

Access of Content to Mobile Wireless: Opening the “Walled Airwave”

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1 Introduction

As wireless communications progress, they encounter as well as create new barriers to openness. This chapter will discuss the problems of access by content providers and portals to wireless networks.

Openness is more than competition. Competition means the ability of companies to contest each other and to seek customers' business. This can result in efficiency and enhanced consumer welfare. But it can also result in a competition among bundled product packages instead of competition on a product-by-product basis. Openness, on the other hand, means the ability of competitors to access consumers directly rather through their own rivals. This is particularly an issue in network industries, and has been a constant theme of regulatory battles for more than a century. In telecommunications, product and service markets were closed to competitors for a long time. For example, rival equipment makers existed domestically and internationally but could not reach customers of AT&T's network.

Telecom networks were opened first to customer equipment. Then, openness reached long distance, international service, network equipment, and local telecommunications. It has now been partly extended to Internet service over cable TV networks. But it has not yet reached wireless communications. Here, competition has been fostered but not openness. To the contrary, most trends of wireless policy have been in the opposite direction. This has direct implications for the access of content.

2 The Problem of Vertical Integration

Mobile communications are becoming the front-line communications device for most people. After the attacks on American cities on September 11, 2001, it was used from airplanes, from under the rubble, and as a substitute for congested landlines. Wireless is moving into Internet access, transactions, and media content.

The major problem with the emerging wireless environment is that it is vertically integrated in ways that have become unthinkable for other media. Could one imagine a telephone carrier that can limit user access only to its own Internet portal that can select the accessible websites that can control the type of telephone equipment its users are attaching, and the software that these users are downloading? These limitations have not been particularly noticeable in the past, where cell phones could be thought of as some kind of advanced cordless phone for the car. But cell phones are now becoming much more than that, more like computer and media terminals on the go, and for more people. (A similar type of emerging issue is the access to interactive digital TV.)

The main characteristic of the wireless business is that the customer is a contractual subscriber who is served vertically by a wireless carrier that provides a full set of services. The basic components of a wireless operation are graphed in the following:

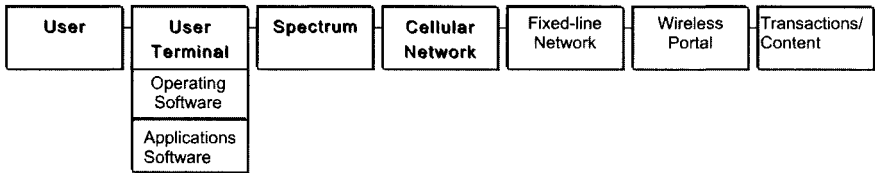


Figure 1: Components of wireless carrier’s services

The user reaches his carrier via his terminal (handset) and the carrier’s allocated frequencies. The call is then routed via a fixed network to the recipient. More recently, this has been extended to route Internet-style communications to a wireless portal that links into transactions and content.

The key component to this system is the spectrum allocation. It enables the carrier to control downstream the terminal equipment and access of a subscriber, and leverage this position of “owning the customer” upstream to the other steps of this chain.

In consequence, we are quite used to the notion that the carrier:

- Controls the access to a wireless portal, its content and features, of the providers linked by that portal, and of the placement of these links

- Selects, markets, and approves the customer handsets and connects it to its network
- Provides, selects, and adopts many of the features, capabilities, and content resident on the handset
- Provides software-defined functionalities on the network
- Selects and approves services resident on the network and provided by itself or by third parties
- Operates the wireless portion of the communications path
- Operates or provides the local fixed line distribution
- Operates or selects the long distance and international carrier
- Selects, for areas in which it does not provide service, a partner mobile carrier that services the subscriber, at rates negotiated and billed by itself

There is nothing wrong with a carrier offering all of these components in a bundled fashion. However, one can readily recognize good old friends, issues that have bedeviled fixed line telephony and cable television:

- Selectivity over content, which would be particularly troubling as the wireless medium becomes a mass medium with audio, text, and maybe video
- The reduction or lack of customer choice in applications and content inherent in a vertical integration with no or limited alternatives
- The reduction in innovation of service provision due to the closed nature of the applications and software that can be offered by third parties
- The absence of choice for customers to use, where more advantageous, alternative wireless arrangements are possible such as wireless LANs, other carriers for roaming, or stronger signals of another carrier
- Market power with respect to vendors of m-commerce, and requirements on such vendors to become business partners
- Restrictiveness in the inter-carrier transfer of instant messaging.

