

By Cesare Bolis

Web Client technology for Logistic Telemetry

Thanks to an innovative and reliable technological solution, the Sapio group uses Movicon's Web Client potential to update maintenance work in real time and plan the supply logistics for their thermal gas (oxygen, nitrogen, argon, etc.) self-production and storage systems.



Sapio group the Italian company that was established in Monza way back in 1923. It plays an important role in Europe in the production and distribution of pure, very pure technical gas and medicinal gas. With a group turnover exceeding 360 billion and over 800 employees, the Sapio group has boosted the development of new technologies to an even greater extent in collaboration with its partner, the American AIR PRODUCTS and CHEMICALS Inc. (APCI), one of the most important worldwide producer of technical gas. Two years ago, the company launched a project that was to optimize the way its self-production systems were run and serviced as well as the logistics used to distribute the products to its customers. This was done by implementing a telemetric data gathering and monitoring system. The architecture of the system partly involves the company's own geographic network and partly the commutated telephone line. The purpose is to improve the investment that the system represents, i.e. reduce the production and maintenance costs, optimize product distribution in terms of saving, service efficiency and prompt deliveries.

The systems in the Sapio Caponago plant (Milan).

A capillary network of self-producing plants

Thanks to a capillary production network and a marketing organization that covers the whole of Italy, the Sapiro group provides, amongst other things, oxygen, nitrogen, acetylene, hydrogen, argon and carbon dioxide in the different technical qualities required for the most avant-garde uses. These range from the more conventional uses in the metal-working industry, for mechanical productions and welding, to those of the chemical, food, pharmaceutical, electronic industries and even the medical field and that of scientific research.

Mixtures for calibration, mixtures for scientific applications and individual gases with the highest degree of purity that the current technological state-of-the-art can achieve, are all at the disposal of the various chemical, electronic, nuclear, metal-working, food production sectors and for industry as a whole.

Sapiro's productive structure mainly comprises three sectors: the primary one, in power stations that produce large quantities of technical gases in the liquid or gaseous state; the secondary one where the liquid product is gasified, conditioned in bottles and mixed when required.

The third sector which covers self-production on the customer's premises, includes unmanned systems installed and controlled on site, providing customers with continuous supplies of different gases at competitive prices.

The need for data that are always up to date

The self-production plants must guarantee that technological gas is supplied to customers that cannot sustain interruptions in the service. This is why the plants must be highly reliable and almost always equipped with back-up reservoirs provided with liquefied product by the company's logistic structure.

These supplies and the relative vehicles that carry the products are handled by the distribution logistics division situated in Monza, with operating departments in the group's main plants.

For Sapiro, full control over the self-production plants is firstly required by the distribution logistics division. An unbroken supply of products with optimized costs and a good quality service for the customers can only be guaranteed if complete and reliable information is available.

The updated data, which represent the operating status of the remote controlled, unmanned plants, are also required by the maintenance department which now has the tool it needs to keep plant operation under control: it acts where required by remote control, restores the operating conditions of the self-production plants

