Remote Control with the Web to manage integrated water cycles safely

The Acque Water Spa group is responsible for managing the Waterworks services to supply clean water to the vast Tuscany region. Movicon was chosen as the supervision and remote control system, allowing the company to accomplish their mission by exploiting, the Web client and Server redundancy features provided.

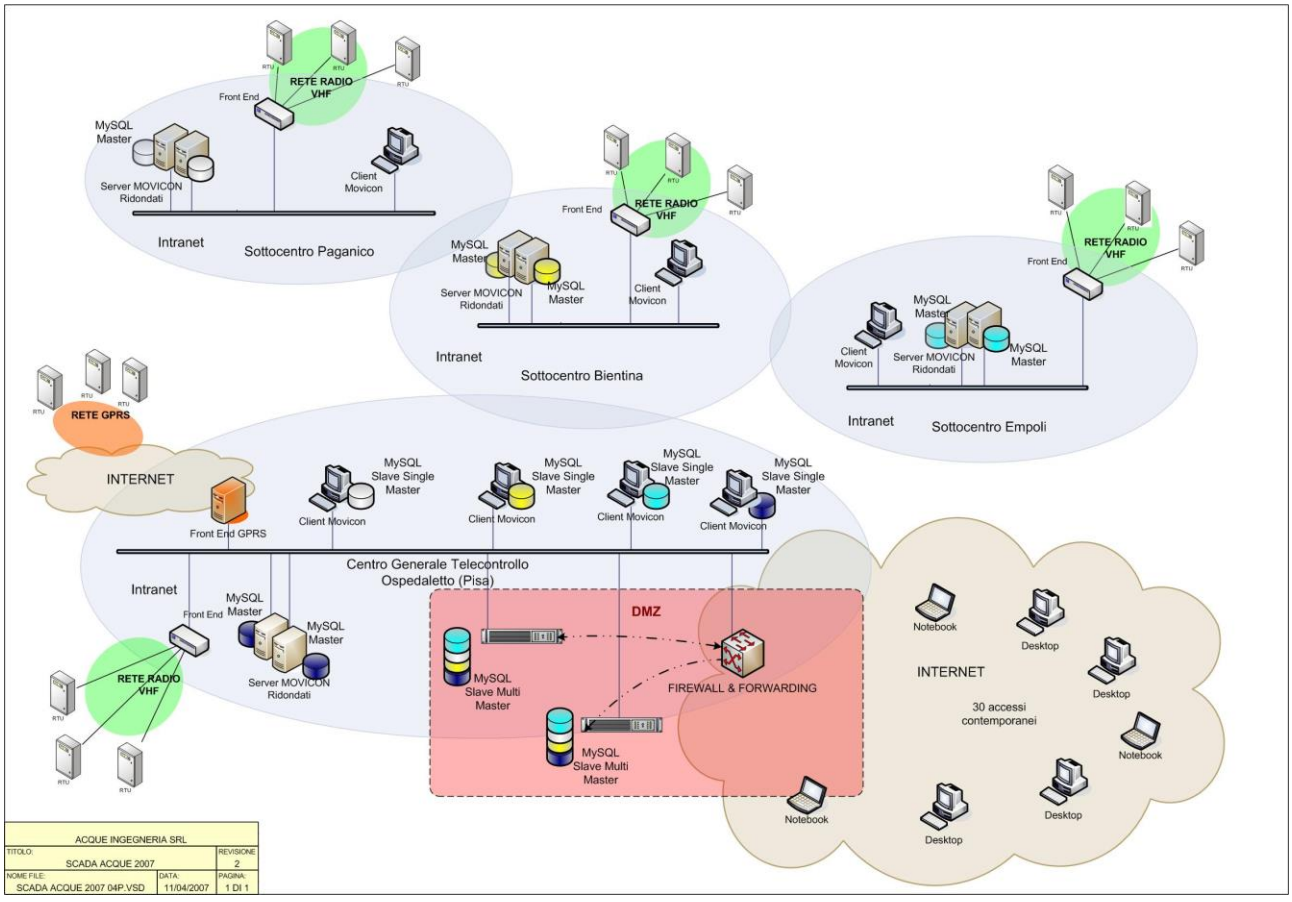
The public utility service operators in the wastewater sector do not have an easy job of managing water cycles (capitation, distribution, depuration, drainage), nowadays usually commissioned by public administrators. The mission of these private companies (ex. Municipality owned) is to implement the best and most reliable modern technology to ensure the community is supplied with clean drinking water in a safe clean environment.

