



Consumer Federation of America

THE PUBLIC INTEREST IN OPEN COMMUNICATIONS NETWORKS

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ISSUE BRIEF

For almost two decades, consumer advocates have been among the leading proponents of open communications networks. Unlike most consumer issues, where price is the advocates' central concern, in the matter of communications and the Internet, their primary focus has been on another aspect of market performance: innovation. They view open communications networks as an environment friendly to innovation driven by consumer choice and decentralized decision-making. Their analyses have demonstrated the benefits of open communications networks in terms of core Internet services, computer development, and broad spillovers into the economy.

This Issue Brief summarizes the public interest in open communications networks by providing an analytic framework for evaluating the impact of open communications. It applies the framework to two critical public policy issues currently being considered by the Federal Communications Commission (FCC or the Commission) and the courts – nondiscriminatory access to telecommunications networks and oversight of services delivered by Internet protocols (IP-enabled services).

A CRITICAL POLICY DECISION

In the last quarter of the twentieth century, the convergence of computers, communications, and the Internet, all deployed under design principles of open architecture, created a digital communications platform that became a uniquely important platform or “bearer service.” It supports a broad range of economic activities in the 21st century digital economy and revolutionized the environment for innovation. Nations, regions, industries, and firms that seized the opportunity presented by the open digital communications platform have enjoyed much more vigorous economic growth than those that did not.

Policy choices that required open architecture and nondiscrimination in access to communications networks played a key role in creating the open communications environment. For three decades the Computer Inquiries of the FCC required open architecture and nondiscrimination in access to communications networks and kept the underlying telecommunications facilities open and available, ensuring that services could grow without

the threat of foreclosure or manipulation by network operators. This constrained the ability of telephone companies to leverage control over the communications infrastructure and ensured a network that was interconnected and accessible to producers and consumers, free from the domination of centralized network operators and not Balkanized by proprietary standards. Open communications networks mirrored and supported the open architecture of the Internet.

After decades of success, policymakers in the U.S. seem to have lost their appreciation for the fundamental importance of the principle of open architecture. Federal regulators have accepted the proposition that the owners of advanced telecommunications facilities should no longer be obligated to provide non-discriminatory access to their networks. Fortunately, although the FCC has repeatedly tried to eliminate the obligations of nondiscrimination in interconnection and carriage, the fundamental policy decisions are still up in the air. Appeals courts have declared twice that principles of nondiscrimination should apply to advanced telecommunications networks. Many regulatory proceedings that will define the architecture of the communications network in the 21st century are ongoing at the FCC or in various stages of litigation.

Thus, the principle of open architecture in communications networks is still in play. A deeper appreciation of its importance remains vital in the policy debate. This paper argues that allowing network owners to discriminate against communications, content, equipment, or applications represents a dramatic change that would render the information environment much less conducive to innovation. The mere threat of discrimination dramatically affects incentives and *imposes a burden on innovation today*.

The case is made for open communications networks by combining two analytic frameworks. The first perspective is provided by the new field of network theory, which pinpoints the source of the benefits of open communications. The second perspective is provided by analysis of network economics. It highlights the positive aspects of network effects and feedback loops. Concerns about network effects that may enhance the market power and anticompetitive behavior of firms dominating critical locations in the platform also need to be raised. By describing the underlying network principles that created the conditions for a technological revolution, the paper endeavors to highlight critical policy decisions that helped to create and sustain the dynamic innovation environment in the narrowband past, which should be embraced for the broadband future.

OPEN COMMUNICATIONS AND THE DIGITAL INFORMATION REVOLUTION

The digital communications platform consists of four layers: the physical layer, the code layer, the applications layer, and the content layer. At the physical layer, cheap, powerful computers, routers, switches, and high-capacity fiber optic cable are the rapidly proliferating physical infrastructure of the digital economy that allows communications at rising speeds with falling costs. In the code and applications layer, a software revolution is the nervous system that enables messages to be routed, translated, and coordinated. Open protocols facilitate communications. Standardized and pre-installed bundles of software applications have allowed the rapidly expanding capabilities of computer hardware to become accessible and useful to consumers with little expertise in computing. At the content layer,

every sound, symbol, and image now can be digitized. As computing speeds, storage capacity, and transmission rates become big enough, fast enough, and cheap enough, it becomes feasible to move huge quantities of voice, data, and video over vast distances.

