

The need for service-aware media networks in an all-IP world

BY BENGT HELLSTROM

With the dramatic increase in video traffic and with new production models implemented, network complexity also increases. In addition, deploying new services and network elements poses a challenge to network manageability. As video is a mission-critical application, it requires high quality of service (QoS), which in turn requires careful planning resulting in increased complexity and higher cost.

Moreover, the QoS problem accumulates with the number of hops and ports in the network. And while consumer-driven QoS demands increase, there has been no major change in traditional data-centric IP QoS mechanisms in the past few years.

One solution is to apply over-provisioning of bandwidth, that is, high-priority media traffic is only allowed to occupy a certain per-

centage of the total IP/Ethernet bandwidth. However, over-provisioning is normally a very costly way of addressing the issue. Forward error correction (FEC) schemes can help to a certain degree, but the network still has to be engineered to an acceptable packet-loss level for the FEC to deliver the required quality for media services.

In large-scale networks, more advanced IP/MPLS (multi-protocol label switching) traffic engineering therefore needs to be employed, with a great deal of fine-tuning required to achieve the needed QoS for video. Besides, as the network changes through geographical expansion or addition of new services, the network operator must re-do the engineering and

IP media service architecture

The traditional approach to video-over-IP transport is to put network adapters, encoders or other media devices with IP outputs at the edge of the IP network and then rely on IP/MPLS routers to deliver sufficient quality. However, this approach will require frequent and complex MPLS traffic engineering as discussed above.

Moreover, management of the media services would only be available at the edge of the network, with resulting limitations in performance monitoring and lack of control of service routing and protection. Larger operators could also face organisational issues with different departments responsible for the IP/MPLS core and the media services.

In order to provide high-quality media services and service integrity to its customers, operators need to be serious about their media business and create reliable media service networks, using the IP core for connectivity. Telcos are already doing this for other services such as broadband, mobile and enterprise. As the media service needs to be handled on-demand, and on an hour-to-hour basis, it is very important to manage media services independently of the IP core network.

One proposed media service architecture is shown in Figure 1. Media access (MA) devices together with media switch routers (MSRs) form a media service network on top of the IP/MPLS core. This architecture provides two major benefits: a

true service-aware media network together with enhanced QoS and performance of the IP network. Services, unicast and multicast can be provisioned on demand, and different protection mechanisms can be applied per service independently of the core. Services supported should include not only IP but also native video and audio services such as ASI, 3G/HD/SD-SDI, AES and MADI.

The media service network should also have the capability to provide performance monitoring both per service end-to-end for service level agreement (SLA) verification as well as per IP connectivity link for fault location. Performance monitoring and SLA verification both at the service layer and link layer is going to become increasingly important moving to an all-IP world.

Embedding this functionality into the MSRs would significantly reduce overall capex and simplify trouble-shooting and SLA verification, reducing operational cost.

The media service layer could be realised with different technologies and products. Net Insight's approach is unique in that it has the ability to handle all media services individually within the IP network. This capability means that the operator can provision, monitor and protect each service on-demand and end-to-end across the IP network, making the network media service aware.

By measuring packet loss and jitter in real time and on all intermediate links, the health of the underlying network is monitored to allow SLA reporting and fault location per link, visibility that is not possible using classical data routers such as MSRs.

In addition, Net Insight is able to deliver 100% QoS for media-rich network traffic. This is accomplished in two ways. Net Insight's Nimbra MSR ensures zero packet loss within each node, thanks to its lossless routing, and improves the quality of the IP network traffic with QoS-enhanced links.

The Nimbra MSR reshapes and re-synchronises the traffic at every MSR hop. Before sending the traffic to the next MSR, the traffic is reshaped to Constant Bit Rate (CBR). This makes it easier for the IP/MPLS core router to handle the traffic and avoid packet loss.

A media network with Nimbra MSRs on top of an IP/MPLS core also significantly increases the manageability of media traffic, thanks to its provisioning, monitoring and protection of individual services. **APB**

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Figure 1. The service-aware media network allows operators to offer their customers truly managed media services with guaranteed QoS.

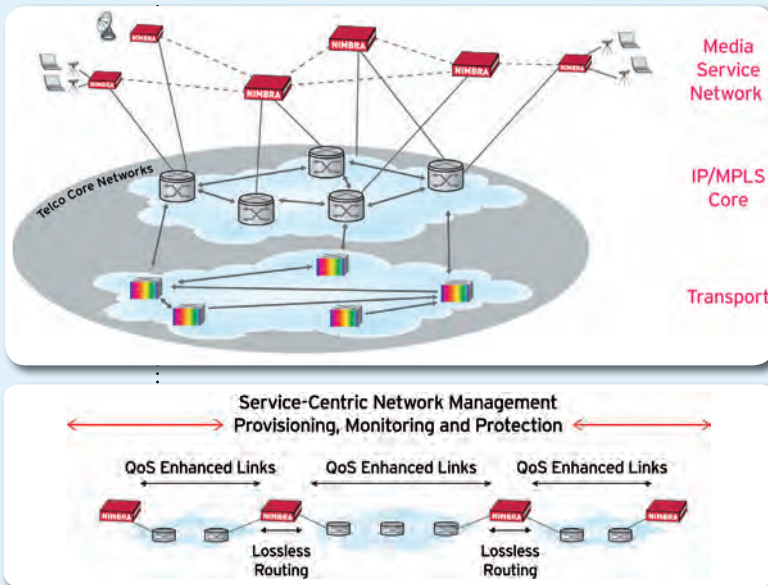


Figure 2: The Nimbra MSR enables service-centric network management and ensures QoS through unique features such as lossless routing and QoS enhanced links.

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