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TV In Your Pocket:

Mobile Video Downloading Report

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Introduction and Key Findings

Introduction and Key Findings

Mobile devices, including smartphones and tablets, have become integral to the modern lifestyle. Mobile apps are routinely used for information, entertainment, gaming, socializing, shopping and more—practically every activity can now be pursued on a mobile device. In addition to this explosion of mobile adoption, screens have grown both in quality and size, allowing users to have increasingly immersive experiences.

Meanwhile, streaming video has become a mainstream activity for millions of viewers around the world. At the intersection of mobile and video, there is a massive opportunity for video service providers to capture more attention and revenue. In fact, 29% of 18-34 year olds consider the smartphone to be their primary medium for entertainment, according to recent research from Manatt and Vorhaus Advisors.[1]

To fully realize this potential, pristine viewing experiences must be delivered. Yet a variety of challenges make high-quality streaming to mobile devices difficult, if not impossible. Savvy video service providers have therefore concluded that enabling viewers to download video to their mobile devices for offline viewing is necessary.

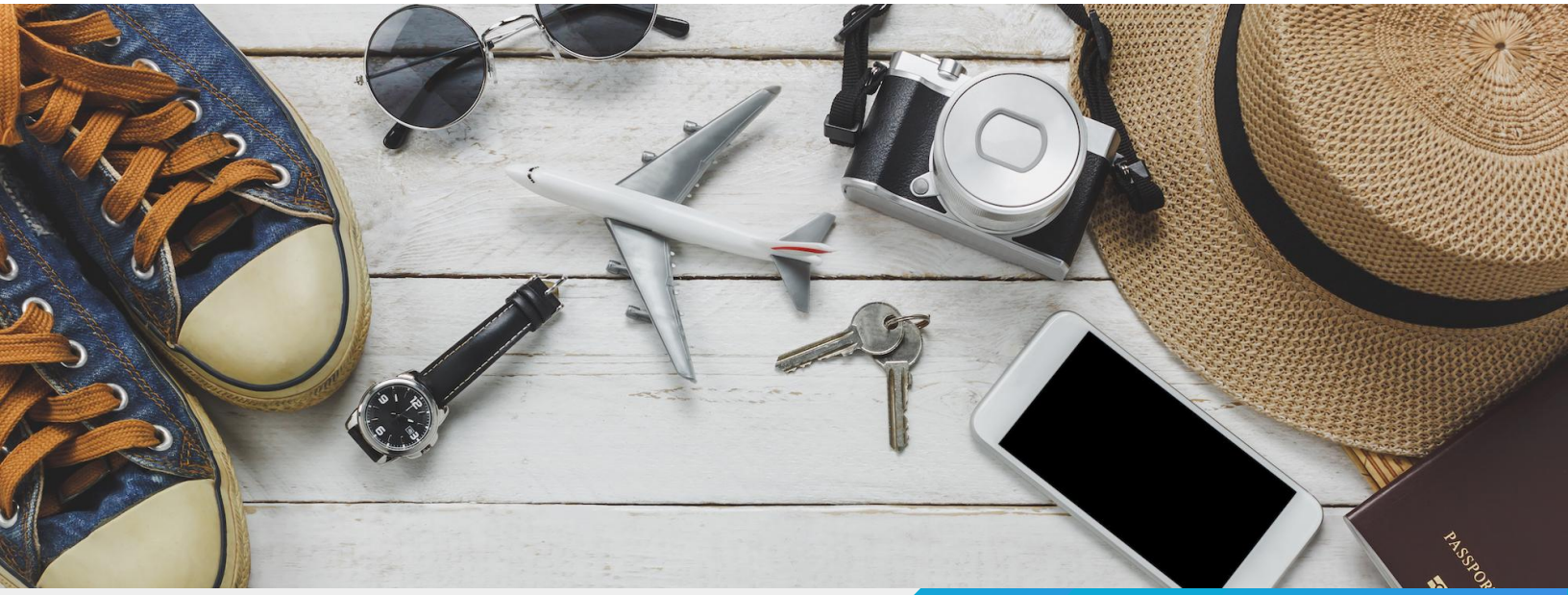
To provide industry executives with a better understanding of which video providers are now offering video downloads and the key features they include, we have created this inaugural *TV In Your Pocket: Mobile Video Downloading* report. We believe it is the first comprehensive report studying mobile video downloading and that it will be an essential resource for anyone in the industry responsible for the competitiveness of their video service.

Mobile video downloading is on the cusp of an inflection point because high-profile services like Disney+ and Apple TV+ that launched in Q4 2019 not only offer full support for video downloading, but actively promote it as a key feature. They join other popular services like Netflix, Amazon Prime Video, CBS All Access, Showtime and others who already offer downloading.

There is already significant usage of the feature among streaming video viewers. 59% of U.S. streaming service users expect services to allow them to download videos. What's more, those who use downloads are using it 132% more than in 2018.[2] As more users experience the benefits of mobile video downloading and realize that it solves pesky streaming issues like buffering, momentum for the feature will build. Add it all up and mobile video downloading is "table stakes" for any video service provider to be fully competitive.

Following are key findings from this report:

- Of the top 80 video service providers that we analyzed, 28 offer mobile video downloading. Support was not restricted to top SVOD providers like Netflix, Showtime, and Disney+. Services with a more niche appeal, such as Gaia and Beachbody On Demand, also provide the feature. The highest profile service not to support downloading is HBO Now while many niche providers like Acorn TV and SworkIt Fitness have yet to add the downloading feature.
- iOS is supported by all 28 of these providers for mobile video downloading, and all but four of them support Android.
- 19 of these providers allow users to select the video quality or file size of their video download.
- Three providers automatically delete downloaded episodes once they have been watched, and only one of these (Netflix) proactively downloads subsequent unwatched episodes in the series
- All the 28 services allow video downloads to execute in the background while users engage with other apps on their devices.
- 25 of 28 services enabled users to specify that downloading only occurs when connected to a Wi-Fi network.



