

Supporting Multi-Media IP Services to SME/MBU Customers Using High Speed Wireless Access

By Erik Boch ■ *DragonWave Inc*

Traditionally, services to Small & Mid-sized Enterprise (SME) customers in Multiple Business Unit (MBU) locations were comprised almost exclusively of leased line TDM circuits provided by the Local Exchange Carrier (LEC). Generally, these low speed switched circuits were the only practical, cost effective telecommunications options.

The evolution of Ethernet-based LANs resulted in the need to multiplex data traffic onto these TDM circuits as well. More recently, high bandwidth IP requirements and a growth in Video and Voice-over-IP (VoIP) technology within the SME market have driven a requirement to connect these customers' voice, video and data requirements across Ethernet. The cost-effectiveness and high speed of fast Ethernet (100baseT) and Gigabit Ethernet (GigE) are highly attractive access alternatives which form the basis of many wireless service providers' value proposition to the SME customers.

Typically, service providers employ high speed optics or wireless Ethernet radios to provide a "big pipe" connection to the SME MBU locations. The wireless alternative is highly cost effective, rapidly deployable and of fiber-like service quality. In order to offer premium revenue services, the service provider can offer the subtended SME

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customers Service Level Agreements (SLA's) which match their various needs. In order to do this, a managed traffic function is required at the MBU site so that the ingress traffic attributes accurately support the SLA's of the various tenants and their respective multi-media traffic demands.

IP Service Examples

There is a general trend toward advanced IP-based telecommunications services resulting from the fact that these tend to be seen as cost effective and highly flexible when compared to traditional "legacy" services .

There are a number of IP services that tend to run natively across Ethernet networks. Historically, these types of services are run across access links by adapting them to TDM or [optical] SONET formats for transport. Recently, service providers are providing IP-based access services by simply leaving the IP services on native Ethernet . Ethernet in the metro allows the service provider to flexibly deploy a wide variety of services whilst operating a flexible, adaptable Ethernet network.

When considering Ethernet-based services, a typical MDU enterprise tenant might require one or more of the following services;

- LAN extension (connecting multiple

- enterprise sites together)
 - o Private VoIP
 - o Private video conferencing
 - o File sharing
 - o Applications sharing
 - o Private storage networking
 - Internet Access
 - VoIP to the PSTN

LAN services in which the MBU enterprise is part of a larger corporation are becoming increasingly popular as the primary means of communicating shifts from voice to email and video conferencing. In these cases, there is a need for network connectivity which supports a variety of routinely used applications. These types of applications place varying demands on the network, for instance;

- VoIP requires low latency and low packet loss
- Video-over-IP requires low packet loss and when used for real time applications it also requires low latency
- File sharing requires large bandwidth connections so that file transfers are fast
- Applications sharing allows centralized, manageable applications through the use of high speed connectivity
- Private storage in distributed LANs usually takes the form of multiple storage sites. Typical back-ups require the transfer of large amounts of data and therefore large bandwidths are needed.

T1/E1 circuits for example
Gigabit Ethernet in the Metro Market, Yankee Group, Report Vol. 2 No. 9, July 2001
Passmore, "The Power of Ethernet", Business Communications Review, March/2003

Internet access generally does not require extremely large bandwidth connections although user experience deteriorates when the connection bandwidth is low. It can be challenging to maintain high speed Internet access performance when this type of traffic is generally of low priority.

Although VoIP services directly connected to the PSTN are not widespread yet, the use of VoIP is increasing in popularity. The primary driver behind this lies in the fact that when voice and data

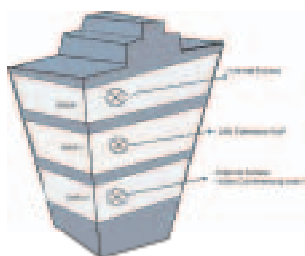


Figure 1 – An MBU Comprised of Several SME's with Various IP Access Needs

types employed was generally dealt with

nection. This works relatively effectively where fiber-to-the-building exists. In fact this is the case in somewhere between 3% and 10% of the buildings. Where the building is not "fibered", the challenge lies in the upfront investment needed to run the fiber connection to the building. The high cost of this ends up being a huge barrier, especially when a small or medium sized MBU is concerned. From the landlords perspective, having available state of the art telecommunications access services is essential in attracting and retaining high value tenants. From the service providers perspective, having the building "connect-

Table 1 summarizes a few typical IP applications and their demands on access network performance.

