

public Internet infrastructure, or might share some of that infrastructure (potentially generating conflict with open Internet traffic, unless sufficient capacity is provisioned).

The committee discussed whether the degree of capacity isolation between a video service and BIAS service has implications as to whether the video service should fall under the rules of the R&O. For example in the extreme case where there is no capacity isolation between the video service and the BIAS service, it might seem that this is an OTT service, even if the service met the “reach” criterion from the R&O. But as the degree of isolation increases, there is an ambiguity as to what the boundary is.

### **Differences Between MVPDs’ IP-VIDEO and Over the Top Video**

The emergence of higher speed broadband networks of all access network technology types has contributed to the emergence of Over the Top (OTT) video services that deliver content via the end users’ BIAS service. Examples of OTT video services include Netflix, YouTube, Hulu, Amazon Prime, and Vudu. While OTT services may function in a manner somewhat similar to the IPTV systems described above—i.e. they have a client-server architecture, and stream only the requested content to the user—there are a number of distinctions between MVPD IP-video and OTT services.

- 1) **Customer Expectations:** MVPD services are usually offered as an integrated service package by the MVPD, often including “truck rolls” to install in-home wiring and equipment, network monitoring, customer care and helpdesk services, etc. OTT services typically offer only online and/or phone support and in-home service is available only through 3<sup>rd</sup> party integrators, if at all.
- 2) **System Design:** MVPD services are typically engineered to provide features for the linear TV service such as Instant Channel Change that consumers have grown accustomed to. MVPD services are delivered over a privately owned and managed network within the service provider’s infrastructure, rather than over the public Internet. Of particular note, an MVPD’s IP-video services are delivered via the MVPD’s own network and generally are not available via the Internet outside of a customer’s home. This aspect of the service may relate to the “reach” criterion of the FCC. OTT services typically are delivered via a third-party (i.e., not the MVPD/ISP) content delivery network and use the subscribers’ BIAS service for access to the home.
- 3) **Equipment:** MVPD services typically are accessed on leased equipment, although increasingly operators are making it possible to access MVPD IP video services on retail equipment. OTT services can be accessed via retail consumer devices in the home such as Apple TV, Roku, and Boxee, or “smart” TVs, Blu-Ray players, AV receivers, as well as via Internet browsers on general purpose devices such as computers and tablets. Some cable operators and telco IPTV providers offer their own OTT video services that are wholly distinct from their managed in-home MVPD services. Some of these services are simply standalone third party devices that provide a hardware and software “front end” for a variety of OTT services (e.g., Roku). Others are offered by the OTT content provider as a more convenient means of accessing their own content (e.g., Apple TV), as well as other partnered providers’ content. Boxee is an example of yet a different category, a sort of hybrid device that combines non-IP broadcast and cable services (either local OTA broadcasts or basic cable video delivered by QAM) with OTT Internet

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video content. Satellite TV providers are also now delivering OTT video, both on-demand type streaming and/or downloadable (to a DVR), and selected live linear TV that is concurrently being broadcast on their satellite signals (e.g., DirecTV's "DirecTV Everywhere" service).

- 4) Regulatory Requirements: MVPD services typically face local franchise requirements, EEO and other back-office requirements, PEG (public, educational, government access) programming requirements, emergency alert requirements, CALM requirements, etc. The STBs that provide the video services, and/or the services themselves, must be capable of complying with these obligations. If the OTT IPTV uses a separate STB, these devices and the video services they deliver, generally speaking, are not subject to the same set of regulatory obligations. One notable exception is that OTT services and devices are required to support closed captioning.
- 5) Video quality: OTT services typically offer a range of streaming rates or video resolutions for different content (e.g., differentiating between SD and HD content), and use adaptive bitrates that can vary, adjusting to the bandwidth available on the user's connection. Most of these services stream at bitrates ranging from less than 1 Mbps up to 5-6 Mbps. Further, many OTT service providers rely on content compression, buffering and error correction on the consumer device, as well as adaptive bit rate streaming to optimize the user experience. MVPD services are typically provisioned such that adaptive coding and similar techniques are not needed to preserve the user experience.

The committee considered this list, and concluded that these differences are typical characteristics, but were not definitional, with the exception of the relationship to the issues of reach and capacity isolation.

### Conclusions

In the end, each of the methods described above for delivering video content and other services to the user can potentially deliver the same or closely similar functionality and experience while watching video in the home. However, the underlying technical methods and requirements are significantly different, with differing benefits and limitations. In the context of the R&O, the multi-channel video service in an IPTV configuration can be considered a specialized service: they use capacity on the provider's last mile facilities, they are application level services, they are logically separate from the BIAS service, and the IP service over which they run is restricted to the facilities of the MVPD operator; it does not provide access to all of the public Internet. In contrast, the OTT video services run on top of the BIAS service, and partake of the same service as all the other Internet-based applications. The resulting differentiations are important in signaling the implications of specialized services. Providers of MVPD IPTV can make higher assurances of delivery quality, can offer different pricing packages, and assure that IPTV and OTT Internet services do not disrupt each other.

It would seem that at the present, many versions of BIAS are good enough to support innovation in TV services, and the combination of MVPD and OTT alternatives are providing competition and consumer choice in the market. Concerns about the implications of specialized services on BIAS must be forward looking and thus speculative.