Disruptive Impact of Streaming on the TV and Video Industry

Viewers today expect to be able to watch their favorite TV shows and movies when, where, and how they want. This desire for video consumption freedom is fueling the surge in online streaming, which, in turn, has put traditional industry business models under increasing pressure. Consider that in Q3 2019, cord-cutting hit a record high of over 1.7 million traditional pay-TV subscribers, according to Leichtman Research Group.[3]

The intensifying competition for audience attention has led to a massive increase in the capital spent on high-quality original programming by an expanding array of video service providers. In 2018, FX Networks estimated that TV networks and streaming providers created nearly 500 scripted original programs, up more than ten times in the past ten years. Netflix alone will spend approximately $15 billion on content globally in 2019.

Major media companies now understand the imperative to launch a direct-to-consumer video service. A rush of household brands, including Disney, WarnerMedia, Apple, and NBCUniversal, are entering the market. Never before has it been more important to deliver premium content with outstanding experiences across a range of connected devices. For all video providers, it is no longer enough to offer a wide variety of content; viewers must also be able to watch their choices with minimal friction.

Mobile streaming is challenging

Streaming video has evolved significantly in the past ten years, from desktop viewing primarily to connected TV and mobile devices. Viewers have more flexibility than ever, upending the notion of “appointment viewing,” especially for entertainment programming. This is particularly true for mobile viewing, which lets users watch TV and movies, and even sports and other live event programming, regardless of their location. All this flexibility means that viewers are increasingly incorporating mobile video into their lifestyles and relying on it more for their entertainment needs.

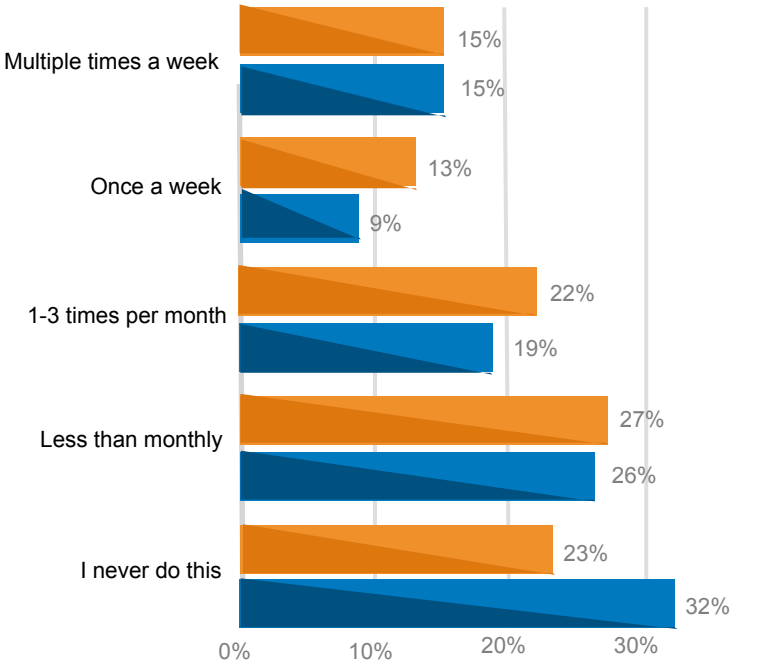
However, challenges in mobile connectivity continue to make delivering out-of-home viewing experiences a challenge. For users not on an unlimited mobile data plan, watching video can eat up a lot of their monthly data allotment. Viewing high-quality video on wireless networks can also fail for a variety of reasons. For example, a wireless carrier may not have enough cell capacity, or handoffs between cell towers may be interrupted while a user is in fast-moving cars or trains.

Sometimes, viewers don't have mobile connectivity at all or have severe streaming limitations, such as on many airlines. Finally, Wi-Fi hotspots aren't ubiquitous and universally accessible, and some may block streaming outright.

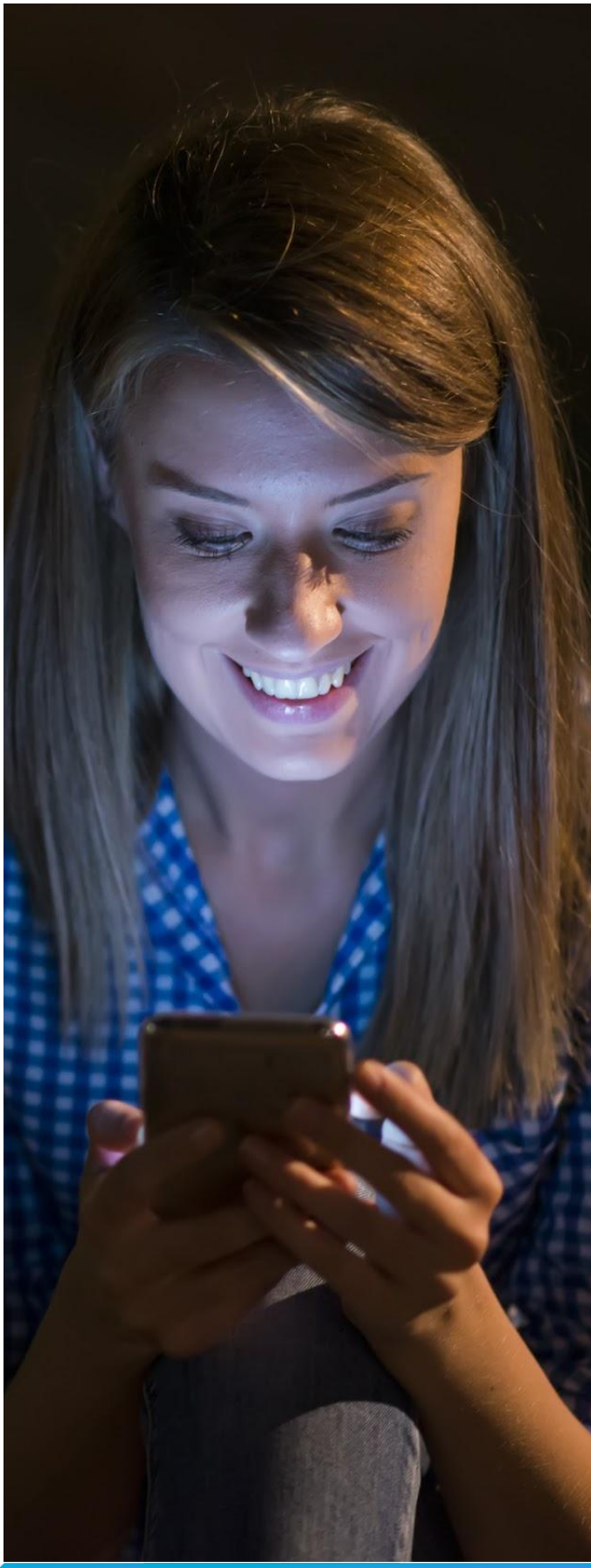
Mobile Video Downloading for Offline Viewing

