

Moving to Next Generation Ethernet



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Today's Ethernet is not the in-building connectivity technology of the past. It has evolved to become the means by which applications, content and communications are delivered across the globe. In this article, John Hoffman describes how Ethernet has developed to become the technology of choice for global service providers.

Ethernet has moved from being regarded as a cheap means of enabling the Internet by providing long distance data connectivity at a radically reduced price. It is now universally recognized as a high-quality transport technology. That shift in perception hasn't happened overnight – after all, Ethernet is recognized as the technology used to link IT networks in the workplace and home – but a series of factors have come together in the last 24 months that have truly changed customer and service provider understanding of the advantages the technology has to offer.

Lower cost in general, and lower total cost of ownership in particular, has been the original attraction of Ethernet. That remains the case but Ethernet's success isn't driven so much by service providers looking to deploy cheaper, more flexible infrastructure, as it is by their customers coming under intense pressure to reduce their operational costs as their appetite for bandwidth increases. Organizations simply need to do more for less and Ethernet is an enabler of that, especially as markets recover from the recession.

WHY ETHERNET NOW?

The lower cost of Ethernet is driven by three key factors. First, Ethernet ports

are less expensive than any other port on the market. In addition to being less expensive, they are more flexible, allowing a single port to handle a wide variety of bandwidths. For example, a Fast-Ethernet port will handle bandwidths from 1 to 100 megabytes. Second, the flexible bandwidths available present the largest area for saving. Most enterprise customers who purchase a DS3 admit to only using 20 to 25 megabytes. A customer who purchases a 20 megabyte circuit instead of a DC3 sees immediate savings and service providers can see savings in their own backbones. Using the flexibility of a 10 gigabyte Ethernet port, providers can start at 1,000 megabytes and then grow their backbone in 500 megabyte increments. This slow growth feature, enabling service providers to match outgoing cash to incoming cash, creates a much stronger, more predictable cash flow profile for the service provider. Finally, bringing together the flexibility of the Ethernet ports and the bandwidth flexibility, nonservice impacting upgrades allow Ethernet users to slowly and confidently upgrade their network without bringing down their service. This is an important feature used by service providers to gradually expand their network without network down time and without large jumps in OPEX.

While the cost advantages have been

understood for some time, the perception that Ethernet offered inferior performance and customer experience remained in both the service provider and the end user market until recently. However, Ethernet has now entered a new phase in which understanding of its capabilities and strengths are now more widely understood. Much of that change in perception is due to efforts made by the Metro Ethernet Forum and the success of its initiatives to standardize and certify Ethernet services across the globe. That has given users comfort and led to the development of many Ethernet services backed by performance metrics, as opposed to basic services with little or no associated performance metrics.

Where service providers once did not take Ethernet seriously as a technology, partly due to their legacy investments in traditional telecoms network technologies, they now recognize its potential to radically alter the cost base of their operations. Service providers are seeing growing demand for Ethernet services from their customers. That demand comes from organizations of all types including those that previously might not have perceived Ethernet as a suitable technology for their business. For example, one Tata Communications customer in the financial services sector has moved its backbone



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to Ethernet because it recognized Ethernet alone had the capability to address the cost-cutting pressures it faced. It's worth emphasizing that for an organization of that type, Ethernet services must offer sufficient resilience, performance and redundancy – cost saving potential alone won't be enough to shift such an organization away from traditional Layer-1 options.

DELIVERING ENHANCED CUSTOMER EXPERIENCE

Service providers are now able to deliver the necessary improved Ethernet service quality to organizations of this type. In addition, data Service Level Agreements (SLAs) have become increasingly granular. They now include SLAs that encompass packet loss, latency and jitter in addition to standard metrics such as uptime. Importantly, these are geared towards the data layer and, since that's where the bulk of traffic is, and where future traffic growth is expected, they are therefore more relevant to current users' demands.

The rise of data is one aspect that has played to the strengths of Ethernet. The change in the nature of traffic from traditional Point-to-Point towards Point-to-Multipoint and multipoint has also made Ethernet an increasingly well-suited technology to the nature of traffic carried on the world's communications networks. That, coupled with emergence of technologies that enable new Ethernet functionality, makes Ethernet still more attractive. Although currently less than 3% of Ethernet connections are multipoint, that figure is set to rise to 40% over the next few years and Ethernet providers will need to turn to new technology to efficiently meet that customer demand.

A key technology for enabling that growth is 802.1ah, Provider Backbone Bridging (PBB), which is the most efficient technology for delivering multipoint services. PBB has the capability to minimize MAC-related problems because they do not rely on customers' MAC addresses for service routing. MAC stands for Media Access Control and is a unique identifier assigned to every Ethernet port produced. Service providers today are using technologies that use customer MAC addresses. Today, with limited multipoint business, using customer MAC

addresses works. However, as multipoint business grows, using customer MAC addresses will run into scaling issues. PBB essentially eliminates the scaling issue by using the PBB network MAC address for frame forwarding and not the customer MAC address.

Perhaps even more significant is that fact that PBB implementation is transparent to customers, and will benefit them indirectly because service providers will be able to enhance some of their services as a result. Tata Communications, which deployed PBB last year, is now able to provide its customers with functionality it could not get on older platforms.

Tata Communications deployed PBB last year. It allows them to offer better quality, while also moving to a newer platform and equipment that enables a significant jump in what it can do for a customer.

