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OTT/IPTV Content Protection

OTT & IPTV
Content Rights & Restrictions

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Overview

Today, content is king, and there are three major actors in the content life cycle:

- 1. Service Provider:** The company that provides the IPTV and OTT service at your doorstep. This could be a local IPTV service provider like Verizon or AT&T, or OTT players like Netflix or Hulu.
- 2. Content providers:** Companies who own original content and their copyrights. Those are either studios, TV show producers, or individual broadcasters who have control of their content and distribution rights (e.g.: HBO and Sony).
- 3. User:** Subscribers to IPTV or OTT services.

TV/OTT service providers purchase the rights to distribute content from a local distributor or the original content owner/provider. The original owner or content provider gives service providers the right to distribute their content in specific geographical areas. Various rights and restrictions are part of the contract agreement. It is in both content and service providers' interest to protect content from illegal use.

A Video ecosystem is enormous and video delivery life cycle is very complex. We enjoy video in a seamless experience by pressing a play button, but a lot of validation and verification happens under the hood before viewing begins.

In this document, we take a deep dive into the roller coaster ride that the video goes through before you begin watching it.

Firstly, streaming is not free. If you are streaming a video, you have paid a monthly subscription fee, purchased a video, or watched a series of advertisements. If the video is not free, providers protect it with a set of content rights and restrictions. These rights are regulated by content providers and exercised by service providers.

Here, we'll see what different rights and restrictions apply to a streaming video, right from its creation to consumption.



Content Rights

Content licensing is one of the most expensive and complicated areas in the modern day video services industry. The world of content rights continues to evolve with new business models, use cases, delivery mechanisms, and competitors. These are a set of rights that a service provider must secure even before displaying content to the user. If a service provider (Netflix, YouTube, Verizon, AT&T, etc.) wants to publish content from a specific content provider (ESPN, Disney, etc.), it must gain rights (licenses) from the provider. Some of these rights include:

- **Streaming rights:** These rights (license) enable a service provider to stream contents from a network owned by content providers. Based on the agreement, service providers pay an affiliate fee per channel and per subscriber to the content provider.
- **Purchase/Rent rights:** Service providers secure these rights for T-VOD content. The copyright must be bought from content providers so that VOD service providers can publish this content on catalogs for users to purchase or rent. Each service provider strikes a different deal with content providers.
- **Recording rights:** A service provider buys rights for allowing the secure recording of content (DVR). Rights differ based on consumption platforms. For example, mobile apps may not be allowed to record content on the device. Normally, these rights permit IPTV service providers to offer linear recording via STB (Set-Top Box). Some providers do not allow you to play recorded contents on platforms other than the STB.
- **Lookback rights/Time-shifted rights:** A lookback or catch-up feature allows users to stream previously aired content for up to 3 days after the program's original air time. This is like a short-time VOD experience. Service providers secure rights from channel providers to allow lookback. These rights may differ from platform to platform, even for the same channel.
- **Download rights:** These rights are different from streaming rights and recording rights. Typically, download rights apply to VOD content either purchased (TVOD) or subscribed (SVOD). These rights enable downloading of VOD content on the device. However, for TVODs, the expiry of these contents depends on purchase type. For SVODs, it varies from network to network.
- **Geo rights:** When you buy rights from content providers, they are tied to geographical territories. If you are an MVPD service provider, you buy rights for areas where you operate. Usually, VMVPD and OTT providers buy nationwide content rights, which can be expensive.
- **Video format rights:** The streaming rights are secured separately for different resolutions. Usually, SD rights are easier to gain than HD or 4K. Content providers do not allow high-resolution streams if the service provider's platform is not equipped with industry-standard DRM solutions.

- **Casting rights:** One way to enjoy video is to cast it on companion OTT devices. Users can even use their cast-enabled handheld devices to control everything from playback to volume remotely. Not all content providers allow casting, or they limit it to specific cast-enabled devices.
- **Platform rights:** There are various ways to stream video today. Users may prefer watching videos on their personal devices (iPhones, Android phones), relatively bigger screen tablets, or OTT devices (Apple TV, Fire TV, Chromecast), directly on the STB, or on the web. There are different licensing rights for each kind of platform.
- **Digital rights management (DRM):** This technology prevents the illegal use of copyrighted digital materials. DRM tools protect the copyright holder's rights and block the modification and distribution of content. Service providers must ensure content owners that they are using industry-standard DRM solutions in their platforms to gain rights to distribute video content. Most of the time, this requires native DRM software to enforce the highest level of protection (e.g.: FairPlay DRM on Apple devices and Widevine on Android devices). These DRM solutions protect both software and hardware.