Fortunately, there is a solution to the inherent weaknesses in the mobile streaming model: enabling viewers to download video to their mobile devices for offline viewing. By doing so, video becomes truly "mobile," in that viewers have the assurance that they can watch their favorite TV programs and movies whenever they like – completely independent of the availability or quality of mobile network access. Viewers can plan their viewing accordingly, confident that they'll be able to watch when, where, and how they choose.

Frequency of download use by UK and US SVOD users



@nScreenMedia, 2018 (US n=1000, UK n=500)



According to research from Penthera, 59% of users in the U.S. now expect streaming services to include a download feature, and 54% say they would be more likely to subscribe to a streaming service if that service offered a download option.[4] In fact, according to Penthera, 67% in the U.S. and 66% in the UK would pay a monthly premium for download capabilities. What's more, those that have the feature use it. 65% of U.S. and 78% of UK SVOD customers say they are weekly or monthly users of video downloads. The benefits to video providers are clear – improved audience loyalty, reduced churn, higher monetization, and greater competitiveness. These are all reasons that have led savvy video providers to embrace mobile video downloading.[5]

Despite the keen interest in mobile video downloading, for now, the only services to support downloading are ad-free SVOD. The problem could be because providing ads in downloaded video is quite complicated. Ads need to be regularly refreshed, requiring integration with multiple ad server systems. As well, the refreshed ads need to be inserted into the downloaded video, which affects many other parts of the content provider's technology stack.

US: Download by the Numbers

of users who expect streaming services to include a download feature

would be more likely to subscribe to a streaming service if that service offered a download option

would pay a monthly premium for download capabilities

say they are weekly or monthly users of video downloads

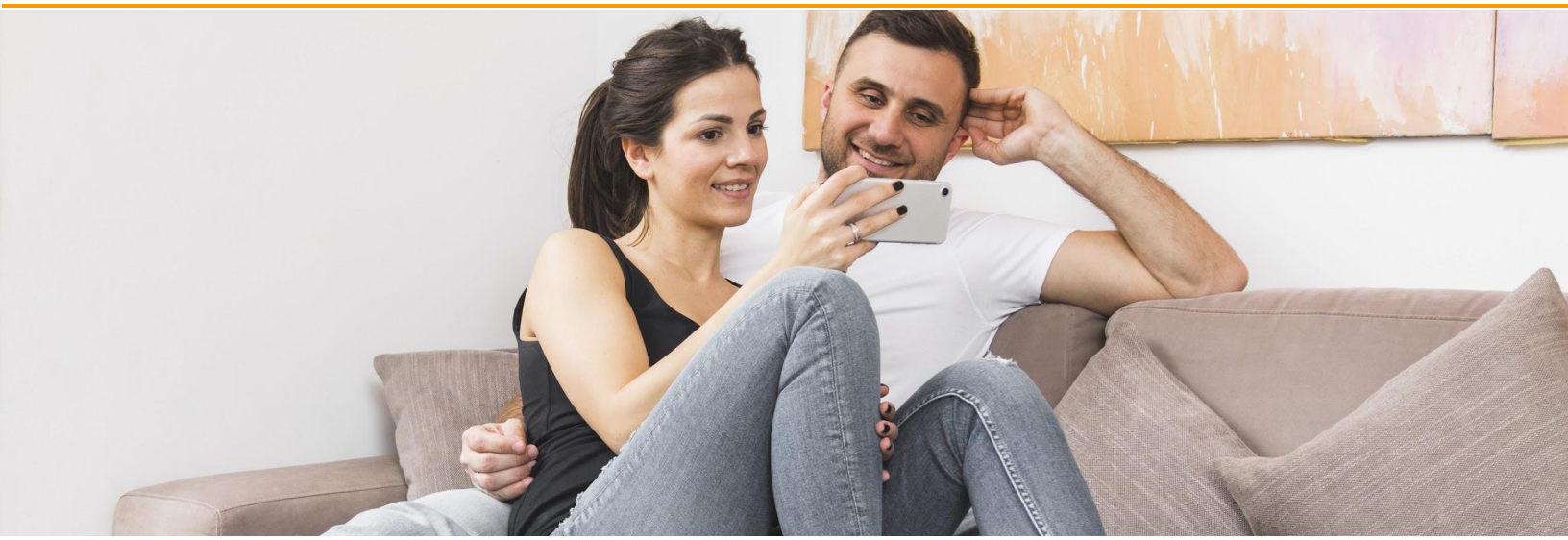
Penthera, 2019 US Survey

Video Services Tested

For this report, we have analyzed 80 video services in the U.S. (see Appendix 2 for full list). We tried to identify those that are most popular using a variety of publicly available sources including consumer SVOD usage surveys, industry reports, and app downloads as reported by sites such as AppAnnie. The content focus of these video services includes general interest entertainment, sports, and niche categories (e.g. how-to, international, etc.) from established and early-stage media companies.

We believe this is the first report to comprehensively assess the state of mobile downloading, and it provides a critical window into a capability that is quickly becoming competitive table stakes. We intend to continue updating this report on a semi-annual basis.

What We Tested



What we tested

We tested the download functionality of all the services that supported the feature. In all, we looked at eight different aspects of download functionality. A brief description of each and the test procedure used is detailed below.

