Study Benchmarking and Tracking Online Film & TV Piracy in Japan

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Photonic System Solutions Inc. (PSS)

Contents

Chapter 1: Purpose of the survey *3*

Chapter 2: Survey Overview *4*

2.1 Overview of piracy sites and apps 4

2.2 Outline of piracy sites 5

2.3 Outline of piracy app survey 8

Chapter 3: Investigation method and results *10*

3.1 Quantitative analysis of a piracy site and the application 10

3.1.1 Investigation method of the piracy site 10

3.1.1.1 Classification of the piracy site 10

3.1.1.2 Listing method of piracy sites 14

3.1.1.3 How to select piracy sites for investigation 15

3.1.2 Findings about the piracy site 19

3.1.2.1 Listing of piracy sites in Japan 19

3.1.2.2 A type and contents of piracy sites 21

3.1.2.3 Server setting country of piracy sites 22

3.1.3 Investigation method about the piracy application 23

3.1.4 Investigation result of piracy applications 24

3.1.4.1 List of piracy applications in Japan 24

3.1.4.2 Types and contents of piracy applications 25

3.1.4.3 Number of downloads of piracy apps 26

3.2 Time-series analysis of piracy sites 27

3.2.1 Method 27

3.2.2 Survey results 29

3.2.2.1 Monthly visits to 624 piracy sites 29

3.2.2.2 Total time spent on piracy sites 33

3.2.2.3 Number of unique users on piracy sites 36

3.3 Content viewing situation survey results for students 41

3.3.1 Survey Overview 41

3.3.2 Type of a device and for the viewing of video contents 41

3.3.3 Video content replay from a PC 42

3.3.4 Viewing video content from mobile device 43
3.3.5 Recognition of the origin of delivery of contents 43
3.4 Summary of Chapter 3 44
3.4.1 Quantitative analysis of a piracy site and application in Japan 44
3.4.2 Trends over time in piracy sites 45
3.4.3 Content viewing situation survey results for students 45
Chapter 4: Analysis of Survey Results 47
4.1 Features of piracy sites in Japan 47
4.1.1 Scale of piracy sites as seen from comparison with regular sites 47
4.1.2 Trends by type of piracy sites 48
4.2 Features of piracy apps in Japan 49
4.3 Anti-piracy measures by the Japanese government in April 2018 49
4.4 The piracy use situation in CDN 52
4.5 About the function to support the creation of piracy sites 53
4.5.1 Example of building a P2P site 53
4.5.2 Example of building an Online Reading site 54
4.6 Countermeasures for future piracy sites 55
4.7 Summary of Chapter 4 56
Chapter 5: Survey Summary 58
References 60

Chapter 1: Purpose of the survey

Viewing movies, animations, TV programs, and manga via the Internet is increasingly expanding due to the high speed and large capacity of communication lines and the spread of mobile information terminals. In this situation, pirated content illegally copied without the permission of the rights holder is frequently uploaded and released on the Internet. In addition, piracy distribution forms, such as a Leech sites, which provides only links to content files, P2P services, which directly exchanges files between terminals, and smartphone apps that have these functions are becoming more and more advanced.

In particular, in 2018, a piracy comic site that could be visited casually by many general users emerged, but was closed as it became a as a social issue. These sites are characterized by the fact that it is difficult to identify the operation manager and even to request the removal of infringing contents, so that it is difficult to counter with conventional piracy countermeasures. As an emergency countermeasure against such malicious piracy sites, the study of site blocking by ISPs has started at the Intellectual Property Headquarters of the Cabinet Office, but the discussions have not been finalized and legislation has not been achieved.

Therefore, even today, only a small amount of pirated content is actually deleted following the individual claims of the right holder. For this reason, it has not yet been possible to fundamentally stop the loss of profits due to viewing by an unspecified number of end users. On the other hand, stricter penalties have been strengthened on a limited basis, such as criminal punishment for end users that download content while knowing it is a pirated version. However, in reality, this only a general awareness campaign.

Based on this situation, the purpose of this report is to:

① Measure the landscape of the most frequently accessed piracy sites / apps in Japan, with movies, TV, anime, manga (comic) content

② Provide analysis on trends in the use of these sites/apps in Japan over last two years

To support discussion about the best policies for reducing online piracy in Japan.

This report has been prepared by Photonic System Solutions Inc. for the Motion Picture Association (MPA) – Asia Pacific and the Japan and International Motion Picture Copyright Association, Inc. (JIMCA). We hope that this report will be useful in future inquiries and discussions with the government, copyright holders, and the press.

Chapter 2: Survey Overview

As outlined in the objectives, we listed piracy sites and apps that are often used in Japan, and quantified their characteristics and investigated and analyzed their usage trends.

2.1 Overview of piracy sites and apps

The outline of piracy sites and apps we reviewed is as follows.

[Research period]

This research was conducted during the following period.

From April 1, 2019 to September 30, 2019

[Content to be surveyed]

We surveyed sites and apps that contain one or more of the following four types of piracy contents, whether it was domestic or international content.

Table 2-1 Content Type Definition

Content type	Definition
Film	Movies screened in movie theaters, including Western and Japanese films. Includes animated movies.
TV program (TV)	TV programs such as dramas and variety. Does not include movies and anime. Includes overseas dramas and variety show
Anime	Animation other than movies
Manga	Comics and comic magazines

[How to get site and app features]

Features such as the number of visits to sites and apps were acquired from SimilarWeb, a website traffic measurement company [1].

[Survey period]

In order to investigate trends in piracy sites and apps, the survey was conducted

for the following two years using the above-mentioned SimilarWeb service.

July 1, 2017-July 31, 2019

2.2 Outline of piracy sites

The outline of the piracy sites is as follows.

[Survey sites]

The survey was conducted by classifying the piracy sites where the surveyed video contents were posted or stored without permission into the following five types.

Table 2-2 Definition of piracy site types

Site type	Definition
P2P site (P2P)	Sites that provide torrent files for downloading piracy content using the peer-to-peer method.
Streaming site	Sites that have the ability to play pirated video content within the site, and content files often exist on other sites.
Online Reading site	Sites with the ability to browse pirated manga on the site, and content files often exist on other sites.
Leech (link) site	Sites that do not have content files on their own sites and that lead to other piracy sites or download files from other sites.
Host (storage) site	Sites where files can be stored online and used as place to store pirated content which is accessed by leech sites and streaming sites.

The above classification is in accordance with the following survey classification.

In 2013, the Ministry of Economy, Trade and Industry's "FY2013 Intellectual Property Rights Working Group Infringement Countermeasures Improvement Project (Contents Piracy Countermeasures Survey) (Roland Berger Implementation)"[2] conducted the actual situation of intellectual property rights infringement on websites. In the METI survey, piracy sites were classified into the following five types, with the site names of the piracy sites and the number of visitors to according to SimilarWeb [1] listed. Table 2-3 shows the site types and features of

the METI survey. This survey was conducted as the position of planning and drafting of the Manga / Anime Piracy Countermeasure Project (MAGP), and then MAGP has been carried out continuously.

Table 2-3 Site Type Characteristics and Number of Sites
in Content Piracy Countermeasures Survey (2013) (Created based on [2])

Site type	Site features	Number of sites
Manga Online Reading	Reading Scan data published	30
UGC site	Play in streaming format	65
Online storage	Select a URL on the reach site and download the file to DL	24
Torrent site	Torrent file DL	33
Leech site	Guide to contents storage	59

In the 2013 survey, UGC sites were targeted, but this survey excludes UGC sites, expect that sites that only handle pirated content or sites that have a category where only pirated content is aggregated are included as streaming sites.

Streaming sites and Online Reading sites often do not have content files on their sites, and are classified as Leech sites if classified broadly. In this survey, according to the classification in the 2013 survey, the classification shown in the above table was used to better understand the characteristics of piracy contents. Leech sites in this survey were limited to sites that do not have content files on their own sites and that do not have Streaming and Online Reading functions.

[Investigation procedure]

For the piracy site, the necessary data was collected and analyzed according to the following procedures (1) to (5).

(1) List of piracy sites

Piracy site candidates were extracted by the following seven methods.

① Listing with the system database currently in operation by PSS
② Past survey report data
③ Lumen database
④ Google Transparency Report
⑤ Site list by summary sites
⑥ Use of SimilarWeb to find similar sites
⑦ Result from search engines

(2) Narrow down piracy sites

The site extracted in (1) was confirmed, two types of search criteria were performed, and survey target sites were determined.

Criteria work ①: Exclude sites that have been closed or not classified as piracy sites

Criteria work ②: Use the number of monthly visits obtained from SimilarWeb to narrow down to more than 100,000 monthly visits from July 2017 to June 2019 in order to conduct the survey efficiently.

(3) Collection of basic data on piracy sites

Collected by accessing and confirming the basic data of the piracy sites targeted for investigation narrowed down in (2).

① Site name
② URL
③ Site type
④ Main content types
⑤ Site status

(4) Collection of server country information on piracy sites

Information on the country of server installation of the piracy sites under investigation was collected by “Netcraft” [3].

(5) Collection of features during the survey period of piracy sites

The following feature values for each month of the survey period (July 2017 to July 2019) were collected from SimilarWeb for the piracy sites that were the subject of the survey.

① Monthly visits
② Average visit duration
③ Monthly unique visitors
④ Number of pages viewed per visit

[Detailed survey procedure]

In June 2019, we picked up frequently visited piracy sites from the surveyed piracy sites and conducted a detailed review.

(1) Collect detailed data with SimilarWeb

(2) Collect data with “Alexa”
(3) Collect data with “Netcraft”
(4) Site feature report creation
(5) Collect information on each site by FReCs List
(6) Obtain a list of popular URLs from SimilarWeb and create a list of popular publications by matching the information in (5).

Detailed survey results are shown in Appendix 3.

2.3 Outline of piracy app survey

The outline of the piracy app survey is as follows.

[Survey application]

As with piracy sites, surveys were conducted by classifying piracy apps that publish surveyed content without permission.

Table 2-4 Piracy apps type definitions

App type	Definition
P2P App	An app that provides torrent files for downloading piracy contents using the peer-to-peer method.
Streaming App	Apps with the ability to play piracy video contents
Online Reading App	Apps with the ability to browse piracy manga.
Leech App	Apps with functions to direct users to piracy sites and download content files.

[Investigation procedure]

For piracy apps, the necessary data was collected and analyzed according to the following procedures (1) to (3). The following is described for Android OS, but the same is true for iOS.

(1) List of piracy apps

Piracy apps candidates were extracted by the following five methods.

① Candidates are extracted by keyword search in the official store (Google Play)
② Search YouTube for videos related to piracy apps and extract candidates
③ Extract candidates with Google search

④ Extract candidates by keyword search in unofficial stores (Apk sites, etc.)
⑤ Search related apps on piracy sites on SimilarWeb and extract candidates

(2) These apps extracted in (1) were actually installed and videos were checked to determine if there were a piracy app. The following basic data was collected for apps judged to be piracy apps.

① App name
② App ID
③ App type
④ Main content types
⑤ App status

(3) Collecting feature values during the survey period of piracy apps

Regarding the piracy apps to be surveyed, the following feature values for each month of the survey period (July 2017 to July 2019) were collected from SimilarWeb.

① Number of monthly downloads
② Number of service users per day per month
③ Number of activations per user per month
④ Monthly app usage rate

Chapter 3: Investigation method and results

In this chapter, we explain the investigation method and results of the actual situation of a piracy site in Japan and the application. The analysis of the findings is placed in the following chapter.

3.1 Quantitative analysis of a piracy site and the application

3.1.1 Investigation method of the piracy site

In this study, we conducted a quantitative investigation into the usage of piracy sites from July 2017 to July 2019 (2 years). In this section, we explain the investigation method.

3.1.1.1 Classification of the piracy site

We classified piracy sites in following five kinds and investigated it.

(1) P2P
(2) Streaming
(3) Online reading
(4) Leech
(5) Host

The methods for storing pirated files can be broadly classified. Sites (2) to (4) do not store files in their own sites. For this reason, these are sometimes collectively called reach sites.

This classification was based on the 2013 Intellectual Property Rights Working Group Infringement Measures Strengthening Project (Contents Piracy Countermeasures Survey) report.

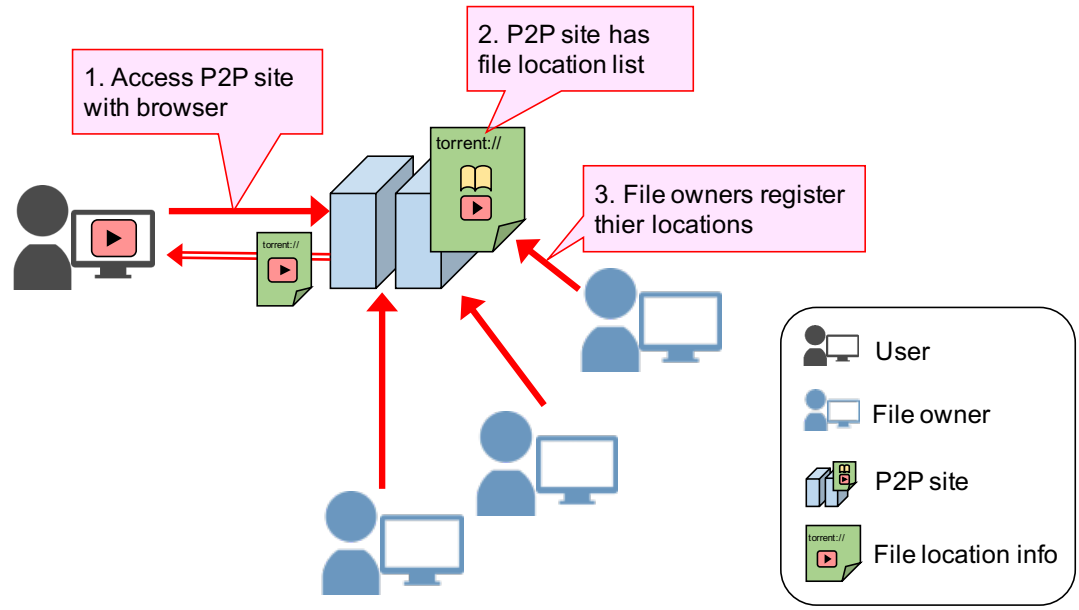
In the following, the definition and mechanism of these sites in this study will be described together in the configuration diagram.

(1) P2P:

P2P offers pirated contents to the user using a peer to peer method communicating without a server between multiple terminals, and they are called “tracker sites”. The constitution example is shown in Figure 3-1. When we access the P2P site and require a pirated file, we can download the “location information file” of the contents file called the torrent file. Based on the information of the torrent file, the target file is received in pieces

from other users' terminals that own the content file, and is constructed into a pirated file for watching. It is torrent client software that control these a series of movement. Torrent client software is legal but is a problem when P2P site manage the torrent file. The pirated content includes many animations, films, TV programs, wide variety of sites also list comics.

