

# Spotify

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Software Engineering Process - Soft Issues  
**InfoCom 08**

22 maj 2009

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### **Sammanfattning**

*Spotify is a high on demand streaming service. It was introduced in 2006 by its two Founders Daniel Ek and Martin Lorentzon. There are around 1,4 million users today and over 10,000 tracks are being added each day. It's been referred as a substitute to the iTunes software.*

# 1 Introduction

In 2006 a new revolutionary and unique service was founded by Daniel Ek and Martin Lorentzon. Their vision was "to help people to listen to whatever music they want, whenever they want, wherever they want". The coined name Spotify arose, which is a mixture of the words spot and identify. The service would help you spot and identify your favourite songs. When the service was launched in October 2008 only invited beta testers had access to it and by the time it was launched over 300,000 people stood in line for an invite. The rumour about the service had spread like a wildfire over the internet and it had been phrased as the potential iTunes killer. Still the team behind Spotify claims the hype around the service wasn't intentional. Today Spotify has over 1,4 million users and about 10,000 tracks are added each day.

## 2 Description of the System

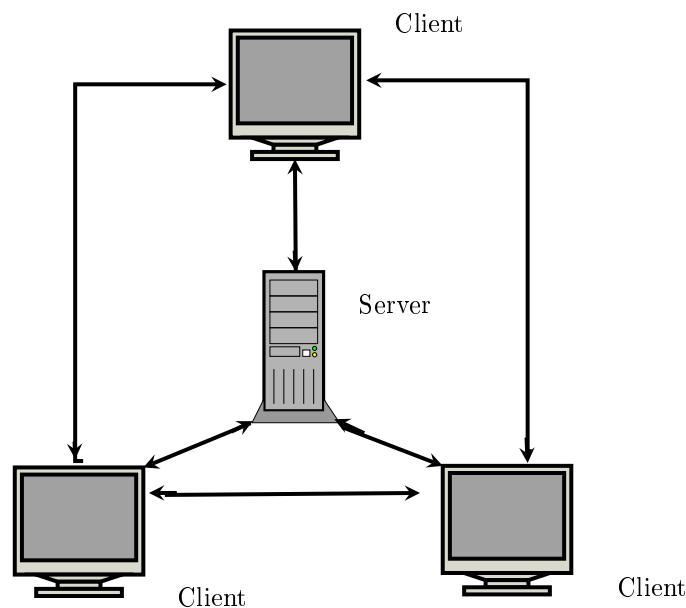
### 2.1 Design

Even if there are some major similarities with the music application iTunes by Apple Inc. the software design is made by Spotify Ltd. Including low-level component and algorithm implementation issues as well as the architectural view. The design is cognition friendly and that is proven by many years of usage by a lot of people using the iTunes player around the world. Even if the designs are similar, such as; the design of the volume, media buttons and search field, they are based on completely different systems. There could be discussions on how Spotify has "stolen" the design, but because of the differences in the system, the discussion could be dropped easily.

### 2.2 Format type

Spotify is a peer-to-peer and server based music streaming program. It allows users to listen to their music of choice from an easy client that delivers music instantly with almost no buffering. [1] The combined peer-to-peer and server based streaming is unique for Spotify. Each client summarizes information about the songs being played in an index and is sent to the Spotify streaming hub. The index is then used to inform other clients about new peers that they can connect to and fetch the streaming data for individual tracks. The client acts as a server upon start-up, listening for incoming connections from other Spotify users, as well as intuitively connecting to other users to exchange cached data. There are today no official details on how many connections that can be established between the clients. [2]

The audio streams are in the Ogg Vorbis format 'q5', in about 160 kbit/s [2] instead of the MPEG-1 Audio Layer 3 format that is most commonly used for audio streaming. The Vorbis is an open source project headed by Xiph.org Foundation. [3] The project produces an audio format specification and software implementation for lossy audio compression that is intended to be a replacement for the proprietary MP3 format. Vorbis is most commonly used in conjunction with the Ogg container format and it is therefore often referred to as Ogg Vorbis.