Unless otherwise specified, all downloads were performed over a Wi-Fi network. An Android phone (Samsung Galaxy s8 running Android 8) and iPhone (6S plus running iOS 13.1.3) were the primary test devices. Each test was performed on both devices. Differences between the two, if any, are noted in the test results below.

Test 1: On which devices are downloads available?

Using app stores, FAQs, and help systems, we first checked whether video was downloadable when using either of the two most popular mobile platforms in the US, iOS and Android.

Test 2: Selectable quality/file size levels

Controlling the quality/file size of the download helps the user in two ways:

- Manages storage space on the device
- Accelerates the speed of download when time or bandwidth is limited

We checked the mobile app to see if there was an option to select the quality or file size of the download. If no option was found, we initiated a download to see if the user was offered the option to select the quality/file size at that time.

Test 3&4: Auto-delete of watched episodes / “subscription download” of next episode

Automatically deleting an episode once it is watched helps preserve valuable space on a mobile device. We checked which services support the feature.

We also tested for “subscription download” to a TV series. With this feature, the next few unwatched episodes or new episodes are automatically downloaded to the device when Wi-Fi connectivity is restored. The subscription can be explicitly set with a widget in the interface or implicitly by downloading three or more episodes of a show. We checked for both approaches in our test.

Test 5: User-initiated download completing in the background

Once a user begins using download functionality, a great way to annoy them is by forcing them to wait in the app while the download completes. This test verified that a user could initiate a download, switch to another app on their device, and have the download complete in the background. The feature is important because it prevents the user from being forced to stay focused on the app while the downloading occurs.

Test 6: Only download over Wi-Fi

Many mobile customers do not have unlimited data plans and therefore must try to stay below the cap on their mobile data consumption. Enabling video downloads only over a Wi-Fi network is a great way to allow them to remain below their mobile data cap. We checked the option exists and that the app sticks to it.

Test 7: Download auto-restart after failure

A download can fail for many reasons. For example, when a user wanders outside of the range of home Wi-Fi, turns off their phone at night, or goes into airplane mode. We tested if the app resumed a requested or automatic download once connectivity was restored.

Test 8: Download prioritization

Users may wish to prioritize one download over another for a variety of reasons. For example, before heading out on a trip, users might browse the content library and schedule to download several movies and TV shows to watch on the trip. What if they were also watching a movie and ran out of time to finish it before they had to leave? Naturally, they would want to prioritize the partially watched movie for download over other titles they have not already started watching.

We tested to see if a user could prioritize certain videos to download before others.

Test 9: Queue download for later

Water-cooler conversations still carry weight with consumers when it comes to finding something to watch. For example, a commuter on a train talking with workmates may hear about a new show that he wants to watch. Immediately queuing download of the show on his smartphone guarantees he will not forget it. However, what if his phone is on the mobile data plan and the app is set to only download over Wi-Fi? Is it still possible to queue the download for when Wi-Fi connectivity is restored?

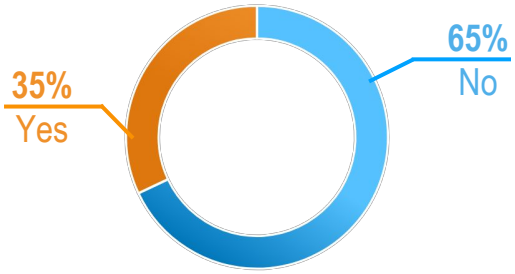
With the app set for Wi-Fi only downloads, we tried to set a show to download while on mobile data (Wi-Fi was not connected.) We checked the show was successfully added to the download list and that the download did not start. We then connected to Wi-Fi and verified the download was automatically re-initiated and completed.

The Results

The Results

Of the 80 services we tested, 28 (about one-third) support video downloading. The feature is not only restricted to the largest of providers. To be sure, widely adopted services including Netflix, Amazon Prime Video, CBS All Access, Showtime, Starz, and Fox Nation all offer downloading. Hulu only added the feature, in October, 2019, but only for its ad-free subscribers.[6] Apple TV+ and Disney+ both launched with the feature included in early November, 2019.

Percentage of US online TV services that support video downloads



@nScreenMedia,VideoNuze 2019

Some well-known video services failing to support video downloads include HBO Now, ABC Go, Comedy Central, and Univision Now. It is also interesting to note that none of the virtual MVPDs – including YouTube TV and AT&T TV Now – support downloads, despite having extensive on-demand and pay-per-view movie libraries.

Smaller video service providers in the Fitness and Wellness category like Beachbody On Demand and Gaia support downloads, as do niche services like History Channel and Lifetime Movies. Moreover, though their product development budgets are necessarily far smaller than the popular SVOD services, they do not shy away from including more complex features such as download prioritization and file size control.

In general, functionality between Android and iOS versions was identical, with one notable exception. iOS versions of the apps did not provide notifications of download progress and completions. Users must check the download screen of the app to see progress.

Apple TV+ and Disney+

We expected Apple and Disney to have learned from the download implementations of others and deliver great examples of the state-of-the-art of download. With such high expectations, we were disappointed with the Apple TV+ implementation.

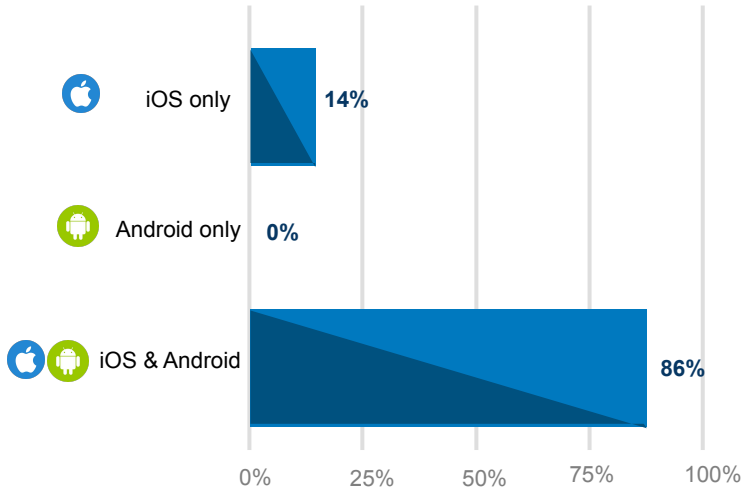
Netflix lets a user select the download quality, which allows them to boost download speed and reduce the memory the video file absorbs. Netflix also allows a user to automatically download the next episode of a show and delete watched episodes. Apple does none of this. A user can only select a show to download, cancel the download, and delete a video. Moreover, we found downloads to take a long time versus other apps.

