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Why Mobile Carriers Are Turning To Ethernet

By Charles R. Kenmore

With the proliferation of smartphones and PDAs, mobile providers are expanding their service offerings beyond voice services to include broadband data, video and texting, all of which increase minutes of use (MOUs) on their networks.

While mobile generally is associated with wireless-based technologies and with being untethered, the less-talked-about aspect of wireless is that only the access portion (RAN) typically is radio-based. Connectivity between the cellsites traditionally has been accomplished via T1/E1s, private lines, microwave transport and, increasingly, Ethernet, a lower-cost, IP-based transport alternative. As a means for adding network traffic and revenue to their extensive fiber based networks, cable operators have expanded their business and wholesale services to handle mobile backhaul traffic. In this article, we will discuss the use of Carrier Ethernet in association with wireless backhaul by cable operators.

What Carrier Ethernet Can Do

Mobile operators' backhaul requirements result in high recurring costs, with approximately 35 percent of the carrier's network-operating costs being subsumed by backhaul expenses. As mobile TV, streaming video and mobile music services gain popularity, the need for backhaul will increase, and it is likely that associated expenses also will increase as mobile providers pay other carriers for more Layer 2 transport bandwidth. Carrier Ethernet, when used for mobile backhaul, enables wireless providers lower leased-line expenditures with cost savings of between approximately 20 percent to 25 percent per month.

Ethernet's additional capacity also eliminates contention issues that hinder traffic flow and can degrade the end-user experience, particularly with new latency and delay-dependent video-based applications and services (*e.g.*, mobile TV, high-speed Internet, streaming music and video). For the cable operator, the operations, administration and maintenance capabilities associated with Ethernet means being able to guarantee network availability while assuring low levels of jitter and delay. Service Level Agreements (SLAs) and quality of service (QoS) are important in such enhanced mobile offerings as video, where dropped packets are much more noticeable than in a voice conversation.

While Carrier Ethernet is making progress in the cable market for backhaul, it still is a small part of the overall \$20 billion-plus transport market, and mobile operators are expressing concern over quality. This is a reasonable concern, and vendors like ANDA

Networks are able to provide cable operators with ease of integration between legacy and newer operations support systems, which therefore enables faster provisioning, better network metrics, and the ability to offer and enforce service level agreements. During the next several years, cablecos will use a combination of technologies, including Ethernet for backhaul, as they transition to an all-IP based network.

There is a certain network symbiosis between cable infrastructure and wireless networks. In many instances, cellular towers are located in areas passed by cable's coaxial and fiber plant as mobile providers and cablecos alike need to provide geographic coverage to a similar (if not the same) set of customers. According to the CTIA, there are more than 220,000 cellsites in the United States being used to help ensure coverage for wireless calling. For mobile operators not affiliated with a landline telco, contracting with a cable operator gives them the opportunity to avoid doing business with a competitor that may also have wireless operations in addition to taking advantage of hybrid fiber/coax or dark fiber rather than leasing copper plant.

Mobile operators need the additional capacity offered by Ethernet in order to offer bandwidth-intensive services that will tax existing infrastructure. In general, Ethernet provides 10 times the bandwidth at 80-percent of the cost, making it a worthwhile technology for backhaul.

The Benefits

Carrier Ethernet's benefits also include the presence of Metro Ethernet Forum specifications, to which adherence enables service availability. These specifications include:

- Between 20 Mbps and 100 Mbps Committed Information Rate (CIR) - bandwidth scalability;
- Between 50 Mbps and 500 Mbps Excess Information Rate (EIR) - burst capability;
- Less than 3-millisecond-to-5-millisecond latency (one-way);
- Less than 1-millisecond-to-3-millisecond jitter (one-way);
- As many as eight unique service classes (CoS) for voice, Internet and video applications;
- Sub-50 ms recovery time; and
- Carrier-grade five nines (99.999 percent) network availability.

Standards are vital to helping to ensure quality, and mobile providers have added Ethernet interface support to 3G/UMTS specifications validating Ethernet as a key component of their strict transport criteria required by operators. These operators share

the expectation that Ethernet would offer the same robust, stringent performance metrics of TDM. As additional spectrum is licensed for advanced services, mobile operators will deploy more smartphone applications, thereby further driving capacity that is better handled by Ethernet than by TDM.

About Ethernet OAM

While cablecos have had success in offering E-LINE and E-LAN business services through such entities as Cox Business Services and Optimum Lightpath, backhaul requires further network-performance monitoring in order to proactively detect and prevent network failures across customers and on an end-to-end basis. This is achieved through Ethernet OAM, which encompasses the installation, monitoring and troubleshooting of the network. It is vital that a provider recognize a problem before it has an impact on the customer and to be able to use this visibility to deliver improved SLAs.

Going forward, mobile backhaul over Ethernet will replace traditional T1s as a preferred medium. With it comes greater responsibility by cablecos to guarantee mobile providers' mission-critical traffic will traverse the IP network without incident and, when problems do occur, they will be easily solved. With Ethernet standards and the right network tools, mobile backhaul will be a win/win for cablecos, mobile operators and their customers.

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