Comcast BUSINESS CLASS

ETHERNET VS. T1s FOR INTERNET ACCESS

A MORE COST EFFECTIVE AND FLEXIBLE ALTERNATIVE

INTRODUCTION

The Internet is an integral part of doing business – from sending emails to hosting a web site to setting up IP VPNs to interconnect locations. Today, more than ever, organizations require reliable Internet connectivity with increasingly higher speeds to satisfy growing application requirements. They must accomplish all of this while carefully managing their IT costs.

Internet usage continues to grow and evolve significantly from its simpler web browsing and email origins. Organizations large and small now extensively rely on the Internet as a critical component of their business operations. They use the Internet to increase productivity, provide Business-to-Business (B2B) or Business-to-Consumer (B2C) services, streamline their supply chain, and outsource IT applications to reduce costs. Internet bandwidth requirements continually increase as organizations adopt new, innovative ways to leverage the Internet utilizing Web 2.0 Internet-based applications.

The adoption of new technology can help drive costs out of business operations as well as serve as a path to new revenue generation. For example, by moving applications to hosted or "cloud-based" services, an organization can eliminate the capital expense of the application servers and operational expense of software licenses and support while reducing the burden on their IT support staff.

According to IDC's recent report "Worldwide and Regional Public IT Cloud Services 2010–2014 Forecast" spending on public IT cloud offerings exceeded $16B in 2009 and is forecast to reach $55.5B in 2014 representing a 27.4% compound annual growth rate. This rapid growth rate is over five times the projected growth rate for traditional IT products (5%).

Usually, this requires a costlier, higher speed Internet connection. However, the CapEx and recurring OpEx savings of cloud-based services typically provide a better return on investment than the additional Internet bandwidth costs. During times of accelerated growth, organizations can leverage the Internet to rapidly respond to the need to quickly increase productivity and supply chain while carefully managing costs.

Organizations require operational agility to quickly adjust to changing business demands

A popular way for organizations to connect to the Internet has been via a T1-based dedicated Internet access (DIA) service. T1 DIA services are typically offered over 1 or 2 T1 circuits so the bandwidth options are limited, inflexible and costly as an organization's bandwidth and application requirements grow. To be competitive, you need to quickly and cost-effectively adapt your Internet access bandwidth. T1 DIA services are challenged to meet these elastic bandwidth requirements.

There is, however, an alternative cost effective and more flexible option to connect to the Internet using an Ethernet dedicated Internet access service.

INTERNET ACCESS SERVICES

To contrast and compare the different approaches to Internet access services, one must first understand what each service provides. Below is a review of the different services, how they are designed and delivered, and how to increase Internet access bandwidth with each option.

T1 Dedicated Internet Access

T1 DIA service is delivered over either a single T1 circuit (to achieve 1.5Mbps) or two bonded T1 circuits (to achieve 3Mbps of bandwidth). The service requires a router with one or two T1 WAN interfaces which is typically part of the initial service setup cost. This T1 WAN router typically provides a 10/100Mbps Ethernet port to connect to your router or an available Ethernet port on your Ethernet LAN switch.

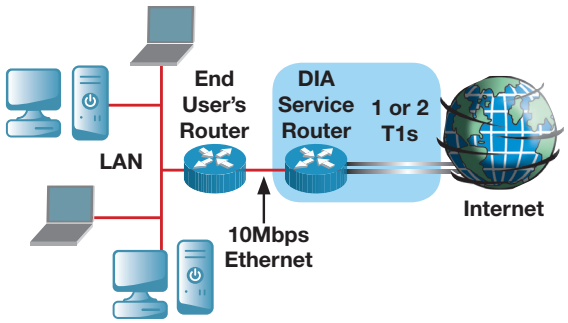

Figure 1: T1 DIA Service Configuration

The monthly recurring cost (MRC) for the service will depend on whether you purchased the service using 1 or 2 T1 circuits. Refer to Figure 2 for a cost breakdown of a T1 DIA service.

In order to keep entry costs low and eliminate interoperability issues, the service provider will include a router supporting a single T1 circuit when you purchase a T1 DIA service with a single T1. If you need more bandwidth, you need to purchase an upgraded service which may require you to purchase a new T1 router to support the bonding of the two T1 circuits. Typically, there will be another setup cost as well as a higher MRC for the additional bandwidth. With a T1 DIA service you purchase bandwidth in T1 (1.5Mbps) increments.

Note that the cost of a T1 DIA service with 2 T1 circuits can have up to twice the MRC of a T1 DIA service with 1 T1 circuit. This cost is associated with the leasing of an additional T1 circuit from the incumbent telecommunications service provider.

Item Billed	CapEx	OpEx
Initial T1 DIA service installation		
Setup Cost	T1 Router	$X
1.5 Mbps MRC	-	$Y/month
Adding additional (T1) bandwidth		
Setup Cost	New 2xT1 Router[1]	$Z
3 Mbps MRC	-	~2 x $Y/month

Figure 2: CapEx and OpEx for DIA service

Many T1 DIA service providers cannot provide Internet access beyond 2 T1s. If your Internet access bandwidth needs increase beyond 3 Mbps, you will have to switch your service to a different technology that offers higher bandwidth choices for Internet access. An organization's Internet bandwidth requirements may increase for many different reasons, including:

- Increasing number of visitors to your locally hosted public web site for eCommerce transactions
- Increasing use of cloud-based services where you move applications from running locally to running from a remote data center or hosted server in the cloud

Upgrading a T1 DIA service to a higher bandwidth may take days or even weeks

Upgrading to a higher bandwidth may require an additional T1 or a higher speed circuit such as a T3. This will result in a service disruption if you must replace the existing T1 DIA customer premises equipment to support the higher bandwidth connection. If new equipment or circuits are required, it may take days or even weeks to upgrade your Internet connection.

