

Telco Breaks Through Scalability Limits for Metro Rings

One of the first carriers in Brazil with a converged IP NGN, CTBC adds Resilient Ethernet Protocol access layer.

EXECUTIVE SUMMARY
<p>CTBC, an Algar Company</p> <ul style="list-style-type: none"> • Industry: Telecommunications • Location: Uberlândia, Brazil • Number of Employees: 13,500
<p>CHALLENGE</p> <ul style="list-style-type: none"> • Continue to grow the subscriber base and expand into new markets • Simplify operations (and reduce OpEx) by migrating to an all-IP next-generation network (NGN) by 2012 • Increase revenue with new services
<p>SOLUTION</p> <ul style="list-style-type: none"> • Core upgraded with multiservices capabilities • New access solution for large markets, based on Cisco Carrier Ethernet switching technology with Resilient Ethernet Technology (REP)
<p>RESULTS</p> <ul style="list-style-type: none"> • Scalable Carrier Ethernet for large markets • Performance gains and carrier-class resilience for multiplay services like IPTV and video on demand (VoD) • Strengthened reputation as market leader by pioneering services in the region • Proven viability of the IP NGN architecture and on-track progress for IP convergence

Challenge

For more than 50 years, Companhia de Telecomunicações do Brasil Central (CTBC) has pioneered telecommunications in Brazil. CTBC has grown a subscriber base of more than 1 million customers with innovations playing a vital role in its success. The carrier was the first to deploy a commercial optical fiber network in Brazil, and the first to offer cellular service, digital and cable telephony, and prepaid fixed telephony along with providing integrated multimedia solutions and world-class contact center services.

In 2005, CTBC began to evaluate a next-generation network (NGN) design that would enable the convergence of multiple networks. The objective was to simplify operations and, therefore, lower operating expenses (OpEx), while also enabling transport for business services, broadband capabilities (DSL), and “triple-play” offerings. After evaluating proposals, CTBC chose a Cisco® Carrier Ethernet Solution and began the first phase of its migration to an all-IP network.

CTBC has taken many steps toward its goal. Upgrading the core network with the Cisco Catalyst® 6500 Series and deploying the Cisco Catalyst 3750ME Series Switches within the access layer enabled the deployment of new business services. In mid-2007, the network grew to include new metro rings based on the Cisco ME3400 Series Ethernet Access Switches aggregated with Cisco 7600 Series routers. The Cisco Carrier Ethernet technology provided a cost-effective solution for the expanding business service subscribers and residential ADSL customers.

In late 2007, the carrier was ready for the next step in its convergence initiative: to support mobile backhaul of its 3G network over the IP core. However, CTBC faced a major challenge when work began on the build-out of the all-IP network to reach a new city. Guaira, in São Paulo, required a large number of stations (more than nine nodes) and the standard Ethernet protocol conventions (Spanning-Tree) were not meeting the need.

“Taking advantage of REP within our access layer has significantly increased the overall robustness and reliability of our network.”

– Nelson Orozimbo Resende

Solution

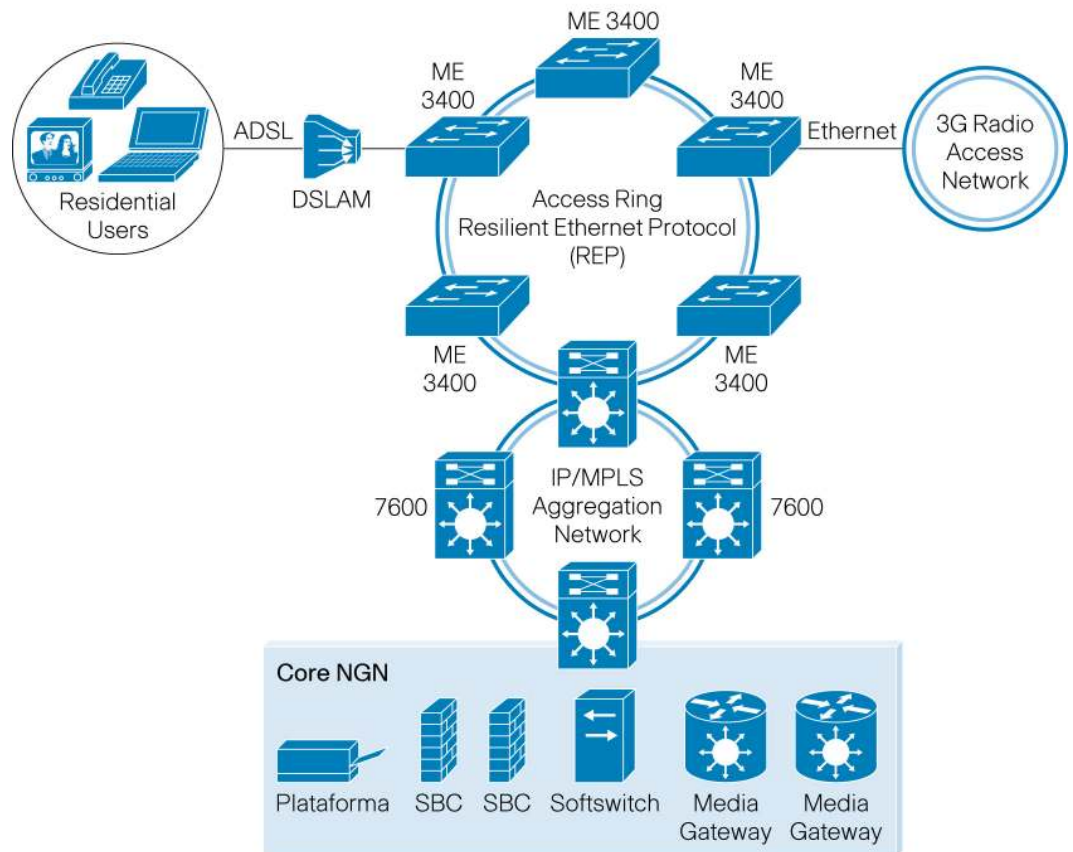
To scale Metro Ethernet rings for large markets like the São Paulo region, the CTBC network architects turned to Cisco for advice and learned about the new Cisco Resilient Ethernet Protocol (REP). Just released on the Cisco Catalyst 3750ME Series Switches and Cisco ME3400 Series Ethernet Access Switches, REP was developed to overcome several limitations faced with traditional Carrier Ethernet ring topologies:

