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## The State of the Debate on Network Neutrality

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The debate over “network neutrality” has recently emerged as the single most important communications policy issue—at least within the United States—that is now being debated around the world. The resolution of this debate may greatly influence what applications and content are available to Internet users, which business models are successful for service providers, which modes of social communication develop, and which technical designs are effective. As applications move to become Internet Protocol (IP)-based, the reverberations will also reach those sectors that build on or compete with the Internet, including the telephone, television, radio, and electronic commerce sectors. The magnitude of this issue demands careful consideration by policymakers. The papers in this special issue can serve as a valuable basis for such consideration.

While network neutrality has been defined many ways that emphasize different goals, a central component of network neutrality concerns the extent to which providers of Internet services should be allowed to favor some traffic or users over others, perhaps affecting what content, applications, or devices are used on the provider’s network. Much of the debate has surrounded the provision of “last-mile” connections for broadband Internet service, such as DSL or cable modem service, but this debate has also spilled into other parts of the Internet, and even other communications systems such as cellular networks.

The origins of the debate have its foundations in twin regulatory and technological developments. From a regulatory perspective, it is worth noting that Neutrality principles were never enshrined in law or regulatory practice. However, the FCC did rule that the underlying transmission components which were required for narrowband ISP service were a “telecommunications service” and so subject to regulation and had to be made available to all on a non-discriminatory basis. In the broadband era, the FCC faced the

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question of how to classify the new cable modem and DSL services. The FCC in its *Cable Modem Order* [FCC 2002] declared broadband service over cable to be an "information service" and thus exempt from the telecommunications regulations. In the "Brand X v. FCC" decision, the Supreme Court upheld the FCC's order in 2005 and the FCC swiftly followed with a ruling that DSL service was now also an information service. We thus entered a new regime in which no one knows what the legal limits of discrimination or contracting practices, priming the Net Neutrality debate.

In addition over recent years, advances in technology meant that new types of packet prioritization and blocking based on, for example, the type of content would become more practical [PEHA], thus setting the stage for discussing a wider range of putative possible discriminatory models before they emerged in practice.

Given the stakes, it is not surprising that the net neutrality debate has become highly politicized, with advocates on both sides marshalling one-sided arguments to influence policy in their favor. While such advocacy is hardly new, the technical complexity of controversies like network neutrality make it difficult for policymakers to define and frame the issue, much less identify an appropriate solution that reconciles the conflicting interests [MORGAN]. Not only are the issues complex, but also inherently interdisciplinary; there are aspects of the debate that require depth of knowledge in Internet technology, market economics across multiple industry sectors, antitrust law, and more. As a result, we see a high stakes game in which stakeholders seek to redefine or obscure the issue to favor their own position, while policy-makers struggle to make sense of the apparent contradictions.

The debate is further complicated by the fact that network neutrality can be addressed (through action or a commitment to inaction) in many different government bodies, each of which is acting separately. Within the United States, for example, this is a legislative issue that has spawned many bills before Congress [BILL1, BILL2, BILL3, BILL4, BILL5, BILL6], and is potentially a key part of any re-write on the 1996 Telecommunications Act [ACT] which had little to say about the Internet. Within both the U.S. Federal Communications Commission and the U.S. Federal Trade Commission, Net Neutrality has been seen as a regulatory issue, spawning various reports and proceedings [FTC, FCC]. Within the U.S. Department of Justice, it is an issue of antitrust. At root, the debate is about the future of regulatory policy for the communications sector as we move toward a post-convergence world where legacy industry boundaries and regulation of cable television, broadcasting, and telecommunications need to be reconciled with the challenges of competition among broadband platform services, based on the Internet. It engages questions of what sort of new (if any) legislative rules are needed to protect open access (however it is defined) to the Internet, and which regulatory agency ought to be responsible for implementing our National communications policy.

