

2017

Global Internet Phenomena

**SPOTLIGHT: THE "FULLY LOADED"
KODI ECOSYSTEM**

What is Kodi?

Kodi (formerly known as “XBMC” and “Xbox Media Center”) is open source media player software that allows users to view local media and to stream remote media such as videos, music, and pictures on PCs, set-top boxes, smartphones, and tablets.

While local file playback was the initial application for Kodi (XBMC at the time), remote streaming has become an increasingly popular feature as online video sources became commonplace over the past decade.

This remote streaming is accomplished via small “Add-on” modules that a Kodi user can easily add to their Kodi installation via a menu within the application. Whether the remote streaming complies with applicable laws will be for the courts to decide, but for the purposes of this report we are going to assume the position that the large catalog of official Add-ons that stream content from their original sources (e.g., YouTube and BBC iPlayer) is licensed content and complies with applicable laws and that streaming content via the unofficial Add-ons examined by Sandvine do not have the proper legal rights from the content owner (“unlicensed content”) and do not comply with applicable laws.

“Fully-loaded” Kodi set-top boxes are sold preconfigured to access unlicensed content.

Kodi is Just Software

One of the biggest misconceptions about Kodi is the belief or presumption that the application itself hosts unlicensed content. The image below, taken from the Kodi download page, makes it very clear that their application ships with no preloaded content at all; it is left to the individual user to configure the application to play either local files or stream remote ones.

i The official Kodi version does not contain any content whatsoever. This means that you should provide your own content from a local or remote storage location, DVD, Blu-Ray or any other media carrier that you own. Additionally Kodi allows you to install third-party plugins that may provide access to content that is freely available on the official content provider website. The watching or listening of illegal or pirated content which would otherwise need to be paid for is not endorsed or approved by Team Kodi.

Figure 1 - Content disclaimer from Kodi’s download page

Armed with this understanding, it’s best to view Kodi as a piece of software in the same way that we think of web browsers and other media players. With the right technical know-how, many different software applications - Kodi, Chrome, Firefox, VLC, etc. - can easily be configured to access both licensed and unlicensed content, and it is at the intention of the user as to what content they access.

Recently, the Kodi name has been associated with unlicensed streaming. One major reason is the availability of “fully-loaded” Kodi boxes available through online markets such as Facebook, Craigslist, and Kijiji (see Figure 2) – and even advertised on roadside signs.

A “fully-loaded” Kodi box is essentially a small set-top box with enough computing power to play HD content; importantly, it comes pre-loaded with the unofficial Add-ons and Kodi software configured to access unlicensed content. Simply by plugging such a box into a television and connecting it to the Internet, a large catalog of unlicensed content becomes available to even the most technically challenged user.

Sandvine currently estimates that roughly 6% of all households in North America currently have a Kodi device configured to access unlicensed files and streams.

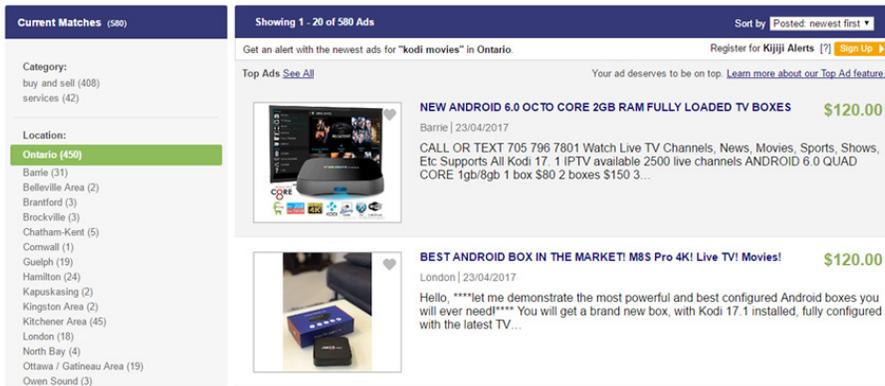


Figure 2 - Screenshot from a Canadian online marketplace selling “fully-loaded” Kodi boxes; this marketplace returns more than 500 unique ads for such devices, with prices ranging from \$50 on the low end, to over \$100 on the high end

How Unofficial Kodi Add-ons Work

Often, the Unofficial Kodi Add-ons that underlie the “fully-loaded” Kodi boxes that access unofficial and unlicensed content are simply aggregators of content from multiple sources; they act like a user interface for an address book that knows where to find content that’s distributed throughout a range of Internet storage services.

