Alcatel Wi-Fi Position Paper

Wi-Fi: It's everywhere – at home, at the office, on the street

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Just imagine: You arrive at Paris' Gare du Nord train station, ready for your business trip to London on Eurostar. In the waiting lounge before departure, you switch on your laptop and use the local hotspot to log on to your company's Intranet, check your e-mail and access a key contract. Then you surf the Web to download a movie for the trip and check the railway timetable for your return journey later that day. Once on board, you sit back and relax to watch the film, and spend a few minutes updating the contract.

A fantasy? No, that's reality. That's Wi-Fi. At the bustling Gare du Nord, Alcatel has supplied and deployed a Wi-Fi hotspot (providing broadband wireless data access) for SFR, the mobile telephony subsidiary of Cegetel. This railway station, the third busiest in Europe in terms of passenger traffic, is the first in France to offer Wi-Fi service.

The Gare du Nord is a prime example of the growing trend to offer Wi-Fi at home, in the office and at public hotspots, bringing users a wireless, broadband connection to the Internet, liberating them from the constraints of a physical, cable connection. Today, with market take-up accelerating, Wi-Fi is well on its way to becoming ubiquitous.

A World without Wires

A versatile technology, Wi-Fi (short for wireless fidelity) frees the end-user from the rats' nets of wires and connectors that typically encumber computer installations at home and at the office, while also providing a wire-free broadband Internet connection in public locations. For the user, it's easy: to surf the Net in public hotspots, the user turns on his own Wi-Fi-enabled laptop or PDA, types in his access code – and he's up and running instantly, accessing the Internet without a wire in sight. Payment is easy, too: the user can either buy a prepaid card or subscribe to the service and be automatically authenticated when he arrives in the hotspot.

With Wi-Fi becoming increasingly available at home, at the office and at public hotspots, users have many opportunities to test it. Typically, users try it on the road, demand it at work and buy it for their homes, with each activity spurring increased usage in the other markets. Moreover, Wi-Fi is educating users for the mobile broadband wireless market, initiating them to the capabilities of 3G/UMTS.

Indeed, Wi-Fi, with its true broadband capabilities and growing penetration in the home, the enterprise and public hotspots, may well become pervasive. Market take-up is accelerating, pushed both by the low cost of Wi-Fi radio access systems and by the generalized availability of the Wi-Fi interface in new-generation PDAs and PCs (equipped, for example, with the Intel® Centrino™ chip).

The ABC's of Wi-Fi

The technology behind Wi-Fi comes from the corporate world. Based on the Ethernet standard, it provides a wireless broadband extension to the local area network (LAN), producing a Wireless LAN (or WLAN). This means that the user can connect to a LAN over the air, using his personal laptop computer, PDA or soon even a mobile phone. There is no wire, no hookup and no hassle. Wi-Fi is a tremendous boon for companies, as it eliminates the need to run cables, while offering employees additional mobility.

Wi-Fi radio technology is specified by a series of standards (IEEE 802.11); its systems are designed to offer high bandwidths of up to 54 Mbit/s and provide limited mobility across small cells of 50-100 m in diameter. Wi-Fi is not designed to be a truly mobile system, as it does not include the high-speed, high-density hand-over mechanisms associated with mobile radio access technologies like GPRS and UMTS. Wi-Fi thus offers limited mobility with full broadband access (making it ideal for PCs), while 3G/UMTS offers complete mobility with a somewhat smaller bandwidth (making it perfect for handsets).

From its origins in the corporate world, the evolution of Wi-Fi led to two new implementations, for home networks and public hotspots. In home networks, Wi-Fi is combined with a cable or DSL modem to offer a cable-free connection to the Internet, bringing relief from the proliferation of wires in the home. In hotspots (which are simply places like airports, hotels and cafés where Wi-Fi is used to provide public broadband services), users can access the Internet, corporate intranets and local Web sites; they connect simply using their own, personal Wi-Fi-enabled laptops or PDAs.

