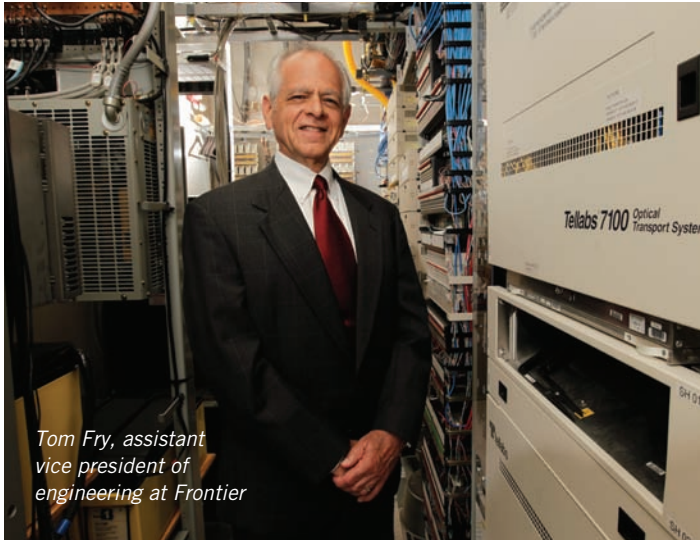


The New Frontier

The largest telecommunications company focused on rural America selects Tellabs.

By Jim Hinckley



Tom Fry, assistant vice president of engineering at Frontier

“We knew we had a big job ahead of us,” said Tom Fry. That might be the biggest understatement since “Houston, we have a problem.”

Frontier Communications, where Fry is assistant vice president of engineering, became North America's largest predominantly rural carrier and fifth-largest ILEC after acquiring 4.8 million lines from Verizon Communications in July 2010. The transaction expanded Frontier's footprint in 14 states spanning the Mid-Atlantic region to the Pacific coast.

Besides national scale, the acquisition also gave Frontier ownership of several optical networks using the Tellabs® 7100 Optical Transport System (OTS). These multiservice, packet-optical transport nodes contain a key set of technologies that fulfilled one of the conditions regulators imposed when approving the acquisition: increased broadband deployment. Frontier wanted to roll out broadband service quickly to unserved and underserved markets to demonstrate its commitment to the regulators and, more importantly, provide this service to its new customers.

The new markets are predominantly rural, and they lacked broadband infrastructure. Frontier thus faced the daunting task of rapidly installing, testing and turning up new optical equipment to convert several thousand network miles to broadband. On top of everything, many of the markets were “islands”: areas not bordered by other Frontier markets.

“Given the highly dispersed nature of the properties we acquired, and the bandwidth required both now and in the years ahead, we needed an optical transport and routing solution that would give us maximum flexibility, scalability and cost savings,” said Fry, whose other title is head of Frontier's CO equipment installation team.

“And just as important, we needed a team of people with the knowledge and experience to help us integrate that equipment into our new networks as quickly as possible. Tellabs® Global Services provided both.”

Why the Tellabs 7100 Optical Transport System?

Frontier's longstanding relationship with Tellabs was a major reason why the operator knew where to turn for technology and technical support.

“Frontier has had a significant embedded base of our Tellabs® 1000 Multiservice Access Platforms for more than 15 years,” said David Karlin, senior executive account manager of the Tellabs sales account team supporting Frontier.

In early 2010, Frontier and its Tellabs Global Services team began discussing technology options for the new markets. In most of them, the acquired infrastructure was operating at or near capacity, except for the territory powered by the Tellabs 7100 OTS.

Frontier chose the Tellabs 7100 OTS because it enabled the company to meet regulators' short-term acquisition conditions while laying the foundation for other high-bandwidth services in the future. The solution provides a modular set of technology options, including packet aggregation and switching, ROADMs and TDM with SONET/SDH and OTN. In addition, a dynamic control plane and Tellabs network management system provide deep, system-wide control. The question was, which Tellabs 7100 OTS platform would best fit Frontier's unique needs?

“We needed a system powerful enough to shoot beams of light over longer distances than ever before,” Fry said. “Yet it also had to be agile and precise enough to deliver just the right amount of bandwidth to specific locations.”

Compact and Flexible

Roughly half the size of the Tellabs 7100 OTS, the Tellabs® 7100 Nano™ Optical Transport System provides the same integrated networking and Ethernet switching, but with a smaller footprint. These attributes make the Tellabs 7100 Nano OTS a more affordable network-edge solution.