## Appendix 2: Specialized services case study

### *3rd party purchasing of services for their customers (e.g. games)*

This case study looks at the challenge of supporting applications that have a requirement for enhanced service qualities that cannot today be met over the Internet.

This is a forward-looking case study.

### **Background**

The Internet provides “best effort” delivery of packets – no guarantees of delivery or delivery time of packets, no guarantees one packet will have the same path/fate as the next.<sup>88</sup> This approach has meant that the Internet is resilient overall, no participating network imposes performance requirements on another, and interconnection between networks is simplified with minimal agreements and commitments required between providers.

This approach to internetworking has successfully allowed significant third-party online services to be developed for use by customers globally and independent of any individual customer’s access ISP. When these services operate over the Internet they are sometimes referred to as “over the top” – (OTT) services.<sup>89</sup> Increasingly, these services support high-performance hardware on the client end as well as the server end, with attendant expectations of network connections that support their activity. They include applications with particular performance expectations – subject to reduced quality in the face of jitter or high latency, or even any form of timing disruption. A case in point is massive multiplayer action video games, where network-induced delays not only cause deterioration in the video quality experience, but can also get a player killed in the game. A person using a network that is persistently lagging is not going to keep up their (paid) subscription to the service. Consequently, having assured quality of network service from their servers to (and from) the end user may be of considerable interest to such services.

We describe three different ways that a provider of access service<sup>90</sup> can arrange with a third-party service developer to provide enhanced quality of service. All three seem to offer a similar enhancement for the third party service, but one seems to be a specialized service, one seems to be forbidden under the rules of the R&O, and one seems to be permitted within the rules that govern BIAS service. We use these illustrations to make the point that the R&O as written may not provide the right distinction between what is permitted and what is forbidden.

### **Third-party services over the access ISP’s network.**

#### **Example 1: A separate specialized service for third-party service**

<sup>88</sup> Some networks might provide Service Level Agreements (SLAs) that provide bounds on service quality parameters.

<sup>89</sup> The Report and Order refers to providers of these types of services as “edge providers.”

<sup>90</sup> In this Appendix, this type of provider is called an “access ISP”

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An access ISP might set aside capacity separate from the BIAS service to carry the traffic for the third-party services that are using it. For the purpose of this discussion, we will refer to this separate capacity as an Enhanced Access Channel (EAC). There are a number of ways that one might argue that an EAC is a specialized service, and thus not covered by the requirements of the R&O.

**Reach:** The EAC service, as described, is not intended to reach large parts of the Internet. It is designed only to reach to specific customers who subscribe to the third party service. Using the sub-group's interpretation of the R&O, this example is thus a specialized service. The third-party service is no longer considered OTT, because it is now delivered over the access ISP's EAC. (On the other hand, the packets from the third-party service provider must reach the access ISP by some means—it is a question for consideration whether the means of delivering these (across other parts of the Internet or separated in some way) is part of determining how we characterize the EAC. See Example 3 for an elaboration of this point.)

**Capacity isolation:** If the EAC is implemented without impacting the BIAS customers' agreed capacity to access the Internet, it can be considered "isolated" from the BIAS service. This argument is similar to the one posed in the IPTV case study.

**Generic service:** The third-party service is not a generic platform – it is a specific "application level" service. The EAC, as described, would be a general IP platform, but one that is specially provisioned to support such third-party services.

**Business model:** An access ISP might offer the EAC service independent of BIAS, with separate models for revenue generation. Customers might not need to subscribe to the BIAS service to get access to the third-party services delivered over the EAC.

In addition to the reach criterion, one or another of these reasons might be used to make the case that the EAC can be considered a "specialized service," as defined by the working group, under the Open Internet Report & Order (R&O), even though it is providing access to a third-party service that in other circumstances might be delivered over the Internet (OTT).

### **Example 2a: Buying quality of service guarantee (access provider choice) – differentiated service level on BIAS**

If, in contrast, the access ISP implements enhanced access to the third-party service over BIAS by prioritizing the service's OTT traffic amongst all the general Internet traffic going to users over the BIAS, the situation is different. In this example case, there would be no capacity isolation. There is a separate business relationship and possible additional revenue stream. The OTT service is using the Internet, with its global reach. The sub-group concludes that this behavior might fall under the Open Internet rules for BIAS in the R&O and might not be allowed. The lack of capacity isolation (of the preferentially-treated OTT service and general Internet traffic) might additionally warrant consideration by the FCC to further understand the implications for the consumer and the effect on competitive services running over the BIAS.

### **Example 2b: Buying quality of service guarantee (user choice) – differentiated service level on BIAS**

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Like Example 2a, this scenario assumes the access ISP agrees to implement prioritization of the OTT service's traffic amongst all the BIAS traffic, but only if a given customer elects to have that prioritization of their traffic.

In this case, although there is no capacity isolation, the impact on the customer's other Internet traffic is at their election.<sup>91</sup> The sub-group believes that such a scenario would be subject to the R&O, but would be deemed an acceptable behavior under that order. It might still warrant consideration by the FCC to further understand the implications for the consumer and the possible competitive services running on the BIAS service.

### **Regulatory analysis**

The distinctions between these various approaches are subtle. In each case, the goal is to provide a differentiated experience for a specific third-party-provided application or service. Possible objections to this outcome may include:

- The new service sets a high barrier to entry for new OTT competitors, essentially requiring that they establish such delivery relationships in order to be viable in the market; and/or
- The new service reduces the access ISP's need or likelihood to improve the BIAS service with techniques and tools that might generally improve the performance of similar OTT services. (The so-called "dirt road" BIAS).