*Illustration of the peer-to-peer and server based system.*

### 2.3 System requirements

Spotify runs on the three large operating systems used for personal computing. It runs natively on both Mac OSX and Windows based machines. It also runs on Linux based machines using the tool Wine with the executable version for Windows. There are no precise system requirements other than the operating systems need to run Mac OSX 10.4.0 or later, or Windows XP or later. The only precise requirement is the broadband connection needs to download at least 256kbit/s. If the bandwidth is lower there could be some minor buffering delays. [4] Because of the low bandwidth requirements, a Spotify client should be able to run on a 3G connection. [18]

### 2.4 Availability in different countries

The free version is only available in Sweden, Norway, Finland, the UK, France, Spain and The Netherlands and in some of those countries an invitation is required. Spotify is available in a larger area if you choose the Premium version of the software. This allows a large number of countries in western Europe to use it e.g. Italy, Netherlands, Estonia, Sweden and Switzerland.[2] Today, Spotify is not available in U.S. and Canada, probably due to licensing problems. Because of terms with the labels involved with Spotify, you can not travel unlimited with your Spotify account. If you have a Spotify account, you can travel abroad for a fortnight without returning to your country. After 14 days you can't connect to Spotify unless you are connecting from an IP or proxy from your country.

### 2.5 Licences

The Spotify client uses a proprietary software license. Proprietary software is computer software which is the legal property of one party, in this case Spotify

Ltd. The terms of use for other parties is defined by contracts or licensing agreements. These terms may include various privileges to share, alter, disassemble, and use the software and its code. [11]

### **3 Quality characteristics**

To evaluate software is sometimes a very complex matter. That is why ISO, the international organization for standardization has come up with a model to make it easier to measure quality in software. This model, ISO 9126, also makes it easier for the customer to analyze the potential purchase in a more effective manner, by highlighting which aspects of the software that should be taken into consideration. The model has six quality characteristics which, when studied and evaluated gives a good picture of the software quality. Which quality characteristics that is the most important varies depending on the products nature.[28] In Spotify's case the most important characteristic according to us, is the usability. The Spotify vision is to make all music in the world available to everyone. In order to do this the software has to be usable for everyone.

#### **3.1 Functionality**

This characteristic describes how well the software fulfills its basic purpose. Spotify offers an alternative way to listen to a huge selection of music. A search field allows the user to locate the music he/she wants. It also contains previous searches and the choice to save a playlist, and to share that with others. There is a selection to sort music after popularity, album and track length. You can click the artist name to view a short biography of the artist. One part of functionality is information security. In December 2008 a small security breach was found in the Spotify software. The hackers managed to obtain 40 passwords before the breach was found and fixed. This is further described in section 2.2.

#### **3.2 Reliability**

When a system is mature, reliability is measured in recoverability and fault tolerance. In Spotify's case this means that in a time of high pressure on the server, songs shouldn't need buffering time. Failing in this would probably lead to a drop in the number of customers. The peer to peer technology combined with server based streaming also increases the stability of the system.

#### **3.3 Usability**

Usability only exists when the software is functional. The usability is important for the spotify software. There has to be an, easy and smooth process of selecting a song and playing it.

#### **3.4 Efficiency**

This describes how much of the system resources the software uses e.g memory, disk space and network. The spotify system is very efficient because of the effective usage of bandwidth. Users relieve the Spotify streaming hub by streaming data to other users with peer to peer technology.

### **3.5 Maintainability**

In terms of software this is the supportability. The ability to support software is decided by the complexity and readability of the code. Everything that can help finding the problem and correct it, is considered a cause of maintainability. This is a difficult characteristic to evaluate since we don't have access to the source code.

### **3.6 Portability**

This describes how well the software can adopt and work in other environments. Subcharacteristics also describes co-existence and replaceability. A project to make it possible to use spotify with your cellphone is currently beeing developed.

