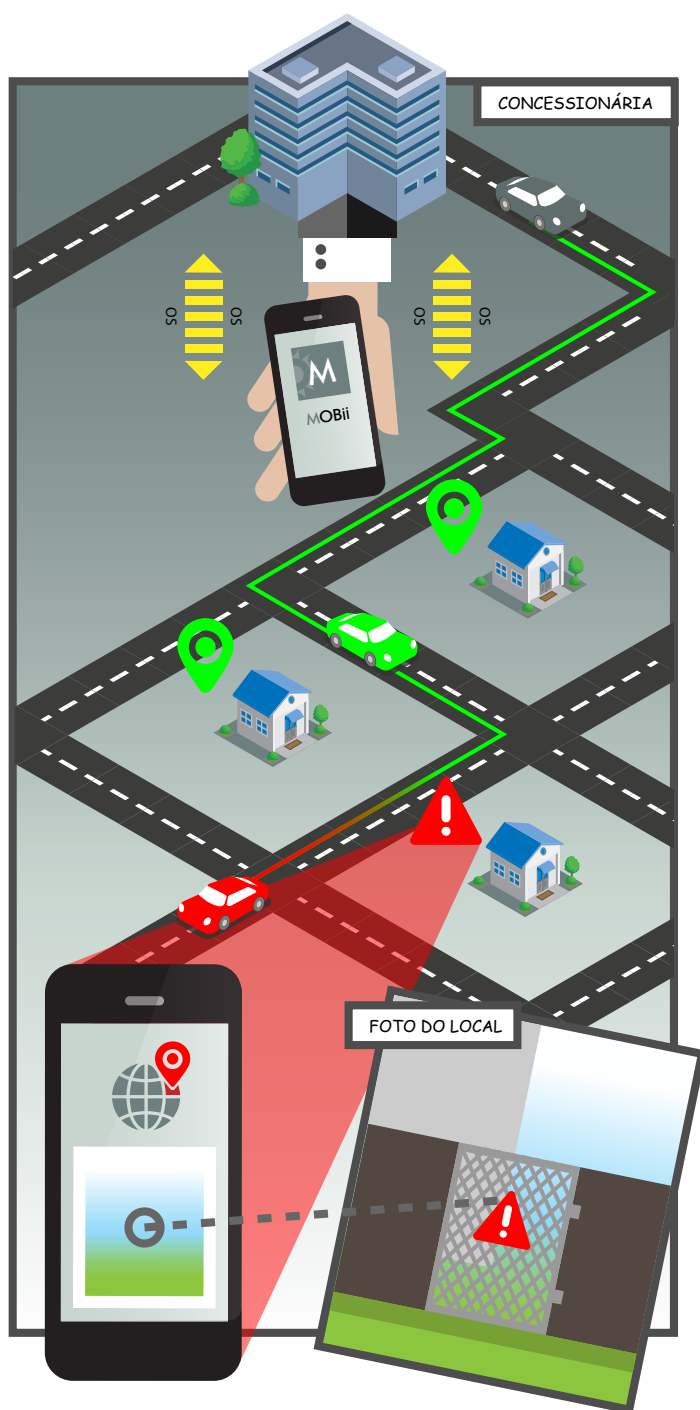
In regions with no telemetry, reader personal collect meter data for billing, which can be transmitted immediately to the utility or, in case of no network, automatically at the moment the device finds a Wi-Fi or 3G connection.

### Parameterization:

The web manager performs the Software management, which allows sending a new parameter to the meter whenever necessary, before the reader team leaves to field. Upon arriving at its destination and initiating the metering data collection, the new parameters are updated with no need of personal interference, that is, in a transparent and risk-free manner.

### Program Load:

The same process described for parameterization applies in this case. The difference is that a specialized professional prepares and controls this task.



### Permission Control:

- Readers Privileges configuration.
  - Sporadic reader.
  - Service Order Reader.
  - Advanced Reader.
- Integration with Hemera C&I.
- Read - Storage - Synchronization.
- Service Order Dispatch.
- Detailings with pictures.

### Customization:

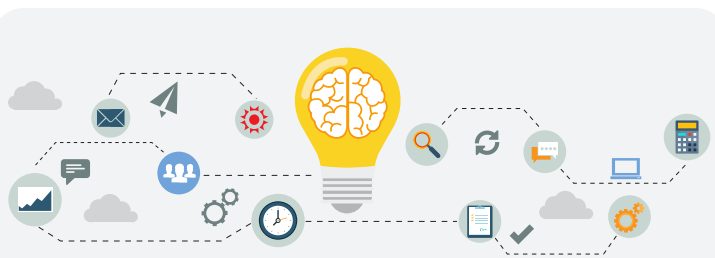
It is possible to customize systems integration to automatically provide new Service Orders creation, according to the customer's needs.

### Service order dispatch:

The reader personal receives in the application, the Service Orders load for a certain period, through the integration between the web manager and the utility commercial system. In addition, once in field, it is possible to remotely receive any changes, new information (new service order, maintenance order etc.) from the web manager and synchronize the completion of a Service Order with the web manager.

### Routing:

In the web manager, it is possible to map the best route to execute all Service Orders. The software also makes possible to verify if the field professional followed the defined route and the start and end time for each service. If it is not possible to execute a Service Order due to force majeure (no access to the meter, absent resident, etc.), the professional takes a local picture and registers the reason for the obstruction. The photo is archived and synchronized with the web manager, with information about where it was taken (lat long).



### Implementing additional functions:

- Customer inspection.
- Irregularity occurrence forms.
- Residential customers reading.
- Read and print simultaneously.
- Integration with Hemera Residential and Gauss system.
- Integration with other MDMs available in the market.

# CAS Hemera Residential



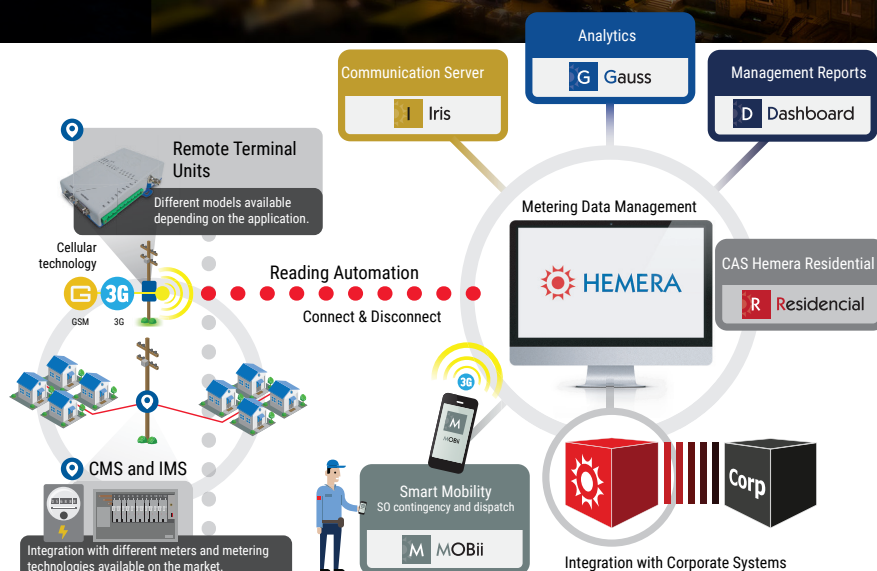
**Focused on Energy Metering Management via telemetry, Hemera Residential provides efficiency and holds a large volume of data.**

**It promotes the identification and resolution of failures related to billing, energy balance, connect & disconnect, analysis and utility losses. From remote controls, it allows metering and operation centers to optimize their efforts in the field.**

## Metering Management

Based on a multi-protocol architecture and prepared to support different meters and SMI or SMC technologies and with smart meters available in the market for low voltage, the system enables reading process automation for billing and connect & disconnect, providing greater reliability in online data delivery.

The System implements customized and differentiated by technology physical field vision mapping. Metering Systems technologies implement different alarms and events. Hemera Residential allows the utilities to fully exploit the functions of each technology in a standardized manner in a single system. It also allows field equipment commands, from each technology, to be sent to configuration, maintenance or on-demand reading functions.



*Hemera Residential reading automation flow.*

## Energy Balance Analysis

Intelligence to establish a set of pre-configured rules for energy balance automated analysis from statistical processes that identify the consumer units that most contribute to zone unbalance, helping in loss identification and recovery.

Balance analysis rules can be activated or deactivated according to the needs of each application environment. The analyses' results are presented in full reports and graphs that help identify losses and detect potential target customers.

<b>IMS</b> Individualized Metering Systems.	Landis&Gyr (Gridstream) Elster (Mesh) Itron (Mesh) CAS (Backpack)	Eletra (Backpack) Elo (Backpack) Nansen (Backpack)	Multiprotocol
<b>CMS</b> Centralized Metering Systems.	Itron (Aurum) CAM (Complaint) Nansen	Landis&Gyr (SGP+M) Elster (Garnet) Ecil	
<b>CRMS</b> Centralized Reading Metering System.	Landis&Gyr (RS485 or Zigbee) Eletra (RS485 or Zigbee) CAS (Backpack)	Itron/Actaris (Euridis) Elo (RS485 or Zigbee) Nansen (RS485 or Zigbee)	

**ABILITY TO INTEGRATE WITH NEW TECHNOLOGIES.**

## Z-Smart Solution

**Backpack with remote operation for reading, connect & disconnect and reducing losses processes at low voltage costumers.**

Conventional electronic meters can become "smart meters" with the possibility of remote communication and connect & disconnect actions, regardless of the meter's supplier.

### Advanced Features

Exclusive functionality of differential current monitoring and phase and current sensing, collaborating with electric power utilities' efforts in loss prevention and diagnosis.

### Field Environment Protection

Intruder phase sensing. Service quality for the utility, benefiting the final consumer's protection. Notification to the utility in case of voltage identification in cut customers.

### Data Access

Independence, flexibility and convenience in metering data availability. Data is obtained by scheduling and also on demand, including Mass Memory registered by Z-Smart Backpack.



### CAS Embedded Intelligence RS2000 Z-Smart Backpack

- Remote Terminal Units functionalities for ABNT meters with connection via optical port or serial port.
- Modules for single-phase, two-phase and three-phase direct metering meters.
- Remote reading with scheduling.
- Remote Connect & Disconnect up to 100 A.
- Zigbee Communication.
- Remote firmware update.



### Alarm monitoring, detection and generation for:

- ▲ Differential current.
- ▲ Intruder phase.
- ▲ Meter self-reconnection.
- ▲ Communication failure between the backpack and the meter.
- ▲ Overcurrent.
- ▲ Metering inconsistency.
- ▲ Phase exchange.
- ▲ External meter replacement.
- ▲ No phase voltage.
- ▲ Presence of current without metering feedrate.



### CAS RS2000 – Backpack:



Z-MONO  
SMART



Z-MONO  
Universal



Z-TRI  
Customer and Trafo



Z-TRI BALANCE  
Trafo



Z-ABNT

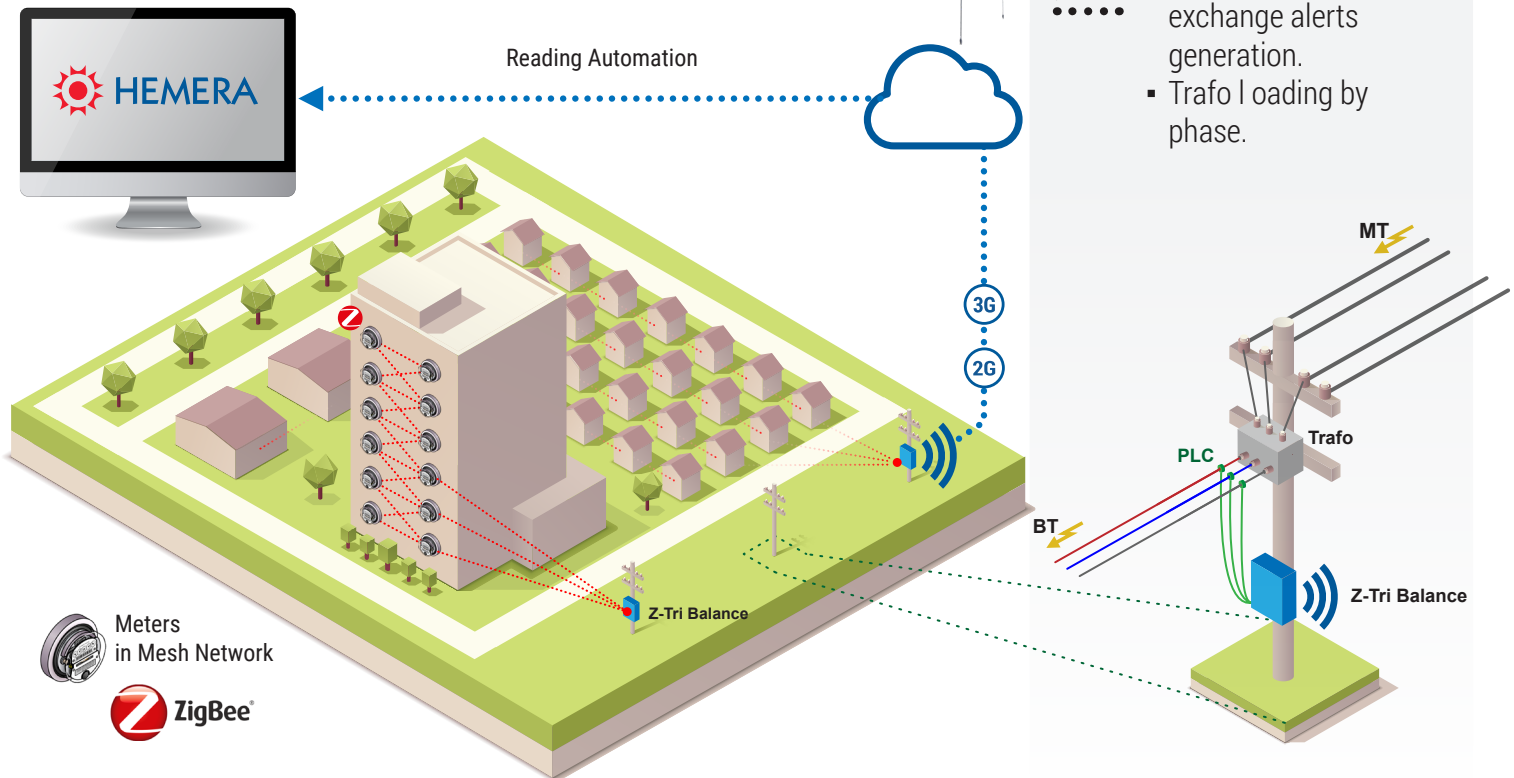


Z-REPETIDOR  
and Z - SERIAL

Several models available by accessing [catalogo.castecnologia.com.br](http://catalogo.castecnologia.com.br)

## Hemera Functionalities

- Consumption information by phase.
- Balance analysis by transformer.
- Load analysis by phase in the transformer.
- Control over connect & disconnect scheduling.
- Customer meter self-registration and self-connection to the respective LV/Trafo transformer meter.