Content Restrictions

Geo-Restrictions

With the far reach of the Internet, it is possible to access anything from anywhere in the world—including video content. Video content providers decide whether or not service providers can distribute content worldwide, nationwide, or even to a specific geographical territory. These rules may vary from one service provider to another based on copyright agreements and licensing rights with the content provider.

The driving force for geo-restrictions can be one of the following:

- Copyright agreements
- Licensing rights
- Price discrimination
- Legal requirements

Here are a few examples of geo-restrictions:

Out of Country: Most global OTT service providers (Netflix, Hulu, Hotstar) have a country-specific catalog of content. They redirect you to the country-specific catalog page as you sign in by determining the tentative location of the incoming IP address. However, some of the country-specific service providers block your access to content either by not displaying them or setting geo-restriction rules on the CDN where they host

Out of Home: This restriction is only applicable to the OTT companion counterparts of the MVPD service providers where the users have STB installed in their homes. The content providers allow access to more channels and networks when the users are streaming video from their home network rather than outside networks. This is because providers can offer the best quality of service and content protection on managed home networks rather than on outside, unreliable networks. Providers can determine Out of Home status by comparing the incoming IP address with the home WAN IP address.

DMA restrictions: In the U.S., local broadcast channels are DMA (Designated Market Area) restricted. To allow the streaming of local channels out of home, service providers must first determine that the user's current geolocation is within the permitted DMA. If not, they block access to the local channels.

IP Restrictions/Proxy & VPN Streaming: All incoming video requests coming from geo-restricted areas are blocked by determining their IP addresses' location. Similar checks can be applied for determining Out of Home status. However, there are various ways to mask actual IP addresses by routing requests through country-specific proxy servers or VPN. To avoid such exploits, service providers usually use third-party services that keep track of popular VPNs and proxy servers to determine if they are being used. The service providers can restrict user's access in such cases.

Platform Rights & Restrictions: There are various platform-specific restrictions and rights exercised by both service and content providers.

Jailbroken/Rooted Devices: Most video viewing occurs on handheld devices, phones, or tablets. Many OTT companies develop apps with a mobile-first approach. However, there is an evident risk of distributing videos on non-managed devices. Most modern phones can be jailbroken or rooted with little or no effort, which opens a serious risk. Hackers can easily find the cryptographic keys used for decrypting the media content and access or even pirate the content. This is one of the main reasons most OTT players do not allow streaming on jailbroken/rooted devices.

Screen/Video Capture Restrictions: Screen/video capture is a recent feature available on phones and tablets that can be misused to copy and pirate videos. This restriction avoids such a vulnerability. Content or service providers must ensure they exercise such restrictions correctly.

HDMI/HDCP: HDCP (High-Bandwidth Digital Content Protection) is a protocol developed to prevent copying media content to avoid piracy. Every phone OEM has to comply with the current version of the HDCP protocol. When a user connects a phone or tablet to an external device through HDMI or a similar form of connection, the video content can be copied and pirated if the receiver is non-HDCP compliant. Media transfer is strictly prohibited over such connections and is only allowed when an HDCP compliant receiver is detected at the other end. Service providers with lower HDCP versions sometimes downgrade the video quality to SD from HD.

Platform: Service providers buy streaming rights separately for each kind of consuming platform. There are individual rights for streaming on iOS, Android, Roku, and Fire TV devices.

Other Content Restrictions

Blackouts: The blackout restrictions apply to MVPD and VMVPD operators. The service providers sometimes get into a conflict with broadcasters over retransmission consent fees. Until they resolve this conflict, service providers are restricted from displaying/streaming the content. In the U.S., geo-blocks are often used in blackouts, a common practice among broadcasting companies, national networks, sports leagues, and associations.

Geo-restrictions ensure providers do not stream a specific sporting event in an area where:

- the event in question is taking place;
- national networks exclusively own distribution rights;
- providers are broadcasting the event locally.

Concurrent Streams: This restriction applies to TV-anywhere apps, where password sharing is widespread. Today, most video streaming services try to mitigate password sharing through two blunt methods. They either limit the number of devices per account that are allowed to stream video simultaneously or force users to re-enter their passwords more often. These restrictions are imposed by both content and service providers collectively.

Video Download Restrictions: There are various kinds of restrictions that content providers apply on download and related scenarios. Usually, all TVOD (Transactional Video On Demand) content is allowed to download after purchasing or renting. This content issues viewing licenses, which determine when the viewing window expires. Not all SVOD (Subscribed VOD) content is permitted to download. A specific content provider decides this, and service providers must respect that. Some content providers allow SVOD content to download, but it comes with auto-expiry after a specific time period. After expiry, the user must re-acquire the license to continue watching. Some SVOD content must auto-delete after the viewing window has expired.

