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New models and conflicts in the interconnection and delivery of Internet-mediated content

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ABSTRACT

This paper examines the dramatic changes in interconnection and compensation agreements between content providers and carriers resulting from increasing use of the Internet for bandwidth intensive carriage of video. It identifies two emerging models: (1) interconnection and compensation arrangements that increase the total payments to Internet Service Providers ("ISPs") from end users, upstream ISPs and content providers; and (2) strategies by content creators and distributors to achieve congestion-free delivery at the lowest cost.

While supportive of commercially negotiated agreements, the paper suggests that the two emerging models will trigger more disputes as interconnecting parties increasingly lack motivation to cooperate in finding ways to balance traffic flows and instead seek ever increasing compensation. The paper recommends that National Regulatory Authorities require ISPs to engage in transparent network management practices, backed up with reporting requirements that can help identify the causes of congestion and degraded service.

The paper also suggests ways for regulators to resolve disputes between ISPs and content providers that could harm consumers, particularly when retail ISPs, providing the first and last kilometer of service, seek to leverage access to end users by demanding surcharges from upstream carriers and content providers. By creating such a bottleneck, retail ISPs may reduce the value of Internet access subscriptions, or increase costs even when congestion remedies do not require more broadband network capacity. Reporting requirements can provide empirical data for necessary forensic investigations that can determine whether a massive increase in traffic volume has caused congestion, or a carrier has artificially created it by strategic allocation of existing bandwidth and switching capacity.

1. Introduction

Forecasts of media convergence have become a reality as the Internet increasingly provides a single medium for the delivery of information, communication and entertainment ("ICE").[1] As media technologies merge, previously stand alone channels of distribution begin to combine making it questionable whether existing business models and regulatory regimes

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[1] "[O]ne of the most consistent drivers of profound change in the area of cyberspace law has been the convergence of cloud-based products and services with the distribution and consumption of entertainment content. Specifically, the public's relentless desire for access to and consumption of 'any content, anywhere, at any time,' coupled with the widespread proliferation of Internet-connected consumer devices—from the mobile phone, to the tablet, to the Smart TV—has played a substantial role in the marked growth of novel cloud-based products and services" (Schnapp, 2013, p. 1).

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will persist.[2] Already trend setting consumers have begun to abandon pay television subscriptions as they "cut the cord"[3] and access content on their own terms. These early adopters of new technologies and do it yourself strategies consider anathema the traditional concept of "appointment television"[4] where viewers access content at a specific time, on a particular channel and via a single display technology. One can anticipate a future predominated by "cord-nevers" who primarily access content on an ad hoc basis, having never subscribed to a multi-channel package of programming.

Early adopters of new media expect to have near ubiquitous broadband access to content anytime, anywhere, via any device and in any presentation format. Many consumers have no patience with business models that ration content access through a series of display windows that match availability with willingness to pay. For example, movie access traditionally has run a time sequence starting with theatrical presentation and followed by pay per view, DVD sale, premium cable and satellite channel access, DVD rental, broadband download, etc. Many consumers now resort to unlawful strategies that achieve access to pirated premium content via multiple screens soon after initial release. Television sets, computer monitors, smartphone screens and tablets offer much of the content previously made available exclusively via the movie screen, or to only one of the many other mediated screen options.

New media options and convergence have the potential to disrupt the business plans of incumbents, but also challenge established legal, regulatory and policy assumptions. However if finding alternative ways to access desired content results in abandonment of existing subscription options by many consumers, content providers and distributors may slow down or end their experimentation with new distribution technologies.[5] Alternatively they will more aggressively pursue digital rights management ("DRM") techniques to prevent piracy and even fair use (Raymond, 2013; Weiser & Parchomovsky, 2011).[6] In any event, the proliferation of new media access options will require much more coordination between and among the ISPs and the providers and distributors of content at the very time incentives to cooperate have declined.

