Enabling the Future of Wi-Fi® Public Access

Wi-Fi Alliance
February 2, 2004

Executive Summary

Wireless networks have moved beyond homes and offices. Mobile professionals who demand access to data have spawned the creation of public access “hotspots” that provide wireless access in locations as diverse as coffee shops, airports, hotels and telephone booths. Their number is growing rapidly and is projected that by 2007 hotspots will number 530,000 in the United States, almost 800,000 in Europe and more than a million in Asia.

Yet, Wi-Fi® public access is not without challenges. Concerns over security and the difficulty of establishing a wireless connection stymie many users. The lack of roaming agreements forces users to maintain multiple accounts or one-time service charges so they can access the Internet from any public hotspot. These issues represent significant obstacles to a widespread public embrace of Wi-Fi public access networks. Until they are addressed, the full potential of Wi-Fi public access cannot be realized, and ubiquitous access will remain more of a vision than a reality.

This whitepaper examines the evolution of the public access market and discusses the roadblocks that impact its potential. Furthermore, it identifies the leadership role being taken by the Wi-Fi Alliance in developing universal standards and requirements that will insure the interoperable, secure and easy-to-use experience that users require and that will open the Wi-Fi public access market to a whole new customer base. The Wi-Fi Alliance is committed to accelerating the public access market through extensions to its certification programs, and development of best practice documents that will reduce complexity and costs in these deployments. Through these efforts the WFA is working to broaden the appeal of wireless services to a fast-growing user-base of Wi-Fi-equipped consumers.

The Wi-Fi Alliance is a nonprofit international association formed in 1999 to certify interoperability of wireless Local Area Network products based on IEEE 802.11 specification. Currently the Wi-Fi Alliance has member companies from around the world, and numerous products have received Wi-Fi certification since certification began in March of 2000.

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Wi-Fi® is everywhere

In 1997 the Institute of Electrical and Electronics Engineers (IEEE) ratified the 802.11 specification for the use of wireless local area networks in the unlicensed radio bands in the United States. By 1999, an enhancement to the specification for the manufacture of wireless local area network (WLAN) equipment operating in the 2.4 GHz spectrum was ratified as 802.11b. This increased the data rate for WLANs to 11 Mb per second put the performance of WLANs on roughly the same par with their wired cousins and opened a promising market for wireless fidelity (Wi-Fi) network equipment.

Success of the standard

Recognizing the market potential behind the specification, several leading industry players, including Cisco, Intersil, Agere, Nokia and Symbol, joined together in 1999 to found an industry organization that would drive the adoption of 802.11 as the single globally accepted standard for high-speed, wireless local area networking (WLANs). That organization, originally known as the Wireless Ethernet Compatibility Alliance, is the Wi-Fi Alliance.

Organized as a nonprofit international association, the Wi-Fi Alliance was founded to test and certify the interoperability of WLAN products based on IEEE 802.11 specification. The Wi-Fi certification program assures consumers that devices that bear the Wi-Fi CERTIFIED™ logo on the box will interoperate with other Wi-Fi CERTIFIED devices. This assurance has spurred customer confidence and opened the door to widespread acceptance of WLAN products in the market.

The Wi-Fi certification program ensured rapid adoption of 802.11b-based products and opened the door to a market explosion of Wi-Fi (Wireless Fidelity) products in both home and enterprise. Wi-Fi was widely and rapidly embraced by manufacturers and consumers alike. It offered manufacturers, service providers and developers a single standard wireless platform for product development that spawned a wave of new product introductions.

Membership in the Wi-Fi Alliance includes member companies from around the world. In addition to 802.11b, the 802.11 product family now also includes 802.11a which can achieve data rates of 54 mbps and 802.11g which can achieve 802.11a speed but operates in 802.11b's 2.4 GHz frequency, making it backward compatible with the enormous 802.11b installed base. The Wi-Fi Alliance tests and certifies the interoperability of new products for each of these standards.

Since it launched the Wi-Fi® certification program in March, 2000, the Wi-Fi Alliance has certified more than 1,000 products. Today the Wi-Fi logo is recognized everywhere as an emblem of interoperability and consumer confidence in WLAN technology. And the IEEE 802.11 standard, as the Wi-Fi Alliance intended, has emerged as the dominant standard for wireless LANs (WLANS) worldwide.