Disney+, on the other hand, delivers a full-featured offering on both Android and iOS. Users can select download quality, execute downloads in the background, and reorder multiple downloads. The only major feature missing from the implementation is the ability to automatically download the next episode of show and auto-delete watched videos. However, this could be considered nit-picking since Netflix is the only service to support auto-download and delete.

Test 1: On which devices are downloads available?

All 28 of the services that allow viewers to download shows and movies support iOS devices. Four services – Apple TV+, Hulu, Lifetime Movie Club, and History Vault - do not support downloads to Android devices. Given that iOS and Android split the market for smartphone devices in the U.S., all services should support both platforms.[7]

Mobile video platforms supported by online video services for download



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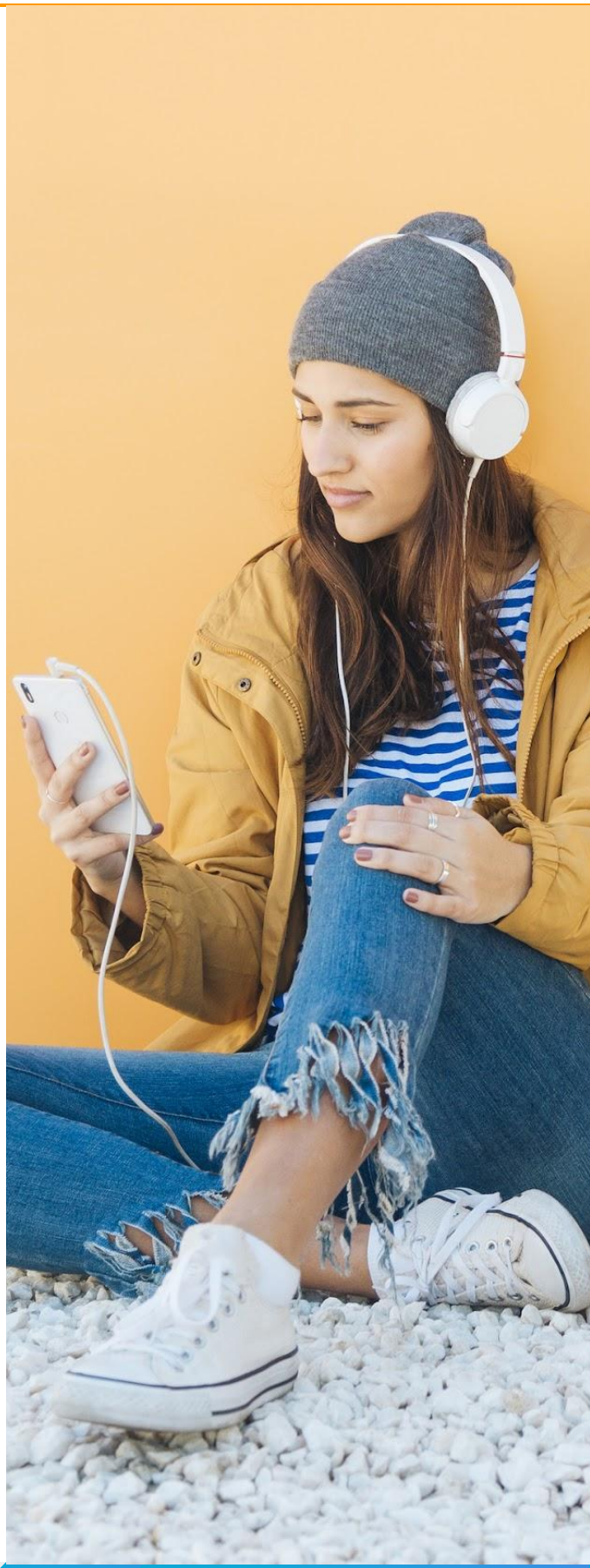


Test 2: Selectable quality/file size levels

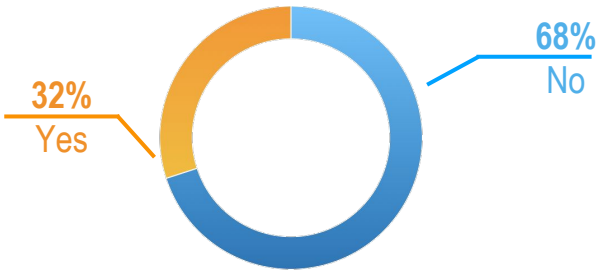
Of the services we looked at that currently support downloading, 19, or 68%, also allow users to select the video quality or file size on the devices they support (both Android and iOS or iOS only if that is all they support.) Apple TV+ does not support selectable video quality.

There are three important benefits of allowing selectable quality and file sizes by viewers.

Firstly, many people still have relatively low mobile data caps. Downloading just two or three TV shows can easily exceed a 2-gigabyte cap. Controlling the use of that data is very important to those with low data caps. Secondly, many smartphones have limited local memory available. Again, users will want to optimize their usage of valuable storage space. Thirdly, consumers typically download videos for trips just before they are about to leave. Since time is short, the ability to trade-off a little quality for a faster download will be much appreciated by customers.

There is a wide difference between how each service implements selectable file size. For example, Amazon Prime Video provides four quality levels and clearly informs the user how much space each uses. Hulu, on the other hand, allows a user to select between only two levels: “Standard” and “High” quality. As well, there is no hint as to how much storage space is saved in the process.

Can users select the download quality/file size?