Using our proposed definition of a "specialized service," the working group believes (using Example One for illustration) that an ISP that wants to offer enhanced access service qualities to third party services can do so as a specialized service under the R&O. Since there are potential benefits as well as potential harms that might arise from these various services, as the R&O notes, these services must be monitored for their effects on the growth of Broadband Internet Access Services. The working group is of different opinions as to whether consideration of hypothetical outcomes should warrant any reconsideration of definitions at this time, or whether monitoring is the correct action.

These are potential policy considerations that might arise as the FCC considers the method for monitoring the effect of specialized service on BIAS.

### **Third-party services beyond the broadband access network**

The focus of the R&O is on broadband access—the network that provides the actual path to the end user. But the issues that distinguish specialized services from BIAS can be found in the other parts of the network.

#### **Example 3: Specialized core network support**

Assuming there are common performance characteristics and requirements for more than one third-party service, it's not unreasonable to think of a dedicated core transit network being set up to serve as "glue" between third-party service servers and access ISPs – e.g., the early model for

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<sup>91</sup> Such a service could affect other consumers' service in the case of congestion.

Internap as “Super Performance IP”, or what content delivery networks do for accelerating static content.

In this example, then, a customer will have good performance from the third party service if their ISP interconnects with this dedicated core network. While the third-party service experiences will be different for customers of such ISPs than for their neighbors who do not use an ISP connected to the dedicated core, this is not due to a new or distinguishing feature of the access ISP (e.g., no preferential treatment is given to the 3<sup>rd</sup> party service on the ISP's network).

This is not particularly new – performance between consumers and any network endpoint is dependent on core network connections and conditions.

The working group believes that a reasonable reading of the R&O would suggest that the core of the Internet (the global interconnection of ASes) is not subject to the order. However, much discrimination might occur in that part of the Internet. The working group also asks whether different treatment of traffic in the core of the Internet might influence whether the delivery path across the access ISP's network is a specialized service, as we question in Example One.

#### **Example 4: Open-standards based approach to signaling requests and requirements throughout the network**

Establishing prioritization of traffic at the access ISP is only going to solve part of the performance problem. Non-interactive services can couple access priority with heavy (and heavily distributed) caching, but that is not applicable in the case of massively multiplayer games. Such OTT services need to have solid network performance between all nodes involved in the interaction, including any transit links.

A future approach might be to ensure that there are open standards and best practices that are developed to support highly interactive traffic in general, and perhaps some level of mutually-cooperative signaling of performance preferences that works across network domain boundaries in the Internet.

(This is not completely theoretical – RITE (“Reducing Internet Transport Latency”) is funded by the European commission under the fp7-ICT programme, with the following focus:

RITE proposes to remove the root causes of unnecessary latency over the Internet. Whilst time-of-flight delay is inevitable, greater delays can result from interactions between transport protocols and buffers. It is these that RITE will tackle.

<http://riteproject.eu/about-2/> )

As part of ensuring that the BIAS service offerings evolve appropriately and are not unduly pushed aside by specialized services, the FCC could consider monitoring such developing technologies and whether they are being appropriately implemented in improving access ISP networks for broadband Internet access services.

### **Consider the future**

In all of this, perhaps the most important thing for the FCC to consider is the distinction between challenges and solutions for today, versus opportunities tomorrow. While the problem outlined here (high performance requirements in globally distributed services) is real, as the examples highlight there are many approaches to addressing the issue in both near and long term ways. Making a ruling to require, enable or prevent a particular behavior today may curtail some of those options.

In the case of high performance requirements of globally distributed services, there is every possibility that technologies will evolve to address the problem in general, and a general trend away from optimizing packet traffic and towards more application/service optimization is possible. This is the thrust of proposals for "Software Defined Networking", "Information Centric Networking", and general cloud infrastructure.

## **Open Internet Label Study**

Transparency Working Group  
Open Internet Advisory Committee  
Federal Communications Commission

**The Transparency working group has proposed a system to label Internet service with information that consumers may find useful when selecting a provider, including speed, price, and other metrics.**

The Transparency Working Group of the Open Internet Advisory Committee (OIAC) was formed to provide advice to the FCC on the transparency of offerings from Internet Service Providers (ISPs). In particular, the Open Internet Order [1] says:

“Fixed and mobile broadband providers must disclose the network management practices, performance characteristics, and terms and conditions of their broadband services”

The Transparency Working Group has studied the way that ISPs present performance characteristics and pricing of their service offerings to consumers, coming to the conclusion that presentation consistency would benefit consumers. The Transparency Working Group recommends the adoption of a voluntary open Internet labeling program as a means of helping consumers more easily compare and select Internet service offerings.

### **Motivation for an Internet Service Labeling Program**

Some consumers are not able to easily compare Internet service offerings. Organizations such as the National Hispanic Media Coalition have conducted focus groups that show that some consumers are confused when choosing an ISP. Many articles have been written to highlight that some consumers are confused when choosing a wireless service provider [2][3][4][5].

A simple and consistent label will enable consumers to make apples-to-apples comparisons when considering an Internet service selection or when considering a change.

