Monitoring: Products and Services

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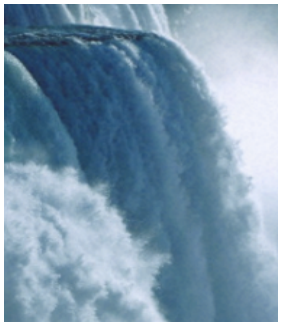
ENERTRONICA GROUP

Index

Applications



Water management

Industrial Automation

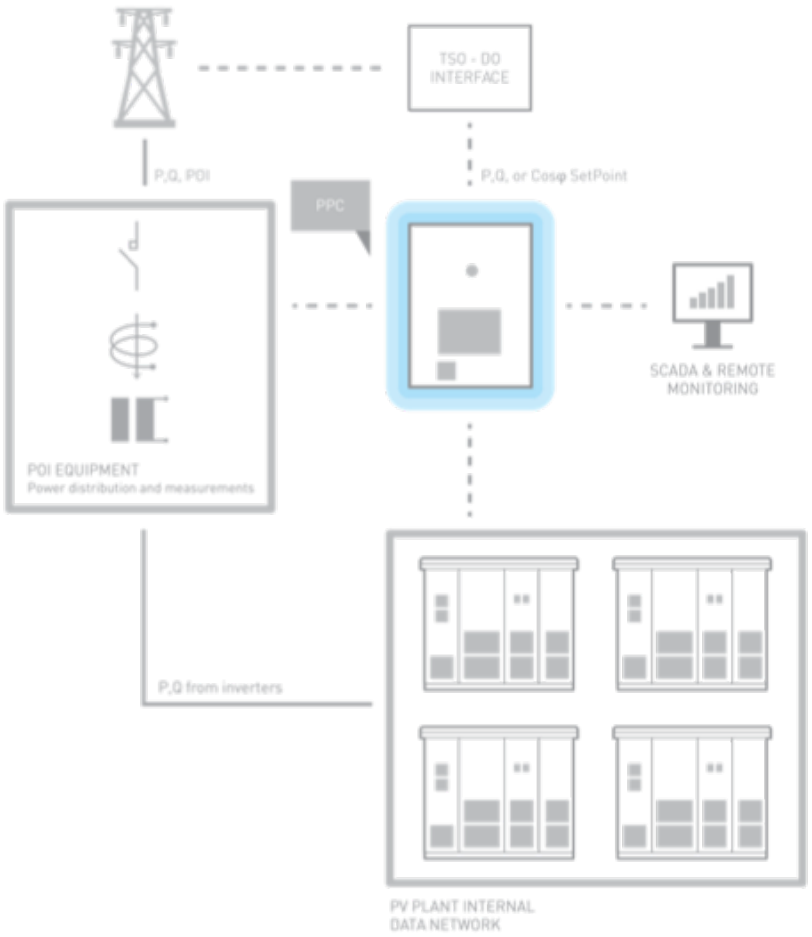
Energy consumptions

Wind

Photovoltaic

Santerno monitoring solutions can be applied to several areas and allow a secure and reliable management of the data, everywhere and any time.

Energy control: ***PPC***



PPC, Power Plant Controller, regulates the energy production for the entire plant

Independent from rated power

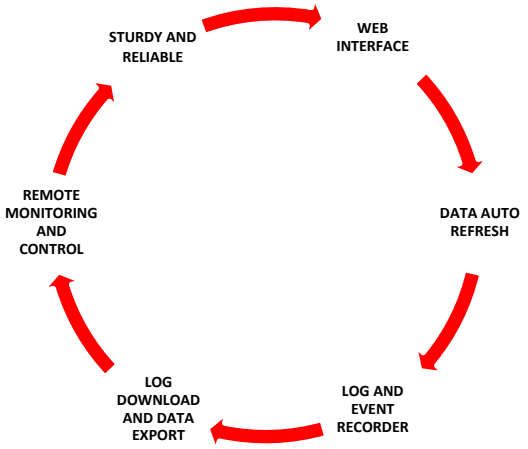
Control at POI, Point Of Interconnection

Both local and remote commands

Scada and grid operator interface and communication

Control modes available:
- Active power
- Reactive power
- Power factor (cos ϕ)
- Voltage
- Start and stop

