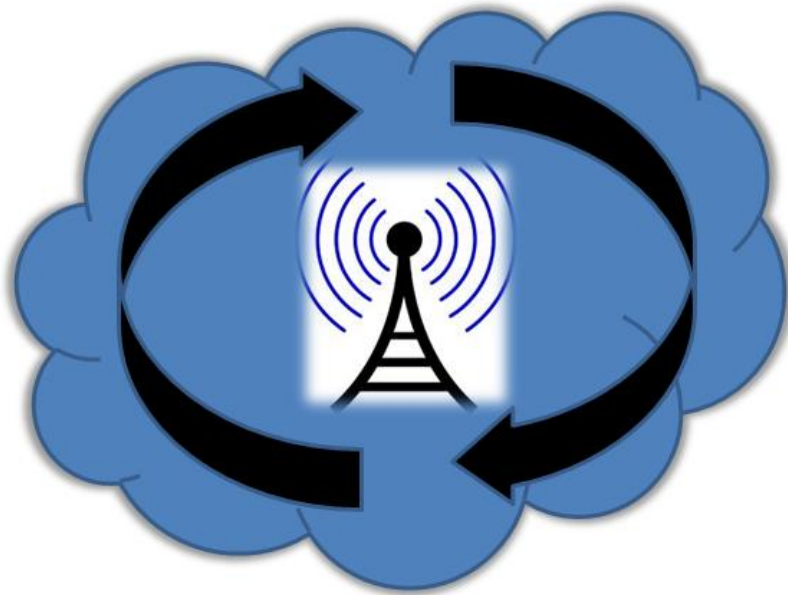


# Mobile Cloud Video: Sync or Stream?



**October, 2010**



**FUNAMBOL**

# Mobile Cloud Video: Sync or Stream?

## Table of Contents

I. INTRODUCTION.....	3
II. MOBILE DATA USE CASES.....	5
III. MOBILE CLOUD SYNC VS. STREAM: APPLE VS. ORANGES.....	9
IV. TO SYNC OR NOT TO SYNC, THAT IS THE QUESTION.....	12
V. ABOUT FUNAMBOL.....	12

## I. INTRODUCTION

During the recent Apple TV announcement, Steve Jobs said that Apple learned that consumers did not want to sync video. Job's view shouldn't come as a shock, since the new Apple TV device is sold as a 'stream only' solution, but the inference was that syncing video became outdated overnight, like brick-sized cell phones.

With respect to video, it is easy to understand why. When a large video such as a movie or TV show downloads to a PC, it can take minutes, hours or even days, depending on its length, resolution (standard def or high def), source (commercial content system or peer-to-peer network) and network bandwidth. Automatically syncing video – unattended, automated copying from one location to another, as opposed to manual downloading – inevitably ties up resources (a gigabyte file takes time to transfer whatever the platform) and may be pointless. It doesn't matter if your cable or satellite connected digital video recorder is full of content you're never going to watch, but if your phone was constantly downloading large videos that were never seen (draining the battery and spiking your phone bill) it would give you reason to pause.

The idea of syncing video may seem counter to the instant gratification of turning on TV, playing a DVD, watching YouTube or streaming NetFlix movies (except, perhaps, for the annoyance of occasional buffering). On the mobile platform, the potential latency and waste of video sync is pronounced. It drains the battery and unless you happen to be in WIFI range, bandwidth is much more limited and expensive. But at the same time, who has the tolerance to watch streamed mobile video that keeps breaking up or that is subject to repeated buffering? After a few moments of video interruptus, you may give up trying to view a video at that particular time.

This begs the broader question, when is syncing better than streaming? With faster 4G wireless broadband networks rollouts in progress, and the wireless and entertainment worlds converging at a screen near you, does it make sense to 'think about sync' in the long term, or should people just stream all of their data and media wirelessly, perhaps via the cloud?

