CITY COUNCIL OF RIVAS VACIAMADRID AT THE VANGUARD WITH ITS MULTISERVICE IP NETWORK

Rivas Vaciamadrid City Council

The council hopes to turn the city into a shining example of environmental friendliness and innovation, tackling this challenge through the key areas of environmental sustainability, citizen participation, governance and the application of technology.

SECTOR

Rivas Vaciamadrid is one of the best equipped councils in the Region of Madrid, in terms of technology.

CHALLENGE

To implement the best and the most up-to-date information and communication technologies, ensuring that they are not a barrier to the provision their wide range of services to citizens or to the implementation of environmental projects aimed at saving energy, so as to improve the quality of life of citizens and companies, in an objective manner.

TECHNOLOGICAL SOLUTION

The creation of a MAN network, which, by deploying a fibre optic infrastructure between the different municipal offices, in conjunction with a WiFi MESH network deployed throughout the city, has made possible to develop an IP platform from which to integrate all municipal services, including voice, data, video and technical services for buildings, as well as those distributed throughout the city. The system being implemented includes: unified communications with integrated IP telephony, the TETRA network and dual-band GSM telephones, the city's call centre, the public announcement system, management of the technical departments of municipal offices, video surveillance, traffic light control, access control, Rivas TVnet, and mobility in the streets of the city for personnel working for the city council. Apart from free internet access in 62 municipal centres (schools, cultural centres, sports and leisure complexes, etc.) and at bus stops, the city council is looking into the possibility of offering Internet access on roads.

BENEFITS

Information and real-time management of the operating conditions of buildings and systems, leading to lower energy and water consumption, reduced communications costs and the cost and improvements of maintenance and operating conditions. In addition, the system offers a renewed capacity for improvements to the city and better quality of life for our neighbours.

This city council is one of the best examples of the limitless use of information and communication technologies, going far beyond the traditional use of data and voice.

The municipality is located southeast of Madrid, and has a population of over 68,000. In 2004, the ambitious “Rivas 21.10 Digital” project was launched. It is an initiative based on an intensive use of Information and Communication Technologies (ICTs), aimed at turning Rivas into a veritable “Digital City” by 2010. Meeting the challenges posed by a new century undoubtedly requires the mobilisation of every available municipal resource, and structural changes must be made, bringing clear improvements to the management of the municipality, something that will benefit all of its citizens.

This solid infrastructure will provide support for important strategic projects for the city, including the Rivas Ecópolis (Rivas Ecocity) initiative. This project is aimed at revolutionising citizens' interaction with their surroundings. The approach to the design of new cities and active involvement in responsible water and energy consumption are examples of the key elements of this, the creation of a new concept of habitability and coexistence for the whole community.

The City Council of Rivas Vaciamadrid enjoyed the support of Cisco Systems when implementing the “Rivas 21.10 Digital” project. This company, recognised worldwide for its Internet networks, designed the architecture for the IP network which is to form the platform for the implementation of all of the services that the city council hopes to make available in the coming years. The project has also benefited from the support of several other companies, which have provided state-of-the-art technologies for each of the areas involved in the initiative, all of which are integrated in the IP network platform.