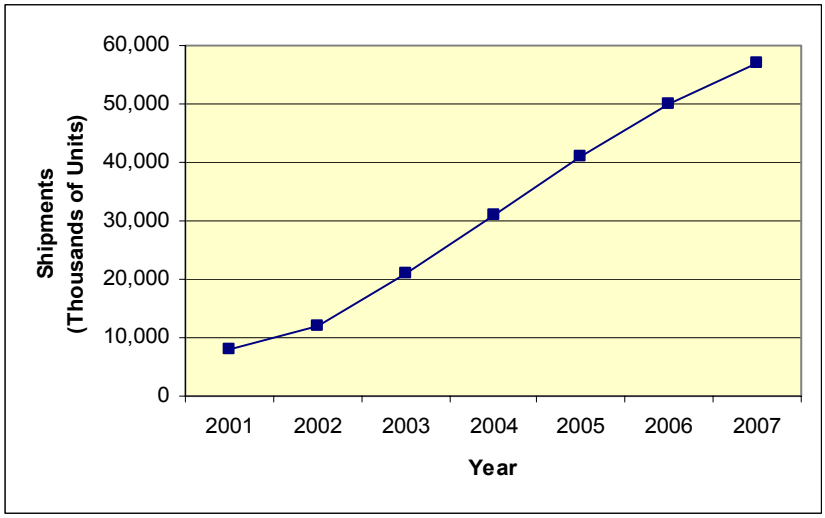
Wi-Fi's deep reach into home and corporate settings has expanded into public spaces. The rapid adoption of the standard and the widespread popularity of Wi-Fi computing spurred the development of wireless Internet service providers (WISPs). This new type of service provider embraced the standard to create an entirely new business model, building out public Wi-Fi infrastructures to provide wireless Internet access to traveling business users.

Today that model is evolving as other service providers, telecoms and mobile operators, eager to enrich their offerings with wireless Internet connectivity, make public access Wi-Fi service available to their customers.

As the market evolves, so do the efforts of the Wi-Fi Alliance. In addition to its work to test and certify the interoperability of Wi-Fi devices, the Wi-Fi Alliance has taken the lead in initiatives aimed at enhancing and simplifying the user experience, promoting standardization to reduce the cost of infrastructure build-outs in the public access space, and pushing market acceptance of Wi-Fi public access.

Success in the market

Lively competition among manufacturers of Wi-Fi devices drove down prices in the market which, in turn, made the new technology as affordable as it was attractive to consumers. Free of the network cable that tethered their computers to their desks, users were now able to carry laptops or other portable computing devices with them to work more productively, collaboratively and comfortably in a variety of different settings.



Source: Gartner Dataquest (September 2002)
Chart: Courtesy of Nomadix, Inc.

By 2000, the worldwide market for WLAN products had reached $785 million. Market analysts Gartner/Dataquest estimate that worldwide shipments of WLAN adapters will reach 26.5 million units by the end of 2003—up from 15.5 million units in 2002—and revenue from those sales, Gartner predicts, will approach $2.8 billion.

These sales have increased significantly in the consumer market. Wi-Fi interoperability, standardization, volume production, demand and competition have driven WLAN product pricing to a level that anyone can afford. Today, it is possible for a person to "unwire" at a cost of about $80 for an 802.11b access point (AP) that enables Wi-Fi® network communications within a 100 to 300 foot range. Prices on 802.11b wireless network interface cards (WNICs), which enable laptops or hand-held computing devices to associate with an AP and gain wireless access to the Internet, are now under $30. These price reductions are spurring sales even higher. Gartner predicts that shipments of Wi-Fi-enabled client devices will near 70 million by 2006.

Emergence of the Public Access Market

Users are now accustomed to the freedom and mobility that Wi-Fi offers. They are demanding high-speed wireless Internet access in all the environments where they work and play. And they're getting it.

The low cost barrier to Wi-Fi networks and the ease with which establishments can install them has helped spur their adoption in areas frequented by business travelers and, increasingly, in public spaces frequented by the general public. They can be found everywhere from waiting areas in international airports to convention facilities in world-wide hotel chains to fast food restaurants in California and RV (recreational vehicle) parks.

