

Interactive MusicNetwork

Technical Report: Apple iTunes Music Store

MN_TR_DP_iTunes

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1 Introduction

Ipsos-Reid described in [1] that “a healthy number of file traders are willing to pay for fee-based online music”. As already discussed in [2] among the reasons for the failure of current fee-based online music distribution sites are subscription based services (instead of pay-per-download) and the mediocrity of their offerings:

- The prices are too high.
- The music selection is too limited.
- The usage of obtained music is too restrictive.
- The quality is not better than in free (illegal) offers.

According to [2] a great potential to make significant revenue is there “if the pay music service would only compete directly with free P2P services, leveraging their limitations”. Additionally, P2P-networks are not considered as competitors to CDs but are seen as a promotional method like radio. “Piracy is not the number one reason why the record industry wants to eliminate the free P2P services. New CD sales have dropped, that's true, but marginally. Used¹ CD sales meanwhile have skyrocketed. “

Thus Apple iTunes Music Store's success [3] is not as much astonishing: In less than 24 hours it nearly sold 300,000 tracks at \$0.99. However, pricing is still too expensive considering the arguments of [2]. Furthermore, its success is achieved although only the Mac audience is address, which is about 5% of today's PC users.

In the following sections we provide some information on the technical realisation of Apple iTunes Music Store, a short analysis and an outlook on its future and the future of online music distribution in general.

2 Technical Description

In this section we describe the hardware and software related to the iTunes Music Store. We start with the hard- and software requirements. We will explain the iTunes4 jukebox software and its dependencies with the iTunes Music Store and the iPod, which probably have a strong influence on the success of the iTunes Music Store.

The basic functionality of iTunes Music Store is quite simple:

1. iTunes application connect to the Music Store via the Internet, using the Web – HTTP protocol.
2. The user can browse and select the music pieces he/she wants,
3. The user can listen to 30 seconds preview and when convinced, he/she can purchase the desired music pieces²,
4. The purchased music pieces are then downloaded through an encryption-protected channel,
5. The user can listen to the music directly from iTunes, burn it to a CD or put the music pieces onto the iPod to listen to them in a mobile style.

Figure 1 shows the operations possible with the music downloaded from iTunes.

¹ More and more second-hand CDs are sold.

² Details about the electronic payment and registration are not considered.

