

# Whither 10-Gig Ethernet?

Kenneth M. Percy and Edwin E. Mier

## Vendor survey reveals cost concerns and preference for LAN vs. WAN interfaces. Slow initial sales expected.

The vendors of 10-Gigabit Ethernet have come under scrutiny lately concerning their products and plans. Given their many and varied claims, Miercom tried to determine how far this product set had progressed via a survey of Ethernet switch vendors in June 2002.

More than 20 Layer-2 and/or Layer-3 switch vendors agreed to review our email survey questionnaire, which asked about current and near-term plans as well as the impact and direction of 10-Gigabit Ethernet technology. By the deadline for responses, we had received completed questionnaires from 10 of them. Respondents were offered the option of anonymity, which some accepted. Those who agreed to be identified included Avaya, Extreme Networks, Force10 Networks, Foundry Networks, Juniper Networks and Riverstone Networks.

Among the major findings:

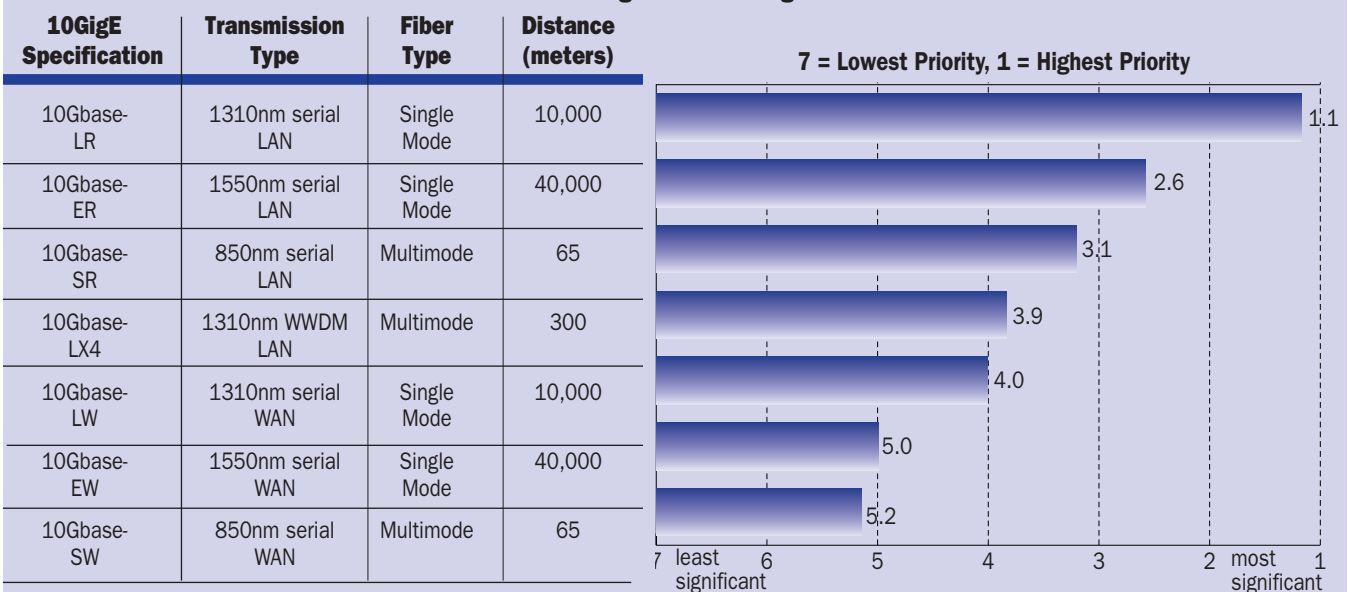
- The first wave of 10-Gigabit Ethernet Physical Interfaces (PHYs) support predominantly 10GigE LAN rather than WAN interfaces.
- Half the respondents claimed to be shipping 10GigE products as of June, and all expect to have products fielded by mid-2003.
- Among the Ethernet features that will be fully ported to 10GigE products are universal support for 802.1 p/q-based VLAN tagging and DiffServ-based QOS.
- The respondents have a relatively glum short-term sales outlook.
- Delayed finalization of the 10GigE standard (IEEE 802.3ae) was not cited as a major obstacle to progress. Instead, cost was nearly universally cited as the primary barrier to quicker 10GigE availability and rollout.

