

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)
)
Annual Assessment of the Status of Competition in) MB Docket No. 07-269
the Market for the Delivery of Video Programming)
)

REPLY COMMENTS OF CISCO SYSTEMS, INC.

I. INTRODUCTION

Cisco Systems, Inc. (“Cisco”)¹ hereby responds to the Commission’s above-captioned *Further Notice of Inquiry* (“*FNOI*”), which seeks comment on the market for the delivery of video programming, including consumer premises equipment (“*CPE*”) such as cable set-top boxes, devices for viewing Internet video content on a television, and devices for viewing broadcast television and multichannel video programming distributor (“*MVPD*”) content on a personal computer (“*PC*”) or handheld device.²

As the record in this and other Commission proceedings³ demonstrate, today’s video distribution marketplace is characterized by explosive growth and innovation in smart video

¹ Cisco is the worldwide leader in networking that transforms how people connect, communicate, and collaborate (see www.cisco.com). Cisco customer premises solutions provide powerful home-networking and content-sharing options that allow subscribers to live the “Connected Life” with simple, affordable tools to enjoy and interact with content in new ways. These solutions draw on Cisco’s rich experience in providing more than 40 million set-top boxes worldwide.

² *In the Matter of Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, MB Docket No. 07-269, *Further Notice of Inquiry*, FCC 11-65, at ¶¶ 66-67 (rel. Apr. 21, 2011) (“*FNOI*”).

³ Many of the equipment issues on which the *FNOI* seeks comment are discussed in the record of the open “AllVid” proceeding. *In the Matter of Video Device Competition*, MB Docket No. 10-91 *et al.*, Notice of Inquiry, 25 FCC Rcd 4275 (rel. Apr. 21, 2010) (“*AllVid NOI*”). Cisco has advocated that the Commission defer action in that proceeding in light of marketplace developments and the harms an AllVid mandate would cause. Comments of Cisco Systems, Inc., MB Docket No. 10-91 *et al.*, at 2 (filed July 13, 2010) (“Cisco AllVid Comments”). The Commission is appropriately collecting information in this non-rulemaking video competition proceeding about the ways in which set-top boxes and related software and devices may impact the market for delivery of video programming. Cisco urges the

devices and home networking technology. Many of these developments would not have been possible even as recently as two years ago. Increased computer processing power, reduced memory costs, and higher broadband speeds have enabled smartphone makers, tablet producers, and other consumer electronics manufacturers and software developers to enter the smart video device marketplace. Companies such as Cisco are introducing cloud-based MVPD architectures to seamlessly serve MVPDs, online video distributors (“OVDs”), and other video sources for display on these new smart video devices. Consumers today have access to more video content and more ways to watch that content than ever before. Yet even in this dynamic marketplace with many choices, leasing a set-top box is still an attractive choice for many consumers.

Further, while the central role of single-purpose video set-top boxes likely will decline as video distribution evolves, MVPD-provided CPE may not entirely disappear. Consumer video, data, and voice services are converging, and this convergence puts unique demands on consumer home networks. Consumers will need devices and software to manage and optimize video, data, and voice traffic on their networks.

This deluge of choice and convergence of services represents the future of video delivery and home networking, and it transcends the traditional, linear video-centric model of video distribution. In fact, if current trends continue, the Commission ultimately may find it challenging to measure the “market for the delivery of video programming” as a stand-alone matter. Cisco offers these comments to assist the Commission in producing a report that reflects the rapidly evolving video distribution market.

Commission to distinguish between data and predictions submitted in response to the *FNOI* as a legitimate component of the big-picture examination of the video marketplace, versus thinly-disguised policy initiatives more properly raised and, if it were appropriate, addressed in the rulemaking context. *See, e.g.*, Comments of the AllVid Tech Company Alliance, MB Docket No. 07-269 (filed June 8, 2011).

