

Common Goals, Unique Strengths

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To help you sort through the hotspot offerings, we created a fictitious company, McDonald and Seifert Engineering, and issued an RFI to hotspot service providers AT&T Wireless, Boingo Wireless, Deep Blue Wireless, Gric Communications, Hotspotzz, iPass, Surf and Sip, T-Mobile, Toshiba and Wayport.

McDonald and Seifert has 375 field employees working on a variety of engineering projects, often out of temporary facilities far removed from its Pepper Pike, Ohio, central office. The firm does business globally and is always looking for innovative ways to meet the communications needs of its mobile sales and field services staff. Wireless hotspot accounts would fill the bill.

Using notebook computers, field employees interact with headquarters systems via a remote-access VPN supplied by Check Point Software Technologies. The most common applications for remote workers include Microsoft Outlook/Exchange, Web-based applications and FTP. It's not uncommon for field workers to transfer tens of megabytes of data during a work session, but since these sessions are generally once or twice a day, MSE's IT team considers a wireless hotspot service a practical approach.

Of the 10 providers we contacted, only AT&T Wireless declined to participate, saying its network is in too early a stage of buildout.

The field consisted of two types of providers: aggregators (Boingo, Gric and iPass) that resell services and network operators (the rest). Many of the operators have roaming agreements with one another to broaden coverage. Nearly all the providers

- Use IEEE 802.11b
- Intend to migrate to market-leading technologies such as 802.11a and g
- Offer a variety of pricing options, including low-commitment, month-by-month, or even hour-by-hour, plans
- Provide some form of centralized network monitoring and management
- Assign private IP addresses and use NAT (Network Address Translation) to translate to a public address for Internet access and
- Allow authentication via a secure (SSL-based) Web page.

In identifying differences among vendor services, the most significant was pricing--from \$10 on the low end for monthly service to \$60 on the high end. The aggregators' services cost more than going directly to the network operators, because fees must be divided between two companies, but in return you can expect broader coverage and some value-adds. Other factors that set each provider apart include integration with cellular networks; having Bluetooth on their road maps; regional, nationwide or

international coverage; offering key value-added services, such as dial-up and Ethernet; and providing a software client for functions such as authentication, location discovery and security.

Our talks with these providers revealed two important future developments: dramatic planned increases in coverage that could not yet be announced and significant decreases in projected pricing. In fact, many of the participants outlined grand schemes, though much of the information was off the record. We've included the highlights with this caveat: If you choose a provider based in part on future offerings, you'll want to pay attention to our analysis of the company's business model (see ["Wi-Fi Hotspot Providers at a Glance."](#)).

As for facilitating roaming between operators, most pointed to the Wi-Fi Alliance's ongoing but as yet incomplete efforts, referred to as Wireless ISP Roaming, or WISPr, though none has yet implemented support for WISPr. Note also that roaming is not necessarily bilateral--just because Provider A allows access for Provider B's customers does not mean Provider B will return the favor.

Boingo's on Target

Selecting the service provider that best addressed the needs of MSE proved challenging, but after perusing the RFIs, we selected aggregator Boingo Wireless as our Editor's Choice. Boingo delivered a clean RFI response that clearly answered all our questions and provided MSE with good coverage options, flexible pricing and innovative client software. MSE will pay more with Boingo than if it went directly to the network operators, but in exchange Boingo supplies connectivity at a wide variety of locations, including restaurants, hotels and airports. We also liked Boingo's pricing plans. Finally, Boingo provides innovative client software that facilitates the use of hotspots. The company has done a good job in this area--T-Mobile Hotspot has contracted with Boingo Wireless for software for its network.

We want to make clear, however, that customers with even a slightly varied set of selection criteria could easily select a different provider. Each brings a unique set of strengths, whether it be global coverage, dial-up options, low costs, restaurant/coffee-shop emphasis, full ISP services or cellular integration.

Boingo Wireless

 Boingo distinguishes itself as the leading aggregator because it focuses exclusively on wireless broadband. In contrast, the other two aggregators responding to our RFI, Gric and iPass, focus on both wireless broadband and global dial-up services. However, Boingo does have a business relationship with Fiberlink Communications, which resells Boingo's service in combination with dial-up. Boingo is also unique in offering very rich client software that includes network sniffing, authentication and security functions.

Boingo's coverage is impressive: It provides service in 2,000 locations across 428 cities, 32 airports, 794 restaurants, 430 hotels, and it recently added service at the Orange County Convention Center in Orlando, Fla.

