



Staying Mobile

HOW TO STAY CONNECTED WHEN YOU'RE ON THE MOVE



by
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Maintaining seamless roaming capabilities between various communication access methods, without ever losing connectivity to the network or experiencing any interruption of service, is essential for a successful wireless future.

Wireless technology is changing the way millions of computer users stay in touch, both in their offices and on the road. Many companies throughout the world are using private wireless LANs as extensions of their core communication strategies. As a result, productivity is improved because enterprise users are able to move about the corporate campus while maintaining their direct connections to core databases, shared applications, and collaborative communication links. Smaller companies and millions of individual users are also turning to WLAN technologies to tie together computer networks and connect to broadband access points.

External to the enterprise, operators, service providers, and site owners have begun rapidly rolling out public hotspots that provide fee-

based wireless services. Aside from the advantage of providing Internet access, these services are increasingly focusing on much higher value-added services such as printing and localized online content in public locations such as airports, cafés, hotels, and conference centers.

Industry researcher Gartner Inc. estimates that by the end of 2003, 12.5 million business users will use WLAN hotspots, growing to 58 million in 2006.

In addition to building upon the expanding base of WLAN-equipped computer users, wireless hotspots can also leverage an even broader group by offering the same localized services to users with PDAs and cellphones.

However, as corporate and public WLANs continue to gain popularity and workforces become more mobile, moving between different network technologies and locations presents a number of new challenges. The majority of users can't and don't want to deal with the setup issues for accessing different wireless technologies such as 802.11b, and subsequent WLAN standards, Bluetooth, GSM/GPRS, CDMA or 1xRTT, etc. Also, when users are on the move it is very important to seamlessly and transparently manage their available access choices. Key features needed include a method to implement policy-driven "best way" objectives, such as automatic selection of optimal bandwidth or lowest-cost connection alternatives.

For corporate and public WLANs to fulfill their promise as productivity-enhancing tools and new revenue-producing opportunities, four critical factors must be achieved:

1. WLANs need to provide pervasive service availability so users are able to access rich services over a variety of wireless technologies.
2. Service providers and operators of public WLAN sites need to have integrated billing and management mechanisms to maximize their revenue opportunities and streamline the rollout of WLAN services.
3. Mobile users need to seamlessly maintain persistent connections as they move within and between wireless environments.
4. Both users and WLAN providers require tight security and access control to provide privacy and protect network integrity.

Achieving Pervasive Availability of Rich Services

Any public or private wireless implementation must provide access availability to the full range of targeted users, devices, and connection modes. Users can't benefit from the services unless they can connect to them. For public hotspots this can mean supporting wireless connections over IEEE 802.11b, Bluetooth, or infrared (IrDA) and possibly also over 2G or 3G wireless telephony standards (GSM, GPRS, CDMA, UMTS, and CDMA2000). Even though enterprise implementations generally confine their initial connection methods to 802.11x standards, many companies are also finding it advantageous to provide limited access to their visitors via a variety of other methods such as Bluetooth or IrDA, or simply wired Ethernet to hotel rooms, business centers, or meeting rooms.

When implementing wireless IP access environments, both hotspot site operators and enterprise IT departments are looking toward flexible software-only solutions that allow them to leverage standard hardware choices without locking them into proprietary platforms. These wireless access servers need to support open industry communication standards, such as WLAN access points, Ethernet, RADIUS, and a range of IP authentication and routing protocols in order to deliver services and to back-haul user traffic onto WAN environments. Depending upon the backbone connection requirements for individual hotspot sites, wireless access servers may also need to support a variety of WAN standards such as T1/E1, ISDN, and ASDL.

On the user side, it's important to "keep it simple." Wireless access should not impose undue restrictions or special requirements on the user's device. Users should be able to access services and information at any hotspot using standard HTML or WML browsers without needing to either install specialized software or change the basic configuration of their client devices.

Since the ultimate objective is to deliver a rich set of services rather than to just provide connections, wireless access server software also needs to provide a robust and adaptable foundation for storing and serving localized information and applications. For example, a hotel chain offering wireless hotspots at various facilities might want to provide their guests with dynamically changing information about local events, weather, restaurants, and other attractions as well as more generic information about other hotels in the chain.

Within a specific hotel site, certain authorized guests might also be provided WLAN access to other services such as printing, conference room multimedia facilities, etc. Wireless access software that also incorporates advanced database technology, such as native XML support, allows the server to seamlessly interface with both portal services and other legacy resources. This can enable operators to efficiently deploy a combination of localized and universal information or to dynamically link authenticated users with controlled access to premium services at specified sub-locations.

