

Confronting the Capacity Crunch

By Tim Young

Traffic Jam:

No one enjoys being stuck in traffic. As you read this article, you may still be recovering from your morning or evening commute. In fact, if traffic is particularly nasty in your neck of the woods, you may be reading this article while you're sitting in near-standstill traffic (though that's something I can't say I recommend).

Now, let's say you get so fed up with the traffic that you decide to leave and go somewhere where there are no cars at all. After three years on this carless island, you return home, rested and tanned, to find that traffic hasn't improved. In fact, it's



I'd imagine that you'd turn around and head right back to your car-free island.

While such an increase in auto traffic is fantasy, such an increase in wireless data traffic is all-too-real for a number of wireless carriers. In fact, AT&T reported at 4G World that they've seen precisely



gotten worse. Much worse.

Traffic has gotten so bad that there are fifty times as many cars on the road as there were just three years earlier. A 5,000% increase in three short years.

such a growth in just as short a period: 5000% more wireless traffic flows across AT&T's wireless network than they saw just three years ago.

And I know what you may be thinking: Let's all blame the iPhone. To do so, however, would

ignore the fact that increased data usage is not a phenomenon limited to a single device or a single network. The Wireless Communications Association International notes that a typical smartphone uses 30 times as much data as a traditional wireless phone, and a connected notebook/netbook consumes 450 times as much data. A traditional wireless phone, with regular consumer usage patterns, uses around 30 megabytes of data a month. A wireless laptop user can chew through 13GB in that same time span.

And AT&T is by no means alone in their data explosion. Hong Kong's OFTA released numbers early this year that stated that wireless users in Hong Kong used 14 times as much wireless data as they did just 2 years ago.

In addition, Motorola has reported that 78 percent of US wireless users now have a cell phone capable of accessing the internet. 40 Million Americans are active users of mobile internet services.

And that's just the beginning.

Technology players from Intel to Amdocs cite analyst projections that network will support over one trillion devices by 2015. Smartphones. Netbooks. A whole new slate of devices that are becoming mobile data-capable like Kindles and satellite navigation systems. All of these devices are attempting to find a spot on a crowded spectrum for their respective data.

From the standpoint of supply and demand, there seems to be a nearly limitless demand for wireless data. Users have indicated, through their usage patterns, that they're increasingly coming to expect to access any service, anywhere and at any time.

Furthermore, the demand for data is outpacing the increase in profitability. One recent study put revenue growth in the wireless sector at 2x over

the next five years. A doubling in revenue is welcome,

So how can wireless providers confront this onslaught of data?

Handling the Flood:

Building additional towers or allocating additional bandwidth would be helpful, but is a tremendously slow proposition. Furthermore, the demand for data is increasing at such an explosive rate that even if providers had the wherewithal to build all the towers that they'd need to meet raw demand (and they don't), the rate of increase is such that the construction would be continuous. That's not to say that wireless providers shouldn't add more towers. They should, and quickly. However, other tactics are necessary to make the traffic more manageable.

Much more feasible solutions exist.

Service providers can undertake projects to offload their wireless traffic onto WiFi, spreading out the data-load. In addition, by employing 4G technology, providers can create more efficient networks that are able to crowd more bits onto the same amount of spectrum.

Furthermore, existing backhaul solutions can be made cheaper and more efficient by employing technology like Ethernet. Using Ethernet to carry the bits and bytes from the cell sites to the switching centers alleviates some of the congestion on the network in a way that's cost-effective for the provider.

However, larger, more efficient networks are only part of the solution.

Operators also need to meet the challenge of increased data demand with business models that embrace the increase in demand, but also ensure that the heaviest users are carrying their fair load

of the cost associated with providing them with the quality (and quantity) of service they demand.

Differential pricing may be the key to ensuring that premium levels of quantity and quality are available, but that those premium levels are charged for appropriately. That may mean that faster speeds and top-shelf QoS cost more. That may also mean that the time of day is taken into consideration in charging models, requiring those who demand massive bandwidth at peak times to pay more. 'Best effort' and off-peak offerings would cost less. Some consumers may be initially frustrated by such a charging model, but (assuming data users don't get socialized into expecting low-cost, all-you-can-eat plans like many wired network customers have) wireless customers already expect to pay more for higher levels of usage, so tiered pricing for level of service is a natural progression.

Needless to say, OSS and BSS firms could be absolutely invaluable in providing help at every step of design and planning networks that can deliver tiered service, regulate QoS, and rate, charge, and bill appropriately. An appropriate OSS strategy could equip wireless carriers to enable backhaul for the purposes of lowering the cost associated with massive amounts of wireless data, monitor, rate, charge for, and bill out different levels of data usage, and generally create more visibility into the wireless network in order to make all of these cost-saving and data-load-reducing steps more feasible and cost effective.

Options:

Let's go back to the fifty-fold car increase that greeted you after your return from Car-free Island. New roads would have solved the problem, but they would have taken so long to construct that they never would have kept pace with demand. No one would be able to drive at all in the meantime.

However, a well-run highway department could have found ways to shift some cars onto less-congested side-streets, and some passengers onto trains or buses to maximize efficiency. Tolls could have been instituted to ensure that those who use the roads more heavily are picking up a portion of the additional cost of maintaining those roads. Incentives could be put into place to encourage motorists to use the major roads at off-peak hours, such as discounted tolls for usage during hours in which traffic is generally lighter.

These steps would help to reduce, streamline, and optimize traffic in ways that simple construction couldn't.

Wireless providers have a choice. The traffic is coming, and it's not going to slow substantially any time in the immediate future. How will they handle the traffic they've been forced to deal with today and the traffic they must deal with tomorrow?