

A New Chapter for Mobile?

How Wi-Fi Will Change the Mobile Industry as We Know It

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Cisco Internet Business Solutions Group (IBSG)

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Imagine building a shiny new mobile network and no one came to use it. Could new 4G networks become nothing more than expensive Wi-Fi? “The death of mobile” may be a slight exaggeration, but increasing demands on mobile networks, combined with changing consumer behavior and a new appreciation for Wi-Fi networks, mean that traditional mobile networks are currently being re-evaluated by network architects and mobile consumers alike. Not only will these next-generation wireless networks change how mobile services are delivered—they will also fundamentally transform the mobile industry as we know it.

The Explosion of Mobile Data

The growth of mobility—and the way it has changed our lives—is unprecedented. Close to 80 percent of the world’s population now enjoys access to a mobile phone. In 97 countries around the world, there are now more mobile devices than people.¹ Exciting new devices, including iPhones, Android-based smartphones, and tablets, are flooding the market and consuming large amounts of mobile network traffic. Compelling video, social networking, and other innovative applications running on these latest devices are clogging mobile networks with massive new sources of data. Market research by the Cisco® Internet Business Solutions Group (IBSG) reveals that more than three-quarters of Americans will be watching videos, updating their social networks, and participating in video conferences on their mobile phones by late 2012.² People now expect to lead untethered, “anytime, anywhere” lives. Increasingly, they rely on mobile networks instead of wired networks in their homes, offices, and on-the-go to support their fluid lifestyles.

The net result of all of this increased mobility and technological innovation is phenomenal growth in mobile network traffic. Cisco’s Visual Networking Index (VNI) predicts that global mobile data traffic will increase 26-fold between 2010 and 2015, reaching 6.3 exabytes per month by 2015. Global mobile traffic will continue to explode, growing at a rate three times faster than that of fixed IP traffic over this same period.³

In many ways, mobile operators are now victims of their own success. They have contributed to this growth by subsidizing the price of data-centric devices and encouraging their usage through unlimited data plans. The initial exclusive deals for the iPhone by AT&T and carriers in other countries may have contributed to the outstanding success of this iconic device by creating perceived scarcity, and the result has been phenomenal consumption of mobile data traffic. Additionally, mobile operators have aggressively promoted data-hungry applications such as mobile TV, video, and social networking.

Now, most mobile operators are beginning to fight back in an effort to better align network demand with revenue growth. The days of unlimited data plans seem to be numbered as more and more operators introduce tiered plans. They are also imposing data caps on heavy users and implementing sophisticated traffic management to control individual users and applications. Many mobile operators are aggressively acquiring new spectrum and rolling

out long-term evolution (LTE) networks in an attempt to increase capacity and improve the underlying transport economics. Other carriers are searching for new sources of revenue, such as advertising and data insight, or trying to manage CapEx by outsourcing network build and operations, or other new business models.

Despite all these attempts to manage the growth of mobile data traffic, customer demands and expectations continue to rise. End users increasingly expect a highly available, reliable, and fast mobile data network providing an experience indistinguishable from that of wireline broadband.

Mobile operators are struggling with how they can provide this mobile experience in a cost-effective, scalable, and profitable manner. Cisco IBSG believes that next-generation wireless access networks may provide much of the solution. Wi-Fi, the “silent sleeper” of wireless access networks, may be a viable substitute or, more likely, a complement to licensed mobile networks. While Wi-Fi may offer salvation, concurrent changes in the technology and the market may, in fact, challenge the existence of mobile operators.

Wi-Fi: The ‘Poor Cousin’ Comes of Age

In the decade or so that Wi-Fi has existed, most technologists and mobile industry executives viewed it as the “poor cousin” to licensed mobile communications. Because it operated in unlicensed spectrum and suffered from security issues, interference, and poor quality of service, most industry pundits saw it merely as a wireless replacement for the LAN cable. Wi-Fi hotspots did begin to appear in homes, offices, and public spaces, such as hotels and coffee shops. However, mobile operators never viewed this as a viable business, and they did not consider Wi-Fi a threat to their business. In fact, it wasn’t until recently that mobile operators even acknowledged the existence of this alternative wireless network and began to allow Wi-Fi-enabled smartphones onto their mobile networks.