These problems will now be analyzed in greater detail.

3 The Problems of Wireless Non-Openness

3.1 Closed Portals Reduce User Choice

Under the presently evolving system, users reach a wireless portal, from where they can be connected to a variety of other sites. The selection and placement of these links, however, is under the control of the carrier. Other portals might be accessed, but that requires additional clicks. This situation is very similar

to the one discussed for cable television's access to portals other than those of the cable company or its partner. These issues, subsumed under the term of the "walled garden", are well known and require no recapitulation. Virtually the same arguments on both sides apply also to cell phone access to portals, and through them, to the broader Internet. It should be noted, however, anticipating the conclusion of this paper, that they are much easier to resolve for the wireless medium.

3.2 Transactions and Content are Limited

The wireless carrier's portal is not a common carrier. Hence, the selection of websites, e-vendors, and content providers is entirely that of the carrier. Its selection would be based on its own economic, cultural, and political considerations. Being a selector, it would also incur some legal liability, which would further increase caution.

3.3 The Usefulness of User Equipment is Limited by Closed Operating Systems Software

Beyond the question of whether multi-services equipment can be licensed and connected is the question of control over the nature of the terminals themselves. As handsets become smarter, they begin to resemble small computers. To function, they incorporate operating system software.

As wireless networks begin to offer increasingly higher-level services, the question of who may load what applications onto a handset, and what network-based service interfaces these applications may access becomes important. Is a user restricted to only the applications that are offered by his primary service provider, or may he load other applications? Furthermore, can these applications have full access to the functions of the network and the handset?

3.4 Reduction of Choice Among Cellular Service Providers

Currently, cell phone users enter into a service agreement with a single carrier. That carrier accepts all of their calls or reaches them in the case of incoming calls. Where the user is outside the service territory of the carrier, the user is serviced by another carrier in a "roaming" arrangement. The roaming-partner carrier is selected by the primary carrier in a com-

mercial agreement (a “preferred” roaming arrangement). The call could also be picked up whichever carrier is around (a “general” roaming partner, typically a set of carriers, with prices set industry-wide). The third type of arrangement is based on signal strength, where the roaming goes to the strongest signal in that area, unless there is a primary or general roaming agreement, which would override. Whatever the arrangement, the user has no choice in the matter, in contrast to the arrangement in GSM countries, where a caller can select the roaming carrier and override its primary carrier’s choice.

In the U.S., this choice is further limited by the different wireless protocols used by carriers. A user of a carrier operating on the CDMA standard cannot roam, in technical terms, on a TDMA or GSM carrier. A limited number of handsets can use both TDMA and GSM since they are related. But on the whole, the ability to switch to a carrier using another standard is minimal. In contrast, in GSM countries users can easily take their handset to any other carrier.

Furthermore, it is impossible to subscribe to more than one carrier using a single handset. For example, if a user spent much of his time in both New York and Atlanta, and no company serviced both cities, he might want to subscribe to companies in both cities rather than pay expensive roaming charges. However, there is presently no practical possibility to switch between two carriers. In theory, something exists called “dual NAM” that would permit dual-carrier subscriptions. In practice, however, phone inquiries to several major carriers did not reveal the availability of such arrangements. This contrast with the situation prevailing in GSM countries, where user can have the “SIM” cards of several carriers and inserts one of them into the handset when she wishes to use that carrier.

Also in theory, a reseller or reseller group could resell the services of more than one carrier or service type. This assumes that permission would be granted by the carriers whose service is being resold, which is not likely if they refused to permit such choice for their direct customers.

This lack of choice has real implications. Roaming calls are quite expensive, and are not part of the subscriber’s “bucket” of minutes. They are a major moneymaker for carriers.

The main problem here is not technology but resistance to competition. Once a user can switch freely among carriers, where will it end? A user might regularly drive through some areas where the signal of his primary carrier is missing, and then select another carrier that performs better. Next, a user might switch to a carrier who offers her the lowest rate during that time period. Soon, the user would be able to engage in “least cost routing”, LCR, as in “always best connection” (ABC). This means that there might be automated

competition for every call, as opposed to the present system of competition for the subscription.