One thing is certain, mobile video adoption will accelerate, due to several trends, including the rapid rise of smartphones, low cost mobile data plans and 4G. A study commissioned by Cisco found that 10% of consumers worldwide already watch video on mobile phones. The most active age group is 25 to 34 year olds, who view 40 minutes of mobile video daily. For more findings from the survey, see <http://bit.ly/bUKZzp> or the survey results at <http://bit.ly/4HZWw>. It's clear that mobile video consumption will grow exponentially as 4G takes root and the mobile video experience goes viral - the real questions are when, how and who will benefit.

Unsurprisingly, most people don't lose sleep over the question of syncing versus streaming, they simply want the best experience. At Funambol, our business is syncing and streaming data and media between diverse mobile devices and systems, so it's a topic near-and-dear to our core. Years ago, we settled on the approach of reliably delivering the content people want, when they want (online or off), with the lowest impact on mobile device battery life and network resources. With that approach in mind, it's helpful to analyze the sync versus stream conundrum by looking at use cases and examples, especially for mobile video.

The short answer, for those with limited interest in this topic (or an MTV-afflicted attention span :) is that syncing is not going away. For certain data and media, it continues to make complete sense to sync with mobile devices, even video in some cases, as this satisfies the need to reliably provide content at the right time and lowest cost. Wireless networks may be getting faster, but they are not always available and always have a cost, so the need for offline access and syncing remains. We are looking at a future where a mix of data and media syncing and streaming will prevail, as discussed further below.

## II. MOBILE DATA USE CASES

Table One on the next page lists common types of data and media that people use on mobile phones and devices. These are divided into several categories:

- PIM (personal information management) data
- Communications
- Files
- Media (non-video)
- Media (video)
- Mobile content
- System files

The categories are further divided into types, with a description of how each type is typically used on a mobile device. This is followed by the frequency that each type of data is often synced or streamed, the relative size of the data, and a last column that indicates whether it makes more sense to sync or stream that data or media with a wireless device.

Note the use of the word 'hybrid' in the last column. Although we at Funambol like to think that we have 'green' (eco-friendly) tendencies, hybrid in this context has nothing to do with latest Toyota Prius. Instead, it refers to syncing OR streaming, or a variation, as being appropriate, depending on the situation. For example, with rich media consisting of large files, such as video, it may make more sense to sync its meta data, such as a video name, description, length, and performers, rather than the content itself. This hybrid approach is becoming more popular and used to enable control of a DVR or internet TV service with a mobile handset. Another example of hybrid is a 'smart sync' approach that only syncs large content when Wifi or a fixed internet connection is being used. As time goes by, more hybrid sync and stream approaches will evolve.

Category	Type of data	Mobile sync or stream example	Sync or stream frequency	Data Size	Sync or stream?
PIM	Contacts/address book	Outlook or Gmail contacts synced	Medium	Small	Sync
	Calendar (agenda)	Outlook or Gmail calendar synced	Medium to low	Small	Sync
	Tasks (todos)	Outlook task synced	Low	Small	Sync
	Notes	Outlook note synced	Low	Small	Sync
Communication	Email	Email accessed via mobile phone	High to low	Medium	Hybrid
	SMS / MMS	Occasional backup	Low (i.e. backup is rare)	Small	Sync
	Call log/history	Occasional backup	Low (i.e. backup is rare)	Small	Sync
	IM/chat	Occasional backup	Low (i.e. backup is rare)	Small	Sync
	Social network updates	Occasional backup	High to low	Small	Hybrid
Files	Text	View on mobile phone	Email attachment usually	Small	Stream
	PDF	View on mobile phone	Email attachment usually	Variable	Stream
	MS Office	View or edit on mobile phone	Email attachment usually	Variable	Stream
	Other e.g. jpg	View on mobile phone	Email attachment usually	Variable	Stream
Media (non-video)	Pictures	Take on phone, share with others	Becoming more frequent	Medium	Sync
	Music	iTunes download; stream Pandora	Medium to low	Medium large	Hybrid
	Podcasts	iTunes download	Medium to low	Medium large	Sync
	eBooks	Download	Medium to low	Medium large	Sync
	Voicemail/ notes	Record on phone, rarely send	Low	Medium	Sync
Media (video)	Mobile-captured	Take on phone, share with others	Becoming more frequent	Medium large	Sync
	YouTube	View on mobile phone	Medium to low	Medium large	Stream
	TV show	Download or stream to phone	Becoming more frequent	Large	Hybrid
	Movie	Download or stream to phone	Becoming more frequent	Extra large	Hybrid
	Sports, news, weather	Download or stream to phone	Becoming more frequent	Medium large	Hybrid
	Videocall/conference	View on mobile phone	Becoming more frequent	Medium large	Stream
Mobile content	Ringtones	Download to phone	Medium to low	Small	Sync
	Games	Download to phone	Medium to low	Medium	Sync
	Maps	Download to phone	Medium to low	Large	Sync
	Apps	Download to phone	Medium to low	Medium	Sync
System files	Browser bookmarks	Occasional backup	Low	Small	Sync
	System and user settings	Occasional backup	Low	Medium	Sync
	System software	Occasional backup	Low	Medium large	Sync