### PLC – Power Line Communication

- Customer identification by transformer phase.
- Undue phase exchange alerts generation.
- Trafo loading by phase.

## Z-Smart Solution advantages

**Low cost communication.**

**Scalability** to high density regions.

**Adaptability** and **flexibility** for implementation in mixed regions of single-phase, two-phase and three-phase customers.

**Easy** asset configuration and control in the field.

**Multi-manufacturer approach:** freedom of meter choice, with remote connect & disconnect.

**Self-manageable grid:** one device acts as a repeater for others, extending the communication range safely and dynamically.

**Single platform** to manage Residential Customers, C&I, Free Customers and Border.

**Guaranteed integrity** of the customers' meters registration by Trafo.

**Centralized and personalized support**, avoiding attrition with suppliers.

Open API for **integrations with legacy systems.**

**Technical staff** qualified in the utilities' business.

**Agility and flexibility in the development of new features** for the product and integrations with new meters.

**Encrypted grid.**

**Flexibility and convenient access** to metering information.

**End to End Solution.**

Collection, communication, analysis, asset management, billing and energy balance.

**Native integration** with Hemera Platform.

### Processing Capacity Certificate

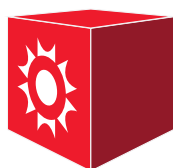


Hemera processing capacity:  
Up to 16 million messages – 6h:40m  
Approx. 40 thousand messages/min.

## Integration with Corporate Systems

CAS systems can be integrated with other utility's systems, allowing the following:

- Information sharing, creating new applications for data processed by CAS platforms, ensuring data integrity.
- Potentialization of corporate systems' benefits already incorporated into the utilities' routine.
- Addition of value to the business from functionalities' availability resulting from the integration.



▪ SAP    ▪ AJURI  
▪ CBILL    ▪ CS  
▪ SIFAR    ▪ USEAL

## CAS Hemera Platform Integrations

- **Commercial Systems:** billing and connect & disconnect process automation.
- **Services in the Field:** customer services automation.

## Connect & Disconnect associated with the Commercial System

It allows the sending of connect & disconnect requests to be remote and automatic, offering greater agility and reliability to the process, in addition to complete monitoring reports and request history.

## Field events monitoring

It informs the events occurred in the monitored elements, alerting about physical and logical conditions related to the metering point. Through event analysis, analysts are able to infer on the existence of situations that require field inspections or regularizations.

## Advanced Tools



**Scheduling** allows activity automation, among them: billing, reporting, reading, parameterization and connect & disconnect.



**Generation and exporting of managerial reports** to study customer behavior, asset management and monitoring of Remote Terminal Units' connectivity and meters in operation.



**Meter's geographic location** visualization through Google Maps, helping the work of field teams.



**User administration and access with privilege levels.** Recording users' actions for the purposes of auditing and monitoring the commands sent, documenting all the actions taken in the meter.

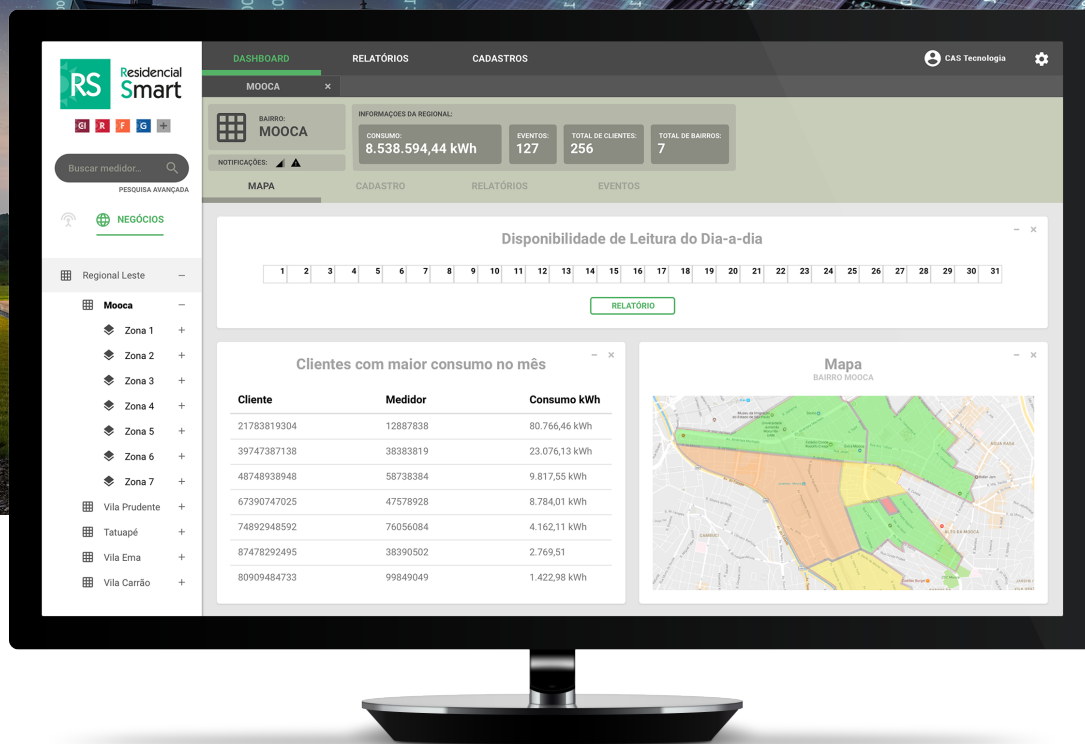
## Contingency and Performance



High data availability and scalability.

- Easy maintenance in the servers' physical architecture – allowing one server to take over the services of another when it is under maintenance.
- It allows the use of smaller servers with load balancing, enabling high availability and flexibility in storage.
- Effective improvement in message processing capacity, accelerating data recovery in case of unavailability.
- Process independence, allowing prioritization of the utilities' business' most critical activities.
- Compliance with several **operating systems**, adapting to any computational structure.

# Hemera Residential Smart



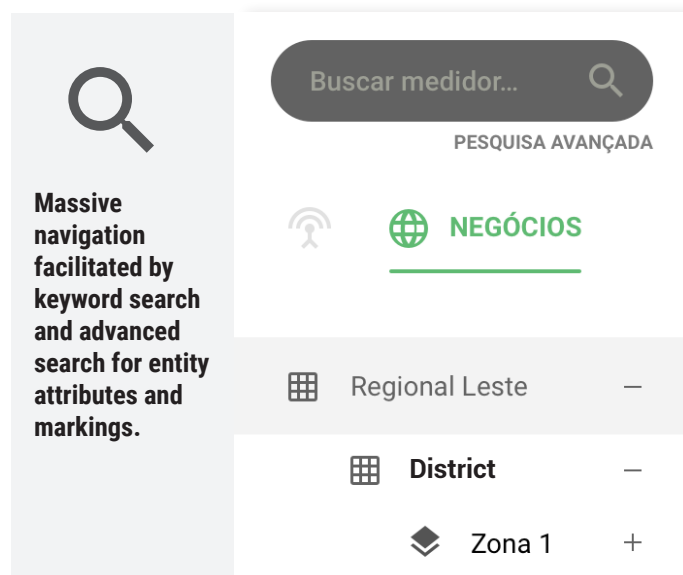
**Multi-tariff Smart Meters' large volume of information management, which contemplate Hour Tariff, Power Quality and Distributed Generation data, adding more intelligence to the business and massively facilitating the operational work.**

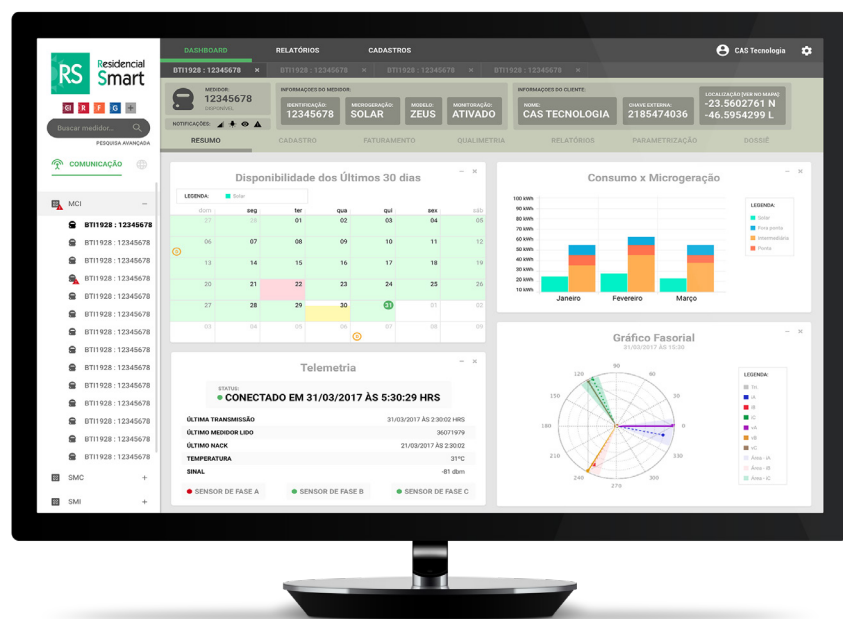
## Main Functionalities

- Multi-Tariff, including Hour Tariff
- **Binomial Tariff Support**
- Electric Power Quality
- Loss Analysis
- Distributed Generation
- Metering Data Monitoring
- Rules and Alarm Configuration












## Navigation in 3 Independent Views

- Communication View** – View the meters from its communication technology.
- Distribution Network View** – View the meters from the distribution hierarchy network.
- Business Vision** – View the meters from their geolocation in the concession areas.





## Exclusive Features

-  Different meter protocols recognition and conversion into metering data, exploring the advantages of each technology.
-  Management of energy and demand registers reading in four quadrants per hourly station.
-  Registers for billing availability analysis.
-  Mass Memory availability analysis for loss analysis.
-  Energy consumption management by Distributed Generation Tariff Station, by type of generation.
-  Instantaneous electrical quantities mapping in phasor graph.
-  Alarm distinguished management, allowing automatic inferences and utility inferences for markings on attention and monitoring states, in addition to occasional occurrences.
-  Remote Connect & Disconnect process management based on commercial or field operation processes.
-  Power quality and voltage data availability on a permanent basis.
-  Energy balance by LV transformer.
-  Consolidated views by customer group, with a synoptic view on a map of the most critical areas, by alarms and unbalance.



## RS2000 Remote Terminal Units Integrated to the Meter

**RS2000  
EVO**

**ZEUS**



**RS2000  
EVO**

**SMW**



- **3G/GPRS** remote communication, with possibility of dual SIM Card.
- Interface with meter according to the **protocol (DLMS/COSEM, MODBUS)**, allowing:
  - Register readings and instantaneous quantities collection.
  - Configuration.
  - Drives – such as Connect & Disconnect.
- **Local configuration** via **Bluetooth** interface.
- **Field contingency for Connect & Disconnect and reading** via Bluetooth interface.
- **LAST GASP** alarm.
- Equipment's internal **temperature** indicator.
- **Remote Terminal Unit's** firmware upgrade.

# CAS Hemera Frontier

Border Metering and Free Customers operational and strategic management, in compliance with regulatory requirements.



## Metering Management

Hemera Frontier Platform provides resources and tools that meet the Border Metering and Free Customers needs, helping in energy supply continuous monitoring and in information management.

- It provides relevant and complete information, updated in real time, which contributes to decision making and the identification and resolution of failures related to data collection in the field, including recorders, mass memory and instantaneous electrical quantities.
- It enables remote actions by metering and operation centers, anticipating eventual field maintenance. It provides tools for meter remote parameterization.
- It controls and manages the energy consumed by Free Customers in the utility concession area.

## Market Regulations

It allows the availability of an exclusive channel for the regulatory agency, or a shared but priority channel. Metering data are made available in the form of detailed

reports according to the user's needs, in standardized file formats to meet regulatory requirements.



## Tools for monitoring data collection and XML files generation

The collected data are processed and the XML files generated for submission to the regulatory agent. This functionality meets automatic generation demands by scheduling or manually, as required by the customer.

## Integration with different Protocols / Meters

Hemera Frontier Platform has intelligence to interpret all the metering protocols currently used in the country and approved by the regulatory agent.



## Main Tools:

### Virtual Meter

Hemera Frontier has the Virtual Metering tool, which enables metering data compound calculation for a region or group of consumers, according to formulas pre-established by the user.

#### Total energies summarization:

- Captive Market.
- Free Market.
- Power Plants.
- Billing Measurements.

#### Main and Rearguard Meter

A graphical report comparing the Main and Rearguard meters, containing all the tabular information from the Mass Memories.

#### Missing Data Automatic Reading

Missing Data identification through periodic tasks, with an indication of the period to be filled for the next reading to reach 100% of the Mass Memory.



#### Smart Estimation

CAS Tecnologia Virtual Meters use the missing data estimation methodology ONS-PDC ME 01, used by the regulatory agent.



#### Alerts about Past Events

Through configurable alarms, it allows to identify problems in the quality of the collected data, metering of atypical electrical quantities, discrepancies in the collected parameters, quality loss in power supply and other aspects of the network that require inspections and regularizations, promoting the analyst's fast action.



#### Task Scheduling

It allows the user to configure specific tasks, making process management more dynamic, with configurable scheduling options: billing, reporting, reading, parametrization, notifications, etc.

### Metering data compound calculation of a region/consumer group.



$$+ \div \times =$$

Compound calculation



# HEMERA

Screen: Main x Rearguard Meter Report.



## Metering Reading

### Metering contingency tools in case of reading failures at the Border and in Free Customers.

It allows meter reading in order to avoid that the teams use different softwares for each type of meter.



Mobile app for Smartphone to collect readings from electronic meters:

- Web Manager.
- Native integration with the Hemera® Platform.
- Collector with Android operating system, and Bluetooth communication.



Point to point meter reading, using regulatory agency communication channel.

- Communication problems diagnosis and meter configuration.
- Tests in the regulatory agency audit channels.

## Free Customers Billing



In addition to Free Customers billing already performed by Hemera for all standard ABNT meters, it is possible to carry out the billing using **SL7000 Meters** through public format standard ABNT file.