The technological changes had dramatic economic effects. Supply-side, economies of scale and scope drove costs down. By increasing the number of units and types of services sold, the cost per unit falls dramatically. Demand side economies of scale, known as network effects, are an equal, if not more powerful, source of cost reductions. As more consumers use a particular technology, each individual consumer can derive greater benefit from it. In addition to the direct network effects (direct communications between end-users on the network), larger numbers of users seeking specialized applications create a larger library of applications that become available to other users. As the installed base of hardware and software deployed grows, learning and training can be applied by more users and to more uses.

The nature of information reinforces the technological and economic changes. Information production exhibits unique characteristics. It is significantly non-excludable. Once information is distributed, it is difficult to prevent it from being shared by users. It is non-rivalrous. The consumption of information (reading or viewing) by one person does not detract from the ability of others to derive value from consuming it. It exhibits positive externalities. Information is a major input to its own output, which creates a feedback effect. Putting information into the world enables subsequent production at a lower cost by its original producers or others. Where network effects and feedbacks are direct and strong, they create positive feedback loops.

The effect of the digital platform was driven by the fact that the three major components of the digital platform – the personal computer, the Internet, and telecommunications networks – had open architectures for key interfaces. The architectural interfaces to access the components were available to all potential users and producers on identical terms and conditions. Users did not have to negotiate rates, terms, and conditions or request permission to deploy or interconnect new components or services. Individuals seeking to plug into or develop a component or application for the platform could not be discriminated against. They simply had to conform to an open standard.

Decentralized experimentation by users turned them into producers whose command over increasing computing power created the conditions for a dramatic increase in innovation. The Internet unleashed competitive processes and innovation exhibiting the fundamental characteristics of audacious or atomistic competition. Open communications networks played a key role by allowing experimentation, innovation and commercial activity to flourish rapidly across a broad national and international scope.

A strong commitment to open architecture was critical to ensuring the platform was open. A longer historical perspective on the role of open communications networks in the development of capitalist economies suggests that increasingly interconnected and open communications networks have played an important part in furthering economic growth.

The legal obligations of common carriage and nondiscrimination, ensuring open access to the highways of commerce and means of communications, dates back to the end of feudalism and emergence of capitalism. They have been applied in increasingly sophisticated forms of commerce and communications, from early inns to roads and highways, canals, railroads, the mail, telegraph, and telephone. The FCC's Computer Inquiries were the information age embodiment of these principles.

The commitment to open architecture in public policy went farther. The Internet protocols themselves were the result of a search for a more robust architecture for communications. Having initiated the Internet project based on principles of open architecture, the government's insistence that open protocols be supported, as the Internet moved toward widespread availability, was also an important policy decision.

ROBUST NETWORKS AND TECHNOLOGICAL CHANGE

Emerging network theory helps to explain the fundamental institutional underpinning of the dramatic technological and economic developments associated with the open digital communications platform. Across a range of physical and social sciences, this theory offers a policy-relevant explanation of robust (successful) institutions based on an understanding of the principles of network architecture. The architecture of the network dictates its robustness. Open architecture is a key to multiscale connectivity, the central architectural feature of "ultrarobust" networks. This is also the fundamental characteristic of the digital communications platform that is critical to the new information environment.

Interconnectivity is a critical feature of networks. Robust networks are typified by the formation of links between nodes, with hubs forming bridges that hold the network together. In robust networks, hubs and links form modules. Modules share strong internal ties and specialize in discrete functions, but have weak ties to the rest of the network through bridges. Successful networks grow and establish structures according to rules that foster efficient communications structures. The efficient, robust networks are hierarchical and modular; exhibiting both decentralized and distributed communications traits. This allows experimentation at the periphery, without threatening the functionality of the network. Failure is not catastrophic, since it can be isolated and its impact minimized. Success can be pursued independently because of modularity and exploited quickly because of efficient communications.

Robust networks support rapid and efficient technological innovation. Efficiency in decision-making occurs by breaking down problems and solving them at the "local" level, because local information is the ultimate source of the solution, but local clusters must be modules, possessing adequate resources and autonomy to solve problems. The result is efficient as long as it economizes on the need to flow information up through the hierarchy. Modularity with open interfaces loosens the dependence on simultaneous solutions to multiple problems by supporting implementation at different places and different rates. The digital communications platform exhibits these characteristics in the extreme. It is modular, hierarchical, and distributed. It exhibits dense, multiscale connectivity. It has the characteristics of an ultrarobust network.