**Table One: Mobile Data Types and Use Cases**

The information in Table One was developed based on the knowledge of Funambol personnel, who collectively have many years of experience working on large-scale implementations of sync-centric projects in diverse markets around the world. The stream or sync choice will always be subject to a wide range of factors including personal preferences, however, the table reflects Funambol's view of the most prevalent scenarios in the 'real mobile world' based on how people typically interact with different data and media on diverse mobile devices.

What conclusions and insights can be drawn regarding when it is better to sync versus stream?

For PIM data such as contacts, calendars, tasks and notes, it makes more sense to sync with mobile devices than to stream. The data is relatively compact, it can be used on multiple devices, and it's valuable while on the go, even if offline (e.g. being able to instantly access a calendar anywhere). The on-hand value of PIM information is high, especially contact information, as it is often integrated with other apps and services, and the cost of syncing it on mobile devices is relatively low.

With communication data, such as email or social network content, in some cases it makes sense to sync, while in other cases, a hybrid syncing or streaming approach is better. BlackBerries, for instance, which have (email) sync at its core are considered by many to be the pinnacle of mobile email. The 'CrackBerry generation' want their email as soon as it's available, no matter what. For others with more casual email needs, and with different devices, a mobile webmail service (a form of streaming) is adequate. In some respects, this is superior to syncing because it does not needlessly tax their phone battery or wireless network.

In the mobile files category, mobile differs from PCs in that for the most part, people primarily view files on their handsets rather than create or edit them. There are exceptions but for both consumer and professional users, small screens and keypads make file manipulation cumbersome. In addition, mobile files are often accessed as email attachments. What may be counter-intuitive is that although email may be synced (e.g. in the case of BlackBerries), it often makes sense to stream files, such as pdfs. Email attachments can be large and may not be essential to the message, so it makes sense to make them available optionally. Why pay the price to sync them if not used? Many mobile email solutions, including Funambol, stream file attachments when they are requested.

For non-video media – pictures, music, podcasts, ebooks, voice recordings – the table suggests that syncing or a hybrid approach is the norm vs. streaming. Why? It boils down to the media's intended use. In the case of pictures taken on a mobile phone that the user wants to share, it

makes sense to sync them to a photo sharing site. For music, Digital Rights Management can dictate whether music is owned and if it can be freely copied. This affects whether it is synced or streamed, akin to the difference between buying an iTunes song versus listening to an online service such as Pandora.

