Chapter 11 - Looking Ahead to Managing IMS-Blended Services

The emerging IP Multimedia Subsystem (IMS) is a network architecture that many telecommunications operators will use to deliver converged network services to wired and mobile users alike. Several operators worldwide have already begun deploying their IMS infrastructures, which use a mix of IP, telecom, and cellular-industry standards.

IMS network infrastructures will allow service providers to offer fixed-mobile convergence (FMC) and other multimedia services. The aim of IMS is to enable the delivery of multimedia services over multiple domains (packet-switched and circuit-switched) and across different wired and wireless access networks with no disruption in their voice, data, and video sessions.

Merged Internet, Telecom, and Mobile Services

In its initial iteration, IMS will be a network platform for blending the Internet and telecom environments. The fixed and cellular components provide near-ubiquitous access, while the IP-based Internet technologies allow for the development and delivery of creative application services. All services, current and future, that the Internet provides will run transparently across fixed and mobile networks in an IMS network environment.

Among these services are traditional circuit-switched voice services and newer IP-based services, such as VoIP, video-over-IP, and other “SoIP” (services-over-IP), as well as push-to-talk over cellular (PoC), and a new breed of instant Push-to-X services such as Push-to-Video (instant video sharing) and Push-to-Photo (instant image sharing). Others will include multiparty gaming, videoconferencing, multimedia messaging, presence (user location and availability), content sharing (“see-what-I-see”), and collaboration.

IMS will eventually give network operators and service providers the ability to control service performance and charge for individual services, while subscribers will have access to all their services whether they are at home, in the office, or on the road, domestically or abroad. Carriers worldwide are in the very early stages of deploying IMS networks and will be building them over the course of the next 3 to 4 years, with services to follow for at least the next 10 years.

QoS in Public Telecom Networks

The concept of quality of service (QoS) is a fairly new one in public networking environments. Most fixed and cellular telecom network operations take place at the lower OSI layers, which inhibits deep packet inspection (DPI) and thus precludes application control. Today most telco voice is circuit-switched, while data is transported by special packet-switched 3G and Next Generation Networking (NGN) overlay networks. In other words, voice and data are not truly converged, and today's public packet-switched networks are not application-aware.

This lack of content/application awareness is a problem, especially in markets where regulations mandate parental control to block minors from accessing adult content or prohibit double charging both for content and for the bandwidth used to deliver it. Without deep packet inspection, there is no way to identify application flows at this granular level, track them, and appropriately charge for them or block them.

Mobile carriers with these challenges require DPI to inspect and filter URLs and to prevent double charging, as well as to distinguish between different applications for per-service billing. Indeed, in an IMS-based infrastructure, *DPI is a vital element for the delivery of QoS and for charging different fees for different types of traffic flows*.

IMS and Non-IMS Traffic on One Network

IMS architectures will deliver QoS when IMS network infrastructures and IMS-enabled clients become ubiquitous. In the interim, which is likely to span decades, both IMS and non-IMS applications will coexist. Today, for example, there are only a few IMS-capable phones commercially available—an indicator that the industry has far to go before IMS-compatible applications become the norm and not the exception.