These public access "hotspots" are springing up at a very rapid rate to meet the connectivity demands of users who, accustomed to Wi-Fi access, demand easy-to-access, ubiquitous connectivity when they travel away from home or office. These hotspots, within the United States and the vast majority throughout the world, use 802.11b equipment. They provide high-speed wireless Internet access through a variety of providers, including WISPs, traditional service providers, telecoms, mobile operators and aggregators on a fee-paid or "free" basis.

Boingo Wireless, an international aggregator of Wi-Fi service providers, describes the future as a “land grab” and estimates that there are as many as 2 million potential hotspot locations in the United States alone. These include:

- 212 conference centers
- 3,032 train stations
- 5,352 airports
- 53,500 hotels
- 72,720 business centers
- 202,600 gas stations
- 480,298 restaurants, bars and cafés
- 1,111,300 retail stores

These various venues are finding Wi-Fi service to be an attractive differentiator in drawing new and additional same-location revenues. An example is the popular Starbucks coffeehouse franchise in the United States. Starbucks became one of the first retail establishments to provide Wi-Fi Internet access when it partnered in 2001 with the now-defunct MobileStar network to provide hotspots in more than 2000 locations. MobileStar, which heavily invested in wireless infrastructure early on, filed for bankruptcy later that year. Today T-Mobile services the Starbucks hotspots. And MobileStar’s experience stands as a lesson within an industry still struggling to define solid business models in a young and burgeoning market that cries for them.

Two key issues stand in the way of widespread consumer adoption and the success of these models. They include:

- A lack of awareness among consumers that publicly accessible wireless links exist.
- Consumers’ inability to receive the kind of single bill/single service they have come to expect of the mobile IP operators who now provide them wireless cellular telephone service.

Link Awareness

According to Gartner estimates, more than 59 million mobile workers took to the road in 2002. Many of these business travelers rely on network connectivity to do their jobs. Many have begun to plan their travel (including recreational travel) and accommodations around the availability of high-speed Internet access. These are people who will frequently choose one hotel over another to avoid the expense and limited productivity of slow dial-up connections, or who will frequent a coffee shop or restaurant with Wi-Fi® access to check their e-mail during lunch and coffee breaks. They are the obvious clients of Wi-Fi public access.

However, a consumer market for Wi-Fi public access, one that is driven by the ever-increasing sales of Wi-Fi-enabled devices into the home, looms even larger. Any user with a Wi-Fi-enabled laptop or personal computing device can access the Internet through a public access hotspot. Hotspots are beginning to proliferate, even in places that businesses travelers do not frequent, to serve that wider demand. Today, they can be found in vacation resorts, campgrounds, marinas and aboard cruise ships.

An Arizona research firm, Forward Concepts, estimates that by 2007 number of hotspots will grow to 530,000 in the United States, almost 800,000 in Europe and more than a million in Asia.

Increasingly, more and more laptops are being shipped with Wi-Fi embedded in them. No longer will individually be required to go out and purchase a separate Wi-Fi card. It is estimated that 40-50% of all new laptops come with Wi-Fi built in. This will drive use of Wi-Fi at home, but will also drive the demand for public access usage for business travelers. Further, it is expected that Wi-Fi will be as common as a modem in a laptop in the upcoming years.

Yet, even as more and more users become “Wi-Fi-enabled” through purchases of new devices, they are unable to fully utilize and enjoy Wi-Fi hotspot service. Numerous hurdles stand in their way.

Chief among these hurdles is user awareness of the Wi-Fi service. Potential customers could already be in an area with Wi-Fi services and not even know it. Unlike a menu above a counter or a product on a shelf, a Wi-Fi public access offering in a restaurant or retail venue exists in airwaves that are invisible to a consumer. One cannot see it being deployed. Not only are users unaware that Wi-Fi Internet access is available at a location, they frequently do not know whether there will be a hotspot at their travel destination, how to identify it when they get there, or how to make a connection if they do.

This problem of service awareness poses a serious impediment to the growth of the industry. Forrester Research cautions that public WLAN hotspot business will plateau at about 7.7 million users by 2008.

The Wi-Fi Alliance is addressing this problem through its Wi-Fi ZONE™ program, which extends the Alliance's widely recognized interoperability assurance program to public access hotspots.

Wi-Fi ZONE certification is designed to raise user awareness of Wi-Fi hotspots and drive demand for Wi-Fi public access services offered by wireless Internet service providers (WISPs), aggregators, telecoms and mobile operators, just as Wi-Fi® certification has done for the sale of Wi-Fi devices.