IoT Datalogger: ***Bridge***



Bridge Mini Embedded

Bridge Mini Standalone

Bridge

Bridge connects systems, machines and data all together. A simple and fast way to implement monitoring application

Available in three versions: ***Bridge*** e ***Bridge Mini Standalone*** and ***Bridge Mini Embedded***
Bridge Mini Embedded is installed inside the Santerno inverter (Sunway TG and Sinus Penta line)

Bridge can manage device of any brand and model, by means of standard IoT and industrial communication protocols

Bridge: tech specs

Power supply	9-36V
CPU	Celeron 1.83 GHz
Ram	4 GB
Storage	64 GB SSD
Communication ports	1 RS485 (insulated) 3 Ethernet ports 10/100/1000 Mbit
Wi-Fi	802.11 b/g/n (optional)
USB port	USB 2.0 host profile
Temperature range	-40° / 70° C
IP protection	IP20
Max monitored tags	Up to 1000
Mounted	DIN rail

Bridge Mini: tech specs

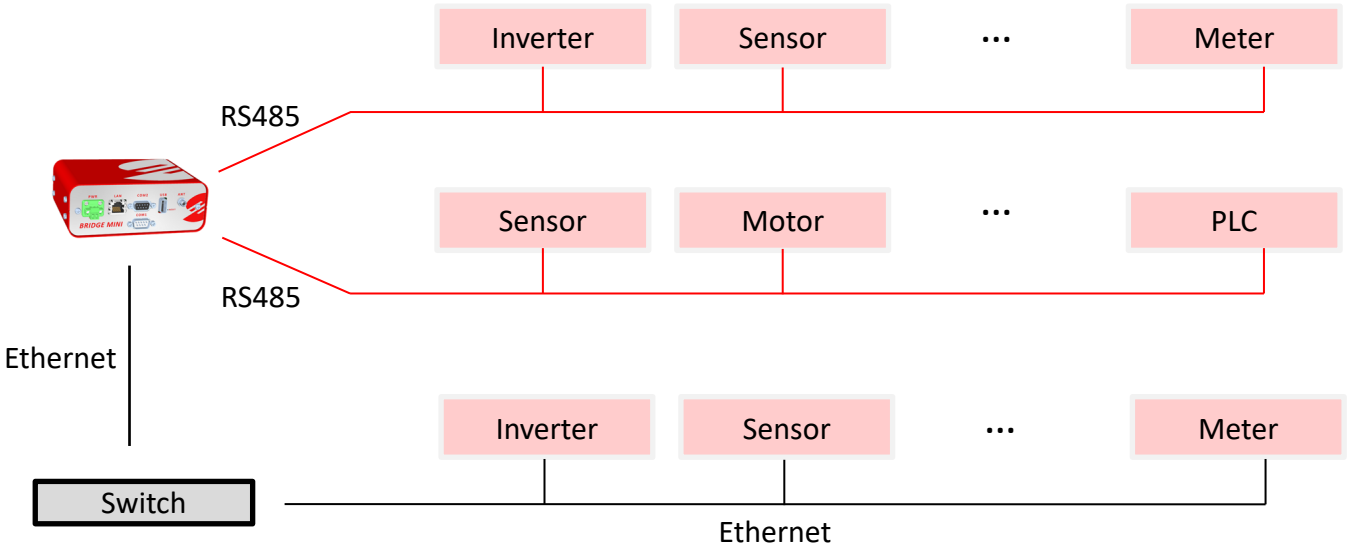
Power Supply	9-36V
CPU	ARM9 800MHZ
Ram	512MB
Storage	eMMC 4GB
Communication ports	1 RS485 insulated 1 RS485 1 Ethernet 10/100 Mbit
Wi-Fi	802.11 b/g/n (optional)
USB port	USB 2.0 host profile
Temperature range	-40° / 80° C
IP protection	IP20
Reset button	Factory settings reset
Max monitored tags	Up to 250
Mounted	DIN rail / inside the inverter(Sunway TG, Penta and Iris Blue line)