While mobile operators were building out their 3G mobile networks, and dreaming of even newer 4G networks, much was quietly happening in the world of Wi-Fi. Cisco IBSG has observed a number of key changes in the marketplace that may indicate that the traditional mobile industry is on the brink of fundamental change.

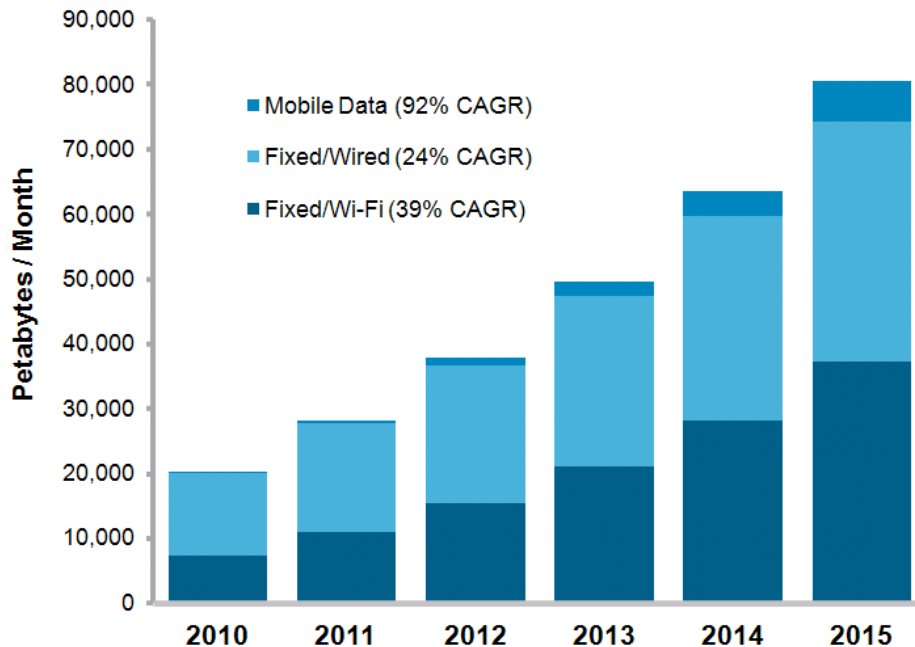
Massive Growth in Wi-Fi-Enabled Devices

Wi-Fi began to take off with the nearly ubiquitous integration of Wi-Fi into laptops and a simple user interface integrated into computer operating systems. Now, nearly all personal mobile devices, including smartphones, tablets, cameras, and game consoles, are Wi-Fi-enabled. ABI Research conservatively estimates that the number of Wi-Fi-enabled devices will grow by more than 300 percent from 2009 to 2015, to more than 2 billion worldwide.⁴

Almost Half of Network Traffic Growth Is Wi-Fi

While everyone rightly points to the projected exponential growth in mobile data, it is still relatively small in comparison to the portion of global IP traffic transmitted over Wi-Fi networks. While mobile data may be *growing* faster, the Cisco VNI predicts that it will still constitute only 8 percent of total IP traffic by 2015, while Wi-Fi traffic will represent 46 percent (see Figure 1).

Figure 1. Projected Global IP Traffic by Access Network.



Source: Cisco Visual Networking Index (VNI) Global IP Traffic Forecast, 2010–2015

Significant Growth in Wi-Fi Access Points

Wi-Fi access points have rapidly found their way into homes, businesses, and public spaces. In November 2010, IDC predicted that there would be more than a quarter-billion Wi-Fi access points in homes throughout the world by 2014. Once shunned by corporate IT departments, Wi-Fi has increasingly made its way into most businesses. In fact, Nemertes Research estimates that more than 95 percent of U.S. businesses have now adopted Wi-Fi.⁵ Once a luxury in select coffee shops or hotels, Wi-Fi hotspots can now be found in many public spaces, including trains, sports stadiums, and even parks. In-Stat estimates that there are currently 4 million public hotspots in the world, a number that will double in the next three to four years.⁶