The Wi-Fi Market

The Wi-Fi market is split into three main segments: residential/SOHO customers, enterprises and hotspots. According to analysis by In-Stat (Feb. 2003), the residential/SOHO segment leads the market with around 60% of equipment sales. The enterprise market accounts for most of the rest, while the hotspot market represents less than five percent. In 2002, total investment in network equipment was US$1.8 billion.

Residential/SOHO Market

According to industry analysts (Lehman Brothers, Gartner, Dell'Oro), the residential/SOHO market was worth US$1.1 billion in 2002, up a hefty 45 – 100% from the previous year's total of US$500 – 700 million. The market is led primarily by dedicated SOHO connectivity specialists.

Alcatel does not directly address the residential mass market for broadband devices. Rather, the company's strategy is to approach this market through partners, such as is the case with its DSL modems, which are sold by Thomson.

Enterprise Market

According to Dell'Oro, the enterprise market for access points is currently worth about US$600 million and is growing at the rate of 15 to 20% per year. Three types of firms supply this market: network equipment manufacturers, small Wi-Fi specialists, and integrated voice and data solution providers such as Alcatel.

Although enterprises were the prime movers and original beneficiaries of Wi-Fi technology, they were initially slow to deploy it because of security concerns. However, with the emergence of the Wi-Fi Protected Access (WPA) and IEEE 802.1x standard, which ensure secure access control (through authentication) and data encryption, these security issues have now been resolved.

As a result, enterprises have resumed rapid take-up of Wi-Fi technology, integrating it with their LANs. Meanwhile, VoIP-enabled PBX systems, which are now being integrated into the LAN environment, will soon benefit from the wireless LAN, through a new generation of Wi-Fi phones for enterprises. In this environment, the Wi-Fi extension to the LAN will offer a convergent access infrastructure for both voice and data.

Alcatel is highly active in the enterprise market, where it is the European leader in PBX and DECT systems. Alcatel offers Wi-Fi as an extension to its LAN offering, working with partners whose products it certifies, and is developing advanced Voice over WLAN service.

Hotspot Market

The hotspot market is currently worth around $100 million and is supplied in its majority by network equipment manufacturers; other suppliers include integrated voice and data solution providers, such as Alcatel, and small Wi-Fi specialists. Alcatel projects that by 2007, another €900 million will be generated by the market for infrastructure equipment and network installations.

Today, carrier-managed hotspots are only in the build-up phase; worldwide, there are some 20,000, of which Korea Telecom in Asia, T-Mobile in the USA and Swisscom in Europe are among the most dynamic. Alcatel projects that by 2007, worldwide annual operator revenue generated by hotspots will be €5 billion, representing income from subscriptions. Asia is and will be the market leader, followed by the US and Europe. There is thus a strong medium-term perspective for development of the hotspot market.

Alcatel is highly active in this market, providing end-to-end solutions for fixed and mobile carriers and large standalone operators, such as airports.

These different markets have a significant impact on each other. For example, enterprises have been steadily building wireless LANs, driving down production costs for the associated network equipment. Carriers benefit from these lower costs when building public hotspots, where costs range from €1500 for a single access point to €300,000 for a larger hotspot composed of 100 access points together with an application and customer care platform.

Alcatel's Wi-Fi Solutions

Wi-Fi is an important business for Alcatel, as part of its strategy of providing end-to-end solutions to its customers. Alcatel wants to ensure that all its clients – including enterprises, fixed operators and mobile operators – can provide continuity of service to their employees and customers. Alcatel is therefore committed to offering comprehensive solutions that complement its existing portfolio.

Alcatel provides an end-to-end Wi-Fi solution for each of its customer segments, including all network equipment and associated services, with support provided for all security features established by the latest standards. It likewise provides support for advanced, end-user-centered broadband applications and services, such as location-based services.

Among Alcatel's customers, some enterprises are early adopters, while others prefer to wait before deploying. Most, however, will ultimately provide Wi-Fi service to their employees. The situation is similar among carriers, some of whom take an aggressive approach, while others have a wait-and-see attitude. Ultimately, though, all carriers will offer Wi-Fi. In this context, Wi-Fi represents an important business, indeed a strategic one, for Alcatel.