The goal of this special issue is to provide a snapshot of the current debate, as seen from the perspectives of 19 preeminent thought leaders on this issue. This issue is a collection of papers from respected academics with diverse views, and diverse expertise. Of the 15 papers that follow, five are written by engineers [CLARK, PEHA, SICKER, CROWCROFT, JORDAN], four by economists [CAVE, BAUER, FAULHABER, HAHN], four by lawyers [FRIEDEN, CHERRY, WU, YOO], and from co-authors of diverse

expertise [LEHR]. This issue will not present a consensus solution, but we hope it will shed new light on the issue, including complexities that are often absent in more public forums.

Perhaps the clearest conclusion when viewing all of these papers is that the issue of network neutrality is more complex than the public debate reported in the trade and popular press might lead one to believe, and that those who understand and acknowledge these complexities tend to be in greater agreement than the stakeholders. Most papers in this special issue are nuanced. Even those who are inclined to be in favor of network neutrality regulation recognize danger in going too far. At the same time, most of those who are inclined against network neutrality regulation recognize danger in a world with no regulatory protection for open access. The authors generally recognize that some differentiated traffic handling (AKA non-neutral treatment of packet data) may be desirable to reduce "bad traffic" like viruses and Distributed Denial of Service (DDoS) attacks, while the need to protect end-users from an abuse of market power *may* provide a valid basis for restricting providers' practice of discriminatory traffic handling. However, the authors differ with respect to the extent to which they view market power as an issue for Internet services, and the appropriate form of regulatory policy, even if abuses are perceived to pose a valid risk.

The papers collected here also make clear that that further discussion and research is required before broad consensus will be possible. An immediate barrier to progress is the lack of a consistent definition of network neutrality among these papers, which demonstrates both the scope of the issues included and the lack of consensus as to which problems/potential solutions are most important/likely to be effective. As a result, authors sometimes talk past each other. For example, the issue of vertical integration is often raised in the public debate on network neutrality. This has prompted some authors to make extensive arguments that vertical integration need not be harmful to consumers [YOO]. Others have argued that even if vertical integration is banned, this does not protect consumers from harm, so vertical integration is merely a secondary issue [PEHA]. Until consensus is reached on whether vertical integration is central to network neutrality, it will be difficult to reach consensus on the best policy. At the same time, other authors seem to believe that the decision about whether to regulate should depend more on the likely impact on innovation [BAUER], the risk of foreclosure by last-mile providers [FAULHABER], or oligopoly rents in upstream markets [PEHA] rather than on vertical integration.

While the network neutrality issue is framed in a variety of ways, discrimination is a common component. Discrimination may take many forms, from outright blocking to complex pricing strategies. Several network neutrality bills before the U.S. Congress would severely limit the extent to which broadband providers could adopt these strategies. Sometimes, these bills are justified as a defense of the traditional end-to-end design principle that has played an important role in the Internet's evolution [BLUMENTHAL]. Perhaps in response to such policies, several authors argued at length that discrimination can be beneficial [PEHA, JORDAN, FAULHABER, LEHR, SICKER]. Moreover, some argued that it is not appropriate to characterize today's Internet as entirely consistent with the end-to-end principle and/or entirely free of discrimination [JORDAN, CROWCROFT, PEHA, HAHN]. The majority of papers in this issue argued that the more extreme forms of network neutrality regulation would be counterproductive in some way [JORDAN, PEHA, YOO, BAUER, CROWCROFT, FAULHABER, HAHN, SICKER, SIDAK]. Opinions differ on less extreme versions.

Many papers discuss potential risks if network neutrality regulation is not adopted. Concerns varied considerably. These included the possibility of oligopoly pricing [PEHA], lack of availability of certain services [WU], reduction in innovation [BAUER], or impediments to free speech [CHERRY, PEHA]. While most would view these results as undesirable, opinions differed greatly on the likelihood that such undesirable outcomes have occurred or will occur under present market and regulatory conditions.