## **4 Availability for disabled**

Spotify is developed for all sorts of listeners. No policy whether spotify is designed to be used by people with disabilities exist at this point. Although there are some clever functions that may faciliate the usability. Below lies a few disabilities which can in some way be indirectly helped by certain functions.

### **4.1 Sight disability**

For a user with sight disability, he can easily enter the radio section and click his way to different genres and artists by orientating through different icons. The interface behaves like a typical internet browser and therefor the user can easily backtrack previous navigations.

### **4.2 Hearing impared**

For a person who is hearing impared the system may not fulfil the served purpose. The content is mainly audio which in this situation is hard to be interpreted by a hearing disabled.

### **4.3 Dislexia**

A user with a writing or reading disorder can easily mistype an artists name or song. Spotify has indirectly helped them by adding a misspelling function in the search allowing the user to choose from suitable results that resemble the spelling error.

## **5 Ethical Aspects**

### **5.1 Censorship**

Since the largest labels in the world has signed a contract with Spotify, they could gain control and have influence on the music broadcasting through Spotify. Smaller labels with focus on political movements, vulgar lyrics and provocative songs could be omitted if the large labels gain influence. In order to create a large cultural database, such influence can't be accepted.

## 5.2 Despotify

In the late 2008 a security breach was found by a couple of unknown coders. They discovered a way to ask the server for information and was able to stream music with a third party text based client. The coders, as they prefer to be called are from the hacking community 'hack.se'. They made the code open source so people from around the world could try it out and make own implementations in the software. The bug was later filled by Spotify and the guys behind Despotify announced that they would not try to make any further changes in the software. They do encourage other people to do it though. [8]

## 5.3 Privacy

Spotify never intend to give away information regarding you without your notice. However, Spotify do share information about you to improve their service. They use it for tracking behaviour with advertisements, uploading more music that is popular and comply with laws and regulations. Even if their privacy policy is quite clear, a bug used by the Spotify hackers behind Despotify could manage the responding server to send private details about other peers connected to the network. [17] The server response was name, email and encrypted passwords. The team behind Despotify managed to hash 40 encrypted passwords before the bug was fixed. This clearly broke the privacy policies and Spotify sent information about the bug and asked the users to change their passwords.

## 5.4 Advertisements

Often the majority of all users dislikes the commercial, but it is inevitable. To run a music streaming software with licensed music a stable income is necessary. By tracking the users information they can give you commercial that is designed for you. The ethical aspects on custom making commercial is widespread. In some sense, you will get better advertisements but the integrity is jeopardized. [20]

## 5.5 Monopoly?

Today Spotify is the only music streaming service that can offer such a wide variety of artists and labels. In one way they do have a total monopoly to provide music free because of the agreements with the large labels. A new actor will have problems to gain market in music streaming business. There are other services, but they don't work the same way. Last.fm is a music community site, where the service knows what you are listening by a small plugin, implemented in different audio players. There are also stand-alone clients that monitors the music applications. It will create a playlist on the homepage that will fit your music profile. Pandora.com is also music streaming service that is available in the U.S. By typing in an artist, the Pandoras box will find other artists that will fit your music profile.



## **6 Legal aspects**

### **6.1 Country restrictions**

Spotify's business idea is to make all music in the world available to everyone. To do this they have to sign a lot of record label deals. To build a huge music library like Spotify is not an easy business though. They have encountered a lot of obstacles along the way. In January 2009 Spotify came out with a message that a lot of changes were being made to the music catalogue, and a lot of tracks were removed. The reason for this was in order for Spotify to respect all the restrictions that followed with the label deals. Some of the agreements that Spotify made, had restrictions in which countries they were allowed to play. These problems were inherited by the old ways of consuming media such as CDs and tapes. The problems were introduced when streaming media services arrived on the market.[24]

