RESEARCH ON METHODS FOR IPTV SERVICES PROVISION

Kadatskaja O.I., Saburova S.A., Said Mohamed Aamir

V.V. Popovsky Departanent Infocommunication
Engineering, HNURE, Ukraine

E-mail: olha kadatska@nure.ua

Abstract

Researched support IPTV services provision carried out by the IMS entities, can presented eTOM processes involved in ordering operation focuses on the configuration of resources and also the collection of information necessary to monitor service (type of service, SLA, resources state). The process of ordering as defined in the eTOM framework enables the delivery of service in a dynamic way according to the resources state, the service nature and customer type, indeed, the ordering scenario includes a set of processes, which provide to make the optimal decision for resource configuration for IPTV traffic.

The NGN network evolution and growth of demand in the trafficking of IPTV technology namely the video broadcasting(BC), video on demand(VoD), and The Personal Video Recorder(PvR), also the requirement of QoS have stimulated the market to opt for service convergence solutions that implement mechanisms to improve the quality of service provided to customers.

Triple Play means the transmission of voice, data and video by subscription to one access. The broadband IPTV network can handle all three (voice, data and video) services. Common applications for this procedure are telephony, television, and high-speed Internet services.

Depending on the network architecture of the service provider, there are two main types of IPTV architecture to consider when deploying centralized and distributed.

The main objective of this policy is to ensure QoS priority including dedicated bandwidth, controlled jitter and latency that are required by the IPTV traffic mainly the BC one including improvement of loss characteristics To catalyze the implementation of policy-based networking, which helps streamline network operations and provides for scalability we can appeal to the SLA (Service Level Agreement).

At the same time, ensuring prioritization IPTV sub traffic via policy is another important aspect of managing service-levels.

In addition, it is important to ensure that to prioritize traffic in an IPTV or IMS (IP Multimedia Subsystem) client should not affect traffic in the skins of those IPTV or other consumers.

Under the process implemented by the 3GPP approach to improve the quality of IPTV service in the IMS, QoS procedures should be performed during initialization of streaming without taking into account the differentiation between the IPTV sub trades, neither between users of it, hence the interest of a new approach for differentiation of traffic as that of IPTV users.

For handling such constraints, the system must monitor the network parameters and guarantee network resources for the traffic flows. This achieved using a comprehensive QoS management scheme based on the eTOM process, together with an algorithm for classifying packets IPTV.

To model and analyze the network and the service activity a functional charter called eTOM (enhanced Telecom Operations Map) is used.

By projecting, the eTOM process on the IMS can note that the latter designed as an end-to-end call management infrastructure that provides quality of service (QoS) between two call endpoints. Once the service delivered, there is no effort to monitor the receipt of media by the customer.

The eTOM framework proposes a complete set of hierarchically layered processes describing all operator activities in a standard way that can used to monitor the quality with which the IPTV flow is distributed and propose corrective actions to remedy the degradation of QoS.

From this perspective, proposes an IPTV QoS policy design and enforcement scheme, which based on eTOM process that precisely relies upon the combination of a set of elementary capabilities. That is meant to help IPTV service providers in better providing hard guarantees about the level of quality associated to the delivery of VoD, lineare TV and PvR services that can benefit from the IP multicast transmission scheme [1].

The IPTV as the main technology which provides multimedia services; this service class is mainly unidirectional with high continuous utilization (few idle/silent periods) and low time variation between information entities within a flow. However, there is no strict limit for delay and delay variation, since the stream normally aligned at the destination. Additionally, there is no strict upper limit for the packet loss rate.

IPTV has different video traffic (Broadcast, video on demand, PVR, nPVR) which has variable data rate due to the dynamic nature of the captured scene and the Encoding process:

- VoD content/movies (Vidéo à la demande): allows users to select and view a video on demand. The VOD content can transmitted through the platform IMS- based IPTV, which includes a library of movie titles, music on demand. In most cases, this implies the support of trick functions for stream control like play, pause, and stop via the Real Time Streaming Protocol (RTSP).
- PvR (personal video recorded): allows the user to record the broadcast content.
- Linear TV service/Broadcasting TV: enables the client to request and retrieve live TV via unicast and multicast channel using MPEG 2 TS or MPEG4 AVC (H.264).

These types of traffic are different in their sensitivity to latency, if can use an EF behavior to video stream in the DiffServ network. There will be a problem, because Broadcast video can’t support latency compared with VoD/PVR one and due to the fact that multiple IPTV streams placed into the same flow aggregate (FA)/ It is hard to design a maximum limit for traffic policing at the ingress router of a DiffServ domain. If a lot of EF traffic enter into the DiffServ domaine, the core router can cause latency to broadcast packets by serving continuously EF packets at the highest priority, this behavior increases delay. Excessive EF traffic in the core network will therefore lead very fast to full queues and large packet drops.