Age Restrictions: The television industry designed a rating system known as the TV Parental Guidelines to give more information about content and its age-appropriateness. TV ratings help parents block out programs they don't want their children to watch. They can also use parental control technology in cable and satellite set-top boxes with the TV Parental Guidelines to block programs based on their ratings. Service providers' apps allow primary users to register their kids' age, avoiding inappropriate content. The parental restrictions are usually applied by prompting users to enter a pin/passcode before they can watch age-restricted content.

Casting Rights: Screen mirroring technology allows phone, tablet, or computer screens to display content on another screen either through wireless mediums (AirPlay, Chromecast, DLNA, DIAL, etc.) or through wired mediums (HDMI, Display ports, etc.). Explicit rights have to be acquired from the content provider for each kind of screen mirroring. These rights are baked into DRM policies based on the consuming platform's capabilities. Content providers may choose to lower the resolution (SD from HD) if HDMI connected devices do not support the HDCP protocol version as implemented in the DRM policy.

Summary

Content is king in the video world, and both content and service providers are working to protect it. Protections come in the form of rights and restrictions governed by the content owner or service provider. Some of these rights and restrictions impact a user's viewing experience or a service provider's business. Service providers sign formal license agreements with content providers for each channel or network.

The license agreement stipulates content usage alongside various rights and restrictions, some of which we've mentioned in this article.

Glossary

This glossary will help understanding commonly used terms in this article.

IPTV - Internet Protocol Television (IPTV) is a system where digital television services are delivered over the internet, using Internet Protocol

OTT - Over-The-Top (OTT) refers to the delivery of content over the internet rather than through a traditional cable or broadcast provider. Some examples of OTT services are Netflix, Amazon Prime, Hulu, and so on.

DRM - Digital Rights Management (DRM) is a technology that prevents the illegal use of copyrighted digital materials.

VOD - Video on Demand (VOD) refers to any video service that offers videos, TV, or movies available at a viewer's convenience. Popular examples of Video on Demand businesses include Netflix, Disney+, Verizon, Hulu, etc.

T-VOD - Transactional Video on Demand (T-VOD) allows consumers to purchase content on a pay-per-view basis. You can think of it as an online Blockbuster. Consumers generally have the option to either rent or buy.

S-VOD - Subscription video on demand is a that allows users to access an entire library of videos for a small recurring fee. This fee may be charged daily, weekly, monthly, or annually, depending on the service. Once the user has paid for access to the service, they can watch as many videos as they want on any device with internet access. SVOD examples you may know of include Netflix, Hulu, and HBO.

STB - A Set-Top Box (STB) is a device that generally contains a tuner and connects to a television which is used to transform the signal from the cable, satellite, or from other sources to a form that can be used by the television set.

DVR - Digital Video Recorder (DVR) is a consumer electronics device used to record video in a digital format to a disk drive or to a mass storage device. And can able to playback the recorded content when needed.

MVPD - Multichannel video programming distributors (MVPDs) are service providers that deliver video content to a consumer on their television, either through satellite, cable, or linear broadcast.

VMVPD - Virtual multichannel video programming distributors (vMVPD) also referred to as streaming TV services — aggregate live and on-demand TV and deliver the content over the internet in a linear fashion.

CDN - Content Delivery Network (CDN) or Content Distribution Network, is a large distributed system of web servers distributed across multiple locations to deliver content more efficiently to users. When a page is requested, content is dynamically identified and served from the closest server to the users, enabling faster delivery.

DMA - A designated market area (DMA), also referred to as a media market, is a region of the United States that is used to define television and radio markets.

HDMI - High-Definition Multimedia Interface (HDMI) is an audio/video interface that provides all-digital audio and video via a single cable. It supports a range of higher video resolutions and refreshes rates, plus multi-channel digital audio on a single cable.

HDCP - High-bandwidth Digital Content Protection (HDCP) is a specification developed by Intel Corporation to protect digital entertainment across digital interfaces. HDCP eliminate the possibility of capturing digital content from the source to the display.

OEM - Original Equipment Manufacturer (OEM) refers to the manufacturer of the original equipment, that makes a part or subsystem that is used in another company's end product.

DLNA - Digital Living Network Alliance (DLNA) is a standard that enables digital devices such as personal computers, mobiles, digital video recorders, and TVs to be connected on a network and to share data that is on the connected DLNA-compatible devices.

DIAL - Discovery and Launch is a protocol co-developed by Netflix and YouTube with help from Sony and Samsung. It is a mechanism for discovering and launching applications on a single subnet, typically a home network.

About the Authors

Ashish Ghulghule, Director, Engineering, has 15+ years of experience in developing and delivering applications for mobile and CE platforms. Expertise in developing streaming solutions (IPTV/OTT) on multi screen platforms including Apple, Android, Roku, Chromecast and STBs. Managing multiple projects with cross geo and cross platforms teams. Love coding, strategic planning, connecting with people and customers.

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