Bridge: Benefits

Bridge e Bridge Mini share the following advantages

Built in Web interface	Visualization and configuration are made with a standard browser, access protected with username and password
Automatic data refresh	Data is refreshed automatically (customizable timeout)
Custom synoptic	Synoptic can be customized
Datalogging	Measurements and events are saved onto the internal storage on Excel files (.csv). Sampling customizable
Log download	USB stick and FTP client
Data export	Acquired data is real time published with standard protocols, ie Modbus TCP, MQTT and REST APIs
Communication gateway	A single access to communicate with all the connected devices
Remote assistance	Secure and bidirectional connected with Santerno Cluod to ensure remote assistance, debug and configuration
Remote monitoring	Natively integrated with ***santerno.io***, the web portal dedicated to remote monitoring
Easy to upgrade	Both locally and remotely
Sturdy and reliable	Industrial temperature range

Local connection



Bridge may connect devices with serial wire (two separate ports) and/or Ethernet

Bridge support Inverters, PLCs, Meters, Sensors, any device in general, by means of Modbus TCP/RTU protocol

All the data is published with both standard and industrial protocols (Modbus TCP, MQTT, REST APIs as an example)

Bridge can be easily integrated with external monitoring systems, in order to realize multi layer architectures

Remote connection

Bridge remote connection with Santerno Cloud is

Simple: all the Internet connection are supported with no particular configuration needed

Secure: the connection is outgoing only, this ensure that there's no need of IT support to configure the local router (ie to open ports or configure protocols like UPnP)

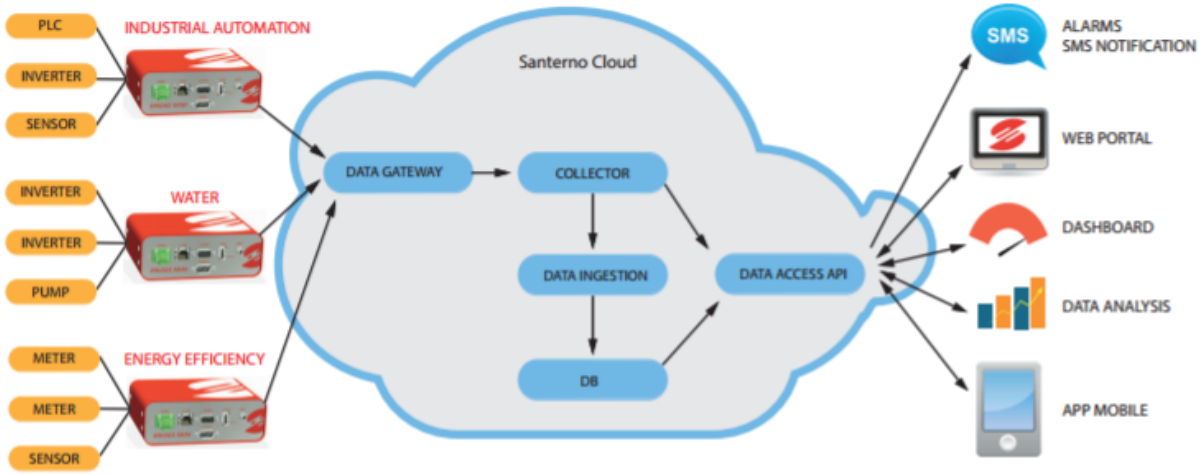
Encrypted: all the communication are encrypted with modern algorithms, ie AES256, SHA512 with string private keys (> 2048 bit)

Controlled: every Bridge has its own authentication credentials, which may be managed remotely as well