### First Things First

The survey began by asking: When did or will you begin shipping 10GigE product? We led with this question after having to postpone a public lab-test of 10GigE products; very few vendors would agree to be tested. That experience, plus a spate of articles, has led to considerable skepticism about whether 10GigE is really ready for prime time.

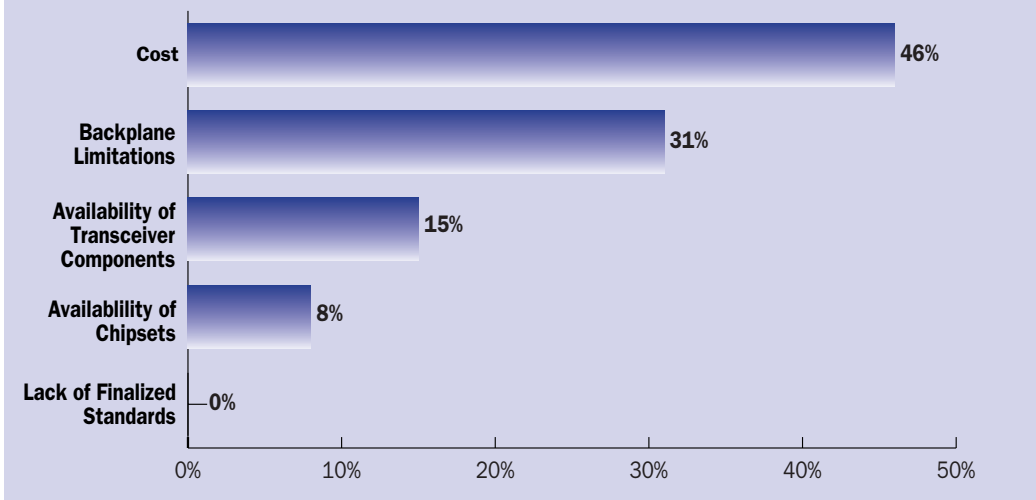
Ken Percy is a technology analyst and Ed Mier is founder at Miercom, a network consultancy and product test center based in Princeton Junction, NJ. They can be reached at [kpercy@mier.com](mailto:kpercy@mier.com) or [ed@mier.com](mailto:ed@mier.com).

FIGURE 1 Most Significant\* 10GigE Interfaces



\*Vendor assessment of "relative market importance"

**FIGURE 2 What's Holding Up 10GigE?**



**“Most products on the market cannot support line-rate transmission”**

We found it interesting that 60 percent of the respondents claimed they'd be shipping product as of early July, and another 20 percent said that they'd be shipping by the end of the year. The remainder expected their first 10GigE products would be out by the middle of 2003.

The question of exactly what will be shipping, however, remains to be seen. Robert Quiros, director of product marketing for Force10, claims, "...most products on the market cannot support line-rate transmission. We are concerned that many 10GigE products do not deliver 10 Gbps. [This gives] the technology a negative perception, slowing its adoption."

We also asked which of the seven 10GigE physical interfaces defined in the draft standard the vendors would support in their initial implementations. All of them said that their initial 10GigE products would support 10Gbase-LR, a LAN interface for 10-kilometer runs over single-mode fiber. Six of the 10 respondents said that they either support or will support at least one other physical interface in their initial offerings. Of those six, five said they also support or will support 10Gbase-SR, 10Gbase-ER or both. Notably, these are also LAN interfaces (Figure 1).

The respondents' initial focus on LAN interfaces stands to reason. The WAN interfaces are more complicated to implement because they must interoperate with SONET OC-192, which has a slightly different transmission rate. The only 10GigE WAN interface that any respondents—and it was only two of the 10—said they'd support in their initial offerings was 10Gbase-LW. See Figure 1 for a thumbnail comparison of the 10GigE interface options.

Not surprisingly, the respondents' product plans regarding which 10GigE interfaces they support are consistent with their perceptions of the relative market significance of the different interfaces. We asked vendors to prioritize the seven

interfaces in order of market importance from 1 (most significant) to 7 (least significant). The results are summarized in Figure 1. Clearly, vendors will seek traction out of the gate primarily in metropolitan and campus networks, but the battle to supplant SONET as the Layers 1 and 2 technology of choice for metro/campus networks apparently will not be joined right away.