Wi-Fi ZONE tells users where to find Wi-Fi-approved, publicly accessible wireless Internet service by offering an online directory they can use to look up the location of Wi-Fi ZONEs at their destination. It also brands Wi-Fi ZONEs, and allows venue operators to prominently display the universally recognized Wi-Fi insignia to show customers that Wi-Fi service is available at their location and that their service has been certified by the Wi-Fi Alliance to be interoperable with the user's Wi-Fi CERTIFIED equipment. This is essentially identical to the objective of the Plus and Cirrus logo on bank automatic teller machines (ATMs).

Roaming

High-profile hotspot rollouts like Starbucks and McDonalds highlight the potential of ubiquitous service availability. But despite the abundance of headlines these rollouts have generated, accessing various WISP networks is neither seamless nor easy—as early users of these networks can attest. Users who attempt connections from different hotspot providers confront an array of log-in options and pricing plans from different providers. These providers use a variety of schemes to authenticate users in order to authorize use and track billing. This complicates what should be a simple process of logging on. A standard logon procedure is clearly needed.

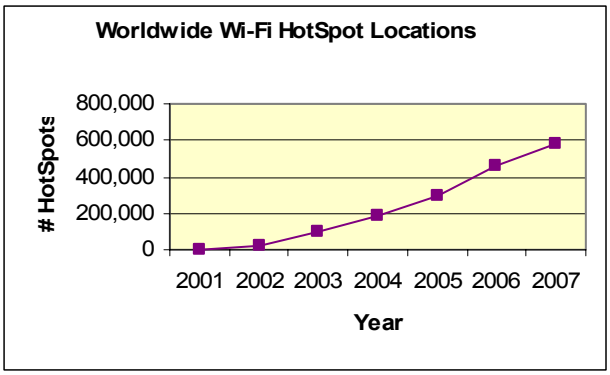
Many providers have begun to address the problem through roaming agreements with one another, and with aggregators and clearing-houses. With roaming agreements in place, they are able to reconcile disparate log-in and billing procedures with single account log-on that bills charges back to the user's home provider.

As the market continues to evolve and more providers embrace single-bill roaming agreements, users will enjoy simplified "single account log-on" at various locations and all charges will be billed back to them through their individual providers.

Much work remains to be done. But in many major cities where users roam from hotspot to hotspot as they travel through hotel and convention districts, it is already possible to glimpse a future of limitless roaming potential.

Ubiquitous mobility

Ultimately, the public access Wi-Fi® market is poised to provide coverage experience for business travelers in a seamless fashion across the "business travel corridor." Growth in the number of Wi-Fi hotspots presents the potential for users roam from hotspot to hotspot.



Source: TeleAnalytics (January 2003)

Ubiquitous mobility will give rise to new wireless applications and business opportunities, such as entertainment and other voice and video applications, that will support mobile IP-like sessions (digital roaming that provides uninterrupted connectivity and seamless hand-offs, much in the same way that voice applications over cellular phone service operate today). This convergence—and the opportunities it represents—cannot be fully realized until the Wi-Fi public access market is able to provide a much more simplified and seamless experience to the user than is available today.

The Public Access Value Chain

The public access landscape is fragmented. However, a number of key players that occupy positions within the public access value chain are working to foster new markets and business models as demand for Wi-Fi service grows. These range from hotspot owners who provide the customer venues to the aggregators who own the customers and the service providers who own the infrastructure.

Each link of the chain has a unique approach and a unique set of business drivers. Each also provides a cascading market of value-added services ranging from IT specialists that provision and secure the network to clearing houses that provide user authentication and billing reconciliation for the providers.

Many are also engaged in a network of partnerships and strategic relationships designed to rapidly expand and enhance their customer offerings. The Wi-Fi Alliance is working with each of these constituencies to facilitate the development of simplified, workable business models that move the industry forward.

Venue owners & associations

Retail venues are finding that Wi-Fi Internet access can be a powerful magnet that attracts new customers, holds customer loyalty and increases in-store sales. Hotspots employ many different revenue models to drive this business.

