



Introduction

In last month's Hot Topic, we discussed storage performance metrics and talked about immediacy and persistency as two performance metrics.

In this month's Hot Topic we explore the concept of IT QOS (Quality Of Service) - how an information (IT) network can be measured in terms of the end to end user to user or multi user to user or user to multi user or multi user to multi user experience. Note that users may also be devices and that we may need to measure the response time of device to device or multi device to multi device exchanges.

Differentiating IP QOS and IT QOS

The term IP QOS is already familiar to many readers. IP QoS is the differentiation of services using internet protocols to provide differentiated levels of service. Differentiated levels of service can be delivered through the use of priority protocols such as RSVP, Diffserv, MPLS, SIP and/or IETF RTP (Internet engineering task force real time protocol.)

IT QoS additionally comprehends application performance at either end of the (wireless or wireline) delivery pipe, i.e. it includes storage performance and server performance which is a product of storage and server hardware and software functionality.

Variables as always tend to be memory bandwidth and delivery bandwidth related. A shortage of memory and delivery bandwidth creates packet loss and/or repetitive retries which in turn trigger delay and delay variability.

The more flexible we make the software, ie the more responsive the software is to user demands, the less predictable the performance. Flexibility and consistency are hard to deliver together.

The problem of protocol performance

We also need to consider protocol performance. RSVP, Diffserv, MPLS, SIP and IETF RTP are well defined protocols each with a role to play in traffic prioritisation. The problem arises when these protocols are used together and are expected to deliver consistent end to end delay and delay variability. This in turn may compromise application performance which is ultimately what we are trying to bill against.

The wireless complication

Adding wireless introduces additional unpredictability. Higher bit error rates may trigger higher level send again protocols. Discontinuous coverage (user walks into tunnel) introduces session discontinuity. An IT manager, (a manager responsible for information technology in a corporate, public safety or utility application for example) may have to specify how his/her network will perform over an IP network which may also have a wireless radio link as part of its delivery routing. The performance of such a network constitutes IT QOS, the measurement and management of IT quality of service.

IT QOS and Service Level Management

Service level quality is dependent then on the quality of the wireline or wireless access network, the quality of the core network, the quality of the server bandwidth and application bandwidth available and the capabilities of the people using and administering the system. For specialist users, service level management may also include service level agreements made with third parties including government funding agencies This is service level management in the context of incident response management and as such needs to be integrated into existing command and control systems. Typical performance metrics could be the time taken for an ambulance to arrive, and/or how long it takes the police or fire brigade to respond to a call out and /or making the trains, planes and buses run on time. These networks are characterised by sudden peaks in demand- a major incident for example. Service level agreements have to specify how the network will behave and respond when overloaded.

Grade of Service variables

In a radio network we also usually add in grade of service (GOS) which describes how much of a specified area will have radio coverage .IT QOS therefore depends on IP QOS which depends on GOS which determines whether SOS response times can be met.

This slightly arcane process is described in QOS SLA's (quality of service service level agreements) and the administration of QOS SLA's is known as service level management (QOS SLM).

Service Level Management

QOS SLM is the consequence of moving from circuit switched to packet routed networks circuit switched networks provide consistent and tightly constrained end to end delay and no delay variability. However circuit switched networks are not particularly efficient when loaded with highly asynchronous traffic.

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