Step1: Retrieve torrent files



Step2: Retrieve piracy content files

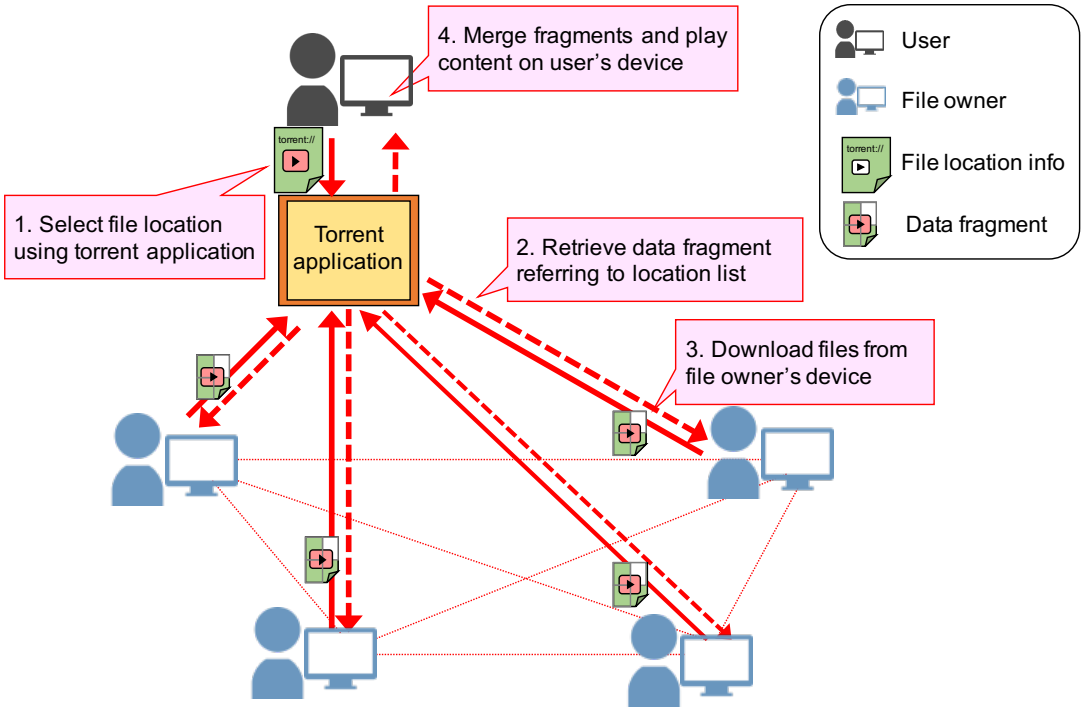


Figure 3-1 Constitution of the P2P piracy site

(2) Streaming:

A site with a function to play back the pirated video contents such as animations, films, and TV programs from their site. The example is shown in Figure 3-2. There are not pirated files on the streaming site itself, the actual files are often stored on host site (5). The user can watch content regardless of whether files exists on a site.

In this investigation, video sharing sites (user generated content (UGC) sites) were excluded, though piracy contents are often contributed by the general audience. Once the category consisting only of piracy sites in the UGC sites was confirmed, we classified them as a streaming site and added it to the subject of survey.

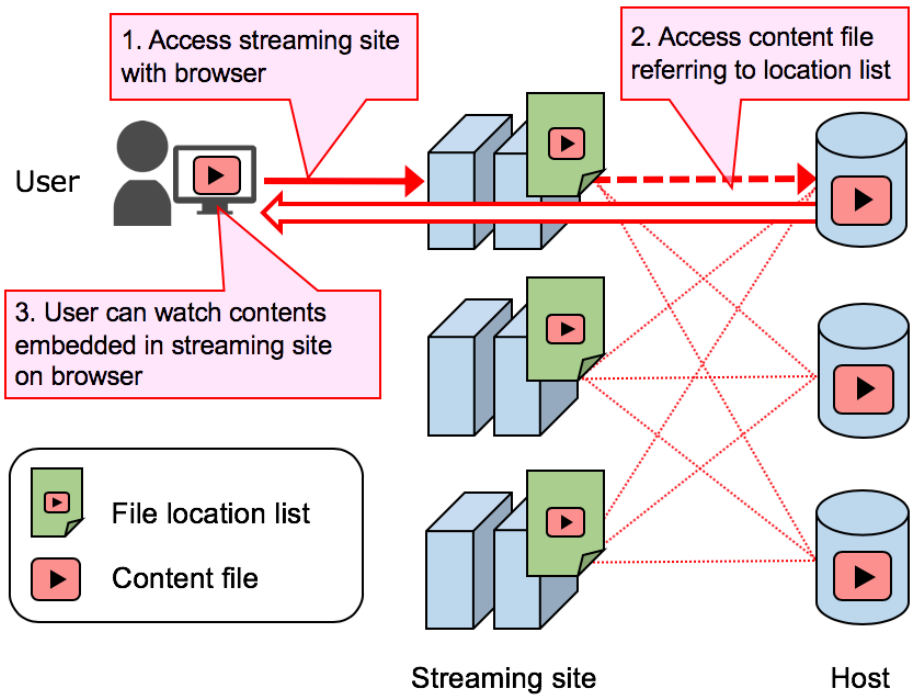


Figure 3-2 Constitution of the Streaming site

(3) Online Reading:

A site with a function to read the pirated edition contents such as comics on the site. We show an example in Figure 3-3. Like a streaming site, the pirated files do not exist on the online reading site. The actual files are often stored in the host site. Therefore, although it is structurally close to a streaming site, it is classified as another category in that the target content is a still image.

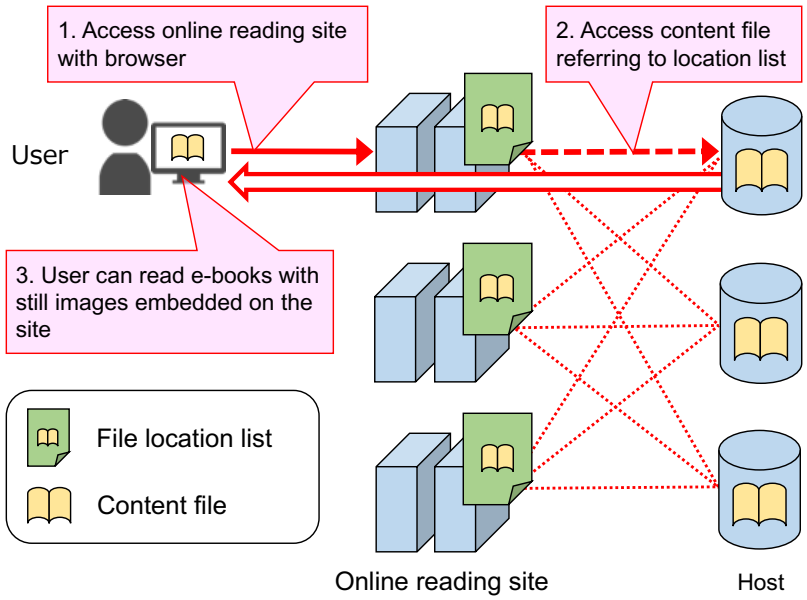


Figure 3-3 Constitution of the Online reading site

(4) Leech:

A site to direct to the piracy site without having contents file its own site. In this investigation, we define the site that does not have a streaming function or an online reading function, as a leech site. The example of the server is shown in Figure 3-4. When a user visits leech site, the link to another site to watch pirated content is displayed. When a user clicks the link, another site is opened and the user can watch contents and can download the file.

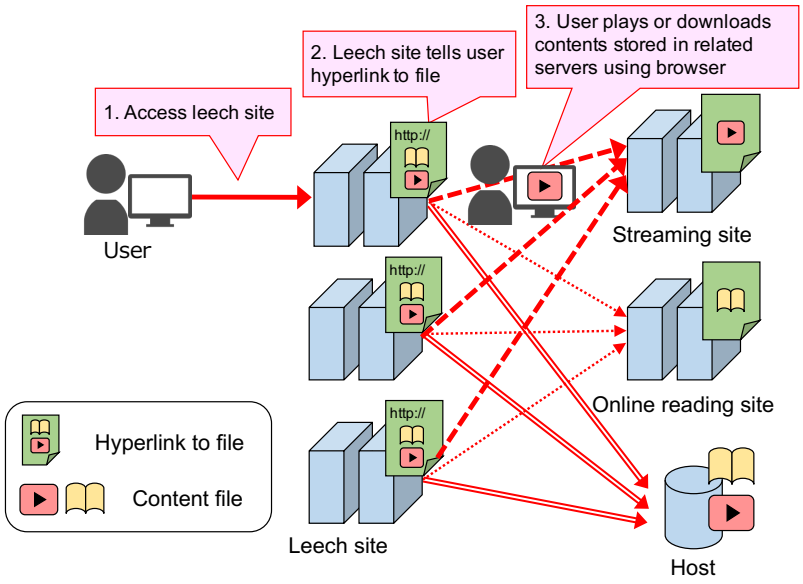


Figure 3-4 Figure of constitution of the Leech site

(5) Host:

This is a storage site that can store files via the Internet. In this survey, the storage site (Host) is the site used to store the pirated files of the streaming and Leech sites mentioned above. (See Figures 3-2, 3-3, 3-4)

In addition, we classified the contents types of each pirated file in four kinds like table 3-1.

Table 3-1 Definition of the contents type

Content type	Definition
Film	Movies screened in movie theaters, including Western and Japanese films. Includes animated movies.
TV program (TV)	TV programs such as dramas and variety. Does not include movies and anime. Includes overseas dramas and variety show
Anime	Animation works other than movies
Manga	Comics and comic magazines

Sites or apps where the content type could not be confirmed due to access issues were identified as unidentified or unknown.

3.1.1.2 Listing method of piracy sites

We collected piracy sites with the seven following methods to list piracy sites.

① Listing by the system database that PSS is applying:

PSS develops FReCs© and software and, since the establishment of the business in 2008, detects for illegally uploaded animation on the video sharing site. We extract the target site using the database which this FReCs© system manages.

② Past working papers data:

We extract it from MAGP (Manga-Anime Guardians Project) reports by Ministry of Economy, Trade and Industry (METI).

③ Lumen database:

Lumen (https://www.lumendatabase.org/) is the site that report contents of DMCA (Digital Millennium Copyright Act) save it, and is

shown. Therefore, we can extract piracy sites because the information that is listed as DMCA is collected in Lumen Database.

④ Google transparency report:

The transparency report of Google shows the data when the government or a company are excluded from search results on Google through the request from a user or a copyright holder. The information of piracy sites is included there.

⑤ Site list by the summary website:

A summary website or a bulletin board to search for piracy sites appear when we search keywords such as “comics for free” or “raw movie”. We investigate a site introduced in that.

⑥ Similar sites feature in SimilarWeb:

The candidate of similar sites are displayed when we search about a known piracy site in SimilarWeb. These similar sites, are very likely to be a piracy site. We extract these. In addition, information on the inflow source site or the outflow destination site was also referenced.

⑦ Results from search engines:

We investigated using search engines such as Google.

As a result of sites that we collected with the seven methods mentioned above, and having removed overlap, we created listing of the candidates of piracy sites of more than 2,600.

3.1.1.3 How to select piracy sites for investigation

In the listing of 3.1.1.2, more than 2,600 cases were extracted even after duplicate sites were deleted. However, some of these sites were not valid for this survey, including sites that were already closed and sites that did not infringe copyright. Therefore, narrowing was performed in two stages as shown in Figure. 3-5.

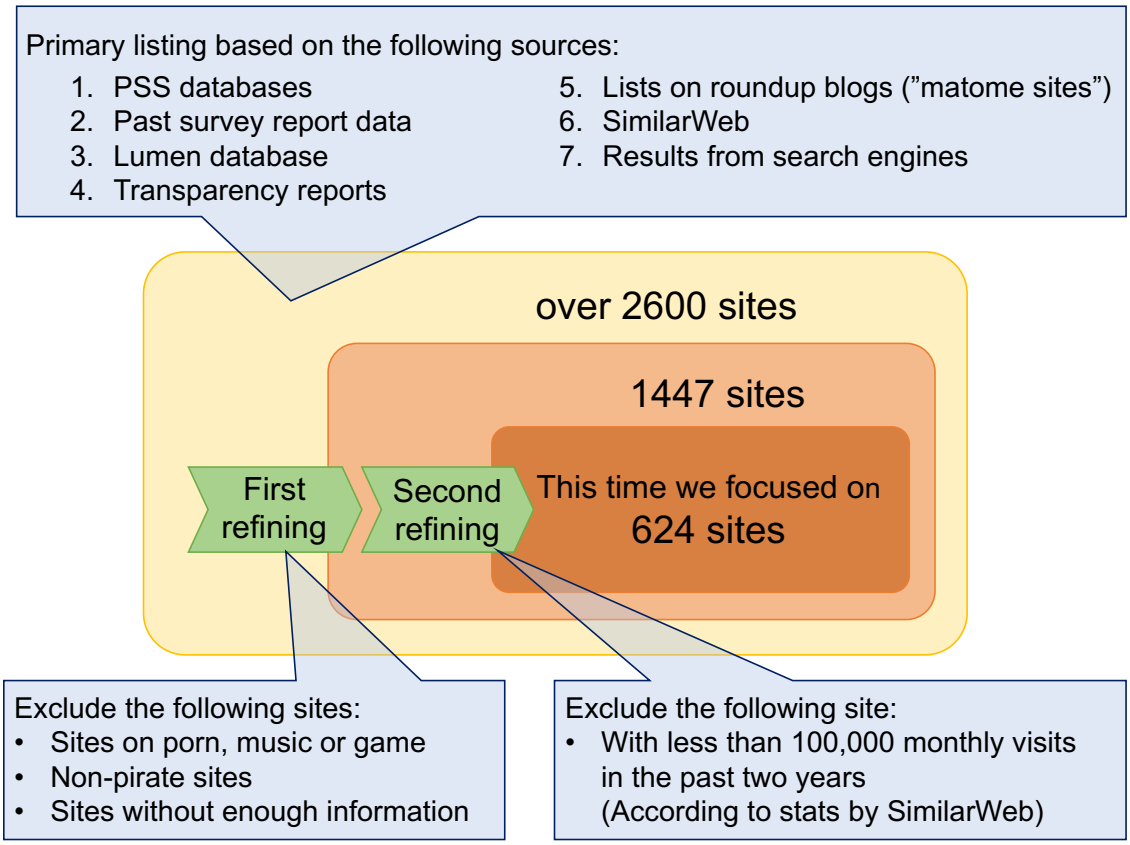


Figure 3-5 Method of selecting piracy sites to be surveyed

Refinement ①: Excluding an inappropriate site, we made a piracy site list

* We excluded sites where copyright infringements are not obvious

*We excluded sites handling only content that is not the subjects of the survey, including music / games

*We excluded sites where piracy and other types are mixed, such as UGC sites

*We excluded porn sites

*We excluded sites that were not suitable for an investigation; for example, sites without concrete URLs.

Through the refinement work mentioned above, we reduced the site list from 2,600 cases to 1,447.

Refinement ②: We extracted piracy sites with larger proportion of access from Japan.

*Using SimilarWeb, we obtained monthly access from 1,447 piracy sites in Japan over the past two years (from July 2017 to July 2019), and selected sites that exceeded 100,000 visits per month even once.

Of the 1,447 piracy sites, 624 were selected for this survey. The list of these subjects of survey piracy sites is shown in Appendix 1. We investigated items to show in table 3-2 about these piracy sites that we extracted by the method mentioned above and analyzed the result.

Table 3-2 Investigation items and investigation method of the piracy sites

Survey category	Survey method	Notes	Appendix 1 posted
Site name	Directly Checked		○
Site URL	Directly Checked		○
Site type	Directly Checked	P2P, Streaming, Online Reading, Leech, Host	○
Type of infringing contents	Directly Checked	Film, TV, Anime, Manga	○
Site status	Directly Checked	active, not accessible, etc.	○
Number of monthly visitors	SimilarWeb		
Netblock Owner	Netcraft		○
Hosting Company	Netcraft		○
Country	Netcraft	If the Hosting Company is unknown, it was set to unknown	○
Monthly unique visitors	SimilarWeb		
how to access	SimilarWeb	Desktop, Mobile	
Duration	SimilarWeb		
Number of page views per visit	SimilarWeb		
Content list	FReCs©List	for 14 piracy sites	
Popular Page	SimilarWeb	for 14 piracy sites	
details		for 14 piracy sites	

When we acquired data of the use situation of piracy sites in Japan in Refinement 2, we used a Similarweb paid account. We can investigate the items in the above table including the number of access according to a country using Similarweb.

In addition, regarding the illegal content list in the last item, we selected 14 piracy

sites that have a particularly large number of visits, and investigated the number of published works, the composition of the sites, and the procedures for viewing the content. Furthermore, in order to list the pirated material, a part of the PSS system FReCs©List was used to develop an information collection program to collect information from the piracy site.

