the wireline transport of choice. If you’re not a new operator and you have existing facilities, “the biggest problem is Ethernet is not available to most of the cell sites because most of the transport providers only offer Ethernet over fiber and fiber’s not there,” said Michael Howard, principal analyst/co-founder of Infonetics Research.

That, said Mike Emmendorfer, senior director of solution architecture and strategy for cable equipment vendor Arris, gives his cable customers a leg up in the backhaul competition.

“The MSOs have built extensive fiber infrastructure throughout the communities where (wireless) base stations are. They will then extend that fiber infrastructure to those base stations and light up some of their existing technologies that they’ve used for years to support commercial services: SONET or optical Ethernet or EPON (Ethernet Passive Optical Network). Most of the MSOs are going to be moving to optical Ethernet and eventually EPON because EPON is going to be a very efficient manner to deliver cellular backhaul services,” Emmendorfer said.

Whatever the case and whatever the play, the consensus is that Ethernet is here to stay.

continued from page 8

The RAN is currently dominated by circuit switched SONET/SDH technology, an always-on transport that is more expensive per bit than Ethernet traffic. By redesigning the RAN to provide packet transport end-to-end, mobile service providers can eliminate the extra layers in the network. As voice traffic migrates to IP transport based on Session Initiation Protocol (SIP), IP/MPLS technology makes it easier to provision, scale, and manage these services. Moving to Carrier Ethernet in the RAN brings sizeable cost efficiencies to mobile service providers with no loss of network performance, stability, or manageability. By using Pseudowires—which are MPLS virtual circuit “tunnels”—mobile service providers can aggregate and transport TDM, IP, Ethernet, and ATM traffic as well as clock synchronization from the RAN to the network core. The solution increases bandwidth available for backhaul and other services by an order of magnitude but at one-tenth of the cost per bit when compared to T1 and E1 service. Additionally, IP/MPLS in the RAN brings intelligent features such as

continued on page 11
Wireless is There When There’s No Fiber
BY FIERCETELECOM

Even with a world full of contrarians, you would be hard pressed to find anyone who disputes that Ethernet-over-fiber is probably the best transport method for the heavy load of IP-based data streaming today’s wireless backhaul networks.

But, “it’s not a black-and-white world where we’re going to say every tower in the world is going to be fiber. There’s going to be a lot of copper but the percentage of fiber is going to go up and the percentage of copper is going to go down pretty significantly over the next five years,” said Tom Huegerich, vice president of global fiber for ADC.

Traffic Engineering and Fast Reroute throughout the network. Mobile service providers can make use of the existing MPLS infrastructure while extending the packet-based core already deployed out to the edge of the network as well as take advantage of the highest levels of traffic grooming and network management, QoS, and the ability to assign classes of service.

With SONET/SDH equipment vendors aware of the progression of more services to IP and the growing bandwidth demands with multimedia applications, SONET/SDH equipment is migrating to packet-based transport based on MPLS. Many mobile service providers are proactively revamping their RAN backhaul to cost-effectively migrate their hub-and-spoke network architectures to a meshed network edge, with IP/MPLS Layer 3 routing intelligence moving throughout the network from core to cell site. A single combined network, using MPLS both in the core and RAN, can simplify operations and lower operational expenses. By using a standards-based MPLS Pseudowire solution, additional bandwidth can easily and flexibly be added to cell sites and aggregation sites as needed.

To facilitate this migration, the Broadband Forum is actively developing specifications for the application and deployment of IP/MPLS technology in the converged network. New work is underway addressing MPLS in Mobile Backhaul networks, MPLS in Carrier Ethernet networks and respective certification test specifications for both efforts. For more information about these important initiatives, check out http://www.broadband-forum.org/technical/technicalwip.php.

The collapse of backhaul technologies onto a single IP/MPLS network results in reduced operating costs, rapid provisioning of bandwidth to support new services and service growth, seamless support of 2G/3G/4G radio technology, and the ability to take advantage of alternative transport media (such as Ethernet and DSL) for additional cost savings. The Broadband Forum will continue to do all we can to make this transition as seamless and effective as possible to ensure industry growth and network convergence success.

Sultan Dawood is a member of the Broadband Forum’s Board of Directors and has expertise in developing IP/MPLS and Packet Transport technologies and solutions. Sultan earned his Bachelor of Science degree in Electrical Engineering from Old Dominion University in Norfolk, Virginia.

The migration of mobile backhaul networks from TDM to all-IP will be implemented from the edge to the core, but it will not be a step change. Rather, a gradual evolutionary approach will be needed because TDM-based voice and data services are not going away any time soon. High quality voice services must be maintained to minimize subscriber churn, while gracefully introducing new packet-based network transport architectures that can be scaled up as data demand increases.

As mobile operators worldwide grapple with the evolution of their backhaul network to all-IP, a key issue will be how to maintain accurate, cost-effective and reliable synchronization. The current suite of packet-based solutions such as Synchronous Ethernet (SyncE) and IEEE 1588v2 requires operators to make a relatively risky leap to one or a combination of these new and unproven technologies. This “Sync Gap” between TDM and packet network clock sync methods calls for other solutions that retain carrier-class sync simultaneous with the ongoing evolution of the transport network.

The Broadband Forum is actively developing specifications for the application and deployment of IP/MPLS technology in the transport network, with a new Distributed Sync™ functionality on its Eclipse Packet Node microwave backhaul platform. This patent-pending feature provides TDM-like clock synchronization over hybrid TDM/packet or packet-only microwave backhaul networks, without requiring any valuable backhaul payload bandwidth.

Distributed Sync complements the new standards-based solutions and enables operators to delay moving to these IP-based schemes until after their network migration to IP transport is well progressed or even complete. Distributed Sync offers a standard, primary reference clock-traceable output at the base station over a multi-hop, nodal backhaul network, even in an all-IP environment where no TDM transport capability is available.

Distributed Sync enables mobile operators to reduce the risk and cost of network migration by decoupling synchronization from transport network evolution to all-IP and maintain the comfort, reliability and security of their proven TDM-based synchronization.