Bernini Building Energy Upgrade (Verona)

Movicon 11 supervises special systems for distributed areas designed for bank and office use

The 17th century Bernini building prominently stands in the historical centre of Verona and is now head office to a banking institute after being renovated both in architecture and advanced energy management technology in 2010 focusing on energy consumptions and building/system synergy in particular.

One of the general building upgrading project objectives was to install one unique system that controlled all plant engineering linked the thermo-mechanical and electrical systems, with the possibility of remote and local control management stations.
This building has three floors with a basement housing the central heating system.

SUPERVISION, MANAGEMENT AND CONTROL SYSTEM

The supervision system integrates into one hardware and software platform monitoring and controlling thermo, electrical, lighting systems with access control security, burglar and fire alarms fully monitored by TVCC.

All the systems use standard communication protocols so that they can be interfaced and communicate with each other easily.

The supervision system has been developed with the Movicon 11 Scada/HMI software platform designed by Progea which has made it possible to integrate in one PC Server only, multiple communication drivers such as:

- Bacnet/IP or LonWorks: thermo mechanical systems (DAIKIN and SAUTER)
- CEIABI/IP: anti-intrusion and fire alarm systems
- FXPro or ModBus: illumination and technological alarm systems
- Modbus serial and TCP/IP: electric network Analyzors
- TCP/IP: TVCC systems

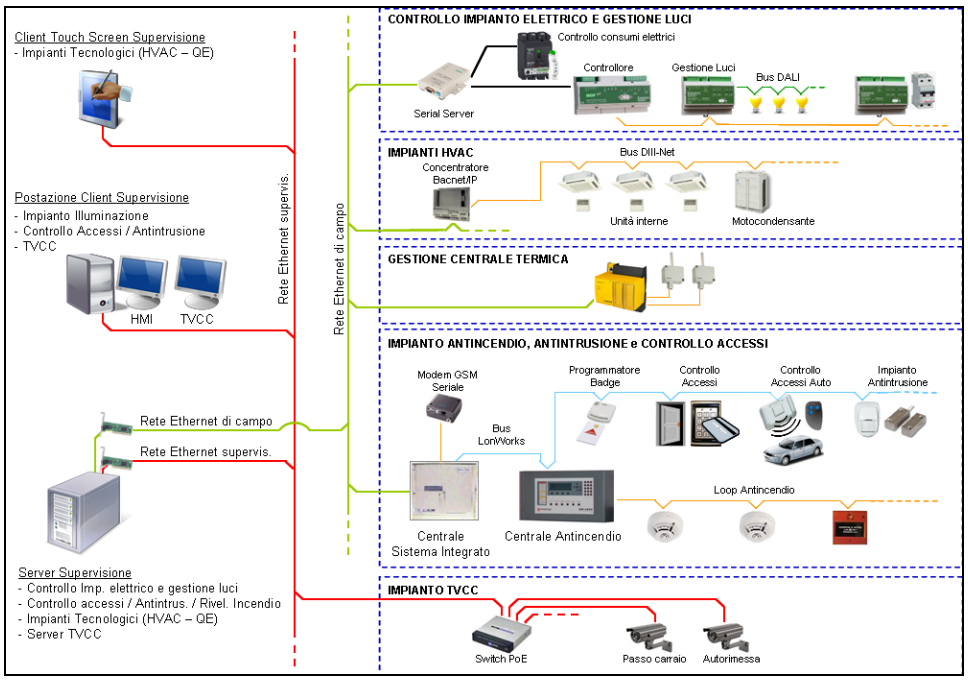

Figure 1 – Supervision system layout and connections

Centralizing all the acquired information from the field into one unique Server made it easy to obtain interaction among the various systems: for example on the event of an anti-intrusion alarm system all the lights in the detected area will automatically turn. The anti-intrusion alarms can also be set with default value set points (settable) and the lights can be forced to turn off for optimizing energy consumptions.

Furthermore the system has offered the possibility to develop an Server/Client architecture for which the Server functions as a concentrated acquisitioned field data center, allowing Clients to visualize and control parts of the system left at their disposal such as light, anti-intrusion and TVCC managements for the PC in reception or the heating and air conditioning systems for the PC installed locally or remotely in the technical office.

The advantages obtained by using this type of system and its configuration possibilities are:

- one unique hardware and software platform for integrating various systems.
- maximum server reliability configured with redundant power supply and ventilation
- use of standard and leading brand devices and software configurable as desired using correlated applications (no device programming constraints where suppliers are concerned)
- energy consumption analysis using report and trend graphics
- deployment flexility and expandablity
- simple remote access to information from all system controlled areas over intranet/internets networks
- technological alarm and light control

The illumination system management involves the use of lighting fixtures interfaced with DALI bus and regulated by means of luminosity sensors and presence detector sensors in conformity with the most recent European norms for energy system classification (EN 15232).