The digital communications platform has transformed the very fabric of the innovation process. The open digital communications platform facilitates and accelerates technological innovation by altering the information environment to make distributed solutions more feasible. The digital communications platform became a critical enabling technology, in which interconnection, interoperability, and maximization of available functionality to end-users are essential ingredients for the continued flow of dynamic innovation. The digital revolution allows technical knowledge to be embodied in software and hardware and to be implemented and coordinated with rapid communications over great distances.

Technological innovation has moved outside the firm. As hierarchical modularity in the network replaces vertically integrated hierarchy in the firm, complex digital platform industries have benefited from open network approaches. Smaller innovative firms each pursuing a particular challenge results in greater innovation and technological change. Vertical integration and extreme hierarchical structure lose their comparative advantage; modular flexibility and connectivity gain significant advantage.

The revolution in communications and computing technology combines with the institutional innovation of the Internet to create not only a potentially profound change in the environment in which information is produced and distributed, but it opens the door to greater competition among a much wider set of producers and a more diverse set of institutions. The deeper and more pervasively the principle of openness is embedded in the communications network, the greater the ability of information production to stimulate innovation.

Given the characteristics of the digital communication platform, public policy should favor open interfaces in the platform because of the strong complementarities across a large number of components. Coordination and collective action problems make it difficult to coordinate progress through private transactions. Private interests with strategic assets can “hold up” the advancement of the platform. Open interfaces overcome these problems. In each of the components of the platform, repeated efforts to impose proprietary closure were challenged and rejected. In the telecommunications network and the Internet, public policy resisted closure.

THREATS TO OPEN COMMUNICATIONS NETWORKS

A framework for economic analysis of the digital communications platform must also recognize the potential for new and more harmful types of anticompetitive behavior in platform industries. Platforms heightened the potential for negative, anticompetitive actions by private parties who have a dominant position at key locations of the platform. This also provides the basis for policies to defend the open architecture of the platform. Dominant firms that own and control key layers of the platform may have the incentive and ability to protect and promote their interests, distorting the architecture of the platform at the expense of competition and slowing innovation.

In old economy industries, vertical leverage is exploited by business practices. By integrating across stages of production, incumbents can gain control over critical inputs, which can be withdrawn from the open market, driving up competitors’ costs. This vertical

integration creates barriers to entry by forcing potential competitors to enter at more than one stage, making competition much less likely. Exclusive and preferential deals for the use of facilities and products compound the problem. Vertical integration facilitates price squeezes and enhances price discrimination.

In a platform industry, vertical leverage can take an additional and more insidious form, technological manipulation. Introduction of incompatibilities can impair or undermine the function of disfavored complements. The refusal to interoperate or the withholding of functionalities is an extremely powerful tool for excluding or undermining rivals and thereby short circuiting competition.

The growing concern about digital information platform industries derives from the fact that the physical and code layers do not appear to be very competitive. There are not now, nor are there likely to be, a sufficient number of networks deployed in any given area to sustain vigorous competition. Vigorous and balanced competition between operating systems has not been sustained for long periods of time.

Dominant firms at the physical and code layers have a variety of tools to create economic and entry barriers such as exclusive deals, retaliation, manipulation of standards, and strategies that freeze customers. They can leverage their access to customers to reinforce their market dominance by creating ever-larger bundles of complementary assets. Control over the product cycle can impose immense costs by creating incompatibilities, forcing upgrades, and by spreading the cost increases across layers of the platform to extract consumer surplus. If a firm is a large buyer of content or applications or can dictate which content reaches the public through control of a physical or code interface, it can determine the fate of content and applications developers.

These anti-competitive behaviors are attractive to dominant firms in the physical and code layers for static and dynamic reasons: preserving market power in the core market, preventing rivals from achieving economies of scale, enhancing the ability to price discriminate, driving competitors out of neighboring markets to create new market power, and diminishing the pool of potential competitors. The observable behavior of the incumbent wire owners gives immediacy to the concerns that the physical layer of the communications platform will not perform efficiently or in a competitive manner without a check on market power. Public policy should resist efforts to impose proprietary closure, which would undermine the open architecture of the platform.