Once the consumer has made a selection, and at any time afterwards, the label provides the information that could be used by the consumer when accessing a test site to confirm that the service is performing roughly as expected. In addition, third parties can provide consumers with performance parameters that help the consumer in determining whether their existing service fully meets their needs.

While mobile data networks are rapidly evolving, fixed and mobile connections are both a significant part of today's network experience. For this reason, service providers that do not provide access to the entire public Internet should not make use of the label at all.

### **The Proposal – A Label Similar to the Nutrition Label**

The FCC could promote a labeling program for both mobile and fixed services. Such a label program would provide the following information:

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- Performance: upload speed and download speed
- Price (monthly fee averaged over three years)
- Usage Restrictions (any points at which the terms of service that apply change)

These numbers are very far from a complete picture of an Internet service offering, yet they seem to be the right level of detail for most consumers. These numbers do not capture important technical factors such as jitter, latency, and impacts of over provisioning. For this reason, the ISP might also provide a much more complete disclosure like the one recommended by BEREC [6]. These details are vital for expert analysis and service offering comparison.

### **Methodology**

To participate in the label program, ISPs self-report three pieces of data: upload speed, download speed, and price. In addition, if there are any usage restrictions, including data caps, ISPs need to report them as well.

The label data is made available for each active service offering. If a service offering is a legacy service and no longer available to new customers, the ISP can determine whether they want to report current data for the legacy service; however, ISPs are encouraged to report data for both active and legacy services.

### ***Upload and Download Speed***

The upload and download speed numbers are meant to reflect the performance delivered by the ISP to a consumer's broadband modem. Yet, it is recognized that upload and download speeds vary greatly from consumer to consumer since they depend on several factors such as geographic location, home network configuration, and time of day. These complexities are well known, and they have been discussed in the context of the FCC's Measuring Broadband America (MBA) program, which compares an ISP's advertised speed with a measured speed. It is important that the terminology and methodology used for the label program be consistent with the MBA program, allowing the two programs to reinforce and supplement each other.

It is envisioned that the label data would include the upload and download speed as determined by lab testing. ISPs measure the maximum ("up to") speeds achievable, within statistical bounds, over a segment of the access network closest to the user (e.g., DSL-capable copper loop segment, or shared DOCSIS channel).

In the near term it is not feasible to base the reported data on large-scale customer measurements. Currently, this type of data reporting is not usually available at scale due to a lack of measurement standards in deployed equipment. In order to establish the labeling program, the FCC will need to work with industry to define a measurement process for the data to be reported by ISPs. Since the upload and download speed numbers are meant to reflect the speeds that consumers can expect to receive, ISPs should take into account any short-term traffic management loads that impact consumer experience as well as long-term capacity management processes when reporting the data for the label.

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Please note that outside of the label, the Open Internet Order obligates ISPs to provide relevant information about their service (e.g., upload speed, download speed, usage thresholds, latency, and price). ISPs provide this information today in a variety of ways, including their web sites. Currently, the data used for the upload and download speed inputs for the label is often the same data that the ISPs disclose on their corporate websites. Publication of label data is discussed further below.

### *Price*

Price is an important aspect of a consumer decision. Initial price for Internet service often reflects a discount or promotion as a purchase incentive. As a result, to reflect the long-term cost to the consumer, an average monthly price reflected for 36 months is proposed. In addition, the prices should reflect all taxes and fees. Since the label shows the monthly average, this will take into account any sign-up discounts, promotions or incentives for new customers, and it reflects any rate adjustments following the expiration of any such incentives.

The price is based on a geographic location, such as the zip code or census block for each service offering. Since pricing often varies by location, it is not usually possible to provide one price for the entire country.

Bundling is a popular practice for ISPs. Bundling refers to giving a price discount to Service A if a consumer purchases both Service A and Service B from the ISP. While regional discounts are reflected in the price, the label only reflects the price for the Internet service offering. Consumers may receive a lower price for the Internet service if they choose additional services from the same ISP. The ISP can make this obvious by providing two labels, one for Service A by itself and another one for Service A and Service B together. When the consumer purchases the Internet service on an ISP's website, the label could reflect the actual price, including any bundle discounts of all of the items in the consumer's shopping basket.

If an ISP has many different service offerings, with and without bundling, in many different geographic locations, then the publication of all of these labels might become unwieldy. However, presentation on a website can be straightforward if the consumer provide their location and then the applicable labels are displayed.

At least one ISP has reservations about the inclusion of price data in the label. This ISP is concerned about the potential to increase customer confusion rather than reducing it.

### *Publishing the Label Data*

Three alternatives were considered for ISPs to make the label data available:

- 1) The ISP posts the label data on its own web site
- 2) The ISP provides an API to obtain them
- 3) The ISP periodically files them with a third party

Choices (1) and (2) offer the opportunity to be dynamic. That is, when the ISP adds a new offering or makes a change to a current offering, the information is available to the consumer almost instantly. Further, these choices can be driven by a back-end provider database, which

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allows the potential customer to provide a location (e.g., a street address) and learn the label data associated with each of the service offerings that are available.

Choice (2) is the easiest for third parties to facilitate comparative shopping using very current information.

Choice (1) is easiest for small ISPs. Choice (3) may also be acceptable for small ISPs, but a periodic filing process could be more cumbersome for consumers and analysts to obtain timely information.

The Transparency Working Group recommends that the FCC pursue choice (1).