Alcatel's Wi-Fi solution is made of basic building blocks that can be integrated into heterogeneous networks. It is therefore an excellent choice for enterprises and carriers alike, both those that have deployed an Alcatel solution and those that do not yet have a full Alcatel infrastructure. For radio technology, Alcatel has chosen to integrate best-in-class radio systems from leading third-party providers. In order to rapidly bring its Wi-Fi systems on line, Alcatel's solution is backed by a full set of services that include radio design, system deployment, support services and application customization.

Solutions for Enterprises

For enterprises, Alcatel offers Wi-Fi as an extension to its LAN offering, which is based on the OmniSwitch product family and provides seamless, high-speed connectivity in the workplace for both wired and wireless access. The wireless OmniSwitch simplifies mobility management and reduces the cost of deployment by moving intelligence from the radio system to the switch.

For PBX systems, mobility is an important issue. Today, with its PCX Enterprise family, Alcatel offers VoIP connectivity. With Wi-Fi, moreover, wireless data service can be overlaid by voice to offer basic Voice over Wireless LAN (VoWLAN) service. VoWLAN can be enhanced to offer the same set of features and QoS that are currently available with DECT systems (Digital Enhanced Cordless Telecommunications). Alcatel is currently developing a VoWLAN-enabled solution that complements DECT technology for the corporate environment.

Alcatel does not sell Wi-Fi infrastructure or terminals directly to enterprises, but rather certifies partners, such as Symbol Technologies, whose equipment is guaranteed to work with Alcatel solutions.

Solutions for Fixed Carriers

Fixed carriers provide Wi-Fi service for both the residential sector and the hotspot business. To address the hotspot market efficiently, fixed carriers bundle Wi-Fi service

with a DSL subscription – a profitable approach, as the Wi-Fi business case shows. Indeed, Wi-Fi service makes the carrier's service portfolio more attractive and increases the average revenue per user (ARPU) over basic DSL. Likewise, bundling Wi-Fi with an existing DSL subscription keeps customer acquisition costs low. Moreover, carriers limit their capital investment costs by leveraging their installed base of DSL infrastructure for backhauling.

With its installed based of some 27 million DSL lines, Alcatel is ideally placed to offer its Wi-Fi solution. Indeed, it leads the worldwide market in DSL equipment, with an almost 40% share of all lines shipped at end of 2002 (source Dell'Oro Group).

For hotspot systems, Alcatel offers fixed carriers an end-to-end solution that includes the hotspot access equipment and the complete back-end infrastructure, encompassing:

- Hotspot backhauling through the DSL network,
- Authentication,
- Roaming with other operators' networks,
- Flexible billing platforms,
- Service application platforms.

Alcatel's flexible solution supports different levels of centralization for access control. For instance, a collection of hotspots can be controlled from a central aggregation point in the DSL access network. This approach drives down the overall cost of the solution, capitalizes on end-user management features already available in Alcatel's solution and simplifies overall data provisioning and maintenance. Moreover, Wi-Fi subscriber management, authentication and accounting is integrated with the Alcatel SMC platform (Service Management Center), a leading product for broadband subscriber management.

Solutions for Mobile Carriers

Mobile carriers play an important role in the hotspot market, offering Wi-Fi as a complement to mobile data services such as GPRS/UMTS. Wi-Fi provides full broadband service with limited mobility, while mobile data systems offer more limited bandwidth with full mobility. Thus, an end user with a portable device enabled for both Wi-Fi and GPRS obtains full GPRS connectivity while on the move and broadband Wi-Fi access while at a hotspot. Some PDAs already include Wi-Fi and GPRS interfaces; soon mobile handsets will also integrate Wi-Fi connectivity. To deploy the hotspots, connectivity is provided by the mobile operator's pre-existing transmission infrastructure, often complemented by DSL backhauling.