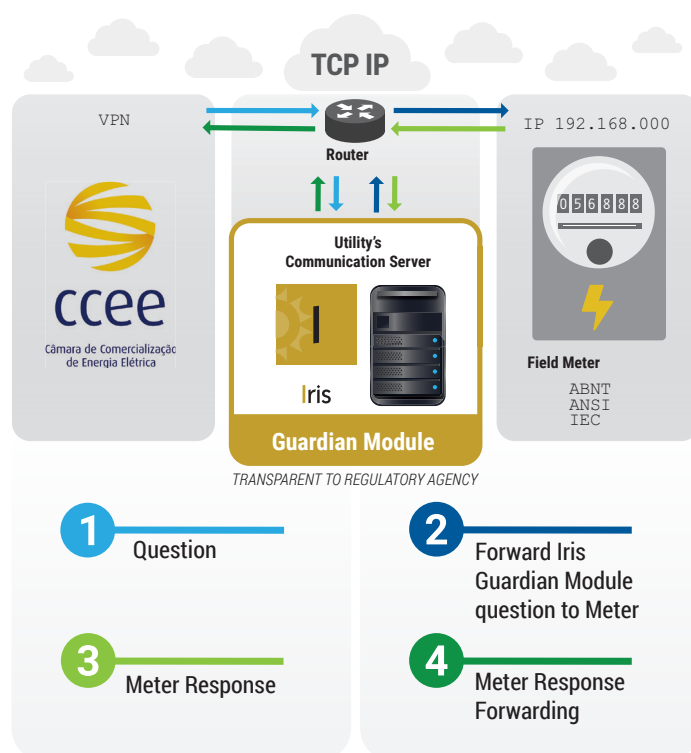
Guardian

It monitors the readings carried out by the regulatory agency for logical inspection, with protocol verification and analysis of the communication channel up to the meter. It identifies communication failures and allows the repair for new access attempts. Success in monitoring communications between the regulatory agency and Utilities.

- Carried out logs analyses.
- Analysis report.
- Alarms – identification of events related to communication failures.

Through the **Port Forward** module, it is also possible to perform the regulatory agency analysis for meters that do not have telemetry / CAS Remote Terminal Unit in the field or when the agent already has a TCP-IP infrastructure up to the meter.

### Communication Architecture



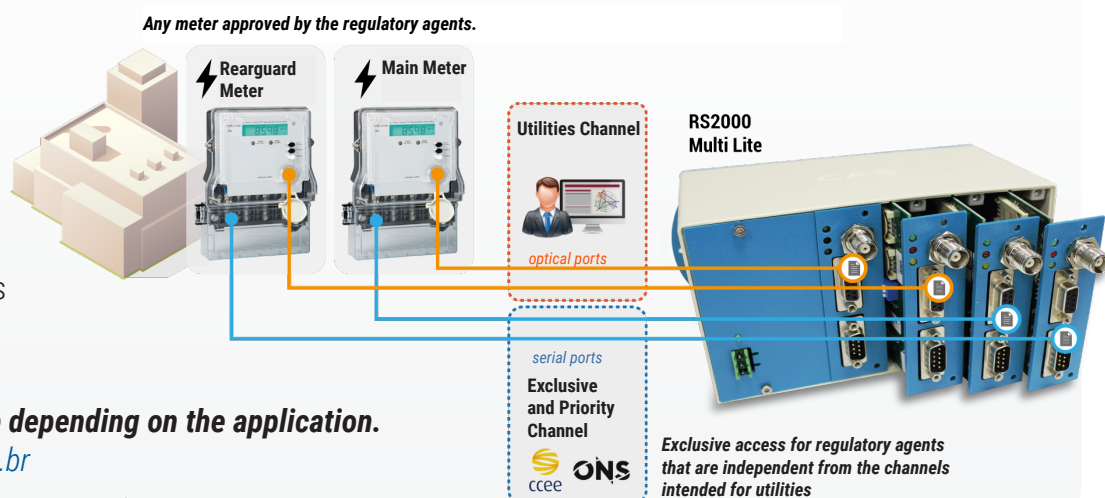
Communication Server that provides operational and strategic support, enabling two-way communication with metering and automation systems.

## CAS RS2000 Remote Terminal Unit used in the solution

Remote Terminal Units developed for **Free Customers** and **Border Measurements** remote reading.

### RS2000 Multi Lite

Exclusive system for sharing independent remote terminal units in a single cabinet, providing simultaneous readings from both Utilities and regulatory agency.



**Different models available depending on the application.**

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Ultra Lite GSM



Ultra Lite Ethernet



Lite DS 3G

## Hemera Frontier's Benefits

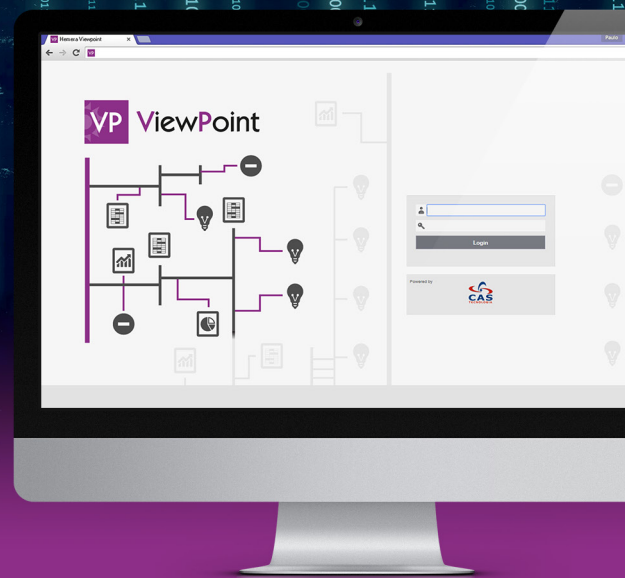
- **Easy** configuration and **complete asset control** in the field.
- **Multi-manufacturer approach:** freedom of meter choice, using a single piece of equipment in the field.
- **End to end solution:** from the collection to the delivery of information to regulatory agency.
- **Monitoring** and analysis of the actions carried out by the regulatory agent at the metering points.
- **Single platform** to manage **Residential Customers, C&I, Free Customers and Border Metering**.
- **Free Customers Billing** using the same standard as for Large Consumers.
- **Centralized and personalized support**, avoiding attrition with suppliers.
- Open API for **integrations with legacy systems**.
- Possibility of using the **existing IT infrastructure**, optimizing investments.
- Technical staff **specialized in the utilities' business**.
- Speed ability and flexibility in the development of **new features** for the product.



### Contingency and Performance

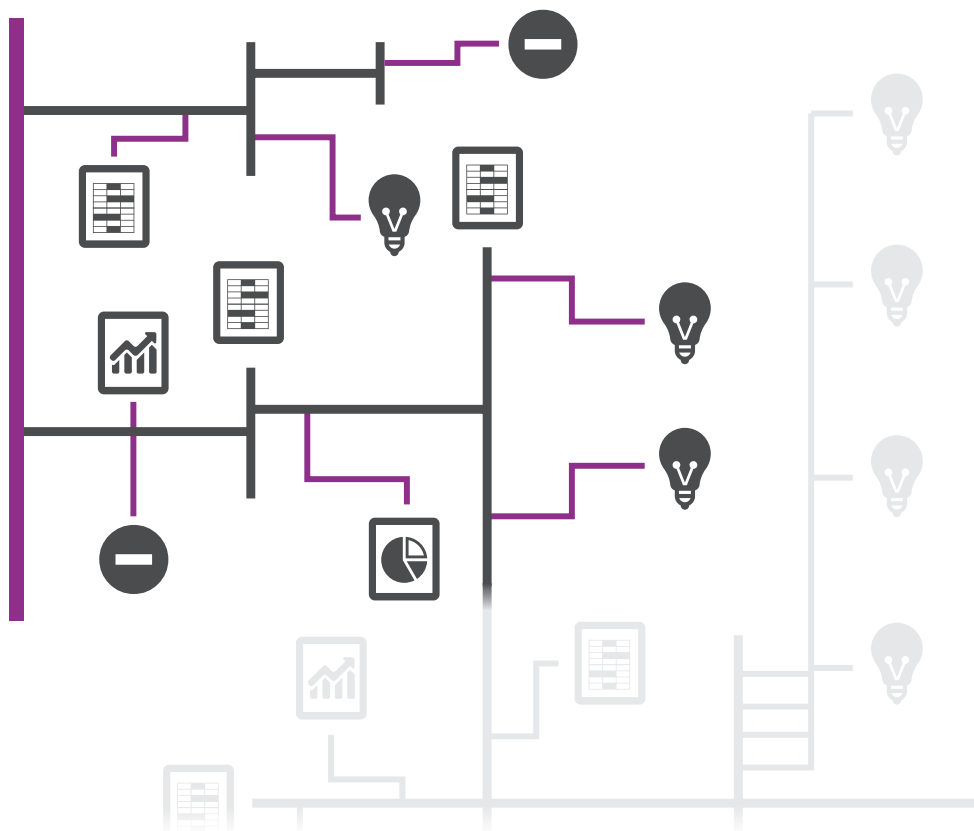
- Big data availability and scalability to meet the needs of utilities due to metering endpoints increase.
- Easy maintenance in the servers' physical architecture – allowing one server to take over the services of another when it is under maintenance.
- It allows the use of smaller servers with load balancing, enabling high availability and flexibility in storage.
- Effective improvement in message processing capacity, accelerating data recovery in case of unavailability.
- Process independence, allowing prioritization of the utilities' business' most critical activities.
- Compliance with several operating systems, adapting to any computational structure.

# CAS Hemera ViewPoint



**Utility's integrated operational metering management as an important tool for load balance analysis.**

ViewPoint system offers operational metering integrated management for utilities, enabling a web-based visualization of energy and consumption data, allowing centralized analysis of different points of the network, which are important for load balance.



## Advantages:

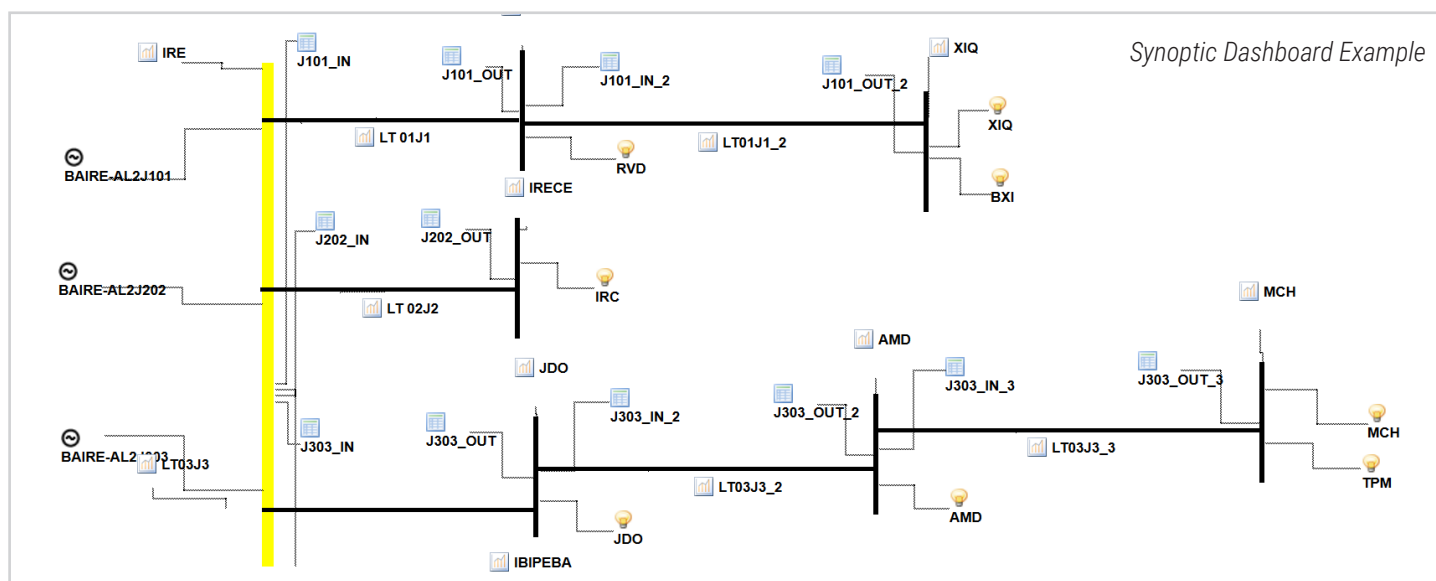
- Metering all load segments identifies electric load flow in the transmission network.
- Consolidation and automatic analysis of up-to-date information allows energy balance management and losses analysis, collaborating for decision-making.
- Performs centralized and efficient load management with no need for changes in the existing data structures and systems.
- Provides resources and tools to continuously assist customers monitoring for an agile and efficient load management.

## Operational Metering Integrated Management

CAS Hemera ViewPoint centralizes and consolidates data from different systems to determine the actual situation about technical losses and feeder circuits, enabling the full integration of automation data (SCADA), Energy Commercialization Chamber metering data with boundary and large clients (free and captive) metering data.

From information consolidation and automated analysis, the system allows energy balance management and losses analysis, identifying the energy flow in the transmission network. The energy flow monitoring in the basic network of the utility can be carried out daily, allowing mapping the network behavior in a detailed way.

## Features and Functionalities



### Comparative report of main and rear loads

The main and rear comparative load reports allow the evaluation of operational metering using the comparison between the resulting metering (accurate data) and the verification metering (less precise operational metering provided by the utility operating system). This way, it is possible to detect points that could harm the precise load matching.

### Loads Comparative Report

In order to evaluate the current load behavior, these reports are comparative data consolidated historical, used as basis to enable the load/point metering evolution. The load comparative between different periods (months) can be carried out through specific reports and the information is presented in graphics of losses for each metering point, by determined period.

### Synoptic Panel

The synoptic panel presents the transmission network topology mapping with the specification of every point that influence the load matching. This feature also allows identifying the energy flowing in the network per segment. The panel presents the sections in which the balance should be applied through the loads behavior analysis and boundary points. Main, rear and operational meters readings are performed.

