



Z H O N E®

Grande Creates Transparent LAN Ethernet Services Using Zhone EFM

“Ethernet over copper allows Grande to rapidly deliver packet services that our subscribers demand, while lowering our cost structure.”

Lamar Horton
 Director Network Engineering
 Grande Communications



Grande Communications is a facility-based carrier that is an LEC, MSO and IXC headquartered in Austin, Texas. Founded in 1999, it serves a broad market area that includes Austin, San Marcos and San Antonio.

Grande has built its own fiber-based network from the ground up, delivering advanced broadband services to both residential and business customers. It prides itself on using the latest technologies and delivering the most advanced services, with a philosophy that every customer should enjoy the benefits of advanced communications, whether in a large or small community.

Among the many advanced services Grande offers are Metro Ethernet fiber and Ethernet over T1 services, which they refer to as EoTDM. Grande is one of the first to offer comprehensive business Ethernet services over a complete IP network. Zhone has been supplying Grande with the MALC BLC for Ethernet aggregation and with Network Extender Ethernet Access Devices (EADs) since their service was launched, and these solutions are an integral part of Grande’s marketing program for EoTDM Transparent LAN Service (TLS).

Zhone has played a valuable partnership role with Grande in their EoTDM service program, providing technical as well as competitive research and analysis, along with developing technically-focused white papers which Grande uses for promoting their service. Most recently, Grande and Zhone have developed a new marketing brochure for Grande’s services to be used to promote the benefits of EoTDM as a co-branding effort.



A unique approach to Ethernet services

As a service provider focused on broadband services, Grande's strategy for Ethernet T1 service is based on reducing some of the complexity and cost associated with Multi Protocol Label Switching (MPLS) or Virtual Private LAN Services (VPLS) at the customer premises. These have traditionally been popular business services, providing ATM-like connections across IP networks for delivery of layer 2 services such as ATM or Frame Relay. Grande uses Zhone's TNE T1 Network Extenders and MALC T1 Ethernet aggregation line cards to deliver alternative Transparent LAN Services (TLS) and Dedicated Internet Access (DIA) under its enterprise business services, branded as "Grande Dedicated Data Connection (GDDC)".

Grande assessed the pros and cons of MPLS or VPLS services for business customers, then developed a simplified service offering based on EFM to appeal to customers normally leasing TDM T1s. The key to Grande's strategy was to adopt a simple layer 2 approach using native Ethernet, avoiding the hassles of provisioning routers and dealing with TCP/IP controls. Grande also found an appealing economic case for Ethernet over copper services when compared with MPLS and VPLS, due to the simpler equipment requirements of EoTDM versus the other more complex requirements of other solutions.

Lowering the Cost of Business

Ethernet over copper with loop bonding can be used with a variety of layer 1 modulation protocols. Grande has chosen T1s for their service offering. Based on layer 2 Ethernet, EoTDM does not require the level of provisioning and on-going maintenance that MPLS tunnels and assigning IP addressing do. This frees Grande from time-consuming provisioning at the router. Nor is PPPoE needed by the business customer – it is completely handled by Grande. And Label Switch Router (LSR) support is not required to determine packet routing, eliminating additional equipment requirements.

Grande uses the 802.1p packet prioritization and 802.1Q-in-Q VLAN tagging capabilities in Zhone TNE Network Extenders to handle packet forwarding and QoS. QoS can be managed by the service provider, the customer, or both for flexibility in service. Zhone's application of open interfaces and standard Ethernet practices enables Grande to leverage the EoTDM network with Grande's other Ethernet access networks.



Grande Headquarters, Austin TX

Zhone TNE Network Extenders are pre-configured for plug-and-play operation. Grande provides a TNE at the customer premises, which connects directly into a MALC Ethernet aggregation access system with a T1 Ethernet loop-bonding line card. TNEs perform auto-discovery and turn up automatically. Grande's business customers need only connect their LAN via the RJ-45 ports on the TNE to be in service. No new interfaces or intermediary devices are needed to have complete LAN-to-WAN Ethernet connectivity.