The logical components needed for broadcast/VoD services can divided in components needed for VoD, for broadcast or general components needed for both services.

The fig.1 provides a better understanding of the processes behind VoD/PvR and broadcast transportation [1]. This high level arch customers and customize commercials.

The mechanisms for providing service in the IMS support different types of service such as data transfer (FTP), messaging but also requiring video and voice (IPTV, VoIP) services. Mechanisms capable of maintaining a high level of security. In addition, to facilitate the deployment of new services video and voice regardless of network topology.

As shown in fig. 2 the supply of a service begins with SIP INVITE sent by the client to the P-CSCF, this latter forward the constraints defined in the request to the S-CSCF to identify the appropriate application server communicating with the HSS. The application server negotiates with the client the type of codec to use before sending the RTP stream to the client [3].

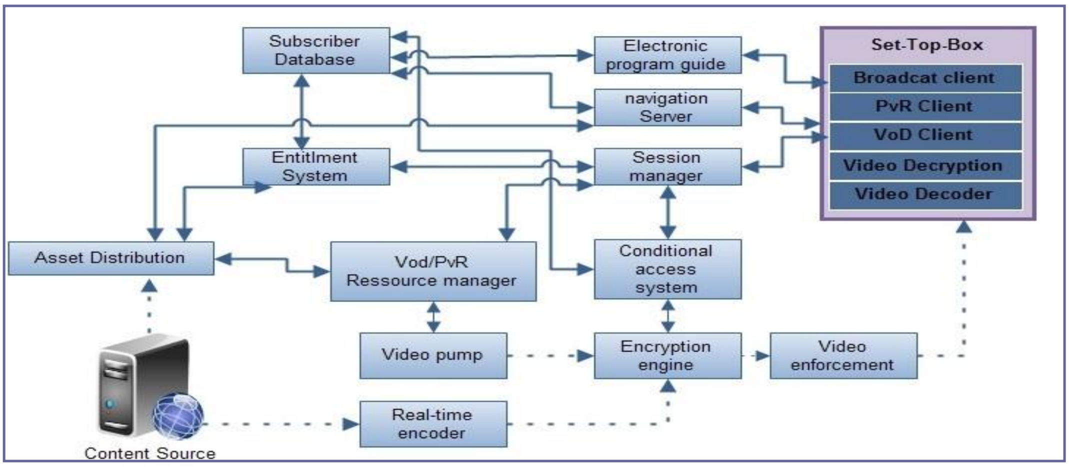

Fig.1. Logical components of the IPTV technology

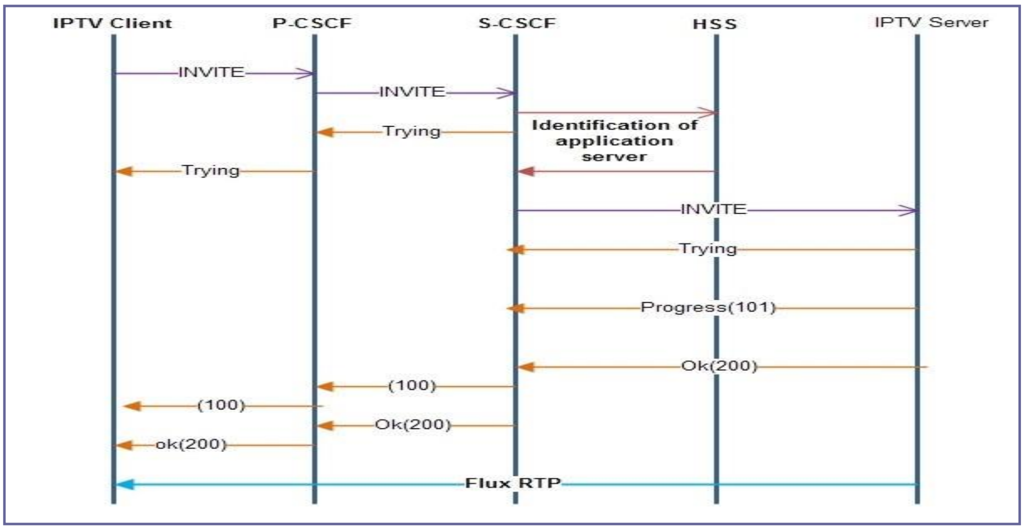

Fig. 2.Provision of service in the IMS (IPTV use case)

The provision of service in the IMS has no specification for IPTV that classified as a single video traffic, the fact that this technology can decomposed into three sub traffics. Different services: broadcast, video on demand, personal video recorder, also the differing types of clients requires the integration of new mechanisms for QoS management that will support the variety of aggregated traffic in IPTV as well as diverse types of users.