II. THE VIDEO DISTRIBUTION MARKET IS INNOVATING IN RESPONSE TO CONSUMERS' DESIRE FOR MORE CHOICE IN VIDEO DELIVERY, AND THE ROLE OF THE SINGLE-PURPOSE, HARDWARE-BASED VIDEO SET-TOP BOX IS DIMINISHING

The market for the delivery of video programming consistently has offered increasing consumer choice in what to watch – and when and how to watch it. For much of MVPDs' existence, this innovation in content and services necessarily has been tied to changes in set-top boxes. However, the recent development of powerful portable computing and fast broadband services have made possible the rise of a significant and growing amount of video consumption that is not tied to set-top boxes. As a result, not only do consumers have access to more content, they can now increasingly watch that content wherever and whenever they want, on a growing number of devices. Consumers continue to demand more choices in video viewing, and video providers are using increasingly sophisticated and flexible video delivery solutions such as online distribution and cloud-based architectures, like Cisco's Videoscape product.⁴

Twenty years ago, cable service was a one-way network of thirty analog channels delivered through a rudimentary device that expanded the range of frequencies which a television could access. Since that time, manufacturers have constantly refined and enhanced the primary video delivery function of set-top boxes while continuing to add new functions. Today's set-top boxes deliver hundreds of channels and are “sophisticated two-way digital devices that can support high-definition programming, digital video recording [“DVR”], interactive program guides, interactive television applications, and other innovative services.”⁵

⁴ See Letter from Natalie G. Roisman, Counsel to Cisco Systems, Inc., to Marlene H. Dortch, FCC, MB Docket No. 10-91 *et al.*, (filed Feb. 2, 2011) (describing an *ex parte* meeting with FCC staff in which Cisco described its Videoscape technology) (“Cisco Videoscape Ex Parte Letter”).

⁵ Comments of Motorola, Inc. on NBP Public Notice #27, GN Docket No. 09-51 *et al.*, at 9 (filed Dec. 22, 2009).

Set-top boxes with DVRs and video on demand (“VOD”) services enable consumers to watch a wide and increasing catalog of video content at the time of their choice.

Yet many recent developments in the video distribution marketplace are largely independent of traditional set-top boxes. OVDs such as Netflix and Hulu have emerged as significant and growing sources of consumer video, as many commenters in this proceeding and the Commission itself have recognized.⁶ Such services bypass the set-top box completely by delivering video content over the Internet to broadband-enabled consumer electronic devices such as Internet-connected TVs, gaming devices, tablets, and smartphones. Cisco’s most recent Visual Networking Index (“VNI”), a comprehensive analysis of global Internet traffic, indicates that such services are significant today and will grow explosively over the next four years. The most recent VNI estimates that 40% of all consumer Internet traffic in 2010 was video content.⁷ More than 80% of that traffic was video content similar to traditional MVPD content: long-form video such as that on Hulu or Netflix; Internet video watched on a TV screen (using a consumer device such as a Roku or Xbox 360, Internet-connected TV, or similar device); or live TV

⁶ Comments of Comcast Corp. at 32; Comments of DirecTV, Inc., at 20-24; Comments of Google Inc., at 1; Comments of Netflix, Inc., at 4-5; Comments of Public Knowledge at 10; Comments of Rovi Corp. at 2-3; *FNOI* ¶ 4 (“[W]e plan to include OVDs [in the 14th Report] for the first time, in light of the growing importance of online video distribution to consumers.”); *Id.* ¶ 68 (“Recent reports indicate that an increasing number of consumers are viewing videos online.”); *Application of Comcast Corporation, General Electric Company and NBC Universal, Inc., for Consent to Assign Licenses and Transfer Control of Licenses*, MB Docket No. 10-56, Memorandum Opinion and Order, FCC 11-4, at ¶ 82 (rel. Jan. 20, 2011) (finding that OVDs are a potential competitive threat to MVPDs.) (“*Comcast-NBCU Order*”).

⁷ Cisco Visual Networking Index: Forecast and Methodology, 2010-2015, Executive Summary, (“Cisco VNI”), available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360_ns827_Networking_Solutions_White_Paper.html. The Visual Networking Index is forecast of global Internet traffic growth which Cisco has been updating for over five years and which has historically slightly under-estimated Internet traffic growth. See Grant Goss, IGN News, *Cisco Predicts 15 Billion Network Devices in 2015*, http://www.pcworld.com/businesscenter/article/229170/cisco_predicts_15_billion_network_devices_in_2015.html (last visited July 8, 2011).

content watched over the Internet.⁸ Cisco projects that consumer Internet video will grow nearly 50% every year through 2015, and will comprise 63% of all consumer Internet traffic in 2015.⁹ Internet video viewed on a TV screen, the category most directly equivalent to services offered through traditional set-top boxes, is expected to grow 77% annually through 2015.¹⁰