### Verified Matching Load Report

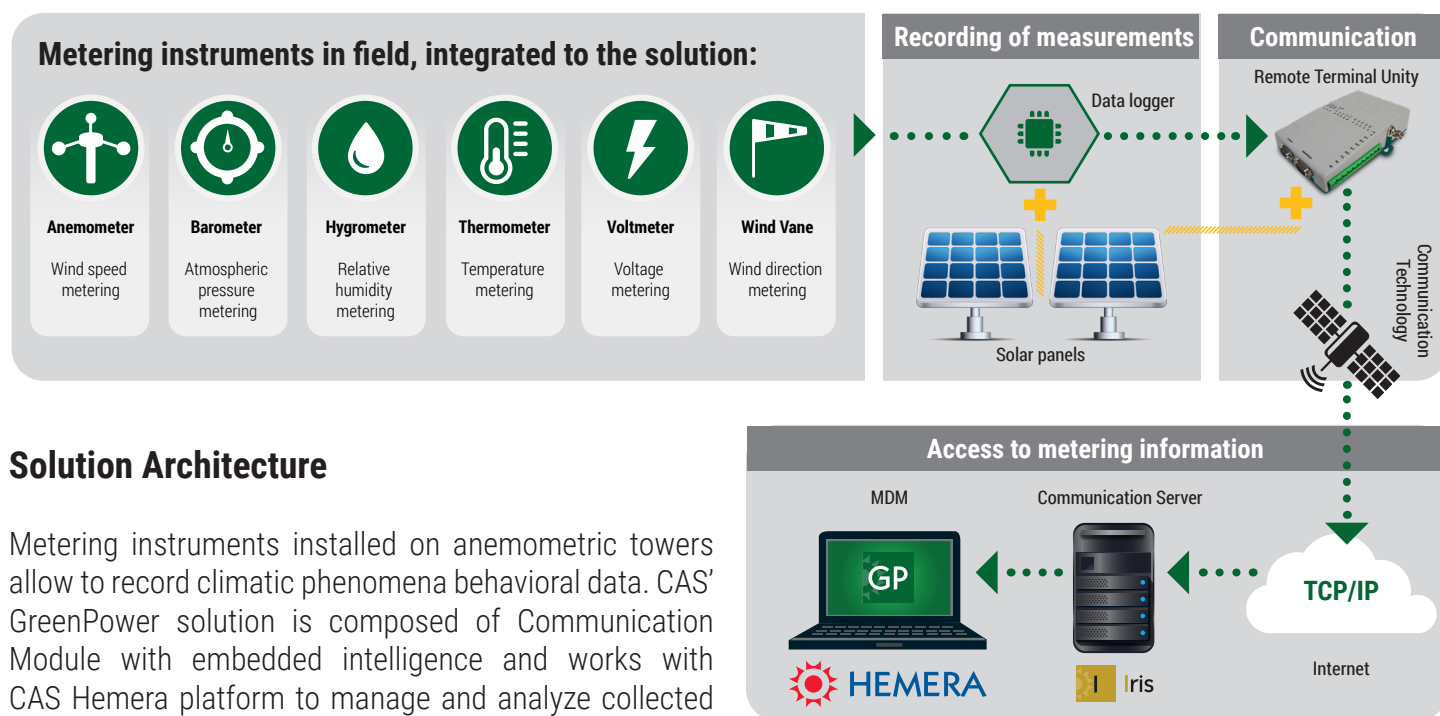
Through consolidated information, this report provides access to records of all matching load performed.

# CAS Hemera GreenPower

Operational support to feasibility studies and generation, from remote and continuous monitoring of climatic conditions and field instruments.



GreenPower was developed for companies seeking to endeavor or expand their business in renewable energy generation market through the continuous metering data monitoring.



## Solution Architecture

Metering instruments installed on anemometric towers allow to record climatic phenomena behavioral data. CAS' GreenPower solution is composed of Communication Module with embedded intelligence and works with CAS Hemera platform to manage and analyze collected information, with various data logger models so that all data generated by the instruments are transmitted and remotely stored.

For data communication, a range of technologies are required to enable the utility to respond to field challenges, including mobile and satellite network communication. The solution can also count on solar energy to feed the equipment.

From field deployed technology it is possible to frequently send data to CAS Hemera GreenPower. Information are organized and processed in order to support the analysts' efforts to be concentrated in necessary information analysis for study. One of the direct results of this process is field teams agility, avoiding to damage collecting data and the quality of the study in compliance with Energetic Research Company and National System Operator requirements.

## Features and Functionalities

### Reading Automation

Data collection automation enables its storage, shipping and consistent organization, gathering subsidies to remote monitoring and continuous operation.

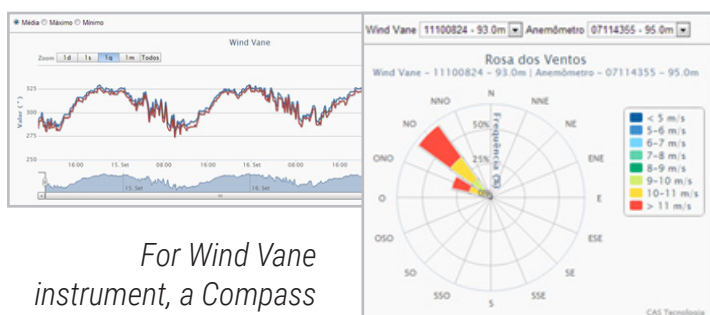
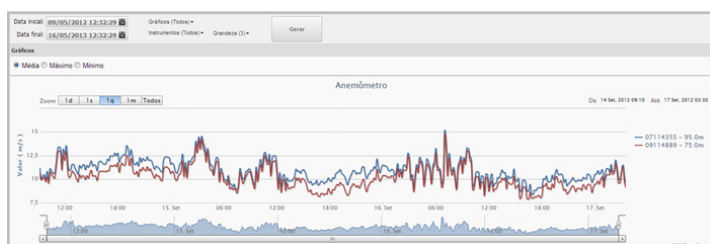
In addition to the possibility to access updated data, the solution allows the storage by the communication module, so in case of any data logger failure, the historic data base remains available to the utility.

Objects hierarchical presentation allows agility to register and to create field objects links:

- Complete data of each anemometric station
- Data loggers mapping by station
- Tower instruments individual detailing

### Graphic display of Metering Instruments

The generation of graphics for each instrument facilitates analysis. Graphics can be consolidated with daily, weekly, bi-weekly or monthly summarization.



*For Wind Vane instrument, a Compass Card chart is added to the screen.*

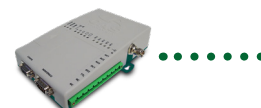
*Screen for data collection automation.*



### Meeting Regulatory Requirements.

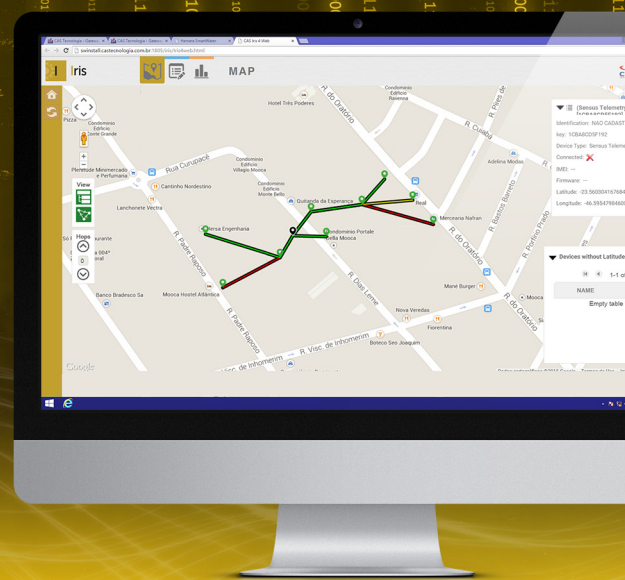
In compliance with Energetic Research Company and National System Operator requirements, CAS Hemera GreenPower offers file export tool to AMA system, according to technical note EPE DEA – 04/12 and to NSO monitoring.

### RS2000 product line - Satellite Communication Capability.



To meet all scenarios diversity, it is important to the utility to have options for communication technologies, even in remote environments. The CAS RS2000 communication modules were developed to provide viable alternatives for all environments.

# CAS Hemera Iris



*Communication Server that offers operational and strategic support, allowing two-way communication with certified metering and automation systems.*



*Compatible with multiple telecommunication operators and different technologies - 3G, GPRS, Radio, Satellite, Ethernet. It has the capacity to manage thousands of points.*

*It generates detailed management reports that are important for the telemetry park technical control and supports decision-making. It also optimizes the field equipment operational management.*

## *The use of CAS Hemera Iris allows:*

- *Data traffic - Gathers and processes the modules data traffic information to cellular communication costs control (mobile operator). Reports of cost prorated distribution for the data network according to the use by chip, by application and by client.*
- *Dual Chip - Manages the communication of dual SIM Card equipment.*
- *Reports - Administrative, statistical, alarm and disconnection recognition reports for the communication modules, with event logs.*
- *Multi-manufacturer - Allows integration with third-party communication modules.*
- *Security - Allows setting of different user access levels.*
- *Control of connections and commands - Control all connections and disconnections for each managed modules, sending maintenance commands for necessary reconfigurations in order to keep the connection active.*
- *Zigbee equipment integration - Enables the management of Zigbee equipment associated with a WAN telemetry.*

## SNMP Protocol

The Simple Network Management Protocol (SNMP) is widely used for network management, especially in networks for real-time data flows, facilitating the network monitoring.

Main benefits:

- Provides comprehensive network management by monitoring each component performance, as well as identifying and solving eventual failures.
- The availability of component performance accurate data enables effective actions in field.

## DNP3 Front-End Module

This module enables network monitoring in a qualified manner, going beyond the basic physical alarm functions of CAS communication modules installed in field.

The integration between communication modules used for customers metering and supervisory systems (SCADA) allows to the utility enhanced operations ability and added value to the business, since these same telemetries can be used for network analysis and control, outages detection and maintenance decision making.

The system provides the following information to the user:

- Outage events in clients with telemetry.
- Values of magnitude: power, power factor, frequency, voltage and current values with their respective angles.
- Field sensors status.

Main benefits:

- Each CAS communication module can perform as a network outage sensor, eliminating the installation of new components and boosting the return on telemetry investments.
- Provides proactive actions to field actions - such as contingency to distribution failures – supporting other areas in the utility like reactive call center service.

## COMMUNICATIONS PROTOCOL

### Ambiente de Campo

- Medidores
- Transformadores
- Religadores
- Equipamentos com RS232, RS485, Ethernet



### Comunica

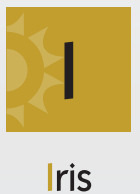
- Internet
- LP
- VPN

- Satélite
- Rádio
- Ethernet
- Rede Celular

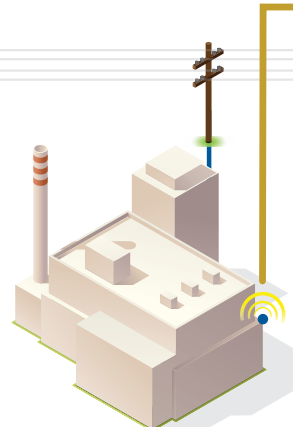
### Meter Data Management



### Communication Server



### Customers with RS2000 line communication modules





General illustration of communication protocols.

## Execution of Programmable Scripts

Intelligent functionality used in IRIS Manager to automate telemetry functions, detecting adjustments needs and executing them automatically.

In field, the communication module has, in its configuration, several business rules that able the analysis of metering data and adverse situations presented by the metering system.

Once the detection of the need to update the parameter configuration becomes automated, the process becomes more intelligent and agile.

Main benefits:

- Protocol, signal level and temperature monitoring. Tasks scheduling and event parameters setting.
- Agility at work, enhancing business knowledge.
- Scalability gain and operating costs reduction resulting from unforeseen circumstances that would require field services and maintenance.
- Integration with CAS Hemera Gauss system for analysis and notes of the executed scripts results.

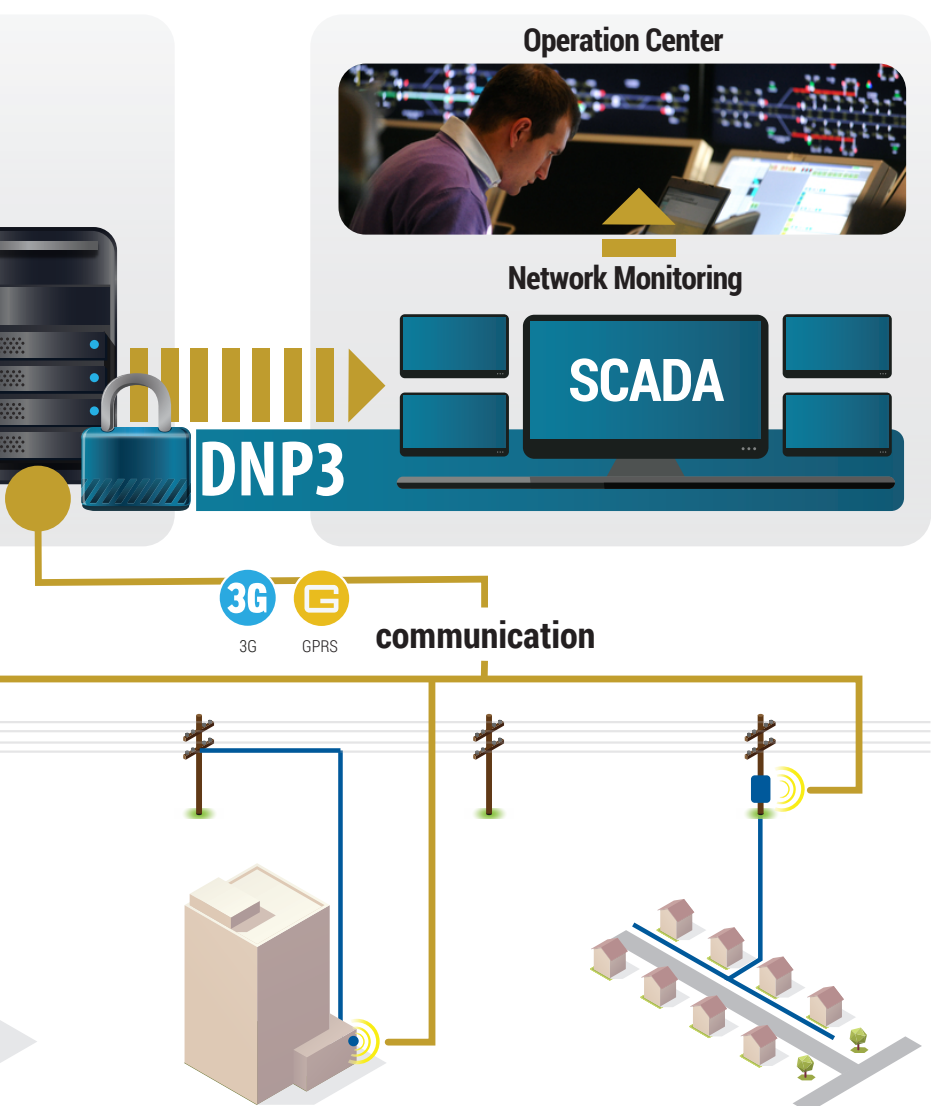


Illustration of the DNP3 Front End Module operation with CAS communication modules