Those they choose are largely a function of their customer base, branding and the nature of business they seek to attract. A division president at McDonald's restaurant, for instance, identified the business driver there when he announced at a hotspot rollout, "We want the Golden Arches to be the first choice for a great meal and a place to go wireless." By contrast, the US regional telecom giant, Verizon, is using Wi-Fi® to enhance its offering to online DSL customers. And in many locations, civic volunteers, including the members of NYCWireless in the United States and Elecktrosmog in Sweden, provide hotspots as a free service to their communities.

The Wi-Fi Alliance has identified organizations that represent the highest-demand venues and is working with them. Some of these include:

- The Wireless Airport Association (WAA) and the International Air Transport Association-Safety, Operations & Infrastructure (IATA – SO&I).
- The National Multi-Housing Council - Multi-family Information and Transactions Standards (NMHC – MITS).
- The National Restaurant Association.
- The US Department of Transportation, Federal Aviation Administration and Transportation Security Administration.

The WAA and the IATA – SO&I, for instance, are presently defining standards for Wi-Fi airport service and are working to address the safety and consumer needs of passengers, employees and tenants in airports. The NMHC – MITS is working to develop standards for transactions in the housing industry.

Aggregators & clearing-houses

Aggregators help provide a seamless experience to hotspot users by aggregating the services of many different WISP networks to offer global Wi-Fi access under single billing plans. Aggregators typically sell their services into both the wholesale and retail markets, targeting businesses and individuals who require global connectivity. Their challenge is to develop a consistent offering to customers by cultivating roaming agreements across a diverse set of business partners.

Aggregators represent key partners to WISPs that own the infrastructure and are seeking to resell their connectivity to telecom carriers, as well as to Wi-Fi Virtual Network Operators (WVNOs) that offer connectivity services and own customers but do not own the infrastructure. Aggregators offer customers of WVNOs the ability to easily and invisibly roam among partner networks.

Similarly, aggregators are partnering with traditional carriers, affording telecom DSL and cable providers the opportunity to bundle Wi-Fi access in their online offerings. These partnerships not only enhance the carrier's service offering to customers, they enable the carrier to rapidly expand the network of hotspots their customers can access directly.

Clearing-houses are third-party service bureaus that provide settlement, billing, access control, authentication and accounting services to most of the members in the value chain, including wholesale customers, network operators and content providers, ISPs and International Network Operators. Their network of partnerships typically includes other clearing-houses and aggregators with which they provide integrated connectivity and security options, as well as other technology services.

As with aggregators, the clearing-house business model is evolving. Presently, it is complicated by a lack of standards and inconsistent data collection methodologies. But that model, too, is moving toward one that promises consumers predictable and consistent billing for hotspot service as they roam from one service provider's location to another.

The present situation is not unlike the early days of cellular telephone service when users were required to enter codes as they moved among different providers' networks and received separate bills from each provider. Just as the cell phone industry worked to quickly leapfrog users over the difficulty of performing manual intervention as they roamed from one service provider's area to another, the Wi-Fi® industry is working toward providing customers with a single bill that consolidates charges across networks.

Service providers

WISPs are the predominant owners of the WLAN public access infrastructure. At great cost, they widely deployed WLAN technology to create an offering that competes directly with cable and DSL providers for delivery of broadband Internet services. WISPs deploy and operate wireless Internet service for the venues and split the revenues with them.

However, the days of massive infrastructure build-outs to provide that service are over. Many early players built costly infrastructures to provide the "backhaul" that insured guaranteed levels of performance at the venue. A number of early players, including MobileStar and hereUare, buckled under the cost and filed bankruptcy. However, others such as Wayport have built successful businesses through partnerships, validating the WISP model and providing the impetus for new players to enter the game. Newcomers such as Starhub in Asia and The Cloud in Western Europe are just ramping up.

Large international and regional telecoms and wireless providers such as SwissCom and TeliaSonera in Europe, and T-Mobile USA and Verizon in the United States have further validated the market by adding Wi-Fi public access to their offerings. These groups rely on partnerships with WISPs to generate new mobile Wi-Fi customers and grow revenue without the expense of building new infrastructure.