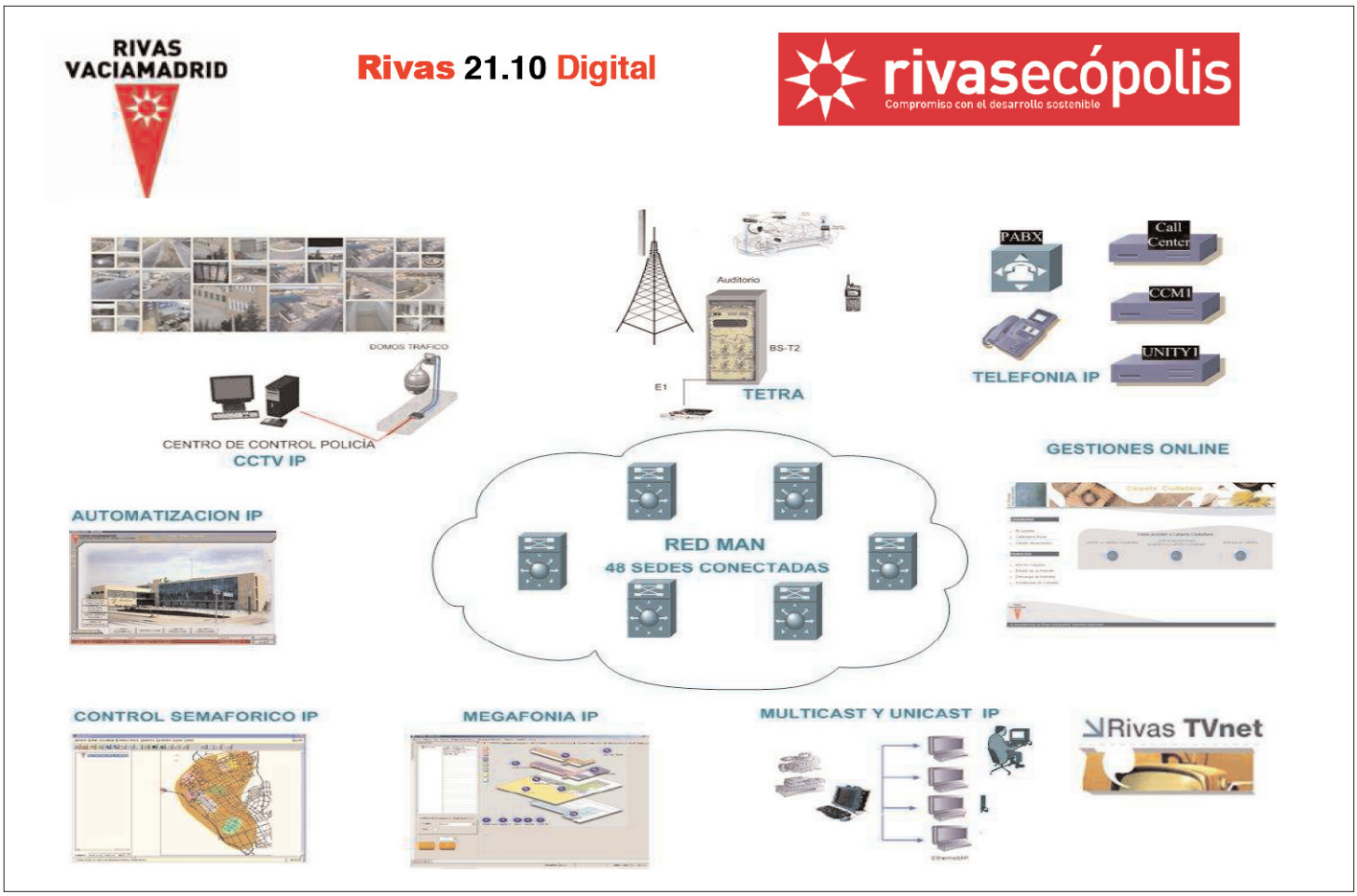
THE RIVAS DIGITAL CITY PROJECT

The Project was launched in March 2004, and different stages have since been undertaken. The starting point was a situation in which none of the city council buildings were interconnected. Each building had to rely on an ADSL connection for data and connection to the public voice telephony network. This meant that the Internet connection was very slow, the availability of systems was very low and offered only minimum security, the cost of communications between municipal offices was very high, and there was no capacity for controlling energy or water consumption. There was also room for improvement in terms of access control at the offices in question. In short, there was a long road ahead, but the support of the city's administrators, and the creation of the Concejalía de Telecomunicaciones (Department of Telecommunications) made the launch of the project possible. It was aimed not only at solving the problems experienced at that time, but also at allowing future initiatives in the municipality to be supported without the need for changes to the IP network platform.

The most suitable solutions were sought throughout, in each of the areas involved, so as to ensure the success of the innovation project and the implementation of the new technologies throughout the municipality. The city council subsequently extended this network to the Educational Community, through the Rivas@duca project, which was to provide more than 14 secondary schools and 2 primary schools with WiFi access and internet connections in all classrooms.

From a technological perspective, the project can be divided into the following blocks:

Data Processing Centres: The creation of a principal and backup Data Processing Centre has allowed us to consolidate the municipal applications and databases, as well as the servers and data storage facilities. Updating these systems entailed the optimisation of resources such as servers, storage, software license management, integrity, security and the availability of data and applications. From the point of view of the city's citizens, the process allowed us to offer our services from any municipal building, improving response times and leading to a reduction in the amount of investment needed in terms of equipment, by optimising the use of existing equipment.



Metropolitan Fibre Optic IP Network: One of the first activities entailed the interconnection of the 62 municipal offices using fibre optics and a Gigabit IP network. Each of the offices has Ethernet network connections. The structure of the Multiservice network is such that it provides a high rate of availability and very low latency, as well as a multicast platform for the reception of Rivas TVNet.

Metropolitan WiFi and WiFi MESH IP Network: As a backup to the wired metropolitan network, all municipal buildings have been provided with access to the network through a WiFi network with a range of over 8 km2. Likewise, a WiFi MESH network has been deployed throughout the municipality, in order to extend the network from the buildings to the streets and to allow municipal employees to enjoy the same functionality inside and outside of municipal offices. Initial work is also underway on the connection of all elements of the city that can be managed remotely to this network (public lighting, irrigation of parks, street furniture, etc.). The platform for services based on localisation (LBS) is already available. It will allow a new model of services to be deployed in the near future, allowing access to applications by municipal employees through any WiFi device, located anywhere within the city or in the active municipalities, through RFID.