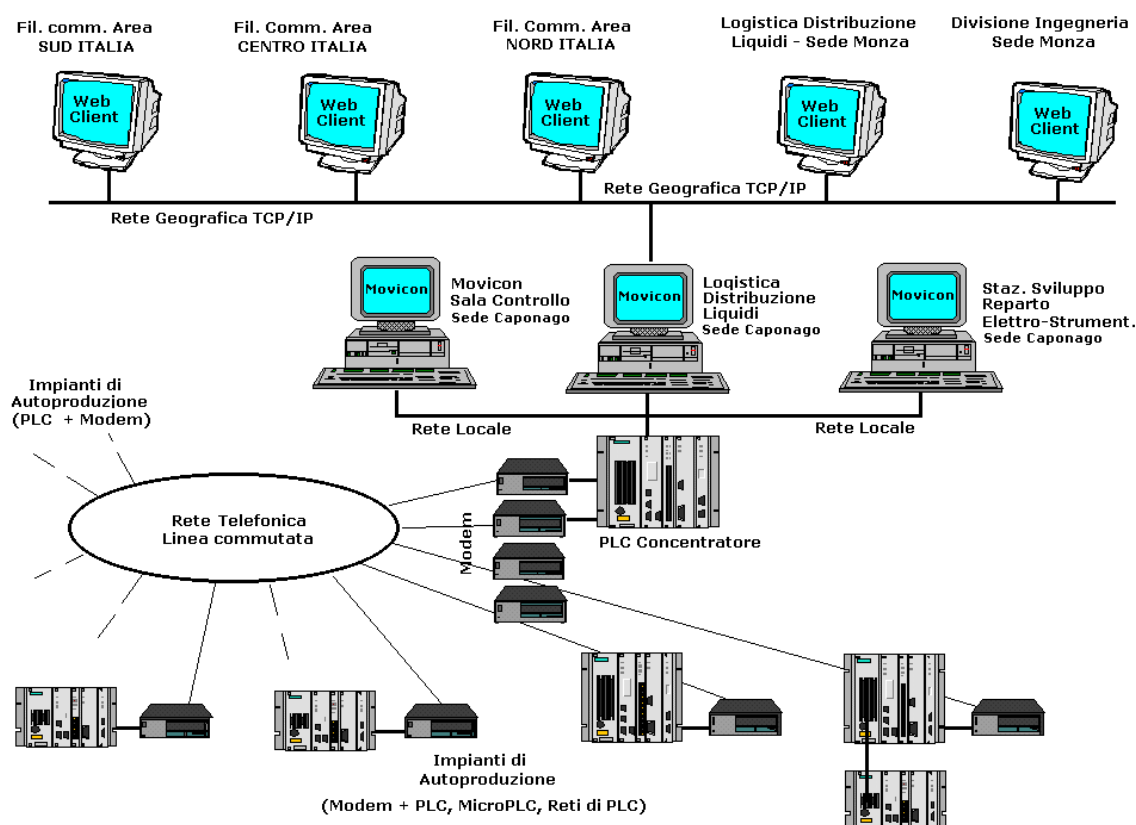


A telemetric station based on Movicon Web Client, installed in the offices of the engineering division of Monza (MI). Thanks to Web Client technology, the office is linked to the Movicon server to which the data of the telemetric system are sent.

without actually having to visit the sites, or plans maintenance work on the plant premises according to the data acquired.

The plant and storage situation is also monitored by the engineering division in the Monza headquarters (Milan) where the project was created. An observation point where the efficacy of the computerized system can be ascertained and a technical backup station when required.

The end users of the service are the administration and accounting departments. These need the production data (of the self-production plants) in order to price the supplies, define the maintenance budgets, prepare plant efficiency statistics or evaluate the produced and distributed gas balance sheets.



The architecture of the system uses the existing infrastructures and is based on reliable, tried-and-tested technologies.

The telemetric system

The self-production and storage systems on the customers' premises are not manned, thus the local control station is solely based on a normal PLC or microPLC connected to a modem operating via a normal commutated telephone line.

Each self-production plant (about 20 are connected at the present time, scattered throughout Italy) or storage plant (about 40 in different locations) transmits or receives data calls to/from a data concentrator. This comprises a PLC in the control room of Sapió's Caponago plant in Milan. The concentrator PLC in the control room makes calls to the self-production systems in cyclic mode, acquiring the data at preset

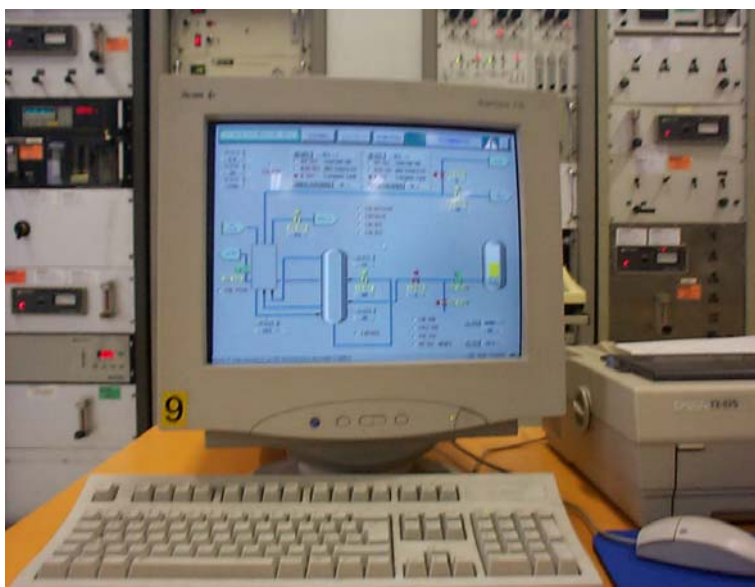
time intervals. In the case of alarms of a significant event, the PLC program of the plants activates the communication link and calls the control room, transmitting the necessary information. The concentrator PLC is connected to 4 modems on the same number of commutated lines, so the telemetric system can easily connect itself or be connected to the plants. This prevents the risk of too much traffic along the communication lines owing to the large number of remote controlled sites being handled. Moreover, this operating mode allows the communication to be activated towards the remote controlled peripheral at the same time without preventing the system from receiving calls from other remote sites.