3.1.2 Findings about the piracy site

3.1.2.1 Listing of piracy sites in Japan

1,447 piracy sites were detected at the time of an investigation of June, 2019 in Japan. Their monthly visits total number was approximately 340 million visits (342,013,201). Among them, we had 624 sites piracy sites which has over 100,000 monthly visits in two years from July 2017 to June 2019. Appendix 1 is the list which showed these piracy sites (624). In addition, the above list is arranged in descending order of the total number of visits in the three months from April 2019 to June 2019.

The top 50 sites list of piracy sites from Appendix 1, is shown in table 3-3.

Figure 3-6 shows the ratio of the number of visits to piracy sites in June 2019 to the total number of piracy sites with a large number of visits (1,447). The horizontal axis shows the number of top visited sites, and the results up to the Top 100 site are shown. Also, the color coding of each bar graph represents the ratio of piracy sites by site type.

The top 10 account for approximately 50% of visits for the whole 1,447, and the top 100 account for over 90%. By focusing on the top 100, we will cover 90% of piracy sites.

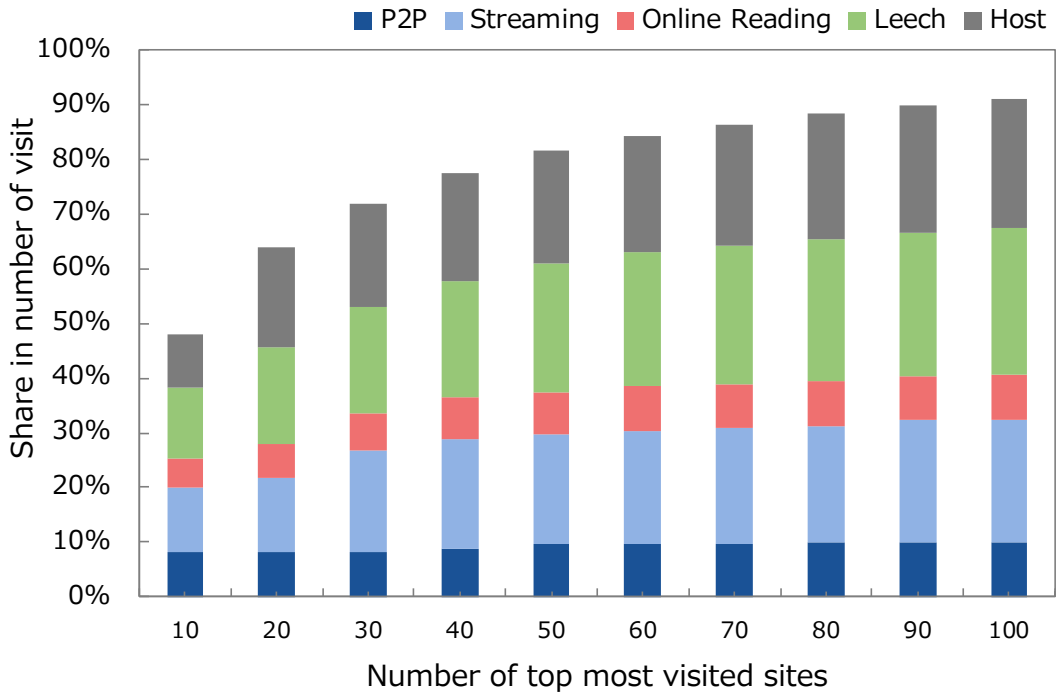


Figure 3-6 The ratio of the high-ranking piracy site for the number of the total visits to piracy sites

Table 3-3 Piracy sites list (extract of Appendix 1)

No.	Site name	URL	Site Type	Main content
1	Nyaa	nyaa.si	P2P	Anime
2	FC2 ひまわり動画	himado.in	Streaming	Anime
3	13DL.NET	13dl.net	Leech	Manga
4	B9GOOD	b9good.com	Streaming	Anime
5	Youtubeアニメ無料動画++	tvanimemuryoudouga.com	Leech	Anime
6	MexaShare	mx-sh.net	Host	
7	MANGA ZIP	manga-zip.net	Leech	Manga
8	uploaded	uploaded.net	Host	
9	RAPID GATOR	rapidgator.net	Host	
10	Katfile	katfile.com	Host	
11	zippyshare	zippyshare.com	Host	
12	13DL.NET	13dl.link	Leech	Manga
13	KissAnime	kissanime.ru	Streaming	Anime
14	星のロミ	hoshinoromi.org	Online Reading	Manga
15	SakuraFile	sakurafile.com	Host	
16	openload	openload.co	Host	
17	ANIME-SHARING	anime-sharing.com	Leech	Anime
18	無料ホームシアター	mhometheater.com	Leech	Film
19	LHScan	lhscan.net	Online Reading	Manga
20	9TSU	9tsu.com	Streaming	TV
21	B9GOOD	up.b9dm.com	Streaming	Anime
22	全話一気に視聴するならココ!!(アニメ)	littlestar.wp-x.jp	Streaming	Anime
23	NOSUB	nosub.tv	Streaming	Anime
24	isekairaw	isekairaw.com	Online Reading	Manga
25	GOGOANIME.com	gogoanime1.com	Streaming	Anime
26	Manga Zone	manga-zone.org	Leech	Manga
27	MEGA	mega.nz	Host	
28	Dl-Zip.Com	dl-zip.com	Leech	Manga
29	VERYSTREAM	verystream.com	Host	
30	しょぼんBOOKs	rawmangazip.com	Leech	Manga
31	Youtubeentertainment shows動画倉庫	owaraidouga.jp	Leech	TV
32	アニメ動画ブログ	animevideojp.com	Streaming	Anime
33	MioMio	miomio.tv	Streaming	TV
34	東京図書館	tokyotosho.info	P2P	Anime
35	Salefiles	salefiles.com	Host	
36	GOGOANiME TV	gogoanime.io	Streaming	Anime
37	anitube Animes Online	anitube.biz	Streaming	Anime
38	Anime Torrent Start	anime-torrent-start.com	P2P	Anime
39	Book Share ZIP	bszip.com	Leech	Manga
40	AKIBA-ONLINE NEO-OTAKU COMMUNITY	akiba-online.com	P2P	Anime
41	アニメNEW	animenew.be	Leech	Anime
42	Youtubeドラマ無料動画	doramadouga.jp	Leech	TV
43	CLIP WATCHING	clipwatching.com	Host	
44	Wupfile	wupfile.com	Host	
45	A-zmanga	a-zmanga.net	Leech	Manga
46	Fembed	fembed.com	Host	
47	RawQQ.com	rawqq.com	Online Reading	Manga
48	アニメ広場	anime-hiroba.com	Leech	Anime
49	animeFLV	animeflv.net	Streaming	Anime
50	DAWNFUN.COM	dawnfun.com	Leech	Manga

3.1.2.2 A type and contents of piracy sites

Figure 3-7 shows the number of piracy sites in Japan classified by site type for the above piracy sites list (624). Streaming sites have the larger percentage, with P2P sites, Leech sites, and host at the same level. The number of online reading sites was as low as 4%.

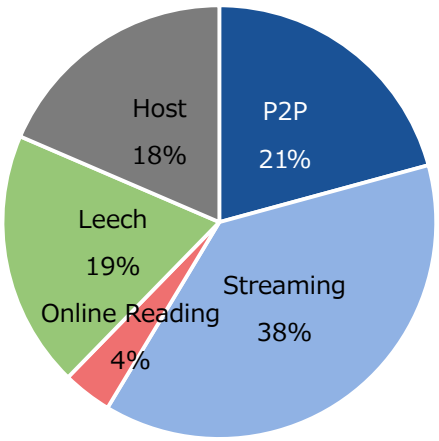


Figure 3-7 Classification (Total 624 site) of piracy sites

Figure 3-8 shows the breakdown of the number of sites by major content posted on each piracy site. However, because there are many host sites whose contents are unknown, 508 sites were targeted. There are many contents in descending order of films, anime, and comics. Each site has multiple types of content, but in this classification, content with a large number of publications is the main content. “Unidentified” indicates that the site could not be confirmed as it was already closed or could not be accessed.

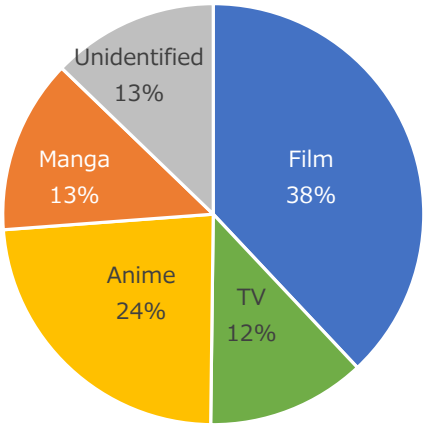


Figure 3-8 Main contents (the situation of 508 sites except Host) in each piracy site

3.1.2.3 Server setting country of piracy sites

We showed the result that investigated where the server is hosted in Figure 3-9 for 624 piracy sites for this investigation in a graph. The United States 9%, followed by Japan 6%, and Netherlands 5%. 39% of host countries were identified in contrast 61% were unidentified. Furthermore, 86% of piracy sites were listed as unidentified using CDN (Content Delivery Network) service of CloudFlare. This result is shown in figure 3-10.

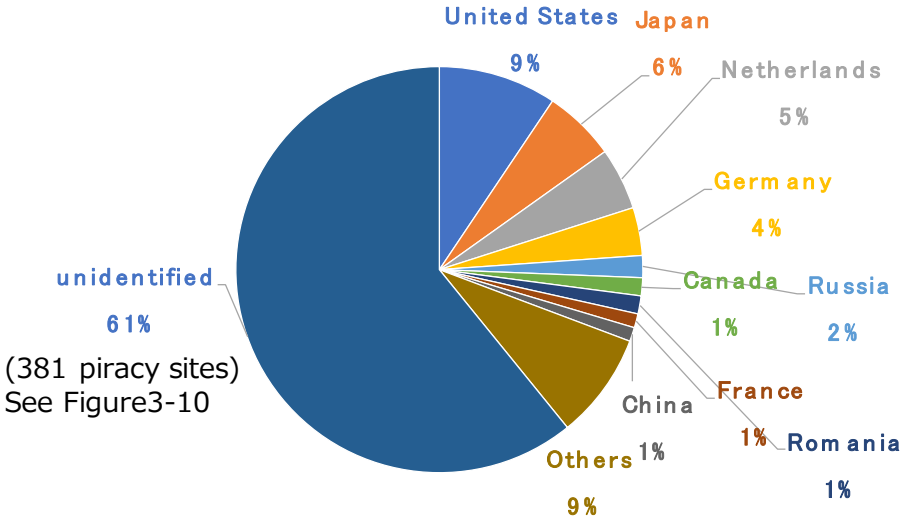


Figure 3-9 The country where server of piracy sites (624) are installed in

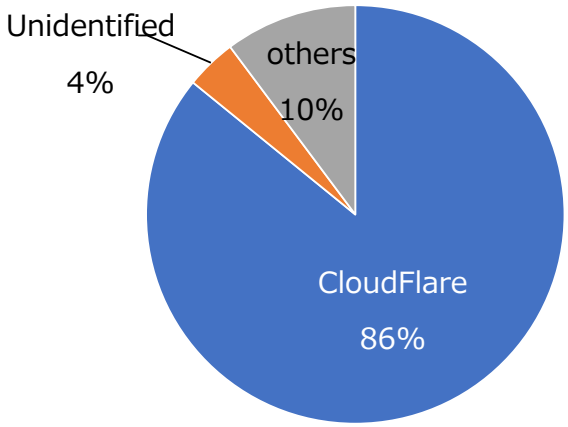


Figure 3-10 The ratio of the CDN in piracy sites (381) where servers setting countries unidentified

As described above, piracy sites make it difficult to take measures against copyright infringement because there are many sites whose host server location is unknown. We

also found that most of these sites use CDN services. CDN is described in detail in Chapter 4.

3.1.3 Investigation method about the piracy application

With the spread of mobile devices (smartphone, tablet), application allowing the viewing and listening of pirated contents is more common. In this section, we explain the investigation method for quantification of piracy applications.

The mobile OS includes iOS and Android, the type of applications and how to obtain them vary depending on the OS.

In this investigation, we prepared a smartphone and a tablet of each OS and we installed piracy application confirmed operation.

The investigation methods according to the OS are as follows.

(1) iOS

For iOS, only apps that have received Apple's pre-approval will be distributed on the App Store, so there are fewer piracy apps than the Android series described below. However, piracy apps can be obtained from unauthorized app stores such as "TweakBox", "Ignition", and "Panda helper". Therefore, apps obtained from these stores were also surveyed.

*Official store (App Store)

Searched for keywords such as Free "movie" (anime, film, manga) in the search window of App store, Apple's official store, and installed and investigated piracy app candidates.

*Unofficial store

① In YouTube, we searched for keywords such as "app to watch "movie" (anime, film) on iPhone" and "app to read manga on iPhone", then extracted and investigated these apps.

② We searched for keywords such as "Tweakbox movie app" (anime, manga) in Google and investigated it.

③ We installed a piracy application candidate from Tweakbox, which is one of the unapproved application stores and investigated them.

(2) Android

Google Play is preinstalled to most of devices of Android. We defined Google Play which was a representative application store as official store in this investigation and investigated it.

More piracy applications are available in Google Play than App Store for iOS.

In addition, we can obtain applications from other application stores (Amazon application stores) and apk delivery sites (APKPure) with the Android device.

Therefore, we did as follow and pushed forward the investigation.

*Official store (Google play)

Searched for keywords such as “movie free”, “anime free”, “manga free”, “cinema HD”, “film HD”, “anime”, “manga”, “TV Japan” in the Play Store, and extracted piracy application candidates and investigated them.

*Unofficial store (Apk sites)

① We searched for it with keywords such as “free movie android” (anime, manga) in Google and extracted piracy application candidates and investigated them. We searched application deleted in Google Play store with a keyword of “application excellent apk” in Google and we extracted piracy application candidates from the unofficial store and investigated them.

② Among the piracy sites listed using SimilarWeb this time, we researched related apps on Streaming sites and Online Reading sites and listed them as piracy apps.

We performed listing of piracy applications with the above-mentioned method and evaluated the actual use situation based on the number of downloaded of applications.

Specifically, we used the SimilarWeb API to obtain the monthly downloads for each app for a two-year period from July 2017 to June 2019, and calculated and evaluated the total number of downloads.

3.1.4 Investigation result of piracy applications

3.1.4.1 List of piracy applications in Japan

As a result of investigating piracy apps in Japan, 111 piracy apps were extracted. The list is shown in Appendix 2. Most of the piracy applications in the list are for Android. Applications for iOS and applications for Android with the same functionality exist. Therefore, we pushed forward with an investigation in the Android system during this investigation mainly.

The top 10 apps list of piracy apps from Appendix 2, is shown in table 3-4.

Table 3-4 List of piracy applications (extract of Appendix 2)

No.	App name	App ID	Main Content
1	アニメ動画-アニメぷれいす-	me.mv.animeplace	Anime
2	Tubi TV - 無料テレビ＆映画	com.tubitv	Film
3	Showbox	com.tdo.showbox	Film
4	Terrarium TV	com.nitroxenon.terrarium	Film
5	Manga村 -山頂-	jp.hanull.sanchohmanga	Manga
6	FrostWire: Torrent Downloader & Music Player	com.frostwire.android	Film
7	Popcorn Time	dp.ws.popcorntime	Film
8	Manga Rock	com.notabasement.mangarock.android.titan	Manga
9	MangaZone	com.ng.mangazone	Manga
10	MangaLife - Best Free Manga Comic Reader	ai.medialab.mangamaster	Manga

3.1.4.2 Types and contents of piracy applications

Figure 3-11 shows a breakdown by type of piracy applications listed. In 111 applications, 68% were streaming. Figure 3-12 shows the results of a survey of the main content provided by piracy applications. The most common with 49% was films, while the ratio of comics, anime and TV was almost the same at 15%.