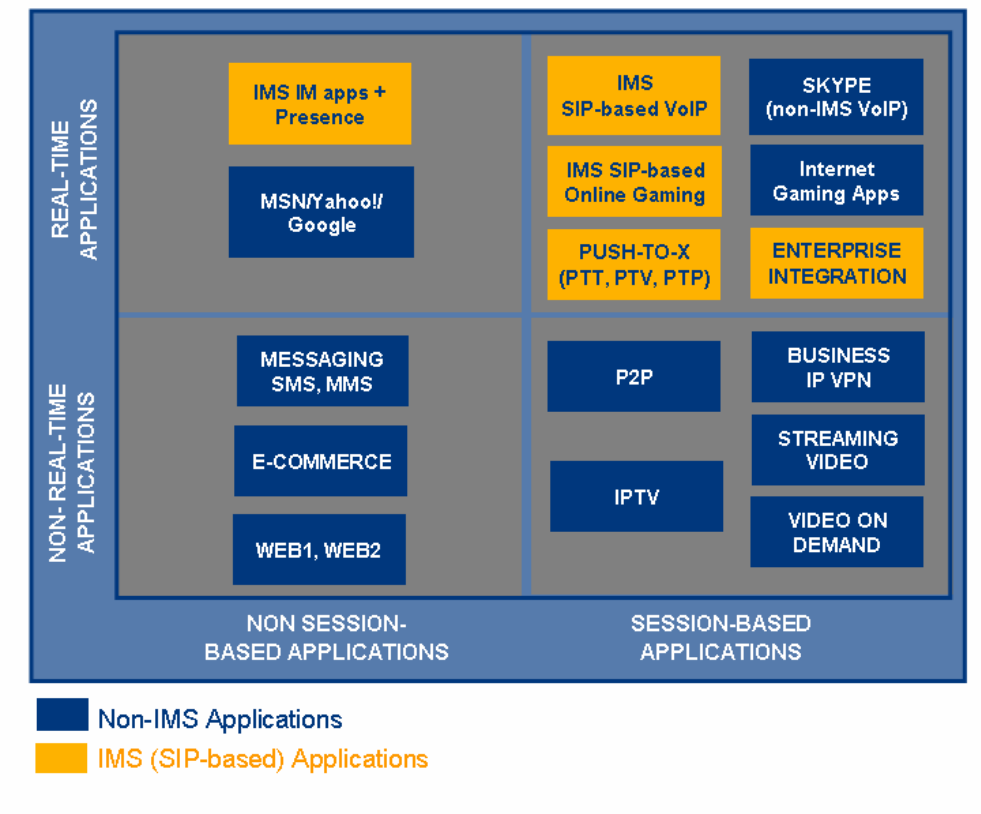

Figure 1: Many IMS applications are real-time in nature and will coexist with traditional applications for many years to come.

Both types of applications, then, will traverse IMS-enabled networks for a long time. How can an operator differentiate between them and offer service packages that take their respective characteristics into account?

Doing so requires a DPI-capable service control system that can distinguish between IMS and non-IMS applications. In this context, the DPI device will reside between a wireless or fixed access network and IP networks such as the Internet or a public carrier's IP backbone (see Figure 2).

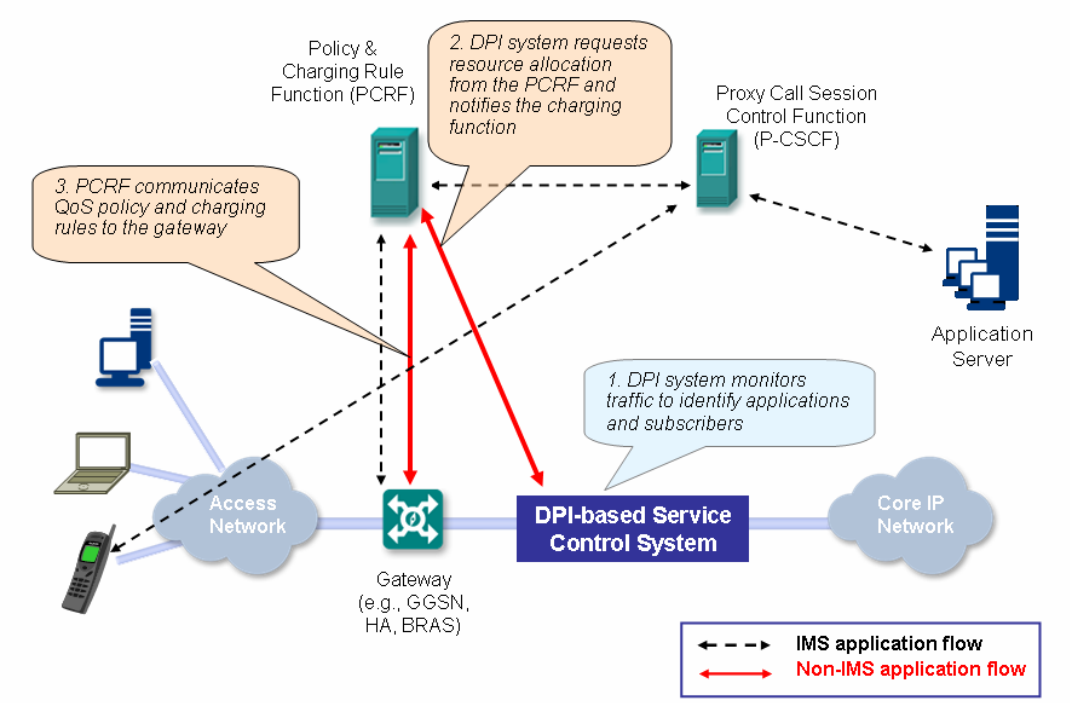

Figure 2: The DPI-based service control system in the IMS infrastructure identifies and classifies applications that are not compliant with IMS standards.