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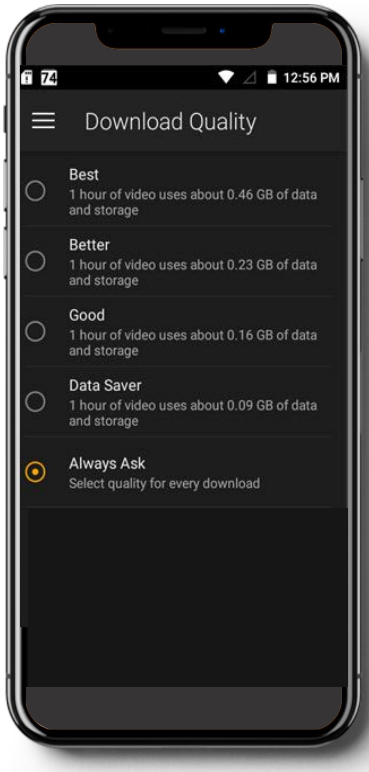
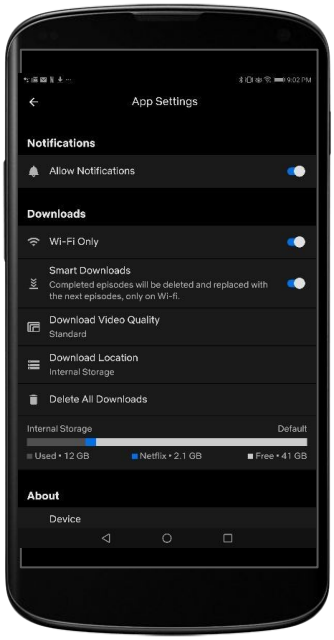


Amazon Prime Video provides four quality levels and clear data on storage savings

Test 3: Auto-delete of watched episodes (“Clean-up” device space)
Test 4: “Subscription download” of next episode

The automatic deletion of watched episodes was supported by only three services: Netflix, CBS All Access, and Sony Funimation.

Only one service - Netflix - supported automatic download of the next episode in a series. If users enable the service’s “Smart Downloads” feature, when they download three or more episodes of a TV show, Netflix automatically deletes watched episodes and replaces them with the next episodes in the series. Services like Amazon Prime Video allow a subscriber to download an entire season of a show in one click. That said, given how precious local storage is for many users, few would want to take advantage of this feature for more than a show or two.



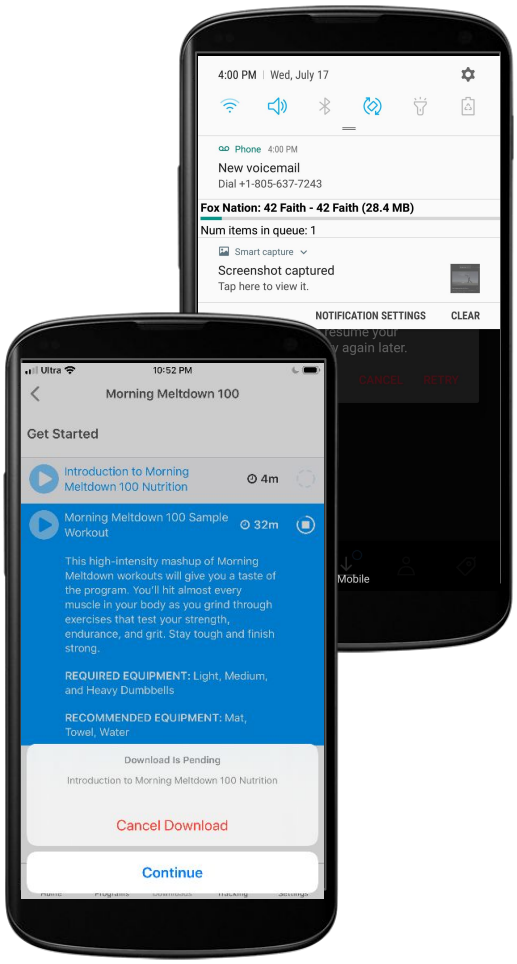
Test 5: User-initiated download completing in the background

All the services that support video downloads allow the operation to execute in the background. In other words, a user can schedule the download and switch away to other apps or watch other videos while the download proceeds as a background task.

However, keeping the user informed of download progress was a lot less consistent. On Android, more than half of the download supporters fail to give the user adequate information regarding in-progress tasks. Six services provide no feedback on the progress of the downloads, meaning the user has no idea how much longer they must wait for all downloads to complete. Seven services let users know downloads are occurring but do not provide notifications when downloads are complete.

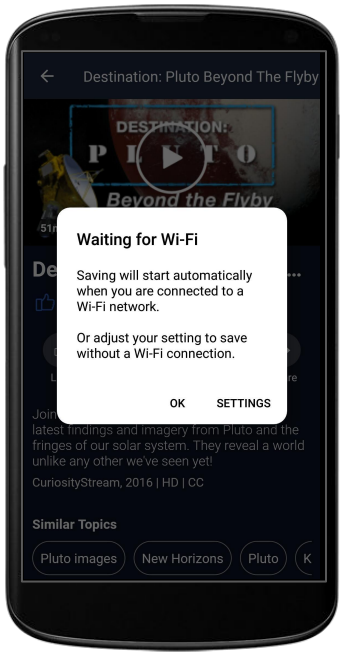
Fox Nation provides a good example of how services can keep users unobtrusively informed as to the progress of requested downloads. The service uses the notification bar on Android devices to tell the user download progress and status.

For some reason, none of the services notify the user of download progress or completion on iOS. To monitor progress a user must return to or remain on the download page.