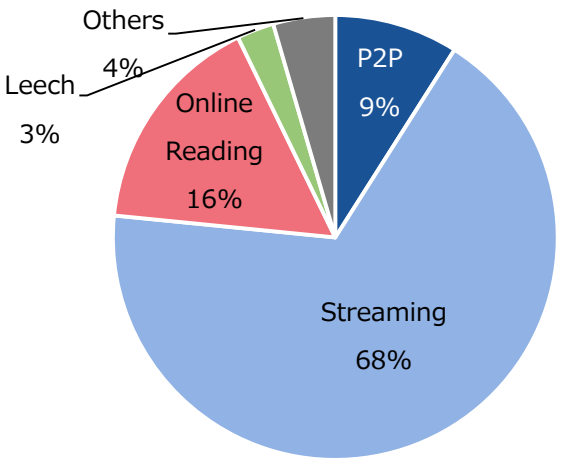


Figure 3-11 Breakdown of by type of piracy applications (111)

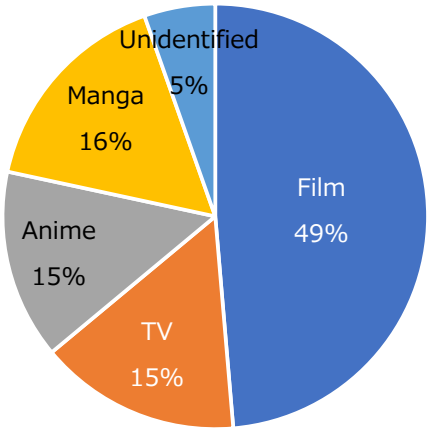


Figure 3-12 Breakdown of main contents in piracy applications (111)

3.1.4.3 Number of downloads of piracy apps

We obtained the number of monthly downloads for each app over two years from July 2017 to June 2019 using the SimilarWeb API, and calculated and evaluated the total number of downloads. As a result, the total number of downloads of the 111 piracy apps extracted in this survey in Japan over the two years was about 1 million.

In order to evaluate the number of downloads, the following survey was further conducted. We picked up regular video apps and manga apps, investigated the number of downloads over the past two years, and compared it with the number of downloads of piracy apps.

Figure 3-13 shows the ratio of pirated sites in descending order of the number of downloads in Japan over two years. Japan's top share was for watching anime , accounting for 64% of all downloads.

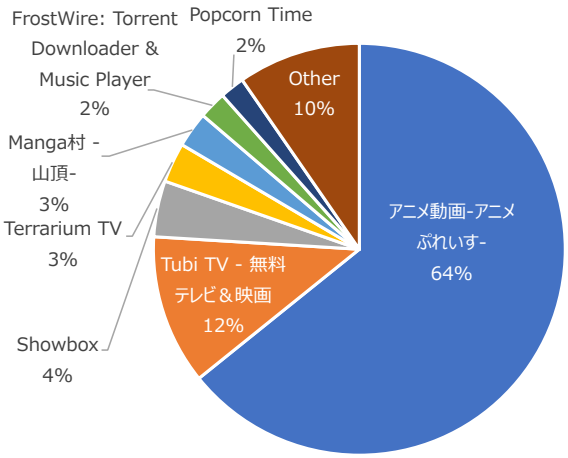


Figure 3-13 Pirated apps with many downloads in Japan
(Total number of downloads: about 1 million)

We picked up three representative regular-version video apps and book apps in Table 3-5, examined the number of downloads over two years, and compared them with piracy apps.

As a result, the total of 3 regular video applications was 27.1 million and the total of 3 regular book all was 14.7 million, for a total of 42 million downloads.

In fact, there are many regular apps other than those selected this time, therefore the total number of piracy apps is estimated to be only 2% or less of three regular apps.

From this fact, it was found that in Japan there are many users who enjoy videos and books with the official apps, and piracy apps are not used frequently.

Table 3-5 List of regular apps used for comparison survey

Video applications

No.	App name	App ID	Main Content	JAPAN Total Downloads (2017/7-2019/6)
1	AbemaTV -無料インターネットテレビ局 - ニュースやアニメ、音楽などの動画が見放題	tv.abema	TV/Anime	-
2	Amazon Prime Video	com.amazon.avod.thirdpartyclient	Film/Anime	-
3	TVer	jp.hamitv.hamiand1	TV	-
			Total	27.1million

Book applications

No.	App name	App ID	Main Content	JAPAN Total Downloads (2017/7-2019/6)
1	Amazon Kindle	com.amazon.kindle	Manga	-
2	LINEマンガ - 人気マンガが毎日無料で 読み放題の漫画アプリ	jp.naver.linemanga.android	Manga	-
3	マンガワン-小学館のオリジナル漫画を毎日配信	jp.co.comic.mangaone	Manga	-
			Total	14.7million

3.2 Time-series analysis of piracy sites

In this chapter, we report the result that we investigated the change and use situation of the piracy sites in chronological order

3.2.1 Method

We used the 624 piracy sites that we extracted in Chapter 2 for Japan and analyzed the change over two years and one month. (from July 2017 to July 2019)

We acquired the following item data from the 624 sites and, using the API of SimilarWeb, performed count and analysis.

The items which we acquired using SimilarWeb API are as follows.

Area: Only in Japan
Period: We acquired the monthly data of from July 2017 to July 2019
Items:
- Monthly visit number (Total / desktop / mobile)
- Average visit duration (Total / desktop / mobile)
- Monthly unique visit number (desktop / mobile)
- The number of pages reading per visit (Total)

Breakdowns in the parenthesis behind the investigation items are the total and by device (desktop / mobile) provided by a function of SimilarWeb.

3.2.2 Survey results

3.2.2.1 Monthly visits to 624 piracy sites

Figure 3-14 shows the two years trend (from July 2017 to July 2019) of the total number of monthly visits to the 624 piracy sites from Japan.

The graph shows the following facts:

① Until March, 2018, the total number of visits to piracy sites gradually increased to around 640 million.
② The number of the total visits decreased sharply in April 2018 and decreased to approximately 320 million in June.
③ As of June 2019, there is an estimated 340 million total visits, and a gradual increase is observed. The scales of the copyright infringement are still large.

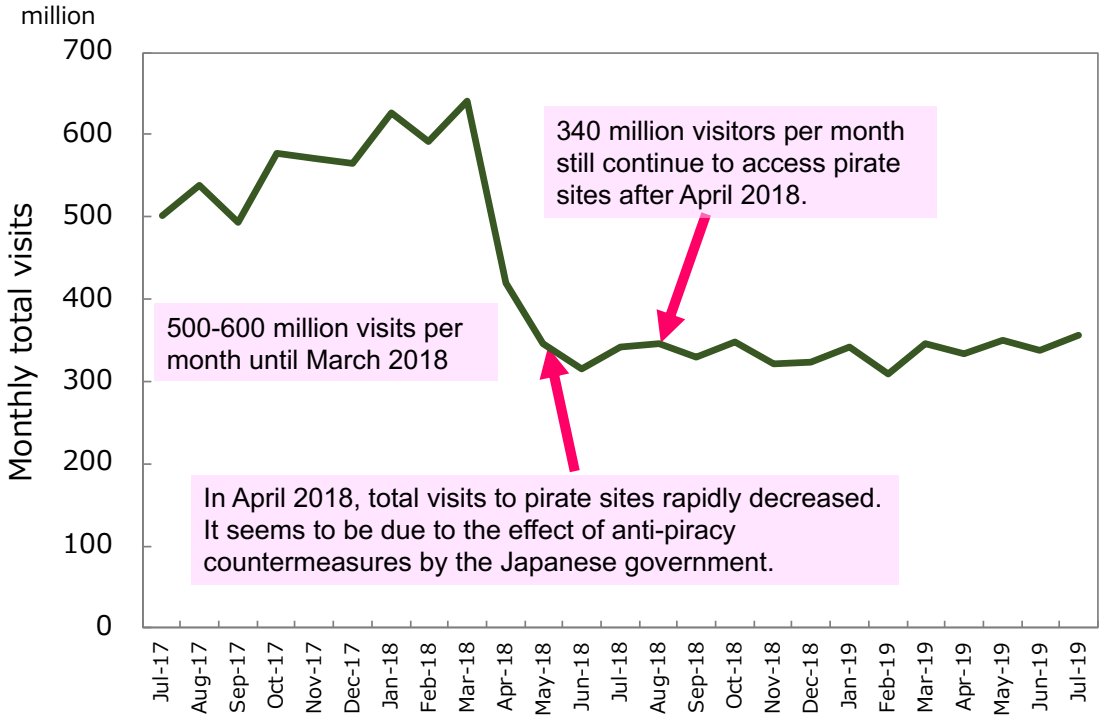


Figure 3-14 Changes in the total number of visits to piracy sites (Jul-17 to Jul-19)

In order to confirm the situation in Figure 3-14 in detail, the number of monthly visits by site type was examined. The result is shown in Figure 3-15.

Figure 3-15 shows the following:

④ The total number of online reading site visits during the two years has changed significantly. It increased rapidly in October 2017 and decreased sharply in April 2018. Since then, the total number of visits has fallen below 10 million, but has increased again since May 2019.

⑤ The total number of visits to sites other than Online Reading decreased in April 2018.

⑥ Since 2019, Host sites have been on a slightly increasing trend, Leech sites have been flat, Streaming sites and P2P sites have been on a decreasing trend.

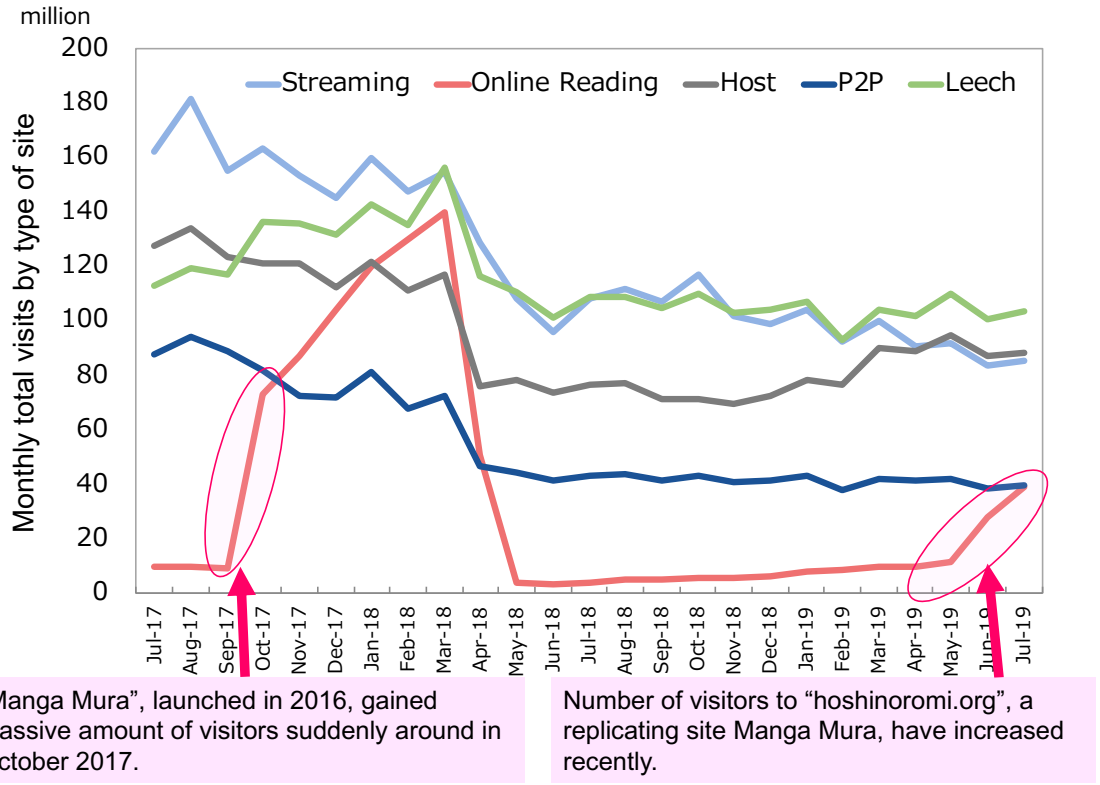


Figure 3-15 Trends in the number of piracy sites visits by site type
(Jul-17 to Jul-19)

Piracy countermeasures were discussed in April 2018 by the Japanese Government, and "Manga Mura" problem was widely covered in the media and developed into a social issue. The action of the government on April 2018, which will be covered in detail in Chapter 4, greatly decreased the access to piracy sites.

About, ④ in particular, the change in the number of the total visits to Online Reading sites until April 2018 closely reflects the increase of visitors to the “Manga Mura” site. After “Manga Mura” take down in April 2018, Online Reading sites dropped to a low level, but with the appearance of “hoshinoromi.org” in May 2019 which has the same function to “Manga Mura”, and the number of the visits increased again. In April 2018, the government tried to take countermeasures against “Manga Mura”, “Anitube”, and “MioMio”, this also greatly affected the number of visits to other piracy sites, and overall visits decreased.

Figure 3-16 shows the total number of monthly visits to the 624 piracy sites by device.

Figure 3-16 shows the following:

⑦ The number of visits to piracy sites using desktops decreases a little until March 2018, and a roughly flat state continues after the sharp decrease in April.

⑧ The number of visits to piracy sites using mobiles as of July 2017 was half that of desktops, but suddenly increased afterwards. It became almost equal to desktops in March 2018.

⑨ The number of visits from mobile decreases sharply in April 2018 and becomes lower than the number of visits from desktops. It increases slightly from around February 2019.

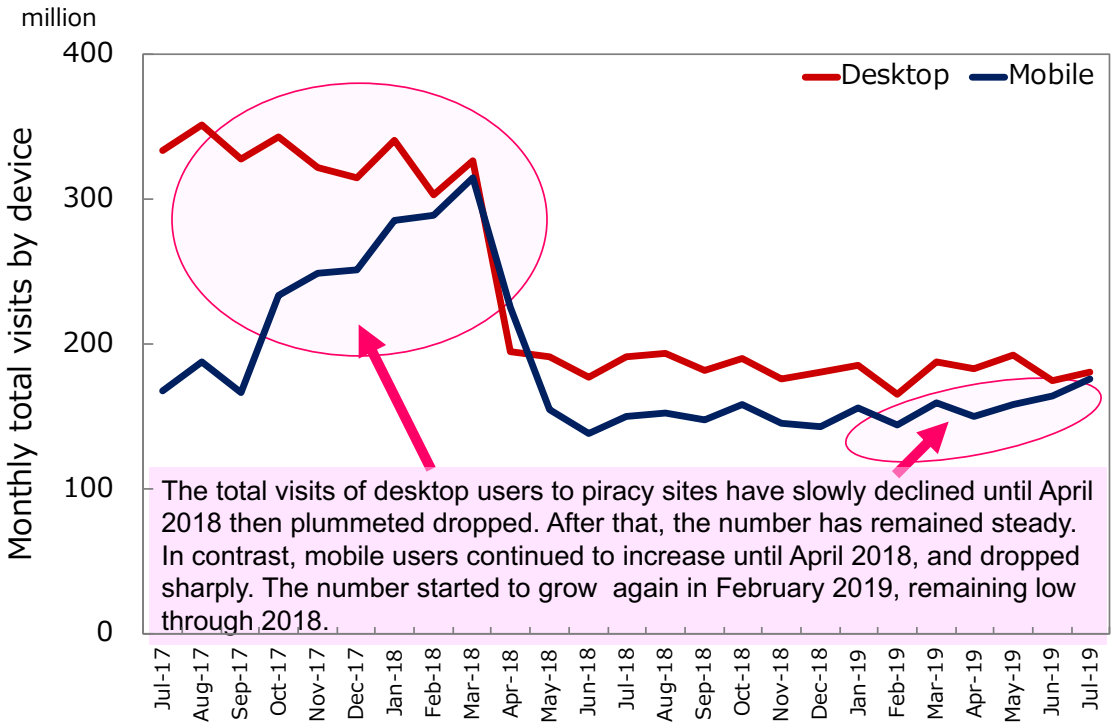


Figure 3-16 Trends of the total number of visits to piracy sites shown by device

The number of visits by device and by site type is shown in Figure 3-17. There were big differences for every site type, and the following trends were seen.

