Synopsis: A local government in Brazil improves emergency response times and makes better use of city resources - boosting its ability to save lives, homes and infrastructures from floods and landslides - when it engages IBM Business Partner VirtualAgility to implement an emergency information system based on its VirtualAgility OPS Center and WorkCenter technologies, IBM DB2 Enterprise Edition, IBM Lotus Domino, IBM Lotus Sametime, IBM WebSphere Application Server and IBM WebSphere Portal software running on System x servers, and built upon the IBM Government Industry Framework, Triton.

Location: Rio de Janiero, Brazil

Industry: Government

URL: http://www.rio.rj.gov.br

Client Background: The Rio de Janeiro City Hall is responsible for providing, managing and maintaining the infrastructure for the city of Rio de Janeiro. As the local government, officials in the city hall strive to safeguard and improve the quality of life for the city’s nearly six million residents who occupy an area of 456 sq mi.

Business Need: For a city that receives nearly 43 in. of rain annually and a large portion of its population lives in shantytowns built on precipitous hillsides, Rio de Janeiro is accustomed to floods and landslides. The threat to life is very real. Unfortunately, city hall officials lacked any swift and effective way to alert the six million citizens - occupying an area of 456 sq mi - to the potential danger and to respond quickly.

When disaster strikes, it is critical for officials to understand the readiness of resources - bulldozers, excavating equipment, police, firefighters and medical personnel - and where to send them. The problem was that responsibilities and resources for response execution were distributed among so many agencies that coordination became nearly impossible. Plus, there was no single view of the event - each agency collected bits of information and stored it in its own preexisting systems. Without the ability to share information across agencies, no one had a clear...
picture of what another was doing. Because systems were not integrated and information was not consolidated, the city and its agencies struggled to communicate with each other and, ultimately, warn the public in a timely fashion.

The city agencies include:

- Companhia de Engenharia e Tráfego (CET-RIO), which is responsible for monitoring and controlling traffic. Traffic is monitored visually through 115 cameras placed strategically around the city. The cameras use fiber optic to transmit images to an operations center, where they are stored and managed in the agency’s data servers and systems. Operators control the cameras using joysticks and inform street officers of issues or unusual events by radio or cell phone.

- Alert Rio, the agency responsible for monitoring rain, forecasting the probability of landslides and alerting citizens to potential danger. The agency gathers data using sensors and radars, and collects information from other government agencies and public websites. Meteorologists then use the data to calculate the probability of rain and/or landslides by region, and publish their reports and alerts on the Alert Rio website, which can be accessed by all city hall agencies and citizens.

- Civil Defense, which manages and controls potentially disruptive and threatening events and activities throughout the city. The agency receives calls and alerts from citizens as well as from local fire or police officials, and then coordinates a team to investigate the situation. An incident report is sent to the head office, and situation details are entered and stored in the IT system. The agency also communicates with other agencies, such as Alert Rio, to collect information about weather conditions and manage the situation accordingly.

- Regulation, which is responsible for managing medical resources, such as paramedics, ambulances and nurses, in the event of an emergency or crisis. The agency receives information about the situation - such as type of crisis, location, and number and conditions of victims - from the fire and police departments as well as from the Civil Defense agency. The agency then coordinates the resources and dispatches a team to the incident.

The city had no mass communication or warning system in place. When the threat of landslides was imminent, no one official or department had a single view of the situation, so response times were slow. Officials relied on cell phones and radios to communicate and maps to keep track of information. The mayor would view and try to assess conditions using the cameras at the CET-RIO operations center. Agency and street-level officials would wait for the information they needed to warn the public and manage the situation. Citizens would be alerted in an ad hoc fashion or via short message service (SMS) texts to their cell phones regardless of whether they were near the danger region or not.

To warn citizens of potential danger, coordinate emergency activities more effectively and respond more quickly, the Rio de Janeiro City Hall needed a single, integrated view of a crisis. It required a solution that would integrate preexisting agency systems and facilitate communication between agencies. The city also wanted to make better use of its existing resources, such as cameras and sensors.
Solution:
The Rio de Janeiro City Hall turned to IBM Business Partner VitualAgility to implement an emergency information system based on its VirtualAgility OPS Center and WorkCenter advanced visualization technologies along with IBM DB2 Enterprise Edition, IBM Lotus Domino, IBM Lotus Sametime, IBM WebSphere Application Server and IBM WebSphere Portal software running on IBM System x servers. A team from IBM Lotus software services provided system configuration and support.

VirtualAgility integrated the IBM software and a broad mix of emergency-response applications into its OPS Center and WorkCenter systems, effectively bridging the information gaps among the city’s multiple agencies. The solution also utilizes the IBM Government Industry Framework, Triton, a government-focused software platform that helps clients build on a service-oriented architecture (SOA)-based foundation and open standards, make use of their existing technology investments to speed implementation. A team from IBM Tivoli software services provided system configuration and support in connection with the Triton government industry framework.

The VirtualAgility OPS Center and WorkCenter technologies collect and integrate data from the various agencies’ systems, making it easier to share information and providing officials with a single view of information, situations and events. DB2 Enterprise Edition software is used to store and manage data about incidents - including report details, resources and contacts - as well to support crisis-management operations across the city. WebSphere Application Server software acts as the foundation for building and managing SOA-based applications and services, while WebSphere Portal Server software aggregates Web-based content and applications and provides the interface for the solution. Lotus Domino server software plus Lotus Sametime software provide a platform that delivers instant messaging and Web conferencing capabilities, collaboration tools and support for Internet phone services.