Enabling technology – Forums and standards bodies

A number of different engineering forums and industry organizations are working with each other in key areas to develop interoperable standards that will bridge the interests of all of these players and directly impact the evolution of Wi-Fi® public access. These include:

- The Institute of Electrical and Electronics Engineers (IEEE), the European Telecommunications Standards Institute/Broadband Radio Access Networks (ETSI/BRAN) and the Multimedia Mobile Access Communication Systems-High Speed Wireless Access Subcommittee (MMAC-HSWA). Although they are not specifically involved in activities related to public access, the IEEE, ETSI and MMAC are vitally involved in setting standards for WLANs. They jointly sponsor the WLAN Interworking Group (WIG), which addresses interworking topics. WIG is working to define a general interface between Wi-Fi LAN and public (cellular) networks.

- The Internet Engineering Task Force (IETF) is working to establish protocols to be used in authenticating users across networks.

- The 3rd Generation Partnership Project (3GPP) and 3GPP2. The 3GPP is working to standardize architecture and specify protocols for WLAN–3GPP inter-working which includes access control, authentication and accounting. 3GPP2 has just started to work on WLAN-3GPP2 inter-working. These two bodies seek to converge the most widely deployed cellular standards—GSM and CDMA—through third-generation (3G) cellular technology.

- The Internet Protocol Detail Record (IPDR) organization is working to establish an accounting and settlement specification that will promote roaming across hotspots. Its Wireless LAN Accounting and Settlement workgroup seeks to standardize financial processing between wireless operators.

Barriers to mass adoption

Although players in the value chain are rapidly forging business models to drive the public access market, there remain numerous barriers to mass adoption that must be addressed before ubiquitous mobility can be achieved. These barriers include limited public awareness of Wi-Fi links, inconsistent technical standards as users move from hotspot to hotspot, the lack of uniform authentication procedures and single-bill roaming agreements, as mentioned above.

Public awareness

Wi-Fi® may be everywhere, but if it is not identified by a commonly recognized service identifier it is invisible to users. Telcos and other network operators who partner with, and resell, the aggregator's service under their own banners have done a good job in advertising their public access offerings, and driving user awareness and demand for hotspot service. These providers offer their customers information on how to connect and receive access at a public hotspot, as well as online directories to hotspots in their own networks and those of their partners. But these do not embrace other competing networks to offer users a complete overview of their options in the way that the Wi-Fi ZONE™ program does – particularly as a global indicator of service availability.

Much remains to be done in the area of education and support. Many users still find it difficult to make a connection. Although many hotspots operate with users' Wi-Fi NICs, allowing them to automatically log on when they launch their browsers, others require users to manually configure their own access connection. Some operating systems lack automatic discovery of Wi-Fi networks, requiring users to perform manual scans to find the network. Depending upon which WNIC they are using, users may need to run a Wi-Fi management utility and create a new network location. This is not easy for the uninitiated.

Concern for security

The scenario is further complicated by the open nature of public access Wi-Fi networks and users' concern that their data can be compromised. Security measures such as Wi-Fi Protected Access™ (WPA) and Wired Equivalent Privacy (WEP) require keys that are not easily distributed at public hotspots. In order to promote unhindered access and maximum use of their hotspots, venue owners rarely deploy these security measures.

Although the vast majority of service providers use Secure Socket Layer (SSL) security to protect the transmission of credit card and log-on data, other data including e-mail, downloads and uploads are typically transmitted in the clear. Some service providers warn of this fact and recommend that their customers deploy personal firewalls and Virtual Private Networks (VPN) encryption if it is available. Users who wish to use VPN encryption often face the more complicated challenge of having to install and launch encryption software.

Complex billing models

WISPs and carriers commonly offer a menu of pricing plans for Wi-Fi customers, including some combination of fixed fees, usage fees and service fees.

Fixed fees cover basic service charges and are usually purchased by the day, either as a rolling 24-hour period from the time of purchase or a fixed daily charge, or as a monthly plan. Almost all subscription services offer a flat monthly fee, charged once per month. Other charges may apply, such as fees for the number of devices that access the network or location charges assessed by the hotspot.

Usage Fees asses charges in increments by the number of bytes of usage, amount of time spent online or (in the case of providers such as aggregators that do not directly maintain the network) the number of successful authentications.

Service fees are often added to usage or fixed fees as the value of the service improves. For example, per-minute charges may be added as available bandwidth increases. The most common pricing models include specific access charges for bandwidth availability, e-mail or special services such as VPN, and charges for add-on services such as streaming video or voice-over IP.

While these pricing plans offer users a welcome plethora of choices, the lack of "global service/single bill" offerings still frustrates users who do not want to deal with a multitude of different charges from different service providers.