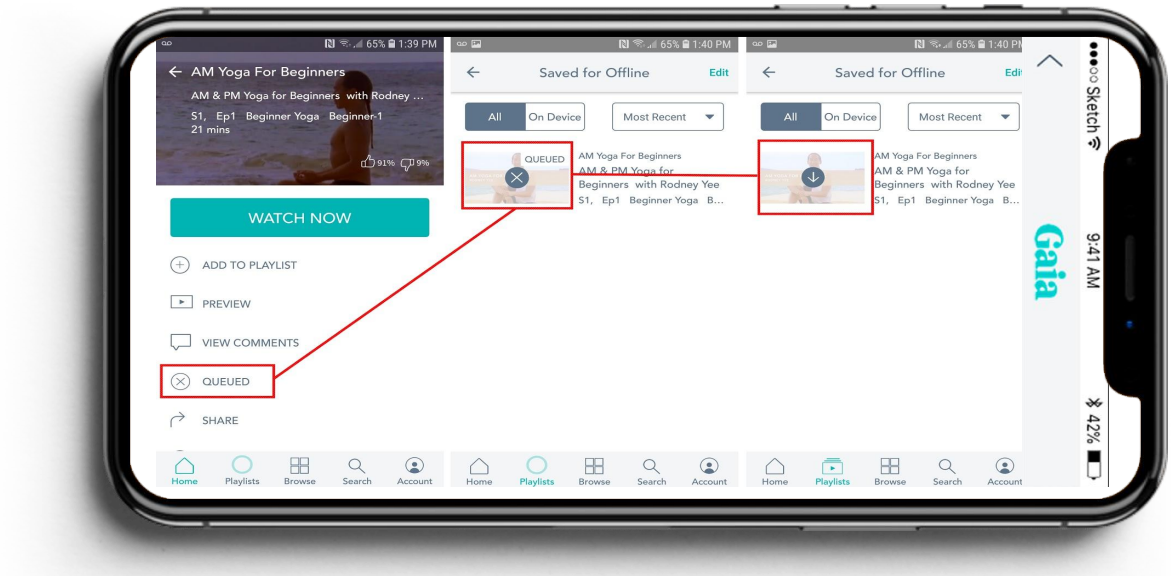
Test 6: Only download over Wi-Fi

Three services - Apple TV+, AMC Premiere, and Boomerang - did not allow the user to restrict downloads to Wi-Fi only. Again, Wi-Fi only downloading is critical for users that have capped data plans.



Test 7: Download auto-restart after failure

A download can fail for many reasons. For example, when a user wanders outside of the range of home Wi-Fi, turns off their phone at night, or goes into airplane mode. We tested if the app resumed a requested or automatic download once connectivity was restored.



Gaia provides a clear, understandable path through the scheduling and download process.

Test 8: Download prioritization

Generally, services download shows one at a time, rather than downloading multiple videos at once. The exceptions to this approach are CuriosityStream, Apple TV+, and ESPN+. With these apps, if a download is underway and the user selects something else to download, both shows download simultaneously. Of course, the first download will slow down once another download starts.

As well, all the apps download in the order in which the user selects the shows as the default. The first show selected is downloaded first, second selected is downloaded second, and so on. The exceptions to this first-in-first-downloaded approach are CuriosityStream and ESPN+. Our test showed that it is difficult to predict which download will complete first with these two services.

Some apps allow the default order of downloads to be changed. However, the ability to change the order of downloads was implemented differently by each service, and there were many differences between Android and iOS. For example, Netflix allows users to change the order of downloads on Android devices, but not on iOS. The Criterion Channel, DC Universe, YouTube Premium, Showtime, and Lifetime Movie Club allow iOS users to change the order but not Android users.

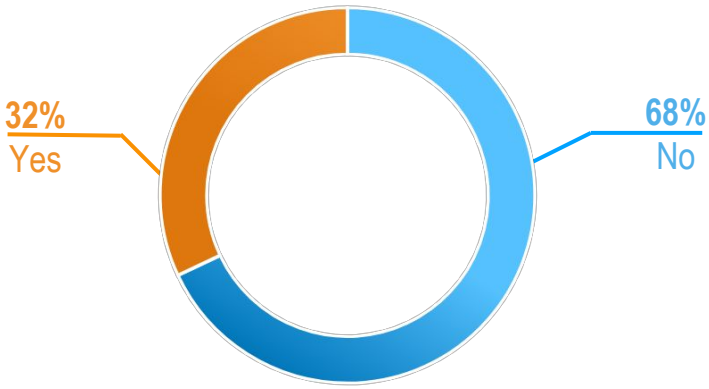
Test 9: Queue download for later

Customers often want to download only on Wi-Fi to save on mobile data plan costs, but Wi-Fi is not always available. For this reason, being able to queue a download to occur later, when on Wi-Fi, is handy.

Unfortunately, only nine services (one third) support the feature. There were also inconsistencies between Android and iOS. For example, The Criterion Collection allows scheduling on mobile data from iOS but not Android. DC Universe and CBS All Access allows it from Android but not iOS.

However, all seven do not allow the download to start until a Wi-Fi connection is re-established.

Percentage of services that allow downloads to be queued on mobile data while set to download only over WiFi.



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Conclusion

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Mobile video downloading is being embraced by many video service providers, giving their viewers valuable flexibility to watch their favorite shows whenever they want, irrespective of connectivity limitations. With mobile video downloading, viewers truly have “TV in their pockets” at all times. Ultimately for video service providers this means greater user loyalty, satisfaction, and monetization.

Yet, as this report shows, there are still many video service providers that haven’t enabled mobile video downloading. They are falling behind competitively, and as more new services like Disney+ and Apple TV+ launch with downloading support, user expectations will further increase.

Even for services that already offer downloading, as this report demonstrates, features and implementations vary widely. With mobile lifestyles becoming more common, advanced downloading functionality will become a bigger differentiator. Ad-supported services which have not yet adopted downloading have the biggest mobile opportunity to expand their revenue-generating ad avails.

With so much of the video and TV industries undergoing rapid change, mobile video downloading is poised to become a more important driver of future success.

penthera

About Penthera

This report was sponsored by Penthera. Penthera is a global software company that develops and deploys products that remove friction and improve the mobile video experience. With tools that include video download, content subscriptions, and buffer-free streaming technology, Penthera helps OTT providers compete in a crowded marketplace and improve key business metrics such as viewer engagement, increased revenue, and churn-reduction. Penthera works with leading media and entertainment brands around the world: CBS, Fox, HBO, Liberty, AMC, Globo, Showtime and many other streaming providers. Led by Michael Willner, Chairman and CEO, and Dan Taitz, President and COO, Penthera is transforming how the world accesses mobile video.

