Brazil Extends Broadband Technology to Tiny Municipality to Promote Benefits of a Digital City

Executive Summary

CUSTOMER NAME
Government of Brazil, Ministry of Communications

INDUSTRY
Public Sector

CHALLENGES
- Extend telecom coverage within diverse geographic region
- Coordinate efforts between local and central governments
- Motivate service providers to modernize communications infrastructure without projected ROI

SOLUTIONS
- Extend broadband coverage to a small, rural town to demonstrate the power of the Internet
- Replicate local solution in other communities around the nation
- Maximize customer satisfaction and create viable business models for service providers

RESULTS
- Deployed broadband mesh network in Tiradentes
- Created plans to extend broadband to all 5,600 communities throughout Brazil
- Teamed with systems integrator to maintain and improve national infrastructure

Say "Brazil" and three things typically come to mind: soccer, samba, and Carnival. Sports, music, and festivals, however, are not all for which Brazil is known. The world's fifth-largest nation by size and population is also an agricultural giant, producing more coffee and sugar than any other nation. Brazil boasts one of the world's most extensive road infrastructures, and is one of the most diverse nations ethnically. Despite this, Brazil is arguably one of the world's most remote countries. Tens of millions of Brazilians live in the country's heartland, a geographically diverse terrain, in a self-sufficient manner without reliance on public utilities. Some of these people, thus, are disenfranchised and detached from their national government, healthcare providers, and education system. Because of this, connecting Brazil's more than 180 million residents is one of its most daunting challenges. Nonetheless, Brazil is working to extend broadband communications to as many citizens as possible.

Business Challenges

To compete with Mexico, Turkey, South Korea, and other emerging economies, Brazil is trying to overhaul its information communications and technology (ICT) infrastructure. Given the vast size of the country and the remote areas many citizens inhabit, Brazil's leaders believe ICT must play a greater role if the country is to improve the medical care it delivers, the education it provides, and the services it offers to citizens rich and poor.

Doing so, however, is not always easy. Laying copper through the Amazon Rain Forest is not a viable option, nor is persuading incumbent telecommunications providers to establish new services, such as WiMAX and other technologies, without a clear return on their investment. Furthermore, efforts to increase broadband access have been slow due to bureaucracy within the government.

Nonetheless, Brazil represents an immense opportunity. To help increase digital inclusion and technology usage in Brazil, Cisco® approached the Ministry of Communications about extending broadband to a town to see what would happen if a wireless mesh network was made available over an extended area. Cisco's reasoning was simple: broadband in Brazil, while prized, is available to only a fraction of the citizens. To date, just an estimated six million of the nation's 180 million residents have high-speed communications.

Cisco believed that setting up a test case would give incumbent communications companies, and the government, the justification they needed to move ahead. When word reached the Ministry of Communications that the small city of Tiradentes was hoping for a few PCs and something better than dial-up connectivity, the idea of a digital city was born, and Tiradentes was chosen as the model.

The effort to bring wireless mesh to Tiradentes was more than a simple undertaking despite the small town's modest size of 7,000 people. For starters, Tiradentes lies down a cobblestone road in an old mining town that once produced gold but now profits from tourism. It is a municipality in the state of Minas Gerais in Brazil, some 240 miles from Rio de Janeiro.

Tiradentes was chosen in part based on the efforts of Magda Marostegan, secretary of education and tourism and a retired teacher. She wanted to get the town's mayor and others more involved with technology. Marostegan hoped that increasing PC usage in and around city hall would inspire town leaders to consider allocating more money to education infrastructure, among other things. She found an ally in the late Marcelo Gomes, then the town's secretary of tourism. Gomes saw the Internet as a vehicle for both promoting Tiradentes as a tourist destination and improving education for local residents. Together, Marostegan and Gomes approached Tiradentes Mayor Nilzio Barbosa with an ambitious plan to take advantage of PCs and the Internet. A technology novice, Barbosa suggested the duo take their ideas to the Ministry of Communications, which, unknown to them, was simultaneously considering plans to extend broadband communications to a small town to see what benefits could be derived.