Although not directly part of the solution, the city hall also created a special operations room that houses the main system. The room is equipped with all the necessary technology resources and equipment, such as video cameras and computers. Representatives from each agency will be stationed there in the event of an emergency.

The solution included the following offerings:
Hardware:
System x: System x servers

Software:
DB2: DB2 Enterprise Edition
Lotus: Lotus Domino, Lotus Sametime
WebSphere: WebSphere Application Server, WebSphere Portal

Industry Solutions:
IBM Government Industry Framework: Triton

Services:
Lotus: system configuration and support
Tivoli: system configuration and support for Triton
In the Premium Support side the Premium Support Manager (PSM), a TRITON US Lab trained architect from Software Services team, is responsible for coordinating the product implementation. TRITON is a Smart City portfolio product that acts as a government hub framework. It is a set of IBM products implementation including IBM DB2 Enterprise Edition, IBM Lotus Domino, IBM Lotus Sametime, IBM WebSphere Application Server and IBM WebSphere Portal software, and it is customized for each client according to their own needs. Along with the PSM a total of three professionals are allocated in order to support the product implementation under the architect coordination. They work the implementation through field support services (FSS) hours and cover three different brands each: DB2, Lotus, WebShepre.

In the Consulting side the other involved line of business Software Services team delivers the integration of different Prefeitura organizations through Websphere Message Broker (WMB). WMB workflows serve as collectors for four applications on different areas: AlertaRio, SisDC, CET traffic monitoring camera system and the GIS app. As the collection output the delivery also provides web services to be consumed by VirtualAgility front-end.

The job is proven to be a good size challenge for IBM Brazil. It is the first TRITON implementation and the first Smart City project in Latin America. It certainly proves the One IBM concept and shows a Latino face for a smarter world.

Benefits of the Solution:
With the new emergency information system, officials at Rio de Janeiro City Hall anticipate:
- Alerting the public to floods and landslides more quickly
- Saving more lives, homes and city infrastructures
- Coordinating emergency response efforts more quickly and cohesively
- Simplifying access to critical interagency information and systems
- Gaining a clearer understanding of crises and resources needed
- Being more prepared for emergencies.

Before, it would have taken several days to understand the magnitude of a disaster and to see exactly where and how many emergency resources - both human and mechanical - were needed. Now, within hours, officials have a much better - and bigger - picture of the event. The solution provides a platform that enables information to be shared instantly and rapidly across agency lines - including with police and fire departments - which means that response efforts can be better coordinated. From a single view and in near real-time, the city can see who and what resources are available and needed. The platform also offers Web conferencing, instant messaging, email and whiteboarding capabilities, enabling officials to communicate instantly and discuss and synchronize rescue efforts so they can send the right people and equipment to the right places at the right times. These capabilities potentially save lives and homes.

Information that was critical to response efforts used to be stored in disparate applications, hindering situation awareness and making it difficult for the different agencies to coordinate efforts. Now, the city has a Web-based portal that integrates information, applications and resources. Anyone with Internet access and the proper authorization - from within the operation room to out in the field - can access the data needed. For example, emergency personnel can more easily access information from police dispatch systems and understand where to send more workers. And
commanders in the operation room can access incident management systems from CET-RIO to gain awareness and more control over rescue efforts, and communicate to teams where more help is needed.

Response and relief efforts used to be executed in an ad hoc fashion, wasting valuable time and not making the best use of available resources. Now, execution takes place in a comprehensive operations room, and efforts can run more smoothly. For instance, as soon as Civil Defense learns or is notified of an event, a technician can be dispatched to the location to investigate and gather further information. Meanwhile, Civil Defense can alert the other agencies and start collecting relevant information, such as current and forecasted weather conditions. The field technician can use the Web-based portal to submit a report that includes situation details, such as the extent of damage, number of victims and needed rescue equipment and resources. Officials in the operations room can then share this information - using instant messaging, email and other collaboration tools - with the other agencies to establish a rescue strategy. Within minutes, each party understands its role, where and when to send medical and equipment resources, the number of victims and the damage to infrastructures.

Additional Smarter Planet information:

Intelligent - The solution delivers near real-time information in a single view, enabling officials in the operations room to gain a clearer, more accurate picture of a disaster. This comprehensive view, combined with information sent in from the field, enables the city to coordinate relief efforts more quickly and with more efficiency, potentially saving lives. For instance, an official at the disaster site can assess the situation and send a report to the operations room via a Web-based portal while simultaneously learning that more rescue personnel are on their way. Meanwhile, agency representatives can view report details together, instantly begin communicating with one another, and start developing a recovery plan.

Instrumented - Data is captured wirelessly from existing city resources, such as pluviometers and traffic light sensors. Cameras positioned throughout the city also capture images and send the information back to the operations room via fiberoptics. All of this data is fed into the new solution, providing officials with a more comprehensive view of the situation.

Interconnected - The solution integrates data from applications found across four city agencies, and from the city’s cameras and rain meters, and makes it available via a single view in the operations room. By integrating their disparate information, the agencies can work more closely and collaboratively.

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