Integration of Billing Management and Support Functions

Service providers and operators of public hotspots must be able to meet their overall business objectives while providing the rich localized services needed to attract and retain mobile users. For major mobile and fixed network providers, hotspots offer an opportunity for generating near-term incremental revenues to offset part of their expensive investments in building out 3G wireless infrastructures. For new providers focused specifically on offering hotspot services, the ability to quickly roll out and ramp-up revenue-generating sites represents a make-or-break proposition for their business survival. Finally, for site owners, the ability to enhance visitors' experience and capture new revenue streams with minimal up-front investment is what makes hotspots so attractive.

As shown in Figure 1, by using modular server architectures and leveraging open standards for network management, billing functions can be seamlessly integrated directly into the hotspot support infrastructure. Advanced billing gateway servers can provide integrated solutions for tracking usage and billing users according to a variety of local payment mechanisms. Billing services can be automatically handled through authentication to existing subscriptions, such as ISP accounts or SMS payments via cellular subscriptions. Temporary subscriptions also can be created through the billing server by posting payments directly through the users' credit card accounts or by selling "scratch card" subscriptions, which allow users to buy a predetermined amount of time and then decrease it as it is used.

For multi-site deployments, such as a hotel chain or a string of cafés, individual controllers for different local wireless IP zones can be supported on the back end by shared billing servers and portal servers. The entire infrastructure of IP Zone servers, portal servers, and billing servers should also be manageable via industry-standard Network Management Systems and RADIUS servers. Even though billing and revenue are not typically issues of concern in private WLANs, enterprise deployments can also take advantage of the open standards and modular architecture described above to maximize both network manageability and scalability.

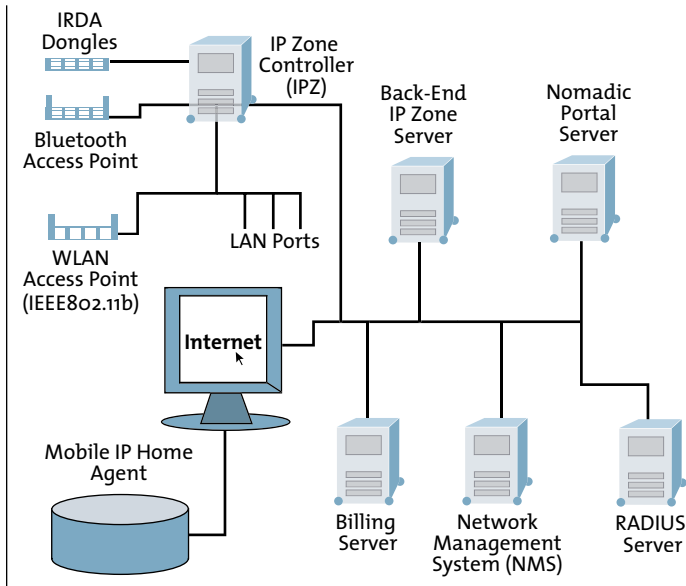
Providing Persistent 'Always On' Connectivity

For users who need to move between different wireless access environments, the primary challenge involves maintaining persistent access to services, even though the underlying connection mechanisms may constantly be changing as the users move. Most mobile users don't really care about how they are being connected – their primary focus is on what they need to access in order to accomplish their goals.

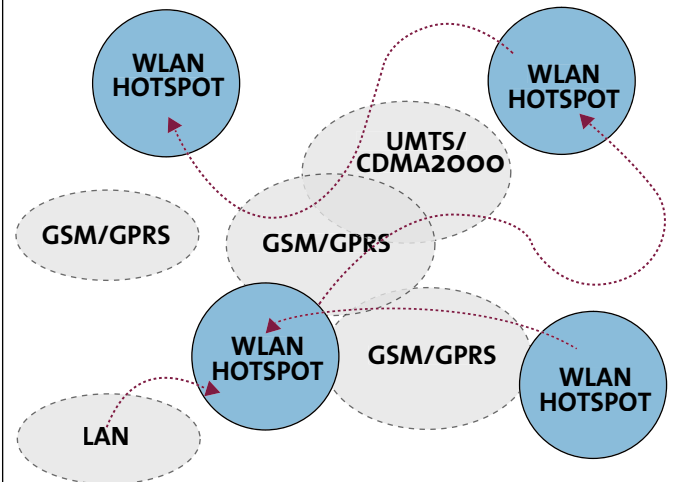
Persistent "always on" access (as shown in Figure 2) can be achieved through the use of new client software based on the Mobile IP standard that enables users to seamlessly move between different access technologies without having to interrupt their activities to log on or re-authenticate in each new environment. Clearly, such a mobile IP client solution must reside completely on the user's device and not require any alterations to server-side configurations.