A Growing Move to Free Access to Wi-Fi Hotspots

In the early days of public hotspot deployment, companies such as Wayport, Openzone, and T-Mobile made a business of installing and managing access points for businesses that wanted to charge for Wi-Fi access, such as coffee shops, hotels, and airports. While that business model still exists, more and more businesses are giving Wi-Fi away for free as either a business differentiator or, more likely, as a competitive necessity. In fact, more than 55 percent of all global public Wi-Fi hotspots were free in Q2 2010, growing from 42 percent in just one quarter.⁷ JiWire estimates that users can now access free Wi-Fi in more than 50 percent of U.S. hotels and cafés, something unheard of just one or two years ago. In addition, wireline broadband providers frequently include free access to a large network of public hotspots as part of home broadband subscriptions. Now, subscribers of large broadband

providers can typically get free access to many of the remaining fee-charging public hotspots.

Wi-Fi Is Becoming a Viable Mobile Data Offload Technology

Mobile operators are beginning to realize that they can use Wi-Fi in congested areas to offload some of the heavy mobile data traffic. In addition to temporarily relieving congestion and improving customer experience, Wi-Fi can improve the overall economics of their network deployment and operations. According to Cisco IBSG, mobile operators can reduce their radio access costs by at least 25 percent (in most cases) by selectively incorporating Wi-Fi into their network architectures and operations.

Wi-Fi Is Becoming Part of a Broader Wireless Network Design

Once relegated to a substitute for computer LAN cables, Wi-Fi is increasingly viewed as an integral part of next-generation wireless access architectures. Wi-Fi not only complements macro cellular networks, but also is a fundamental component of small cell architectures that include femto/pico cells, mesh, and public and secondary SSID Wi-Fi. Cisco IBSG envisions an architecture that integrates Wi-Fi across not just these technologies, but also across multiple carriers in different geographies, and across home, business, and public user segments. Initiatives like HotSpot 2.0 are seeking to cement this architecture even further by establishing standards for such things as Wi-Fi roaming, management, and security to allow seamless integration with other components in the next-generation wireless access architecture.

Many operators, especially in emerging countries, are also exploring the use of Wi-Fi as an alternative means to provide local access to fixed broadband networks. In heavily populated countries such as India, Wi-Fi may be a much easier and more cost-effective way to provide connectivity to densely packed urban residences.

A New Mobile Player in Town

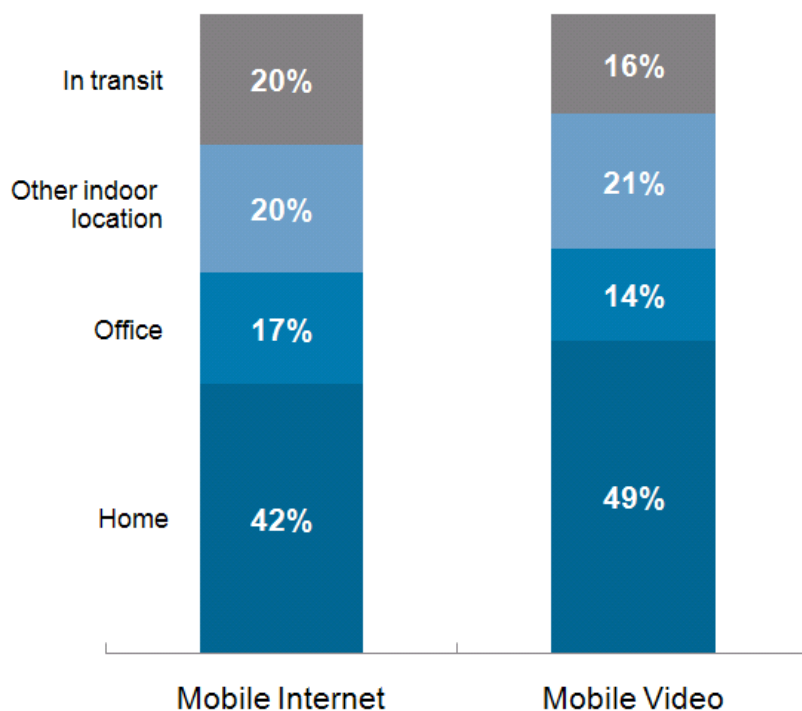
Given these fundamental changes in the marketplace, Cisco IBSG believes that Wi-Fi has truly come of age and now realistically represents a viable wireless access network. The technology is ready, there is already broad coverage, and customers are happily using Wi-Fi as an alternative to mobile. In addition, service providers are finding new ways to monetize their investments in creating a Wi-Fi network.