	Internet Access	Email	File Sharing, centralized applications sharing & storage	VoIP & Video Conferencing (over IP)
Need for low latency?	no	no	no	yes
Need for low packet loss?	no	no	yes	yes
Need for wirespeed (i.e. Fast Ethernet = 100 Mbps Full Duplex)	not usually, unless usage is high	no (but when lots of large attachments....see next column)	yes	yes

(LAN extension or Internet access) are converged onto an IP access connection, the overall cost of the connection is decreased as a result of the fact that the cost-per-megabit on IP data networks is considerably lower than on TDM, ATM, SONET [or other] networks that traditionally hosted the TDM voice traffic.

MBU Access Connectivity

Within an MBU, several tenants may exist. These could range from small stand-alone enterprises to large enterprise branch offices. As shown in Figure 1, enterprise tenants within an MBU will likely have various access service needs (the simplest of which is the amount of bandwidth required). Traditionally, responding to the various bandwidth demands and access traffic

by converting each traffic type to a TDM transport stream and then providing a leased TDM circuit to support it. In that sense, each MBU enterprise customer was treated separately and independently cabled out to the local CO.

More recently, service providers have "fibered" some buildings. In this context, the service provider provides a high bandwidth connection to the building and then, using in-building switching equipment, services to respective tenants are multiplexed to/from this con-

ed" presents a barrier to competitors. So, everyone is more-or-less agreeable to the value proposition involved...but nobody wants to foot the big bill.

An even more recent phenomenon is the availability of Ethernet service connectivity since Ethernet is readily able to transport the wide variety of different services and speeds that might be requested. The drawback of Ethernet technology is the difficulty in supporting Service Level Agreements (SLA's) that are the norm in the "business" telecommunications market. When the

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Finnerman, "VoIP is a Sideshow, Access is the Issue", Business Communications Review, March/2003
Netwatcher, Vol 20.12, December/2002

data from various sources

"In order to meet the demands of the various tenants' differing access needs, the service provider will be confronted with a traffic management problem."

building is "fibered", Ethernet switches or routers are normally used to control quality issues associated with different IP/Ethernet services.

In order to meet the demands of the various tenants' differing access needs, the service provider will be confronted with a traffic management problem. If a large bandwidth connection is run to the MBU, then the problem of administering the appropriate traffic management needed to support the Service Level Agreements (SLA's) is required.

Using High Speed Wireless to "Fiber" an MBU

A practical, cost effective alternative to providing high speed access services to an MBU site can often be realized through the use of high speed Point-to-Point (PtP) wireless access technology .

This technology allows the building to be connected with "fiber" quality despite the fact that it may be located 10 or 20 km from available metro telecommunications infrastructure.

Figure 2 shows the MBU site (depicted in Figure 1) which employs high speed PtP wireless linking between a remote MBU site and nearby metro



Figure 2 – Using High Speed PtP Wireless to Provide High Speed Access Links to MBU sites

Product example: DragonWave Inc.

telecommunications infrastructure. In this scenario, a high speed Fast Ethernet connection is made to the MBU site. At the site, an IP service/traffic manager is employed to parse the available bandwidth up between the MBU enterprise tenants in such a way that their respective SLA's are met and maintained. In this case, for example, SME #1, which is receiving an Internet access service is prevented from consuming bandwidth which SME #2 customer has paid for in order to effectively operate a LAN extension [with VoIP applications] to a sister corporate location.

Summary

Ethernet access links are increasingly popular for "broadbanding" MBU sites. Big pipe Ethernet connections to a MBU activate a powerful telecommunications capability which is essential to retaining valued SME tenants in the MBU.

Fiber optic connectivity reaches only a small percentage of MBU sites and is often an expensive alternative when compared to the use of high speed wireless Ethernet. The use of wirespeed, low latency Ethernet wireless connectivity with on-site traffic management enables a powerful high bandwidth IP-service enabled MBU site. ■

About the Author

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