8.8% of North American households have an active Kodi installation.

The diagram below shows the workflow for Exodus, one of the more popular unofficial Add-ons.

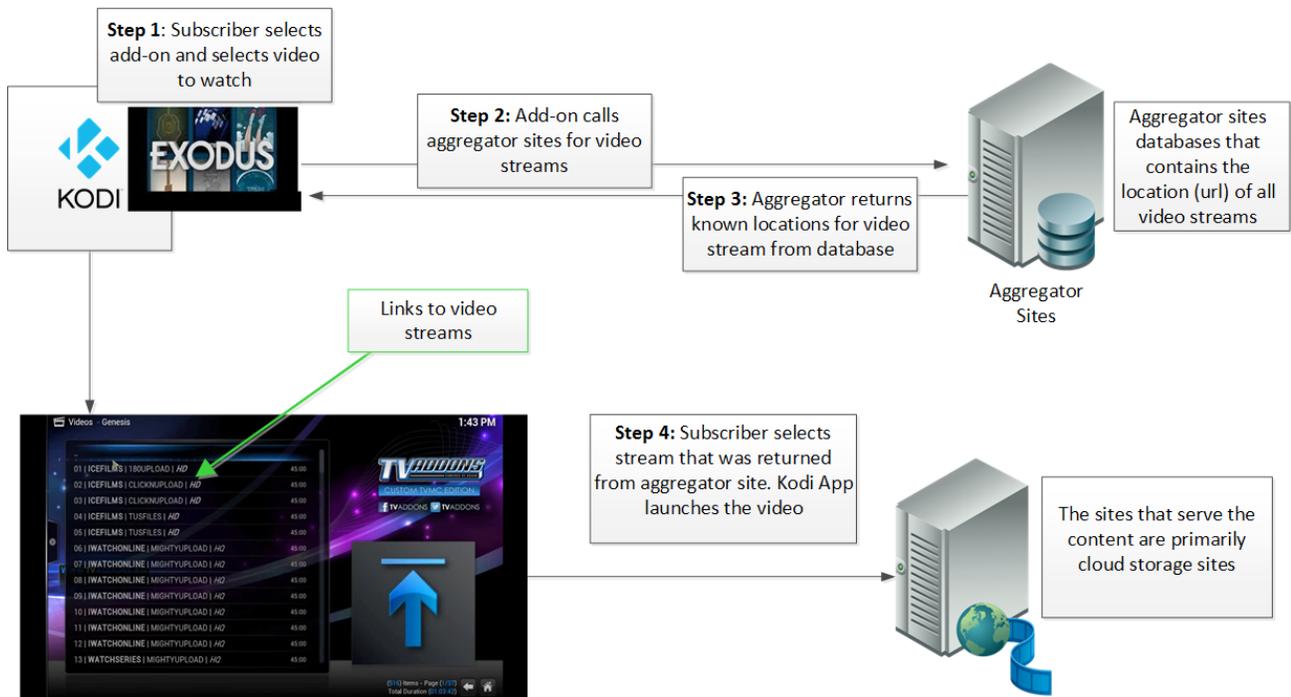


Figure 3 - Workflow Diagram demonstrating how the Unofficial Add-on “Exodus” works

In Exodus, the user selects a video to watch, and then the Exodus Add-on connects to an aggregator site that tracks where various copies of the requested video is stored. The aggregator site then returns a list of available files to the Kodi user interface, from which the user can select the version of the video they wish to stream. The user then selects the video, and the video begins to play.

Unofficial Kodi Add-ons can be configured to access unlicensed live and on-demand content.

The Economics of the “Fully-Loaded” Kodi Ecosystem

Because Kodi is open-source software, there is no licensing fee required to install it on your smartphone, PC, or set-top box. The XBMC Foundation, who are the developers of Kodi, create and maintain the software mainly as a hobby to provide home theater enthusiasts with high-quality media player software.

While the Kodi software is free, the “fully-loaded” box ecosystem has multiple parties who may be making a profit. Some of these participants are outlined below.

Kodi can be run on numerous types of devices including PCs, set-top box, smartphone, and tablets.

The “Fully-Loaded” Kodi Box Seller

The “fully-loaded” Kodi box seller makes money by selling the hardware to end users. As demonstrated in Figure 2, they typically market themselves via online classifieds, and on occasion in retail storefronts. The Kodi box sellers typically make their money on markup/margin from the hardware box itself.

These “fully-loaded” Kodi boxes are also typically sold without any warranty, so the Kodi box seller can make additional money by servicing and reinstalling “fully-loaded” variants of Kodi when certain Add-ons stop working.

