

# CLECs

## Liberate Their Copper

Hargray Communications and Gulf Pines Adopt EFM to Replace T1s

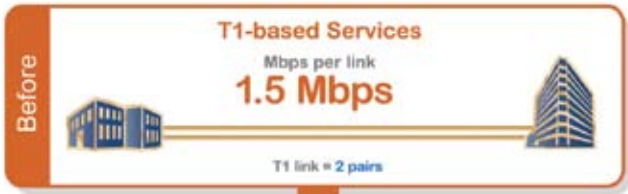
By Philip Hunter

The old saying, "If it ain't broke, don't fix it." only goes so far, as many network service providers across the country are now discovering with their legacy T1 circuits. But the question really is: how do carriers know if something isn't actually broken?

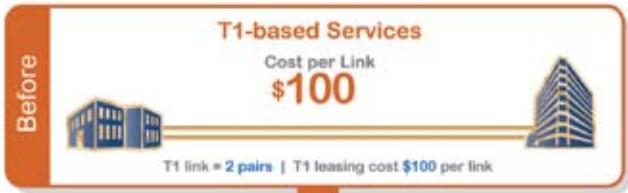
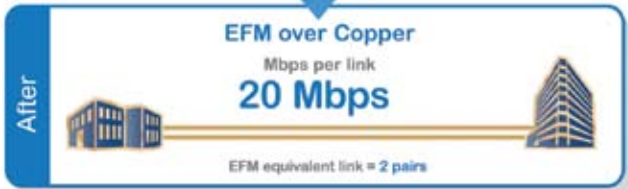
Many carriers today are still relying on outdated T1 circuits to provide broadband data and voice services to their business customers, but there is now an overwhelming business case for replacing these obsolete lines with Ethernet in the First Mile

(EFM) connections that can leverage the same copper network infrastructure to more efficiently deliver broadband services. Such a move would cut OpEx dramatically for any network operator, while liberating bandwidth from the same copper plant and creating the potential for upselling new premium services that offer more advanced service level agreements (SLAs) and higher service reliability. This is a straightforward migration involving a quick and easy deployment of intelligent EFM equipment and next-generation aggregation systems at the customer





**10x Increase or more**



**70% Reduction in cost**



**Enhanced Reliability**  
**Resiliency to Multiple Failures**  
**Superior Service Availability**

premises and central office(s), which will yield a massive increase in bandwidth per dollar.

The second question facing every service provider today remains the same: how to deploy new technology easily and economically, which in turn, enables them to bring new revenue-generating services to market quickly, and provides easy turn up of bandwidth at a moment's notice to meet their customers' diverse needs. As a way to bring in this new revenue, by providing a means to offer higher value services while also reducing their costs, service providers need to ditch archaic T1 circuit technology and deploy new Ethernet over copper technology which gives them the ability to provide in excess of 10 times the bandwidth per copper pair, along with significant cost savings and improved reliability.

Indeed, the time has finally come when the case for migrating to a newer state-of-the-art technology becomes so compelling, and competitively necessary, that it must be done. That time has come for T1 circuits.

One of the significant factors when considering replacing T1 circuit is the simple fact that migration from T1s to EFM over copper eliminates take expensive truck rolls or construction costs, only involving replacement of existing equipment at the central office (CO) and customer premises ends (CPE) of each link. The same copper infrastructure can be used without modification. One of the attractions of Ethernet over copper is carriers can immediately deliver fiber-like performance and reliability in more remote areas without the time or prohibitive cost of trenching.

With a steady stream of defections from T1 to EFM threatening to become a stampede over the next year or two, this message is getting through to network operators across the country. And while carriers may be inspired to migrate for slightly different reasons, their ultimate experience with EFM is often similar in terms of higher quality of service (QoS), improved reliability, and much more potential bandwidth allied to greater scalability. There is also much greater scope with EFM when compared to T1s, enabling service providers to deliver incremental services while maximizing revenues and, subsequently, giving customers the bandwidth they need to run the applications they want.

**Defection Makes Dollar Sense**

"Based on our customer experiences, most CLECs currently are paying between \$50 and \$150 per month for a typical T1 line comprising 2 copper pairs that deliver a total of 1.5 Mbps," says Eric Vallone, vice president of marketing at Silicon Valley-based Actelis Networks. "By taking \$100 as the North American average, this equates to \$1,200 a year for the service provider per T1."