The following figure shows a detailed supervision system screen. This system is currently up and running in all areas with management entrusted to our company where the remote control station, energy management and alarm management are located.

MANAGERIAL LEVELS

The control system is regulated automatically and structured on different managerial levels:

- 1st Control Level (remote control users)

Individual users, using local commands, have the possibility to modify the main working parameters of each single light and internal unit such as ventilator speed, desired temperatures, airflow direction.

- 2nd Control level (centralized command)

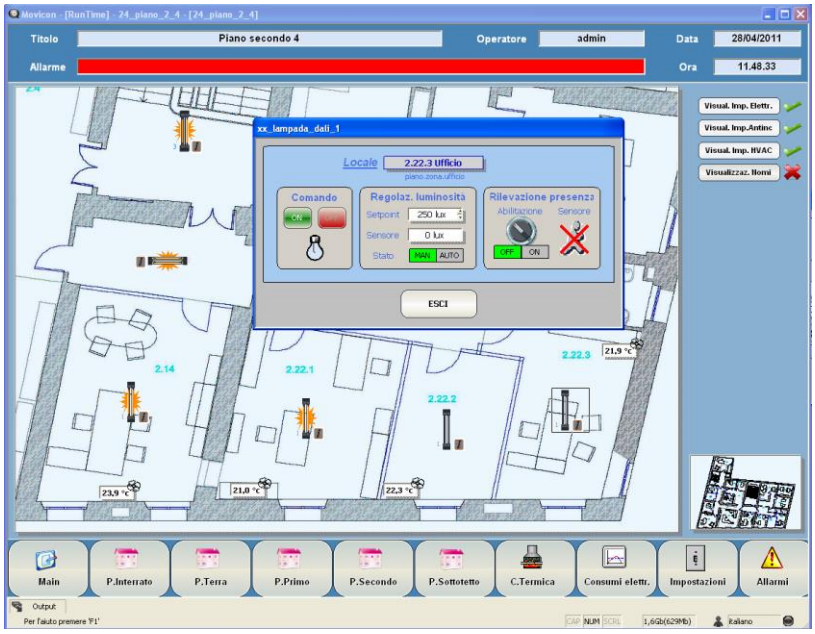

Figure 3 – Screen displaying office plan

Involves centralized control panels such as the Touch Controller with liquid crystal display, which allows the complete air conditioning system supervision, with start/stop functions by zone or for single groups, weekly timers, etc.

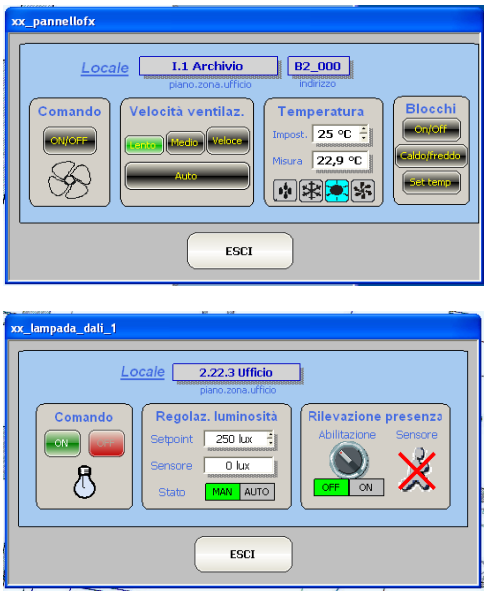

Figure 2 –Control units wth detailed information/commands

CONTROL AND COMMAND USER INTERFACE

Simple and intuitive navigation of maps shown on graphical screen pages makes it possible to access all detailed information relating to each single light and air conditioning/heating unit to command and regulate them. The use of a control system and lighting management system in function with presence detectors and preset lighting values is fundamental for optimizing power consumptions.

- 3rd Control Level (Building Management System)

This level is implemented with the light system devices, HVAC, fire and burglar alarms are interfaced with BMS systems operating with BACnet, LON and Modbus protocols, through purpose-designed Gateways.

CALCULATING CONSUMPTION DISTRIBUTION AND COSTS

One of the project aims was to calculate and distribute electric and air conditioning system consumptions in the most flexible and efficient way possible while taking into account that the various areas may be used by different companies. In cases using air conditioning and heating systems, a connected monitor calculates and displays the quantity of electric energy used by pumps providing heat to monitored zones then each single air conditioning unit.

Figure 4 – Screen displaying HVAC system consumptions

CONCLUSION

This system is designed mainly to facilitate interfacing with all smart building management system instrumentation for overall monitoring and controlling of all working statuses with prompt signaling of any malfunctioning if they should occur.

The validity and reliability of the designed solutions to contain energy costs were confirmed at the end of the last winter season when the first official consumption reports were issued with costs divided by the various users all thank to the supervision system installed.

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