⑩ The biggest change observed was visits to Online Reading sites from mobile.
⑪ P2P and host sites have many visits from desktop.

This result suggests the tendency that Online Reading sites are used for from mobile casually.

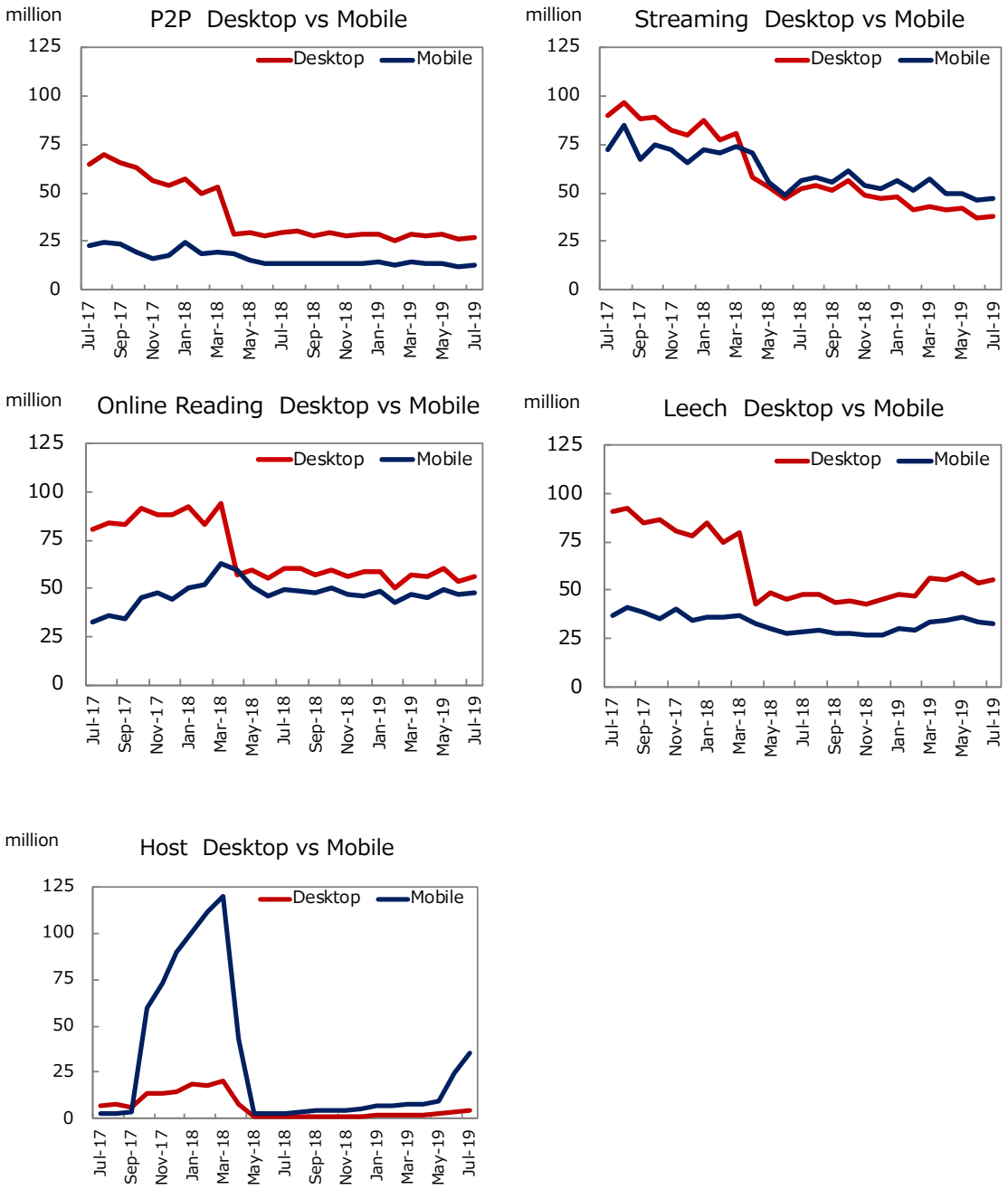


Figure 3-17 The total visits number (2017/7 - 2019/7) according to the device and site type

3.2.2.2 Total time spent on piracy sites

In order to know the actual viewing of piracy sites in Japan, we confirmed the trend of total monthly visits. Visitors may be watching piracy contents for a long time with one access, or they may be checking the site watching any piracy contents.

Therefore, we checked the viewing time of piracy sites for each user every month to clarify the actual situation of the piracy site.

Specifically, we calculated a monthly total viewing time using data as follows for the average time on site for each site and we added these up and visualized it.

Monthly viewing time of each site=Duration x Monthly visits

Figure 3-18 shows the trend of the monthly total viewing time of the piracy 624 sites.

This graph shows the following facts:

① The total monthly viewing time was approximately 50 million hours in July 2017. It suddenly increased, and it was approximately 110 million hours in March 2018.
② It decreased sharply in April 2018, and remained around 40 million hours.
③ The viewing time increases slightly from around April 2019.

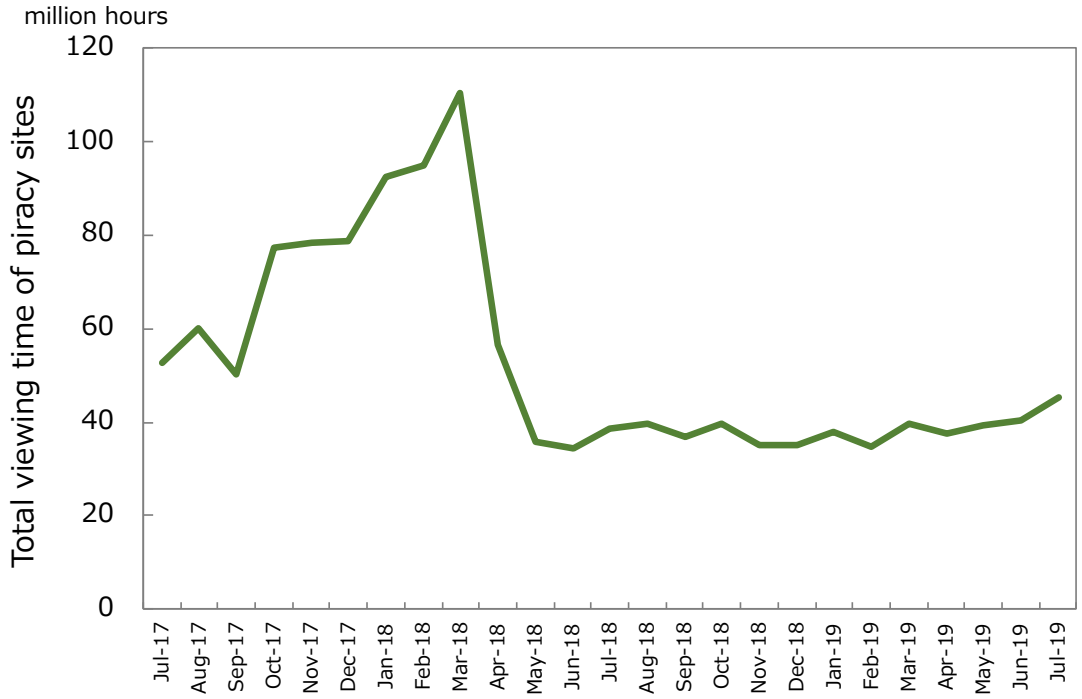


Figure 3-18 Total viewing time trend of piracy sites

Figure 3-19 shows the trend of the monthly total viewing time according to the site type.

This graph shows the following facts:

④ Like the number of the total visits, the trend of the total viewing time of Online Reading sites over two years is remarkable. At a peak point of March 2018, it was over 50 million hours, but decreased sharply in April 2018.
⑤ Although the total viewing time for other site types decreased in April 2018, there is still a certain amount of viewing time and that users continue to use piracy sites.
⑥ Particularly, the total viewing time for streaming site keeps a high level through an investigation period.

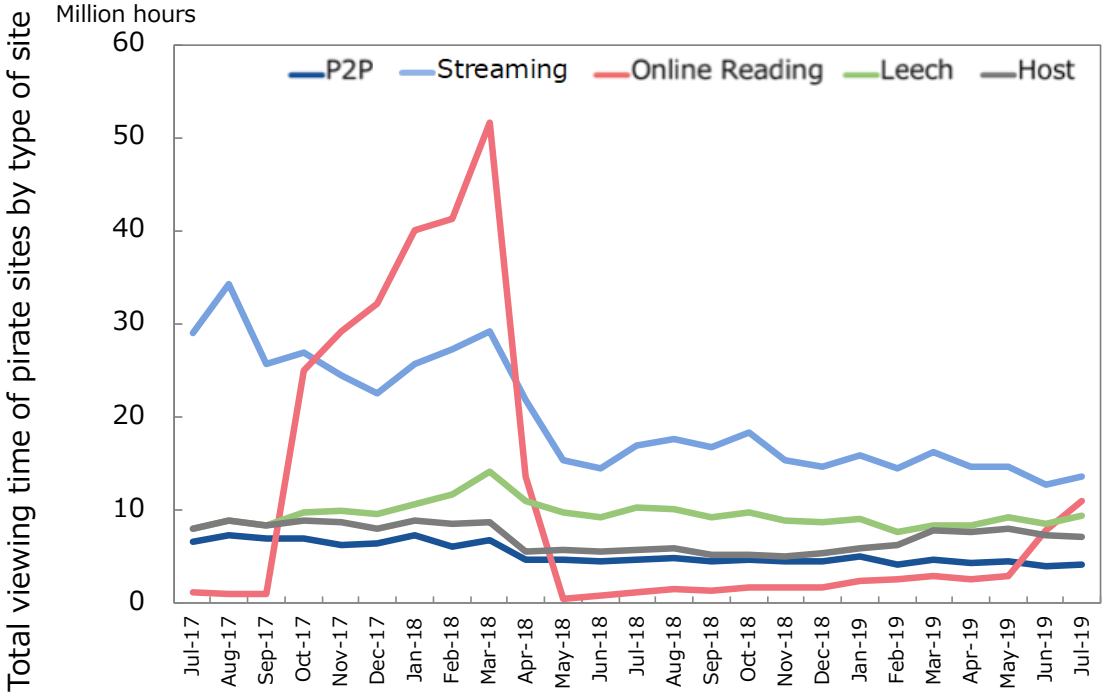


Figure 3-19 Total viewing time trend according to the site type of piracy sites

Figure 3-20 shows the trend of the monthly total viewing time according to the device.

The graph shows the following facts:

⑦ The viewing time of piracy sites using desktops was about 30 million to 40 million hours until March 2018, but since April 2018, it has been unchanged at 20 million hours.
⑧ As of July 2017, mobile viewing time was almost half that of desktop viewing time, but it increased rapidly, reaching about 70 million in March 2018, about twice as long as the desktop.
⑨ In April 2018, the viewing time of piracy sites that used mobile has drastically decreased, but it has remained at about 20 million hours, almost the same as the desktop viewing time. It has increased slightly from around April 2019.

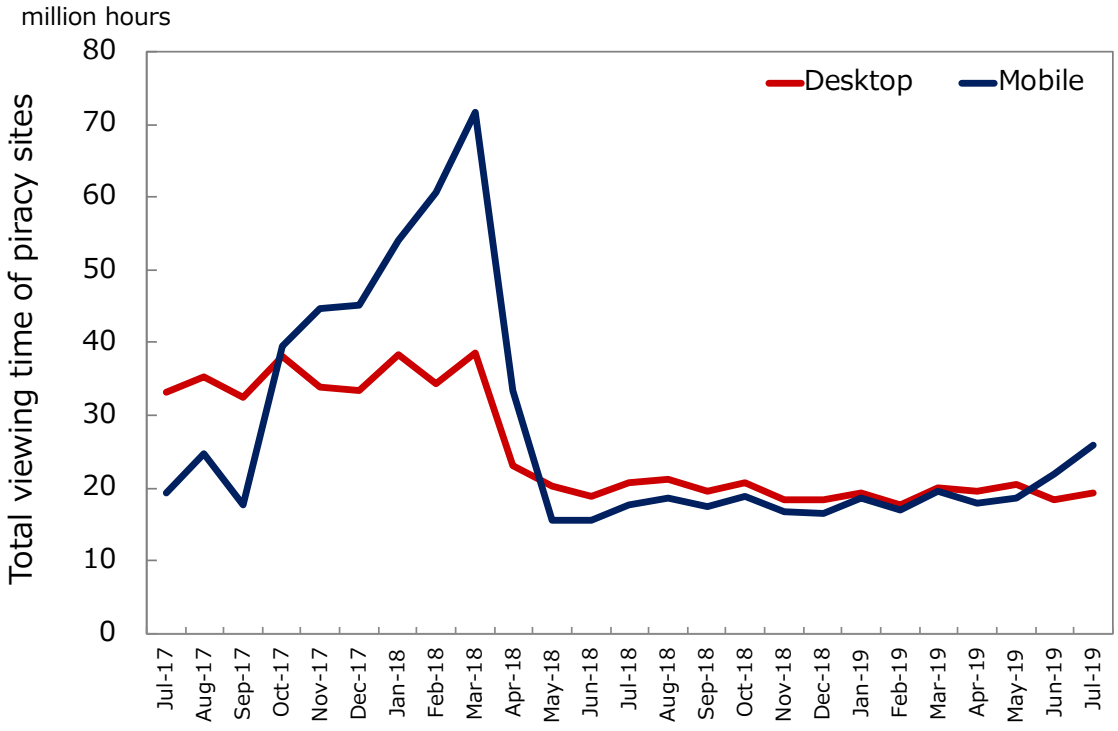


Figure 3-20 Total viewing time trend
according to the device used to access piracy sites

3.2.2.3 Number of unique users on piracy sites

Up to this point, we have shown the results of the survey of the total number of visits and total viewing time during the month, in order to know the actual viewing situation of piracy sites.

In addition, this section attempts to estimate the number of users using piracy sites.

As of June 2018, the population of Japan is about 126.5 million, the Internet usage rate in 2018 is 79.8%, and the number of people using the Internet in Japan is about 100 million.

With the API function of SimilarWeb, it is possible to get the number of unique users per month for each site. Here, the number of unique users is a value obtained by identifying a user who visits a piracy site by an IP address, and excluding the same user from the count when visiting the same piracy site again.

Table 3-6 shows the number of sites with a large number of unique users each month and the number of users for each site type.

The results are as follows.

① The largest number of monthly unique users in the past two years was “Anitube” (anitube.se) (streaming site) in August 2017, with about 7.73 million.
② With regards to streaming sites, “Anitube” was targeted in the anti-piracy countermeasures of the government in April 2018, and it was forced to close. Currently, highest number of users is “FC2 Himawari Douga” (himado.in).
③ As for Online Reading sites, “Manga Mura” (mangamura.org: from October 2017 to April 2018) was closed and then no large user sites appearing. Until June 2019, when the number of visits to hoshinoromi.org site that looked like “Manga Mura”, has increased.
④ For the P2P site, “Nyaa” (nyaa.si) has the top number of users for two years, and more than 2 million users are constantly using it.

It turned out that there were times when more than 7 million people were using a single piracy site. This is a staggering Figure, with over 7% of Japanese Internet users accessing this site.

The most distinctive is the P2P site, “Nyaa”, this has the largest number of users and remains the top P2P site by a large margin.