Roaming

Connecting to the Internet through hotspots in various locations can be difficult. It is often impossible for a customer of one WISP to connect at a hotspot location that is serviced by another without opening an entirely new account, and dealing with an entirely different set of log-on and authentication procedures. The situation compares to the early days of cellular telephones when it was impossible to make a connection while traveling outside your carrier's calling area.

The industry presently suffers from a lack of unified roaming agreements among the various providers who service the hotspots. Although a honeycomb of business relationships is evolving to overcome this problem, travelers who access the Internet through wireless hotspots still confront the need to open different accounts on the various services, usually by entering their credit card number on the venue's portal page. Various players in the public access Wi-Fi® space have developed business models that embrace roaming and extend Wi-Fi public access for their customers. The Wi-Fi Alliance is working on a variety of initiatives to enhance and speed this trend. These initiatives will unify the public access landscape and allow for future growth.

Wi-Fi Alliance—Enabling the future of public access

The Wi-Fi Alliance holds a pivotal position in—and is committed to—enabling the future of Wi-Fi public access. Committed by its charter to certify the interoperability of 802.11 products and promote them in the global market, the Wi-Fi Alliance is focusing on public access in three key areas:

- The development of public access certification programs that will enhance the user experience.
- The development of international standards to promote interoperability and enable roaming.
- The development of a framework for sound business models that will enable the continued growth of the industry.

Wi-Fi ZONE™

As part of its commitment to the world-wide public access service market, the Wi-Fi Alliance introduced the Wi-Fi ZONE program in March, 2003. Wi-Fi ZONE leverages the global success of the Wi-Fi® brand and logo that was introduced with the Wi-Fi interoperability certification program in 1999. Every NIC and AP that has passed Wi-Fi interoperability testing to earn Wi-Fi certification bears the Wi-Fi logo. Today, that logo is recognized around the world.

The Wi-Fi ZONE program allows providers to use this internationally recognized symbol as a means to advertise their Wi-Fi public access service. At the same time, it requires providers to conform to a minimum set of performance criteria to earn Wi-Fi ZONE certification.

Participating providers receive decals bearing the Wi-Fi ZONE logo that can be used with their commercial logos to build a brand identity. This allows users to readily identify their Wi-Fi public access hotspots. Although user support must be available for a venue to earn Wi-Fi certification, it can be outsourced and does not have to be provided directly by the venue's provider.

The uniform branding of the Wi-Fi ZONE logo brings a high level of cohesion and user trust to the diverse Wi-Fi landscape. Only venues that participate in the Wi-Fi ZONE program may display the Wi-Fi ZONE logo at their hotspot, on their Web site or in promotional materials. The program offers numerous benefits to participating service providers, including the additional customer traffic it generates. Users everywhere in the world can look for the Wi-Fi ZONE logo and be sure of getting a Wi-Fi connection that works.

The Wi-Fi ZONE program also provides a free searchable online database of Wi-Fi ZONEs that is updated regularly. Any user may access the Wi-Fi ZONE Finder to identify Wi-Fi ZONEs in areas where they will be traveling. The directory can be found at http://www.wi-fizone.org. Users simply select their country, state and city from a drop-down list. The finder returns a list of all hotspots in that area, along with the hotspots' addresses, connection information and the names of the providers that service them. Users can also print lists of hotspots that match their requirements and take the lists with them when they travel.

As a customer-facing program, Wi-Fi ZONE assures users in roaming situations that their Wi-Fi CERTIFIED equipment will interoperate with that of the venues they visit. It offers direct benefits to Wi-Fi ZONE service providers and venue operators. Not only does it raise their ability to attract new subscribers and customers, it provides greater visibility of their services and brands, and lowers their operating costs through standardization.