3.5 Absence of Choice Among Different Wireless Services

In the past, cellular phone service constituted an end-to-end service, separate from those of others. However, other wireless services are also being offered. Paging has long been a widespread service, and smart paging via narrowband PCS has gained increasing popularity. An example is the BlackBerry pager for always-on email. Some such services are being offered on cell phone terminals, but only using its cell phone frequencies, as opposed to being able to switch to the service provided by another paging company. Furthermore, a cell phone terminal could conceivably be used as a terminal for a cordless phone at home or at the office, directly without going through the wireless network. Similarly, it could be used as a “walkie-talkie” between several other cell phones in a neighborhood, again without going through the actual network. (This is a popular feature provided by Nextel for its own subscribers). It could be a terminal to the type of data services pioneered by Ricochet. The cell phone terminal could also bypass the wireless network through wireless local area networks (WLANs). Or, the cell phone terminal could be used as a radio receiver for broadcast programs, a scanner for police frequencies, an advanced pager, a ham radio, marine radio, and so forth. It might be used in a peer-to-peer fashion, by passing carriers altogether. It is time to think of what we now call the cell phone handset as a future general multipurpose wireless terminal. Not as an end point of a specific wireless network but as the starting point to use applications, using whichever wireless system fits best.

Such multipurpose terminals would be a threat to most cellular carriers. To see that, let us consider the case of public and private Wireless LANs (often called WiFi networks) that are emerging as so called “hot-spots” on college campuses, airports, office parks, coffee house chains, apartment house complexes, and planes and trains. These networks, operating on unlicensed spectrum, already reach wireless speeds of up to 45 Mbps two-way communications, and can service, in principle, any type of wireless device, whether laptops, PDAs, pagers, or mobile phones. They follow the 802.11b standard advanced by Apple, or the Bluetooth standard (whose range is more limited), or the emerging HiperLan2 standard.

These WLANs are expanding into short-range “home networks” as well as wide area wireless Internet service providers (WISPs). These advantages are cheap and easy installation, use of unlicensed spectrum (i.e., without the cost

and delay of a licensing process), and flexibility to change to the next level of technology. Entry barriers are low and could include hotels, colleges, airports, shopping malls, and so on. Disadvantages of WLANs are lower security, the need to coordinate billing and roaming, and the low staying power of new entrants. (Two early entrants – MobilStar and Ricochet, have gone out of business. The latter aimed at a national coverage.)

At the same time, the cellular carriers’ 3G plans are also being contested from below, from upgrades in the second-generation technology known as GPRS, EDGE, and others, generally called “2.5 G.” These technologies raise the data rate for mobile operations to speeds not greatly lower than those realistically expected by the third generation UMTS.

Hence 3G operators are in a bind: They often paid high prices for their new licenses, their average revenue per user (ARPU) is lower than in the past due to competition, and their new data business might be crippled by a combination of WLANs and 2.5 G. Such a combination with the flexibility of software-defined radio technology and unlicensed spectrum, might give use to the next generation of wireless—“4G”—that would be characterized not so much by superior technology but by more flexible one.

3.6 Control Over the Approval of Handsets Reduces Innovation and Choice

The carrier’s business calculus on what equipment to approve is based on a variety of factors. Since in the U.S., in contrast to Europe or Japan, the carrier rather than the consumer buy most handsets, low cost is a major factor, as would be serviceability, ability to maintain a limited inventory, and independence from a single source. In addition to reducing the choice available to users, this system also makes manufacturers somewhat dependent on large carriers. The handset makers also tend to be major suppliers of network equipment. They would not lightly put used equipment into the marketplace that would be disfavored by the carriers as threatening their basic business by facilitating access to services such as WLAN that compete with the business of their best customers.

The absence of openness resembles the “walled garden” arrangements of some Internet portals provided by cable companies. Correspondingly, we can call this arrangement the “walled airwave” system.

4 Implications for Public Policy

The previous section has identified the potential for real problems. But the recognition of such issues does not mean that regulatory approaches are needed. A vigorous competition among mobile carriers could overcome most issues and generate unbundling through market forces. At the same time, the ability to exercise market power with respect to mobile commerce providers or wireless LANs might be common to all mobile providers and more profitable than a more open system. In such a case, market forces might not lead to unbundling.