Based on Cisco IBSG's market observations, research, industry experience, and interactions with service providers, we have developed six assertions on the future of Wi-Fi and its relationship to traditional mobile networks:

1. Wi-Fi Covers Most of the Places Where We Are

We seldom need Internet connectivity from the top of a mountain or the middle of a forest. Research by Cisco IBSG shows that 80 percent of the time, people connect to the mobile Internet from their home, office, or other indoor location—all areas that are sufficiently addressed by Wi-Fi (see Figure 2). Traditional mobile connectivity is needed only in the approximately 20 percent (or less) of cases in which users truly are in transit.

Figure 2. Location of Mobile Data Usage (Percentage of Time Spent in Activity).



Base: Respondents engaged in activity

Source: Cisco IBSG Connected Life Market Watch, 2011

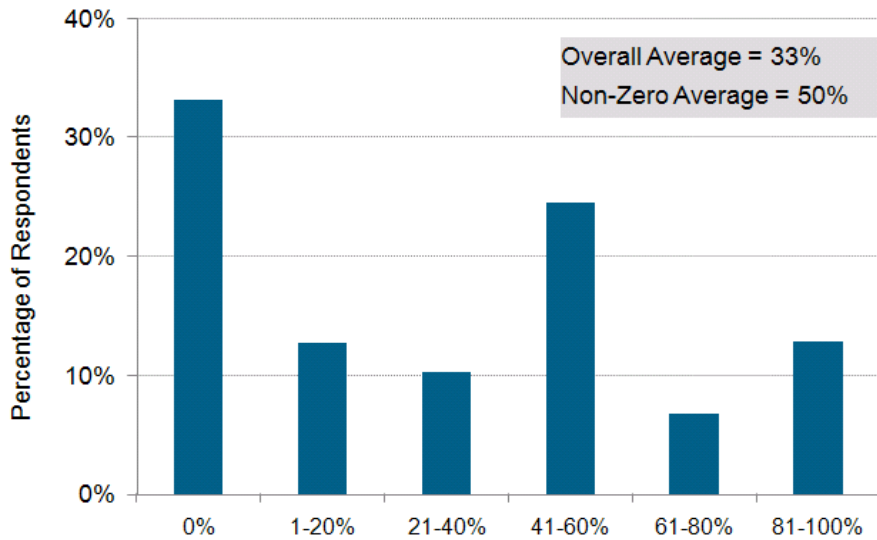
2. Much of What We Do Is Nomadic, Not Mobile

Although we talk about mobility, much of what we are doing is not mobile but, in fact, nomadic. We typically park ourselves at a desk, on a comfortable sofa, or at a coffee shop table to access emails, watch videos, or play the latest games on our portable devices. We seldom perform these activities while walking down the street or speeding along the highway. Recent customer research by Cisco IBSG revealed that two-thirds of the top activities on smartphones were primarily *nomadic* rather than *mobile*. Nomadic activities include email, web browsing, and gaming, but also new activities such as using productivity tools and making video calls. Wi-Fi is perfectly adequate for these activities.

3. New Nomadic Devices Will Consume Even Greater Amounts of Mobile Data

If we thought that mobile networks were already jammed to capacity with mobile data, just wait until the new generation of nomadic devices makes its presence felt. While a smartphone typically consumes 24 times the data of a standard mobile phone, a tablet consumes 122 times more and a laptop 515 times more than a mobile phone.⁶ Growth in tablets is expected to continue to explode, far outpacing the growth of smartphones. The good news is that most tablets and other data-hungry nomadic devices are Wi-Fi-enabled, allowing them to avoid using mobile networks.