Opinions also differ on the extent to which policymakers should act proactively or reactively. Some believe that no regulatory action is appropriate unless and until there is clear evidence of harm [FAULHABER, YOO, HAHN, SIDAK]. Others argue that failure to act in advance may allow incumbents with market power to consolidate such power [WU] or result in wasteful investments in a potential net neutrality "arms race" [LEHR]. Others argue that regulatory uncertainty while waiting for such evidence can deter investment, and that uncertainty can be reduced if a regulator describes behaviors that will not be prohibited along with behaviors that will be prohibited [PEHA].

As shown from the two papers produced by British authors [CAVE, CROWCROFT], the issue of network neutrality is of interest outside the United States, but it is framed quite differently. This stems in part from diverging approaches to unbundling in the U.S. versus the UK and the rest of Europe. Since the *Brand X* Supreme Court ruling [BRANDX] and subsequent actions by the U.S. Federal Communications Commission, U.S. policy has emphasized facilities-based competition and largely abandoned efforts to force owners of infrastructure to share with rivals. In contrast, many such provisions exist in Europe, so there are more alternatives to network neutrality policies.

Within the U.S. market, opinions differed on the extent to which market competition can achieve the most likely goals of network neutrality legislation. Some believe that strong competition already exists [HAHN, YOO]. Others argue that network neutrality is a problem even in markets like cellular where there are a number of competing providers [WU]. In the middle, there are those arguing that network neutrality problems stem largely from excess market power, and the extent to which rigorous competition will emerge in the broadband market is unclear [PEHA, LEHR]. Some further argue that the existence of multiple providers will help not just because they compete, but because this makes end-user provisioning possible [LEHR].

Should the market be insufficient to prevent harmful behavior, opinions also differ on which regulatory agency or rules may be most effective in addressing such challenges. Some appear to favor ex ante solutions [WU], while others favor ex post solutions [FAULHABER, HAHN]. If ex post solutions are needed, some believe that current antitrust laws are adequate [HAHN]. Others believe that antitrust laws are somewhat ambiguous in light of recent Supreme Court rulings [YOO]. Finally, if there is to be a new policy, that policy could be established through legislation such as the one described in [JORDAN], or by direct action from a regulatory agency (but, should that be the FCC or the FTC?).

If problems are to be handled by regulatory agencies, then we must define what behaviors are to be prohibited. Several papers point out why this can be more complex than it appears. Context matters. We have already discussed arguments that vertical integration can be beneficial or harmful, and that

discrimination can be beneficial or harmful. Some papers argue further that discrimination at higher layers in the protocol stack may be more of a concern than discrimination at lower layers [JORDAN, PEHA, CROWCROFT, CLARK, CAVE]. Moreover, it is not enough to consider the impact of an Internet provider's behavior; one must also consider how users will respond to providers, and how providers will respond in turn to users [LEHR]. Finally, even if certain behavior is clearly harmful, one can only address it effectively through regulation if a regulator can detect the bad behavior, so monitoring capabilities must be considered [SICKER]. In short, a comprehensive view of the system is needed to devise effective solutions.

Several authors argue that part of the challenge of network neutrality is that it is intertwined with vital issues of other important business sectors and the future of television [CLARK] and advertiser-driven content distribution [SIDAK]. As if this were not enough, network neutrality is also related to the evolving definition of common carrier regulation, competition policy, innovation, expansion of broadband infrastructure, and open political discourse. Perhaps because of its relation to multiple important and contentious policy debates, one paper argues that the evolution of the network neutrality policy debate can be well understood as a typical example of agenda conflict [CHERRY].

In summary, the stakes of the network neutrality issue are high, and the matter is not simple or obvious, as most stakeholders would like everyone to believe. We hope that this special issue will illuminate many of the points of agreement and points of disagreement among leading thought leaders. Further progress on this issue will likely require greater agreement on what it is we are trying to achieve and the resolution of such questions as whether last-mile broadband facilities-based competition is sufficiently vigorous or not. Thus, it is perhaps no surprise that several papers include explicit calls to get past the polemics, and into the specific details of what future policies might look like [CLARK, PEHA, JORDAN, SICKER].

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