Table 3-6 Trend of monthly Unique User Maximum Sites of Users by Site Type

	P2P	Streaming	Online Reading	Leech	Host
Jul-17	nyaa.si	anitube.se	raw.senmanga.com	manga-zip.net	openload.co
Aug-17	nyaa.si	anitube.se	senmanga.com	anime-sharing.com	openload.co
Sep-17	nyaa.si	anitube.se	senmanga.com	manga-zip.net	openload.co
Oct-17	nyaa.si	anitube.se	mangamura.org	manga-zip.net	openload.co
Nov-17	nyaa.si	anitube.se	mangamura.org	manga-zip.net	rapidgator.net
Dec-17	nyaa.si	anitube.se	mangamura.org	tvanimemuryoudouga.com	rapidgator.net
Jan-18	nyaa.si	anitube.se	mangamura.org	tvanimemuryoudouga.com	rapidgator.net
Feb-18	nyaa.si	anitube.se	mangamura.org	tvanimemuryoudouga.com	rapidgator.net
Mar-18	nyaa.si	anitube.se	mangamura.org	tvanimemuryoudouga.com	rapidgator.net
Apr-18	nyaa.si	himado.in	mangamura.org	tvanimemuryoudouga.com	uploaded.net
May-18	nyaa.si	himado.in	mangamura.org	tvanimemuryoudouga.com	openload.co
Jun-18	nyaa.si	himado.in	mangamura.org	tvanimemuryoudouga.com	rapidgator.net
Jul-18	nyaa.si	himado.in	mangamura.org	tvanimemuryoudouga.com	rapidgator.net
Aug-18	nyaa.si	himado.in	rawqq.com	tvanimemuryoudouga.com	rapidgator.net
Sep-18	nyaa.si	himado.in	lhscan.net	tvanimemuryoudouga.com	rapidgator.net
Oct-18	nyaa.si	himado.in	lhscan.net	tvanimemuryoudouga.com	openload.co
Nov-18	nyaa.si	himado.in	lhscan.net	tvanimemuryoudouga.com	uploaded.net
Dec-18	nyaa.si	himado.in	lhscan.net	tvanimemuryoudouga.com	rapidgator.net
Jan-19	nyaa.si	himado.in	lhscan.net	tvanimemuryoudouga.com	openload.co
Feb-19	nyaa.si	himado.in	lhscan.net	tvanimemuryoudouga.com	rapidgator.net
Mar-19	nyaa.si	himado.in	lhscan.net	tvanimemuryoudouga.com	rapidgator.net
Apr-19	nyaa.si	himado.in	lhscan.net	tvanimemuryoudouga.com	rapidgator.net
May-19	nyaa.si	himado.in	lhscan.net	tvanimemuryoudouga.com	rapidgator.net
Jun-19	nyaa.si	himado.in	hoshinoromi.org	tvanimemuryoudouga.com	rapidgator.net
Jul-19	nyaa.si	himado.in	hoshinoromi.org	tvanimemuryoudouga.com	rapidgator.net

The goal is to know how many users are using piracy sites in Japan. However, the number of unique users for each site cannot be summed to estimate the total number of unique users across all sites.

This is because if a user visits multiple piracy sites, it will be counted multiple times.

Therefore, in this survey, the weighted average of the number of unique users was calculated to represent the scale per site for the month.

The weighted average in this survey is an average calculated by weighting the number of visits for each individual site so that the values of sites with a large number of visits, are accountably reflected in the results.

The specific calculation method is as follows.

If U_{ave} is the weighted average number of unique users, U_k is the number of unique users of the kth site. $V_k$is the number of visits. U_{ave} is calculated by the following formula.

$$U_{ave} = \frac{\sum_{k=1}^{624}\{U_k \times V_k\}}{\sum_{k=1}^{624}\{V_k\}}$$

Hereinafter, the weighted average of the number of unique users is referred to as the number of mean unique users.

The count result according to the site type, using the calculation method mentioned above is shown in Figure 3-21.

This graph shows the following facts:

①	In January, 2018 Online Reading sites had the greatest number of the mean unique users across all piracy sites. This number was approximately 6,500,000 people.
②	It surpassed the 4 million people for streaming sites in July 2017. That was then the greatest number of the mean unique users. This decreased year by year and was lower than P2P sites in 2019.
③	The number of mean unique users for sites other than Online Reading and Streaming did not change significantly. In particular, there was no decrease in P2P due to the government's countermeasures against piracy sites in April 2018.

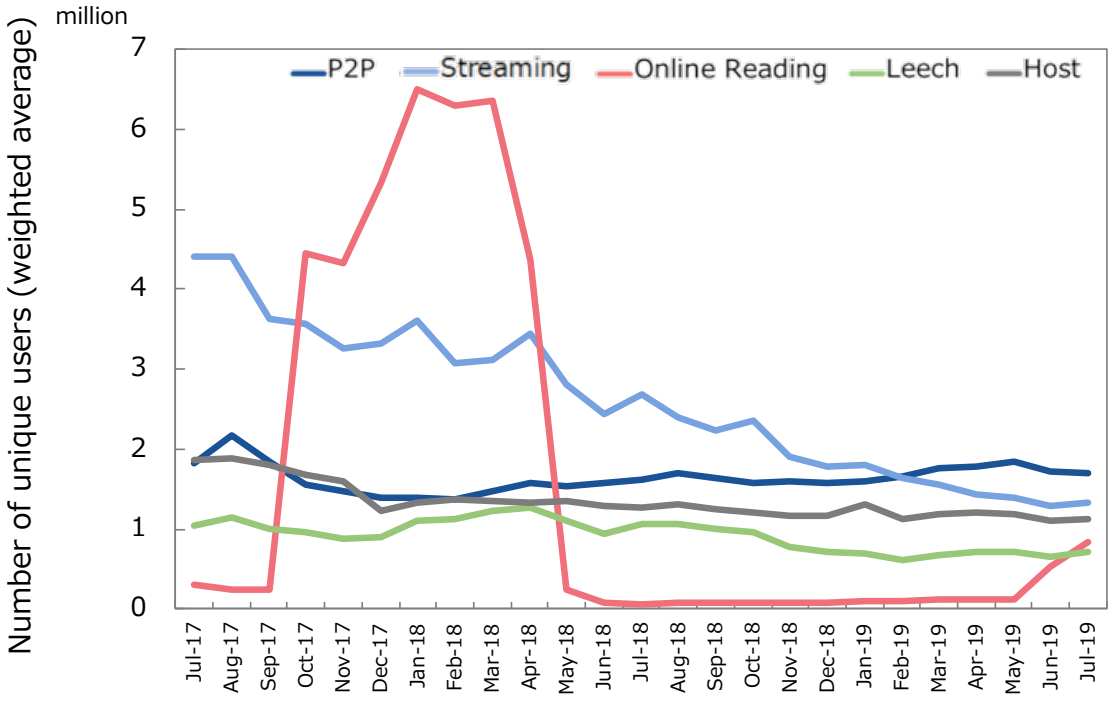


Figure 3-21 The number of the mean unique users by site type

Using the number of the above-mentioned mean unique users, we calculated the mean viewing time per user by site type and showed it in Figure 3-21 and Figure 3-22. The expressions that we used for calculation are as follows.

Assuming that the number of unique users of the kth site is U_k. the number of visits is V_k. and the average viewing time per visit is VT_k. the monthly viewing time VTU_k per user for the kth site is calculated by the following formula.

How to calculate monthly viewing time per user for the kth site

$$VTU_k = V_k \times VT_k / U_k$$

Therefore, the weighted average VTU_{ave} of monthly viewing time per user was calculated by the following formula.

Monthly viewing time per user (weighted average)

$$VTU_{ave} = \frac{\sum_{k=1}^{624}\{VTU_k \times V_k Vk\}}{\sum_{k=1}^{624}\{V_k\}}$$

In addition, Figure 3-23 excludes Online Reading of Figure 3-22.

User spend over 7 hours on Online Reading sites. Whereas for all other sites they spend a maximum of 1.5 hours on that site.

Figure 3-23 shows that the viewing time per user becomes gradually longer.

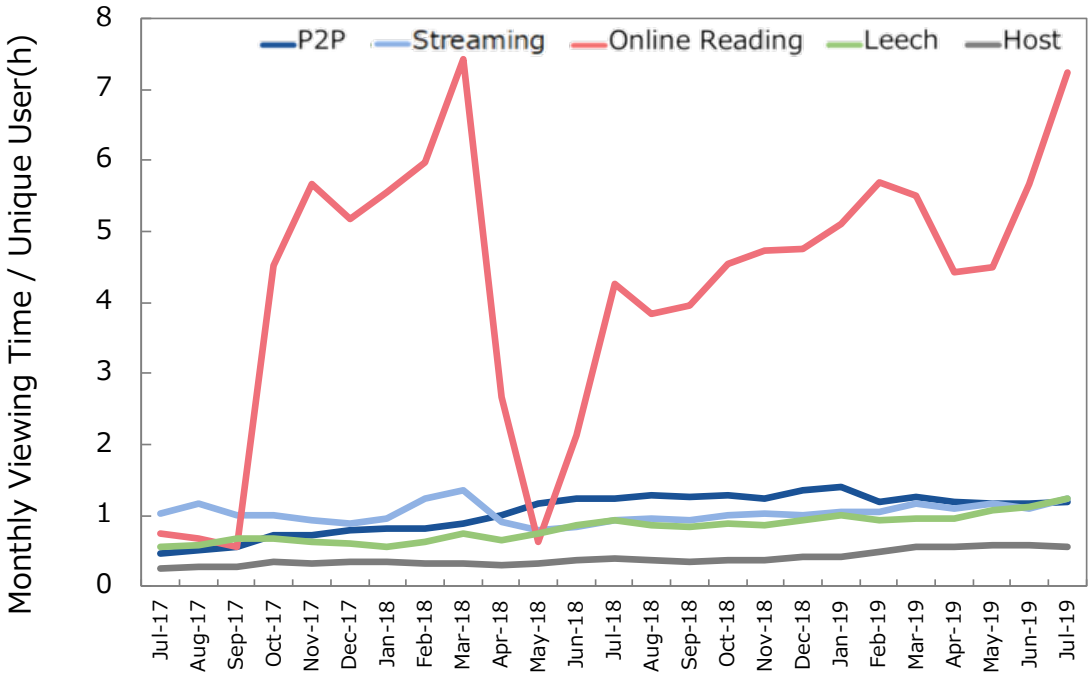


Figure 3-22 Trend of the mean viewing time per unique user according to the site type

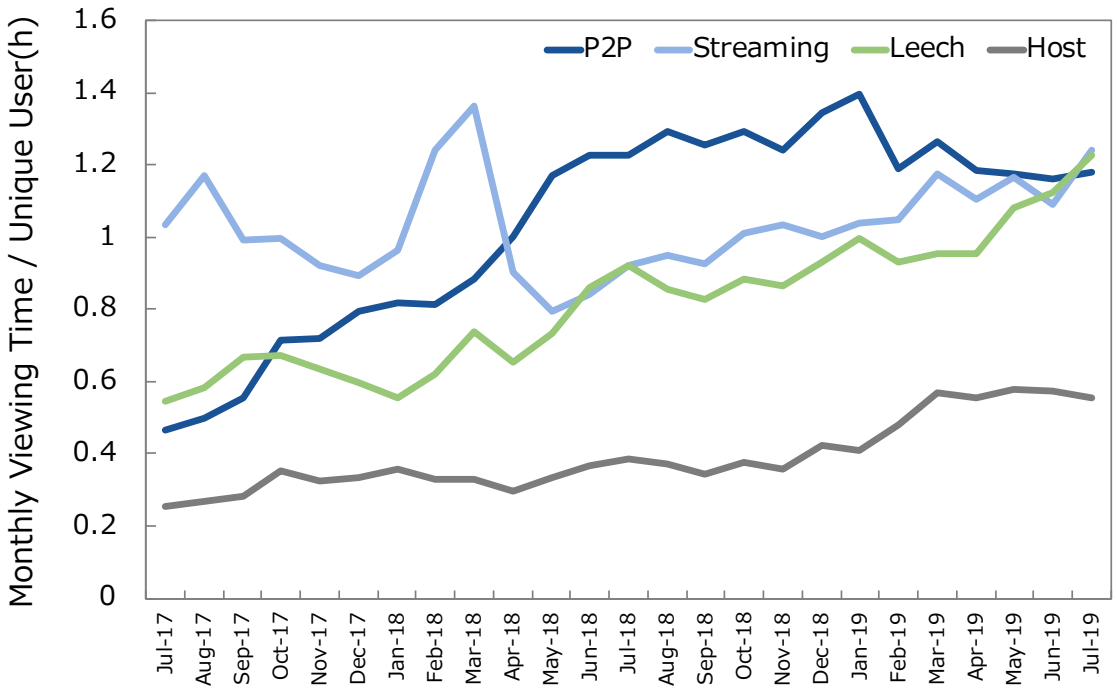


Figure 3-23 Trend of the mean viewing time per unique user by site type (excludes Online Reading sites)

3.3 Content viewing situation survey results for students

We surveyed university students and graduate students on how they watched video contents on the Internet in parallel to this investigation. We will cover part of the result. We are going to publish this survey result in the Intellectual Property Association of Japan.

3.3.1 Survey Overview

In July 2019, we surveyed 383 Japanese university and graduate students about the viewing of video content such as TV shows, movies, music and PV uploaded on the Internet. In addition, a similar survey was conducted with 605 people in 2013, and the changes over these 6 years are also mentioned.

3.3.2 Type of a device and for the viewing of video contents

370 (96.6%) responded that they watched video content, and most respondents

watch video content on the Internet. Table 3-7 shows the devices used for watching video content. Over the past six years, mobile terminal users have increased.

Table 3-7 Seeing and hearing method of the video contents

	This time (n=370)	2013 (n=529)
With a PC	69.7% (258)	81.2% (430)
With a mobile device	89.5% (331)	52.9% (280)

Table 3-8 shows the usage rate of the content type for each device. Over the past six years, the proportion of users of anime and movies has increased, and usage trends have changed.

Table 3-8 Classification of the video contents

Classification	This time		2013	
	PC (n=258)	Mobile device (n=331)	PC (n=430)	Mobile device (n=280)
Animation	158 (61.2%)	187 (56.5%)	165 (38.4%)	75 (26.8%)
Music PV	148 (57.4%)	187 (56.5%)	329 (76.5%)	218 (77.9%)
Movie	106 (41.1%)	128 (38.7%)	112 (26.0%)	40 (14.3%)
Concert video	69 (26.7%)	81 (24.5%)	173 (40.2%)	97 (34.6%)
Domestic drama	54 (20.9%)	83 (25.1%)	108 (25.1%)	53 (13.5%)
Variety	54 (20.9%)	85 (25.7%)	104 (24.2%)	54 (19.3%)
Overseas drama	46 (17.8%)	59 (17.8%)	74 (17.2%)	38 (13.6%)
Music channel	25 (9.7%)	53 (16.0%)	71 (16.5%)	50 (17.9%)

3.3.3 Video content replay from a PC

When we access video contents from a PC, 87.2% of users use video sharing sites such as YouTube 56.2% search it on paid video-on-demand sites such as Amazon Prime Video or Hulu. In addition, 26.0% (67 persons) stored video content to watch on a PC. As shown in Figure 3-25, the number of authorized users who download paid content is increasing.