- **Scale:** Although standard Ethernet switching cannot support more than seven nodes in a ring, REP allows carriers to configure rings with high numbers of nodes. Cisco has tested REP with 16 and 32 nodes, and up to 64 rings can be controlled by a single Cisco Carrier Ethernet switch.
- **Resilience:** REP offers fast and predictable Layer 2 convergence (50 to 250 ms), and fast failure notification even in very large rings. Network managers can manually configure REP for predictable failover, and REP supports a choice of ring topologies (redundant rings and ring segments).
- **Performance:** Virtual LAN (VLAN) load balancing optimizes bandwidth utilization.
- **Ease of management:** Default configurations speed setup and troubleshooting.

“With built-in support for REP, the Cisco ME3400 Ethernet Switches have overcome the Spanning-Tree limitations that were holding us back,” says Nelson Orozimbo Resende, engineering manager at CTBC. “Not only can we grow well beyond seven nodes per ring, but REP also solved some performance issues that would have otherwise affected our voice services. Convergence times with Spanning-Tree were 1 to 2 seconds; with REP, we’ve measured from 50 to 200 ms convergence times for converged voice, video, and data traffic.”

Results

The introduction of REP technology within the CTBC access layer met a short-term need for scalability (see Figure 1). As the company’s subscriber base continues to grow and more cities converge multiple networks onto the new IP NGN, the scalability and configuration flexibility will prove more invaluable. The company is also quick to point out the other gains associated with the latest Cisco Carrier Ethernet solutions. “Taking advantage of REP within our access layer has significantly increased the overall robustness and reliability of our network,” says Mr. Resende. “This means that we can more reliably deliver services to our customers and continue to attract both residential and business customers with our carrier-grade infrastructure.”

Figure 1. CTBC Metro Topology

The scalability, performance, and resiliency improvements contribute to the company's IP convergence efforts, which will result in great improvements in operational efficiencies. CTBC is the first service provider in Brazil to converge its networks. "The main point of our NGN transformation is to reduce our operating expenses and gain faster time to market for new services," says Resende. "Cisco Carrier Ethernet technologies are helping us meet all of our requirements, and we've had a great experience working with Cisco."

Today, as the Carrier Ethernet upgrade is deployed to each city, CTBC is converging mobile backhaul, voice, DSL, and business services onto the common IP network. Next year, IPTV will be offered to subscribers, and the "triple-play" vision will be realized.

PRODUCT LIST

Routing and Switching

- Cisco ME3400 Series Ethernet Access Switches
- Cisco Catalyst 3750 Metro Series Switches
- Cisco 7600 Series Routers (Ethernet Aggregation)

Next Steps

REP was first deployed during the build-out for Guairá, and the results allowed CTBC to confidently deploy services over the converged network. Since then, REP has been introduced in rings in three other cities. Over the next three to four months, CTBC will upgrade all of its Carrier Ethernet access

platforms to support REP, and REP is now an important part of the high-level IP convergence plan that will be completed during the next five years.

For More Information

To find out more about the Cisco Carrier Ethernet solutions, go to: www.cisco.com/go/ce

To learn more about REP, a white paper is available at:

www.cisco.com/en/US/prod/collateral/switches/ps6568/ps6580/prod_white_paper0900aecd806ec6fa.pdf.



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