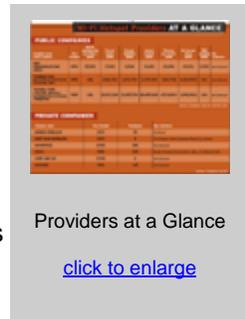


Pricing plans recognize the varying needs of users. Unlimited access costs \$49.95 per month. For those not constantly on the go, the Boingo Pro plan for \$24.95 per month includes 10 24-hour connect days, plus \$4.95 for each additional connect day. Infrequent users can sign up for a "Boingo As-You-Go" plan that has an initial charge of \$7.95 for two connect days and \$7.95 for each additional connect day. For larger customers, such as our RFI target MSE, Boingo offers a convenient bucket of connect days shared among users.

One would expect an impressive list of roaming partners from an aggregator, and Boingo does not disappoint. It has 17 disclosed partners and shared with us a sizable list of as-yet-unannounced collaborators.

The company's current access emphasizes the 802.11b standard. Going forward, Boingo says it will support the access technologies of its partner networks. For security, Boingo says it intends to support WPA (Wi-Fi Protected Access) and eventually 802.11i, and later this year it will integrate 2.5G/3G cellular data based on GPRS and CDMA.

Boingo authenticates users through a Web page (requiring user ID, password) or its client software. This is a particularly comprehensive client that, in addition to authentication, provides signal sniffing, location directory, profile management (for example, private network access versus public network access) and a personal VPN. The VPN creates an encrypted tunnel from the customer's machine to the Boingo data center to guard against eavesdropping. While most enterprise customers will prefer to use their own VPNs, this is a clever solution for smaller business customers and individual users that overcomes some of the security issues of using public wireless networks. Boingo was the only operator to provide this VPN capability with its client utility.



Boingo has raised \$19.75 million in venture funding and has a year and a half of cash on hand. The company is a worthy contender in this market, and winner of our RFI process because of its impressive number of roaming partners, comprehensive client utility and competitive pricing. Future cellular support may also prove beneficial to customers.

Boingo Wireless, (310) 586-5180, (800) 826-4646. <http://www.boingo.com/>

Other Products Reviewed

Gric Communications

 Like Boingo and iPass, Gric Communications is a network aggregator and supports dial-up access, Ethernet and broadband wireless access globally. It refers to its aggregation of hotspots and other access points as a "virtual mobile broadband network" and claims to have the largest such international network in the world, which is consistent with the number of hotspot and dial-up locations it reported in its response to our RFI.

GRIC says it expects to have more than 6,000 hotspot locations available by June 1, the highest number reported by any respondent, spanning 500 cities in 31 countries. This includes more than 50 airports (with 600 hotspots), 4,000 restaurants, 1,000 hotels and 20 convention centers. Today its leading U.S. operator partners include AirPath Wireless, Pronto Networks and Wayport.

Gric's broadband pricing plans offer unlimited dial-up plus 50 hours of broadband (Wi-Fi plus Ethernet) for \$49.95 per month, or 50 hours of dial-up plus 100 hours of broadband for \$59.95 per month.

Gric reported that its virtual network spans more than 300 major telcos, ISPs and wireless ISPs but did not elaborate on its wireless partners. The company is a contributing member of the WiFi Alliance WISPr committee and says it supports the alliance's efforts to enable the hotspot market. Gric also plans to support seamless roaming between Wi-Fi and 2.5G/3G wireless networks.

Complementary offerings include more than 23,000 dial-up access points, ISDN access in 49 countries, PHS (Personal Handyphone System) access in Asia, Ethernet access in 580 hotels worldwide and managed VPN services.

Gric supports 802.11b and cellular technologies, and expects support for 802.11g, GPRS and 1XRTT (CDMA2000 1X) by the end of 2004. Authentication is through its Mobile Office client software, which

also provides access information for different locations. Gric is an excellent choice for customers needing a single global network for Internet access, and because of the large number of hotspots supported, was a top contender in our MSE RFI.

Gric Communications, (408) 955-1920. <http://www.gric.com/>

iPass

 At its inception, iPass was a dial-up network service provider that let users obtain ISP service globally with a local call. It accomplished this by acting as a network aggregator, reselling service from a multitude of ISPs and employing client software to facilitate connections. Like its closest competitor, Gric, iPass has extended its business model to include wireless hotspots, offering an impressive 3,990 locations in 500 cities, 79 airports, 2,013 restaurants, 888 hotels, 10 convention centers and 1,000 other locations. In addition, its traditional dial-up access spans 15,000 access points in 150 countries, assuring subscribers some form of connectivity in many parts of the world.

iPass concentrates on sales to large enterprises. For smaller customers, iPass has partners that resell its service, using a combination of their own brands and the iPass name. The company offers pricing on a per-minute basis, saying that its studies show this model proves more economical for most customers. Pricing in the United States is typically 12 cents per minute.