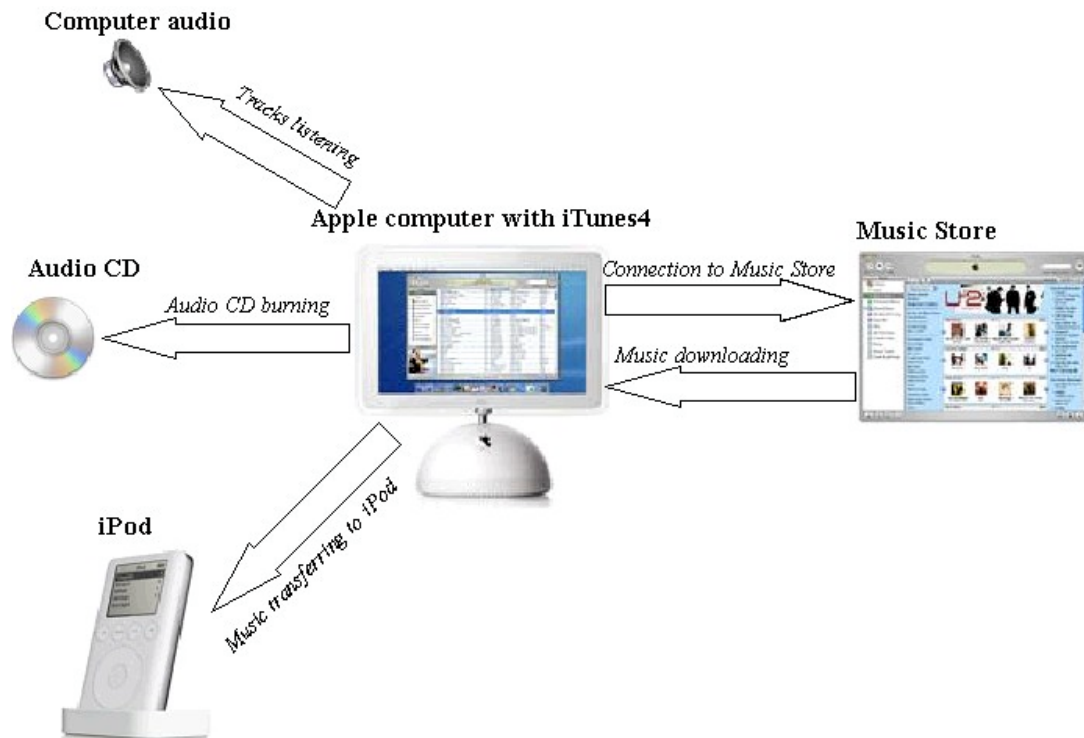


Figure 1: Apple iTunes Music Store and its dependencies to iTunes, iPod, computer audio and Audio CD: Music is selected and downloaded from the Music Store. The access to the Music Store is integrated into iTunes which improves its usability. The downloaded music can be played on computers, transferred to iPods or burned on an audio CD.

2.1 Hardware and software requirements

So far, the developed software requires a Macintosh computer. However Apple announced to develop a PC based version. Hard- and software requirements include:

- Mac OS X (version 10.2.5 or later recommended);
- Internet connection (DSL, Cable or a LAN-based connection recommended for streaming and downloading music);
- iTunes 4, downloadable from Apple web site.
- QuickTime 6.2

2.2 iTunes 4

iTunes 4 is the Mac application (a 'jukebox software') which enables users to enter the iTunes Music Store. Its music player supports the new AAC audio format, and let users share their music with other Mac computers on local Ethernet or AirPort wireless networks.

Using a Mac with a SuperDrive, it is possible to archive music to DVDs. iTunes 4 has a Music Sharing feature that uses Rendezvous to give user remote streaming access to his personal music library. It automatically synchronises with the iPod device (a digital audio player, cf. below) at high speeds over FireWire, by connecting iPod to a Mac computer with FireWire. An entire music CD can be downloaded in about 10 seconds. Moreover, iTunes lets user stay in sync with Play Count, Last Played, Song Ratings and where his Audible³ spoken word content left off.

³ Audible is the service that provides digital versions of over 18,000 books as well as publications like "The New York Times" and "The Wall Street Journal", and archived radio shows such as NPR.

It is possible to generate dynamic Smart Playlists that reflect user preferences and listening habits. To create these playlists, a user only has to indicate what kind of music he prefers: iTunes 4 lets user set the parameters — indicating attributes such as My Rating, Genre, Composer, Artist, Play Count, Last Played and so on — and then creates a personalised playlist.

Because iTunes 4 seamlessly connects to the rest of iLife (Apple's software for digital music, photography, moviemaking and DVD creation), it is possible to access iTunes digital music library and playlists from iPhoto, iMovie and iDVD. Moreover, iTunes 4 can burn audio CDs. Also, the user directly benefits from the integration of the Music Store into iTunes, which is shown in Figure 2.



Figure 2: iTunes integrates the Music Store by providing a link on the menu on the left side of the application window. Together with the seamless integration of iTunes with iLife (Apple's software for digital music, photography, moviemaking, ...) there is an increased usability due to this highly integrated solution.

2.3 iPods

iPods (for Mac and Windows) is a digital audio player which can download music files and hold up to 7,500 songs. It is a very slim device (0.62 inches thick and 5.6 ounces weight) and includes a 10GB, 15GB or 30GB hard drive. The 15GB and 30GB models have a docking station to make them able to charge and sync via FireWire or USB 2.0. They can be connected to a home stereo system, too. iPod supports the most several audio formats, including MP3 (up to 320 kbps), MP3 Variable Bit Rate (VBR), WAV and AAC (Mac-only).

2.4 iTunes Music Store

The iTunes Music Store includes 200,000 songs. It is directly accessible via iTunes 4. Due to the direct integration iTunes Music Store becomes a part of iTunes 4 which allows users to search or browse genres, new releases, exclusives and more. Additionally, any song can be previewed for free. The price for each song is 99¢. It can be downloaded immediately on the local hard drive or held in the shopping cart. A user can perform searches by specifying criteria such as artist, composer title and genre as shown in Figure 3. Then, he can buy tracks from the returned list, which are downloaded to final users' hard disks. It is possible to purchase both single songs and whole albums, too. The iTunes Music Store also provides artists' discographies and album covers.