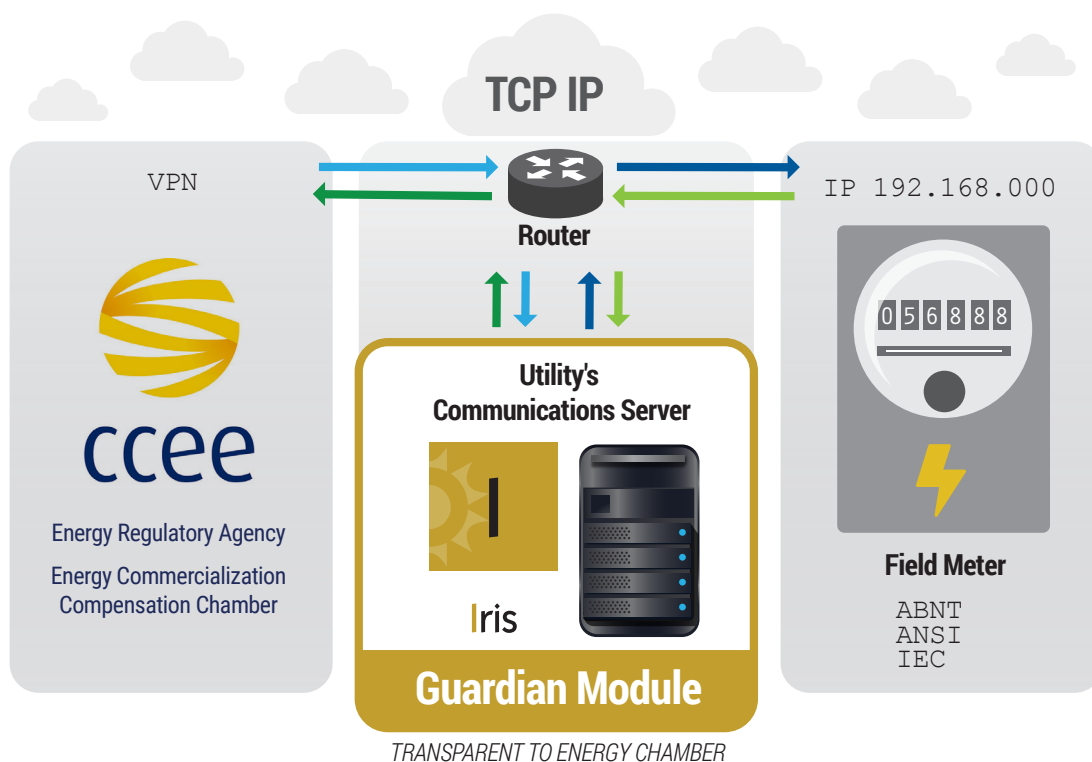


Illustration of the Port Forward Module operation

- 1 Question
- 2 Passing question Iris Guardian Module for Meter
- 3 Meter response
- 4 Passing the Meter response

## Port Forward Module

The Port Forward functionality is a mechanism available to the Guardian module users that enables Guardian-inherent Energy Chamber analysis to be performed for meters that do not have telemetry/field communication module.

That is, in scenarios where the utility already has a TCP IP infrastructure straight to the meter, the connection made by the client or by the Energy Chamber is monitored with the traffic protocol and the communication channel to the meter analysis.

Main benefits:

- Port Forward functionality is valid for ABNT (all national market) and ANSI, IEC (ION, Q1000 and SL7000) meter models.

## Contingency and Performance

High data availability and scalability to meet the utility needs due to the telemetry points increase.

- Maintenance easiness in the servers' physical architecture - allowing another one to perform when a server is under maintenance.
- High storage availability and flexibility using smaller servers with balanced load.
- Effective improvement in messages processing, speeding up data recovery in unavailability events.
- Independent processes to allow prioritization of the utility's most critical activities.
- Compatibility with different operating systems, adaptable to any computational structure.

# Hemera Iris IoT

There are billions of devices in homes, factories, offices, weather stations, oil wells, hospitals, vehicles and, in an increasingly technological world, the reliability of communication solutions, collection, storage and smart analysis of data from these devices is also growing.

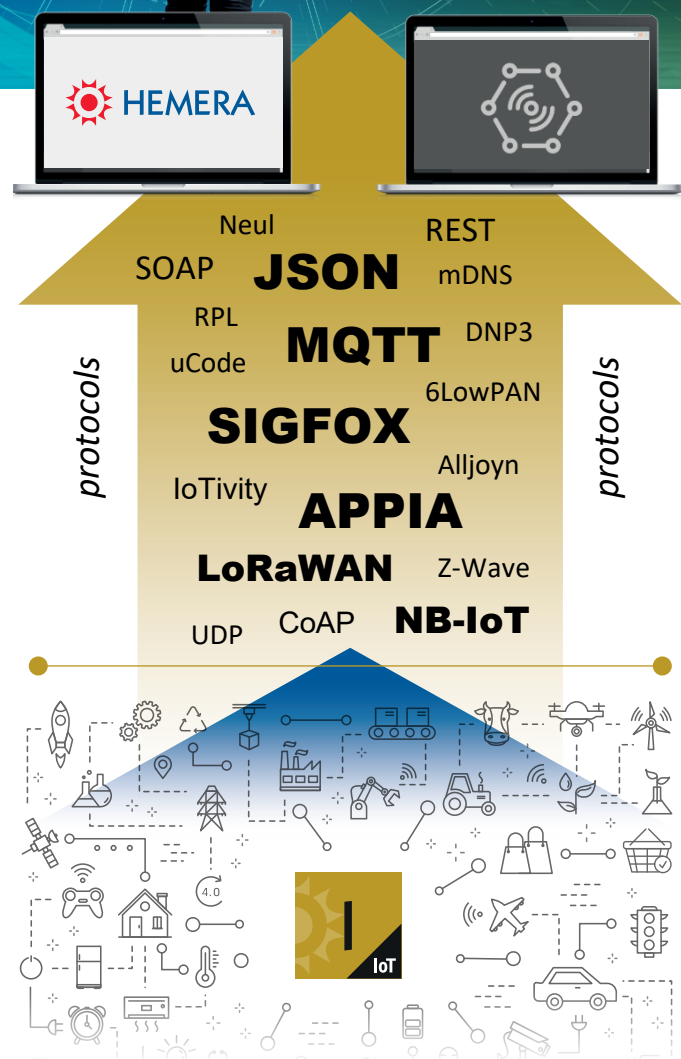
The IoT world behaves in an increasingly intelligent way, with devices communicating via internet in order to integrate and share data and tasks securely and efficiently.

**Iris**, the Hemera Platform Communication Server, offers operational and strategic support, enabling two-way communication between metering, sensing and automation systems approved in Brazil.

With the **Iris IoT** module, the platform expands the possibilities of communication between devices.

**Iris IoT** is a solution that allows for transparently integrating different devices with various IoT communication technologies, as well as systems and equipment that use different protocols.

Different protocols require new implementations and translators. **Iris IoT** automates the receiving, translation and transmission of information between integrated equipment and systems, making configurations and monitoring the solution's functioning through reports, presenting information in a user-friendly way.

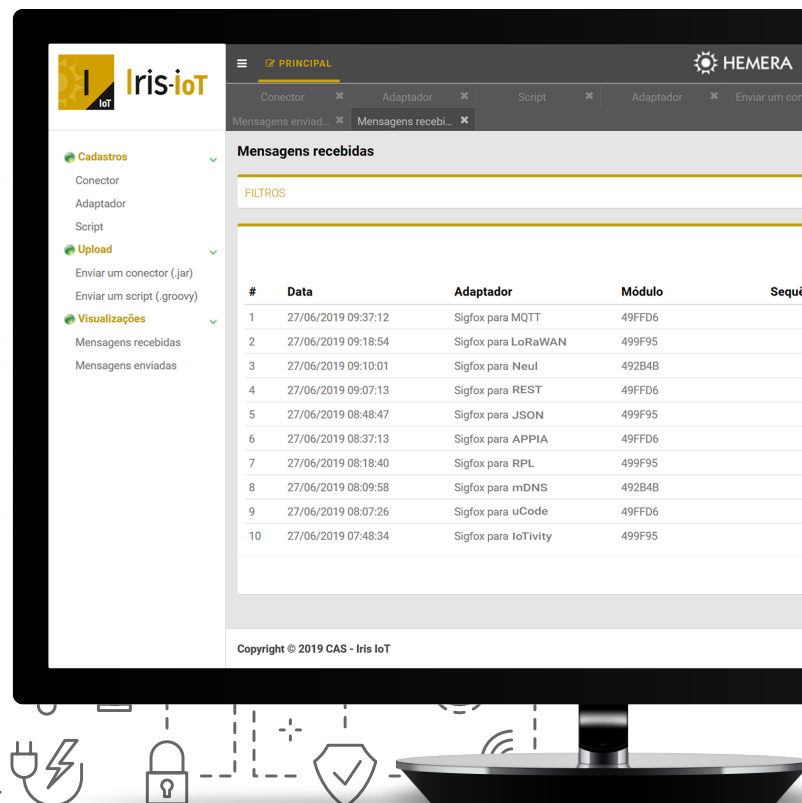


**Iris IoT** is able to translate numerous device protocols, in addition to interacting with systems that allow for receiving and sending data via IoT networks.

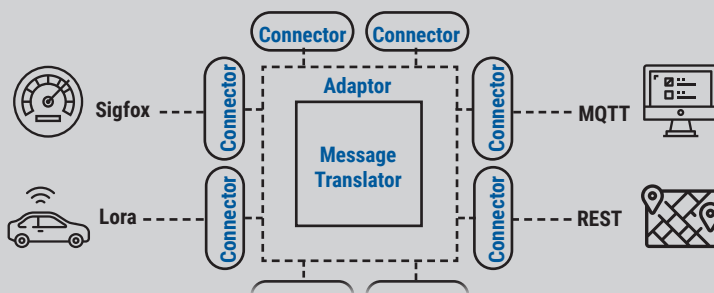
## Iris IoT Features

- IoT protocol translation engine with expansion to other protocols.
- Interface layers for communication with IoT systems, including CAS Iris.
- Data contingency mechanism, including persistence of messages obtained from integrated IoT systems.
- Transforming message payloads, allowing for conversion of application protocols.

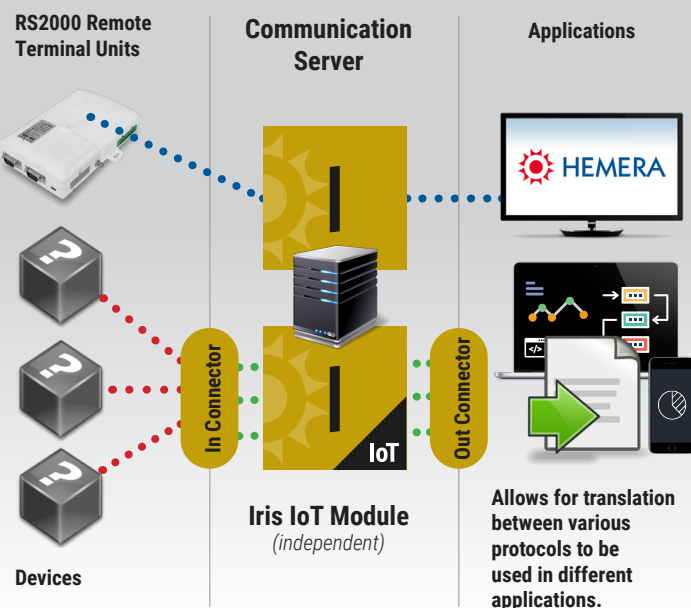
Front-End Environment of the Iris IoT



## Inside the Iris IoT



Solution Architecture - the Iris IoT is independent from the Hemera Iris.



## Connector

Equipment with new IoT protocols can connect to the **Iris IoT** via a new Connector.

Similarly, in order for the messages from such equipment to be available in a system, there will be a Connector to the system's API - Application Protocol Interface.

## Message Translator

Messages can be translated between different application protocols via a Translator.

## Adaptor

This is a kind of *tunnel* for routing messages from IoT equipment using a given protocol to a system that can interpret the same protocol.

An Adaptor entails configuration of:

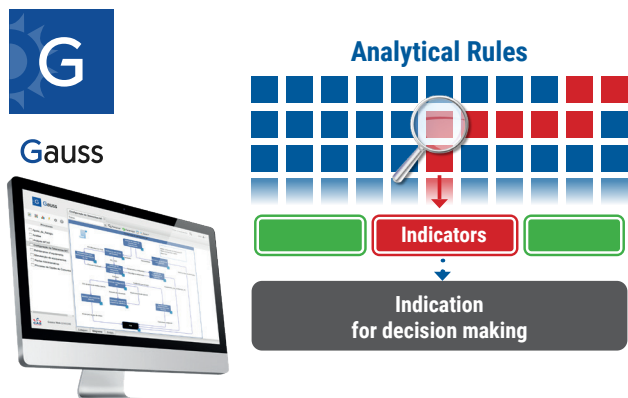
1. An Input Connector for the IoT equipment protocol.
2. A Message Translator.
3. An Output Connector from the interface protocol to the system that will use make available information from IoT equipment.

The Iris IoT allows for dynamic configuration of new Adaptors.

## Examples of Iris IoT application in CAS Tecnologia products and services

### Alerts

IoT devices can generate events from alerts and occurrences. The **Hemera Gauss** application uses analytical rules with these data to generate decision-making indicators in your business.



### Apps

iOS or Android apps can measure the signal level from **RS2000 Remote Terminal Units** used in the field.



### Geospatial View

Devices transmit signals that are viewed by map applications. With the **Hemera Dashboard**, the user can monitor these geospatial markers in real time.



### Graphic View

Information collected by IoT devices can become a database for **Hemera Platform** applications, generating monitoring graphs.

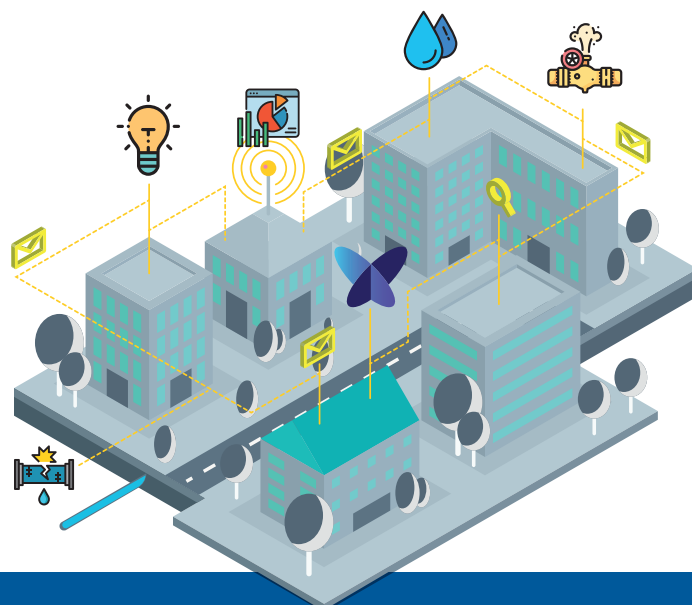


### Individualized Metering

Devices can be implemented in water, power and gas meters, in condominiums, industries and commercial centers, using IoT protocols and monitoring consumption individually.