These high prices, according to Vallone, reflect the historical cost of T1 circuits dating back to the 1990s, when 1.5 Mbps was considered a fat broadband pipe and could serve the data communication needs of a relatively large office. "In Europe costs for the equivalent E1 services delivering similar bandwidth of 2

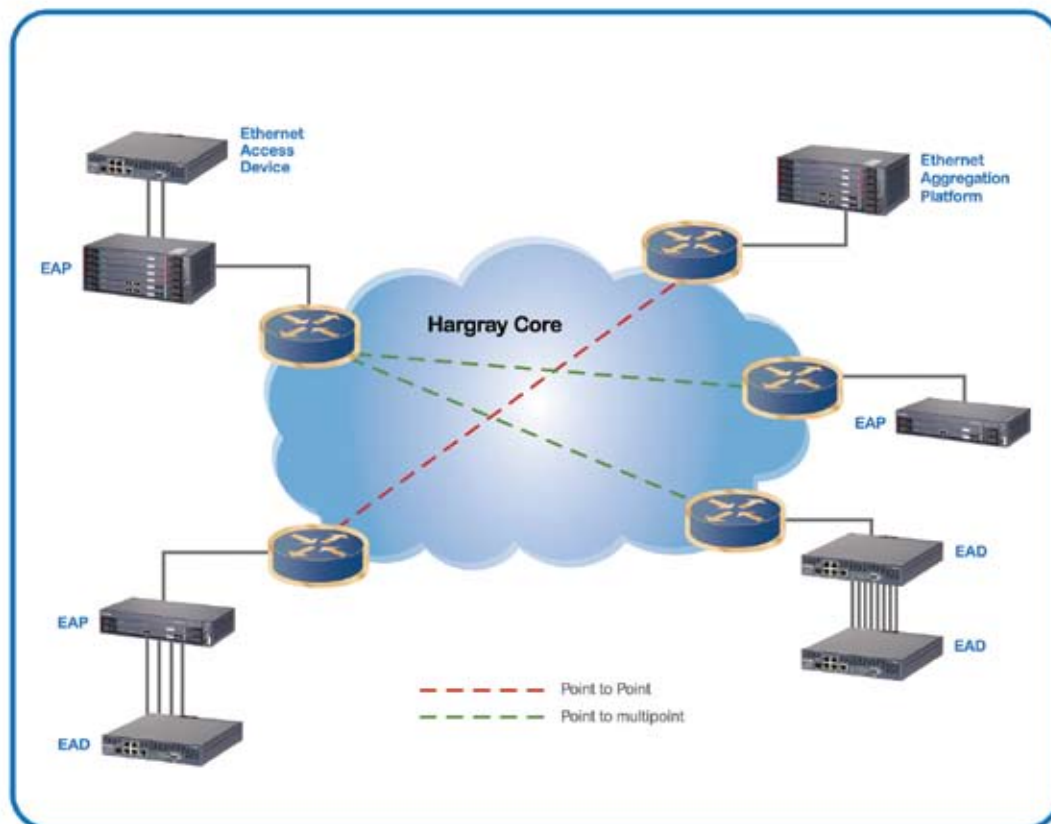


Figure 1.

Mbps are typically much higher than T1 circuits in North America, further exacerbating the benefits of EFM," adds Vallone.

Flash forward to today, when it is possible to lease the basic copper pairs much more cheaply without paying for the legacy T1/E1 service and install an intelligent EFM solution that actually drives copper pairs at much higher speeds and with greater reliability. Now, the two sets of copper pair loops qualify for ADSL/HDSL and EFM-ready, and will typically cost only \$15 each per month, or a total of \$30 per month. This brings the annual cost per circuit down from \$1,200 to \$360. "On a much larger scale, a U.S.-based CLEC could actually save upwards of \$84,000 per year simply by changing 100 T1s over to EFM over copper," says Vallone. "The good news is, many CLECs have far more lines than this example illustrates, and if this in fact is the case, the potential for savings becomes enormous."

For Hargray Communications, a combined CLEC, ILEC, ISP, and MSO serving the Hilton Head Island, South Carolina, and Savannah, Georgia, regions, the big deal about EFM over copper was the vastly increased performance and scalability, as well as reach. Hargray was one of the first local operators to adopt EFM in 2006, driven by an ambition to give its small to medium-sized businesses (SMBs) improved levels of performance and coverage within its area without having to resort to fiber. "We needed to provide 10 Mbps and 20 Mbps services with QoS and Q-in-Q support, and the existing solution based on bond-

ing T1s couldn't scale," says Tony Stout, Hargray's engineering manager. "We can now offer advanced Ethernet services over our legacy copper infrastructure without the cost or delays of constructing fiber."

Stout also indicated that for carriers to get the most out of EFM they must choose the right vendor. At the time Hargray made its choice in 2006, there was only one vendor of EFM over copper solutions, Actelis Networks, which supported all the necessary Ethernet extensions needed to implement a successful service. This choice also enabled Hargray's VoIP service to be supported so its customers could benefit from reduced voice telephony costs without sacrificing quality. "At the time Actelis was the only EFM vendor with MEF (Metro Ethernet Forum) 9 and 14 certification," says Stout.

Together, MEF 9 and 14 certifications guarantee that a vendor's EFM equipment can support key VLAN features such as Ethernet Private Line (EPL) and Ethernet Virtual Private Line (EVPL). "Hargray supports both," adds Stout, "with EPL enabling point-to-point links for customers wanting Ethernet connectivity between a pair of sites, while EVPL facilitates Ethernet networking between multiple sites." (See Figure 1.)