### *Other*

In addition to self-reporting upload speed, download speed, price, and if applicable, usage restrictions for each service offering, ISPs can provide links to the appropriate page on their company website for each offering so that customers can find additional information.

### **Complexities**

There are a number of complexities that must be taken into account when evaluating the label program. Complexities encompass service offerings, customers, and companies. Consideration of these complexities is necessary for a successful label program.

### *Service Offerings*

Bundling: It is common for ISPs to bundle services. Often bundles provide a price benefit for customers, where the cost of the bundle is less than each service individually. The price discount in a bundle may not be broken out by service. As a result, this adds a layer of complexity when participating in the label program since the price benefit of the bundle is not easily reflected in the price data.

Promotions: Throughout the year, ISPs may choose to run promotions for new and existing customers. These promotions are often limited to a certain time period and may include restrictions such as customers committing to a certain length of service contract. The promotion is reflected in the average, but the initial lower price followed by a subsequent higher price is not reflected on the label itself.

### *Customers*

Location: Actual download speed and upload speed will vary based on consumer location. The ISP needs reasonably accurate data for each location where the service is offered. Of course, there will be variability within the region. Measuring each zip code, for example, is not practical. Yet, the ISP needs to provide label data that will be close to the actual performance delivered to the consumer's broadband modem in that geographic area. Reasonable estimates can come from laboratory testing.

Variability: Internet usage is not constant throughout the day or week. Similar to highways or air travel, there are peak usage periods during specific times of the day or on specific days of the week. For example, Internet usage is often high during special events like the Super Bowl.

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Also, Internet usage is higher between 3pm and 9pm EST than at 3am EST. As such, it is difficult to capture one download speed and upload speed to display to consumers given the variability throughout the week.

Thresholds: The label reports download speed, upload speed, price, and if appropriate usage restrictions. There is a risk that customers will look for service offerings with the highest speed numbers, perhaps greatly exceeding their needs. There is a threshold where the customer will not see a speed difference between two offerings. So, even though an ISP may offer the fastest speeds, the difference between that fast speed and a lower speed may be undetectable for the average consumer. The lack of education in the market on how much speed is sufficient may confuse some consumers.

Other Contributing Factors: Many factors contribute to end-to-end broadband performance that are beyond the control of the ISP, including the specific user application, server capacity, aged equipment, and home network configuration. If a consumer does not get the advertised performance due to these factors, this may lead to confusion and increased customer care costs for the ISP.

### *Companies*

Beyond Speed, Price, and Usage Restrictions: The label takes into account upload speed, download speed, price, and if appropriate usage restrictions. While each of these elements of a service offering is important for consumers, these elements are not a complete picture. Key factors that also impact consumers but are omitted from the label include, but are not limited to, quality of customer service, ease of use, setup time, jitter, and latency. By not including all the factors in the label, there is a risk that ISPs will start to de-emphasize these essential factors. Creating a market where ISPs are evaluated only by the numbers included in the label may not be a market improvement.

### **Potential Benefits**

The proposed label has the potential to:

Raise Awareness: A well-branded label would raise an average consumers' awareness about the performance and cost of the Internet services that they purchase. The basic information provided in the label would help consumers perform cost-benefits analyses and make good choices based on their needs and budgets.

Reduce Consumer Confusion: The standardization provided by the label would make it easier for consumers to compare services. The simplicity of the label would help reach even the least tech-savvy consumers. In addition, a label with numbers is much easier for non-English speakers to understand than a lengthy explanation of services in point of sale contracts, bills, or advertising materials.

Promote Competition: Internet service providers, in vying to put forward the most favorable label, would be compelled to provide the fastest and most affordable service to an open Internet. Attaching speed, price, and if needed, usage restrictions in a simple and consistent label format that is easily comparable across ISPs will enhance competition.

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Incentivize Open Internet Practices: The label will likely become a symbol that the provider, regardless of whether they provide fixed or mobile services, offers access to the entire open Internet. In fact, the lack of a label could be an indication that the provider is not providing access to the entire open Internet.

Marketing Tool: The label may make it clear how the selection of a service bundle impacts the price of the open Internet service.

Improve Consumer Loyalty: A label may improve consumer experience by managing expectations and building trust.

Global Applicability: If the FCC encourages the adoption a label, it could lead to an international standard for rating open Internet services. A label with numbers that are easy for non-English speakers to understand will be more palatable for global adoption.

### **Potential Concerns**

The proposed label could:

Mislead Consumers: A label does not cover all aspects of a service that a consumer might consider in selecting a service. The label does not capture the whole picture, and it might omit an attribute that is important to a particular consumer.

Government Cost: The FCC program will require a design team for the label and the development of guidance on its use. A team will be needed to manage the program over time.

Slow Adoption: The benefits will only be achieved once all ISPs embrace the label program. In addition, promotion is needed for all consumers to be aware of the label and its use.

### **Long-term Future**

The Internet Engineering Task Force (IETF) has developed a set of standard metrics that can be applied to the quality, performance, and reliability of Internet data delivery services. Network operators, end users, or independent testing groups can use these unbiased quantitative of performance measurements.

The Broadband Forum has an initiative underway to bring advertised "up to" speeds to be more in line with real-life speed data.

Specific metrics and procedures for accurately measuring and documenting these metrics are under development. Once these metrics are in widespread use, the FCC should consider migrating from service provider estimates of their offerings to actual measurements.