The company's client software, iPassConnect, is similar in functionality to the Boingo client and provides a number of helpful functions, including a consistent user interface independent of the network provider and the type of access network; location of service based on city, state and country; the ability to connect to the Internet at these locations; and user authentication.

The wireless networks iPass supports utilize 802.11b, though PHS is available in some overseas markets. As an aggregator, iPass will support whatever new wireless technologies its partners deploy.

On a roaming basis, iPass supports the activities of the Wi-Fi Alliance. It also has defined a protocol, called General Interface Specification, that specifies how client software can interact with an authentication gateway, enabling the use of that client in any network supporting the protocol.

Strategically, iPass is collaborating with Intel on its Centrino platform. Clearly, iPass has a wide array of business relationships, and with its dial-up business as a base, its emphasis on a uniform global network experience and the large number of hotspots it supports, the company is in a good market position and rates as one of our top RFI contenders.

iPass, (650) 232-4100. <http://www.ipass.com/>

T-Mobile USA

 The largest nationwide cellular operator, with service in 45 of the top 50 U.S. metropolitan-area markets, owns and operates the largest hotspot network in the world, which it acquired when it bought Mobilestar. T-Mobile's network, now called T-Mobile Hotspot, is unique in that it emphasizes carrier-grade equipment and is the only large network currently operated by a cellular operator in the United States.

T-Mobile Hotspot has 2,200 locations nationwide, including 15 airport gates or terminals, 2,100 Starbucks in 23 states and 75 Borders Books and Music locations. T-Mobile says it plans to serve 2,600 Starbucks in 27 states and 400 Borders stores by year's end. Internationally, the service supports 200 Starbucks in the United Kingdom, Canada, Germany, Austria and the Netherlands.

Pricing is \$29.99 per month for unlimited use with a 12-month contract, or \$39.99 without a contract. Prepaid plans are \$50 for 300 minutes, and metered plans run 10 cents per minute with a 60-minute minimum. Enterprise customers can obtain discounts and plans that combine hotspots with GSM/GPRS service. T-Mobile says it intends to integrate its nationwide GSM/GPRS network with its T-Mobile Hotspot service, tying together billing and authentication mechanisms. The company also intends to support the IEEE 802.1x network security framework. These developments are planned for later this year.

The network uses 802.11b, but T-Mobile did not state which WLAN technologies it plans to support in the future. Authentication is via a secure Web page, and hotspot locations are listed on the T-Mobile Web site. The company is also developing client software, which will include a location directory.

While other cellular carriers such as AT&T Wireless are also deploying hotspot networks, T-Mobile is in the lead, in a strong position because of its large base of existing subscribers who may wish to augment their GSM/GPRS accounts with broadband capability. With respect to the RFI, T-Mobile had attractive pricing and an impressive network, but could not provide as many locations as the aggregators.

T-Mobile USA, (800) 981-8563. <http://www.t-mobile.com/>

Wayport



A leading hotspot network operator that emphasizes deployment of its own network, Wayport distinguishes itself in two important ways: First, it offers Ethernet connectivity in many locations, particularly hotel guest rooms. This is a sound strategy because more business notebook computers have Ethernet ports than wireless capabilities. Second, Wayport concentrates on physical locations, such as hotels, that are frequented by off-site employees and business travelers.

Wayport's network includes 450 hotspot locations across 246 cities, six airports and 444 hotels.

Pricing includes both wireless and Ethernet connections. With a one-year contract, unlimited monthly use costs \$29.95; without a contract, it's \$49.95. Daily rates typically run \$9.95 at hotels and \$6.95 at airports. Customers can also buy prepaid connection cards, which cost \$25 for three connection periods, each lasting 24 hours at a particular location, \$50 for eight connections and \$100 for 20 connections. Wayport will customize enterprise accounts.

For roaming, Wayport does not extend its network through agreements with other operators, instead opting to provide other carriers, ISPs and aggregators with access to its network. Roaming agreements are currently in place with AT&T Wireless, Boingo, Gric, iPass and Verizon Wireless. Wayport is the founding member of a roaming initiative called Pass One, however none of the other operators reviewed cited Pass One support.

Wayport supports 802.11b. By the end of 2004, it plans to support 802.11a and 802.11g, as well as 802.1x security. Authentication is via a Web page or client software. Users can learn of locations via a Web page or through a printed location guide.

The number of hotels that offer Wayport coverage is impressive. Enterprises whose employees access their networks mainly from hotel rooms--not an uncommon scenario--would do well with Wayport's service. For MSE, Wayport's emphasis on business locations was a good fit, as was its pricing, but it did not provide as many locations as some of its competitors.

