Personal Broadband and the Enterprise Customer

Two years ago a telecommunications director of a large U.S. bank was meeting with a small high-tech company in Silicon Valley that had a technology that could provide a wireless alternate access method to his 2,000 ATM machines and remote sites. The high-tech company's solution could provide more than 1Mbps to sites in cellular coverage range, and the Bank estimated that it had more than 1,500 of such low-bandwidth (less than T1 speed) sites.

The high-tech company engineers touted the innovation of the technology and the resulting demand it was going to create in the consumer market. While the Bank director was interested in the bandwidth that could be provided, he was most concerned with cost. The meeting was ending abruptly because the engineers could not understand the Bank director's need to prioritize cost and the Bank director could not get involved in the technology without knowing how much he could save. Exasperated, the Bank director explained: "I spend $300 million per year in telecom services. Can this solution reduce my existing costs or not?"

For both the potential wireless broadband providers and the enterprise customer, this scenario is important for the development of future technologies. The high-tech company engineers had assumed that the greatest demand for their high-speed wireless product would be from the consumer market. They had not fully considered the impact/application of their technology on enterprise customers. Particularly when debating wireless technologies, most regulatory, technology development, and investment focus is on the consumer market. Enterprise buyers are not well organized and there is resulting little focus on their needs. Back to the story.

Faced with a direct question, the engineers calculated that their technology could reduce existing costs for certain services by up to 50%. They estimated a market rate of $50 per connection for their technology – while the Bank was paying $100+ per 56Kb Frame Relay link to each of its ATM machines. The technology solution would cut the price in half, and exceed the current quality and level of service. The Bank is still waiting for the roll-out of this service in the US.

This whitepaper seeks to educate regulators, telecommunications carriers and equipment providers on the impact of Personal Broadband for the enterprise customer. Currently, the standards groups for high-speed (1Mbps+) wireless services called "Personal Broadband" are focused on the mass-market consumer segments. Largely, telecommunications carriers and equipment providers alike await the creation of these standards before making the investment in product development or deploying new networks. Specifically, this article estimates the size of US enterprise demand for telecom services and outlines how Personal Broadband will affect enterprise telecom services expenditures.

High-Speed Wireless Technology Trends

Standards and on-going efforts: There are several standards groups focused on the creation of high-speed wireless services. Since late 2002, these Personal Broadband efforts have been focused around two I.E.E.E. standards teams: 802.16 (called "WiMax") and 802.20 (called "Mobile-Fi"). Both standards are IP-based, wireless protocols that would provide >1Mbps per

user. 802.16 is primarily known as a fixed wireless protocol with backing from industry heavyweights Intel and Motorola. 802.20 is a wide-area/mobile protocol with backing from global service providers and from OFDM (orthogonal frequency division multiplexing) provider Flarion and TDD (Time Division Duplex) provider ArrayComm. Both promise high-speed wireless broadband data and voice integration with 3G and other cellular systems. Both are focused on the consumer market.

Other than these I.E.E.E developing standards, there is significant development being made around high-speed wireless now. For example, Vodafone (Australia) offers business and consumers +1Mbps (with 512/128Kb guaranteed) with its iBurst system (wireless, IP-based data architecture). In the US, Verizon currently provides approximately 386Kbps with its high-speed data offering. The service is priced at $80 per month. Significantly, in April 2004 Nextel released an OFDM technology by Flarion that promises 1.5Mbps per user (on an IP-based wireless system). Nextel commercially deployed the technology after a brief pilot with enterprise customers. The service is priced at $79 per month.

Wireless broadband quality and service. In order for Personal Broadband to fully replace the Bank director's landline connections (and become a benefit to an enterprise customer), it needs to provide the same quality of service as landline connections. Common requirements for landline technologies include high levels of: security, availability, diversity, reliability, and quality.

