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Comparative study of video streaming services: OTT AND IPTV

Estudio comparativo de servicios de streaming de video: OTT E IPTV

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Abstract

The purpose of this study is to compare Over-The-Top (OTT) and Internet Protocol Television (IPTV) services, the former consists of the transmission of audio, video and other types of content over the Internet, while the IPTV service is the one that transmits audio and video over IP protocols. The advantages of OTT and IPTV technological systems, protocols for their operation, and a brief review of the hardware required for implementation are presented. The methodology used in the study is bibliographic documentary, the information obtained for the constitution of the conceptual theoretical framework was obtained from specialist. The results allow to evidence that in Ecuador most citizens have a TV and smartphone in their homes, more than half of the population has Internet connection permanently, the evolution of the use of OTT and IPTV exacerbated by the confinement due to the health emergency, are inputs that allow us to conclude that video streaming services: OTT and IPTV constitute an alternative for users, due to the accessibility they present of the content to the user.

Keywords: Video, Streaming, OTT, IPTV.

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Resumen

El estudio tiene como finalidad comparar los servicios Over-The-Top (OTT) e Internet Protocol Television (IPTV), el primero consiste en la transmisión de audio, vídeo y otro tipo de contenido por medio de Internet, mientras que el servicio IPTV., es aquel que realiza la transmisión de audio y video por medio de protocolos IP. Se exponen las ventajas de los sistemas tecnológicos OTT e IPTV, protocolos para su operación, y una revisión sucinta del hardware necesario para la implementación. La metodología utilizada en el estudio es bibliográfica documental, la información obtenida para la constitución del marco teórico conceptual se obtuvo de autores especialistas. Los resultados permiten evidenciar que en el Ecuador la mayoría de los ciudadanos cuenta con un televisor y teléfono inteligente en sus hogares, más de la mitad de la población tiene conexión a Internet permanentemente, la evolución del uso de OTT e IPTV agudizado por el confinamiento debido a la emergencia sanitaria, son insumos que permiten concluir que los servicios de streaming de video: OTT e IPTV constituyen una alternativa para los usuarios, debido a la accesibilidad que presentan del contenido al usuario.
Palabras claves: Video, Streaming, OTT, IPTV.

Introduction

The purpose of the comparative study of *OTT* and *IPTV* video *streaming* services is to analyze the service offered by *Over The Top* [OTT] and Internet *Protocol Television* [IPTV], taking into account that Internet use has become a basic service as a result of the COVID-19 confinement.

The use of a streaming platform requires computational and electronic devices such as cell phones, smart TVs, tablets, personal computers, all with Internet connection and with a transfer rate that guarantees maximum performance (broadband). (Piraján, 2019).

The IPTV technology has created a new form of digital television transmission, managing to transmit a variety of interactive channels that can be used by users. Chronologically, IPTV technology was first used in the early 2000s in Spain - Europe. In Latin America, the first country to use IPTV technology was Chile in 2007, followed by Colombia, which made this transmission through a fiber optic network in 2008, expanding to other countries in the region; in the case of

Ecuador appears the attempt of implementation and operation of the service by the public company in 2014.

OTT services consist of the transmission of audio, video and other types of content over the Internet, while IPTV is the transmission of audio and video over IP protocols. In this regard, the United Nations (2019) reports that these technologies can be used to transmit audio, video and content at a relatively low cost and without the need to purchase special services from a particular company, without affecting the security and reliability of the data received by the user.

Due to these characteristics, many companies that provide Internet service have implemented OTT and IPTV services in order to exploit the current Internet networks and thus use the same infrastructure for data transmission. In other words, no additional facilities are required to offer this service, and operators can manage many of the internal parameters in order to guarantee the quality of the service.

Through the OTT and IPTV technological system, the user can access a large amount of information, both audio and video, with options to choose the programming of his preference. These services also offer advantages in terms of advertising, since companies can offer their goods and products selectively.

According to a report presented by the World Bank. (2019), since 2017 nearly 50% of the population has access to the Internet. It also states that this figure will continue to increase. In addition, it highlights that internet access is becoming more and more common since, this tool has become indispensable to perform some daily activities, either at work, education, as a means of communication, leisure or others.

In Ecuador, this technological system has had a very significant increase, due to the fact that a large part of the population, as a result of the COVID-19 confinement, has access to the Internet, a service provided by both private and state companies, which offer this service at an affordable cost, thus replacing traditional television, which in many cases does not have a good signal and its channels are not available throughout the national territory.

