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FRIDAY FEATURE

The Impact of Optimization on Subscriber ARPU and Loyalty

Venturi Wireless' Krishna Ramadas explains why optimization is integral for controlling churn and maximizing ROI.

The success of Blackberry shows subscribers will pay a significant recurring fee for mobile data services-provided the service performs reliably at all times. As wireless providers introduce a range of new data services, IDC forecasts that U.S. consumer wireless ARPU will trend slowly upward to $48 per user in 2009. Enterprise wireless ARPU will also steadily grow to $74 per user in 2009. However, for wireless carriers to reach their ARPU goals, it will require a level of user acceptance similar to Blackberry's. Mobile data subscriber adoption and loyalty is not only dependent on price, but also on service quality, availability, and reliability. Growth can stall or even go into reverse if customers have disappointing experiences while downloading web or other data applications. Subscribers expect to receive wireless broadband services with quality comparable to wireline broadband. Meeting this expectation is critical to retain customers and ensure market momentum.

Consistent application performance, which is delivered through an optimized RAN (radio access network) infrastructure, is the essential service enabler for customer adoption. However, significant challenges to ARPU goals as well as adoption and loyalty are inherent in 3G wireless networks. What are these challenges, and how can wireless data optimization address them?

It is well known that the cost of acquiring a new customer is roughly double the cost of retaining a customer. So, maintaining high user satisfaction is critical for a carrier's bottom line. User satisfaction for mobile data is often higher when the service is initially launched because there are fewer subscribers competing for the shared bandwidth. With fewer users, there is also limited radio interference. The result is fast, reliable access. However, as the number of subscribers increase, 3G users face problems competing for limited resources as well as problems arising from radio interference, which is unique to wireless networks. A wireless network not only allocates fewer resources among more users but also has a radio environment that becomes "crowded" with more users on the network. Mobile phone users are already very familiar with the problem of busy tones and dropped calls in a crowded cell. Similar cell-load conditions can cause aborted mobile data transactions and frustratingly slow speeds. All of which lead to costly calls to customer service and, eventually, customer churn.

Adaptive Transport Layer Optimization Essential for Wireless Links

Link dimensioning and careful cell planning can mitigate some of the causes of aborted transactions and prolonged transaction times. However, these problems can persist because of limitations in link dimensioning tools and commercial considerations that limit link choices. A majority of web applications rely on TCP (Transmission Control Protocol) to provide robust transport, but the TCP sliding-window mechanism is sensitive to packet drops, which are more common on wireless links than on WAN links. Adaptive transport layer optimization is therefore an essential addition to link-dimensioning procedures. Also, adaptive optimization solutions perform better under the unpredictable packet-drop conditions of RANs. Static TCP optimization methods are less suitable in such situations.

The cellular nature of 3G networks also creates another challenge. It is common for 20-30 percent of customers to be served in areas where cells overlap. In these areas, the subscriber's handset

must select from among different local cell towers based upon perceived signal quality to receive the best signal conditions. "Hand Over" (HO), the term for switching user equipment between towers, is specific to cellular wireless data networks. Users in HO areas often experience stall, with their requests being handled very slowly. Installing optimization equipment within the RAN infrastructure can address the stalls, which often happen during TCP-based application transfers. Optimization is achieved by splitting TCP paths into two segments, a technique suitable for high-delay access networks such as 3G wireless. Stalls resulting from TCP's congestion control reaction can be prevented on the end to end path with the split path as this isolates TCP's congestion reaction away from the radio access segment.

Optimization gateway servers can also help enterprise networks with wireless access. Enterprise servers configured for WAN users can perform equally well for wireless users when the carrier deploys optimization gateway servers. Acceptance for a wider rollout of 3G wireless access is greater when the enterprise's IT personnel do not have to support special configurations for wireless users. In many vertical markets, enterprise applications will increase the demand for 3G services, and the ARPU for enterprise customers is thus expected to be far higher than that for residential customers.

3G Network Delay Negatively Impacts Web and Streaming Applications

Delay on a 3G wireless access link tends to cause more throughput problems for Web applications than similar delays on other types of links. In 3G wireless networks, higher link delay is compounded by delay variations. As a result, content-rich Web pages are painted more slowly, and multimedia applications can suffer unacceptable interruptions due to swings in delay and available bandwidth. This is damaging to the perception of Web and streaming media on the wireless handset as a smooth display of visual frames is essential for a good user experience.

Internet streaming relies on a buffering technique that holds a few seconds of display frames to accommodate some slowness in the arrival of subsequent frames. 3G radio conditions and the resulting variations in available bandwidth challenge these buffering schemes. A larger buffer takes longer to fill, which causes longer delay before the initial frame presentation begins. A smaller buffer is more likely to cause some subsequent frames to "freeze" after it quickly displays the first frame. 3G networks need optimized buffering techniques that adapt to the changing bandwidth available to the mobile user.

The success of WiFi hotspots has been a strong incentive for laptop manufacturers to consider including 3G interfaces in their products to provide mobile users with seamless mobility. Carriers already bundle mobility packages into their services. A traveling 3G user is willing to pay a higher price for the ability to use the larger bandwidth offered in hotspots. User transactions may abort because of the challenges of transitioning between a high-bandwidth/low-delay WiFi to lower-bandwidth/higher-delay 3G network.

Adaptive airlink optimization can deal with all of the above challenges and provide extra robustness to transactions faced with a sudden spike in bandwidth/delay characteristics.

Optimized Mobile Data Important for Adoption, Loyalty, Faster ROI

By improving the subscriber's mobile data experience, wireless carriers will reduce churn, decrease customer service costs, and increase ARPU. Adaptive airlink optimization solutions create a framework that enables carriers to host more-successful services over 3G networks. The success of multimedia services such as streaming applications is important to increasing the revenue base for 3G services. Not only does optimization increase use of these services, but it also maximizes network efficiency, which in turn will enable carriers to achieve faster ROI on their network investments and gain more flexibility to decrease prices and increase marketing spending. The combination of a better user experience with lower prices should create faster service adoption and strengthen customer loyalty.

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