Hargray also looked for the crucial elements of operations management and support. Both of these can consume a lot of manual effort in sending engineers out on site, and effort equals cost. Therefore, Hargray insisted on using a strong Element

Management System so it would be easy as possible to maintain full service over the EFM network. “Enhanced visibility and troubleshooting capability allows us to reduce truck rolls compared with our legacy T1 solution,” says Stout. “Now we can do 95% of diagnostics remotely, and even if we do need a truck roll, we have a good idea what’s wrong before we get there. So, now not only have we increased revenue by offering new services to our enterprise customers, but we have also reduced OpEx by having a fully managed product in the field.”

Perhaps the most important factor of all in Hargray’s choice of vendor lay in support for signal regeneration via e.SHDSL repeaters (e.SHDSL is the improved version of DSL for symmetrical services, providing the physical layer for EFM over copper). “This was a significant factor, since we had some customers up to 22,000 feet from the nearest DSLAM,” says Stout. “We can now reach these customers at the edge of town or in non-populous areas that we had to turn away before.”

## From Hargray to Gulf Pines

For Hargray, the OpEx savings, while welcome, was not the biggest benefit to come from migrating to EFM over copper. For many service providers, though, OpEx savings really are the primary motive for migrating in the first place, even if higher bandwidth services or expanded coverage follow later. In many cases the OpEx savings themselves are essential for staying competitive and keeping control over costs, especially during the current economic downturn.

This was the case for Gulf Pines Communications, a Mississippi-based CLEC specializing in local and long-distance voice transmission, high-speed broadband, and Voice over Internet Protocol (VoIP) services. “We needed a way to be competitive with AT&T not only in offering customers more bandwidth, but to do it in a cost-effective manner that would benefit the company, as well as our customers,” says Michael Harvey, network operations manager at Gulf Pines.

Gulf Pines already offered higher bit rate services via DS3s, but DS3s are an expensive way to deliver bandwidth in the local loop. In this case, their migration to EFM over copper enabled DS3 bit rates to be delivered, but at much lower cost. Gulf Pines is now exploiting the bonding support incorporated in the EFM standard, enabling up to 32 copper pairs to be combined in a single circuit. With each pair carrying 5.7 Mbps in an EFM network, 8 pairs are sufficient for a 45 Mbps circuit, and 32 pairs just blows this bandwidth away.

“Bonding is the most important feature of our EFM platform, as well as just being able to get rid of those costly T1s and DS3s,” says Harvey. In practice the savings have been even greater than Harvey expected. “I have been able to replace expensive DS3s with this equipment and saved the company thousands in recurring costs. The EFM equipment has exceeded my expectations of Ethernet over copper.”

Bonding also increases reliability, since it insulates the service provider and therefore its customers from failure of any single copper pair in a bonded circuit. Service providers may choose to move to two copper pairs as minimum for each EFM

circuit, to exploit bonding redundancy.

However, while this caters for failure of the link, it still leaves the customer exposed to hardware faults within the CO chassis itself. In the past even when there are two separate CO point-to-multipoint systems in a CO, services can still go down when there is a failure because each chassis is connected to different sets of copper pairs. Thankfully, some solutions offer support for cross bonding between EFM over copper systems.

Just as important as reliability is having a future roadmap leading to ever increasing levels of performance, so that service providers can meet their customers growing demands and expectations. Indeed, both Hargray and Gulf Pines have an eye on the future - aiming to more than double the achievable symmetric bit rate per copper pair to 15 Mbps from the previous 5.7 Mbps limit. “That’s where we’re headed, toward Ethernet services with even higher line rates,” says Stout. “We still have many larger customers, and even smaller ones, with a lot of videoconferencing or large file transfers that would like 50 Mbps or more.” Currently, Hargray offers services at up to 30 Mbps.

## The Bonds Created With EFM

These two innovative carriers, Hargray and Gulf Pines, between them exploit all the strengths of EFM: rate, reach, and reliability. The unique EFM repeaters help provide the reach, which was so important for Hargray, while the incorporation of spectral management extensions reduces the impact of crosstalk at the system level as well as between individual pairs. This helps bring home the high bit rates that were particularly important for both carriers.

Above all, Hargray and Gulf Pines demonstrate that, far from running out of steam, their existing copper infrastructure still has plenty of mileage left, both literally and metaphorically, to deliver next-generation services to customers across the U.S that can generate increased revenue today.

Philip Hunter is a freelance science and technology writer based in London, England. He specializes in emerging broadband communications technologies, their impact on telecommunications operators, and the new services that they can deliver to their end customers.

Hargray Communications Group, Inc. provides integrated telecommunications services in the United States. Its services include telephone carrier services, cable television, wireless telephone, and Internet services. For more information, please visit [www.hargray.com](http://www.hargray.com).

Gulf Pines Communications, LLC, is an Integrated Communications Provider dedicated to the sales and services of communications and data products. For more information, please visit [www.gulfpines.com/](http://www.gulfpines.com/).

Actelis is a supplier of Ethernet over copper solutions for network service providers, municipalities, and private enterprises. For more information, please visit [www.actelis.com](http://www.actelis.com), and follow Actelis Networks on Twitter.