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In fact it is important to mention that IPTV technology has created a new form of digital television transmission, managing to transmit a variety of interactive channels that can be used by users. Chronologically, IPTV technology was first used in the early 2000s in Spain - Europe. In Latin America, the first country to use IPTV technology was Chile in 2007, followed by Colombia, which made this transmission through a fiber optic network in 2008, expanding to other countries in the region; in the case of Ecuador appears the attempt of implementation and operation of the service by the public company in 2014.

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many cases does not have a good signal and its channels are not available throughout the national territory.

The study focuses on making known how Communication and Information Technologies (ICT) have grown in recent years by offering tools for users to access streaming platforms that have a wide variety of online audios and videos, which can be watched immediately and continuously without the need to download (Levy, 2019)

Taking into account that OTT and IPTV services currently facilitate the fusion of voice (telephony), data (internet service) and video (television) flows in a single network. For this reason, these services have grown by offering quality services at affordable prices compared to traditional paid operators.

Currently there is an unprecedented technological development, because the Internet user interacts with the issuer and becomes the protagonist, it is who chooses the contents in the various streaming platforms. The Internet user can watch movies, series and videos online at his free choice; being these digital contents the most consumed by them.

The growing use of IP technologies has allowed the streaming platform to be the most widely used in online and interactive television, since it allows the user to have a personalized consumption. That is, this platform allows continuous transmission through OTT, audio and video over the Internet without the need to involve traditional operators for broadcasting. However, to connect they need a device or application that allows them to decode images and sound.

Similarly, the Over The Top (OTT) system is used to transmit audio and video over the Internet. This system is characterized by being a method that depends on the Internet so that they can deliver their service. The (OTT) system, Over The Top is used by large companies such as Netflix, You Tube, Skyoe, Airbnb and WhatsApp, which offer their services in all countries of the world. (Andrade, 2019).

Within this system there are some additional services through which they can operate as is the case of:

- SVOD. This type of service allows that, thanks to the subscription, advertising can be personalized and the user can select the type of advertising he/she wishes to receive.
- AVOD. In this case the advertising services are included in the contents where the free service is offered.

- TVOD. This type of service guarantees access to the platform, where some content must be purchased.

As can be seen, the OTT service offers users a great number of options that adapt to the user's needs, which is why these services have achieved great popularity, due to the service options and low cost.

In OTT service data transmissions are mainly IP and HTTP. By using one of these protocols to transmit audio and video over an Internet connection.

This protocol refers to the transfer of content by means of content through the use of the web, in which they adapt to the medium of transmission of content. This can be achieved by means of a data flow, and allows the sharing of several devices that adapt to the screen resolution. This protocol also improves the security conditions in the services. (Cumbicus, 2016).

Within this protocol there is also the integration with Video Content Authority System (VCAS), which allows to improve the capacity to support the subscriptions of pay TV services, based on many commercial activities. By using this protocol, the description keys will be managed and distributed only to those who should receive it.

IPTV technology allows the transmission and reception of image and voice broadcasting (telephony), data (internet service) and video (television), in a single network. That is to say that through IPTV, the user can have at his service a wide variety of channels where he can make use of movies, text, graphics, data, and video and audio content on demand over a private broadband IP network. (Benavides & Uguña, 2017)..

IPTV offers a number of digital television channels, music, pay-per-view programming, video on demand, electronic program guide, personalized video recording, interactive advertising, information services, games, email, e-learning, karaoke, among other services. In order for the user to make use of them, it is necessary to acquire a receiver and connect it to the TV set or computer. In addition, a monthly subscription must be paid; it should be added that for each special program the user must pay an extra fee. (Guamán, 2017).