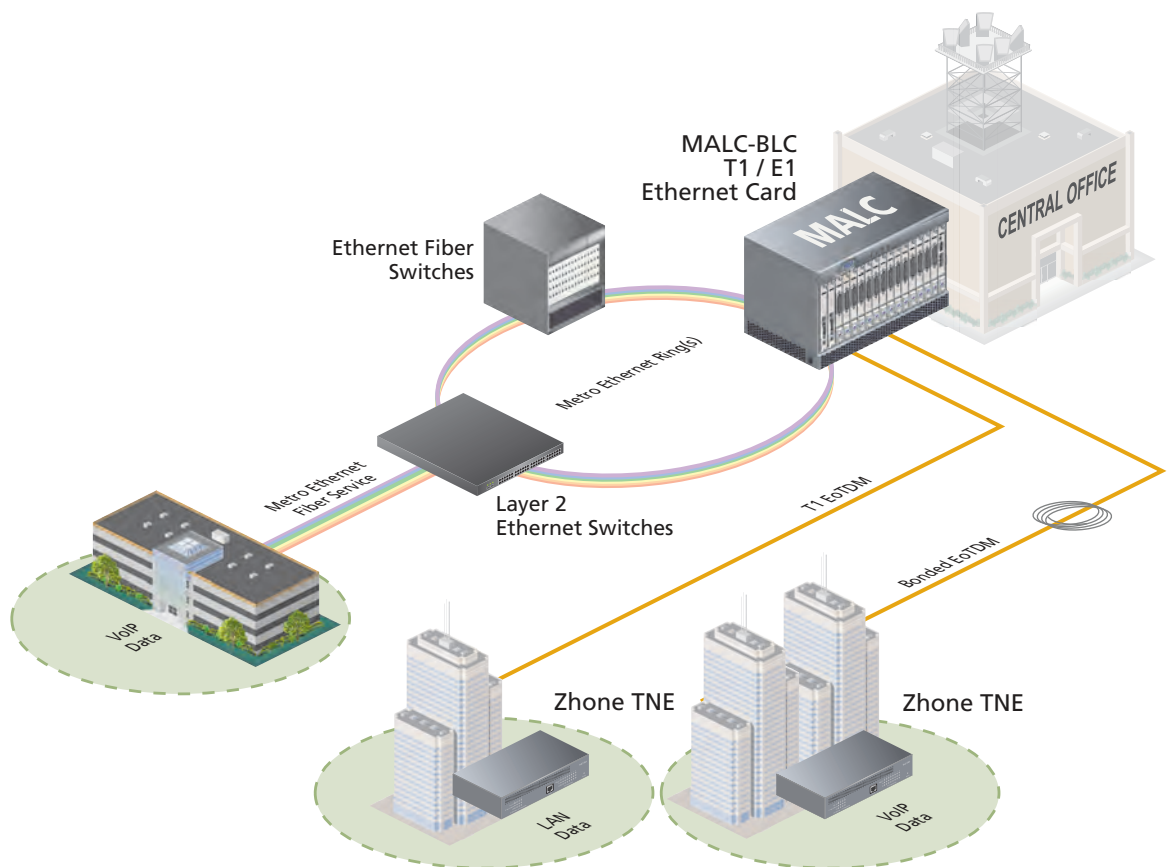


Figure 1: Grande's "GDDC" Ethernet Business Services over T1 or Fiber

Zhone TNE Network Extenders can be used with 1, 2, 4 or 8 T1 lines, with multiple T1s bonded together to provide up to 12 Mbps aggregate bandwidth. On the LAN side, options for 1, 2 or 4 10/100 BaseT Ethernet RJ-45 ports are offered, eliminating the need for a separate hub. Grande can offer flexibility in scaling WAN bandwidth as well as LAN port density to meet the needs of its customers.

“The addition of Zhone’s Ethernet access technology in combination with Grande’s extensive copper and fiber network creates an unparalleled delivery vehicle.”

Lamar Horton
Director Network Engineering
Grande Communications

Higher Quality of Service

The high performance of Zhone TNEs supports a number of quality metrics which Grande is using to market their services. For instance, latency is reduced by as much as 50% over router-based bonding like MLPPP. Likewise, overhead is reduced from about 10% to 5% over MPLS and MLPPP. Combined with jitter control and other QoS features, T1 EoTDM with copper loop bonding delivers fiber-like quality and bandwidth over normal copper pairs.

Grande employs Zhone’s Multimedia Traffic Management (MTM) to ensure their customers receive high levels of service quality. MTM can be used for traffic policing and prioritization, data rate control and packet re-directing on both upstream or downstream traffic. This assures Grande that they are delivering the kind of performance and bandwidth their business customer expect.

Summary

Data network reliability, performance and security are essential to the productivity of an enterprise. Service interruptions and bandwidth congestion lead to lost profitability and productivity. As the demands of business data networks increase, rising expectations for quality of service and level of service have increased on the part of the provider. Ethernet over T1 with loop bonding delivers the right combination of bandwidth, performance, quality and reliability to meet these needs. Combined with Grande’s fiber-based Metro Ethernet network, seamless LAN-to-WAN service connectivity is delivered.

Using proven Network Extender technology from Zhone Technologies installed around the world for more than 8 years, Zhone Ethernet over copper solutions deliver unparalleled benefits and performance. Coupled with Zhone’s unique Multimedia Traffic Management, quality, reliability and value are delivered to every customer.



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