Figure 3. Wi-Fi Access by U.S. Smartphone Users (Percent of Total Browsing).



Source: Cisco IBSG Mobile Cloud Watch, 2011

4. Consumers Will Happily Use Wi-Fi as a Substitute for, or Complement to, Mobile

Recent customer research by Cisco IBSG revealed the startling fact that, on average, U.S. smartphone users were already using Wi-Fi a third of the time to access the Web, instead of using a mobile network (Figure 3). If we exclude the people who never use Wi-Fi, this number climbs to almost an even split in the time spent using Wi-Fi or a mobile network to browse the Web. Consumers seem to be actively seeking out Wi-Fi connectivity for a better user experience and to save money.

Figure 4. Forces that Push and Pull Customers to Wi-Fi.

Customer PULL for Wi-Fi Use	Mobile Industry PUSH for Wi-Fi Use by Customers
Speed: Video-capable, responsive	Pricing: Tiered plans, costs, roaming charges, separate plans
Coverage/Availability: Especially in-building, at home	Complexity: 2.5/3/4G; different devices, plans, coverage, experience across networks
Cost: Inexpensive or free, counter international roaming charges	Usage Caps
Experience: Persistent connection, increasingly seamless, does the job: no need for true mobility	Device Centricity: Need separate plans for different devices

Source: Cisco IBSG, 2011

5. Wi-Fi Can Offer a More Cost-Effective Solution, and a Better User Experience

Consumers are rapidly realizing the benefits of Wi-Fi for higher speed, good coverage, and a better experience—all at a lower cost than the traditional mobile network. Concurrently, mobile operators are invoking policies and strategies that could actually encourage users to migrate to Wi-Fi. Complex pricing structures, higher prices, usage caps, and the fact that most data plans are device-specific all are making users re-evaluate their mobile data needs. Additionally, the complexity of mobile networks increases not only user confusion, but also fears about device obsolescence. Cisco IBSG believes that this alignment between customer *pull* and industry *push* will continue to boost demand for Wi-Fi connectivity.

6. There Are Several Ways To Make Money from Wi-Fi

The Wi-Fi industry has evolved rapidly since the days of simply building and managing retail hotspots. While that is still a viable business, several other viable wholesale and end-user access models are now available, as outlined in Figure 5. In many of these new business models, operators can make money by charging mobile carriers or other Wi-Fi providers, as well as meet broader strategic objectives such as reducing broadband churn or upselling. While we continue to view retail hotspots as a viable business model, Cisco IBSG believes that future value will largely be derived from wholesale access and new business models.

Figure 5. Wi-Fi Business Models.

	Wholesale (Mobile Offload)	Wholesale (Domestic / International Roaming)	End-User Access	Retail Sites
Customer	Mobile carriers	Other Wi-Fi providers—domestic and international	<ul style="list-style-type: none"> Existing broadband customers Business customers Unique Wi-Fi customers 	Businesses wanted to establish semi-public hotspots (cafés, stores, hotels, etc.)
Proposition	Offload mobile data traffic onto Wi-Fi network—save costs, CapEx deferral	Allow customers of other networks to easily and seamlessly roam on your network with no additional charge	<ul style="list-style-type: none"> Extended service (free or small fee) for broadband customers Extended service (bundled) for business customers Provide public access for users who don't want mobile data (e.g., iPad) 	<ul style="list-style-type: none"> Provide managed service for build and operation of solution Internet access Value-add (e.g., data, advertising) May be part of a communications bundle
How You Make Money	Charge mobile carrier for number of users, traffic, capacity	Charge Wi-Fi provider for number of users, traffic, capacity	<ul style="list-style-type: none"> Churn reduction Bundled offer—upsell, acquisition Fees for service 	<ul style="list-style-type: none"> Fees for service Access fees Bundle offer—upsell, acquisition, churn Value-added fees