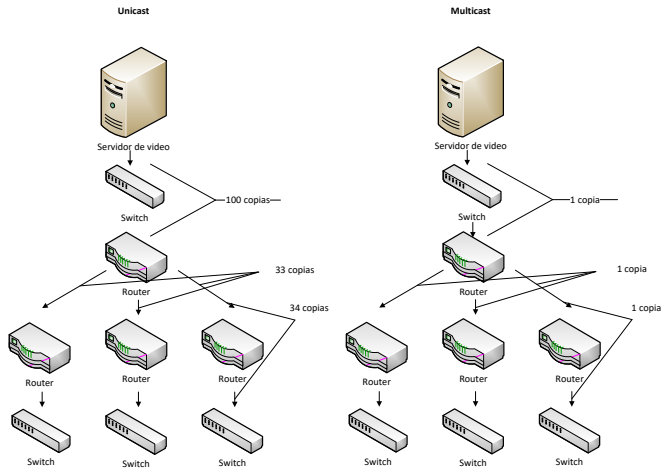
The IPTV system is characterized by being interactive, because it has several services in the same medium, allows surfing the Internet and accessing interactive games. In addition, the IPTV system, contains a series of computer technologies, and allows the distribution and digitization of any media that is connected to broadband Internet.

Through this system, the user has a wide variety of programs available for use. (Borja & Peña, 2014).

The protocols used for video transmission are as follows:

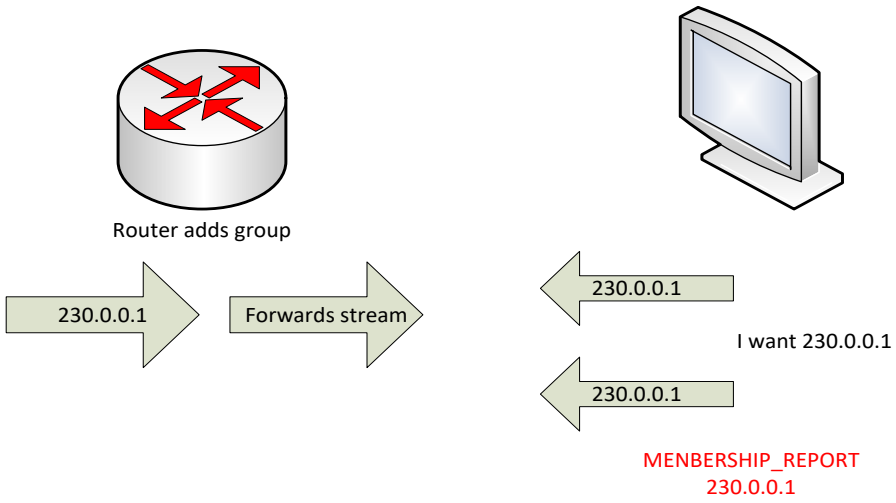
By means of this protocol IPTV technology is able to send to a single IP, all destinations that demand the service, however it is necessary not to confuse it with the *broadcast* services. For its operation, the application subscribes to a group and the host sends a report message < *Menbership_report*>, containing the address of the group to which it now belongs.

Chart 1. IGMP Broadcasting



Based on Goñi (2020)

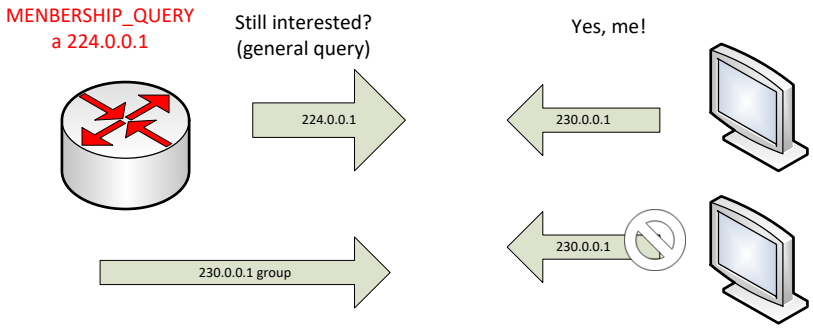
Chart 2. Protocol for sending information



Based on Goñi (2020)

The *routers* periodically send queries (Menbership_query: general) to the group, in which each computer responds with a report to the group to which it belongs, which must include the group address.