THE IMPORTANCE OF ISPs IN THE COMMERCIAL SUCCESS OF THE INTERNET

ISPs are the initial hubs on the periphery of the Internet closest to the end-user endpoints. ISPs played a critical role in the adoption of Internet services by the public. Moreover, because the focal point of change in the Internet revolution has been at the periphery of the communications network, we should not be surprised to find the most pronounced effect of a change in policy there. Certainly the conflict over open architecture has been centered in a battle between ISPs and network owners.

ISPs were generally small operators who tied together the broader population of users. Buying wholesale telecommunications service from telephone companies and selling basic Internet access, combined with a variety of additional applications and services, to the public, they translated the complex technologies that had to be combined to use the Internet into a mass market service. Some of the underlying innovations that the ISPs adapted and popularized had been around for a while; some were very recent, but there were few plain vanilla ISPs, offering only basic access to the Internet.

Local specificity and the importance of the linking and communications functions of ISPs were critical because adaptation requires meeting the needs of a diverse set of users. Thousands of ISPs tailoring services to customer needs supported the rapid spread of Internet subscription and use, but the impact of these ISPs went beyond merely spurring the adoption of Internet service. They opened markets that were neglected by dominant ISPs and forced dominant firms to make services available that they might well have resisted had they not faced the competition.

The competitive pressures brought by small ISPs, and the investment in complementary communications equipment, stimulated by having nondiscriminatory access to the underlying network, represents a general pattern that can be expected to be repeated. In fact, a similar process can be seen in the development of competitive local exchange carriers (CLECs). These entities began by innovating in marketing and customer service, but they also made substantial contributions to the production side of the industry. They have driven innovation in operating support and back office systems, rights of way and collocation, and the provisioning and use of fiber.

Thus, the introduction of competition in a middle or applications layer not only promotes efficiency in that layer, but it may provide the base for launching competition across layers, as well as stimulating investments in complementary assets. It is this competition that is undermined by the closure of the physical layer as the Internet transitions from the open, dial-up communications network to the closed broadband networks being fostered by current FCC policy.

Cable operators have successfully imposed a number of conditions that create discriminatory network access into consumer service agreements or contracts with service providers or have implemented such conditions in the network. Although telephone companies ostensibly have been required to provide access to their advanced telecommunications networks, they have made life miserable for the independent ISPs and CLECs.

ISPs have identified a range of ways the dominant facility owners impede their ability to compete, beyond outright foreclosure. The proprietary network owners impair the ability of competitors to deliver service by restricting their ability to interconnect efficiently and deploy or utilize key technologies that dictate the quality of service. The facility owner can give affiliated ISPs preferential location and interconnection, refusing to peer with other ISPs or to guarantee quality of service to unaffiliated ISPs. Bundling of competitive and noncompetitive services places competitors at a disadvantage. The price charged for access to

the network for unaffiliated ISPs is far above costs and leaves little margin. Consumers pay a price too. The resulting price is too high and dampens adoption.

The results of the closure of advanced telecommunications services are becoming clear. The independent business of buying telecommunications services and selling Internet access service has been all but eliminated from the high-speed Internet market. Throughout the history of the commercial narrowband Internet, the number of service providers was never less than 10 per 100,000 customers. At present, and for most of the commercial history of the industry, there have been 15 or more ISPs per 100,000 subscribers on the open, dial-up Internet. In contrast, there are now fewer than 2 ISPs per 100,000 customers on the high-speed Internet. For cable modem service there is less than 1 Internet service provider per 100,000 customers.

The Internet model has been turned on its head in the closed broadband space. Analysts proclaim critical mass of deployment and wait for the killer application, while they worry about how average users will be induced to adopt services. That was exactly the function of the ISPs, who have been decimated by the denial of access to customers. More importantly, Internet applications did not wait for a subscriber base, they drove demand for subscription. By cutting off access to advanced telecommunications service – the oxygen of the Internet – facility-owners have eliminated competition at the service level. A small number of entities dominating the sale of high-speed Internet access and dictating the nature of its use is the antithesis of the environment in which the narrowband Internet was born and enjoyed such rapid growth. In contrast to the steady flow of innovations and the growth of a large customer service sector that stimulated the adoption of narrowband Internet service by a majority of households, the broadband Internet is a wasteland for innovation.

