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Future Network Architectures

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It's a good example of the way that Ethernet keeps reinventing itself. Where the original Ethernet ran at about 3 megabits, today we've got 400 gig Ethernet under study in the IEEE. Every new generation of Ethernet that comes out, the old generation is a rounding error compared with the new version.

In fact the joke among Ethernet inventors was that the old 56k lease lines that Ethernet replaced in part, that was literally the rounding area between the nominal 3 megabyte rate and the actual rate of 2.94. So there's been this steady and exponential progression in rates.

So to the question of, what is Ethernet, since we cannot describe it in terms of rate alone. What else can we say about it? The original Metcalfe and Boggs paper described Ethernet as "a system of local communication among computing stations." Well, we had metro Ethernet for more than a decade, then there were some wide-area implementations as well, so that's out.

When I was a young network manager I often heard Ethernet dismissed as a science project, and I was told I should go learn "serious" network technologies like TokenRing or something else, because that would be the corporate standard. As we all know now, Ethernet trounced Token-Ring, and not only Token-Ring, but pretty much every other competing technology, so that's out.

Service providers used to complain that Ethernet was somehow not good, because it was unmanaged. Today those same service providers are busy implementing Ethernet OAM, so that's out.

Other network managers used to complain that Ethernet was not good, because it was somehow not predictable or not reliable. Today we have things like resilient packet ring in the WAN and priority-based flow control in data centres that give us very reliable, very predictable service levels over Ethernet, so that's out.

This final point comes already struck out: Ethernet was never expensive. It's always been cheap to build and cheap to implement, because of its simplicity. That brings me to a word that is intrinsic to the past, the present and I think, the future of networking, and that word is money. Bob Metcalfe, before he moved to Texas lived in a very grand, six storey, townhouse in Boston and he often had students over to visit. The students would walk around this great house all glassy eyed and go, "Wow I've got to work really hard and invent something really cool so I can live in a house like this." Dr Metcalfe would tell them, "You don't understand, I don't live in this house because I invented Ethernet; I live in this house because I learned to sell Ethernet."

So I'll just put up this quote that no engineer likes to see, but the fact is that financial factors have always been a part of driving the history of networking forward. Although we have a lot of technical talent on our panel today, I'm hoping that we'll discuss both technical and business drivers when we consider what's to come next when we look at Ethernet.

By David Newman, President, Network Test