- Security: encryption will need to be imbedded in the protocol (vs. the selective nature of Wi-Fi security) to provide the same security as landlines. This is likely the largest obstacle to full replacement of land-line service
- Availability: the service must be available for more than 99.99% (SLAs for Frame Relay services). Accepted wireless Erlang traffic patterns for call blocking (e.g., "system busy") cannot exist when replacing a dedicated connection
- Diversity and Reliability: Having multiple service providers generally reduces single points of failure and carrier outages. However, sole dependence on another carrier's infrastructure for service makes the end-user's connection only as good as the underlying carrier's network (or power supply or network diversity, etc). Overall, diversity is both a positive and negative for reliability. Standard landline reliability is given at 99.99% or better. Wireless carriers will be challenged to meet this as the service will be delivered through cellular towers of various providers, thus all towers will need to be reliable – redundant power supply, etc. to meet overall network reliability metrics
- Quality: Standard data landline quality metrics including packet delivery, latency and jitter will need to be met. For example, Broadwing offers 99% or better packet delivery, and 90ms of latency (US roundtrip) guarantee on its dedicated Internet offering. Qwest guarantees less than 2ms of jitter on IP-based network (important for voice and streaming applications)

Personal Broadband cost. Of primary concern to the Bank director is whether wireless broadband would save him money. It is estimated that Personal Broadband will cut most low-speed WAN service costs in half. For example, Frame Relay, Private Line and IP-VPN cost upwards of $100 per month for 56Kb service. Nextel Communications estimates that wireless broadband will provide 1Mbps+ for $35-$50 per month (in order to compete with cable and DSL)[1]. Personal Broadband would enable remote sites with less than T1 access (1.544Mbps) to double or triple their throughput at a reduced cost. Sites with multiple T1s could see cost savings by replacing the T1 connections with two wireless broadband connections (e.g. 2 T1s costing anywhere from $300-$1,000 per month would cost $100 with Personal Broadband, saving $200-$900 monthly).

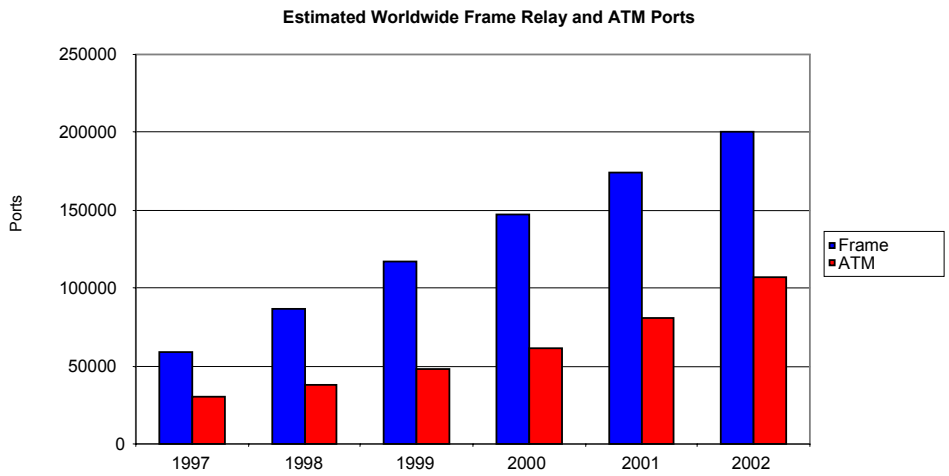
[1] Vittore, Vince. "Future Wireless Target: Fixed Broadband". TelephonyOnline.com, April 15, 2004

Enterprise Telecom

Enterprise telecom background: The domestic large-enterprise segment (e.g. US Fortune 500) spends more than $80 billion[2] per year in telecommunications services (voice, data, remote access, cellular, etc.). This is important to Tier 1 and Tier 2 carriers (MCI, Sprint, AT&T, Verizon, Qwest, etc.) as the business market is the most profitable for these companies. For example, MCI generates approximately 59% of its revenues from the business market segment.[3]

While enterprise telecom services consumption has increased over the past 15 years, the rates for these services have dropped dramatically. Traditional voice and data services used by enterprises (e.g., voice, Private Line, Frame Relay services) have not changed largely in form or function in over a decade. Although technologies such as IP-VPN and ATM have been introduced, carriers have not been able to charge a premium for them, as they have not increased service level or functionality to a degree that warrants a price increase. MPLS and SONET are examples in which functionality/service level have increased dramatically and the carrier can charge a premium; however these services represent a small portion of overall services spend.

Over the past 8 years, price has been the driver in telecom services – not quality – as it is perceived that quality and reliability are equivalent among carriers. Marginal quality improvements have demonstrated little increase in service uptake; only dramatic improvements have corresponded with service uptake. Frame Relay became the standard WAN data service of choice in the mid-1990's since it offered a lower price than the Private Line alternative and could match most customer requirements in speed and quality. It remains the service of choice since the price for ATM services remains comparatively high for low-bandwidth locations such as regional sites or remote offices.