MVPDs are likewise beginning to deliver their content to platforms other than traditional set-top boxes. For example, MVPDs' "TV Everywhere" initiatives allow cable subscribers to view MVPD content over the Internet using PCs, smartphones, and tablets.¹¹ MVPDs have also begun to deliver video services, including subscription linear channels, to software applications that run on Internet-connected TVs, Apple iPads, and other consumer electronics devices.¹²

To offer these new services, MVPDs are adopting cloud-based solutions that can deliver video content to a wide variety of consumer devices.¹³ Cisco's Videoscape product suite is one such solution. Videoscape is a comprehensive digital video architecture with which service providers can deliver to consumers MVPD services, such as linear television and VOD, and Internet video and other non-MVPD services. Videoscape allows consumers to access this integrated content via multiple devices of their choice, while maintaining the security and premium quality-of-service that consumers expect from MVPDs.

Videoscape is a cloud-based open platform that can distribute content and services directly from an MVPD's network to a Videoscape software client running on consumer devices.

⁸ Cisco VNI, tbl. 14. This total does not include any mobile video, some of which is comparable to MVPD content.

⁹ *Id.*

¹⁰ *Id.*

¹¹ Letter from Michael K. Powell, National Cable & Telecommunications Association, to Chairman Julius Genachowski, FCC, MB Docket No. 10-91 *et al.*, at 1 (July 7, 2011) ("NCTA Letter").

¹² NCTA Letter at 3 (describing recent technology demonstrations by Comcast, Time Warner Cable, and Cablevision).

¹³ NCTA Letter at 4-5 (citing a wide range of recent announcements regarding cloud based architectures).

A software client has many advantages over a hardware-based solution (e.g., a set-top box), such as the ability to run on any sufficiently powerful device, including already-existing and already-deployed devices. A software client is also more “future-proof” and cost-effective because it is more easily updated and upgraded than a single-purpose hardware device.

A device with a Videoscape software client can access a Videoscape-enabled provider’s full suite of content as well as unaffiliated Internet or user-generated content. Videoscape’s built-in network intelligence delivers Internet and MVPD video at a device-appropriate resolution and quality-of-service. Videoscape can also transmit high-quality content over many different delivery technologies (including wireless) by intelligently converting the content into a format best suited for transmission over that technology. Videoscape uses well-accepted content protection, digital rights management, and user authentication techniques to prevent the theft of content. Videoscape can transform into smart video devices many existing, non-MVPD retail devices, such as iPhones, iPads, Android smartphones, gaming systems, smart television sets, retail set-top boxes, and home computers.

Cloud-based MVPD architectures such as Videoscape are real, not just “concept car” prototypes. Cloud-based systems have been deployed in countries outside the United States and are being tested in the United States today. For example, Comcast is trialing its Xfinity TV service, which operates on Comcast’s Xcalibur cloud-based application and video architecture.¹⁴ Although Videoscape itself has not yet been deployed in the United States, a major Australian service provider has successfully launched Videoscape architecture, and Cisco believes that

¹⁴ News Release, Comcast, *Comcast Chairman and CEO Brian L. Roberts to Unveil Next Generation Television Experience and New Generation Television Experience and New Broadband Speeds* (June 14, 2011), available at <http://www.comcast.com/About/PressRelease/PressReleaseDetail.ashx?PRID=1097>.

large-scale U.S. trials likely will commence in the near future, with significant deployments by the end of 2012. Other cloud-based architectures are also being deployed by MVPDs.¹⁵

The emergence of OVDs and the rise of cloud-based MVPD systems are slowly diminishing the role of the single-purpose video hardware-based set-top box. As Ken Morse, CTO of Cisco's Service Provider Technology Group has said, "[s]et-tops are clearly moving to the point where they are either a piece of software that lives in another device, or they're virtualized totally in the cloud."¹⁶ However, set-top boxes dedicated to video delivery will be important to MVPDs and their customers for some time yet; there will not and need not be a flash cut to cloud-based architectures because cloud-based architectures can continue to support set-top boxes until full-scale deployment of newer technologies is practical and cost-effective.

