Will Femtocells or Wi-Fi Save Mobile Networks from the Data Deluge?

People love their smartphones. The convenience of having access to the Internet anywhere and at any time is extremely compelling.

In an effort to stoke the fires of demand, the industry is actively improving the offerings. For example, new smartphones now have stunningly high resolution screens to make it more compelling for people to watch videos – and consume mobile data.

Front-facing video cameras, paired with low-cost/no-cost video calling software will undoubtedly ignite video calling and ‘see what I see’ applications. Yet these video calls typically consume 10 or even 20 times more bandwidth than their voice-only cousins.

Mobile operators have already adapted to the new consumer demand for a mobile Internet. Many operators have begun rolling out tiered data plans to entice budget-conscious users to switch to smartphones. In the US, AT&T offers an entry-level data option for 200 megabytes at just $15/month.

But offering subscribers beautiful smartphones with low cost data plans isn’t enough. Subscribers now expect fixed-line broadband performance from their mobile operators. And so the mobile arms race is well under way – 3G, HSUPA, HSDPA, EV-DO, HSPA+, LTE – all trying to claim the ‘4G’ mantle.

To meet ever-increasing mobile data demand from increasingly demanding subscribers, mobile operators have invested heavily in additional macro network capacity and increased backhaul capacity. Unfortunately, where subscribers prefer to use their phones is one of the most challenging environments for radio networks: indoors.

As smartphones become indispensible tools for modern life, it becomes clear that indoor performance – coverage, throughput, latency – is a requirement. While many people are well served by the macro network alone, a dual-network approach, where subscribers have dedicated in-building radio capacity aligned seamlessly with

the outdoor macro network, is one strategy for meeting subscribers' mobile Internet expectations indoors.

Femtocells

One in-building technology is a femtocell. Introduced a few years ago, this technology appeared to be a holy grail for mobile operators – a mini cell tower for the home. It would improve indoor coverage and offload the macro network while increasing overall mobile network capacity. Perhaps, thought the mobile industry, subscribers would even pay for the privilege.

Now after several high-profile service launches, the industry has some solid feedback from operators and subscribers alike. The consensus seems to be that femtocells are indeed a fundamental technology for improving coverage, particularly for people on the edge of the macro network. But in using it as a tool for increasing capacity, particularly offloading mobile data from the macro network, there are a number of challenges.

Perhaps the most powerful data point against using femtocells for data offload comes from AT&T. AT&T launched its 3G Microcell service more than one year ago. Recently, AT&T announced that it was introducing tiered data plans. Many assumed that data, when delivered through the femtocell, would not count against the data cap.

Wrong.

In fact AT&T has publically stated their preferred technology for mobile data offload is Wi-Fi.

Wi-Fi

Until recently, the mobile industry has viewed Wi-Fi skeptically. But the growth of smartphones has seemed to change that perception almost overnight. Today, nearly every smartphone ships with a Wi-Fi radio.

A recent survey conducted by Zoomerang and Kineto Wireless showed that 43 percent of smartphone users in the US used Wi-Fi every day. In addition, a study by Arbitron showed that 62 percent of Internet-connected households—close to 50 million in the US—already had Wi-Fi technology.

Consumer acceptance of Wi-Fi hasn't gone unnoticed by mobile operators. AT&T, for one, has aggressively embraced Wi-Fi through a series of strategic moves. Not only did the company acquire several Wi-Fi hotspot providers, it also quickly gave smartphone users free data access through those locations.

In a significant move, the company deployed Wi-Fi-based 'hot zones,' using Wi-Fi as an outdoor macro network technology to complement its cellular network. In a sense, Wi-Fi has moved from quaint in-home technology to industrial-strength macro network companion.

Yet, there are a few negative aspects to leveraging basic Wi-Fi for mobile data

offload trouble operators. For instance, the mobile operator's own data services cannot be accessed over nor offloaded to Wi-Fi. For most smartphones, the use of Wi-Fi for mobile data acts like a switch: when it's on, all data services route over Wi-Fi. The result is that many of the mobile operator's value-added data services aren't available to the subscriber when using Wi-Fi, or at the very least, those services can't be offloaded to Wi-Fi.

Another issue with Wi-Fi is that it does nothing to improve the coverage or performance of mobile services, particularly voice. Often, a smartphone attached to Wi-Fi must leave the cellular radio on to receive a call or send a text. For subscribers with indoor coverage challenges, Wi-Fi alone offers nothing.

In fact, one can argue that basic Wi-Fi may encourage subscribers to turn to over-the-top VoIP solutions. When faced with dwindling cellular coverage and a strong Wi-Fi signal, some users may launch Skype to place outbound calls, thus marginalizing the mobile operator's primary revenue source: voice.

Smarter Wi-Fi

The mobile industry has defined a smarter way to use Wi-Fi with the 3GPP's UMA/GAN specification, published in release six. This smart Wi-Fi solution uses Wi-Fi for data offload and increasing in-building capacity, while providing improved indoor coverage similar to a femtocell. For subscribers, this is a win-win situation. They get better coverage and faster data rates, using technology already in their homes and smartphones.

For mobile operators, it's also a win-win-win scenario. By improving coverage in challenging indoor environments, customer satisfaction increases, and churn decreases. Plus, Wi-Fi becomes an extension of the mobile network, offloading data while increasing overall network capacity. Finally, this is all accomplished with no additional customer premise equipment or capital.

A few operators have started to embrace this smarter approach to Wi-Fi. Today, T-Mobile US and Orange in the UK both offer services which use Wi-Fi to improve coverage while offloading the macro network.

Conclusion

Wi-Fi has quickly woven itself into the fabric of mobile life. It's clearly the dominant indoor wireless technology. As smartphones become the primary device for accessing mobile data services, mobile operators are quickly realizing that Wi-Fi can offer significant benefits. By embracing a smarter approach to Wi-Fi, mobile operators can improve indoor coverage and offload the macro network—all with technology the consumer already owns.

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