Solutions

To transform Tiradentes into a digital city, Cisco installed five radio base stations, which today provide 2 MB of throughput to users at any one time. Initially, Cisco figured the devices would extend coverage to all residents; but the nearby mountains, thick stone walls, and unreliable backhaul proved more challenging than first thought. The initial installation, however, was enough to give townspeople a glimpse of new opportunities and possibilities in education, small business, and public services.

Broadband has become so desired that residents who do not have immediate access are insisting that they, too, receive coverage. Residents who do have coverage, including local merchants, government officials, and educators, have already incorporated broadband access into their daily lives. "The project has brought great value to the city," says Barbosa. He notes that four of the town's eight schools are connected to the Internet, and that the town itself has a Website (www.tiradentes.mg.gov.br), which helps visitors find Tiradentes and make the most of their stay. In addition, there are cameras mounted at strategic points in the town square to help reduce petty crime such as vandalism.

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Magda Marostegan
Secretary of Education and Tourism
City of Tiradentes, Brazil

Initially, Barbosa worried the project might turn out to be little more than a publicity stunt, leaving him with unmet expectations and a litany of reporters hungry for news of a government-backed technology project gone awry. Fortunately, Cisco has stayed with the project and even found a local, on-the-ground hero in the way of Marostegan's son, Jeamderson. He has become the onsite troubleshooter who keeps the network finely tuned. A student of the Cisco Networking Academy, Jeamderson was initially the only resident available to manage the network when it went up. Since then, he's proven indispensable, helping bring online several schools and businesses in the area. He estimates it will take several additional base stations before the entire town will have access to wireless broadband mesh technology. "My dream is to make it so no one has fear of technology in this community," says Jeamderson.

In addition, the local health center director, Dr. Josemar, says that residents are beginning to embrace the Internet, thanks, in no small part, to the telemedicine labs he's established at two different sites in town. These facilities help patients often avoid day-long trips over the mountain to another hospital facility that has more advanced capabilities. The local doctor uses the Internet to consult with fellow doctors on everything from cases involving lung X-rays to basic blood work.

In addition, the local doctor says he believes that the Internet helps reduce hypertension and depression in patients who feel isolated and detached from living in the remote region by bringing the world and loved ones from afar into their homes. Like many others, he has seen firsthand the benefits that come from social and digital inclusion. Nowhere has this been more evident, perhaps, than the local high school, where 20 workstations connected to the Internet are bringing the world to Tiradentes' door. When Brazil hosted the week-long Pan American Games in Rio de Janeiro in July 2007, for example, students from Tiradentes gathered in the school's computer lab to follow the games live and participate in student forums set up by the games' organizers.

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Students aside, others are hoping to prosper from wireless broadband. One local entrepreneur, for example, has opened an IT shop, helping residents and small businesses connect to the Internet. Plenty of other businesses, too, depend on the improved network connections to communicate with would-be visitors and business partners.

To ensure that access becomes more widespread and meets the enthusiastic demands of the town's residents, Jeamderson works with a committee of townspeople to prioritize which parts of Tiradentes will be online next. There are several community centers, for example, that he'd like to get connected, as well as some poorer neighborhoods where economic activity is limited. He is also working with the high school on a program that keeps kids off the streets. In that program, students ages 16 to 24 receive a modest scholarship for IT training if they agree to help younger kids learn basic IT skills. The program has shown promise and involves 36 instructors. Jeamderson says that Cisco's involvement was, for many reasons, a wise choice.

Business Results

Cisco entered Tiradentes to find a way to benefit from deploying broadband to entire communities and to show the government and others that positive returns could be gleaned from such efforts. Progress has been made on both fronts. For example, a local university whose doctoral students chose the impacts of the Internet on Tiradentes as their dissertation topic agreed to pick up some additional costs to extend broadband coverage to the local community. Moreover, Cisco learned a lot about rolling out the technology, both from a social and from a technological point of view. For example, Cisco's Brazilian team learned how topography, architecture, and other factors impact product performance.