III. AMID MYRIAD AND GROWING CHOICES FOR VIDEO DELIVERY, THE LEASED SET-TOP BOX MODEL REMAINS A USEFUL AND VALUED OPTION FOR CONSUMERS

Even with the numerous evolving video programming access options described above, many consumers continue to consciously and affirmatively choose to lease set-top boxes. Leasing a set-top box has several significant benefits. First, leasing allows a consumer to avoid incurring significant up-front costs. As the wireless handset industry demonstrates, consumers often prefer to avoid the up-front cost of equipment.¹⁷ The typical hardware cost of a digital set-top box ranges from \$150 to \$300 when purchased in large volumes. Leasing enables a consumer to pay a low monthly fee over the term of service rather than making this sizable up-

¹⁵ NCTA Letter at 4-5 (describing trial deployments by Comcast and Avail-TVN, and new cloud-based products by thePlatform, Synacor, EchoStar Technologies, and others).

¹⁶ Steve Donohue, *The Disappearing Set-Top*, Light Reading, Apr. 26, 2011, available at http://www.lightreading.com/document.asp?doc_id=207138&site=lr_cable.

¹⁷ See *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, WT Docket No. 10-133, Fifteenth Report, FCC 11-103, at ¶¶ 93, 339 (discussing the "predominant postpaid handset subsidy model" which "is the overwhelming U.S. industry practice").

front payment. Leasing also makes it easy to switch providers without concern about device compatibility. Significantly, given the rapid evolution of video distribution technology as discussed at length above, the leasing model permits consumers to easily upgrade their services or equipment (for example, adding a DVR) without losing the sunk cost of already-purchased equipment. Similarly, the leased model permits MVPDs to upgrade their networks without forcing consumers to purchase new equipment. Even retail set-top box manufacturer TiVo Inc. (“TiVo”) has noted that, all else equal, many consumers prefer to lease devices.¹⁸ Today, the marketplace appropriately accommodates both consumers who prefer to purchase set-top boxes or use alternative platforms for video delivery, and consumers who prefer to lease set-top boxes from their MVPD.

IV. AS VOICE, VIDEO, AND DATA SERVICES CONVERGE, THERE IS AN EMERGING MARKET FOR DEVICES THAT CAN INTEGRATE THESE SERVICES EFFECTIVELY ON A SINGLE HOME NETWORK

As discussed above, the single-purpose video set-top box remains an important part of today’s video distribution ecosystem, but it appears the market is moving away from such devices. Simultaneously, however, a market is emerging for devices that integrate video services on a single home network with other IP-based consumer services, such as voice and data over wired and wireless media.

When different services share a network, there are several benefits. First, only one network need be created and maintained. Additionally, a single network enables powerful cross-service applications such as caller ID and visual voicemail on the TV, telepresence applications, on-screen social networking to discover and share content, and content portability among consumer devices.

¹⁸ Comments of TiVo Inc. on NBP Public Notice #27, GN Docket No. 09-47 *et al.*, at 12 (filed Dec. 22, 2009).

Voice, video, and data services places different demands on home network resources, and these demands can conflict if not properly coordinated. If a consumer were to plug his individual set-top box, broadband modem, and VoIP telephone into his home network, he would very likely experience degraded quality and adverse interactions between services. For example, watching TV could slow apparent Internet responsiveness, or downloading a large file could cause visual defects in a streaming VOD movie.

To gain the benefits of an integrated network but avoid the potential negative effects, some consumers may prefer to have a service provider coordinate these services through a single in-home device as they enter the home network. Such a device easily would be able to enforce Quality of Experience (“QoE”) rules. The device could, for example, prioritize video or voice traffic in the consumer’s home over data traffic in order to decrease latency and ensure a clear, uninterrupted video experience. Such cross-service home network management would ensure that, among other things, retail video devices experience the best network performance possible. A single central device would also provide a single interface to configure and maintain, as well as a seamless view of integrated content from multiple sources. Such a device would increase convenience and decrease cost by reducing the number of devices and cables consumers would have to purchase, deploy, configure, and maintain.

Perhaps most relevant in the video competition context, a coordinating device that supports home network connectivity for voice, video, and broadband services could simplify consumer access to multiple service providers and could facilitate switching between such providers. For example, such a device could support advanced IP routing to empower the consumer to easily select video service from one provider and broadband data service from a different provider, in a manner that would be transparent to the consumer’s in-home devices.

V. CONCLUSION

The marketplace for CPE to facilitate video delivery is vibrant and evolving to meet consumer demands. While many consumers still embrace the attractive leased set-top box model, there are more smart video devices and greater access to video programming than ever before.

Respectfully submitted,

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