As the Internet has evolved and diversified, interconnection terms and conditions have changed between ISPs. These carriers experiment with alternatives to conventional models that classify interconnection as either peering,[7] or transiting.[8] The former typically involves interconnection between carriers whose traffic volumes generally match thereby eliminating the need for a transfer of funds. Historically smaller ISPs have paid transit fees to larger ones for the opportunity to secure upstream links throughout the Internet cloud.[9]

With the growing availability of bandwidth intensive content carried via the Internet, traffic volume disparities have increased between ISPs. A new category of ISP has targeted the downstream video content delivery market, all but guaranteeing that these Content Distribution Networks ("CDNs") will have more traffic for which they need to secure delivery to end users than what retail ISPs can or will hand off to them for upstream delivery. Such asymmetry in traffic flows traditionally has forced CDNs to become transit payers even if previously they qualified for zero cost peering (Dr. Peering International, n.d.; Kovacs, 2012; Weller & Woodcock, 2013).

The migration of CDNs from peers to transit payers represents one of many adjustments in interconnection compensation arrangements triggered by vastly increasing total volume of traffic traversing ISP broadband networks and changes in traffic flows between ISPs. Heretofore commercially driven negotiations have managed the transition without resulting in many service disruptions. However it appears increasingly likely that interconnection negotiations will become more contentious and protracted, particularly when retail ISPs demand new or more compensation from sources of bandwidth intensive video content: (1) directly connecting upstream carriers, such as CDNs, or (2) farther upstream to the primary sources of content such as Netflix and YouTube.

[2] "The [Internet] cloud's appeal is its flexibility. Using the government as a source of norms in the early stage of the technology's development will not only moot this flexibility, but will also have the effect of locking the technology in at its current state. A government-centric regulatory model in cloud computing is inadvisable, as government is not sufficiently responsive to keep pace with the rapid manner in which technology evolves. Consumers will be the ones to shoulder the burdens of the cost of regulations made in ignorance of the technology's full potential" (Celestine, 2013, p. 158). "With the convergence of these various technologies—for instance, Voice Over Internet Protocol competing with circuit-switched telephony or Internet Protocol Television competing with broadcast and cable—[medium specific]… silo approach to regulation makes less sense today" (Ohlhausena, 2013, unpaginated).

[3] Incumbent multichannel video program distributors ("MVPD") "benefit from the current concentrated market larding them with high profits while they fail to compete or innovate. They have long feared some users would 'cut the cord' on pay-television by canceling their MVPD subscription, deciding, instead to choose a potentially competitive 'virtual MVPD' providing video content through the Internet" (Ammori, 2010, p. 378).

[4] "A secular trend toward narrowcasting has intensified on the web, as more individuals forsake appointment television for the 'long tail' of online content" (Pasquale, 2010, p. 10).

[5] "Many programmers—including both broadcast programmers and non-broadcast programmers—have increasingly begun to circle the wagons with incumbent MVPDs, concluding that they too are better off with a cut of the MVPDs' supra-competitive profits than with the potential wild-west competition enabled by the Internet" (Ammori, 2010, p. 378).

[6] Fair use refers to the lawful, but unapproved use of copyrighted content. In the balance between rewarding innovation and promoting access to content, fair use provides opportunities for limited and conditional access to content without securing and paying for a license when such use serves the public interest and causes little or no financial harm to the creator.

[7] Peering refers to a barter arrangement for traffic exchange where two Internet Service Providers agree to accept traffic from the other on without the transfer of funds. The carriers agree to a settlement-free arrangement, because traffic volumes generally match.

[8] Transiting refers to an exchange of traffic that triggers a financial settlement and transfer of funds. This arrangement typically results when a small carrier needs the services of a larger carrier to reach all Internet carriers and end users.

[9] The Internet cloud refers to the vast array of interconnected networks that make up the Internet and provide users with seamless connectivity to these networks and the content available via these networks. "The increasing functionality of the Internet is decreasing the role of the personal computer. This shift is being led by the growth of "cloud computing"—the ability to run applications and store data on a service provider's computers over the Internet, rather than on a person's desktop computer" (Robison, 2010, p. 1199).