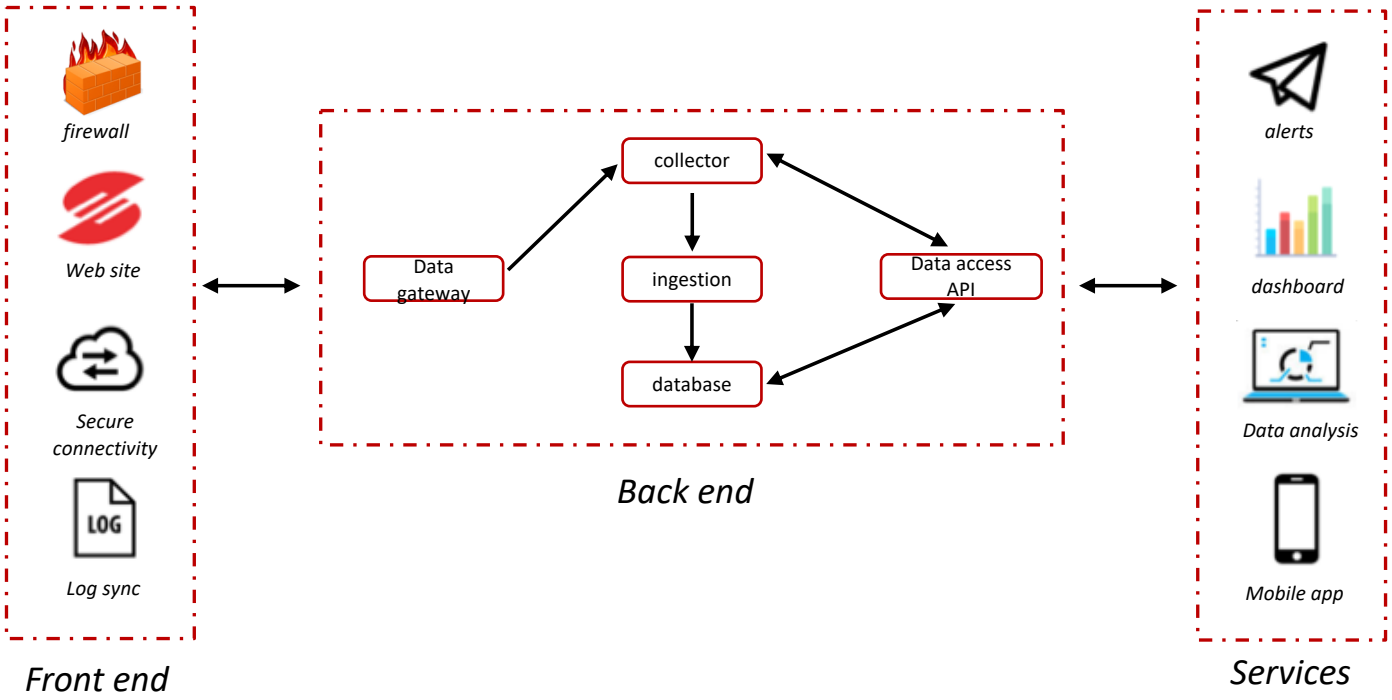
Remote services

Bridge may send data to ***santerno.io***, the Cloud application dedicated to remote monitoring

This web platform is reachable with any browser at https://santerno.io



Santerno.io: architecture



Santerno.io is made of three main layers:

- Front end: the systems and services published in the Internet.
- Back end: all the systems dedicated to collect, catalogue and manage users and data.
- Cloud services: that is the services directly connected to the user.

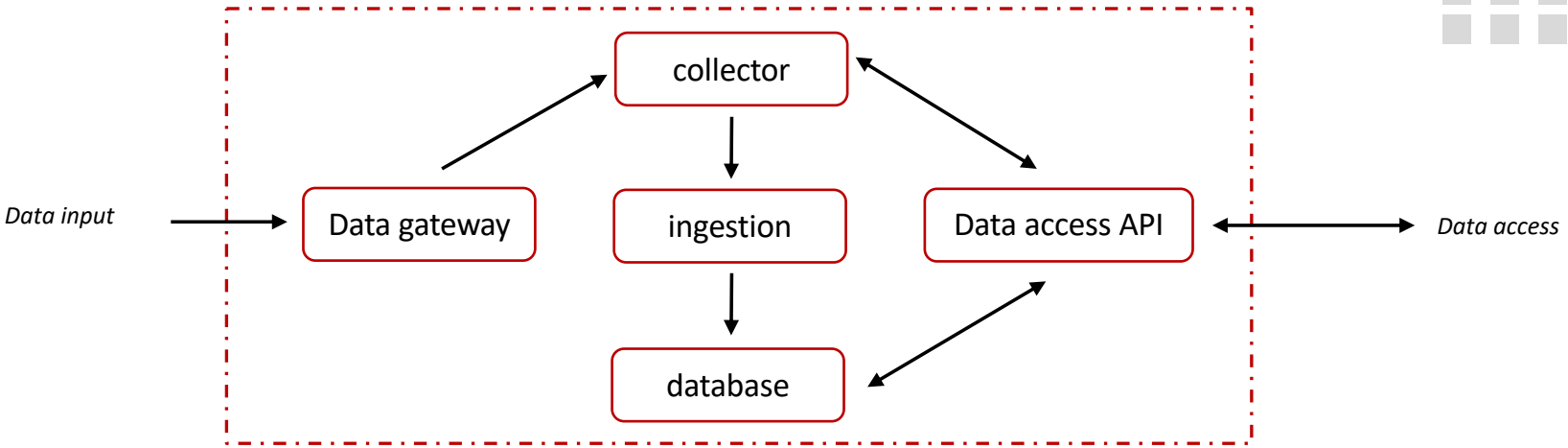
Santerno.io: front end

Front end contains all the services published on the Internet, and thus reachable with a public IP address.