Learn more about download functionality at penthera.com.

Appendix A: Specific features of services supporting video download functionality

Service	Download Support	Select Quality	Auto-delete	Auto-Download	Background Download	Wi-Fi only	Auto-restart	One-at-a-time	Schedule on cell
Amazon Prime Video - Android	y	y	n	n	y	y	y	y	y
Amazon Prime Video - iOS	y	y	n	n	y	y	y	y	y
AMC Premiere - Android	y	n	n	n	y	n	y	y	n
AMC Premiere Video - iOS	y	n	n	n	y	n	y	y	n
Apple TV+ - Android	n								
Apple TV+ - iOS	y	n	n	n	y	n	y	n	n/a
BeachBody on Demand - Android	y	y	n	n	y	y	y	y	n
BeachBody on Demand - iOS	y	y	n	n	n	y	y	y	n
Boomerang - Android	y	n	n	n	y	n	y	y	n
Boomerang - iOS	y	n	n	n	y	n	y	n*	n
CBS All Access - Android	y	y	y	n	y	y	y	y	n
CBS All Access - iOS	y	y	y	n	n	y	y	y	n
^CrunchyRoll - Android	y	n	n	n	y	y	y	y	n
^CrunchyRoll - iOS	y	n	n	n	y	y	y	n	n
CuriosityStream - Android	y	y	n	n	y	y	y	y	n
CuriosityStream - iOS	y	y	n	n	y	y	y	y	n
DC Universe - Android	y	y	n	n	y	y	y	y	y
DC Universe - iOS	y	y	n	n	y	y	y	y	n
Disney+ - Android	Y	y	n	n	y	y	y	y	y
Disney+ - iOS	y	y	n	n	y	y	y	y	y
EPIX - Android	y	n	n	n	y	y	y	y	y
EPIX - iOS	y	n	n	n	y	y	y	y	y
ESPN+ - Android~	y	y	n	n	y	y	y	n	n
ESPN+ - iOS~	y	y	n	n	y	y	y	n	n
Fox Nation - Android	y	n	n	n	y	y	y	y	n
Fox Nation - iOS	y	n	n	n	y	y	y	y	n
Gaia - Android	y	n	n	n	y	y	y	y	n
Gaia - iOS	y	n	n	n	y	y	y	y	n
History Vault - Android	n								
History Vault - iOS	y	y	n	n	y	y	y	y	Y
Hulu - Android	n								
Hulu - iOS	y	y	n	n	y	y	n	y	n
Lifetime Movie Club - Android	n								
Lifetime Movie Club - iOS	y	y	n	n	y	y	*y	y	n
Netflix - Android	y	y	y	y	y	y	y	y	n
Netflix - iOS	y	y	y	y	y	y	y	y	n

Appendix A: Specific features of services supporting video download functionality

Service	Download Support	Select Quality	Auto-delete	Auto-Download	Background Download	Wi-Fi only	Auto-restart	One-at-a-time	Schedule on cell
Pantaya - Android	y	y	n	n	y	y	y	y	Y
Pantaya - iOS	y	y	n	n	y	y	y	y	Y
Showtime - Android	y	y	n	n	y	y	y	y	n
Showtime - iOS	y	y	n	n	n	y	y	y	n
^Shudder - Android	y	n	n	n	y	y	y	y	n
^Shudder - iOS	y	n	n	n	y	y	y	n	n
Sony Funimation - Android	y	y	n	n	y	y	y	y	n
Sony Funimation - iOS	y	y	n	n	y	y	y	y	n
Starz- Android	y	y	n	n	y	y	y	y	n
Starz - iOS	y	y	n	n	y	y	y	y	n
The Criterion Channel - Android	y	y	n	n	y	y	y	y	n
The Criterion Channel - iOS	y	y	n	n	y	y	y	n	Y
Tribeca Shortlist - Android	y	n	n	y	y	n	y	y	n
Tribeca Shortlist - iOS	y	n	n	y	y	n	y	y	n
Up Faith and Family - Android	y	y	n	n	y	y	y	y	n
Up Faith and Family - iOS	y	y	n	n	y	y	y	y	n
VUDU - Android	y	y	n	n	y	y	n	y	n
VUDU - iOS	y	y	n	n	y	n	y	y	n/a
YouTube Premium - Android	y	y	n	n	y	y	y	y	n
YouTube Premium - iOS	y	y	n	n	y	y	y	y	n

*restart stalled and froze
~Could only download ESPN Originals
^The native apps of Shudder and Crunchyroll do not support download. Users are directed to connect their account through VRV, where download is supported.

Appendix B: Tested services

ABC	Fox Sports	Sling TV
ABC News	Fox+	Smithsonian
Acorn TV	fuboTV	Sony Funimation
Amazon Prime Video	FX Now	Spectrum TV
AMC Premiere	Gaia	Starz
Apple TV+	Hallmark Movies Now	Sundance
BeachBody on Demand	HBO Go	SworkIt Fitness
Boomerang	HBO Now	Tennis Channel
BritBox	History	Tennis TV
CBS All Access	History Vault	The Criterion Channel
CNN	Hulu	The CW
Comedy Central	hulu Live	Tribeca Shortlist
Crackle	Hungry Shark World	Tubi
CrunchyRoll	Lifetime Movie Club	Twitchy
CuriosityStream	MLB At Bat	UFC
DAZN	NBC App	Univision Now
DC Universe	NBC Sports	Up Faith and Family
DirecTV Now	Netflix	USA Network
Disney+	NHL	Viki
Disney Now	Noggin	VUDU
Dove Channel	Pantaya	Watch (AT&T)
EPIX	Paramount Network	Watch TNT
ESPN+	PBS Kids	Weather
Facebook	Philo	WWE
Food Network	PS Vue	YouTube Premium
Fox Nation	Showtime	YouTube TV
Fox Now*	Shudder	

*Fox Now download facility was in beta at the time of testing. Downloads frequently crashed causing inconsistent and unusable results.

Appendix C: Sources Cited

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