The backhaul overhaul

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As smartphones and other broadband-hungry mobile devices proliferate, operators are increasingly being forced to seek out more efficient and cost-effective means of meeting the volatile demand for greater bandwidth. Carrier Ethernet is emerging as a viable alternative to resolve the immense bandwidth demand in mobile backhaul applications.

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In a recent industry interview, Larry O'Neill, Ethernet Product Development Manager and Ethernet Marketing Manager of Verizon Communications, acknowledged that communications carriers are facing daunting challenges in the race to meet soaring mobile bandwidth usage: "None of us is meeting the requirements today. We would like to think we are, but in terms of delivering bandwidth to cell sites, we are scrambling."

O'Neill also noted there is a shift occurring in the way companies like Verizon and AT&T are thinking about and managing essential backbone network infrastructures - with smartphones and other broadband-hungry mobile devices proliferating rapidly, operators are increasingly being forced to seek out more efficient and cost-effective means of meeting the volatile demand for greater bandwidth.

Rising numbers of mobile enterprise users and enterprise-oriented cloud computing applications add to the strain on operator networks. Further adding to that strain is the recent news that chip manufacturers are set to introduce mobile-optimized dual-core processors that would allow mobile devices to run more demanding applications and full 1080p high-definition video.

O'Neill's revelation about carriers' ongoing struggle to meet mounting bandwidth demands is borne out by hard numbers - analyst firm Analysys Mason released an April 2010 report projecting smartphone penetration worldwide will grow at an annual rate of 32 per cent throughout the next four years to a high of 1.7 billion devices by 2014. A recent ABI Research report estimates that by that same year, there will be 998 million mobile cloud computing subscribers. In March 2010, Juniper Research pegged 2014 enterprise cloud-based application customers at 130 million.

The move towards "Ethernet everywhere" in mobile is unstoppable and poses this quandary to carriers: How do you address explosive demand for mobile broadband without crippling current network infrastructures? And how do you meet this need effectively without breaking the bank? For savvy carriers and network operators, the answer lies in the deepening intersection of mobile backhaul applications and Carrier

Ethernet technologies. Infonetics estimates the Mobile Backhaul equipment market to grow to $10.4 billion worldwide by 2014 (Figure 1).

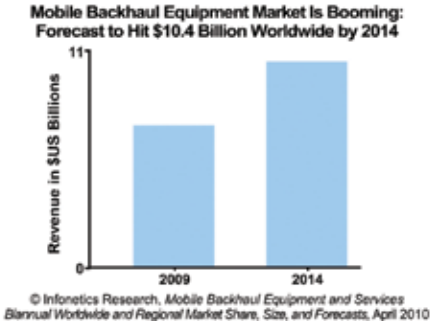

Figure 1: Mobile backhaul equipment market

A towering inferno

Like a firestorm feeding upon itself, surging growth in next-generation devices - like the 160,000 daily mobile activations purported by Google CEO, Eric Schmidt - is pushing operators to broaden their services and applications portfolio. With the debut of these attractive new offerings comes increased customer interest in more advanced devices, and the cycle begins anew.

Operators are finding existing infrastructures unequal to the task of meeting spiraling bandwidth requirements and yet have limited ability to build new cell sites or access additional spectrum bands. Cell tower performance is already pushed to the limit, and carriers are being forced to transport larger amounts of voice and data traffic across the last mile via technologies like femtocells. Some operators have even begun toying with the unpopular idea of usage caps.

Although mitigation techniques like usage caps offer short-term relief, carriers must take a more forward-looking approach if they are to survive and flourish. Operators are recognizing that mobile backhaul can ease performance stresses placed on existing tower sites, while bringing the voice and data traffic overload back under control. Mobile backhaul applications represent a cost-effective way of both meeting and managing the evolving mobile broadband needs of today's smartphone-enabled world. An innovative answer to carriers' current bandwidth predicament, mobile backhaul via Ethernet can produce cost-savings, while elevating service quality and improving operating efficiencies.

Carrier Ethernet and the beauty of backhaul

Many mobile backhaul networks today use an assortment of technologies, including copper, fiber, and microwave. However, for each solution the cost, speed of deployment, integration, and scalability varies widely. There are efforts underway, such as the Metro Ethernet Forum's External Network-to-Network Interface standard, designed to minimize these issues and improve interoperability. In the meantime, however, Carrier Ethernet is emerging as a viable alternative to resolve the immense bandwidth demand in mobile backhaul applications. The technology provides operators with a host of tangible benefits that can be passed on to customers in the form of service quality improvements, such as:

- consistent delivery of high-quality bandwidth via a stable, mature, and market-proven platforms;
- natively transport Ethernet and voice traffic with timing synchronization support;
- generally lowered per-bit costs compared with other backhaul technologies;
- ease and speed of deployment and integration into existing network structures;
- unparalleled modularity facilitating the flexibility and scalability needed to meet evolving demand levels;
- continued technology advancements driven by leading organizations and standards bodies like the Metro Ethernet Forum (*MEF*) and the Institute of Electrical and Electronics Engineers (*IEEE*).

The idea of Carrier Ethernet as a solution to the bandwidth bottleneck is catching on industry-wide. In its most recent Carrier Ethernet Switch/Router (*CESR*) Quarterly Market Tracker, research firm Heavy Reading cited mobile backhaul deployments as a primary growth factor for the Carrier Ethernet market. Analysts at Frost & Sullivan echoed these findings in their July 2010 Internet protocol (*IP*)/ CESR Market Update, noting that the rapid adoption of Carrier Ethernet for mobile backhaul is significantly affecting CESR market revenues.

Thriving in a converged world

The waiting game is finally over; the converged world we've been waiting for has arrived. The union of voice and data is becoming a *force majeure* for carriers - and a veritable traffic tsunami threatening to eclipse bandwidth capacities, leaving frustrated customers and overwhelmed network operators in its wake. Surviving the 'Ethernet everywhere' traffic onslaught requires innovative, forward-thinking solutions that can keep pace with rising volumes of new technologies, applications, and users.

Solving mobile backhaul's bandwidth requirements is a significant problem for carriers to address. Integrating Carrier Ethernet doesn't just solve the problem but improves efficiency and cost-competitiveness. Operators willing to overhaul their mobile backhaul networks to include Carrier Ethernet will find themselves better able at adapting nimbly to changing broadband demands and not just surviving, but thriving in today's converged world. ●

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