Source: Cisco IBSG, 2011

The Future of Wireless Access Networks

Wireless networks will evolve over time, but one thing is certain: Wi-Fi has earned a seat at the architecture table, and will be a critical element of current and future mobile networks. Wi-Fi will fill many business roles. It will undoubtedly become even more important as a *complement* to traditional mobile technology, offloading data traffic from congested networks. Wi-Fi will also be a *substitute* Internet access mode for mobile devices. Consumers may increasingly opt for Wi-Fi-only versions of nomadic devices such as e-readers and tablets. In fact, two-thirds of eBay's global iPad2 sales have been for the Wi-Fi-only model.⁸ Just as railroads replaced canals, and roads came to compete with railroads, Wi-Fi could become a viable *competitor* to traditional mobile networks. Could the fast, new, and expensive LTE networks turn out to be little more than “expensive Wi-Fi”? While Wi-Fi may not spell doom for mobile networks, it could create a situation analogous to that of roads and railroads—where the two networks coexist in all three strategic states: complement, substitute, and competitor.

As the variety and rapid evolution of Wi-Fi business models demonstrate, careful segmentation will be key for success in the Wi-Fi market. First, it is important to understand which devices are involved. Nomadic devices may be prime candidates for Wi-Fi-only approaches. However, for mobile devices such as smartphones, Wi-Fi providers will have to align and integrate their technologies, operations, and business models with those of mobile networks. A clear understanding of customer segments (including mobile operators, consumers, business users, and hotspot venues) is critical to ensure alignment with the best business and operating models. Finally, operators need to be clear about their strategic Wi-Fi objectives. Is the goal to manage broadband churn, enhance business solutions, generate revenue, or create competitive differentiation? Many of these objectives will be in conflict, so it will be essential to set clear priorities for the Wi-Fi business across the entire organization.

As Wi-Fi develops as an essential part of the next-generation wireless access architecture, seamless access to an extensive “carrier-grade” network will become more important. Wi-Fi networks will need to adopt many of the “carrier-grade” attributes of mobile networks, such as authentication, security, billing, and centralized network management. While Wi-Fi already has many of these attributes, standards bodies and initiatives like Hotspot 2.0 are working hard to scale them to become robust and seamlessly integrated across numerous disparate networks. There are already millions of access points in homes, businesses, and public spaces; a broad and pervasive network will be necessary to make Wi-Fi a truly viable complement and alternative to mobile networks. This means not only extensive build-out of national networks, but agreements and mechanisms to allow roaming across both national and international Wi-Fi networks.

Creating Winning Strategies

The rapid evolution of Wi-Fi and its critical importance to the architectures of next-generation wireless access networks present numerous business opportunities—and challenges. Whether they are challenges or opportunities depends on who you are and the point from which you are starting. Different operators have different inherent assets (such as existing networks, access rights, systems, and relationships) and strategic objectives (such as cost reduction, churn management, and new revenue generation), depending on their core business. Strategies will also differ greatly depending on the nature and maturity of the

local market—for example, the highly developed Wi-Fi market in the United Kingdom versus the embryonic market of 8,000 public hotspots in India.

Given this business and market diversity, Cisco IBSG looks at the implications and actions related to developing a successful Wi-Fi strategy in terms of three different types of service providers.

1. Mobile Operator

As builders and operators of services on traditional mobile networks, mobile operators typically have no Wi-Fi network of their own, or very limited Wi-Fi capability. The primary business model for mobile operators is cost reduction—using Wi-Fi to offload growing data traffic to avoid significant outlays in new cellular network equipment. A secondary model might be offering a lower-cost connectivity alternative to mobile data for nomadic devices.

Key considerations for mobile operators include:

- **Strategic positioning:** Do you see Wi-Fi as a complement and work to integrate it into your network and service offerings? Or, do you see it as a competitor, threatening to strand your investments in LTE and additional network build-out?
- **Network rollout plans:** Review how Wi-Fi integration and data offload affect your network investment strategies and the speed and locations in your LTE rollout plans.
- **Pricing:** Do you want to use pricing to encourage Wi-Fi offload at the risk of lowering data revenues? Or, do you want to design pricing plans that encourage coexistence of the two networks?
- **Build vs. rent:** Do you want to build your own Wi-Fi network as part of your offload strategy, or would you like to rent capacity from a wholesaler? How can you build capacity fast enough to ensure a seamless customer experience?