Besides connection in cycles or when events occur, the operator or maintenance engineer can connect to each individual plant at all times, on request, and remain linked for as long as he desires.

The maintenance engineer also has a portable supervisor and remote control station: a laptop which, thanks to the supplied cell phone and the GSM network, allows him to be operative in any situation.

Lots of problems, due to process conditions, can be promptly resolved without the maintenance engineer having to actually visit the site. This is achieved thanks to the two-way structure of the system which allows the process data to be configured in the remote control mode.

Three PC stations are connected to the concentrator PLC. These PCs use Windows NT and Movicon Scada software and carry out a double function: they handle the operations and information acquired, making it accessible to the staff members involved, while acting as a server for the Web Clients connected to Sapio's geographic network.



One of the Movicon stations in the control room of Sapio's Caponago plant (Milan). The control room houses the server, connected to the concentrator PLC to which all the telemetric data are sent.

Web Client technology on TCP/IP

Sapio's geographic network and use of the TCP/IP protocol has allowed Progea's recent Web Client technology, Movicon Web Client 2.0, to be used. This technology has lowered the costs of the project and the running costs of the system, reducing the number of licenses required and centralizing the software.

The logistics division of the Sapio group, the pertinent departments in the headquarters of Monza and the branch offices in the four geographical areas are all physically linked to the server of the local network at the Caponago plant. This in turn is linked via commutated lines to the remote controlled storage systems and plants. The Client stations do not have Movicon licenses, but of the application based on

ActiveX technology, which is housed in a Visual Basic form. Through this, a menu guides the user through selection of the synoptics and plant data to display.

The innovative features of the system led to Sapio's decision to choose it as cost reduction, the absence of any additional software in both the server and clients, software centralized in the server plus performances, guaranteed by the "lightness" of the client (Thin Client) and processing on exceptions, were considered to be of fundamental importance. Moreover, besides providing performances, security and two-way operation, the system also guarantees multi-user functions. Thus, each client station is absolutely free to display the data required in relation to the server and the other clients. Centralization of the management software is solely entrusted to the

Movicon server which acts as server. The project does not require additional software but automatically places the data at the Clients' disposal. To get an idea about how simple the project is to manage, just think how it allows Sapio to add new self-production plants to the server or to modify the existing ones after which the Web Client stations are able to display the new data immediately, without any further operations being required.



The Web Client station of the Logistics department in Caponago. The staff members have updated data from the storage departments at the self-production plants enabling them to optimize and rationalize the use of vehicles. The systems in the Caponago plant (Milan) can be seen in the lower part of the photo.

Control of the systems

The decision to use the existing architecture allowed the investment to be kept to the minimum, using commutated lines available everywhere plus the PLC + Scada solution where Movicon had already been used for some time by the Sapio group. Movicon Web Client achieved a further reduction in installation and running costs, fundamental objective of the company. Just think how there's no need for personnel exclusively dedicated to running the system. All staff members are able to work and use the data seeing how simple the interface is, while the autotest and autorelease functions with which the communication and modems are provided make the project tough and fully fault-tolerant.

Evolution of the project

To confirm how fully successful the project has been, now that the functionality and reliability test of the diversified data collecting system has concluded, the Sapio Group

is now thinking about extending the Web Client concept to other management departments.

Thanks to the information that circulates around the existing technological architecture alone, the group will obtain evident advantages and will be able to reduce expenses with very little effort: pricing of the distributed product, production statistics and plant efficiency, thus rationalized global production in a single concept.

By extending the system, the data of each individual system can be decentralized and re-distributed to the offices in question without burdening the investment which will maintain the same architecture.

The aim is to store these classes of information, i.e. create what's called Data Warehouse in jargon, within a relational database (software data archive) so that the various operators can use it for consultation, to create reports, analyze statistics, plot consumption profiles and forecast the evolution of magnitudes that must be kept under control.

All this regardless of the size and topology of the data collection basin which, for Sapio, is the whole of Italy, and the location of the decision-making divisions.



One of the self-production plants of the Sapio group, which has stations scattered throughout Italy.

Thanks to Cesare Bolis, Sapio SpA