The aim of these experiments is to validate our QoS management architecture by putting himself in practical cases for provision of multimedia services provided by IPTV technology in an IMS network [4].

Tests Bench. Test bench consists of two routers (Linux) (fig. 3), which one connected to an application server and the other connected to client terminal. Two servers one, of which includes the entities of the IMS solution deployed by OpenIMS and another that includes the decision module and XML databases and SQL.

Scenarios. In the first scenario, three customers recorded respectively Platinum, Gold and Best effort. Customer-1 asks about the broadcast traffic, customer-2 requests VoD and customer-3 requests PVR. Then the network congested via FTP stream. Both cases made with and without activation of the platform communication.

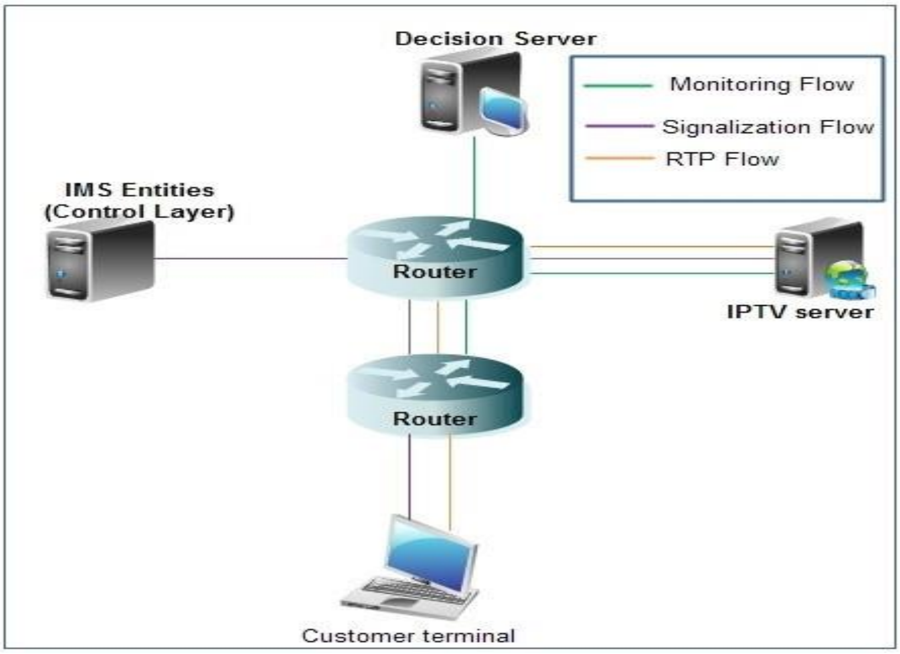

Fig 3. Tests Bench

In the second scenario assume that three users are like GOLD, and ask the same flow as in the first case, Par subsequently the network congested via FTP stream. Then carry out tests before and after the activation of platform communication.

Conclusion

Most of the traffics in IPTV service delivery scenarios are video communication with constraints on delay and loss. Hence, the system must monitor the network parameters and guarantee network resources for the traffic flows, and differentiates between IPTV sub traffic based on their sensitivity to latency and loss by using a comprehensive QoS management scheme. In this paper, can have discussed the use of dynamic QoS and SLA management in IMS networks. Can have accomplished this by using a new approach, which leverages the 3GPP QoS provisioning architecture with eTOM Assurance features monitoring QoS of the delivered flow in real time to monitor the IMS network behavior. The platform will acts as proactive supervisor of the IMS network. It will correct and anticipate the QoS degradations before failures occur at customer premises. It is not a passive platform, which only responsible for producing, managing and sending alarms based on events and thresholds in real time.

References

1. 3GPP TS 23.228 “IP Multimedia Subsystem (IMS), Stage 2”.- 2017.

2. Asiya Khan, Lingfen Sun, Emmanuel Ifeachor, Content-based Video Quality Prediction for MPEG4 Video Streaming, Journal of Multimedia, Vol 4, No 4 (2009),228-239, Aug 2019, doi:10.4304/jmm.4.4.228-239.

3. Fraunhofer Institute FOKUS, “Open Source IMS Core,” http://www.openimscore.org/.-2016.

4. A. Ponnappan, L. Yang, R. Pillai, and P. Braun, “A policy based QoS management system for the IntServ/DiffServ based Internet,” Policies for Distributed Systems and Networks, 2012.Proceedings. Third International Workshop on, pp. 159–168, 2012.