Figure 3: This screenshot shows the results of a search for Mascagni's works within iTunes Music Store.

For users with a broadband connection, iTunes Music Stores can play full-length music videos.

If the end-user doesn't have a broadband connection, he can download the previews (30 seconds long) to his desktop and listen to them, and use the shopping cart to hold all his music selection until he is ready to buy. Moreover, there is no limitation in listening to these previews. Songs are coded with the AAC compression technology and online transactions are protected by encryption software. The iTunes Music Store provides an email bulletin to keep users current with all the new releases and newly added back catalogue selections.

To buy tracks in Music Store, a user has to configure his own Apple account from the iTunes application itself. The Music Store requires a credit card with a U.S. billing address.

2.5 *Payment*

Music can be download as individual tracks or as a complete album. At the iTunes Music Store the price for every founded track is fixed to 99¢. At the moment, iTunes Music Store is only available in the U.S.: it requires a credit card with a U.S. billing address.

2.6 *Protection*

So far, only a few details are revealed [4]. This might also be related to the fact, that the more information available the sooner the protection scheme will be cracked by hackers. This is a major drawback as history tells us that security by obscurity is not possible. We list the main known details below:

- AAC: Songs are compressed in the new AAC format (for Advanced Audio Coding, a big part of the MPEG-4 specification). It uses a 128 kbps bitrate and the resulted music files have a quality that can be compared with 160 kbps MP3 compressed files. AAC files are stated to rival CDs⁴.
- Direct connection: online transactions are protected by encryption software.
- Authorisation: users can play the purchased music on up to three computers, enjoy unlimited synching with their iPods, burn unlimited CDs of individual songs and burn unchanged playlists up to 10 times each. Before listening the purchased music, the computer has to be authorised to play it: this happens the first time the account is configured or as soon as the bought track is played. This authorisation can be set up to three computers, and can be removed.
If user's computer is connected to a local network, the purchased music can be shared with other five computers. Vice versa, user can set preferences to search for shared music.

3 *Analysis*

Obviously Apple iTunes Music Store has some advantages which certainly attract customers very strongly. But it is also welcomed by digital audio device manufacturers and analysts [5]. We will outline these advantages but also some disadvantages in the following paragraphs.

3.1 *Advantages*

- One essential requirement related to the success of any distribution system is the fact that technical restrictions in the use of purchased media must not annoy final users. Apple considered this requirement while designing the iTunes Music Store. This is directly related to the usability of the media. In contrast to other solutions the restrictions due to the DRM system are weakened.
- The usability of the software for downloading the content is also important: iTunes can be called an easy-to-use software.
- Besides the usability the costs are relevant to users: Of course inexpensive music prices are advantages for the success and 99 cents for each song are indeed cheap considering the fact that Singles are almost not available.
- Additionally, there are no costs for subscription.
- Content providers are the most important music labels nowadays: The major labels (Universal, Warner, BMG, EMI and Sony Music Entertainment) provide Apple iTunes Music Store with music.
- First system to gather selling and downloading songs, burning them onto CDs and transferring to portable music players.
- Songs are not disabled when subscription ends.

3.2 *Drawbacks*

Of course there are also some drawbacks that are described detailed in [6]. However, one cannot neglect the fact that despite of these drawbacks (which might be even legitimate considering Apples challenging initiative) the iTunes Music store is very successful:

⁴ Although the quality improvement from MP3 to AAC can not be neglected, different analyses show that both formats can be distinguished from CD if bitrates up to 192kbps are used as encoding parameter.

- If a user is not interested in one or two individual files of an album but prefers to download almost the complete album buying a CD will be more attractive because of the lack of bulk discounts in the iTunes Music Store, the added value of a CD like the backup and the cover art, the unrestricted CD and maybe due to some bargains at local record shops.
- The quality of encoding is restricted to 128kbit AAC encoding which is comparable with 160Kbit MP3-encoding. However, some analyses show that 256 kbit MP3-encoding is necessary to achieve full CD quality.
- According to [6] there is a noticeable loss of quality when converting the AAC files to MP3 files. This also endangers the exchange with other MP3-players.
- This centralised system is difficult to handle if more than three computers are used for playing the audio files.
- The proprietary standard might bring some difficulties in the future if Apples iTunes Music Store fails: Audio files might be lost.
- An advanced search engine might be more interesting (with more than one search field).
- The iTunes Music Store is only available in the U.S.
- Is the credit card paying system the most suitable for selling music online?
- Apple commands less than 5 percent of the desktop computer market.