Unified Communication System: The process of migrating the former conventional telephony systems to a modern IP telephony platform is halfway in the municipality, allowing the integration of multiple services in the platform. IP telephony, instant messaging (IM), voicemail, dual-band GSM telephony, the TETRA radio system, an IP public announcement system and the 010 call centre are operational and integrated. This means that any municipal employee (civil defence, police, maintenance, sports, etc.), regardless of the type of terminal available to them and their location within the city, can communicate with any of his/her colleagues, without worrying about the type of device available to that person. It is also more economical, as all such communication is internal.

Outdoor IP Video Surveillance: A video surveillance system has been deployed throughout the city, for the control of traffic and adjacent zones. The cameras, using analogue and digital technology, are providing the control centre with images through IP connections, wired or wireless. This approach to video surveillance is permitting the much more rapid, economic and efficient deployment of cameras wherever they are required within the municipality. In addition, the control of the traffic light network is IP integrated, which, together with the cameras and sensors fitted beneath footpaths, ensures more efficient management of the traffic circulating in the city of Rivas.

"This commitment to technology began with the deployment of a physical infrastructure based on single-mode fibre optics, with a Multiservice Network infrastructure. As we can see from the diagrams, with the multitude of services implemented and yet to be deployed, and savings to be made and improved efficiency in terms of energy, we have only just begun."

D. Carlos Ventura Quilón, Director of the Department of Telecommunications.

Integral Security System: Rivas has decided to tackle security in municipal buildings in an integral and integrated fashion, ensuring that every building has the following: access and attendance control, visitor control, the generation of passes, CCTV, digital recording, anti-intrusion system, interphone, watchman supervision and fire detection. This approach has provided the city council with a centralised security management system, ensuring identical security measures in all municipal offices, all of it integrated over the IP Network.

IP Automation of Building: One of the priorities of the Rivasecópolis project has been to improve the use of energy and water resources. To this end, 10 municipal buildings are already equipped with programmable logic controllers (PLCs) integrated in the IP network. Together with the centralised SCADA system, the PLCs allow the management and operation in real time of all processes used in buildings: air conditioning, lighting, water, power, gas, access control, public lighting, equipment in sporting facilities, etc. This is leading to an improvement in the management of buildings, a significant reduction in energy consumption, early detection of water or gas leaks and malfunctions in any subsystems, among others. It is also bringing an improvement in the efficiency of the buildings in question, a reduction in CO^2 emissions and a decrease in the monthly expenditure of the municipality. The process of incorporating the other municipal buildings into this model is gradually being undertaken, as improvements are implemented. Apart from the 36 UPS, real time monitoring of breakdowns, alarms, etc., has also been implemented.

Traffic and Traffic Light Control: Regulation and control using the traffic light system meets the dual objective of increasing road safety and optimising the cost of the production process. Through the interconnection of the traffic light control system and the traffic optimisation network, readings can be taken using statistical samples that relate total journey times, measured in terms of the number of vehicles per hour. This system allows the efficiency of the regulation system to be ascertained. It can be expected to increase as total journey times for a given capacity fall.

THE PROJECT IN FIGURES CURRENT SITUATION AS AT AUGUST 2008

The city council belongs to the Community of Madrid, in Spain, and has a population of over 65,000 inhabitants. It covers an area of over 6,000 hectares, and 72% of its surface is occupied by a protected natural area. Its population is very young, with more than 52% aged under 35 years, and 73.7% of the population has access to the Internet. It is located to the southeast of Madrid, and is one of the most innovative municipalities in terms of the application of information technologies and communication systems using IP technology.

The following data give an overview of what the project represents:

Municipal offices: 62
Number of users/employees: 658 municipal users and 22 mixed companies, plus over 1,000 WiFi users in educational and cultural centres
Buildings connected to the network: 62
IP managed buildings: 10
WiFi MESH coverage: 8 km2
IP telephone terminals: 640
WiFi telephones: 22
010 Call Centre agents: 12
VoIP terminals (analogue): 380
IP Communicators: 100
42 Localisation tags PDAs for mobility: 50
TETRA terminals: 330 + 15 in vehicles
Dual-band GSM terminals: 45
IP public address systems: 12 centres
IP CCTV cameras: 20 VIP X I IP cameras, 52 VIP X 2 26 IP cameras and 80 5 Divar IP cameras. 359 cameras in total.
WiFi access points: more than 530 internal points
WiFi MESH access points: 100
Access Control Points: 232 CPU access control and more than 500 doors, card readers and access to car parks, among others.
Traffic Light Control: more than 15 controlled traffic light centres, reducing Co2 emissions, etc.
IP automation of lighting and climate: 280 data points