Functioning as an integral part of the IMS network infrastructure, the DPI-based service control system will inspect traffic to determine if it is an IMS or non-IMS application. It will then communicate with an IMS component called Policy and Charging Rule Function (PCRF) to request the necessary network resources for the non-IMS application and to notify the charging function. The PCRF in turn will communicate with the relevant gateway to set QoS policy and charging rules. For example, in GSM-based networks the GPRS Gateway Support Node (GGSN) executes QoS, while in CDMA-based networks the Home Agent (HA) handles these control functions.

This setup allows future providers of FMC and multimedia services to use their IMS network infrastructures to identify non-IMS traffic on a per-application basis, to channelize that traffic through the IMS architecture, and to charge the appropriate fees for each non-IMS stream. For IMS-compliant traffic, the IMS network infrastructure has the detection and identification capabilities built directly into it for this function.

Chapter Summary

Service providers worldwide are beginning to build their IMS network infrastructures. The goal of IMS is to enable services to seamlessly traverse all these networks so that users can roam across different underlying network infrastructures, whether wired or mobile, with a single device and experience no disruption in their service experience. Technology must be in place not only to allow this *access agnostic* capability but also to identify, control, and charge appropriately for these various services.

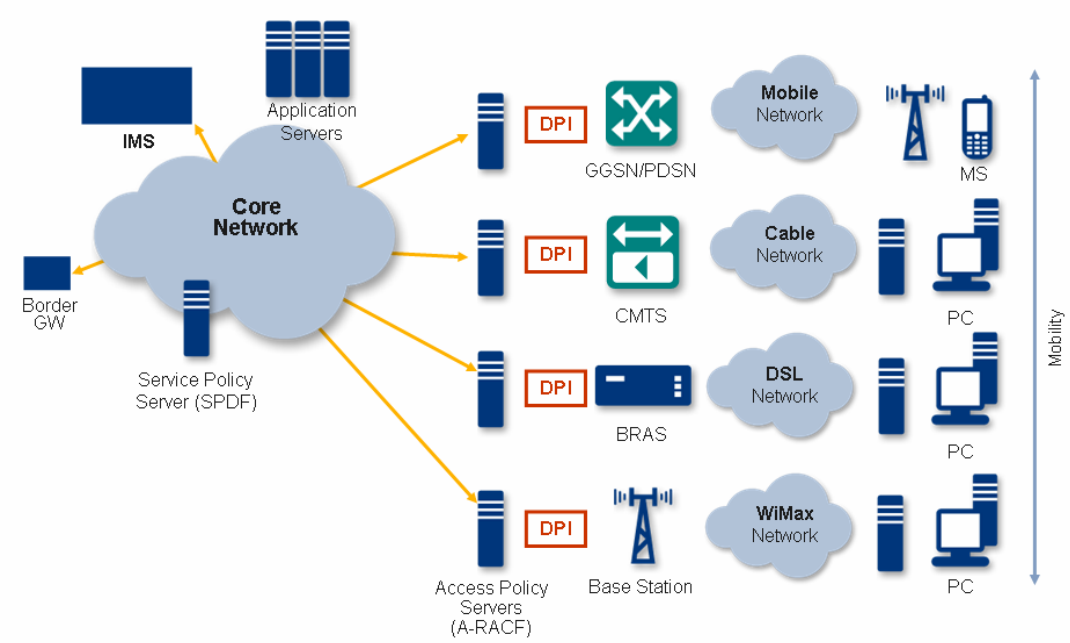

Figure 3: In Next Generation Networks (with IMS infrastructure), Deep Packet Inspection (DPI) is a vital element for the delivery of policy-based QoS.

IMS networks will have QoS capabilities built directly into them for classifying, controlling, and charging for application-specific and subscriber-specific traffic. However, for many years to come, it will be necessary for IMS network infrastructures to deliver applications and services that have not been made IMS-ready. To distinguish among IMS and non-IMS traffic flows, IMS service providers can install DPI-capable service control devices between their access network gateways and IP backbone. The DPI device will examine traffic and determine whether it is IMS or non-IMS traffic. The IMS infrastructure itself will apply traffic classification and shaping to IMS traffic; the DPI device will identify and classify non-

IMS traffic and communicate this information to the relevant elements in the IMS network, which will channelize the flow and appropriately treat it and charge for it.

In this way, the DPI-based service control device becomes the glue that enables providers to forge ahead with their IMS implementations while still having the network intelligence required to classify, shape, control, block, and bill for traffic that will be generated by traditional, non-IMS applications for many years to come.