

Quality of Service and “Net Neutrality”

WHETHER A COMMUNICATION NETWORK delivers the applications you expect as a subscriber, at the promised speed and with all features as advertised, depends upon quality of service, or QoS.

The concept is part of the International Telecommunication Regulations (ITRs), which state that administrations shall “cooperate in the establishment, operation and maintenance of the international network to provide a satisfactory quality of service,”¹ and that they shall “provide and maintain, to the greatest extent practicable, a minimum quality of service.”²

In line with the treaty, ITU has published handbooks and nearly 200 technical standards (called “Recommendations”) on QoS, which are currently in force. They cover such parameters as:

- speed (data throughput) of access networks
- congestion in backbone networks
- delays in transmission (latency)
- variations in delay (jitter), and
- loss of information during transmission.

However, a major challenge for determining QoS has arisen since the ITRs were agreed in 1988. There has been a fundamental shift away from traditional networks based on dedicated service channels, or separate networks for each service. Nowadays, the trend is for a single infrastructure based on the Internet protocol (IP) to deliver all services, whether voice, video or data — and increasingly to just a single device.

Traditionally, responsibility for QoS in international communications is divided among the terminating national networks. But in modern packet-based networks, quality parameters are mostly undefined and the responsibility for QoS is no longer clear. Basically, in an IP environment, services are applications executed in the equipment of the user, and the networks themselves cannot fully control the end-to-end quality of what is delivered.

The problem is becoming more urgent with the dramatic increase in mobile communications, which may include hybrid connections with wired networks and terminals. Added to this, networks are becoming increasingly congested because of the boom in data (especially video) traffic. New approaches are needed for the new structure of today’s communication systems.

To continue providing adequate QoS, network operators and service providers can build more infrastructure — but this requires huge investments to deal with the enormous growth expected in traffic. The parallel solution is traffic management: making systems more efficient, while also setting restrictions on the amount of data that can be sent, and who gets priority as a sender or receiver. How traffic on IP networks could — or whether it should — be restricted in this way is sometimes included in discussions of “net neutrality.”

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NET NEUTRALITY

Traffic management has always been in use, such as to give preference to emergency communications. But there is concern about certain approaches that affect the quality of service provided to consumers. For example, particular types or sources of traffic might be favoured above others, or blocked completely.

Agreements might be struck between Internet service providers (ISPs) and companies that offer applications or content, so that better QoS is given to their transmissions over a network, leaving other customers with less. Then there are the so-called “over the top,” or OTT, services (such as Skype) that run through the networks “on top” of the basic provision of Internet access. Operators might seek to charge for reserving a percentage of capacity for these services — which is then not available for general access to the Internet.

These developments could make it more difficult, or slower, for users to access certain websites or online services. So should operators of IP networks aim to generate revenues by offering higher QoS at a higher price, even if this has an impact on the average customer?

The *Best Practice Guidelines for Enabling Open Access*,³ issued by ITU’s Global Symposium for Regulators in 2010, recommend that regulators should only allow such differentiation when it is objectively justifiable. Many regulators are launching public consultations into practices that differentiate between the ways various data streams are treated.

At the same time, the wider financial implications must be considered. Revenues need to be generated to pay for the expansion of networks, which then contribute to general economic growth. But, according to some studies, operators are no longer likely to achieve the necessary revenues by simply providing core and access networks. Instead, more and more revenue is coming from OTT services.

There are proposals to revise the ITRs in order to respond to these changes in technology and the marketplace. In particular, it has been proposed to replace “minimum quality of service” in Article 4.3 with “satisfactory quality of service,” while administrations should ensure that there is transparency in this area so consumers know exactly what they are getting. At present, an ordinary user of the Internet might not know whether his or her connection is slow because of traffic congestion, or because of intentional techniques employed by an operator or ISP.

Administrations will come together to review the ITRs at the World Conference on International Telecommunications 2012 (WCIT-12). Decisions made there that have an impact on QoS and network neutrality could affect the future development of Internet access, and what quality of experience we can enjoy online.

¹ ITRs Article 3.1

² ITRs Article 4.3

³ Available at www.itu.int/ITU-D/treg/bestpractices.html