[1]Required if existing router cannot support additional T1s.

Ethernet Dedicated Internet Access

Ethernet DIA services are typically delivered over a single Ethernet fiber optic connection to achieve any amount of bandwidth between 1Mbps and 10Gbps. The service typically provides either a 10/100Mbps, 1Gbps or 10Gbps Ethernet port from an Ethernet DIA Service Demarcation Device used to attach your router.

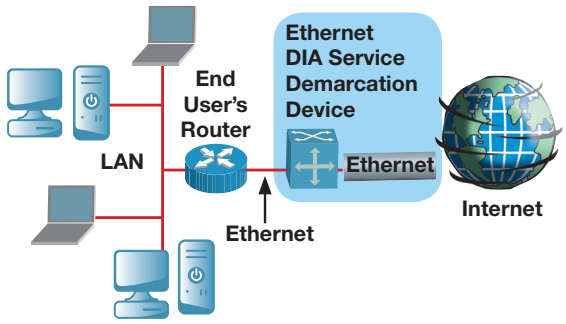

Figure 3: Ethernet DIA Service Configuration

The Ethernet port speed you select will depend upon your initial bandwidth requirements and your anticipated incremental bandwidth needs for the duration of the service agreement. A 10/100Mbps Ethernet port speed is sufficient for most organizations. Note that unlike T1-based DIA services that operate at 1.5Mbps (the speed of a T1 circuit), Ethernet DIA services are not offered based on the circuit speed. An Ethernet DIA service can be purchased in bandwidth increments up to the Ethernet port speed. Bandwidth increments are also related to the port speed. Refer to Figure 4.

Ethernet DIA Service	
Port Speed	**Bandwith Increments**
10 Mbps	1 Mbps
100 Mbps	10 Mbps
1Gbps	1000 Mbps
10 Gbps	1 Gbps

Figure 4: Ethernet DIA Service Bandwidth increments by Port Speed

The Ethernet DIA service demarcation device is included in the initial service setup cost and hence no capital expense is required to connect to the service if you can use an available Ethernet port on your router. Ethernet DIA services are typically delivered via a fiber optic connection. If your building does not have a fiber optic connection, your Ethernet DIA service provider will deliver a fiber optic connection to your building. There will be a one-time cost associated with the installation of the fiber optic connection[2]. There is also an monthly recurring charge based on the amount of bandwidth your organization requires. Refer to Figure 5 for a cost breakdown of an Ethernet DIA service.

Item Billed	CapEx	OpEx
Initial Ethernet DIA Service Installation		
Setup Cost	Service Demarcation Device	$A
	Fiber to premise[2]	$B
MRC for Nx1 Mbps or Nx10 Mbps or Nx100 Mbps or Nx1000 Mbps	-	$C/month or $D/month or $E/month or $F/month
Adding additional bandwidth		
Setup Cost	None[3]	$0[3]
MRC for Additional Bandwidth	-	Billed in 1, 10, 100 or 1000 Mbps increments

Figure 5: CapEx and OpEx for Ethernet DIA Service

An Ethernet DIA service enables you to better manage your IT CapEx and OpEx during varying economic cycles. Cost savings can be achieved using Ethernet DIA because unlike T1-based DIA services, you don't have to switch Internet access technologies or providers when your organizations' bandwidth needs exceed 3 Mbps (2 T1s). Additional cost savings can be achieved by migrating select in-house IT applications to cloud-based implementations.

Upgrading Ethernet DIA services to a higher bandwidth can be accomplished with minimal service disruption

[2]Required if there is no fiber access to your building
[3]If there is an unused Ethernet port on your router

Unlike a T1-based DIA service, Ethernet DIA service bandwidth can be added simply and quickly by your Ethernet DIA service provider who can remotely reconfigure the Ethernet service demarcation device to support the new Ethernet DIA bandwidth you require. You can continue to use the service up until the bandwidth upgrade. If the Ethernet service demarcation device needs to be restarted after the bandwidth upgrade, you may experience a minimal service disruption. If not, your bandwidth upgrade may be accomplished transparently to you. Contrast this to a T1 DIA service where new equipment and new, higher speed circuits are required which may take days or even weeks to get implemented.

SUMMARY

Organizations increasingly utilize the Internet as a critical business tool and Ethernet-based DIA services provide many benefits over T1-based DIA services. The most obvious benefit is higher bandwidth. In addition, Ethernet DIA services enable organizations to more quickly and cost-effectively add Internet access bandwidth to balance their business needs. This elastic bandwidth capability of Ethernet DIA services enables organizations to optimally manage their IT costs while they grow their business.

ABOUT COMCAST ETHERNET DEDICATED INTERNET SERVICE

Comcast offers an Ethernet Dedicated Internet access service that provides that provides reliable, simpler, more flexible and higher bandwidth options than T1, T3 or SONET-based dedicated Internet access services. The service is offered with a 10Mbps, 100Mbps, 1Gbps, or 10Gbps Ethernet port in customer-selectable bandwidth increments ranging from 1Mbps to 1Gbps. For more information or to request a consultation about Comcast's Ethernet Dedicated Internet service, please visit www.business.comcast.com/enterprise/index/services/internet/ethernet-dedicated-internet.

Comcast BUSINESS CLASS