Video media is at the crux of this paper. As can be seen from Table One's rightmost column, there are multiple scenarios for different categories of video. Which is preferred depends on how the category is commonly used on mobile devices. In the case of user-generated video that is captured on a mobile phone that people want to share, it makes sense to sync it with a video sharing site. If you are watching YouTube or using FaceTime or other video chat, streaming is more apropos. For commercial content such as TV episodes and movies, sometimes syncing is better while other times streaming is appropriate. It often depends if you are legally allowed to own the content and whether it is expected that you will watch all of it instantly (such as a YouTube clip) or on a time-shifted basis. A common example of the latter is when the user is offline e.g. on an airplane or commuting on a subway with non-existent, intermittent or saturated network coverage that negatively impacts live playback. A new, real-world example is Starbuck's introduction of free premium content for mobile devices, where people can download (sync) via Wifi free music, videos and ebooks to mobiles for later offline consumption. This is a classic case of where both syncing and streaming are needed, and this is likely to be quickly copied by many purveyors of mass market goods and services.

Two other categories are mobile content (ringtones, games, maps and apps) and system files (e.g. user and system settings, and system software). For these, syncing is superior, because as users spend more money on mobile content, it makes sense that this content resides locally on their phone so it can be used when desired. As phones become more PC-like with extensive memory, the ability to fully back up a phone and restore its contents (i.e. a form of syncing), to the same or different type of phone, becomes more valuable.

### III. MOBILE CLOUD SYNC VS. STREAM: APPLE VS. ORANGES

Video can be viewed in many ways on mobile devices. A discussion of mobile cloud video sync versus stream would be incomplete without highlighting some of the more popular methods.

Table Two lists some high profile solutions offered by a cross-section of providers.

Company/Service	Description	Supported Devices	Supported Video Content	Sync or Stream?	Monetization
<b>Device Makers</b>					
Apple FaceTime	Video calling via wifi	iPhone 4		Stream	Free as part of iPhone 4 over wifi
Apple iTunes	Play, buy and sync music, movies & more	PC/Mac, iPhone, iPod touch, iPad, Apple TV	Movies, TV, video	Sync	Buy or rent videos, season pass
Apple MobileMe	Sync iPhone, iPad and Mac/PC	iPhone, iPod touch, iPad, Mac/PC, Apple TV	User generated movies	Sync	60 day free trial, \$90/year
Apple TV	Stream video and music to your TV	TVs, MACs/PCs, iPhone, iPod touch, iPad	Movies, TV, video	Stream	\$99 hardware & buy/rent video
Nokia Ovi	Sync contacts, email, maps, media	Nokia phones	Videos	Sync (download)	Buy videos
Microsoft MyPhone	Windows phone backup and sync	WinMobile & newer Windows phones	Video backup & restore	Sync	Free
<b>Mobile Operators</b>					
Vodafone 360	Sync contacts & media with mobiles & web	Samsung, HTC, iPhone, SonyEric, Nokia, BB	Does not appear to support video yet	Not applicable	Not applicable
AT&T Mobile TV	Brings TV programs to your mobile phone	Four 3G smartphones	TV programming	Stream	\$10 month subscription
Verizon V Cast Mobile TV	Take your TV to-go	HTC Imagio	Several channels of TV	Stream	\$13-\$15 month subscription
<b>Internet Companies</b>					
Google Android	Mobile operating system platform	Android	User generated & commercial content	Manual sync	Free
Google YouTube	User-generated video website	Android, BB, iPhone, Nokia S60, WM, others	User generated video	Stream	Free, ad supported
Google TV	Combines TV and web on one screen	TV, does not seem to directly support mobile	Any type of video content	Stream	Hardware for legacy TVs
Yahoo! Connected TV	Adds the web & video services to TV	Some newer TV models	User generated & commercial content	Stream	Free, built into some newer TVs
<b>Other Companies</b>					
Netflix	Rent CDs or stream movies & TV	TVs, PCs, iPhone	Movies & TV	Stream	Subscription model
Hulu	View free & premium video in a browser	PCs, some mobile phones	Movies, TV and more	Stream	Freemium (free + subscription)
Slingbox SlingPlayer Mobile	Watch your TV anywhere.	iPhone, Android, BB, WM, Palm, Symbian	Live/recorded TV via wifi or 3G	Stream	\$29 app plus Slingbox hardware
MobiTV	Live and on-demand video on mobiles	Generally smartphones, depends on carrier	Live/recorded video	Stream	Subscription model