3.3 *Mac user*

One aspect that has not been fully considered yet is the profile of the Mac users. As business is always addressing a certain target group it is interesting to see if there are differences between PC users and Mac users.

Several possible differences can be identified. First of all, Mac users prefer a certain type of computer, which is ready and easy to use. They don't want to bother with driver or software problems (as there is less variety of hardware components). As hardware and operation system are produced by the same company they have (almost) one single point of contact when problems occur. Besides this, Mac users are not used to deal with cracks, piracy software. Mac users typically purchase their software. (By the way, this is an interesting point when analysing the success of Microsoft.) Summarised, Mac users are used to pay (more) for good service and are less used to exploit hacks or cracks. Additionally Mac users seem to have a strong affinity or brand loyalty.

A report from Nielsen/NetRatings analysed the Mac users group which is summarised in [8]: "... Those who surf the Web using a Mac tend to be better educated and make more money than their PC-using counterparts, according to a report from Nielsen/NetRatings ... The study also said Mac users tend to be more Web savvy, with more than half having been online for at least five years. And the Mac faithful are 58 percent more likely than the overall online population to build their own Web page and also slightly more likely to buy goods online, according to the report. "With above-average household income and education levels, the Mac population presents a very attractive target for marketers, both online and offline," the research group said ... Nielsen/NetRatings said that 70.2 percent of Mac users online have a college degree, compared with 54.2 percent of all Web surfers. That, combined with their longer surfing histories and their greater willingness to buy products via the Web, makes Mac consumers a prime catch for marketers."

3.4 *Repertoire*

In 2000 Thomas Lue Lytzen and Franz Berliner analysed the challenges the music industry faces when it is to act in a network economy where the distribution of music is no longer restricted to selling physical artefacts to consumers through ordinary outlets [9]. This analyse contains several interesting thoughts which are still relevant today as music industry didn't manage to commercialise electronic distributed music. One important aspect that has to be considered when trying to identify the potential of online music distribution is the behaviour of customers. In [9] two different kinds of future consumers are identified:

- "consumers being more uniform, wanting hit music only (a natural consequence of the music industry releasing an increasing number of compilation albums);"
- "consumers being more individual, specialising in a few selected artists only, or compiling their own albums of favourite artists."

However, radio stations or streaming web radio services directly address the “uniform customers”. Thus one has to raise the question if those people really will spend some additional amount of money for listening to music although they are only focused on hit music and besides this not very choosy: They can listen to hit music all day without any additional costs.

4 Outlook

So far, the success of Apple iTunes Music Store shows us that a successful business model for online music distribution can be established. The model’s major advantages are increased service and decreased restrictions. This also states the fact, that a major interest of participants in illegal P2P-exchange networks is the fact of the broad variety available in these illegal networks, which is beyond the daily mainstream, the advantage of pre-listening or evaluation and easily download.

If the market is the place where offer and demand meet, then Apple seems to have moved a step in the right direction, and customers certainly showed their appreciation. Thus it is interesting to see what might happen with the future of other online music distribution services: Apple’s success put some pressure on the existing services which are partially owned by the record industry. Therefore the existing services will try to copy the model adopted in Apples iTunes Music Store. This will lead to a decrease of prices, as the copyright fees have to be lowered. Recent news about the future plans of RealNetworks or Microsoft strengthens this assumption.

However, the importance of the target group cannot be neglected. Mac users seem to be ideal customers for online music distributions. On the contrary, PC users reflect the general population. Thus it is more difficult to achieve the same success as Apples iTunes Music Store. However, further solutions addressing the needs of future customers, e.g. providing a broad variety of artists customers are specialised, will be strong advantage when commercialising electronic music distribution.

If commercialising electronic music distribution succeeds – which will be the case sooner or later - the winners will be the record industry as more music is distributed, the online music services as more music is distributed online and customers who benefit from the increased service and who might benefit from the reduced prices. Furthermore, less known artists will benefit from online distributions as music providers will have to discover new artists for their "selective" customers: Spezialised music will become more and more important for online distribution which will increase the variety of online available music and which might also affect the quality of future music.

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