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Federal Communications Commission
Office of the Secretary

EX PARTE

February 4, 2010

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street SW
Washington, DC 20554

Re: Notice of Ex Parte Communication, GN Docket No. 09-191, WC Docket No. 07-52

Dear Ms. Dortch:

On January 26, 2010, Lauren Van Wazer, Cox Enterprises; Jay Rolls, Cox Communications; Art Spivy, Clearwire; Richard Woundy, Comcast; Dave Tennenhouse, New Venture Partners; David E. Young, Verizon; David Reed, MIT[1]; Scott Jordan, UC Irvine; Paul Mankiewich, Alcatel-Lucent; Tom Siracusa, AT&T; Robb Topolski, New America Foundation; and Paul Kenefick, Alcatel-Lucent met with members of the Commission to discuss issues associated with the open Internet and technical details associated with network congestion in packet based networks and the related issue of Quality of Service (QOS). This meeting was organized as part of the Technical Advisory Process (TAP), which was created to provide the Commission engineering guidance on network management issues for the Internet. FCC participants at the meeting included Julius Knapp, OET; Jon Peha, OSP; Zachary Katz, OSP; and Walter Johnston, OET. (A full list of meeting attendees is attached.)

The purpose of the meeting was to provide the Commission with general information on the subject of network congestion, mitigation mechanisms that carriers may employ to deal with network congestion and how quality of service (QOS) may be defined and implemented in the context of Internet Protocol (IP)-based services.

It was noted by participants that congestion is not a new issue for the Internet, and many techniques for dealing with congestion have been attempted in the past. The classical response for dealing with congestion is to reduce the admission of traffic to the network. It was discussed that layering may provide a valuable perspective on dealing with the issues of congestion and that, in spite of many attempted innovations, TCP remains the default mechanism for dealing with congestion. However, the underlying network technology is continuing to evolve rapidly.

[1] David Reed and Scott Jordan participated in this meeting as subject matter experts and did not represent the universities with which they are associated.

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The group observed that short-term congestion and long-term congestion are treated differently. Short-term congestion occurs when there may be momentary peaks in traffic. In general, the classic way of dealing with short duration peaks is by using the TCP/IP protocol to send a message to slow down the traffic at the source(s). In addition, buffers are used at the routers to effectively smooth out the momentary peaks in traffic at the expense of some additional latency to the traffic. Once the buffers are exceeded packets may be lost. One issue that was discussed was that increased buffer sizes may be counterproductive by effectively stretching out the periods of congestion and adding intolerable amounts of latency.. With regard to long-term congestion, engineers are generally tasked to increase the capacity of the network along paths or routes where the traffic regularly exceeds some threshold, such as 65 – 75 % of capacity.

The group observed that congestion is more of an issue at the edges of the network than in the core. This is because there are multiple paths to send traffic within the core as well as larger aggregation of traffic which tends to smooth traffic overall. There is a single path at the edge and the lower volume of traffic is more dynamic, with wider variances.

It was noted that ISPs, in general, manage their networks to provide the best overall experience for their users. This is a complex task for a number of reasons. The increasing variability of user traffic leads to traffic surges that arise quickly and persist briefly. Mitigation techniques generally seek to maximize the performance of the greatest number of users while limiting access to network resources to some users.

QOS was discussed, as well as its use in the context of "managed" services. It was noted that QOS comes at a cost in efficiency but may improve the ability to offer specific services. QOS can be used in conjunction with voice-over-IP (VoIP) capability, for example, to provide a service experience similar to that for traditional circuit switched telephony service. As another example, it was noted that QOS may be necessary to provide an acceptable voice service capability in the wireless broadband environment.

It was noted that QOS is currently supported only within the domain of a single service provider. Lack of standards and economic incentives have hindered the ability to support QOS across multiple network providers. Some participants suggested that network capabilities that benefit one service should ideally be extended to support all services.

The complexity of the wireless environment was also discussed. In addition to having all the same challenges as the wireline environment, wireless transmission introduces additional factors.. For real-time services such as voice and video, some participants stated that QOS may be essential to providing an acceptable service. Although the standards for the various wireless technologies provide for different grades of service, it does not appear that these provisions are in widespread use. It remains unclear to what extent such provisions might be used for 4G wireless networks. Some participants expressed the view that the flexibility to use different grades of service is critical for certain applications such as voice or video while others did not agree on this point.

QOS was discussed in the context of other business models and other layers of the network. Amazon's cloud computing service was described, including the model Amazon uses for charging for QOS. It was noted that predictability is a key component in the economics of QOS. QOS can be supported if you can reliably predict the traffic profile to be supported. It is more challenging to offer QOS when the traffic profile cannot be reliably predicted.

Finally, the discussion focused on the potential impact of QOS on Internet 'best effort' service, the need to innovate in an evolving technology environment, the feasibility of extending QOS to other groups and which groups might be potential users of QOS, and whether transparency might resolve fairness concerns where network congestion and QOS mechanisms are implemented.

The group observed that there is a close relationship between the matter of QOS and how to distinguish between managed services and Internet service. This topic will be discussed in a subsequent meeting.

Julius P. Knapp

Julius Knapp, Chief
Office of Engineering and Technology

Attendees

Name	Organization
Stephen Buenzow	FCC
Michael Caiafa	FCC
Saurbh Chhabra	FCC
Michael Goldstein	FCC
Walter Johnston	FCC
Scott Jordan	UC Irvine
Zac Katz	FCC
Paul Kenefick	Alcatel-Lucent
John Kiefer	FCC
Julius Knapp	FCC
Paul Mankiewich	Alcatel-Lucent
Alison Neplokh	FCC
Stagg Newman	FCC
Jon Peha	FCC
David P. Reed	Self (MIT Media Lab)
Jay Rolls	Cox Communications
Tom Siracusa	AT&T
Art Spivy	Clearwire
Dave Tennenhouse	New Venture Partners
Robb Topolski	New America Foundation
Lauren Van Wazer	Cox Enterprises
Richard Woundy	Comcast
David Young	Verizon