### **6.2 Other difficulties**

Some other difficulties that Spotify have encountered are artists that have chosen not to join Spotify. There are artists that want to keep close control over their music more than others, just because of personal reasons. This is the case of for example The Beatles that have chosen not to have their music on any online service.[25] What also slows down the rate of which tracks are added, are that some label executives still feel uncertain that the Spotify way of thinking can be profitable. And if a streaming service is the right way to distribute their media.[23]

## **7 Financial aspects**

### **7.1 Advertising revenues**

The main income comes from the subscription accounts and commercials which is divided between the Spotify team and the contracted record labels. The system is funded through different types of commercials. There are today 30 second audio commercials which appear for every 6th song and just recently the developers added banners and skyscrapers. These commercials only exist in the non-premium accounts and depending on a user's behaviour the advertisements can be targeted. With proper targeting they hope to get higher and better precision rate for the advertisements [25] Spotify claim that they have significantly fewer advertisements compared to what you'd find on commercial radio. In an attempt to attract customers Spotify has also in collaboration with the internet service provider Bredbandsbolaget offered free invites to new customers.

### **7.2 Premium accounts, day passes and gift cards**

A user can choose between different types of access to become a premium user. There are premium accounts where the user pays a monthly fee, which currently is 99 SEK, to gain access to an ad free experience. The user can also select a day pass which allows the user to listen during 24 hours for a small amount of 9 SEK without any adverts. The user can also decide to purchase a gift

away product in form of a gift card containing 6 months of premium benefits for the price of 540 SEKspot. Approximately 5-10 % of the users have premium accounts. The Spotify team states that this is due to the free version, which is simply too good today. Few are willing or in actual need to become a premium customer.DIspotify

### 7.3 Label contracts

Spotify has signed contracts with the 4 larger labels Sony BMG, EMI Music, Universal Music Group and Warner Music Group and thousands of independants. According to the founder Daniel Ek over 10,000 tracks are added every day and the number of different label contracts and deals are constantly growing. The artists are being compensated depending on the popularity of a song[23]. That means that if you are a unknown band with a popular song, you will be compensated in the same way as an already established artist.

Spotify is an on demand streaming service. Together with their partner 7Digital they have launched service for users wanting to purchase songs through the software. This option is currently only available in the UK, France and Spain and at this moment the developers are preparing to make this available in Sweden.

### 7.4 Investors

Still no figure has been confirmed how much funding has been raised by it's large nordic investors Creandum and North Zone Ventures. An online rumour tells that around 15 million euro has been raised. A recent valuation made in march 2009 estimated the company to 71,6 million euro according to the industry magazine Techcrunch. With only 70 employees located around the world the founder Daniel Ek says in a interview that the company are still making losses. He nevertheless hopes to build up a volume in order to generate income for the stakeholders. The strive is to improve the premium benefits by offering even more exclusive material and higher portability in the service. The objective is to have a profitable business by the end of 2009.DIspotify

## 8 Future aspects

In early March - 2009 Spotify had an estimation of one million users. By late March - 2009, the user count was 1,4 million.[26] This shows that Spotify has a huge market potential, and that there is a great need for legal alternatives like this. The timing of the release of Spotify couldn't been better. In the aftermath of the pirate bay trial, when uncertainty grew among filesharers, the release of Spotify gave an alternative to contemporary music consumption i.e filesharing. According to CO-founder Martin Lorentzon it's about changing the old business model of the music industry. There is no longer a need for people to own music, just to have access to it.[27] We think that Spotify will continue growing, as more functions are implemented and the Spotify service being available in more countries. Every day 10.000 tracks are being added to the Spotify library, which now contains more then 6 million tracks.

Because of the low requirements on the bandwidth, the Spotify client should be able to be ported to a mobile platform. Spotify is currently working on a

mobile platform and was first showcased on Youtube when the Spotify platform was running on Apple iPhone. [19] The mobile solution is only going to be available as a premium version. Spotify also has future plans on being able to be run on other third party software.

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