

The Mobile Bandwidth Crunch: Strategies for the Next Decade

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We have all heard the saying, "It's a small world," but as the world becomes smaller, our mobile network needs have become bigger – much bigger. So much so that mobile network infrastructures, previously thought capable of handling consistently heavy traffic, are now showing strain under the torrent of new data they carry every day.

While social networking explodes and consumers transfer their daily Web habits to the mobile phone, there is in the background a struggle for network operators to "keep up with the demand." No one expects network congestion to abate, and what is being done about it is being met with mixed reaction. On the horizon is 4G; marketed as the "miracle cure for data congestion," it is considered by some as a band-aid solution and by others a universal panacea.

The reality is that mobile carriers have to seek *today* solutions to deal with the expanding mobile Internet and specifically the increasing use of mobile video applications. There's no magic bullet, but with a combined approach to adjusting carrier infrastructure and content delivery strategies, the industry will be able to curb the skyrocketing network congestion problem.



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But before I discuss what options we have for a solution, let's take a closer look at the drivers contributing to the mobile bandwidth crunch.

The Big "3"

In my opinion, over the last 12-18 months the mobile industry's greatest achievements have also become some of the biggest threats to its further expansion and advancement.

1. **The Apple Effect:** The introduction of the iPhone and iPad sets the bar at a new level for the types of mobile video experience subscribers (and even non-iPhone users) not only seek but *expect*. In fact, the proliferation of new smartphones and smart devices led by the iPhone and iPad (but followed closely by Android devices) has turned end-users into *video addicts*. Subscribers measure their mobile experience by the amount of data they can download, the video-enabled applications that enhance their experience and the type of multimedia available to them. While transformative for mobile subscribers, the video content addiction fed by these devices is crippling to mobile networks.

2. **Subscribers have become used to "all-you-can-eat data plans."** Originally designed for voice, then mobile messaging, unlimited data plans were the hallmark of North American mobile operator's service offering and were responsible in driving customer acquisition. However, with the advent of the mobile video and video applications, all-you-can eat plans have quickly become a drain on networks. Carriers are unable to recoup the costs of scaling networks to meet demand as more subscribers sign on. Earlier this year, we saw the first major operator draw a line in the sand with AT&T announcing capped data plans. It was a very clear signal that "all-you-can-eat" is coming to an end.
3. **Unprecedented rise in mobile video usage.** Consider these numbers: YouTube accounts for 30-50 percent of all actual traffic over networks with some estimates indicating that video is responsible for 50 percent of mobile traffic over networks. This isn't surprising when you consider that according to Yankee Group, the expected number of global mobile video/TV users will jump from approximately 250 million in 2010 to around 450 million users in 2014. These are just a small sampling of industry research and analysis that point to an unquenchable thirst for mobile video among subscribers. In part driven by the wave of new video-enabled mobile devices, video has redefined mobile networks and placed a premium on bandwidth; a demand that the current networks are unable to support – at the moment.

Impact on End-Users

As I mentioned earlier, mobile subscribers are 100 percent, unquestionably hooked on video content and applications. For better or for worse, you can't deny that mobile content has redefined the mobile subscriber and forever altered their expectation of what is a full and worthwhile mobile experience. Unfortunately, the bandwidth crunch we find ourselves in now threatens to alter those user experiences and in some cases permanently impact end-users relationships with their network providers. The main point here is that while this is a carrier problem, it is felt throughout the mobile ecosystem, no more so than by end-users themselves. Slow loading and jittery content; degraded video quality; the inability to access certain applications and service disruptions are becoming all too common. The effects aren't isolated incidents anymore and carriers are being forced to take action in order to preserve subscriber loyalty.

The Tipping Point

In the picture I've painted there are three main drivers to the bandwidth crunch and end-user experience: content addiction, all-you-can-eat plans and rising mobile video usage. Eventually subscriber loyalty will be threatened by them. What decisions, then, are operators faced with and at what cost? Most recently we've seen the introduction of usage limits to save networks from overload. Ultimately, I believe we'll see more and more carriers turning to this option. It's the fastest way to recoup the costs of more data usage on their networks. What will be difficult to mitigate, however, is while data caps are being put in place, service providers are *banking* on content and the phones that deliver the best content experiences to keep subscribers loyal. Therefore it becomes a delicate balance to maintain; feeding a business model with content revenue, but limiting the flexibility of subscribers to access that content.

Others have suggested that spectrum re-allocation, 4G or LTE networks are what's really needed to lessen the brunt of the bandwidth strain. However, isn't 4G merely a band-aid? More

powerful smartphones and the ever expanding video needs (HD, 3D, full-length features...) seem to show that 4G capacity will be already maxed out by the time of its mass market rollout.

Finally, there's the option of limiting what and when content is delivered to subscribers - a more drastic alternative than even across the board data caps. It's not realistic to think this will offer any kind of long term solution. The fact is consumers are more willing than ever to switch providers for the latest and greatest device and applications. Subscriber loyalty is up for grabs and the winner will be the provider offering the fullest content experience.

Decision Time

I believe the industry is at a tipping point; what are the options to handle this bandwidth crisis? I see five complementary mechanisms that operators will have to consider in order to curb the issue.

Mechanism 1: Cap usage/metered usage. Major global carriers have already done it; it's likely that more operators will quickly follow suit. This can be introduced in a 1-2 years timeframe as most operators need to implement sophisticated tools for charging differentially per service, subscriber, content... The price range is in the tens of millions.

Mechanism 2: Make significant network infrastructure upgrades such as increase the number of cell sites, backbone capacity, get more spectrum, move to 4G, etc. We saw the first hints of network inadequacy as mobile messaging numbers spiked. Operators knew then that their infrastructure was not built for high volume data traffic. This has only grown worse as data usage skyrocketed and video was introduced to mass market. While this may buy operators a few years, a major infrastructure overhaul comes at excessive cost and planning. This is a 5-10 years strategy with CAPEX and OPEX in the hundreds of millions.

Mechanism 3: Implement technologies that can manage intelligently mobile traffic. This can include: Deep Packet Inspection (DPI), Policy and Charging Rule Function (PCRF), Flexible Billing Systems. These technologies are available and being deployed. Time frame is 1 to 2 years, price in the tens of millions.

Mechanism 4: Offload traffic, using femtocells, mobile CDN, provide economy of scale through edge caching... Depending on where the traffic is offloaded (cell site, edge), the costs and benefits vary greatly. In any case, it is a midterm solution (3 to 5 years) with solutions in the hundreds of millions investment.

Mechanism 5: This is probably the option that can be deployed the fastest and the least costly with the highest immediate benefit. Video Optimization (transcoding, adaptive bit rate, adaptive streaming, etc.) can address the bandwidth issue now with component technology while leaving the door open for adjustments later, at a reasonable cost. The heart of this solution lies in bandwidth optimization, or the ability to maximize the network capacity providers have now, by making adjustments to the way in which they deliver content to end-users on-the-fly. These are solutions that not only stop the network "waste" incurred by

operators in delivering videos to smartphones, tablets and laptops, but can then effectively double the capacity of existing network infrastructure, while reducing the OPEX and CAPEX investments necessary to run converged multimedia. This can be deployed in months with an investment of millions.

How quickly can the mobile ecosystem evolve?

As we look toward the future, this is perhaps the greatest question - how quickly will demand grow and how long will it take for networks to adapt? Some of the solutions I outlined will take *years* to show real returns, but the industry doesn't have years. With every day the bandwidth crunch is left ignored operators are losing customers to the competition. Our industry needs to address the video growth now, in a holistic fashion. It has to become a core competency of network operators, just like voice or messaging have been until now.

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