### **Conclusion**

The Transparency Working Group recommends that the FCC work with the industry to develop a voluntary labeling program, in which ISPs would disclose in a simple and consistent manner, relevant information about their broadband Internet access services.

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The next steps in establishing the labeling program:

- Establish technical definitions for upload and download speed metrics that are consistent with the definitions used by the FCC's Measuring Broadband America (MBA) program. It is important that the terminology and methodology used by the labeling program be consistent with the MBA program so that the two programs reinforce and supplement each other. If necessary, the FCC should convene a group of subject matter experts to define the upload speed and download speed performance metrics.
- Select a measurement program that will be used in the near term while comprehensive measurement standards are developed and deployed.
- Confirm that publication of the labels on ISP websites is viable.
- Confirm that price should be a part of the label program.
- Get input from the ISP industry.
- Get input from the public and interested organizations, such as the Electronic Freedom Foundation, the Center for Democracy and Technology, and the National Hispanic Media Coalition.
- Design a proposed label as well as HTML assets for use on the ISP websites and marketing documents.
- Implement a pilot with a small number of ISPs to refine the label design, the label presentation, and the methodology. During the pilot, get feedback from consumers as well.

The Transparency Working Group is confident that the Label program will make it easier and less confusing for American consumers when choosing an Internet Service Provider.

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- [6] [http://bereg.europa.eu/doc/bereg/bor/bor11\\_67\\_transparencyguide.pdf](http://bereg.europa.eu/doc/bereg/bor/bor11_67_transparencyguide.pdf)

## Committee Member Contributions

In order to provide more comprehensive insight into the individual perspectives that constitute the Open Internet Advisory Committee, members were invited to submit statements reflecting on the Committee's work.

### **Alissa Cooper**

*Chief Computer Scientist, Center for Democracy & Technology*

I was pleased to serve on the FCC OIAC this year. The committee's efforts to examine a variety of complex, contentious Internet openness issues has resulted in an annual report containing valuable insights that should be read carefully by the Commission.

I participated primarily in the mobile working group, and therefore I offer thoughts below about work in other areas. In all of the committee's work areas, it would be beneficial to obtain input from a broader array of both established and start-up companies, including fixed and mobile platform and app developers, content delivery networks, and transit providers.

### **Specialized services**

The *Open Internet Order* recognizes the possibility that specialized services have the potential to impinge on the growth of Internet services, but as the working group alludes to, it is difficult to judge whether this is taking place in the absence of rigorous metrics for assessing existing services of both kinds. For example, the working group rightly concludes that there is ongoing innovation in the delivery of Internet video, but making that observation does not answer the question of whether innovation in Internet video would be even better served if the relationship between current specialized services and Internet services were different with respect to capacity allocation, congestion management, or counting against data caps. The status quo should not necessarily be assumed to be free of openness concerns in the absence of criteria for evaluating the relative quality of the two kinds of services and the progress of both over time. It may be possible for the working group's future work to make a helpful contribution in this area.

### **Transparency**

The Transparency Working Group proposed a voluntary labeling program that would have Internet service providers (ISPs) display labels on their web sites indicating maximum upload and download speeds, prices, and usage restrictions. While the idea of a label is useful, there are a several aspects of the program that deserve further consideration. First, the focus on speed may put too much weight on a metric that is not always the primary determinant of performance, particularly as more users opt for broadband products with higher maximum speeds. Second, the label may need to better account for the variability of broadband performance, particularly for mobile users, so as to avoid being more misleading than informative. Finally, recent research has indicated how difficult it can be for consumers to select the most appropriate broadband package for their needs and to understand usage restrictions.<sup>92</sup> The Commission should work jointly with

<sup>92</sup> See, e.g., London Economics, "Consumer information on Broadband Speed and Net Neutrality Experiment" (May 2011), [http://stakeholders.ofcom.org.uk/binaries/consultations/net-neutrality/statement/Consumer\\_information1.pdf](http://stakeholders.ofcom.org.uk/binaries/consultations/net-neutrality/statement/Consumer_information1.pdf) and Consumer Focus, "Lost on the broadband super highway" (Nov 2011), <http://www.consumerfocus.org.uk/files/2012/11/Lost-on-the-broadband-super-highway.pdf>.

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the research community, consumer advocates, and industry to ensure that labels are effective for consumers.

### **Conclusion**

The committee has made useful contributions to ongoing discussions about Internet openness and I look forward to participating in its the future work.

**Maurice Dean**

*Director, Open Connect Product Management, Netflix Inc.*

**Netflix Statement on The Open Internet Advisory Committee July 2013 Report**

Netflix commends the Committee chairs and members for dedicating time and resources to produce this report. The report identifies areas of debate among stakeholders on this committee. It does not resolve these debates. Instead, it identifies areas that should be addressed by the FCC to ensure the Internet remains an open and dynamic platform for free speech and economic growth. Moving forward, we recommend the OIAC and FCC focus on the following areas:

**Data Caps**

Consumers pay ISPs for Internet access to connect to the amazing content and services the Internet offers. Data delivery and consumer data consumption are not cost centers for ISPs – they are revenue generators<sup>93</sup> and significant sources of support for broadband deployment. Consumer groups<sup>94</sup> and technology experts point out that data caps are hard for people to understand and are not effective for managing network congestion or costs. Concerns remain regarding the purpose and incentive for applying data caps. These are heightened when ISPs apply caps in ways that favor their own services and penalize consumers who want to use alternative online services. The Open Internet Order cautions against anti-consumer and anti-competitive billing practices. The FCC should monitor to ensure that data caps do not suppress overall Internet usage and impede the Nation’s goal of encouraging broadband adoption, usage and investment.