Wayport, (512) 519-6000. <http://www.wayport.com/>

Hotspotzz



Hotspotzz operates its own hotspot network and also provides a full set of conventional ISP services--an attractive model for smaller companies that don't want to have separate ISP and hotspot accounts. Hotspotzz is also the only hotspot operator with an aggressive deployment plan for campgrounds and taverns.

Hotspotzz's 574 locations, distributed across 58 cities, include 64 restaurant/coffee shops, three hotels, one convention center, two shopping centers, three hot zones (a continuous portion of a metropolitan area) and 500 KOA campgrounds. The company says it will add coverage at more than 1,000 taverns by year's end, projecting a total of 2,500 locations.

Per-user pricing is extremely aggressive, at only \$9.95 per month for unlimited use, with no contractual commitments or \$14.95 including dial-up service. Short-term plans include \$5.95 for 12-hour blocks and scratch cards that offer one hour for \$2.95, four hours for \$4.95 and 24 hours for \$7.95. Groups of 50 or more receive a 25 percent discount.

Roaming partners include iPass and Airpath Wireless, and Hotspotzz says it plans to support all major roaming initiatives by year's end. Added services include dial-up access (using the same user name and password as hotspot service), e-mail accounts, spam and virus protection, personal Web accounts and Web acceleration.

The network uses 802.11b, and Hotspotzz says it plans to deploy 802.11g and Bluetooth by 2004. The operator uses Web-based SSL authentication and informs users of locations via its Web page and e-mail.

To expand its network, Hotspotzz has an ISP affiliate program, where any ISP can purchase and install a Hotspotzz-enabled access point. Hotspotzz handles the authentication and customer relationships, but the ISP keeps 100 percent of the revenue generated. Presumably, Hotspotzz's payoff is gaining a broader network for its subscribers. This is good example of the innovative business models operators are using to develop the market; however, the Hotspotzz network's consumer-oriented hotspot locations were not a good fit for MSE.

Hotspotzz, (887) 580-6231, (801) 924-0900. <http://www.hotspotzz.com/>

Surf and Sip



Surf and Sip Surf and Sip's strategy is to operate its own network, minimize complementary services and keep costs down. Of its 350 hotspots across 200 cities, 300 are in restaurants, consistent with the name of the company, with the remainder in hotels and marinas. Thirty-nine of the locations are in San Francisco, where the company is based.

Per-user pricing is \$20 per month with an annual commitment; otherwise you'll pay \$30 per month. Pay-as-you-go plans include a one-day rate of \$5, a seven-day rate of \$20, and a 30-day rate of \$40. Surf and Sip also offers 30-minute and 120-minute cards at \$5 per hour. The company did not specify any discounts for large numbers of users, suggesting a more consumer than enterprise focus.

The company's roaming partners are iPass and Boingo--the arrangement allows iPass and Boingo subscribers access to the Surf and Sip network, but Surf and Sip subscribers cannot access the iPass and Boingo networks. Surf and Sip did not list any specific roaming initiatives it intends to support, and for all technology questions, indicated it would support whatever prevails. Current access points use 802.11b.

Customers obtain information about hotspot locations via the Surf and Sip Web page and e-mail. Despite its inexpensive rates, Surf and Sip was not a good fit for our RFI because of its locations and number of hotspots.

Surf and Sip, (415) 974-6321. <http://www.surfandsip.com/>

Toshiba America Information Systems



Toshiba is a relative newcomer in this market but brings an aggressive deployment plan and the broadest range of components, including a hotspot network, access point hardware, flexible offerings for service partners, as well as laptops and PDAs with integrated Wi-Fi capabilities. Toshiba's commitment to this space is evidence of how strategic this market has become for the computer and communications industries. Toshiba's approach is to minimize network deployment costs by providing low-cost access points that integrate the access-control function, to centralize all other functions, and to use low-cost backhaul connections such as DSL.

Toshiba's network is in a rapid stage of buildout, and Toshiba did not state what how large its network would be by June 1 (as the RFI requested). However, the company indicated an ambitious goal of 10,000 hotspots globally by the end of this year in locations that include coffee shops and hotels.

Pricing depends on the location and is often determined by an entity other than Toshiba, such as the hotel. Costs typically range from \$6 to \$8 per 24 hour session, \$5 to \$7 per two hour session and \$3 to \$5 per one hour session.

Toshiba supports the Wi-Fi Alliance's WISPr effort but so far has made only one roaming agreement, with iPass, public. However, the company says it intends to have roaming agreements with a sufficient number of providers so that a single user account will provide Internet access at any public location. We like to see companies aim high.

