



BY RON WILSON, EXECUTIVE EDITOR

IP networks' spread brings challenges to networking SOCs

Perhaps the most pervasive trend in networking today is the seemingly complete victory of IP (Internet Protocol) over rival protocols and the concomitant spread of GbE (gigabit Ethernet). GbE is replacing other alternatives and even packetizing legacy data flows and carrying them as encapsulated IP traffic. Along with carrying the traffic, the new fast networks also must provide the application-specific services that older networks have evolved. This trend is drawing together disparate networks into a single medium, vastly simplifying facilities management for network operators but creating a pain for silicon designers.

The highest-profile example may be in data centers, in which a 10-Gbit Ethernet fabric is drawing in three physical networks: InfiniBand for clustering, Ethernet for data, and Fibre Channel for storage. The convergence means that the single network must offer all the management and QOS (quality-of-service) features that three kinds of networks formerly provided. That scenario, in turn, has implications for network-adaptor cards, classifiers, and fabrics throughout the network.

The same process seems to be uniting the various networks that serve users of the Internet. In the past, local networks for end users, the aggregation networks, fiber-access networks, and mobile backhaul networks all had distinct requirements. According to at least two semiconductor vendors, however, all of these networks may be converging. "We are seeing a need for a common feature set at several different layers of the network," says Jim McKeon, senior manager of product marketing for the service-provider

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segment at Broadcom. The need for features, including MPLS (multiprotocol label switching) and time synchronization, is cropping up across access, backhaul, and aggregation networks, he adds. Switches throughout the network essentially must support carrier-class services.

Requiring all these functions across such a range of price and performance becomes a serious challenge for SOC (system-on-chip) designers. The high-end switches may require dedicated hardware and substantial memory to meet the demands of, for example, MPLS at wire speed. Yet low-end switches go into cost-sensitive markets and can't carry a silicon overhead for performance they don't need.

Fortunately for chip designers, a

pattern still exists where functions occur in the network, according to Eric Hayes, Broadcom's senior director of product marketing. "At the edge, policy is user-based and generally oriented toward security concerns," he says. "As you move nearer the core, policy becomes more QOS-oriented. So while we have a uniform programming model across the families, the ability to apply policy varies from chip to chip."

Switch-fabric vendors aren't the only ones to see a growing commonality across applications. NPU (network-processing-unit) vendor Xelerated has been successfully serving the mobile backhaul market but finds fiber-access applications increasingly attractive, says Thomas Eklund, Xelerated's vice president of marketing and business development. Both markets face similar QOS issues but from different sources.

In the backhaul market, ATM (asynchronous-transfer-mode) networks often handle latency-intolerant time-domain-multiplexed voice traffic. In that market, the challenge is how to handle the increased data services that smartphones demand and that LTE (long-term evolution) promises. In fiber-access networks, built for sporadic and latency-insensitive Web browsing, the problem is IPTV. Both applications now seem to be converging on similar needs for management and QOS, and those needs look a lot like carrier-Ethernet specifications.

A parallel between the two convergences exists in data centers and in the global network, which, in the long run, may foretell an evolution to an architecture that distributes computing and storage resources throughout one network. In the meantime, SOC designers will be busy enough figuring out how to assemble and lay out the optimum family to spread a new level of classification and routing services across a lot of legacy applications. **EDN**

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