**Interconnection**

The Open Internet Order seeks to keep the Internet “open and interconnected,” yet the Interconnection policies of market-dominant ISPs may negatively impact reliable delivery of popular applications. Just four access providers control nearly 70% of the 80 million broadband subscriptions.<sup>95</sup> The OIAC should examine interconnect practices that impede the free flow of content delivery to consumers.

**Application Layer Performance Testing**

The OIAC should augment its current transparency focus by promoting greater consumer insight into application performance. Evaluating broadband performance based on the applications and services that people use most empowers consumers with practical information to evaluate plans and service providers. Content services collate a wealth of anonymized data that can form a wider picture of application performance. Expert input from Edge Providers & transit providers would provide clarity and direction for more open disclosure.

**Specialized Services**

Specialized services may promote development of innovative services, but they should not be permitted to cannibalize Open Internet capacity growth. Nor should specialized services be arbitrarily invoked to evade Open Internet protections or to unfairly disadvantage rival Internet applications. Netflix supports identifying criteria to prevent such gamesmanship, however the

<sup>93</sup> <http://gigaom.com/2013/02/20/say-it-with-me-now-data-caps-are-about-profits-not-recovering-fixed-costs/>

<sup>94</sup> <http://www.publicknowledge.org/blog/question-core-data-caps-debate>

<sup>95</sup> <http://gigaom.com/2012/08/14/us-added-260000-broadband-subscribers/>

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working group has been challenged by definitional inconsistencies within the Open Internet Order. The development of these services should be monitored to ensure that they do not deter investment in Internet services, or limit consumer access and enjoyment of Internet services.

### **Broader Stakeholder Input**

The OIAC should address current and emerging obstacles to the Open Internet by seeking input from a broader range of stakeholders in the Internet ecosystem, including transit providers, content delivery networks, and greater representation by Internet start-ups and new entrants who would be significantly impacted by barriers to an Open Internet.

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### **Jessica Gonzalez**

*Vice President, Policy & Legal Affairs National Hispanic Media Coalition*

This report is the result of countless hours of collaboration between open internet committee members. I congratulate the Commission, the committee and the working group chairs for this notable accomplishment and I look forward to continuing the dialogue which, thanks to these efforts, will now be more informed than ever before.

With that said, it is important to note that adoption of the recommendations in this report, alone, cannot guarantee the continued openness of the internet.

It should come as no surprise that creating this document through a consensus-driven, multi-stakeholder process was not easy. Although I appreciate the collegiality and dedication of my co-members that represent internet service providers, we cannot well expect them to put the public interest over their business interests. As a result, some recommendations are too watered down to actually serve the public interest and preserve a multiplicity of voices over the internet.

The Commission should solicit public comment from the many diverse stakeholders that could not be invited to this table. Many other interested individuals and organizations have expertise in this area and can build upon the outstanding work of this committee.

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### **Shane Greenstein**

*Professor and Kellogg Chair of Information Technology, Kellogg School of Management,  
Northwestern University*

#### **Thoughts on the Open Internet Advisory Committee at its first year**

It is the one year anniversary of the OIAC, and time to briefly reflect on its work. I have been happy to be part of this committee, and contribute to discussions through participation.

My own views are partially shaped by my experience in my working group. It analyzed data caps, and usage thresholds in broadband networks.

Unless I am mistaken, our working group was the first organization to map the landscape by bringing all the arguments into one place. We did not settle anything, nor was it within our purview to settle anything. Rather, we attempted to move the conversation to a more productive place.

Let's be clear about what we accomplished. The group wrestled with competing definitions, and identified bridges between different general arguments and specific observable behavior and facts. The group analyzed where the FCC or another consumer-protection policy-making body, such as FTC, might want to monitor events and where issues remained unsettled.

I have read the other reports too, and they cover novel territory, and they are thorough and careful. They too attempt to move the policy conversation to a more productive place.

There is a lot here to like. I would be happy to continue to serve.

**Charles Kalmanek**

*Former Vice President of Research, AT&T*

**Thoughts on the Open Internet Advisory Committee at Its First Year**

The one year anniversary of the Open Internet Advisory Committee is a good time to consider the ground that's been covered. The committee brought together a broad group of experts with different perspectives, all of whom share a commitment to an Open Internet. I was actively involved in the mobile broadband, specialized services, and transparency working groups, and participated in discussions with the economic impacts working group. The collective conclusions of the working groups indicate that the broadband Internet marketplace continues to be dynamic and beneficial for users, identified no clear issues that require regulatory intervention or rule changes, and recommend continued observation by the Commission.

The mobile broadband working group highlighted the dynamic and global nature of the mobile ecosystem. The U.S. leads innovation in this ecosystem in many ways. While mobile network providers play an important role in the ecosystem, the openness and innovation of the mobile Internet depends on the interplay between many players, including platform and device vendors. As a measure of the rate of change in the mobile ecosystem, some of these players have acquired significant influence in the market only recently. Therefore, one of the concerns about the Commission's approach to openness arises from the particular limits of its purview under the Open Internet Order, which is focused exclusively on broadband providers.