BENEFITS

The principal benefits of the implementation of this project, based on an IP network platform as an element of integration for all services, are the considerable reduction of all implementation and maintenance costs, through the elimination of duplicate costs, thereby ensuring lower overall costs for the network infrastructure, the simplification and reduction of administration and maintenance costs, the optimisation of the cost of transferring extensions and line costs; rented and commuted alike. Furthermore, unified IP networks with integrated voice, data and video technology allow a wide range of applications to be installed, increasing productivity and controlling consumption, offering high value added to the municipality and protecting investments already made in future extensions and aimed at meeting the demand for new services.

PROJECT BENEFITS AND RETURN ON INVESTMENT

The establishment of this project and the improvement of services throughout the municipality of Rivas Vaciamadrid have led to notable savings in investments.

- The energy efficiency programmes have brought a saving of 35% and more than 1200 tonnes per annum in energy consumption, and more than 1800 tonnes in air conditioning.

- A reduction of more than 3000 tonnes in CO^2 emissions, thanks to traffic light control.

- A reduction in the cost of telephone and other online services has led to savings of 50%, or 300,000 Euros per annum for Telephony and Communications.

- The implementation of the new network infrastructure has resulted in savings of 50% on global costs.

- The savings made in the municipality in terms of communications, water consumption, lighting, the optimisation of services to the citizen have been significant. In fact, it is not unreasonable to say that expenditure in the municipality is currently the same as in 2005; the difference is that many more services are being offered, while the payroll of the municipality has grown by around 50%.

"Rivas Ecópolis will continue to grow gradually. In the coming years we will continue to implement the plans set forth and the campaign to promote the dissemination of information and enhance the visibility of results obtained, in order to improve awareness among citizens. To this end, the Rivas Ecópolis will be based on environmental sustainability, citizen participation and new forms of governance, in a new approach to three different aspects of the realities of modern living: environmental science, citizenship and technology. Our aim is to ensure that every new project should be developed in line with these new technologies."

D. José Ramón Martínez – Coordinator of Rivas Ecópolis

FUTURE PLAN FOR EXPANSION AND THE DEVELOPMENT OF NEW SERVICES

The municipality is refusing to conform to traditional methods. It is constantly in search of innovation in all of its activities. To this end, IP management systems will be provided for all remaining buildings, covering technical services, inventory and the control of the municipality's street furniture, as well as the remodelling and centralisation of management of all public lighting, the regulation of light intensity in order to reduce costs, and referencing and documenting all municipal archives and the software for object management.

The meshed network will be used as a means of communication for water meters and automatic irrigation systems, the waste collection system, ascertaining whether itineraries have been properly observed, internet for local buses, pollen levels in the city, pollution, etc...
Future buildings will be fitted with the latest technology from the start, as these projects already include the specifications of all of the subsystems described above, to be executed during construction.

CISCO EQUIPMENT INSTALLED

The platform for the CISCO network is composed of the following elements:

- Wired metropolitan area network: Catalyst 6500 in the nucleus of the network (city council networks, Cerpa, Youth, Deputy mayors and Police) and both Catalyst 3750 and 3760 for access to every municipal building with redundant 2 Gb links.

- Metropolitan WiFi network: internal AP1131 access points and external AP1 522 MESH access points, WISM controllers, WCS management appliance with integrated localisation services (LBS).
- Unified communications system: Geographically redundant CallManager Cluster (deputy mayors and police), Unity messaging, IPCC Express for the 010 call centre, IP telephones in different models (7961 and 7941), Model 7921 WiFi telephones and Nokia E61, E65 and E71 dual-band GSM telephones.
- Network security: FWSM Firewall module integrated in the Catalyst 6500.
- Internet access: Cisco 3745 Router
- Security events: Cisco Mars
- Management system: Cisco Works
- Radius servers for 802.1x. Security at network points

MORE INFORMATION

For further information on Cisco's products and services, see our website, at http://www.cisco.es

For further information on the City Council of Rivas Vaciamadrid, please see the websites: http://Rivas-Vaciamadrid.org, http://rivasecopolis.org y http://www.cisco.com/web/ES/videos/index.html

Rivas Digital 21.10 is seeking to bring about the increase in quality required for all administration. CITs are here to stay, and we need to seize the opportunities they offer, in order to ensure that the benefits are enjoyed by all citizens, without exceptions. The involvement of social and economic agents and the participation of citizens in the affairs of the city council are fundamental to the success of this project".

D. Marcos Sanz – Councillor for Territorial Policy, Public Works and Infrastructures and Telecommunications

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