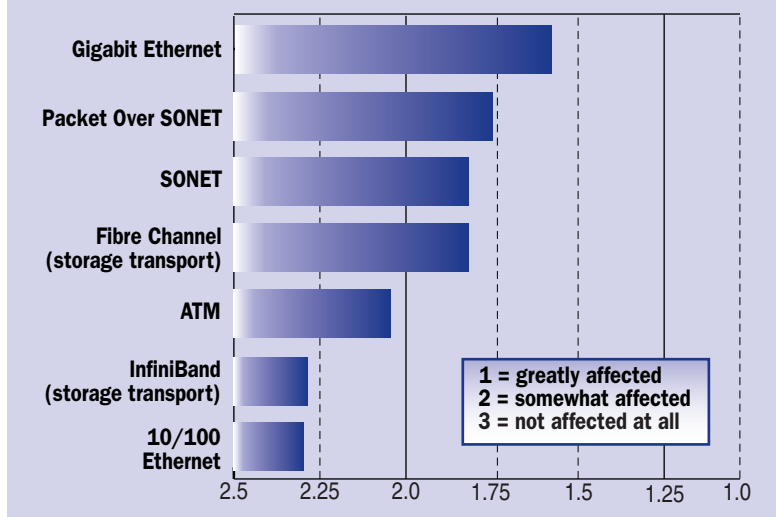
#### The Party Line

All the respondents expect to port all currently supported quality of service mechanisms—including 802.1 p/q-based VLAN tagging and IP-header-based packet prioritization, e.g. DiffServ (differentiated services)—from their existing Ethernet product lines over to the 10GigE implementations. In addition, 60 percent also plan MPLS support over 10GigE.

The final draft of the 10GigE spec was ratified by the IEEE's 802.3ae's working group not long after this survey was issued and, to our surprise, none of the vendors cited a lack of completed standards as an impediment to their 10GigE development efforts. Instead, the most onerous speed bump these respondents identified was cost—sticker shock is slowing 10GigE development more than any other factor. However, Force10's Quiros qualifies these concerns: "Like OC-192, pricing for a 10-Gbps-10-km port depends on what it's deployed on. On a core router, this port lists for as much as \$175,000. On an Ethernet switch, the same port can list as low as \$55,000."

Also revealing was the preponderance of vendors citing backplane limitations as the biggest impediment to 10GigE's development (Figure 2). While few in the industry doubt that vendors actually have 10GigE modules that can be deployed on their chassis-based systems, these responses lend credence to the skepticism about the ability of their corresponding legacy architectures to switch many interfaces at full 10-Gbps rates.

**FIGURE 3 Technologies Most Likely To Be Impacted By 10GigE**



Finally, around 20 percent of the respondents cited a dearth of components—notably chipsets and transceivers—as the factor most limiting 10-Gbps Ethernet.

As shown in Figure 3, vendors were asked about how the proliferation of 10-Gig would affect a group of other technologies. We used a scale of 1–3, with 1 being “greatly affected.” The respondents believed that Gigabit Ethernet, SONET, Packet Over SONET, Fibre Channel and iSCSI would be the most affected. We found it surprising that ATM—which is closely associated with SONET—did not quite follow SONET at the top of the list. InfiniBand, an emerging I/O technology that is perceived by many to be a key potential driver of 10GigE deployment, also placed fairly low.

Concerning interoperability, the vendors who claim to be currently shipping 10GigE products have performed some testing, and each identified specific third-party vendors with whom they claim to have proven interoperability. The most cited partners were Cisco and Foundry, followed by Extreme, Nortel and Juniper. Interoperability with test equipment makers Ixia, Agilent and Spirent also was also frequently cited.

**Division Over Numbers**

Vendors were somewhat split over how many 10GigE ports will have been sold worldwide—by all vendors—by year-end 2002. The average response to this question was 3,600 total 10GigE ports. Roughly half projected sales in the 5,000-plus range, while the other half projected 1,000 and below.