The “Fully-loaded” Kodi Service Providers

As mentioned above, the Kodi software is free. However, there are multiple developers that are fully independent of the XBMC Foundation who create unofficial Add-ons and modify the Kodi software so that it’s “fully-loaded” and able to access unlicensed content. In some instances, these add-ons are available at no cost and are hosted on lower quality servers subject to quality and reliability issues. There are, however, paid services where a monthly subscription can be purchased to access live and on-demand video. These services vary in price, but average around \$10 USD/month; they can be purchased both online as well as from the Kodi box seller who may take a small cut of the fee for selling the service.

The File Hosts

Whether the files are hosted for video-on-demand purposes, or re-streamed for live video, a hosting company or content delivery network (CDN) is also receiving some form of payment in the value chain. Sandvine’s analysis shows that free services often use free cloud services from companies like Google, Dropbox, Amazon, and Microsoft, where uploaders take advantage of the large amount of free storage available with these services.

The paid services are likely to use higher quality providers, and thus the hosting and CDN providers housing the files are likely receiving significant payments due to the storage and bandwidth costs associated with serving video.

The File Uploaders

A small part of the economic chain is the users themselves. In exchange for uploading files and making the unlicensed content publicly available, some unlicensed video service providers grant credits to the users who uploaded the files. This model is somewhat similar to private torrent sites that ask users to ensure they are sharing some files in exchange for having the ability to download more.

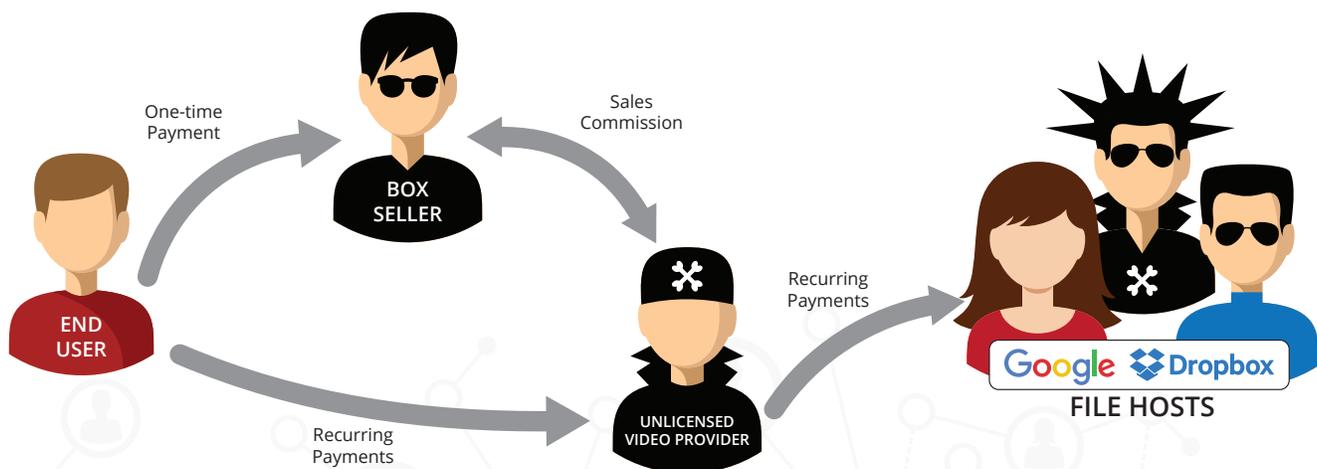


Figure 4 - The economics of the “fully-loaded” Kodi Ecosystem

Kodi Usage Data

Now that the economics of “fully-loaded” boxes are understood, let’s examine Kodi adoption to appreciate just how widespread the phenomenon is.

For this report, Sandvine examined sample data from multiple North America tier one fixed-line communications service providers (CSPs), using a dataset that had over 250,000 anonymized households representing North America as a whole.

The Kodi application itself does not generate much data, but it is easy to detect within a household due to its ‘heartbeat’ traffic which can easily be identified. Of the sample examined, 8.8% of households have an active Kodi installation; this Kodi installation could come in the form of a PC, smartphone, tablet, or set-top box, and in many instances includes Kodi installations on multiple devices within a household.

Kodi was previously called Xbox Media Center (abbreviated as XBMC) because it was initially developed to run on the original Microsoft Xbox.