Even better, this is a free program for service providers that meet the program's requirements. Providers can go to http://www.wi-fizone.org/zoneSignup.asp?TID=7 to sign up to the program

Roaming

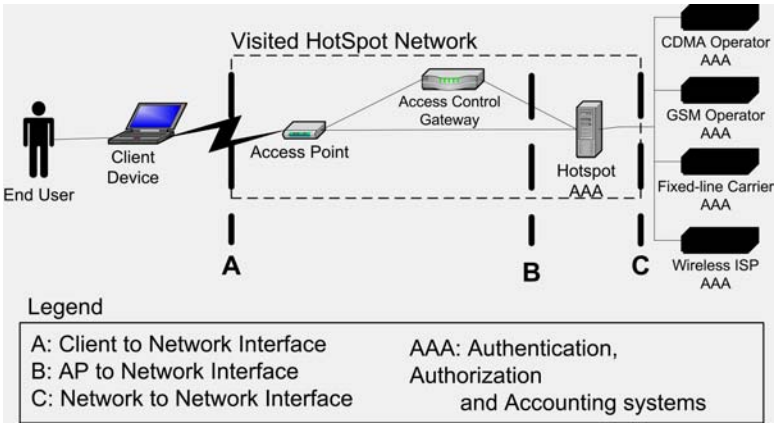
The Wi-Fi Alliance is also working to establish a single set of standards from billing and implementation to escalation processes for all Wi-Fi® hotspots, much like the GSM cellular phone specification (Groupe Speciale Mobile or Global System for Mobile Communications) that established a common pan-European standard for mobile communications.

Earlier this year, the Wi-Fi Alliance published a set of best practices to be used by WISPs in developing their roaming business models. Entitled Best Current Practices for Wireless Internet Service Provider Roaming (or WISPr), it recommends operational practices, technical architecture and an Authentication, Authorization and Accounting (AAA) framework needed to enable roaming for subscribers to Wi-Fi-based WISPs.

The Wi-Fi Alliance is building on this work to develop a recommended practice document that will demonstrate how to implement Wi-Fi Protected Access and 802.1x authentication in public access environments. Wi-Fi Protected Access (WPA) is a highly secure scheme of encryption and access control developed by the Wi-Fi Alliance in conjunction with the IEEE to address the weaknesses of the security scheme in the original specification. (For additional information, see the sections on enterprise security and WPA at www.wi-fi.org).

Additionally, the Wi-Fi Alliance is working to expand its equipment certification testing program to meet the requirements of the public access market. This important initiative is focused on the needs of service providers and will compliment the Wi-Fi ZONE™ program.

This initiative will reduce the complexity, cost and time it takes to deploy Wi-Fi pubic access to a larger customer base.



As shown in this diagram, operators of all types – from cellular carriers to traditional telecommunications players to upstart Wireless ISPs—will be able to seamlessly plug into a standardized and certified hotspot network.

This certification program will establish market requirements such as support for roaming and multiple authentication, authorization and accounting methods. It offers baseline requirements for operators to participate in a Wi-Fi® ecosystem of public access hotspots that promotes secure, easy-to-use and universally accessible connections for users under single-billing plans. The program will allow service providers to ensure that their Wi-Fi-equipped users can purchase services on industry-standard networks.

Conclusion

The Wi-Fi Alliance recognizes that there are costly problems that must be solved if the Wi-Fi market is to grow and prosper. The Alliance has adopted a strategic direction to insure a level of standardization and provide a seamless, satisfying and profitable experience for all parties involved in Wi-Fi public access.

By promoting industry standards through Wi-Fi ZONE™ and its other certification programs, the Wi-Fi Alliance is working to make it faster, easier, and more cost-effective for operators and carriers to deploy Wi-Fi public access networks and enable the evolution to single-bill roaming. By certifying public access points, the Wi-Fi Alliance is extending the vision of interoperability to the service provider community. The prospect of “industry standard” certified hotspots reduces the barriers to deployment and roaming agreements between the operators and aggregators who already have strong relationships to their wireless customers.

Additionally, the Wi-Fi Alliance is working to identify and define billing models for the industry and is taking a coordinating role among various organizations to deliver a matrix of providers who are using those models successfully. Infused through all of its many efforts is the Wi-Fi Alliance’s involvement with the industry players, associations and standards-setting organizations that impact the future of Wi-Fi public access.

As the ongoing certification authority of Wi-Fi services, the Wi-Fi Alliance is uniquely positioned to provide world-wide leadership in pursuit of common goals that will increase adoption, reduce overall costs to providers through the adherence to standards, and assure a secure, quality and consistent experience for users wherever and whenever they wirelessly access the Internet. Its commitment to standards, its large international membership and network of alliances with all key standards-setting organizations, manufacturers, service providers, venue operators and the associations that represent them, positions the Wi-Fi Alliance at the gateway of a future that promises ubiquitous wireless mobility.