The business model for mobile carriers shows that Wi-Fi must be bundled with GPRS and later UMTS. As is the case for fixed carriers, Wi-Fi makes the mobile carrier's service portfolio more attractive, increases ARPU, reduces customer churn and improves the lifetime value of the customer. With this in mind, some operators offer customers a single subscription bundling GPRS and Wi-Fi, an approach that simplifies usage, provides users with seamless access to broadband services, generates a single bill and eliminates the need for prepaid Wi-Fi cards.

For mobile operators, Alcatel offers an end-to-end solution, including hotspot access and:

- Mobile authentication (based, for instance, on a SIM card), with full interworking with the mobile network database (HLR),
- A full range of billing solutions (including prepaid, postpaid, etc.), based on Alcatel's flagship Open Service Platform (OSP),
- Integration in the operator's global application environment, typically based on the OSP.

With Alcatel's solution, the same user interface can be used for both GPRS/UMTS and Wi-Fi. For example, SIM-based authentication and prepaid billing can be provided for both Wi-Fi and GPRS/UMTS, delivering a consistent end-user experience.

Why Choose Alcatel?

Alcatel's Wi-Fi solutions fully leverage the company's rich portfolio of network elements and value-added platforms. Moreover, Alcatel's solution is complemented by the company's strong, customizable billing platform. Whenever needed, Alcatel can act as a systems integrator, both for carriers and for independent hotspots, such as large airports. For these reasons and more, Alcatel's Wi-Fi solution is the natural choice for its customers, including enterprises, fixed carriers and mobile carriers.

Indeed, in each market where it is active, Alcatel stands out as the customer choice:

Enterprise Market

Alcatel's competitors in the enterprise market include network equipment suppliers, small Wi-Fi specialists, and integrated voice and data solution providers like itself. Alcatel is the ideal choice for enterprises, as the company combines expertise in both voice and data, whereas network equipment suppliers and Wi-Fi firms are essentially data specialists. The latter have little or no experience in ensuring the continuous service required for voice applications such as Voice over WLAN.

Alcatel has a major advantage over other large voice/data solution providers, as it is the European leader in the PBX market. Alcatel also leads in the mobility market, where it is #1 in DECT systems, with 25-30% of the European market, according to InfoSource (2002). Alcatel knows how mobility is used in the enterprise, is an expert in solving QoS-related issues, and offers full mobility over converged TDM and IP networks.

Hotspot Market

In the hotspot market, Alcatel's competitors include large and small integrators, network equipment manufacturers and smaller firms specialized in Wi-Fi. One of Alcatel's key differentiators is that Alcatel offers a complete, integrated solution, and not just the access point. This is crucial for carriers that want to control their hotspots. Another key differentiator is its powerful billing platform, which is fully integrated with the solution. The prepaid card is crucial for hotspot operators; Alcatel is an expert in this field and the world-leader of the mobile prepaid market.

Mission-Critical References

In addition to serving the general enterprise and hotspot market, Alcatel is proving its Wi-Fi solutions in mission-critical applications for human transportation systems. This is the case with the Las Vegas Monorail in the USA (a commercial reference) and the Paris Metro in France (a test trial). In both cases, Alcatel's Wi-Fi solution is being used to automate broadband data transmission between the moving trains and the platforms, allowing transportation companies to operate fully automatic transportation systems while ensuring the highest level of end-user safety.

In other Wi-Fi references connected with human safety, Alcatel is supplying wireless video monitoring both for the E35 highway in Italy (a commercial reference) and for trains moving inside the tunnel section between the Kowloon and Hong Kong railway stations (a test trial).

Whatever the context, Alcatel's versatile solution is the ideal choice, as it can simultaneously support:

- Any type of end user (fixed, mobile, etc.) from any type of hotspot,
- Any sort of authentication (Web-based, 802.1x, SIM-based, etc.),
- Any security system (certificate-based (e.g., SSL), VPN (e.g. IPSec), etc.),
- Any payment method (postpaid, prepaid, as you go, credit card, etc.),
- Any business model (roaming, wholesale, etc.).

Conclusion

Wi-Fi enables the convergence between fixed and mobile networks by offering mobility on fixed networks and true broadband access on mobile networks. Alcatel contributes to this convergence through its solutions and by its ability to ensure seamless service continuity across these different networks.