The knee-jerk response to the problems identified in this paper is that competition will take care of it. But suppose that carriers would be consistently worse off by offering consumers the choice of moving easily around to other carriers or service providers. Such competition would reduce prices and profitability. It would, on the other hand, grow the market. But it is quite likely that each carrier would be better off servicing a less competitive slice of a smaller market, rather than engaging in greater competition in a larger market.

It is not clear why a carrier A would be the first to offer such choice to its customers. After all, it would provide an exit to its own customers, without a potential compensating gain from the customers of the other carriers B and C. The main reason would be to hope for enough users of B and C to switch their subscriptions to A in order to have the choice of not using A. This can hardly be a strong selling point. Furthermore, any choice requires the consent and cooperation of B and C, which might not be forthcoming once they realize that they are opening the door to a mutually destabilizing competition. They will be concerned with reputation effects if they are blamed in users' mind with poor performance caused by an element not under their direct control. And they might be able to use bundling as a way to price discriminate, as George Stigler has pointed out in a different context. The likelihood of oligopolistic behavior within a small group of carriers is high. As the number of competitors shrinks, each has less to gain and more to lose by maverick behavior. It is also an inhibitor for any software developer to take initiatives for new applications if the market is largely closed, and this further reduces the attractiveness of any non-conforming behavior by a carrier.

Where market forces do not work, would regulation? Let us look at several potential points of intervention and evaluate their need.

A schematic view of an unbundled wireless network environment is provided in Figure 2. It shows, at each stage of the chain of wireless provision, alternative providers. We conclude that only one of simple policy—the openness of the terminal equipment to access multiple providers of wireless services and providers—is critical. A subsidiary second opening—spectrum—supports such policy.

4.1 The Separation of the User Equipment (UE) from the Carrier

Such a policy would amount to a *Carterfone* policy for users’ wireless equipment. Following that decision in 1966, the FCC permitted users to attach equipment chosen by themselves to the telecom network. While the carrier could still offer and market its preferred equipment, it could not exclude other equipment, as long as it conforms to certain technical specifications pertaining to the RF transceiving function and non-discriminatory industry specifications for air interfaces standards. These specifications could not close equipment third-party applications or access to other network protocols offered by other types of providers, as long as it conforms to the FCC’s software defined radio rules.

While a fully bundled service could be offered by a carrier as before, the carrier could not prevent a user from selecting, for any given call, another wireless service provider or using the equipment for other communications purposes.

The significance of such arrangement is that equipment will be offered by the market that adds features, and, more importantly, permits a user to select service providers depending on circumstances. For example, a user in a shopping mall, campus, office building, or airport could connect to a wireless LAN. A user encountering a circuit busy could switch to another carrier. A user seeking to receive synchronous music, radio style, could do so by accessing a specialized broadcaster.

This choice would reduce the need for most other access requirements, since the user would not be tied to a single carrier with significant costs of

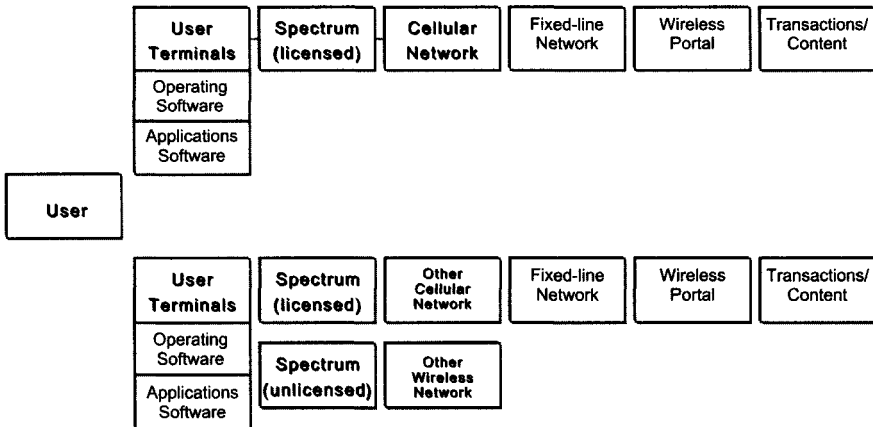


Figure 2: Schematic view of an unbundled wireless network environment

switching to another. This is partly embodied in the GSM standard which provides some user selectivity over carriers, although the approval of such alternatives remains with the primary carrier, which also handles the billing.