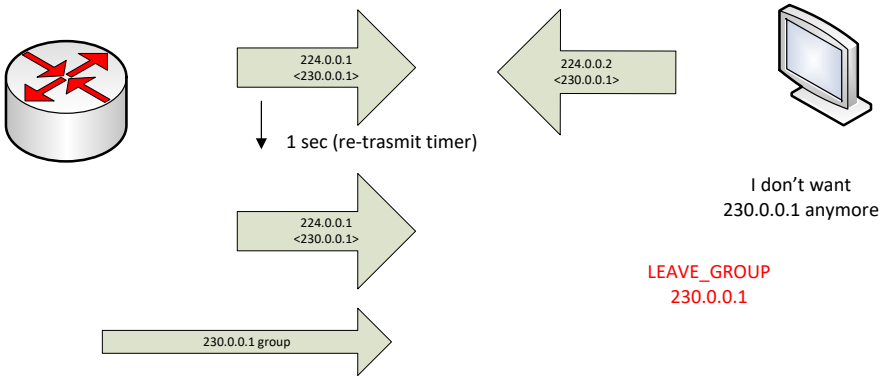
Chart 3. Protocol for sending information



Based on Goñi (2020)

If any of the hosts sends a report, another host in the same multicast group no longer sends a message of its own, which saves resources.

Chart 4. Protocol for sending information



Based on Goñi (2020)

In other words, if messages from active groups are not received within the multicast group, the router deletes this group. In addition, to improve response time and group management, hosts can send *Leave_group* messages to communicate that the routers have left the group.

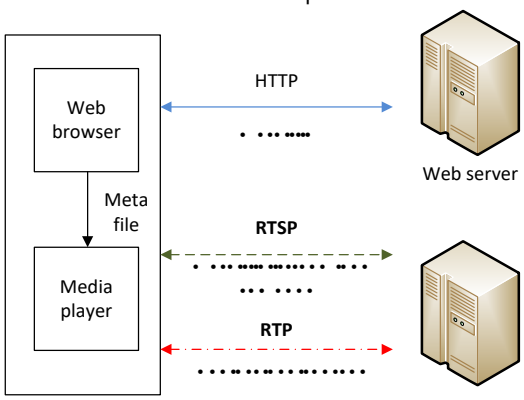
It is necessary to mention that this protocol does not offer any mechanism for routing datagrams, so it is not necessary to use routing algorithms or protocols.

The RTSP protocol is mainly used for the establishment and control of a streaming session, in which it acts as a session remote control, allowing some commands such as play, pause, rewind. This protocol is used in conjunction with SDP (Session Description Protocol), which is responsible for providing the necessary information for the session, such as data streams, content, duration and bandwidth.
The main features of this protocol include:

- Transport layer independence *(TCP or UDP)*
- The server needs to maintain its connection
- Supports *unicast* or *multicast*
- It has a great capacity to adapt to available services

Another type of data transmission protocol is the RPT, which mainly uses UDP protocols to reduce the video-streaming load and thus receive the information. However, this protocol does not offer any guarantee of quality or data delay.
Therefore, it can be concluded that the RTSP protocol is in charge of guaranteeing the establishment and control of the video-streaming connection, while the RTP protocol is mainly used to transport the contents in real time.

Chart 5. RTSP protocol



Based on Goñi (2020)

In fact, the RTP protocol, used for the transport and packaging of multimedia data, is encapsulated over UDP, and above all it is used to monitor the quality of service.

Methodology

The comparative study of video streaming services: OTT and IPTV is documentary bibliographic since the information was obtained from specialist authors such as Marín (2021), Guznay (2019), Guamán (2019), and Orozco (2016). It was also based on descriptive research, which allowed comparing and describing OTT and IPTV video streaming services.

In this sense, Guevara, Verdesoto, and Castro (2020)argue that descriptive research allows to clearly describe each of the components of reality and clearly explain how it influences the subject under study, as in the case of the comparative study of video streaming services: OTT and IPTV.

Hernández and Mendoza (2019)express that descriptive research allows the researcher to use concepts and variables in order to know the causes and consequences that originate the problem under study. Similarly, descriptive research allows the researcher to know the direct opinion on the subject of study.

Results

The results of the comparative study of video streaming services: OTT and IPTV, are performed based on the research presented in the state of the art by expert authors on the subject.

These results show that, at present, the majority of people in Ecuador own a smartphone, and more than half of the population has a permanent internet connection, something similar happens with smart TV, in which the majority of the population owns one in their homes. According to these results Suing, Gallardo and Ortiz (2019) mention that the growing use of social media has led to an increase in online television, so these media have advanced to adapt to the growing need of viewers.

From the results presented by Guzñay (2019), during 2017, OTT usage in our country were 3% of the population, while IPTV usage were 1.8% . During 2018, OTT service rose to 6% and IPTV rose to 4.0%. During 2019, statistics showed that 11.0% of the population had access to OTT services, while 5% had access to IPTV. By 2020, 15.0% of the population has access to OTT services, while 10.0% of the population has access to IPTV service, these data can be seen in the following graph.