The specialized services working group recognized the trend towards network providers offering both Internet services, and specialized services that use the Internet Protocol, over a shared network infrastructure. This trend benefits the Internet by encouraging network investment in a shared IP infrastructure. Because there are functional similarities between specialized and "over the top" services, the group suggested that the Commission should continue to monitor the impact of specialized services on Internet and "over the top" services.

The transparency working group started from the premise that transparency about network management practices is already a requirement of the Open Internet Order, and is the best way to protect consumers. The group's proposal for a labeling program, similar to a nutrition label, has the potential to improve customer understanding of Internet service offers by standardizing the information disclosed by providers. However, the proposal to include an "averaged" price in such a label would likely increase customer confusion.

The economic impact working group recognized the validity of usage-based pricing, and the fact that data caps do not currently affect most households in the U.S. Usage-based pricing approaches are based on the principle that heavier data users pay somewhat more than lighter data users. Some members expressed concern that data caps could affect the growth of data intensive services in the future. The group acknowledged the need for better consumer education and consumer measurement tools, and suggested the importance of continued monitoring by the Commission.

It is gratifying that the conclusions of OIAC's first year of work affirm the Internet's continued robustness, openness, and innovation. While I am leaving the OIAC after this year, I appreciate

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the opportunity that I've had to contribute.

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### **Charles Slocum**

*Assistant Executive Director, Writers Guild of America, West*

I joined the Open Internet Advisory Committee to participate in the important work of evaluating the effects of the Commission's Open Internet Rules. The Writers Guild of America, West, a labor union representing more than 8,000 television, film and online video writers has been an ardent supporter of the open Internet and the rules that protect it. An open Internet promises to increase the options for content distribution, a critical development for independent producers who have been all but eliminated from the television landscape following the demise of the financial interest and syndication rules and subsequent media consolidation. Already, the open Internet is delivering on this promise, with Netflix series created by Writers Guild members garnering 14 Primetime Emmy nominations. It is important to maintain this openness to encourage further development.

My participation on the Committee has been focused on the Economic Impact Working Group's review of data caps. While the Open Internet rules allows ISPs to offer usage based pricing models, I remain concerned about the potential impact of such offerings, particularly on the development of online video. As discussed in the report, capping Internet usage or imposing additional costs for higher levels of consumption could deter consumers from adopting online video viewing. This could harm the positive progress that has been made by the introduction of online video services such as Netflix and Amazon Prime and could deter new entrants, to the detriment of competition and innovation. The report produced by our Working Group is the product of varying viewpoints and interests. It examines the issue of data caps from different perspectives, but makes no recommendations for Commission action. As suggested in the report, I urge the FCC to continue to monitor ISP use of data caps and other forms of usage based pricing.

**Kevin McElearney**

*Senior Vice President for Network Engineering, Comcast*

This Report of the Open Internet Advisory Committee (OIAC) summarizes our first year of work. The Committee considered many challenging issues from the Open Internet Order that have been the focus of speculation and much public debate. But because the Committee committed to adhering to the facts, and to considering diverse views and information from all its members, the Report generally achieves a consensus that we all can embrace and that acknowledges that the Internet is a complex, dynamic, and multi-party ecosystem.

As the Report reflects, the OIAC collaboratively considered issues regarding specialized services, data caps, consumer disclosures, and openness in the mobile ecosystem. From my perspective, there are three general findings that stand out:

- 1) Broadband Internet Access Services in the US continue to grow, evolve, and remain open to innovation.
- 2) The OIAC is an effective way to help bring the Internet community together to help understand different points of view and educate with facts and data (versus speculation) on challenges and opportunities for the future.
- 3) The FCC should continue to play a constructive role in this dialogue.

Additionally, there are some specific recommendations to guide the FCC that reflect the fact that the Internet's greatest strength is its continuing ability to evolve and that we should be cautious of anything that may unexpectedly constrain innovation and investment. For example, the Report concludes that:

- Regulations should not create perverse incentives for operators to move away from converged IP infrastructure or innovative technologies that benefit consumers.
- The existence of specialized services is not something new and provides consumer benefits, including new investment in networks that support broadband.
- A service should not escape regulatory burdens, or acquire a burden, merely by moving to IP.
- To the extent possible, regulation should be technology-neutral.

The Report also reached some conclusions about data caps and usage based pricing that are worth highlighting. As an initial matter, the concept of a take-it-or-leave-it "cap" has been replaced with products designed to offer flexibility. The reality is, with wireline broadband, most of today's *usage tiers* impact only extreme users and meet 98-99 percent of the customer demand today allowing customers to enjoy a full Internet experience. Usage tiers are designed to have the following benefits:

- Ensure that the majority of end users are not forced to subsidize the highest extreme end users;

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- Enable ISPs to create lower-cost broadband plans that spur adoption while also offering the highest end services for early adopters and innovators; and
- Ensure applications and Internet services have incentives to use network resources efficiently.

It has been an honor to participate in this important work with an exceptionally talented and diverse group of Internet industry experts and advocates who share a common interest – the Open Internet. At Comcast, we will continue to work with the FCC to protect the openness of the Internet as well as the continued investment and innovation that has made the Internet the vibrant and dynamic platform that it is today.