Source: Amber Networks. This graph demonstrates the prevalence of Frame Relay services in light of a higher quality, higher bandwidth and higher cost service (ATM).

[2] Aberdeen Group "Total Telecom Cost Management", April 2003. Derived number - from the average Fortune 500 Company estimated telecom spend of $116 million a year with the estimated, average mid-market business telecom spend of $26M per year, p. 10. [Formula: 500*$116M + 1000*26M = $84B]

[3] MCI 10K Report, MCI.com, February 2003

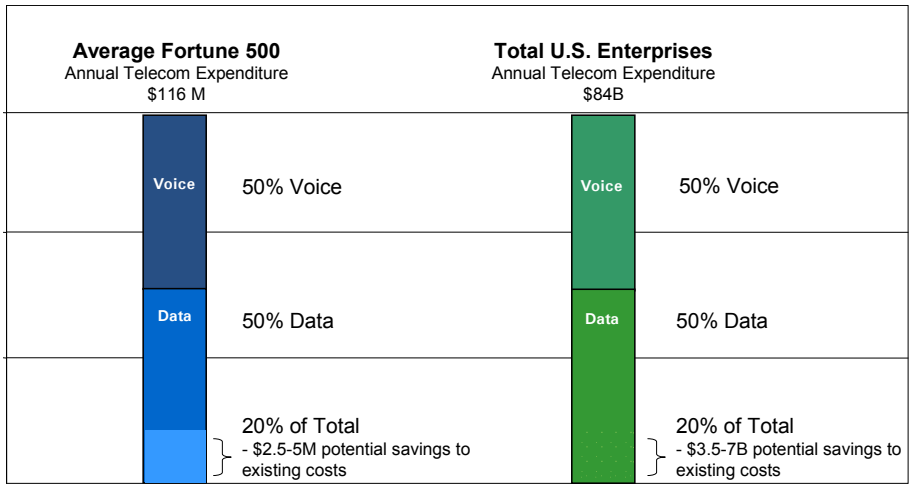
What will unseat dedicated local access? The dedicated T1 access circuit is the current cornerstone of many enterprises' wide area networks, providing connectivity to Frame Relay, ATM, MPLS, etc. networks. While T1 prices have be greatly reduced over the past 15 years, they are still a significant cost to most enterprises and recent regulatory changes are sure to increase these rates over the next 12 months. Wireless broadband will offer a service that is equivalent to dedicated access in terms of quality and reliability at a lower price. And as with any commodity model, price is the driver – and Personal Broadband will be disruptive to enterprise data services. It will be different from other replacement technologies, as unlike the others, it both improves service (quality and bandwidth) while significantly reducing cost. As a result, Personal Broadband will replace dedicated local access at an accelerated pace.

Largely, this replacement will be fueled by those stakeholders who determine the enterprise network topology, including: the CIO, network engineers and telecom managers who are all focused on reliability, availability and bandwidth; and the CFO and procurement organizations who are focused on cost.

Why demand will grow faster. Enterprise demand for Personal Broadband will continue to grow even after the wide area network replacement is complete. This demand will be driven by the end-user, who – focused on connectivity, has traditionally been a silent stakeholder in the selection of network technology. Previously, this stakeholder was ambivalent to the type of wide area network technology he/she was using, since the technology behind the connectivity was transparent. Personal Broadband represents a shift in user access and will drive user interest, since with an always-on connection, it will change how remote/mobile users will work and will allow seamless access to all enterprise applications (ubiquitous access). This seamless coverage will drive demand from a normally complacent wide area network stakeholder – the end-user.