CAS Tecnologia offers an Individualized Residential and Corporate Metering Service.  
[mi.castecnologia.com.br](http://mi.castecnologia.com.br)



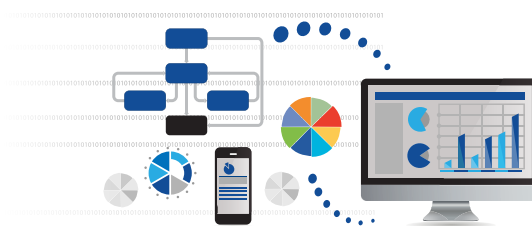


# CAS Hemera Gauss



**System developed to implement the BPM concept with the capacity to manage the Metering Management processes, prioritizing the Utility's decision making.**

**Gauss** meets the complete process management cycle, from modeling to implementation, monitoring and optimization. Workflow control is achieved by creating the respective process steps.



As an advantage, the system is expandable for the application of business rules for different scenarios, allowing: stage creation, filling of configurable fields in each stage, application of transition between stages rules, flow integration for automatic start, change of stages notifications, traceability of each stage of the process.

The indicators available on the platform are the result of the application of rules that are configurable by utilities.

- They increase analysts' technical visibility, allowing the work to be optimized.
- They allow a view of the process, providing indicators and management reports: performance over time, assertiveness of the analysis process and energy gain.
- Allow the creation of several flows for the utilities' processes. E.g.: Contract Control, ISO Document Management, Equipment Maintenance.



## Recovery of Energy Losses

This **Energy Loss Recovery** module is applicable to **C&I Customers** – Commercial & Industrial – to map the end to end revenue assurance process for the utility.

It applies more than **80 business rules** configurable by the utility, combined with more than **30 physical and logical CAS telemetry alarms** to point out suspicious targets that can cause losses. Using **Gauss** it is possible to concentrate the utility's metering analytical activities, allowing a more agile and assertive decision making:

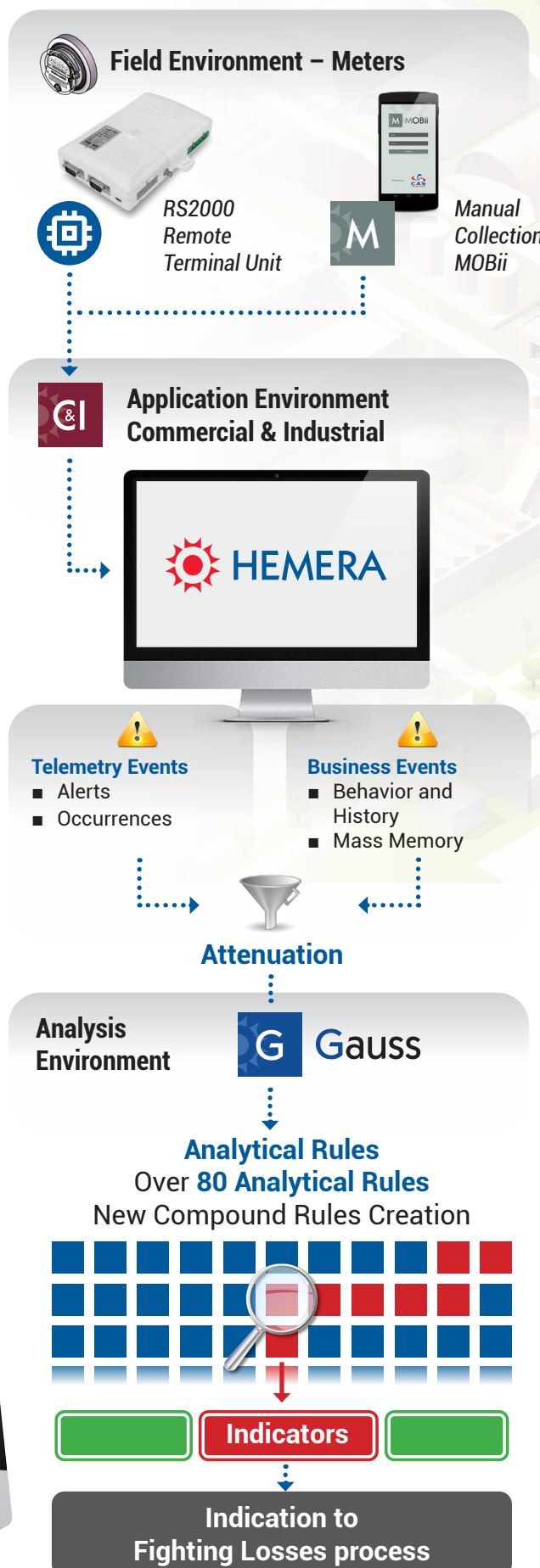
- Invoiced Consumption History.
- Load Curve.
- Phasor Graph.
- Rule Occurrences.
- Indicators.

Rules	Individual rules parametrization.	Creation of new compound rules based on the combination of individual rules.	Rules association to indicators, with configurable weights.
Indicators	Indicators that can point to: defect, meter parameterization error, registration error, suspected fraud.		
	Passing Score attribution to indicators to determine decisions on loss recovery processes.		
Task automatic distribution to people related to the process. Prioritization by indicators.			

At the end, an analysis dossier is generated with the possibility of adding documents, forms and images to a report.



## Loss Diagnosis Automation





Example:  
Meter's clock setting.



## Automation Server

Searching customers in need of clock setting.



Send clock query command



If attempts are over



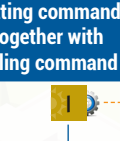
Record command failure



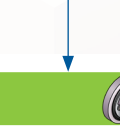
Field Service Call



Send Micro Adjustment command



Send clock setting command together with billing command



End Adjustment



In case of command failure



## Automation Server

It is a process automation module from **Gauss**, with a *Multi Agent* architecture, which allows the isolation of mission-critical tasks and scalability according to process demand.

It supports multiple programming languages and repository with version control.

Automation can be scheduled or triggered by events.



**Automation Server** can automate a task using an external system interface, perform a complex calculation or any task that can be coded in programming language.

Process management at utilities can benefit from **Automation Server** to automate, for example:

- Communication failures treatment.
- Telemetry configuration.
- Meter's clock setting.
- Control over the regulatory agency logical inspection.

## Automation Server native programming



### Communication Failure

- Telemetry communication test.
- Reading failure diagnosis.
- Call opening.
- Email return.
- Risk calculation and decision-making.



### Meter's Clock Setting

- Delayed clock warning.
- Time check.
- Correction through commands.



### Logical Inspection Regulatory Agency

- Logical Inspection Validation.
- Metering Data Delivery in XML.
- Call to open notification at the Regulatory Agency.
- Calls for equipment checks in the field in case of inspection failure.



Automation of the Regulatory Agency Data Delivery Assurance Process and Logical Inspection Monitoring.

## Process Automation at the Utility:



Meter Data Management

Meters  
in the Field

**Guardian**  
Logical  
Inspection  
Regulatory  
Agency



**Residential Smart**  
Monitoring  
Billing Connect  
& Disconnect



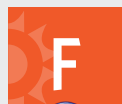
**C&I**  
Monitoring  
Billing



**Residential**  
Monitoring  
Billing  
Connect &  
Disconnect



**Frontier**  
Monitoring  
Load  
Regulation



**Iris**  
Sending  
Commands



Process Metrics  
with Dashboard



Automation Server

Utility  
Systems

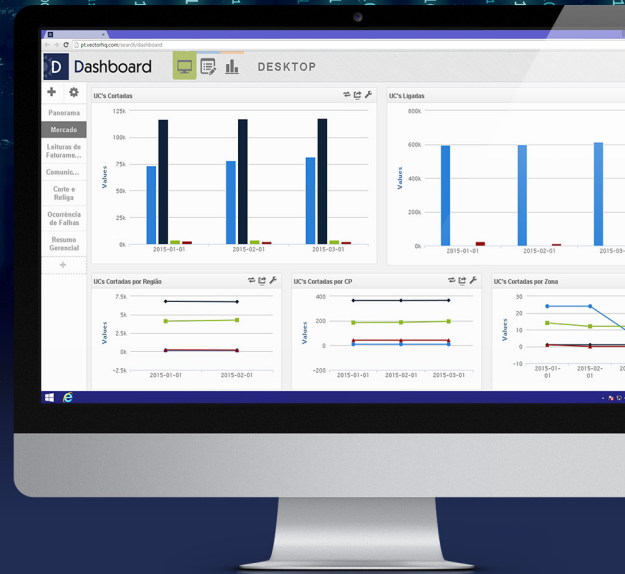
- Communication Failure
- Contingency Meter
- Failure
- Energy Failure
- Billing



### Gauss Benefits

- Speed:** Shorter response time to business demands.
- Assertiveness:** Better results in fighting losses.
- Automation:** Reduction of manual actions.
- Flexibility:** Flow creation and business rules mapping.
- Potencialization:** Analytical intelligence improving productivity.
- Robustness:** Ability to process big data information and scalability.

# CAS Hemera Dashboard



Analytical view for best operational management based on utility analysis and quality processes.

Dashboard system was developed to support new management control demands for billing and metering processes. These demands are mainly due to:

- Need for resources that favors the operation control and management follow-up.
- Growing data volume and the operation complexity.
- Interest in a simplified view to streamline and promote decision-making assertiveness.

From advanced features, the module provides a consolidated view of data extracted from various sources and, natively, from the Hemera platform, with preconfigured reports and graphics.

In addition, CAS Professional Services expertise enables to create new reports with no need for tool coding.

## Key tools and resources

- Desktop creations allow the subdivision of interest topics according to users profile and access permissions.
- A set of rules and criteria for applying filters to charts and reports makes the tool assertive in making priority information available.
- It is possible to add the desirable amount of widgets to each desktop by creating panels with unique information to each user business area.
- Each widget is configurable with different views for charts, tables, and maps.
- Customizable dashboards per user.
- Export to Excel, CSV, HTML, and PDF files.

## Preset Reports

### Field Facilities Overview

It allows the field facilities information view compared to commercial systems records. With data obtained from these records, it is possible to quantify and qualify meters installations in: clandestine installations, billed installations, meters without installations and public lighting.

In addition, it presents an overview of the field installations evolution by installation type with consolidated queries information: monthly, weekly, monthly by region, monthly by Primary Concentrator and monthly by zone.

### Connected Installations Overview

This statement presents a measurement by connected and disconnected customers, relates them to field meter qualifying and reports problems.

### Outage Overview

This statement presents an overview by outage time-lapse range, providing graphical widgets expandable in details in the metering points map.

### Overview of Alarms

This statement presents a view by alarm type, offering graphical widgets expandable in details in the metering points map.

### Billing Reading Performance

Provides effectiveness index for tracking the billing reading performance. The comparative report compares the number of requested readings to the number of sent readings and enables analysis refinement to find possible failures.



Above: Market Charts.

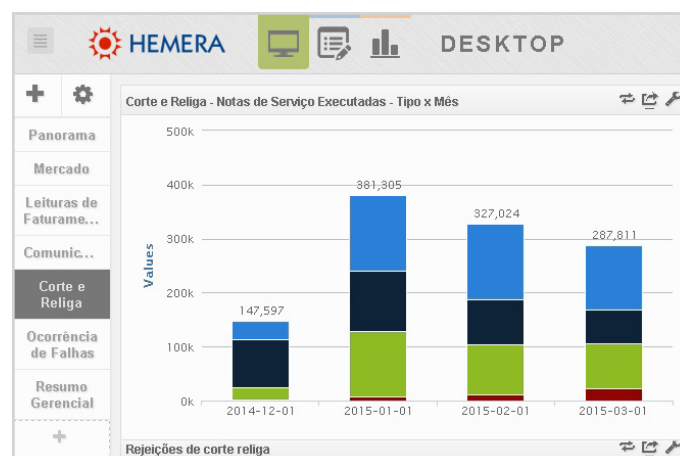
### Communication Performance

Monitors communication performance in different metering elements, such as: balance meters, meters, customers installations, communication modules, concentrators, among other network elements.

### Connect & Disconnect Service Performance

Monitors customer Connect & Disconnect operations performance from commercial systems service orders and compares to the effectively performed registers from CAS Hemera platform modules.

Below: Connect & Disconnect Chart  
- Performed Services Notes - Type x Month.



# CAS Hemera Smart Water

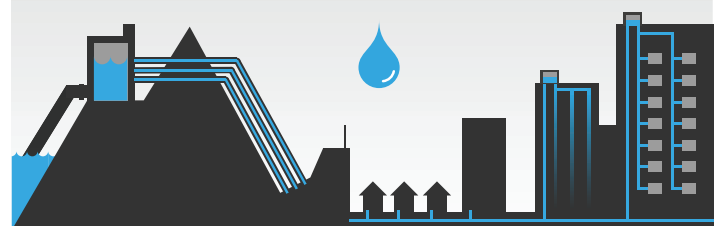


Designed for analysis and smart water management, meeting utilities supply and distribution demands.

SmartWater solution integrates resources in order to promote sustainability and efficiency in all aspects that concerns water system production and distribution. Available controls and collected information support Capex allocation processes. It enables greater return of investment, improving operational efficiency and service quality, while reducing losses.

## Smart Water network solutions should:

- Comprehend and manage all water supply processes.
- Monitor and diagnose events remotely and continuously.
- Manage and prioritize maintenance issues.
- Automate, simplify and streamline processes.
- Guide decision-making based on real data.
- Comply transparently and securely to all regulatory demands and to water quality and conservation policies.



## Utilities challenges

- Water utilities have insufficient access to information such as consumption profile, leaks, network pressure, pipes conservation status and quality of distributed water, required for a perfect production and distribution management.
- Lack of real time information analysis for decision-making and non-integrated knowledge in the different operational areas.
- No access to automated technologies to streamline the decision-making process that generates real time improvements .
- The necessity to minimize losses and possible environmental damage caused by disruptions, spills or leaks that could contaminate drinking water sources.
- Low funding capacity worsened by theft, fraud, and metering problems, as well as an error-prone billing process.

## What can we provide?

### ■ Automation through smart software

100% electronic billing cycle, secure and integrated with other systems. Simplified, remote, online, fast and accurate meter management process. Automatic metering and alarms data available in time alarms.

### ■ Revenue protection

Billing process improvement through the previous identification of metering failures, meters without reading access, inconsistent or incorrect readings.