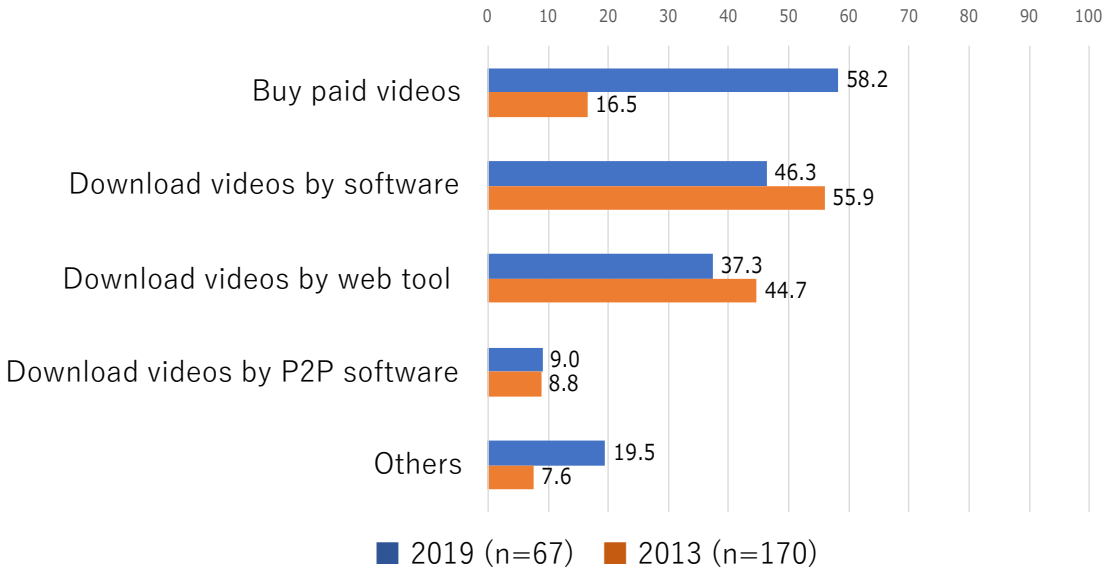


Figure 3-24 Preservation method to a PC of the video contents

3.3.4 Viewing video content from mobile device

When we access video contents from mobile device, 82.8% look for it using video sharing sites such as YouTube, and 51.4% on a paid video-on-demand site. On the other hand, the ratio using the application of Leech site types was only 1.5%. In addition, among audiences with mobile device, 28.7% stored video contents. In addition, 62.1% of those downloads paid contents. Similar to that of PCs, the number of users of paid contents, increases in comparison with six years ago.

3.3.5 Recognition of the origin of delivery of contents

A survey was conducted on the status of recognition as to whether the content distribution source is an official site or a piracy site, and the results are shown in Table 3-9. As in the previous survey, the percentage of users who use both official site and piracy site is high. In addition, the ratio that replied saying “unknown” largely decreases from approximately 30% to approximately 10%. About an origin of delivery of the video contents, their recognition deepened. In the future, the distribution of more content from official websites will reduce the percentage of end users accessing piracy sites.

Table 3-9 The recognition situation of the origin of delivery of contents

Classification	This time		2013	
	PC (n=258)	Mobile device (n=331)	PC (n=430)	Mobile device (n=280)
Only official	94 (36.4%)	112 (33.8%)	84 (19.5%)	65 (23.2%)
Only unofficial	2 (0.8%)	3 (0.9%)	3 (0.7%)	3 (1.1%)
Both	136 (52.7%)	173 (52.3%)	209 (48.6%)	127 (45.4%)
Unknown	26 (10.1%)	35 (10.6%)	134 (31.2%)	85 (30.4%)

The above-mentioned result are clarified in the following points. For video content consumption device type has switches from PC to mobile. In addition, they shifted to paid contents using the services of paid video-on-demand sites such as Amazon Prime Video or Hulu, Netflix.

3.4 Summary of Chapter 3

3.4.1 Quantitative analysis of a piracy site and application in Japan

We investigated piracy sites in Japan from July 2017 to June 2019 and applications and clarified the following points.

① We extracted a list of 1,447 piracy sites in Japan. Among them, there were 624 sites with monthly access exceeding 100,000 visits at least once in the past two years.
② The number of visits to Top 10 piracy sites was approximately 50% of total visits, and Top 100 amount to over 90% of all visits.
③ Streaming sites covered for 40% of all piracy sites.
④ We could not find the host country of 61% of piracy sites, because most used the same CDN service. (See Chapter 4 in detail)
⑤ We extracted piracy applications in Japan and extracted a list of 111 application.
⑥ Streaming is the most common piracy application, accounting for up to 68%.
⑦ Downloads of piracy applications is low relative to the use of piracy sites. The spread of regular version application advances, and piracy applications do not reach 2% of regular versions.
⑧ In a questionnaire result about the video contents seeing and hearing from the mobile device which we showed in 3.3.4, respondents more than 50% use a paid

video-on-demand site.

3.4.2 Trends over time in piracy sites

Following the trends over time from July 2017 to July 2019, the following points were revealed for 624 piracy sites.

① The total number of visits to 624 piracy sites in Japan was approximately 500 million per month at the beginning of July 2007, and increased to 640 million in March 2018. However, in June 2018, it decreased sharply to 320 million.

② As of June 2019, there are 340 million visits, and there is a slight increase.

③ The number of visits to piracy sites increased rapidly until March 2018 and dropped sharply in April. This is thought to have been partly caused by greatly influenced by the anti-piracy site countermeasures taken by the Japanese government at the time, and can be said to have had a significant effect. (Details are described in Chapter 4)

④ At the time of July 2017, half of the access from mobiles to piracy sites came from a desktop. Access from mobiles grew and almost equal desktops now.

⑤ More access to Online Reading sites comes from mobile devices. More access to P2P and host comes from desktop. Online Reading sites are used for from mobile casually.

⑥ As of June 2019, the total monthly time spend on piracy sites are approximately 40 million hours. In particular, the time spend on streaming site remained high throughout the whole investigation period.

⑦ Online Reading sites have the greatest number of the mean unique users of piracy sites. Used by about 6,500,000 users in January 2018. P2P has a stable number of users throughout this period. One particular site has been the top ranked for two years. In spite of piracy site measures by the government in April 2018, the number of the P2P users has not decreased.

⑧ The mean viewing time per user is becoming longer.

3.4.3 Content viewing situation survey results for students

We investigated the viewing of the video contents on the Internet for several hundred university students and graduate students and covered the questionnaire result.

① In comparison with six years ago, the use in the mobile device has increased and exceeded the total number viewing on PC during this time.

② The number of users watching animation on the Internet has increased. Particularly, the ratio of user who watch animations such as an animated cartoon or movie has doubled.
③ The number of users of paid contents has increased.
④ The awareness of whether the content distribution source are official sites or piracy sites have improved, but it has become clear that the content is being viewed while knowing whether it is pirated contents.

Chapter 4: Analysis of Survey Results

4.1 Features of piracy sites in Japan

As mentioned in Chapter 3, there were 1,447 piracy sites in Japan over the past two years, with total monthly visits of about 340 million. The total number of monthly visits for the top 100 sites out of 1,447 was over 90% of the total.

When the number of unique users was confirmed for the top sites visited by site type, it became clear that each of them were over about 2 million.

In this chapter, we will evaluate this number by comparing them with the official distribution site, and describe the characteristics of each site type as seen from the time line of the site.

4.1.1 Scale of piracy sites as seen from comparison with regular sites

We picked up regular distribution sites that seem to be frequently used in Japan, investigated the number of visits using SimilarWeb, and compared them with piracy sites.

Table 4-1 shows the top 3 websites for monthly video access sites in June 2019 for official video and comic distribution sites.

Table 4-1 List of official distribution sites used for comparison surveys

Video distribution sites

No.	Site name	Site URL	Main Content	Japan Total Visits in Jun-2019
1	Abema TV	abema.tv	TV	-
2	NETFLIX	netflix.com	Movie/TV/Anime	-
3	GYAO!	gyao.yahoo.co.jp	TV/Movie/Anime	-
			Total	72 million

Manga distribution site

No.	Site name	Site URL	Main Content	Japan Total Visits in Jun-2019
1	コミックシーモア	cmoa.jp	Manga	-
2	Comic Walker	comic-walker.com	Manga	-
3	となりのヤングジャンプ	tonarinoyj.jp	Manga	-
			Total	70 million

The total number of visits for these six sites is about 142 million, which is far below 340 million for piracy sites. In addition, we picked up the official version of other sites and totaled the number of visits across 50 official sites. This Figure 290 million even after collecting 50 sites, it was found that the number of visits of piracy sites exceeded this.

As for the number of users, "Comic Seymour", the top comic distribution site, was used by about 10 million people. Abema TV, the top video distribution site, was used by about 5 million people. It can be seen that the number of users on most official sites is equal to or less than the number of users on the top piracy sites, and the scale effect of piracy sites can be seen.

4.1.2 Trends by type of piracy sites

According to this survey, it has become clear that piracy sites have very different trends in features depending on type.

Over the last two years, we found that the features of Online Reading sites have changed dramatically compared to other types of sites. According to this survey, Online Reading sites are the smallest in number, and when a user-friendly site appears, it can be seen that users are accessing it regularly out of habit. In April 2018, when the changes were most dramatic, measures against piracy by the government were discussed, and they were very effective. The countermeasures for piracy in April 2018 will be described in detail in the next section.

On the other hand, the most stable type over the two years was P2P sites, where the top site did not change and the number of users was stable. From these things, it can be seen that a particular type of user continues to use it. In order to use P2P sites, it is necessary to install torrent client software and there are some hurdles for general users, so there will be no explosive increase of users. The fact that it exists on such a scale indicates that it is at a level where it cannot be left unchecked, especially when compared with the official version sites in the previous section.

The sites most frequently listed in this survey were streaming sites. Although the number of visits, which peaked two years ago, is declining, the total time on site is still high, indicating that users spend more time on streaming sites. In addition, because there are many piracy sites that could replace the streaming sites that were closed, at the time of the country's countermeasures in April 2018, there was no decline.

Common to all site types, the average time spend on site per user is increasing, and it is estimated that more users will spend more time on piracy sites.

4.2 Features of piracy apps in Japan

In this survey, 111 piracy apps used in Japan were listed. A survey of the number of downloads of these apps over the past two years revealed a total of about 42 million. As mentioned in Chapter 3, this number is about 2% or less compared to the official apps. In addition, in the questionnaire to students, more than 50% of respondents use paid video distribution sites, and the rate of using Leech type apps is as low as 1.5%.

Users are increasingly using mobile devices to view piracy contents, but they can use a browser to access the site rather than using apps.

4.3 Anti-piracy measures by the Japanese government in April 2018

As shown in Chapter 3, it was found that the investigation of "site blocking" by the government and related organizations in April 2018 had a great influence on the trends of piracy sites and users. Therefore, in this chapter, specific cases of malicious sites such as "Manga Mura" are used as examples to verify in the time line what happened during the "Site Blocking" policy.

In Japan, "Manga Mura" has been cited as an incident involving piracy sites that have had the greatest impact so far. A comic pirate site, named as a malicious site along with two other video sites ("Anitube" and "Miomio") at the conference "Urgent Measures against Piracy Sites on the Internet" at the Intellectual Property Strategy Headquarters in the country [4]. And it became a discussion about measures against piracy sites.

"Manga Mura" could not be viewed from any special application and was only able to access it from the browser of a PC or mobile terminal. A large number of comics works were uploaded on the site without the permission of the copyright holder, allowing an unspecified number of end users to browse freely. "Manga Mura" was established in January 2016, and users increased rapidly by word of mouth from about 2017. After investigating the number of monthly unique users as of March 2018 by SimilarWeb, was estimated at 6.6 million people, and 95.86% of hits were using from Japan. The sites ranking in Japan was 23rd place (table 4-2) [1]. Using the publications circulation, the amount of damage was estimated to be about ¥ 300 billion, but problem was that the site was causing significant economic losses.

Table 4-2 The access situation (the July 2019 investigation) of these 3 piracy site in March, 2018 [1]

Name of site	Type of content	Sessions (million)	Monthly unique users (million)	Access share from Japan	Rank in Japan
Manga Mura	Comics	61.9	6.6	95.66%	23
Anitube	Animation	248.1	5.4	98.68%	85
Miomio	Animation	70.1	3.6	79.17%	591

In addition, the monthly unique user number of “Anitube” over the same period hit 5.4 million people using a similar method, with 98.68% of access from Japan. “Miomio” monthly unique user number touched 3.6 million people, with 79.17% of access from Japan.

The history of subsequent claims from copyright holders, movements of investigative authorities, discussions in the Diet and the public-private sector, etc. can be summarized as shown in Figure 4-1.

What attracts attention here is that way a powerful measure against piracy sites, due to complaints raised from the concerned parties, to introduce “Site blocking”, which disables browsing of the site itself. Concrete discussions for legislation started at this point, but as of August 2019, site blocking has not yet been becoming law. It is in the stage of being reviewed and along with other considerations at the review meeting (task force) of the Intellectual Property Strategy Headquarters.

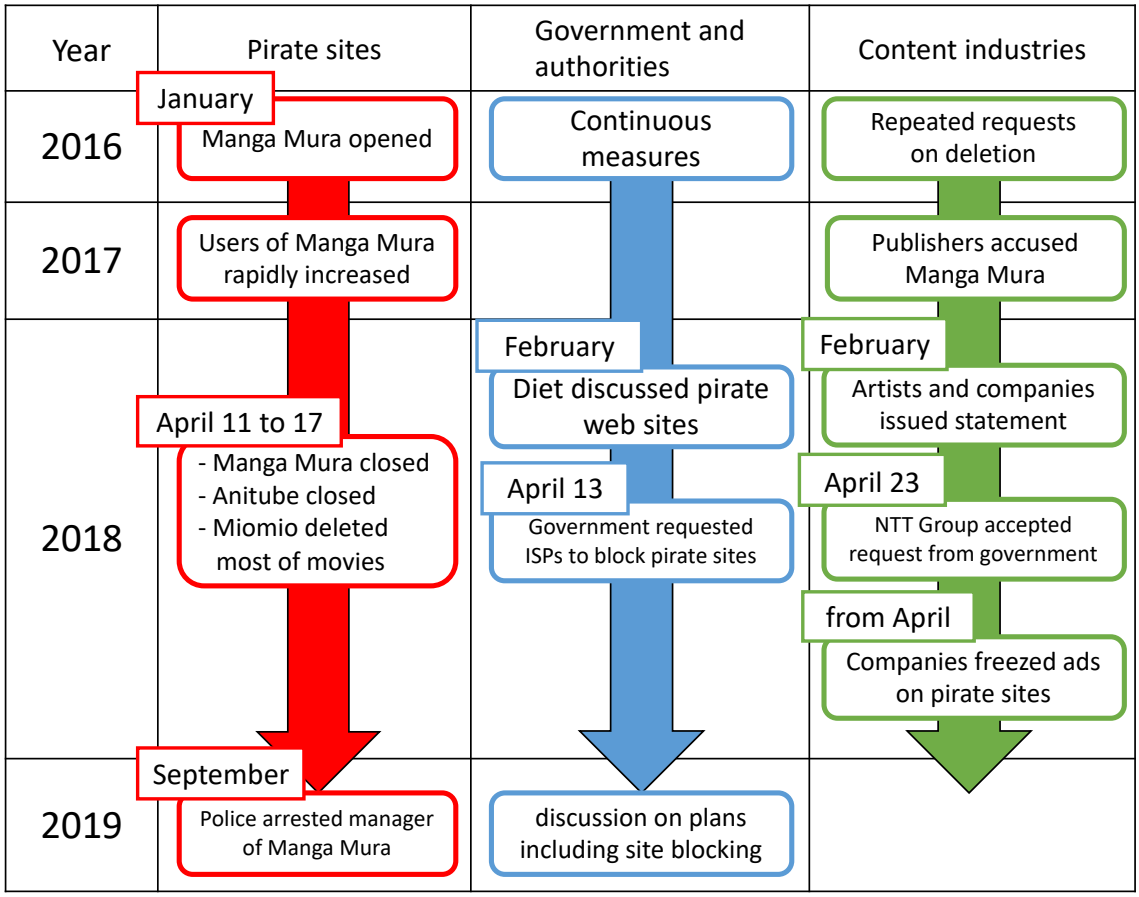


Figure 4-1 Movement (2016 through 2019) from the establishment of the piracy sites to shutdown [5] [6]

Parallel to enforcement of "Site blocking" based on the law, a request to the carrier voluntarily block to these sites were carried out as an urgent measure. It is notable point that some companies decided to enforcement this. On April 23, 2018, four NTT groups (Nippon Telegraph and Telephone Corporation, NTT communications Co., Ltd., NTT DOCOMO Co., Ltd., NTT Plala Inc.) announced the enforcement of the site blocking for 3 sites.