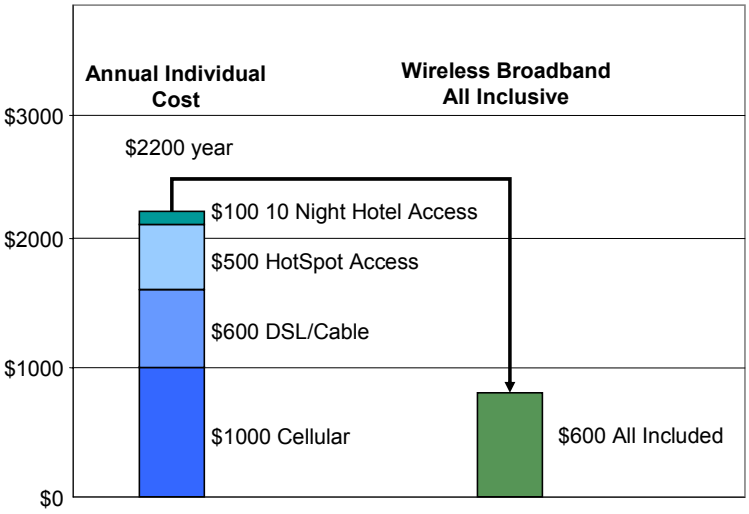
Change in how telecom services are sold – the ultimate bundle. Currently, enterprises have semi-exclusive, long-term contracts with a few select carriers for telecom services. Pricing is based upon the number of lines or sites with a variable usage component on top of the fixed infrastructure. Pricing will shift from this physical-equipment model to rates based upon number of users. In this way, purchasing telecom may begin to look more like purchasing software licenses. Since the access interface will be wireless (unlike a fixed line to a location), the variability in usage will be the number of users. A corporate site license with unlimited usage or a per-employee user license will determine how Personal Broadband is priced and sold.

In addition, enterprises and carriers alike will benefit by bundling services and capturing the enterprise customer across several domains: work, remote access and home. Capturing the individual across domains will create the "ultimate bundle" and tie the enterprise employee to one service provider.



Market impact on enterprise telecom services: On average, a US Fortune 500 enterprise spends $116 million per year in telecom services[4]. We can reasonably assume that data represents 50% of all services. Assuming that 10-20% of these services are data circuits T1 and below, and Personal Broadband is 50% less expensive than current pricing, then Personal Broadband could cut costs from $2.5 – $5M annually per enterprise.

Extrapolated across the $84 billion which US enterprises spend each year, this represents an annual savings of $3.5 to $7 billion. Importantly and conservatively, the Personal Broadband market represents several billion dollars to carriers and equipment makers.



Additional cost savings. In addition to the savings on the landline services, there will be further decrease in enterprise costs related to the reduction of remote access services. A Personal Broadband solution would reduce cellular phone and home office DSL/cable modem charges. These charges are the fastest growing and typically the least carefully managed of all enterprise network costs.

For example, for a company that pays all remote connectivity charges for its employees, Personal Broadband could reduce costs by $600 per employee per year (see chart above). This is an annual reduction[5] of 50% in remote access charges.

As a future advantage, Personal Broadband could support VOIP, replacing cellular charges. This would save enterprises a significant amount on their current expenditures. When fully adopted, Personal Broadband will not only be disruptive to low-speed land-line wide area network technologies, but also to consumer technologies such as DSL, cable modems and cellular due to

[4] Aberdeen Group "Total Telecom Cost Management" April 2003

[5] We estimate remote connectivity to cost $1200 per year per employee, including: high-speed access at hotels and hot spots and DSL/Cable modems. Wireless broadband would cost $600 per year, a savings of 50%

its ability to bundle these services with seamless connectivity under one flat price. This “ultimate bundle” concept will also appeal to the consumer market. Based on historical wireless market demand, consumer markets have flocked to simple, flat-rate pricing. Personal Broadband will offer consumers one flat price for cellular voice and Internet at lower prices than they are paying today.

Conclusions. Personal Broadband will be a technology offering greater service for less cost. Outlined above is how demand will be driven due to reduced cost relative to existing services, which will be supplanted. The groups impacted by this technology shift will be significant. Personal Broadband will be a disruptive change to how and what services enterprise customers and their employees purchase. It will also be disruptive to what services carriers provide, which carriers provide these services and could have a significant market impact on consumer cellular pricing (as many of the profit-rich, enterprise customers migrate away). Enterprise disruption: With a viable solution introduced, enterprise customers will quickly change their expensive, circuit-based infrastructure to wireless connectivity for less cost. Carrier disruption: This change will make the telecommunications industry more competitive, as the Regional Bell Operating Companies (RBOCs) and Interexchange Carriers providing business telecommunications services today will see that market shrink by 10-20%. Personal Broadband will also offer an alternate access channel over the last mile to carriers who are being edged out of the local market by the RBOCs, making the market more competitive. Consumer disruption: consumers will have more choice in cellular and high-speed data options – in addition to seeing greater price competitiveness.

Archstone consulting
http://www.archstoneconsulting.com/

Personal Broadband Industry Organization
http://www.personalbroadband.org/