The results demonstrate the continuous growth of services that allow citizens to enjoy these services, as mentioned by Guzñay (2019)who analyzes the impact that the telecommunications sector is currently facing, and due to the emergence of OTT and IPTV services, many platforms can offer messaging services, image and audio transmission. These services also come hand in hand with new technological trends which facilitate this process.

However, it is important to emphasize that the expansion of broadband Internet connections makes it easier for these services to be of increasingly better quality, allowing families to access these services, generating an expansion in the demands of customers, who are increasingly seeking these services in the domestic market.

In this sense, Sarango (2021)mentions that in Ecuador 55% of people use OTT services, while the IPTV service is used by 79.0%. It should be added that users use these services for entertainment. For education 23% of users use IPTV and 8% use OTT. For work, 8% of users use IPTV and 1% use OTT. Other uses 15% use IPTV and 14% use OTT services.

These results show that most users use streaming TV services for their entertainment, mostly for movies and series services. In addition, this author points out that the importance of OTT services has a greater geographic scope since their contents are through Internet networks, thus gaining users in remote areas where private networks do not reach; and if we add to this the growth of smart devices connected to broadband, a threat to telecommunications operators that provide IPTV services arises.

In conducting a comparative study of video streaming services: OTT and IPTV, Marín (2021)points out the advantages, challenges and opportunities of streaming. This author reports the growth of streaming consumption in recent years and especially during the Covid-19 pandemic in 2020. In addition, he mentions that streaming consumption in several countries is directed towards the cell phone (mobile), which is the tool that allows connecting to the Internet and is used by 9 out of 10 Internet users. This platform is used to watch short and on-demand videos, TV series and movies online.

Similarly Guznay (2019)mentions that IPTV and OTT-TV users are looking for quality services at a good price, which has allowed them to opt for the OTT-TV service, because they can count on an excellent service at a low price, so most users have made the decision to eliminate IPTV services.

In this sense, these authors point out that this service is used by many users to access various contents that are available on the Internet, since they can diversify the content to which they have access at a low cost. In this regard Guamán (2019)analyzes the importance of digital television by IPTV technologies through the copper network with ADSL technology. According to this author mentions the New Information Technologies (ICT), have become one of the most important means for human development, as they have generated important changes both at cultural and intellectual level. He even mentions that technologies have changed people's lifestyles.

While for Orozco (2016) OTT multiscreen video services, allow the user to access the moment he/she wants to the online television service to watch movies, series, sports, concerts or others, only requires any terminal device that is connected to the Internet, through a computer, smartphone, tablet or smart TV.

These authors agree that these services offer several advantages for users to have television on demand, such as movies and television programs that can be used without the need to be downloaded, i.e. they can be used in real time.

- A variety of channels, programs and videos are available to the user.
- The user is the one who decides what type of advertising he/she wants to receive.
- IPTV allows the user to receive and send important e-mails, according to the user's preference.
- The user has access to information, search engines, e-mail, etc.
- Excellent image quality (Ikutza, 2016).

Likewise, these authors refer to the fact that these services have some differences. Among the main ones we have:

OTT

The transmission of services is provided through the use of open internet, where there is no intermediary between the content and the user.

IPTV

The IPTV service uses a dedicated network with an infrastructure that is managed by the service operator.

Conclusions

During the development of the comparative study of video streaming services: OTT and IPTV is positive, proof of this is the growing demand for this service, since it has protocols to transmit audios and videos in real time. One of the great advantages of the streaming platform is the affordable price and the wide catalog of content, the absence of advertising and the convenience of using this platform from the comfort of home.

In fact, the continuous advancement of technology and streaming platforms have allowed to offer services such as OTT and IPTIV, making users have greater access to new digital channels and social networks which has contributed to users have a preference for using the OTT system, because this service is cheaper and offer more programming, for this reason users doubled. Streaming is a platform that allows the continuous transmission and broadcasting of audio and video in real time through the Internet Protocol (IP). To obtain this service, a television channel broadcasts live streaming through its website, the user must connect from his computer, phone, smart TV or Tablet.

As future work, it is recommended to promote the benefits of the streaming platform, so that more people use this platform in their daily activities, since it is not only possible to watch movies and videos, but it can also be used in security cameras and surveillance services for minors.

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