Differences surfaced over the question: Will 10-Gigabit interface costs drop similarly to 10/100 and Gigabit Ethernet, i.e., roughly 50 percent per year for the first three years after gener-

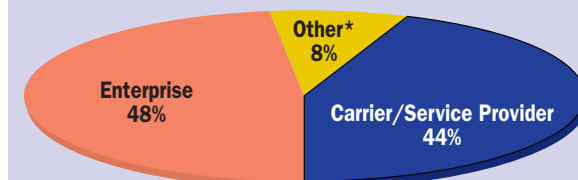
al availability? The “yes” votes carried the day by better than a 2-to-1 margin. Marshall Eisenberg, director of enterprise product marketing at Foundry, typified those views: “Once the component vendors come on line, the pricing of those components should start to decline, leading to a price decline in the 10-Gig interfaces overall. In addition, as more high-end servers ship with 10/100/1000Base-T interfaces built in, more people will enable those servers to run at Gigabit speeds, increasing the need for a higher-speed aggregating service.”

Those who responded “no” mostly agreed that commoditization is inevitable, but not at historically typical rates. “The 50-percent cost reduction per year for the next three years will be difficult to achieve due to the technical complexity of 10-Gigabit Ethernet and the premium for optics,” asserted Kristen Bailey, public relations manager at Alcatel. “We predict a cost reduction for the next three years around 30–40 percent for the first year, and a trend at 30-percent cost reduction after the first year of shipment in volume, assuming a telecommunications and IT market and GDP growth recovery.”

As shown in Figure 4, the respondents projected how sales of 10GigE would be distributed across the following market segments through the first half of 2003: enterprise, carrier/service provider or other (vendor-defined). Though most responses orbited around a 50/50 split, the polarity was extreme in some cases. Nan Chen, director of product marketing at Atrica, sees 95 percent of sales going into the carrier/service-provider sector, while Andrew Feldman, VP of corporate marketing and development for Riverstone, sees it almost completely the other way around. Indeed, Feldman expects that 99 percent of 10GigE interfaces will be purchased by enterprises, “verticals such as financial institutions, education, and government [being] the leaders.”

We also asked the respondents to predict what percent of the first-year’s shipment of 10GigE interfaces would be in LAN versus WAN environments. The average split among the respondents was 65/35 with LANs being the majority, but again there was a considerable difference of

**FIGURE 4 Anticipated 10GigE Deployment By Market Sector Through 2Q03**



\*“Other” responses included:  
Residential broadband/fiber-to-the-home  
University, government, research  
Metro providers

opinion. One vendor saw a 90/10 LAN/WAN split, while another saw the complete opposite. A third vendor predicted 100 percent of sales in LAN environments. Clearly, sales of 10-Gigabit Ethernet products promise to be a riveting spectator sport in the months to come.

### Oracle Vendors

To round out our survey, we asked when the vendors expected to see server-ready 10GigE network interface cards. Predictions here were rosy. Fully 71 percent of the respondents believed that 10GigE NICs would be available within a year—by the summer of 2003.

However, it is unclear whether this optimism reflects confidence that TCP/IP Offload Engine (TOE) technologies, bus throughputs and processor speeds will progress sufficiently to enable servers to tap 10-Gbps transmission links to the network that soon. Frederic Laruelle, product manager at Juniper Networks, frames the issue this way: “I’m not sure what type of server processor could generate that much traffic.”

For a real forward spin, we asked vendors to predict when 100-Gigabit Ethernet interfaces will appear. The soonest was 2004; the latest, 2010. On average, however, the respondents believe that we’ll be wondering about vendor claims for 100-Gigabit Ethernet in 2006.

### Conclusion

So, here’s the bottom line: Half the respondents claim to be shipping products that support 10GigE. LAN interfaces will predominate, in part because the WAN interfaces are more complicated and require interworking with slightly offset SONET transmission speeds.

The respondents agree that we will see 10GigE interfaces in carrier/service provider and enterprise networks in equal measure, but that sales will be slow, at least initially. They also agree that cost is the key barrier to deployment, and that while costs will come down, it may not happen at the precipitous 50-percent-per-year rate we’re used to with lower-speed Ethernet□

#### Companies Mentioned In This Article

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- Avaya ([www.avaya.com](http://www.avaya.com))
- Extreme Networks  
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- Force10 Networks  
([www.force10networks.com](http://www.force10networks.com))
- Foundry Networks ([www.foundrynet.com](http://www.foundrynet.com))
- Ixia ([www.caimis.com](http://www.caimis.com))
- Juniper Networks ([www.juniper.net](http://www.juniper.net))
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