Allows a proactive billing process with early troubleshooting still during the billing cycle. Ensuring greater security and fraud detection in equipment.

### ■ Operational efficiency

Melhoria da eficiência operacional nos centros de distribuição de água, reduzindo perdas de receita com captação, tratamento, distribuição, submedição e furto de água.

### ■ Customer Service Improvement

Increases customer satisfaction as it reduces troubleshooting time, makes the billing process more accurate with no estimated bills and provide quick identification of suspected leaks.

Deeper visibility on customer impact, due to water supply maintenance operations such as reducing pressure and water outage among others.

### ■ Increases reliability in the company

Proactive troubleshooting approach, improving the company brand by reducing network losses and outages, avoiding the troubleshooting process based only on customer complaints.

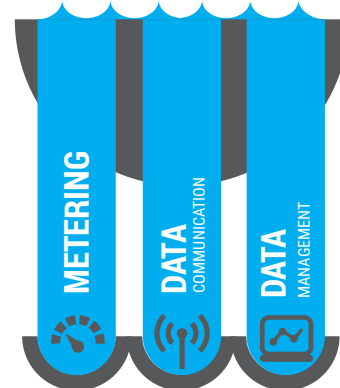


## Smart Water solution Pillars

CAS approach is supported by a set of integrated products and systems arranged to meet end-to-end needs. It is a proven solution meeting long-term technology strategies.

### SMART WATER NETWORK

SOLUTION FOR ANALYSIS, DECISION MAKING,  
TASKS PRIORIZATION, OPERATIONAL  
MONITORING AND RESULTS MANAGEMENT.

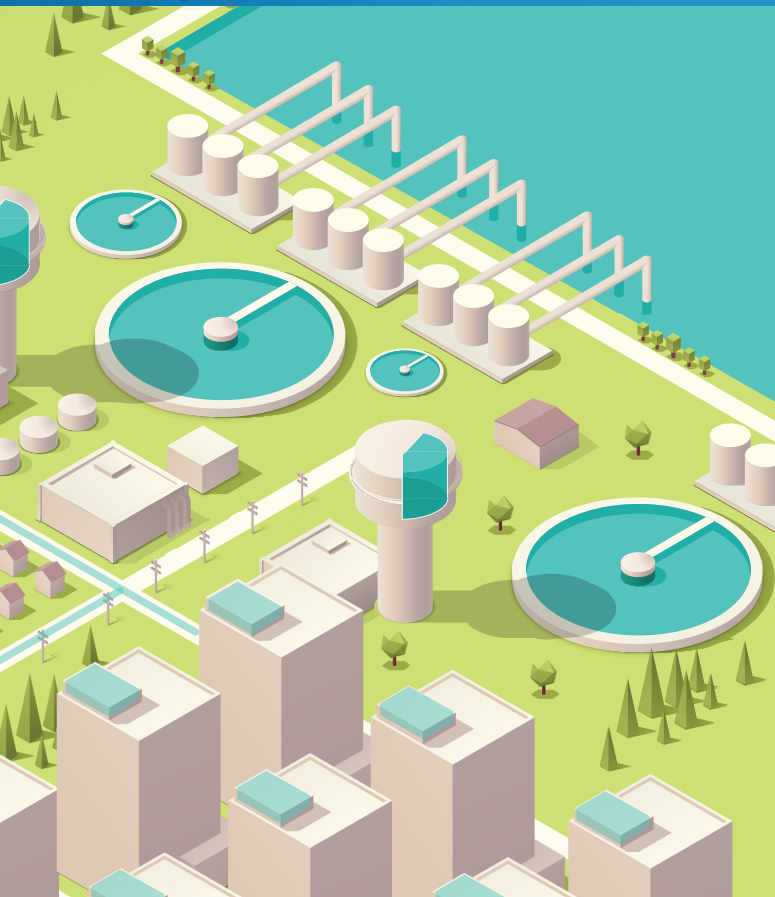


**Metering** automation and accuracy on data collection from smart meters and sensors.

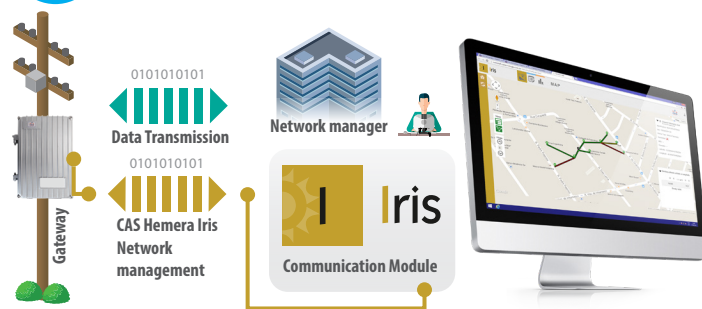
#### **Data Communication.**

Continuous and two-way communication, even in big data scenario, focusing on promoting the information availability.

**Data management.** Centralized and real-time, with flexibility for remote operation and integration with ERP and Billing system.



## DATA COMMUNICATION CAS Hemera Iris



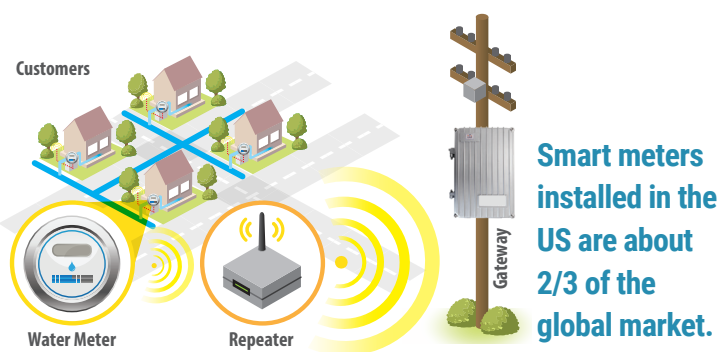
Robust communication technology with various connectivity models to suit different business demands. Ability to communicate to water, gas and electricity meters and sensors integrated to the meter data management platform.

It also offers advanced features for ongoing communication management in favor of data availability and multiple simultaneous communications. Integration with supervisory systems (SCADA).

*\*Not restricted to new equipment: applicable to all meters.*



## METERING Electronic and Smart Metering



- Intelligence regarding water leaks, outage, reverse flow and bypasses.
- Eliminates the possibility of readings error.
- Avoids costs related to problems to meter reading access and reduces the global costs of billing processes.
- Detailed historical information such as readings, alarms, minimum and maximum flows, stored locally with remote access.
- Remote parameterization.



## DATAMANAGEMENT CAS Hemera Smart Water

Provides features of a measuring center supporting key utilities processes such as reading, analysis, water supply and billing, focusing on quality of service, losses reduction and revenue assurance.

The Hemera Smart Water is a universal MDM platform capable of integrating meters, sensors and automation tools from different vendors in a single system. It has resources and tools for continuous and real time monitoring of customer and water supply, providing a single and consistent information view across the different utilities' business areas.

From its monitoring intelligence provides the identification of issues related to losses and defects.

**Wastewater is about 15% to 40% and may reach 70% in some developing countries.**

*\* World Bank*

## Tools

- Complete data readings validation.
- Reports and charts of readings and consumption from the entire network, Metering and Control Areas and single customers.
- Reports and analytic charts configuration to management and decision making support
- Macro-meter integration.
- Water balance analysis to prioritize actions to overcome network losses, allowing the identification, sizing and location of leaks. Long term monitoring in order to identify pattern changes.
- Online charts, alarms, reports in order to detect leaks and anomalies such as reverse flow or empty pipe.
- Individual consumption profile - analytics for inactive or disconnected customer with recurrent consumption
- Customers service with access to updated and accurate consumption data.
- 'Plug & play' and 'Self-healing' data transmission network.
- Accurate and automatic reading of electronic meters, no estimates.
- Reports and charts to assist in meter sizing and life cycle management.
- Robust platform, 'multi-tenancy' and 'multilanguage'.
- Integration API for third party application and system connection.



### Smart asset management:

Hemera Smart Water solution performs continuous monitoring of utility's assets, enabling effective management of all meters and efficient decision-making processes on replacement of outdated models.

### What meters should be replaced?

- With decreased efficiency over time.
- Not properly sized for the consumption profile.
- To important or critical customers.
- Old meters or meters with high usage.
- Abnormal consumption index/very high consumption.
- Technologies at risk of becoming obsolete.



**Information and devices  
Integration connected to this  
universal platform.**



### Contingência e Performance

High data availability and scalability to meet utilities growing needs considering the increase of smart metering endpoints.



**CAS Tecnologia  
In the Water Market**

### Focus on generating real results for utilities:

- Efficiency Improvement.
- Investments prioritization.
- Operations optimization.
- Economic Sustainability.

### Excellence in water, gas and electricity markets solutions.

Experience	Abilities	Innovation
Experience in the Brazilian water market.	High end technology.	Unique approach in complete and integrated Smart Water solution.
Experience with Smart Grids.	End to end solution.	Solution in accordance with the market regulation.
The metering center benchmark in Brazil.	Agile development.	
Fully operational solutions.	Knowledge of utilities business processes. Global access.	Ready for long-term strategies.

# Consumption Management in your hands.

- + Connectivity
- + Mobility
- + Information
- + Economy



## The most complete application to monitor energy, water and gas consumption.

### Daily and Online Information

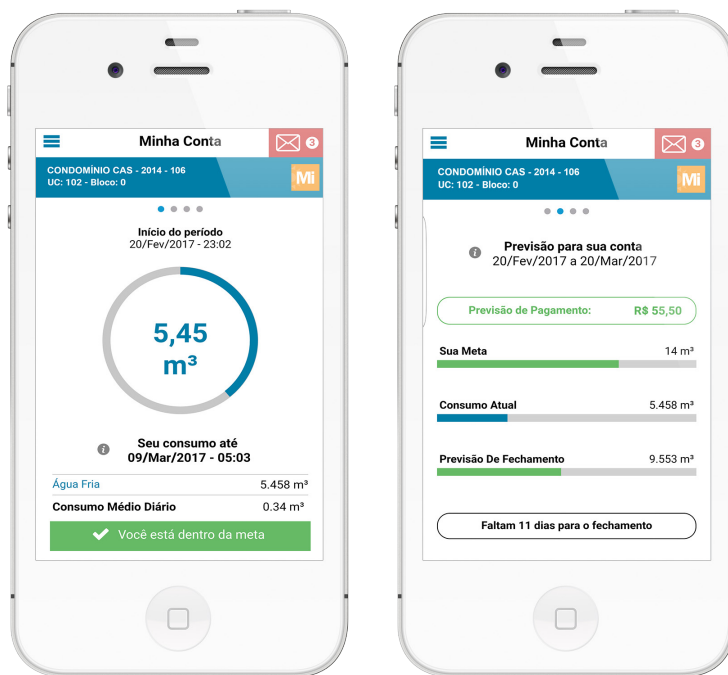
MOBii My Account offers consumption information, focusing on resources saving.

- **Daily average consumption.**
- **Monthly partial and total consumption.**
- **Consumption target.**

The system provides information according to the reading schedule defined by the condominium. The frequency can be daily, with pre-set times.

### Target and Estimation for Month Account

Each user can set a target in the application according to his own goal for consumption reduction.

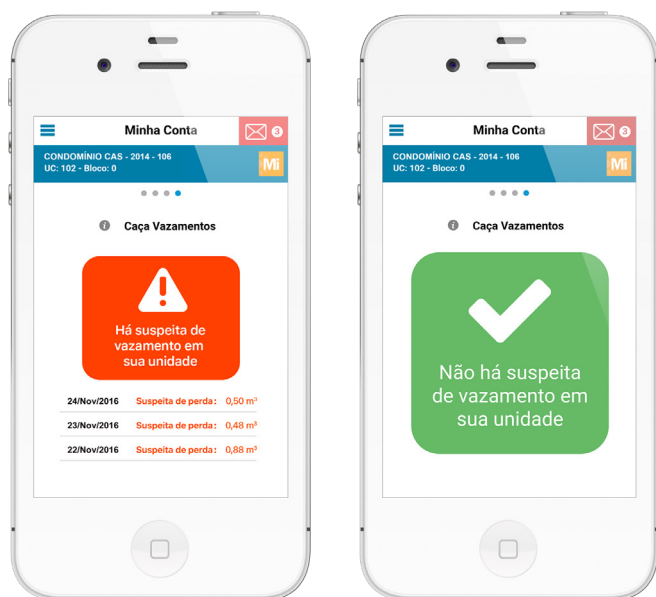


MOBii My Account also suggests a maximum daily consumption to not exceed the pre-set target for the month.

Charts tell you if the consumption is within the goal and forecasts the month bill value.

## Hunting Leaks and Alerts

The application indicates suspected leaks when the system identifies consumption during dawn for 3 consecutive days. In this case, an alert is sent to user informing the period of the occurrence and the amount wasted.



## Requirements



Internet connection - 3G, 4G or Wi-Fi.

Systems: Android 2.3 or higher - IOS 8.0 or higher.

## Sustainability and Conscious Consumption

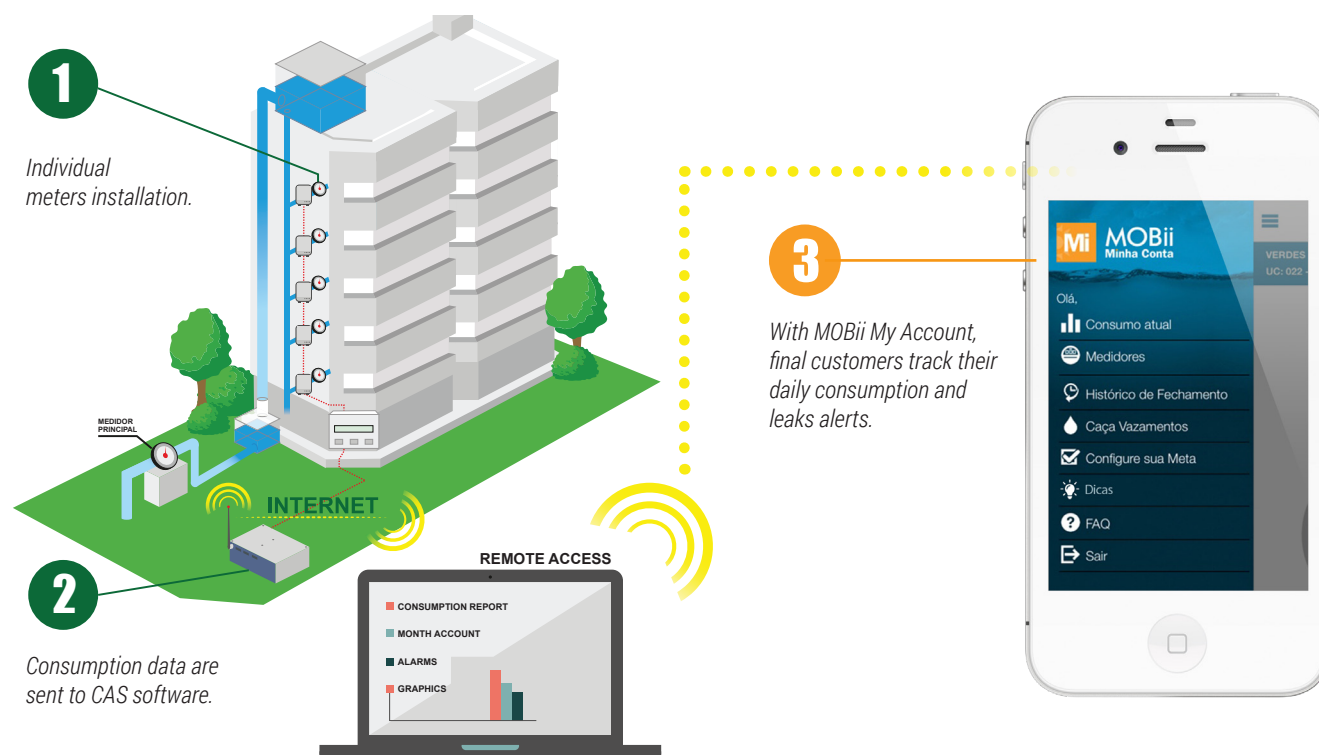
Mobii My Account is an important tool for metering daily consumption on an individual basis, providing the necessary information to ensure that consumption billing are collected fairly in condominiums.