INTERNET PROTOCOL-ENABLED SERVICES

The definitions of telecommunications and information services in the Telecommunications Act of 1996 fits the four-layered model closely. Telecommunications services are defined by the transmission of data (physical layer) subject to network management capabilities (code layer). Information services are defined by capabilities (applications) and subject to user control (content). The definitions adopted by Congress make it clear that the transmission of data over the telecommunications network on which Internet Protocol (IP)-enabled services rely is a telecommunications service. The plain language of the statute has led the Ninth Circuit to that conclusion twice over the past four years.

In the 1996 Act, Congress made it clear that not every transmission is a telecommunications service and not every application is an information service. The nature of a service is not defined by the technology or the protocols used to manage the network; it is defined by what the service does and how it is offered to the public. Congress rejected the idea that the use of a new technology or the use of a new switching protocol automatically renders a service an information service. In fact, it said quite the opposite.

Under the mantra of deregulation, the FCC has sought to eliminate the public interest obligations of nondiscriminatory interconnection and carriage for the nation's advanced telecommunications networks. By failing to regulate the physical layer, the commission has exposed the vibrant competition and innovation on the Internet to the threat of foreclosure. It has also made it more difficult to deregulate the other layers of the platform.

The fact that the underlying transmission is a telecommunications service does not mean that the application riding on it cannot be a telecommunications service as well. Each of the components must be analyzed separately to determine how to define the service. The Ninth Circuit concluded that a service sold to the public could combine both a telecommunications service for transmission and an information service. It is obvious that a service sold to the public also could combine two telecommunications services. In a converging network, however, lines will be difficult to draw. In the past, the Commission has set out to find indicators of the nature of the service as defined by the nature of the transmission, its management, and function.

Because Congress provided explicit direction that changes in protocols for the purposes of network or service management do not change the definition of the service, the initial attempt of the Commission to deal with these matters relied on the concept of a "net change" in the form of the transmitted message. It used the distinction between the code layer and the applications layer to conclude that a change in the protocol to manage the network does not create an information service. That a transmission begins and ends as a voice call, for example, but is managed by being divided into packets, does not make it an information service. The transmission remains a telecommunications service. Analysis of the relationship to the North American Numbering Plan is also a code level consideration. Reliance on the existing telecommunications addressing protocol is an indicator that the service remains a telecommunications service.

The Commission has examined criteria at the physical layer as well. The issue of whether a physical connection is offered to the public for a fee has played a large role in the cable modem proceeding. Examination of the customer premise equipment (CPE) used is another undertaking. Little or no change in the CPE suggests little change in the service. Similarly, reliance on the public switched network to originate or terminate calls is an area of inquiry. If a transmission never traverses the public switched network, the case that this is not a telecommunications service may be strengthened. The opposite is true as well.

At the applications layer, the question of functionality is central. The heart of the information service definition involves the functions or capabilities that are supplied. Delivery of voice calls in real time is a distinct function. Similarly, in the 911 proceeding, the functionality of providing real-time, two-way communications was a consideration. If a service relies on the public switched network, it is more likely to be a telecommunications service.

At the content layer, the critical issue is the way the end-user interacts with the data. Does the end-user control the content and direction of the transmission? Is there an end-user to end-user connection? How are services marketed to and perceived by consumers (e.g., is

the service marketed and does the end-user perceive the service as a substitute for a telecommunications service)? In the 911 proceeding, consumer expectations played a key role.

Having defined an IP-enabled service as a telecommunications service, the Commission does not have to impose regulation. It can forbear from federal regulation. To the extent that the Commission would like to forbear from imposing public interest obligations on specific telecommunications services in specific geographic areas, it must engage in a full and complete proceeding under Section 10 of the 1996 Act. In order to forbear, the Commission must make a series of findings:

- (1) enforcement of such regulations or provisions is not necessary to ensure that the charges, practices, classifications, or regulations by, for or in connection with that telecommunications carrier or telecommunications services are just and reasonable and are not unjustly or unreasonably discriminatory;
- (2) enforcement of such regulation or provision is not necessary for the protection of consumers; and
- (3) forbearance from applying such provision or regulation is inconsistent with the public interest.

It is noteworthy that the first prong of the forbearance test uses terms from the common carrier language of the Communications Act that seem to target the physical and code layers of the platform. The second prong deals with the applications and content layers.