This layer includes:

- Firewalls, which control all the traffic and protect the internal networks from attacks and not authorized access
- Web portals, like https://santerno.io
- Secure connectivity servers, which are the endpoint for the Bridge connections coming from the plants and ensure secure data flow
- Log synchronization servers, to daily backup the plant raw data from a centralized point

Santerno.io: back end



All the data coming from the Bridge are sent to a Data Gateway stage, where they are authenticated, authorized and routed to their receiver

Next step is data collecting, where data is made available for a fast memory access an prepared for storage

At the same time, in fact, data is stored in a database for analysis and queries. When plant raw data is synchronized after a communication outage, this stage ensures to recreate the historical trends

External access to data is guaranteed by means of communication APIs, which ensure that data is available for different systems and applications. Both realtime and historical data can be accessed

Santerno.io: services

The most important data driven services are:

- Alarms notification, email and app supported
- Dashboard, that is customized trends and charts of the most important plant metrics
- Data analysis tools, for data comparison and detailed debug
- Mobile app, for an easy and fast access from the smartphone

Santerno.io: logical architecure

santerno.io architecture has been implemented to ensure

Performance: santerno.io can handle millions of IoT sensors and thousands of connected plants

Scalability: as connected nodes and managed data increase Cloud resources are upgraded accordingly, with an almost linear scalability, without modifying the platform architecture or

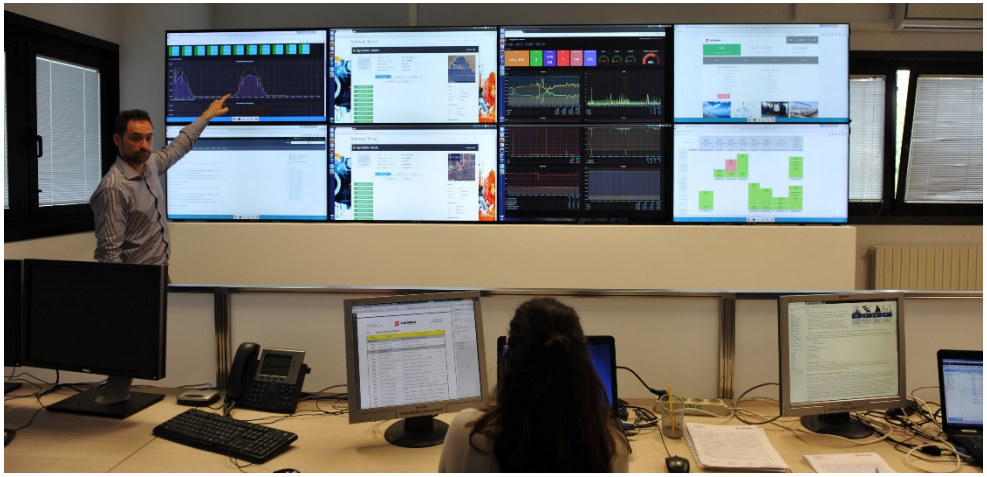
Reliability: systems and networks are redundant at any level

Security: all the accesses are authorized and authenticated, data is encrypted everywhere and security patches are applied as soon as they are published

santerno.io for PV plants

- Plant status and production control in any moment.
  All the relevant information is marked with a dedicated color and code which describe the realtime status in a easy way.
- Smart alarm notification, to ensure minimum downtime and field personell always updated.
- Constant data analysis, backup for detailed report
- Performance and availability calculation

Control Room: description



Control Room (CR) is the heart of Santerno monitoring activities and the proactive management of the O&M contract operations.

CR is remotely connected to the plants and can reach any installed device, including Scada, inverters, string boxes and sensors, in order to monitor all the relevant elements of the plant.

CR is tightly integrated with all the O&M services so it can guarantee to optimize intervention time and to centralize all the information coming from the site.

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