Committed to providing information about new consumption habits of natural resources, EcoConsciente website offers up-to-date information, fun and simple tips on how small acts of everyday life can help to save as well as to preserve the environment.

[www.ecoconsciente.com.br](http://www.ecoconsciente.com.br)

## CAS Tecnologia's individualized metering system



# Hemera Cloud



**Processing services, storage and data management using servers provided by CAS Tecnologia.**

**HEMERA Cloud** use allows all Hemera Platform resources to be managed in a comprehensive and integrated way, **in the same way that the largest electricity utility companies in Brazil already use.**

With **HEMERA Cloud**, CAS Tecnologia takes an important step towards offering **Smart Grid Solutions** to utility companies of all sizes, enabling innovation in managing metering data, reducing costs and eliminating the complexities of IT, specialized labor and data backup within the utilities.

**Complete and updated information, in a centralized manner and in real time.**



With **Hemera Cloud**, Electric Power Utilities and Cooperatives can choose the best cloud Metering Management services, which is a worldwide trend, because they optimize infrastructure costs and allow companies to be more concerned with their business than with technology and maintenance of data management and storage environments.

*SaaS – Software as a Service.*

*PaaS – Platform as a Service.*

*IaaS – Infrastructure as a Service.*

## Hemera Cloud Solutions



Smart Metering Management, promoting ongoing Large Clients monitoring and control. Support to the main meters in the market, focusing on loss reduction and revenue assurance. Meter reading – Through **telemetry**, manual and **MOBii** readings.



With intelligence in big data reading from low voltage meters, it allows to identify and solve events related to losses, analysis, connect & disconnect, energy balance and billing.



Multi-tariff Smart Meters' large volume of information management, which contemplate Hour Tariff, Power Quality and Distributed Generation data, adding more intelligence to the business and massively facilitating the operational work.



Borders Metering and Free Customers Management, meeting regulatory requirements – generating and sending XML files. The Virtual Meter allows metering data compound calculation by region/consumer group.



Communication Server that provides operational and strategic support, enabling two-way communication with metering and automation systems.



Android app with web management module. It provides time reduction in field operations in C&I and Residencial clients, with online Service Orders update in the collector and meters automatic parametrization.

## Benefits and Services

### Ease and Feasibility






With HEMERA Cloud, utilities don't have to worry about:

-  IT Infrastructure
-  Specialized labor
-  Safety.
-  Data Backup.
-  Environment Monitoring.

Metering data management and actions to fight losses gain efficiency:




- 
  - Agile Implementation.
  - Low Investment.
  - No Maintenance.

### Services

-  System Usage Training.
-  Monthly export of meter information for billing.
-  Remote Terminal Units Monitoring.
-  Technical Support.
-  Shipping information daily generation to CCEE\*.

*\*Border Metering and Free Customers.*

### Access and Availability

-  Web access from anywhere.
-  Access to the latest version.
-  24x7 availability.



## Analytical Platform designed for Smart Grids. Advanced intelligence for utilities business processes.

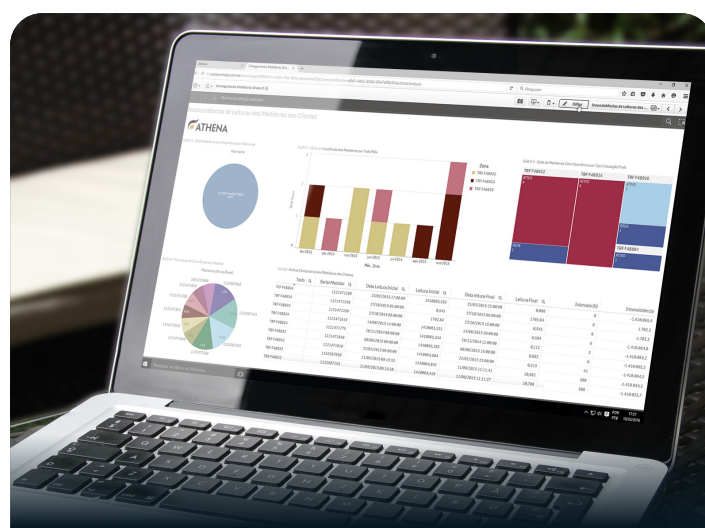
Smart grids provide much more detailed and frequent information about electronic meters and power distribution network.

Utilities' assets telemetry is the Big Data for power industry. Provides much deeper knowledge about load, its behavior and also about the distribution network.

That information, combined with other technical and commercial databases, generates value to the Distribution Company business processes, boosting the investment made in the smart grids.

The challenge lies in the ability to deal with and process big data, allowing users to automatically and autonomously develop analyzes through "ad-hoc" or structured searches.

Even on a conventional network, the solution enables faster and better quality analyzes at strategic, tactical and operational levels, by accessing granular information from different systems and correlating them in a contextualized way.



### Predictive, risk and decision support analysis for:

- Corporate Strategy.
- Market Analysis.
- Energy Supply Forecasting.
- Network Expansion Scenarios.
- Real-time operation.
- Pre and Post Operation Studies.
- Revenue protection.
- Customer Service.
- Engineering and Maintenance.



### Products and Services Quality

Decision support and service prioritization for outage restorage, with **real-time** information from every single event:

- Regulatory impacts: risk analysis about penalties indicators.
- Revenue losses: not supplied energy forecast.
- Amount of interrupted customers and critical customers identification and location.
- Field teams dispatch: suggestion for sequencing and routing services.

The application extends to service quality monitoring on a permanent basis and can be customized according to the most appropriate business rule for each event, reducing operation expenses, penalties related to regulatory limits and/or minimizing events impact on society.



### Infrastructure Management ••

Maintenance expenses reduction and risk minimization, by:

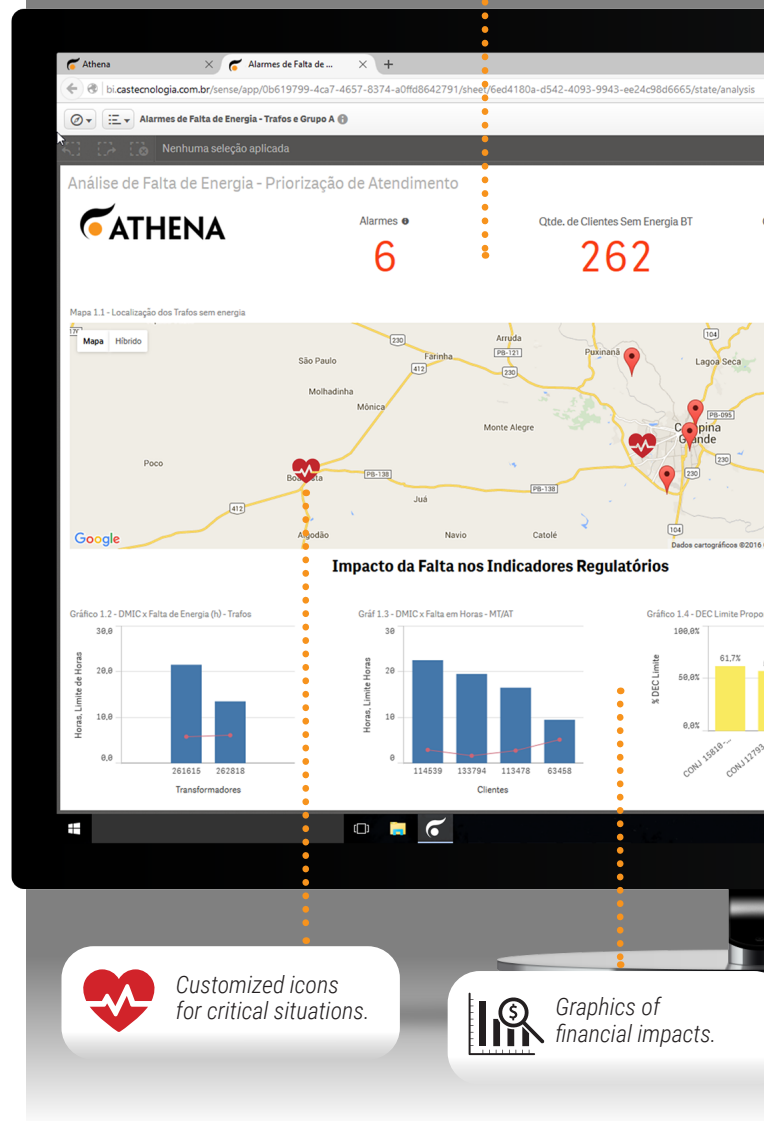
- Accurate assets performance monitoring.
- Identification of inconsistencies, defects and their consequences.
- Communication services quality monitoring.

A precise asset life cycle management identifies lack of performance and failure trends, guiding preventive maintenance or asset replacement. It makes possible the quality of services improvement, the profitability increase over the allocated resources, and a more efficient acquisition and asset management.



Real-time power interruption alarms.

Screen:



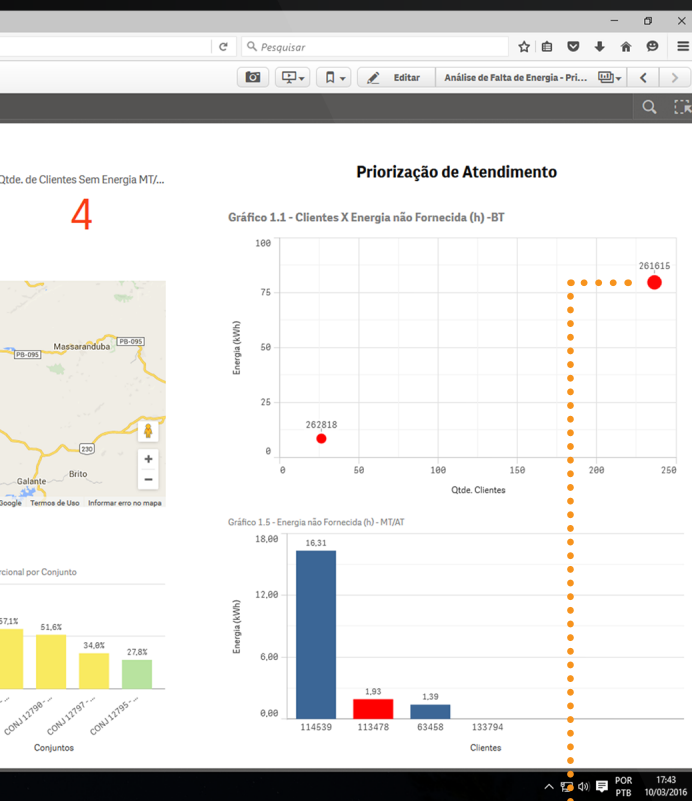
### Commercial •••••

By integrating a wide range of information from different sources, it improves the attendance service and reduce risks in all other customer services:

- Client qualification by adequate scoring.
- Greater assertiveness in customer services
- Agility for new loads approvals, according to network availability.

Provides better quality and greater productivity in services, with detailed customers knowledge, relationship historical and services experience evaluation.

## Power interruption Analysis - Service Prioritization



Scatterplots guiding decision making.



## Strategic Management

Provides advanced analytical view about different regions, business units or group companies performances, based on:

- Regulatory indicators comparison.
- Specific and personalized indicators configuration.
- Trends recognition.

Promotes risks identification and anticipation, helping to meet strategic management goals.



## Energy Market Analysis

Access to micro localized information such as consumption increase historical rate and demand growth forecast by network electric element/region to support processes that benefit with detailed knowledge about load behavior and network availability, such as:

- Market planning.
- Energy supply.
- Electric system expansion planning.
- Assistance to new loads connection (possibility of online consultation).

Great analysis flexibility and agility, and better planning resources, allowing elaboration of scenarios and associated costs, optimizing resources allocation.



## Revenue Protection

Customer behavior analysis, energy balance monitoring for distribution transformers and other associated commercial information are excellent sources for:

- Detection of potential irregularities.
- Improved assertiveness of inspections.
- Regionalization of potential risk scenarios.

It provides risk scenarios configuration in a flexible, integrating information from different sources and introducing new methodologies for fraud analysis.



## Customizable Modules

Fully flexible platform, available for customization according to the utility specific needs.

# Platform Highlights



## Easy Access

Access through main browsers in market - Internet Explorer, Firefox, Safari and Chrome. Available for Android and iOS for smartphones.

## Quality of Information

Information source management (extraction, transformation, cleaning, loading and modeling) carried out by professionals with expertise on utilities' business and all technologies involved.

## High Performance

Due to associative and "In-Memory" technology to consolidate multiple data sources and work with all of them loaded into memory (compresses data by up to 90%), the platform reduces problems like slowness and millions of Smart Grid data complexity management.

## Integration

Integration with several corporate systems: MDM, GIS, Commercial Systems, Service Order, SCADA, Control of Technical Losses, Public Information Systems etc.

## Query Flexibility

"Ad hoc" queries allow users to explore data directly on the platform, automatically and autonomously, no need of an IT analyst.

## Quick Decisions

Eliminates logical errors, allowing decision making based on contextualized information from integrated database.

## Storyteller

Allows the executive and/or manager to understand analysis records through the construction of scenarios and risk assessment by collecting data.



**CAS** tecnologia

[castecnologia.com](http://castecnologia.com)