The Commission cannot forbear regulating voice over Internet protocol (VOIP) services offered by owners of advanced telecommunications network. The advanced telecommunications services provided by telecommunications carriers fail all three prongs of the forbearance test. Unregulated telecommunications service providers will charge rates and impose conditions that are unjust and unreasonably discriminatory. Consumers will be abused and the public interest will not be served.

Whether IP-enabled telecommunications services meet the second and third prongs of the forbearance standard is a matter for analysis. The need for consumer protection regulation arises from the nature of the service provided and the state of the marketplace that provides it (independent of the regulation of the advanced telecommunications service). Necessities tend to receive greater regulatory attention. Sustained and vigorous competition provides the best consumer protection and is the only basis for forbearance.

Presently, both the FCC and the state public utility commissions provide consumer protection through minimal regulation of various aspects of the service transaction. Federal authorities require truth in billing and prohibit slamming. Congress has mandated protection of consumer privacy. State authorities regulate the quality of service and seek to ensure that companies meet minimum financial and managerial standards. The persistence of these regulations reflects the nascent nature of competitive sale of local telephone service and

continuing problems in these new markets. Consumer protection regulation reflects market conditions, not the characteristics of individual companies.

There are certain public goods that regulators might well find will not be provided, no matter how competitive the marketplace becomes. E-911 service is such a public good. Allowing optional participation creates a free rider problem that can ultimately undermine the entire service. It robs the public of the protection of a ubiquitous E-911 service. We doubt that the Commission can find that forbearing from E-911 regulation is in the public interest. Access for consumers with disabilities may be a similar public good. Telecommunications service providers may not find it profitable to serve such customers, no matter how competitive the market becomes, yet, in pursuit of universal service, society demands that they be provided services that are “readily achievable.”

CONCLUSION

The open architecture of the digital communication platform is powerful, but fragile. Open communication platforms hold a special role in the “new” economy. An open and accessible physical layer is critical to the value creation in the platform because it promotes a dynamic space for economic innovation. The true value in the network arises from the creative exploitation of functionalities at the higher levels of the platform.

Arguments against the obligation of nondiscriminatory interconnection and carriage misread the history and incentives of owners of the physical facilities and they misunderstand the value and role of the digital communications platform. It has the unique characteristic of being both a bearer service that affects the ability of many industries to function, as all transportation and communications technologies do, and a general purpose, cumulative, systemic, enabling technology that alters the fundamental way in which numerous industries conduct their business and create technological progress. It is electricity, the railroads, and the telephone rolled into one.

Current arguments against obligations to provide nondiscriminatory access are inconsistent with centuries of legal practice. Obligations of nondiscrimination (e.g. common carriage) were born with and are part of the DNA of capitalism because they facilitate and expand commerce. Monopoly ownership of the means of communications is not now, and never has been, a necessary legal condition for common carrier status. The existence of intermodal competition in other industries did not eliminate the obligation for nondiscrimination. Public roads competed against privately owned canals, but they both were subject to common carrier obligations. Private railroads competed with canals and roads, and they all were subject to common carrier obligations. Telegraph, wireline telephone, and wireless all are common carriers. As we have layered alternative modes of communications one atop another, each using a different technology, each optimized for a somewhat different form of communications, we still impose the common carrier obligations to ensure access.

The empirical record shows that even oligopolistic competition for a critical infrastructure industry will leave far too much rent and control in the hands of the network owners. After repeated efforts by telecommunications facility owners to assert control over

access to the Internet, it is hard to imagine they will willingly adopt an open architecture. The leverage they enjoy in a blocking technology and the interest they have in related product markets disposes them to maximize profits by maximizing proprietary control over the network. In so doing, they can reduce the competitive threat to their core franchise services and gain advantages in new product markets. Facility owners demand a level of vertical control that creates uncertainty about future discrimination, whose mere existence is sufficient to chill innovation.

What is clear, then, is that maintaining an open communications platform for advanced services is in the public interest because only such an obligation can ensure a vibrant, high-speed, next generation of the Internet that will drive innovation, provide a greater flow of information, and have a positive impact on the economy and society. Given the nature and role of networks, policymakers should reconsider and reverse the decision to allow proprietary discrimination to undermine the open architecture of the digital communications platform. The role of regulation should be to ensure that strategically placed actors cannot undermine innovation at any layer of the platform. This is best achieved by mandating that the core infrastructure of the communications platform remain open and accessible to all.