Waterworks Services Managers

Acque Ingegneria S.r.l, with head offices in Pisa, operate in the field of engineering, planning, programming, financial assistance, company management, supervision, work behaviour and testing. This company is part of the Acque S.p.a.

group who have been commissioned by the ATO (Local Authority Water Board) to manage the Valdarno Basso integrated water services.
The Valdarno Basso is a region consisting of 5 provinces, located in the heart of Tuscany, which homes 57 Local Councils and over 720,000 inhabitants together with a sewage network comprised of 2,500 km of canalization and 150 water purifying plants.
Acque S.p.A. was appointed to put a twenty-year-long investment plan into action, aimed at guaranteeing and keeping aqueducts up to the required quality and health standards to provide all areas with an efficient sewage and water purifying system while keeping the environment and local inhabitants protected from pollution and possible health hazards.

Communication is structured on local networks and an intranet network using PCs with multiclient-server configurations. Each controlled area is connected to field RTUs via radio or GPRS and data is stored locally in MySQL databases in two hot backup redundant servers. The process is controlled both locally and by remote control from a General Remote Control Center where data is gathered from all areas and stored in the redundant servers and exposed externally through a controlled access area. This functionality is replicated in the field to guarantee process continuity and in the control room to maintain information reliability of the whole superstructure.



The Acque Spa remote control system architecture

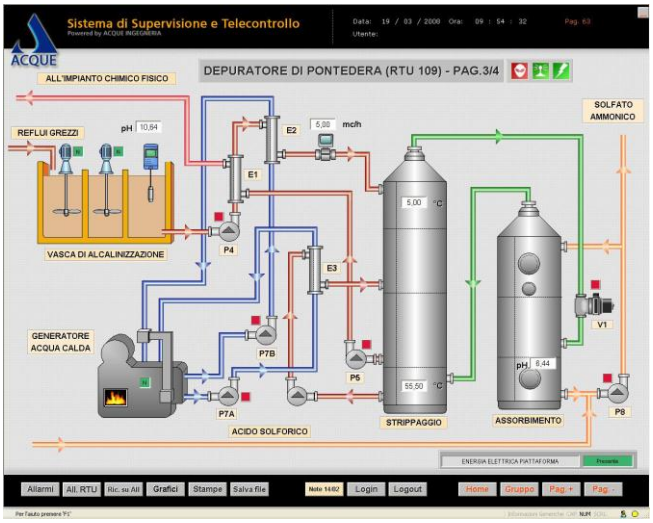
Remote Control

The application used was developed modulated on the most common water boards, setup with 26 remote workstations along with hoisting and purifying depots to guarantee supervision and working of the whole system in all conditions at all times, fundamentally allowing the monitoring and immediate intervention of any suspect event for complete analysing and confrontation.

System Security

The redundancy management in Movicon is completely integrated and guarantees automatic secondary system intervention; this system has PC workstations connected in network based on

TCP/IP, with Primary and Secondary Server functions:



An example of a Movicon screen in the remote control center.

Primary Server: this manages the plant in normal working conditions, maintaining complete control by communicating and gathering data from the plant. Any anomaly, malfunction or error in the correct running of this station causes the secondary station to automatically take over control.