The user only needs to make a one-time entry of the appropriate network permissions for each access environment into the client software, after which the mobile client handles automatic handover between environments with no user intervention required. A single login session can be seamlessly maintained while the user moves through different infrastructures such as Ethernet, GSM/HSCSD/GPRS or CDMA/IS-95A/B, WLAN, Bluetooth, and 3G.

With built-in intelligence to monitor WLAN signal strength and network availability, the client software is able to efficiently manage all handover functions behind the scenes while the users' focus



1 Integration of access, billing management, and support functions



2 Client software provides seamless persistent access

remains on their applications and the tasks at hand. In addition, client-centric functions can automatically select the optimal connection mode according to pre-established policy-driven criteria. For example, if different connection modes are available at the same time, the client software could be set up to default for the highest bit rate, the lowest cost, the best security methods, or other specific user-defined criteria.

Ensuring Optimal Security and Access Control

As enterprise WLANs and public WLAN hotspots migrate into second-generation implementations, security has moved to the forefront as a critical consideration, which needs to mesh smoothly with established open-standards security mechanisms. The approach adopted by most public and private WLANs is to create a two-step presentation in which the WLAN broadcasts a generic set of information declaring its existence, but then requires specific user login and authentication to go any further.

Local services can be provided on a user-by-user basis, based on location and user preferences. For example, an enterprise may allow Internet access to visitors with a valid visitor badge, or a hotel chain could provide tailored services for each guest as part of their hotel services. For access to enterprise networks, Virtual Private Network (VPN) security must be used. However, this is handled by the mobile terminal and the enterprise infrastructure, without involvement from the hotspot operator.

Enterprises consider security a paramount issue and have already spent a considerable amount of time and money to select and implement VPNs and other security mechanisms. Therefore, it isn't reasonable for new WLAN solutions to require enterprise customers to alter existing security infrastructures. Wireless client software must be able to adapt to that choice rather than impose other nonstandard security requirements.

Because the mobile IP client software is agnostic with regard to particular access technologies and is independent of the back-end infrastructure, the mobile IP client software also gives enterprises and end users a flexible mechanism for configuring and connecting via existing security mechanisms, including standard VPNs from Check Point, Cisco, Nortel, Microsoft, and others.

The bottom line for public and private wireless providers and for millions of WLAN users is that achieving seamless mobile access is critical to the successful deployment of public and private WLAN access networks. Full attainment of these goals must rely on the use of open-architecture solutions on both the server and the client sides. Standards-based modular software on the server-side will enable the deployment of rich localized services along with efficient billing and management. In addition, the use of flexible standards-based client-side software will provide users with seamless, persistent, and secure access even when moving between different wireless environments. 🔗

VENTURE CAPITAL *—continued from page 13*

DataBow was designed with a unique user interface that allows users to quickly develop wireless applications without mastering every wireless protocol. Applications can be developed once and used with multiple devices, including WAP and two-way SMS phones, two-way pagers, and wireless PDAs.

In addition, the company has their own line of games and entertainment applications that were developed using DataBow. Java action games like Cargo Hunters, wireless

chess (which features alerts after each player's move), and the Rude Bard peer-to-peer game have all shown promise in the mobile gaming sector. They have also begun to establish themselves as a leader in what might be called "mobile enlightenment." Perhaps influenced by CEO Wilson's time at St. John's College in Annapolis, which is known for its liberal arts focus on the "great books" of history, Open Path Products has produced an Enlightenment suite that features a collection of psalms, poetry, proverbs, and Shakespeare's sonnets that can reside in a J2ME phone's local memory.

Conclusion

Many of these small development shops have adopted the old-school business strategies that were trampled and pushed by the wayside on the road to dot-com riches in recent years. It is refreshing to find the penny-pinching drive to profitability as a common trait. Another similarity is their reliance on handset partners and cost-effective online channels for the marketing and promotion of their products. Nokia's Wright says this allows them to "stay small, stay focused, and generate revenue." 🔗