Its technology is based on 802.11b and will likely include 802.11a, 802.11g and Bluetooth by the end of 2004, like Boingo and most other participants, though Toshiba was one of the few to specifically mention future Bluetooth support. Toshiba does not provide client software and uses Web-based authentication. It informs users of locations through its Web site, partners' Web sites, the Wi-Fi Zone Web site and various other promotional campaigns.

Planned complementary offerings include wireless printing and location-based services, and eventually, voice calling from PDAs. As for our RFI, Toshiba is perhaps a bit early in its deployment cycle but brings to the market vast resources and influence. In addition, its low-cost infrastructure helps make the business model viable.

Toshiba America Information Systems, (949) 583-3000. www.toshiba.com/tais

Deep Blue Wireless



Deep Blue Wireless is a small network operator with coverage concentrated in hotels and restaurants in 11 California cities, the largest cluster in the San Francisco Bay area. Unlike other operators that are expanding coverage as rapidly as possible in what amounts to a land grab, Deep Blue is choosing locations carefully so that it can maintain a positive-cash-flow business model. This is the opposite strategy of its competitors, which are deploying thousands of hotspots in the hope that hordes of subscribers will make the business model work eventually.

Deep Blue offers a total of 50 hotspot locations, including 15 restaurants/coffee shops, 15 hotels and one convention center, in Monterey, Calif. Coverage is also available in apartment buildings, residential communities and on a temporary basis for corporate events.

Pricing depends on location: It's free in some restaurant/coffee shops where the owners provide service to encourage customers, \$5.95 per day at other restaurants/coffee shops and \$8.95 at hotels. In most

cases, the location manages the customer relationship and pays Deep Blue a monthly fee. The company also offers an unlimited use plan for \$19.95 per month. Discounts of 10 percent to 20 percent are available for larger blocks of subscriptions.

Roaming partners include Boingo and iPass, as well as some smaller WISPs through which coverage extends to a few hundred hotspots nationwide. Planned complementary services include voice over IP, driverless printing and location-specific information. Deep Blue supports 802.11b and says it plans to support 802.11a, 802.11g and Bluetooth in the future. Authentication is via a Web page. Users obtain information on hotspot locations through a Web page and printed material.

Deep Blue specializes in tailoring solutions that address the requirements of specific locations, such as access technology, billing and coverage. Focusing on locations such as hotels and restaurants for its key customers, rather than end users, may prove a good strategy. But Deep Blue Wireless was not a good fit for our RFI because of limited locations and number of hotspots.

Deep Blue Wireless, (877) 895-HELP. <http://www.deepbluewireless.com/>

Peter Rysavy (www.rysavvy.com) is a consultant who has spent the last 12 years specializing in wireless deployment strategies.

Scenario

McDonald and Seifert Engineering

McDonald and Seifert Engineering is a vertically integrated engineering-services firm working in such areas as water resources, wastewater management and environmental services. The company offers consulting, engineering, scientific investigations, laboratory analysis, construction management and contract operations and maintenance services. Its clients include an international roster of several hundred customers in both the public and private sectors.

MSE has 800 employees working out of offices in 13 U.S. states and five foreign countries, including a distributed direct sales force of 75 people and 300 field employees working on the many engineering projects being managed by the company. Field staff often work out of temporary facilities in remote locations. Maintaining effective communications with the sales and field support staff is an ongoing challenge, and the firm is heavily dependent on both cellular voice and e-mail communications. About 74 percent of the staff relies on Microsoft Exchange for e-mail services, while the balance--new employees of MSE by virtue of a recent acquisition--use Lotus Domino. Long-range plans call for consolidation onto a single messaging platform, probably Exchange, but that is unlikely to occur until late 2004.

Most of MSE's remote employees access e-mail via notebook computers by dialing to a remote-access VPN. Almost half of the remote employees also use PDAs, including devices from Palm and Compaq and even a few smart phones from Samsung and Handspring. Most of these devices have been acquired by the employees themselves. While MSE's IS staff attempts to provide support when problems arise, the company has no official supported platform and has not deployed any enterprise applications to these devices. The most common applications are maintenance of address books and synchronization of appointment schedules with Microsoft Outlook.

Although MSE would prefer to accommodate personal preferences and deliver e-mail services to a range of different devices, it's clear that standardizing on a single platform would be more efficient. MSE management feels that employee resistance to standardization would be manageable, provided the services available would be perceived as beneficial to most employees. MSE understands that the implementation of wireless e-mail services will likely result in increased service fees, but it hopes that at