“Using Tellabs' 7100 packet-optical technology, Frontier will significantly reduce their total cost of ownership including OpEx by up to 85%,” said JR Due, Tellabs transport solutions director. “Largely contributing to the low TCO is the Tellabs 7100 system's flexibility, efficient use of space, power and simplicity of service additions.”

The Tellabs 7100 Nano OTS can also act as an optical line amplifier and a node for reconfigurable or fixed add/drop of up to 88 wavelengths remotely.

“We recognized that the Tellabs 7100 Nano system’s approach to ROADM would give us maximum flexibility, enabling us to send any or all 88 wavelengths on the network to any add/drops port,” Fry said.

Balancing Act

In early 2011, the first batch of Tellabs 7100 Nano systems and other equipment arrived in Indiana, Michigan, Ohio and West Virginia. After Frontier’s CO equipment and installation teams deployed the infrastructure, Tellabs technicians tested the hundreds of miles of legacy fiber to ensure that it could maintain signal quality as the Tellabs 7100 Nano systems ramp up data speeds and volumes.

Once the testing was finished, the Tellabs technicians turned up the system, and the conversion was complete. The service is branded as Frontier Fast.

“In many of the areas that we’ve converted to the Tellabs 7100 optical transport system the embedded network is an OC-48 or OC-192,” said Bob Staley, network reliability manager in Frontier’s operations group. “With these or lower capacity networks, we normally would have to spend a lot of time and money putting more glass in the ground to achieve a noticeable increase in bandwidth.

“Instead, by installing these new systems at the COs, we don’t even have to touch the embedded fiber, and the converted network is instantly much more robust. Current usage levels aren’t even a third of what the system can handle now.”

The Tellabs 7100 Nano system’s unique technologies make the long-term benefits look even more compelling. Because traditional, fixed-filter technology can add and drop only specific channels or bands of wavelengths at a given location, network engineers typically must plan far in advance for changes in traffic patterns. Adding more capacity disrupts service as new filters are inserted into the network. Then, as the traffic grows, the network requires optical power-balancing (“tuning”), which is also very time- and labor-intensive on a fixed-filter system.

In contrast, the combination of the Tellabs 7100 Nano OTS with integrated ROADMs enables Frontier to add bandwidth and services with minimal planning and without

disrupting services. This architecture also enables Frontier to perform constant, automatic, optical power balancing on a site-by-site basis.

“Our initial deployments of the Tellabs 7100 Nano OTS focused on making Frontier Fast available to homes and small businesses, but that’s just the beginning,” Fry said. “We’ll also be able to offer a broader range of services to

larger businesses in the properties we’ve acquired. We’re also looking to add to our mobile-backhaul business, which has grown recently with our new contracts from AT&T.

“A key benefit of the Tellabs 7100 Nano OTS is that it enables us to deploy additional bandwidth quickly and efficiently. Being able to respond even faster now to both consumer and business needs gives us a major advantage.”

Team Effort

Of the 4 states where Frontier and Tellabs are converting networks, southern Ohio is one of the largest projects, where 19 Tellabs 7100 Nano OTS nodes are linked by more than 380 miles of fiber.

“This ring dwarfs any other that Frontier has ever built, and the Tellabs

7100 Nano systems were only part of the new equipment we were adding,” Staley said. “We ran several rounds of tests to make sure it all worked smoothly.

“With the tight deadlines and certain aspects of the technology being new to our field technicians, we really appreciated the support we got from Tellabs. They were available by phone when we needed them.

“As a result, that huge ring in southern Ohio is now supplying much more bandwidth than before, and doing it very reliably.”

By early April 2011, Frontier and Tellabs had integrated 345 ROADM-based packet-optical transport systems spanning 6,500 network miles. More are in development, and not a moment too soon: Like its peers, Frontier expects broadband traffic to continue skyrocketing. ■



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— Bob Staley, network reliability manager in Frontier’s operations group (right)

CO: Central Office

ILEC: Incumbent Local Exchange Carrier

OC-48: Optical Carrier transmission rate of 48 x 51.84 Mbit/s

OC-192: Optical Carrier transmission rate of 192 x 51.84 Mbit/s

ROADM: Reconfigurable Optical Add/Drop Multiplexer

SONET: Synchronous Optical Networking

SDH: Synchronous Digital Hierarchy

TCO: Total Cost of Ownership

TDM: Time Division Multiplexing