Secondary Server: this manages the plant in redundancy mode in normal working conditions through the shared variable memory areas. This station is capable of interacting with plant independently and has the same identical data storing system found in the Primary. It is always on standby to take over from the Primary to automatically manage the plant whenever any anomaly occur by starting up the communication driver and recording engine functions in order to acquire data needed to do this.

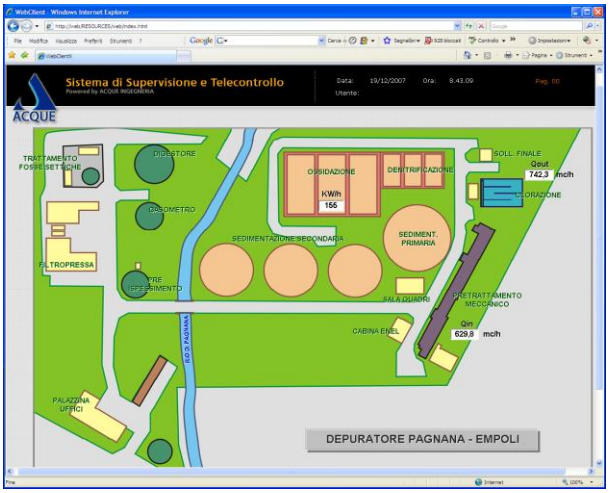
When re-entering into action, the Primary immediately synchronizes and restores all current historical log statuses and alarm situations with its own so no data is lost. By exploiting this type of technology, data recorded during the emergency period can be sent to the Primary by transferring data in binary mode without needing any database infrastructure. This technology greatly reduces synchronization times up to less than a second even for very large amounts of data.

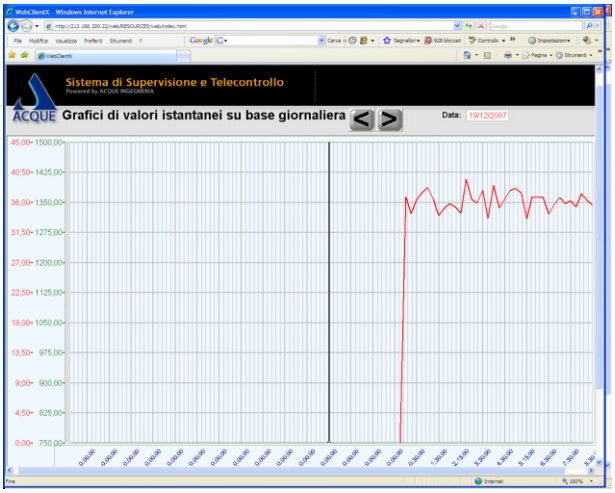
Data synchronization is performed by the integrated redundancy manager in complete automatic and the secondary returns to its initial Stand-by conditions when terminated.

Remote control by Web

Thanks to the Movicon Web Client technology, the Acque Spa personnel can access the plant at anytime, anywhere they happen to be using a normal internet browser to display technological information and interact when and where necessary. The Server residing in the General Remote Control Center consents access to 30 web clients simultaneously and can be extended to accept more. The server is connected in a public network and protected by a firewall and Log On access. Users who have log on access are managers, network administrators and on call duty maintenance staff. Each user can access to display pages according to their user level independently from any other users logged on at that same moment.

The system can therefore be accessed with remote control whenever needed to quickly analyse acquired data, check behaviours on charts and graphs according to day, month or





Two of the grahical pages which can be displayed using the Movicon Web Client with a normal browser.

year for all the process's parameters, such as water load levels, pressures, chlorine, oxygen percentages and other.
The alarm management consents notification of the most important events to on-call duty personnel by telephone, who are equipped with portable PCs for accessing the remote control system via Web Client to monitor system information, such as tank or basin levels and relative level behaviour at different times, as well as view graphical pages showing pump and valve statuses, especially those depots inaccessible by personnel.
Thanks to this system, the managerial staff can get a clear and immediate picture of all situations in order to react immediately when necessary, reducing breakdown times to a minimum while greatly improving services.

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