Since the broadband engagement, Cisco has commissioned a study to determine what community leaders in Tiradentes thought of their digital city. Overall, the study found that town leaders considered the project to be a source of great pride and benefit for education, health, tourism, and safety. That feeling transcends Tiradentes and Minas Gerais, and reverberates in the nation's capitol of Brasilia. There, government officials are eyeing Tiradentes and trying to determine what lessons can be applied elsewhere. The reason is simple, says Atila Augusto Souto, director of universalization, Brazil Ministry of Communications: "Brazil needs to increase Internet connectivity in order for the nation to be more competitive."

He and colleague Heliomar Medeiros de Lima, director of digital inclusion with the ministry, are working to extend broadband even further. They believe that their nation's economic strength and educational quality will suffer if Brazil's use of broadband communications lags behind that of other nations, so they looked to Cisco for some hard-learned lessons.

Together with consultants from the Cisco Internet Business Solutions Group (IBSG), Souto studied what is keeping Brazil from embracing the digital revolution even further. The number of PCs per 100 residents is not the problem. (Brazil has more than Turkey or Greece, for example.) Instead, Medeiros and Souto believe the culprit is backhaul infrastructure. Working with Cisco, Medeiros determined that just 700 of Brazil's 5,600 communities have sufficient backhaul infrastructure necessary for broadband communications. For many, satellite communications is the only option, and Medeiros believes it will take at least 20,000 access points strategically installed on the ground throughout Brazil to even begin to address backhaul and broadband coverage issues in the aforementioned 5,600 municipalities.

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Paulo Abreu
IBSG Consultant
Cisco

To help bridge its digital divide, Brazil asked Cisco and others to provide expertise and technology to build the necessary infrastructure. Currently, the nation is mulling over a plan to build the backhaul infrastructure itself, fearing that its citizens and businesses will fall further behind those in other nations if the federal government waits for an incumbent service provider to undertake such a massive project. A nationwide network is expected to be built on an existing infrastructure of 16,000 kilometers of optic fiber. Afterward, SERPRO, the government's ICT integration arm, will inherit this network and be responsible for upgrading and managing it.

Cisco worked with SERPRO to create a network design, which will evolve an older infrastructure to a full IP Multiprotocol Label Switching network. The initial goal is to connect 10 state capitols spread over 4,000 kilometers. The regions to be connected include Brasília, São Paulo, Rio de Janeiro, Belo Horizonte, Porto Alegre, Curitiba, Belém, Fortaleza, Recife, and Salvador. Initially, the project will include voice, video, and data, connecting all federal government buildings in these regions. Plans also include connecting all 170,000 public schools in the country by 2011; 64,000 are expected to be connected in the first phase, providing basic Internet access, voice over IP, e-learning, and other applications to students, teachers, and administrators.

Cisco's collaboration with the federal government dates back to 2004, according to Paulo Abreu, an IBSG consultant. "We have learned the importance of engaging early on with the government to help develop a digital inclusion strategy according to their objectives," says Abreu. "We know that public sector processes take time, but early investment, perseverance, and distinguished expertise can make a difference."

And they do. Souto says he's learned to count on Cisco for more than technical advice, for example. He also depends on Cisco to find creative ways to fund and manage projects. Much of that trust and reliance was developed as the government observed how Cisco worked in and around Tiradentes.

"What we learned from the Tiradentes example is that technology isn't the issue; you can always work out technology issues," says Souto. "The key challenge is the sustainability and the killer applications that will persuade citizens and local governments and institutions to use the technology in a consistent and useful way. Cisco has shown us a lot in that regard, and we have each learned many lessons from the effort."

More Information

The Cisco Internet Business Solutions Group (IBSG), the global strategic consulting arm of Cisco, helps Global Fortune 500 companies and public organizations transform the way they do business—first by designing innovative business processes, and then by integrating advanced technologies into visionary roadmaps that improve customer experience and revenue growth.

For further information about IBSG, visit http://www.cisco.com/go/ibsg

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

Europe Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: +31 0 800 020 0791
Fax: +31 0 20 357 1100

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