Kodi Adoption in North American Households

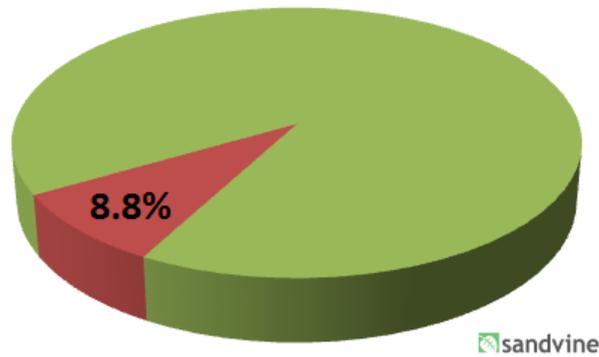


Figure 5 - Kodi Adoption in North American Households

Of course, not all Kodi users consume unlicensed content. To determine the portion of users who do consume such content, we examined the streaming behavior and content sources associated with both official and unofficial Add-ons.

The result: our products determined that 68.6% of households with Kodi devices also have unofficial Add-ons configured to access unlicensed content (Figure 6).

Kodi Households Accessing Unlicensed Content Using Unofficial Add-ons

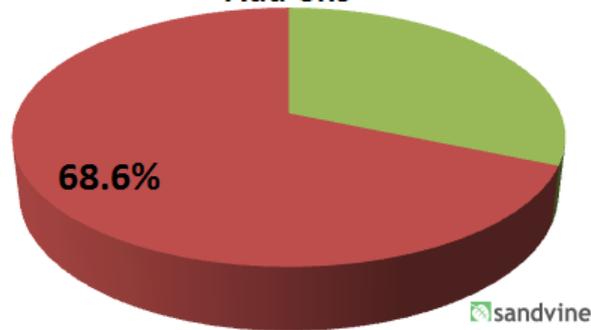


Figure 6 - Kodi Households Accessing Unlicensed Content Using Unofficial Add-ons

It’s straightforward to conclude that 68.6% of the 8.8% of households with Kodi, or roughly 6% of all households in North America, currently have a Kodi device configured to access unlicensed content.

Kodi is not the Root of the Problem

Sandvine is publishing this report due to increasing interest from numerous CSPs, content owners, and regulators, all of whom are aware of the challenges posed by the distribution of set-top boxes such as Kodi that permit the streaming of both licensed and unlicensed content, but none of whom have access to data that quantifies the problem.

In some of the discussion Sandvine has had with the parties listed above, Kodi is often referred to by name as the root of the streaming of unlicensed content problem, but that is wrong.

Kodi simply serves as a front end; If Kodi disappeared tomorrow, then all of the content made available through the unofficial Add-ons would quickly be made be accessible via a web browser, or by another media player, and the parties that are benefitting today (except possibly the “fully loaded” Kodi box sellers), would continue to profit.

Courts in Canada¹ and the European Union², have attempted to crack down on the sales of “fully-loaded” Kodi boxes, but so has the XBMC Foundation who develops the Kodi software. Last year³, the XBMC Foundation acquired the trademark for Kodi and have since started issuing takedown notices against sellers who use the Kodi name to sell set-top boxes and services that facilitate the propagation of unlicensed content for streaming video.

Despite the efforts, to date, of a wide range of stakeholders – including courts, law enforcement, CSPs, the XBMC Foundation, and rights owners like the English Premier League⁴ – the data shows that unlicensed streaming is still prevalent in North American networks. This prevalence is why it’s important for communications service providers to have network business intelligence tools in place to measure and track not only the applications accessing and streaming unlicensed content but, more importantly, the source of the unlicensed content that is available for streaming.

By understanding the source, CSPs and content owners (who are often one and the same) can assist courts and law enforcement agencies to get to the true root of the problem – the streaming service providers and file hosts who profit by enabling access to unlicensed content.

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1. Judge orders interim ban on digital TV boxes over copyright claims from Bell, Rogers, Videotron: <http://www.theglobeandmail.com/report-on-business/judge-orders-interim-ban-on-digital-tv-boxes-over-copyright-claims/article30401979/>
 2. It's illegal to sell streaming boxes with piracy add-ons, EU court rules: <http://www.theverge.com/2017/4/26/15433342/eu-court-of-justice-filmspeler-kodi-piracy-box-ruling>
 3. The Piracy Box Sellers and Youtube Promoters Are Killing Kodi: <https://kodi.tv/article/piracy-box-sellers-and-youtube-promoters-are-killing-kodi>
 4. Premier League gets Kodi piracy court order: <http://www.bbc.com/news/technology-39206185>

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