This approach would be similar to that adopted by the FCC for CPE following the *Carterfone* decision in 1968. It followed Cassandra warnings of impending network chaos, but has worked spectacularly well.

4.2 Access to Unlicensed Spectrum

The key source of leverage for carriers is the high entry barrier for new and future entrants in service provision, due to the spectrum auctioning system with its advance payment feature. Given the difficulty in freeing additional spectrum and the high cost of acquiring it, it seems unlikely that there would be new entrants emerging to challenge the reduced group of carriers. Therefore, government should additionally provide adequate spectrum on a license-free basis, with users and service providers paying for usage rather than for ownership, in the way that automobiles pay for the use of highways. This has been developed in detail by the author in other papers.¹ Once such spectrum is available, and once users' terminals can access service providers such as WLANs operating on such spectrum, users will not be constrained by the limited choice of maybe four cellular carriers that could still collectively be restrictive.

4.3 Access to Alternative Wireless Portals

The third access issue is that to the wireless portal. The issues here are similar to those discussed for the cable industry. The similar arrangement would mean that the wireless carrier would let the user pre-select its primary portal, or that several such portals would be accessible at no extra effort, or that the two upper layers of the carrier portal would be open to third parties. This approach would mirror the open access of the Internet, and the approaches now being applied to Time Warner and considered by the FCC in its proceedings.

Content openness may be the easiest type of openness to consider since it is essentially a browser level openness. The question can be reduced to whether the user can enter an arbitrary URL to a network portal to access content (independent of any business deal between the wireless provider and particular content providers) and whether browser plug-ins can be created and downloaded to render the resulting content if required. This issue is analogous to the walled garden discussions that have occurred in the wired Internet.

This problem would largely go away if the users could also access, through their handsets linked to other carriers and wireless providers, other portals and websites.

4.4 Openness of the Carrier’s Network

The fourth element of openness relates to services offered by third parties and requiring presence in the wireless network. The options are either to keep wireless networks closed to third parties, or total openness, resembling a common carrier access for third party software applications, or a type of equipment collocation that exists in telecommunications. Here, too, the ability to access alternative wireless carriers through flexible handsets would be enough to deal with this issue.

5 Conclusion

The focus of government’s policy has been to provide wireless carriers with choice—in the utilization of the licensed frequency, in the technical specifications of its service, in its pricing, and so on. There has been no similar orientation towards choice of the users, for content and transactions. The implicit notion was that by establishing rival carriers users will be well served. That strategy certainly goes a long way. But carriers are likely to resist offering consumers the choice of moving easily around to other carriers or service providers.

The conclusion of the analysis is that the key point of openness, and arguably the only one needed, is that of *openness of user equipment*. With this openness achieved, the user would have alternative avenues to spectrum, content, portals, applications, software, and so forth. A secondary policy would be to assure alternative wireless pathways such as WLANs by providing an adequate amount of unlicensed spectrum.

Why is all this important? The overall goal of the openness approach described above is to establish for the wireless and wireless content environment the same dynamism shown in the Internet with its open access terminals encouraging hardware and software innovation and applications. Right now cellular telephony is a dynamic sector, mostly based on the growth of penetration. Soon, however, this growth will plateau as universal wireless connectivity is being approached. At that point, we need the impetus for further innovation that a more open system provides. For the carriers, the overall positive impact in terms of traffic generation may well outweigh some loss

of control. For users, service providers, and technology developers, the advantages of openness might be significant.

Communications policy has fared best when it puts its faith in the dynamism of the periphery of the network, instead of seeking to strengthen the ability of the network core to dominate. Wireless is no exception. And the mediocre results of policies focusing on the core, in contrast to those for other parts of the communications environment, suggest that a reorientation is in order. With it we can leapfrog the “3G” model with its carrier-orientation to a “4G” model patterned after the Internet, and overcome the “walled airwave” problem.

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Endnotes

- ¹ See Noam, Eli M. (1998). Spectrum auctions: Yesterday’s heresy, today’s orthodoxy, tomorrow’s anachronism: Taking the next step to open spectrum access. *The Journal of Law & Economics*, XLI, Part 2, 765-790.

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