**Table Two: Mobile Cloud Video Syncing and Streaming Solutions**

The common denominator for inclusion in this table is that the solution must make some form of video content available on mobile phones. Table Two is not comprehensive but rather illustrative of which methods use syncing versus streaming as their fundamental basis. It is organized into categories of mobile video solutions offered by these types of companies:

- Device Makers
- Mobile Operators
- Internet Companies
- Other Companies e.g. Netflix, Hulu, Slingbox and MobiTV

Categories are divided into mobile video services and solutions. They include a description, supported devices and video content, whether syncing or streaming dominates and approach for monetization (which is another interesting trend although outside the scope of this paper).

This section is titled 'Apple vs. Oranges' because this overview of mobile video services and solutions offers some interesting observations:

- The methods used to deliver mobile video today are highly fragmented, with companies advocating different technologies and approaches, none of which have yet to catch on in a dominant way
- Apple is blazing a trail (despite its resistance to Flash on mobile devices) with its combination of iTunes, FaceTime, Apple TV and to a lesser extent, MobileMe. Apple has forged an integrated vision (pun intended) to enabling a wide range of video content on diverse devices that supports both syncing and streaming. Apple's market position and situation are unique and it remains to be seen if their mobile video offerings will gain widespread adoption. So far, they have gone the farthest in showing a blueprint for how to bring together different video content on different devices, including mobile (iPhone, iPod touch and iPad) and television

- What is interesting about Apple is that despite Steve Jobs' saying that video syncing is obsolete, iTunes and MobileMe still rely on sync-centric models, with no indication this will change soon. Apple is heading where Funambol went awhile ago, by realizing that both syncing and streaming must be supported. The major difference with Funambol is that our technology is open source, it works with virtually any device, and is available for others to use. This can be quite valuable for apps and services that need to support more than a single manufacturer's hardware
- Several mobile video services today are limited to geographic areas that have sufficient wireless network infrastructure for carrying video. An example is Hulu, a popular video service in the U.S. which does not yet provide service in other regions of the world. One use case of syncing video is that users could sync the types of video they are interested in, using a low-cost, off-peak channel, increasing the probability of being able to access desired content wherever and whenever (not meant to be a criticism of Hulu, it is a great service, this is just an example)

Mobile video, from a technical (as well as monetization) perspective, will gain increased attention and investment over the coming months. It will also attract extensive innovation that involves both syncing and streaming mobile video via the cloud.

## IV. TO SYNC OR NOT TO SYNC, THAT IS THE QUESTION

This paper discussed common data and media used on mobile devices, as well as some high profile mobile video services and solutions in the market. It examined use cases of how mobile data and content are typically experienced. It concludes that the foreseeable future portends both syncing and streaming, for mobile video and other mobile data and media, as the goal should be to reliably deliver what people want, when they want (online or off), at the lowest cost, taking into account device battery life and network characteristics.

This is of relevance to mobile companies and developers because as video becomes entrenched in mobile apps and devices, just as it is becoming more common on PCs, it will be important to support both syncing and streaming models. In this regard, companies and developers are invited to examine Funambol's open source mobile cloud server and clients that sync and stream mobile data and media with diverse devices.

## V. ABOUT FUNAMBOL

Funambol is the open source mobile cloud company that provides syncing, streaming and device management for billions of mobile phones and connected devices. Funambol open source has been downloaded four million times by 50,000 developers in 200 countries, making it the #1 mobile open source server project. The commercial version of Funambol has been deployed by top mobile operators, device manufacturers, internet companies, service providers and ISVs. Funambol is headquartered in Silicon Valley with R&D in Europe. For more information, visit <http://www.funambol.com>. You can also follow Funambol on Twitter at <http://twitter.com/funambol>.

© Copyright 2010 Funambol, Inc. All rights reserved. Funambol is a trademark of Funambol, Inc.

Other company, product and service names may be the trademarks and/or property of their respective owners.