2. Wi-Fi Network Provider

As builders and operators of Wi-Fi networks, either in public hotspots or through the extension of home and business broadband services, Wi-Fi network providers do not have their own mobile networks. The primary business models for these providers are (1) selling wholesale access to mobile operators for data offload, and (2) selling access and value-added services, such as advertising and data analytics, to retail hotspot owners. Operators that offer fixed broadband access to homes and businesses could also use Wi-Fi as a churn management tool and sales differentiator. A secondary business model might be creating an alternative, lower-cost “mobile network” to obviate the need for 3G/4G connectivity in nomadic devices.

Key considerations for Wi-Fi network providers include:

- **Network build-out:** Aggressively continue to build out your network to maximize coverage of highly trafficked areas. In many countries, there will be a “land-grab” as providers fight for prime real estate to locate hotspots.
- **Manage strategic conflicts:** Set clear business objectives and seek technical and operational solutions to manage inevitable conflicts between the retail business, where local sign-ins and advertising are important, and wholesale businesses, which value seamless authentication and hand-off between mobile and Wi-Fi networks.

- **Partnerships and federations:** Work with other network providers to solve national and international roaming challenges by creating an effective federation of major Wi-Fi networks throughout the world.
- **New revenue opportunities:** Identify new revenue-generating opportunities through such things as embedding easy access to your Wi-Fi network in key nomadic devices; providing advertising and customer insight services to retail hotspot owners; augmenting applications with location services; and charging for premium services and international roaming.

3. Integrated Provider

As large telecom providers that build and operate both mobile and wireline broadband networks, these operators typically have their own Wi-Fi networks, although the extent of these networks varies widely. The primary business model for integrated providers is to use Wi-Fi for offloading data traffic from their mobile networks to reduce cost, manage churn, and differentiate their fixed broadband offers. Integrated providers have the opportunity to effectively bundle Wi-Fi and mobile access to provide users with an effective solution that optimizes price and experience for their specific access devices and mobility needs.

Key considerations for integrated providers include:

- **Bundle with broadband:** Bundle Wi-Fi (both in the home/office and in public hotspots) as part of the broadband solution to manage churn, and to enhance and differentiate the offer from those of other broadband and mobile providers. Actively market and promote the offer to customers.
- **Integrate with mobile:** Develop joint offers, pricing plans, and technical solutions to allow seamless integration and better traffic management and optimization between Wi-Fi and mobile networks.
- **Use core capabilities:** Extend your capabilities and experience in billing, customer care, authentication, and security to create “carrier-class Wi-Fi” across your Wi-Fi network and your partners’ networks.
- **Build vs. rent:** Aggressively continue to create a network to maximize coverage of highly trafficked areas. Carefully consider the network expansion options of building your own Wi-Fi network or renting capacity from a wholesaler.

A New Chapter for Mobile

Mobile has been highly successful in cutting communications cords and changing the ways we work and play. Once considered the poor cousin to mobile networks, Wi-Fi is now a major element of next-generation wireless access networks. Success for both the industry and users in this future mobile world will be driven by seamless integration—from both a technical and business perspective—of these two networks. One network doesn’t do everything. We need to recognize which network is best suited for which location, device, economic model, and customer need. Wi-Fi is a viable wireless access option to cellular. The explosive demand for mobile connectivity means that there is more than enough business to go around. Success will depend on the coexistence of traditional mobile, Wi-Fi, and other next-generation wireless access technologies. Wi-Fi does not represent the death of mobile, but it is the beginning of a new chapter for this revolutionary industry.

For more information, or to discuss Wi-Fi strategies for your business, contact:

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Endnotes

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More Information

Cisco Internet Business Solutions Group (IBSG), the company's global consultancy, helps CXOs from the world's largest public and private organizations solve critical business challenges. By connecting strategy, process, and technology, Cisco IBSG industry experts enable customers to turn visionary ideas into value.

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