Critically, such a platform also delivers flexibility, which is increasingly demanded as customers' bandwidth requirements increase. Service providers are noticing that, although customers face cost constraints that exert downward pressure on bandwidth pricing, their appetite for bandwidth itself is far from decreasing. For example, a customer that had a 45mbps DS3 link three years ago is not looking to take 45mbps over Ethernet and cut their costs by half. Instead, they want to increase their capacity to 75mbps or 100mbps without a commensurate increase in cost. As pricing declines, so capacity requirements increase, and more and more companies are demanding 10GB Ethernet links.

Tata Communications' experience certainly bears that out with many customers demanding 10GB Ethernet capacity. The company expects that, as pricing declines, there will be more and more demand for large capacity. As a consequence of which, Tata Communications has made the move to Ethernet enhanced with technology such as PBB. Had it not taken this approach, it would be faced with no option other than to roll out more and more equipment to support more and more volume in common with other service providers.

RESILIENCY, REDUNDANCY AND SECURITY

The market has now developed far greater awareness that, from a network resiliency and protection point of view, Ethernet is at least as safe as other technologies and, in some cases, has greater attributes. The recent spate of natural disasters has highlighted these issues. For example, the Japanese tsunami has seen electrical power to cable landing stations knocked out, in some cases for weeks, the route diversity offered by Tata Communications' new Next Generation Ethernet network would have mitigated the severe difficulties if Tata Communications' cable stations had been impacted. Stations have been designed to fail over onto diesel-powered generators in emergencies, but those generators may only have fuel for one week. If the disaster knocks out electricity, plus makes it impossible to deliver additional fuel, the problems faced are significant.

Tata Communications' next generation network offers the opportunity to easily and flexibly reroute through alternative cable stations without impacting the service significantly, because of the nodal diversity that Ethernet networks can provide if designed and deployed effectively.

That flexibility enables Ethernet's evolution to a platform where superior customer experiences can be delivered. A great example of that is Ethernet's capability to provide reduced latency for mission-critical applications and continuously monitor the latency.

Tata Communications Partnership Program delivers the right mix of technology, tools and support to enable service providers to gain an edge on the competition in an increasingly global telecommunications marketplace.

"Tata Communications has been a valuable partner in helping MASERGY meet its rapidly growing customer demand for connectivity throughout India. We look forward to working with Tata as we expand our partnership to other parts of the globe."

Mr. Cam Anderson,
Vice President, Access Management
MASERGY

Tata Communications' large, privately owned, undersea network connects North America to Europe, to India, to Asia and back to North America. Tata Communications' cables literally span the globe.

Five years ago, latency would not have been an important issue. However, as far more bandwidth intensive applications, such as the placing of electronic trades, are being used, service providers must be able to assure latency levels.

The networks created by enterprise customers are carrying some of those companies' most sensitive data, whether it is confidential emails, customer data or critical financial details. Data security is among an organization's greatest fears and recent examples, such as the repeated hacks of Sony Playstation's system demonstrate the damage that security breaches can do to an organization's reputation and ultimately value. Security threats now encompass not only hacking into servers, but also into information carried across service provider lines. Organizations want to be assured of the security of their data in transit, especially when that is customer data.

Tata Communications has traditionally provided superior data security. Its investment into the Next Generation Ethernet network continues Tata Communications' emphasis on security.

EXPANDING GLOBAL FOOTPRINT

While it is impractical for individual service providers to continue to try to cover the globe themselves, it is important to find

a global partner for Ethernet services. Tata Communications offers that with a network footprint that reaches more countries than almost any other provider. By the year-end of fiscal 2012, Tata Communications will reach 67 countries and currently, the service provider has one of the largest global Ethernet networks in the world. It is not just the number of countries that needs to be taken into account, but also the types of markets addressed.

Tata Communications is an emerging market leader. Its home market in India is a well-recognized key emerging market and the company has dense coverage with more than 120 PoPs and 31 metropolitan networks across the country. In Africa, Tata Communications is the major shareholder of South African service provider, Neotel. Also in Africa, it has equipment in PoPs in Kenya and is setting up the same in Nigeria. Other key emerging markets include: Thailand and the Philippines plus significant coverage in the Middle East.

However, footprint is not the only aspect that needs to be considered. The services provided need to be as close in quality as those provided on a service provider's own network. The service can only be perceived to be as good as the end-to-end service quality delivered. Quality of the network is there for a key differentiator. Tata Communications Next Generation Ethernet network (NGE) has been designed to raise the bar for global quality

and provides core layer availability of 99.995%, and services will be backed by a PoP-to-PoP latency SLA beginning in mid-2011. In addition, the nodal diversity on Tata Communications' core layer provides customers with protected circuits against catastrophic nodal failure.

Tata Communications has been at the forefront of global Ethernet deployments, because it recognized early on that the technology addresses both quality requirements and continued downward cost pressure faced by the industry. Tata Communications was the first global provider to offer MEF-9 and MEF-14 certified services. It has been recognized by the MEF in the organization's 2010 awards as the "Best Ethernet Service Provider in APAC" and as provider of the "Best Wholesale Service in APAC".

It is this combination of technical innovation and global Ethernet footprint, combined with the understanding of what is required to create successful global partnerships, that make Tata Communications the obvious choice to be the Next Generation Ethernet partner for service providers.

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