In parallel with the movement of the government and related organizations, "Manga Mura" and "Anitube" became inaccessible the 11th and 16th respectively. and Video playback screen was deleted from "Miomio" on 17th. Both sites appear to have voluntarily closed before eventually been blocked by the carrier. In fact, as shown in Chapter 3, the number of visits to piracy sites has plummeted. The distribution of advertisements was stopped, the funding source was turned off investigations began and several publishers field criminal changes again these piracy sites for alleged violations of copyright law during 2017. Although other factors may have had an impact,

it is believing that the strong attitude to “Implement site blocking” was good. The piracy sites were closed down voluntarily, with access dropping from approximately 650 million piracy sites to approximately 340 million access according to Figure 3-15 of Chapter 3. The effect, as of May, 2018, and decrease of around 300 million access was confirmed.

4.4 The piracy use situation in CDN

(1) Summary of the CDN

As a result of having checked the actual situation of piracy sites this time, the server setting location for 381 sites equal to 61% in the subjects of survey 624 site, is unidentified. Among them with 86% is Cloudflare [7] (Cloudflare is a CDN company with head office in CA). (cf. Chapter 3 Figure 3-10)

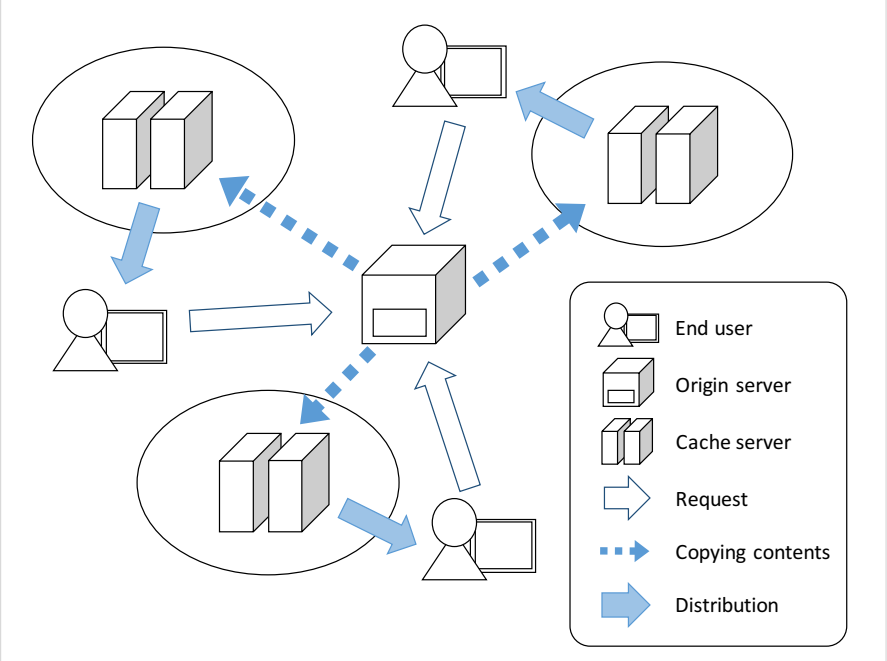


Figure 4-2 CDN system diagrammatical view

The CDN is comprised of an origin server and multiple cache servers (called the edge location server.) when an end user visits an origin server, the system can send the content from a closer cache server (Figure 4-2). The CDN company places datacenters around the world, in based on the distance to an end user, the load situation of the system, and the network situation, amount of

using. The Web site can process mass requests by using CDN, and can offer of stable service.

(2) Difficulty of the locating of the piracy sites in the CDN

When a piracy site is built on CDN, it becomes difficult to pinpoint the location of the cache server which delivers contents to an end user.

For piracy sites, the same IP address was obtained from many of the VPN servers in Japan, South Korea, Taiwan, the United States, and Germany. However, confirm it is difficult to the IP addresses of piracy sites built on Cloudflare via VPN services that can actually switch the country of the Internet connection (using the host command on the terminal prompt screen). CDNs are no different from general Web servers for end users, in that the same DNS record can be obtained when accessing the Internet from anywhere in the world.

(3) Opinions and actual situation of CDN side regarding piracy sites deletion request

In response to an inquiry from the Task Force on the anti-piracy measures on the Internet regarding the anti-piracy measures of CDN, Cloudflare submitted the view that it was not in a position to delete the content because it was not a web hosting company. However, it responded to requests for disclosure of information about publishers, which led to the identification of "Manga Mura" operators. [8] In the future, a relationship of trust and liaison system will be required so that information can be provided by CDN more smoothly. However, the cases identification are rare, and the actual situation of piracy sites has not yet been discovered. More detailed investigation is required.

4.5 About the function to support the creation of piracy sites

When one piracy site is closed, multiple new piracy site repeatedly appears and disappear, making it more difficult to eradicate piracy sites. This time, we surveyed support functions that helped build two types of piracy sites.

4.5.1 Example of building a P2P site

We will report in detail about "Nyaa", which was the top for P2P site for two years with the highest number of visitors and unique users. "Nyaa" is a repository that can post and display the table of contents of files used when exchanging material with P2P.

It is a repository that can reproduce the model that manages the layout, request controller, etc. to create a new “Nyaa”. You can get it on “github”. (https://github.com/nyaadevs/nyaa) (Figure 4-3) The development language is Python.

This repository has 250 fork (copied) as of September 2019. In addition, the README on “github” details how to run it, if you have a programming background you can immediately install it, and it is possible to reproduce a site similar to “Nyaa”.

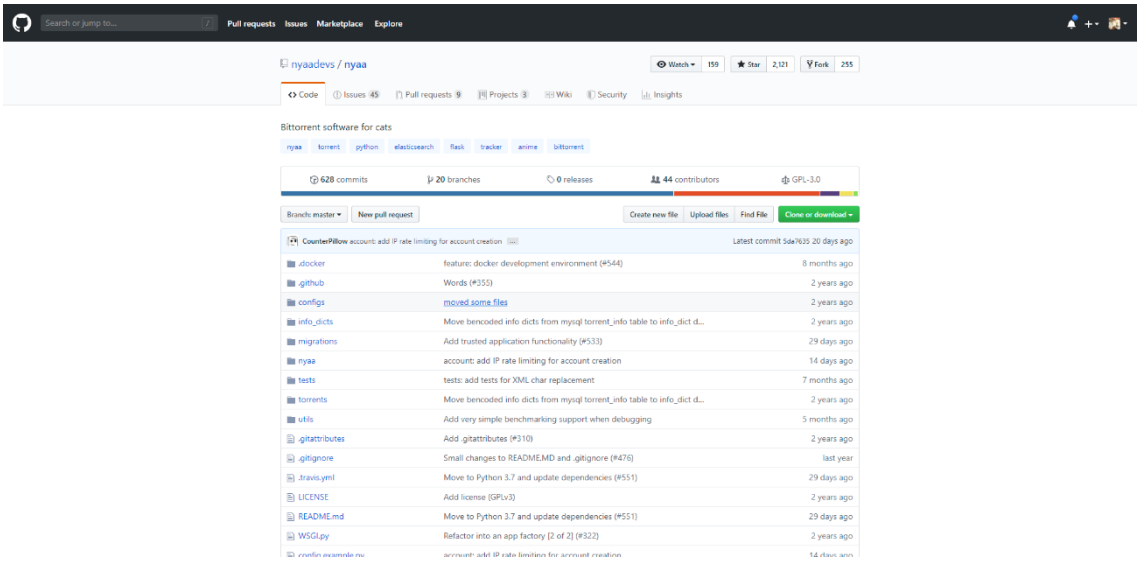


Figure 4-3 Capture image of “Nyaa” source code repository (https://github.com/nyaadevs/nyaa)

4.5.2 Example of building an Online Reading site

In this section, we report an example of building an online reading site. Figure 4-4 shows a demo site with the theme “Madara” from “Wordpress”.

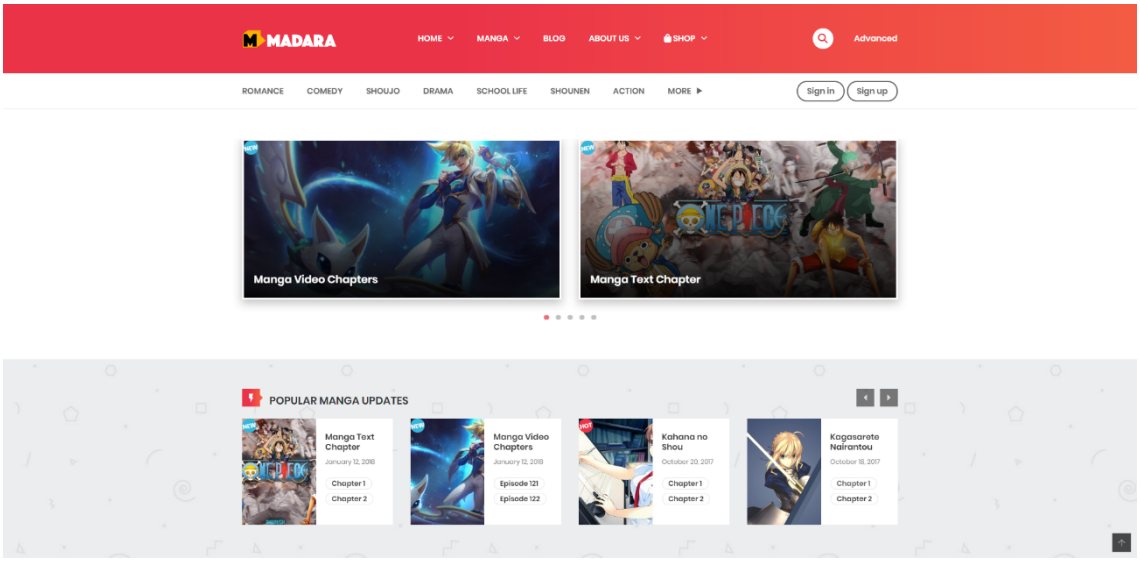


Figure 4-4 Captured image of “Madara” demo site (http://demo.mangabooth.com/)

“Wordpress” is a PHP-based application that can manage blog sites. In addition, “Wordpress” has a feature called “Theme” that allows a customized layout based on PHP, and the above-mentioned “Madara” is included in this theme. These themes can be introduced with a single click.

“Madara” is clearly suggested to be a theme with the function of “Uploading comics”, “Updating which comics have been uploaded, and Reading online”. You can’t actually read comics on the demo site, but there are pages that are supposed to be read. In addition, it functions as a streaming site.

One of the sites using “Madara” is “Manga Mura.club”.

4.6 Countermeasures for future piracy sites

A number of countermeasures and investigations have been conducted on piracy sites viewed from Japan. Still, there are piracy sites that are more popular than the official version and continue to be visited daily.

In this survey, it was confirmed that the anti-piracy countermeasures by the country on April 2018 caused 3 sites to close and also changed end-users piracy awareness, resulting in a drastic decrease in the number of visits to the all piracy sites. At that time, the country took a strong stance against piracy sites. It is expected that piracy site countermeasures will be further promoted by deepening discussions in the future.

However, although some users have become aware of copyright infringement, some

also use piracy sites while knowing that it was illegal.

Furthermore, it is considered that one of the important future issues is how to deal with P2P sites.

4.7 Summary of Chapter 4

(1) There were 1,447 piracy sites in Japan over the past two years, and the total number of monthly visits was about 340 million. The total number of monthly visits for the top 100 sites out of 1,447 was over 90% of the total. The total number of monthly visits to the 6 major official distribution sites was 140 million, which was lower than piracy sites.

(2) Checking the number of unique users for the top piracy sites visited by site type, it was found that there were about 2 million people each. For the official sites, about 10 million comic distribution sites and about 5 million video distribution sites were used for the top sites. The rests were equal to or less than the number of piracy site users. This shows how much influence the piracy site has.

(3) The changes in number of uses of Online Reading sites over time were very large, but P2P sites were relatively stable. In particular, Online Reading sites were greatly influenced by the government's anti-piracy countermeasures in April 2018. On the other hand, the P2P site continued with the top site being unchanged for two years, indicating that there were 2 million specific users.

(4) The usage of piracy apps in Japan is less than 2% compared to official apps, indicating that they are not as popular as piracy sites.

(5) The number of visits to piracy sites exceeded 650 million in March 2018. However, anti-piracy countermeasures by the Japanese government were discussed, and the Japanese government took a strong stance against piracy sites, which had a great impact on society as a whole. As a result of these countermeasures, sites such as "Manga Mura" were closed and the number of visits to the all piracy sites dropped sharply. Therefore, it is considered that these discussions were effective in countering piracy sites.

(6) A survey of the countries where piracy sites were established revealed that 381 server countries, 61% of the 624 sites surveyed, were unknown, of which 86% were built on the CDN provided by Cloudflare. When a piracy site is built on the CDN, it is difficult to identify the location of the cache server that distributes the content to the end user, and it tends to become a hotbed of piracy site. However, Cloudflare tends to respond to requests for information disclosure related to site

operators, and a cooperative system will be required in the future.

(7) There were functions that helped build piracy sites. As an example, we introduced the “nyaa” repository that enables the same construction as the “Nyaa” site and the “madara” theme of “Wordpress” that enables users to build a site similar to “Manga Mura.club”.

Chapter 5: Survey Summary

In this survey, we identified piracy sites and apps for movies, TV programs, anime, and manga in Japan, and investigated changes over time in their use in the two years from July 2017 to July 2019 using SimilarWeb data. The purpose is to inform discussions about the best policies for reducing online piracy in Japan. And clarified the actual situation.

(1) As a result of investigating piracy sites in Japan, we were able to extract 1,447 sites. Among these, 624 sites with over 100,000 visits per month were surveyed for a two years period.

(2) The total number of monthly visits to piracy sites in June 2019 exceeded 340 million. The top 10 sites count for approximately 50% of the total number of visits, and the top 100 sites total exceeds 90%. Therefore, for piracy sites countermeasures, it is only necessary to concentrate on high sites with.

(3) There were 340 million monthly visits to piracy sites, while the total number of visits to 50 official sites was 290 million.

(4) As a result of the investigating 381 server's country identifier, 61% of the surveyed 624 sites, were unknown, and 86% of them were built on the CDN provided by Cloudflare.

(5) The usage of piracy apps in Japan is about one-hundredth of that in the United States, less than 2% of the usage of official apps and not as much as piracy sites.

In addition, the following has become clear about the trends in the situation of piracy sites in Japan over the past two years.

(6) Monthly visits to Japanese piracy sites were about 500 million at the beginning of July 2017, and peaked at over 600 million in March 2018. The main ones are Online Reading Site such as "Manga Mura". It was a rapid increase. However, the target site was closed as a result of piracy countermeasures by the Japanese government, and due to the heightened awareness of copyright infringement by users, it can be seen that it suddenly decreased to 320 million in June 2018.

(7) As of June 2019, there were 340 million visits, showing a slight increase, and the scale of copyright infringement is still large.

(8) As for the trends by site type, the time line for Online Reading sites were very volatile, while P2P sites were relatively stable. In particular, Online Reading

sites were greatly influenced by the government's anti-piracy countermeasures in April 2018. On the other hand, the P2P site continued without the top site unchanged for two years, indicating that there were 2 million core users.

In this survey, the most distinctive impact was the drastic drop in visits to all piracy sites in April 2018. Countermeasures against piracy by the Japanese government were discussed, and the response that the government took on piracy sites, pushed piracy sites to close. At the same time, it brings a change in the awareness of using pirated contents for end users, and as a result, has proved very effective as a countermeasure against piracy sites.

On the other hand, since April 2018, the number of visits to piracy sites continues to exceed 300 million per month. For this reason, it is necessary for content providers to provide attractive distribution services that are more convenient than piracy sites. As well as to deepen discussions on more effective and sustainable piracy countermeasures.

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