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Cloud Services from Consumer Standpoint

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Cloud Services from Consumer Standpoint

Did non tech savvy consumers catch up with the cloud service development to its fullest extent?

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Information Technology

Abstract

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Cloud Services from Consumer Standpoint

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The objective of this thesis is to clarify the use of cloud services and how they are used in practice.

This thesis will first cover the history of cloud computing. At the early days of computing, services have been stored on servers locally and could be accessed through direct connections. After this, services have been on the users' personal computers.
Nowadays, services are stored in the cloud.

This research paper focuses on four sub topics: communication services, healthcare services, payment services, and video streaming services. Each topic will be outlined and their usability will be reviewed.

Next, security and privacy related concerns regarding the use of cloud services, which the user must take into consideration, are listed.

For this thesis, a survey regarding the use of cloud services was devised. The survey was distributed internationally to provide a more comprehensive data.

Concluding, the direction of the use of cloud computing will be predicted.

Keywords cloud computing, communication services, healthcare services, payment services, video streaming services, BIT, information technology

Laurea-ammattikorkeakoulu **Tiivistelmä**
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Tietojenkäsittelyn koulutusohjelma

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Pilvipalvelut käyttäjän näkökulmasta

Vuosi 2016 Sivumäärä 38

Tämän opinnäytetyön tarkoituksena on selvittää pilvipalveluiden käyttöä sekä kuinka niitä käytännössä käytetään.

Opinnäytetyö tulee käymään myös pilvipalveluiden historiaa läpi lyhyesti. Aikojen alusta käyttäjän saamat palvelut ovat olleet servereillä paikallisesti ja niitä on käytetty kiinteillä yhteyksillä. Tämän jälkeen palvelut ovat olleet käyttäjien omilla tietokoneilla. Nykyään palvelut ovat tallennettuina pilveen.

Opinnäytetyö keskittyy neljään aihekokonaisuuteen: viestintäpalveluihin, hyvinvointi palveluihin, maksupalveluihin sekä videon jako palveluihin. Jokainen aihealue tullaan hahmoittelemaan ja niiden käytettävyys tullaan arvioimaan.

Lisäksi listataan pilvipalveluiden käyttöön liittyviä turvallisuus ja yksityisyys asioita, jotka käyttäjän tulee ottaa huomioon.

Opinnäytetyötä varten tehdään selvitys pilvipalveluiden käytöstä. Kattavan otteen saavuttamiseksi käyttöä selvitetään kansainvälisellä kyselyllä.

Kyselyn tulosten perusteella arvioidaan mihin suuntaan palveluiden käyttö tulee menemään.

Avainsanat pilvipalvelut, viestintä palvelut, terveydenhuolto palvelut, maksupalvelut, videon jako palvelut, tietojenkäsittely, tietotekniikka

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1. Introduction

Cloud computing is becoming more and more important nowadays. The trend has been growing rather rapidly over the past couple of years without the typical consumer even knowing of their existence or what they were. When speaking of cloud computing one must consider all of its aspects, such as cloud storage, media streaming providers, communication services, healthcare services, payment services, and less obvious aspects like cloud backups.
The purpose of this research is to inspect different consumer cloud computing platforms.

Firstly, this paper will give a brief overview on the history of cloud computing. Furthermore, this paper will explore the experience and usability of cloud computing from a consumer standpoint. Next, it will focus on applications and devices used for cloud computing and how these affect consumers on a daily basis – with special emphasis on Finland. Lastly, security and privacy concerns of cloud computing services will be addressed within this paper.

The goal of this paper is to provide a kind of manual for non tech savvy consumers on how to use cloud computing services and their applications. Ultimately, the consumer does not care how the cloud service provider is providing their service for them because they do not need to know where the server is located and who is providing the service. Consumer cares more about the interface, usability and that the services are terminal independent, which is quite often true amongst cloud services.

This thesis will not explicitly cover the cloud service models with which the service providers are producing their cloud services with because that information is not public knowledge. The service provider may produce their services with the following cloud service models: SaaS (Software as a Service), PaaS (Platform as a Service) and IaaS (Infrastructure as a Service).

- SaaS: Applications that are being run by infrastructure and the platforms are being managed by the cloud providers.
- PaaS: Development environment offered to application developers such as operating system, programming language, database and web server.
- IaaS: Physical resources such as computers and virtual machines.

This thesis will assess the use of cloud computing applications with the help of examples. Four key theme topics were chosen to illustrate cloud computing services. The examples will demonstrate the setup of the services and their daily use. Usability will be evaluated based on personal experience or public online reviews.

The main source for statistical data for this paper will be a survey devised to address customers' experiences with cloud computing services. Today, the most frequently used cloud computing services are e-mail, online storage, and streaming media content, e.g. music, videos, and TV shows. The most successful companies are Apple, Google, Amazon, Azure, and Microsoft.

2. Research Method: Survey

The research method for this thesis paper is a public survey created with the online tool Survey Gizmo (http://www.surveygizmo.com). From there on, the survey was spread worldwide through social media to friends, relatives, and family.
There were no problems to be addressed with this survey; the point of the survey was to accumulate different user experiences from a wide array of respondents. The results of the survey gave a good insight to the current use of cloud computing services worldwide.

The survey was used as a data collection method for this thesis. A quantitative research method was used with the data collection and the answers were interpreted based on the results. In addition, the thesis uses a common model from the quantitative method, from theory to practice, which is also known as deduction.

The quantitative research method is based on the description and interpretation of the target or phenomena, with the help of statistics and numbers. In a quantitative research approach, different classifications, cause- and effect relationships, comparisons, and descriptions of a phenomena that is based on numerical results are often the point of interest. (Jyväskylän yliopiston Koppa 2014).

The thesis analysis method was a quantitative research method. The results of the survey have been interpreted in the thesis from various standpoints and conclusions have been drawn from these conclusions.

Qualitative research is a scientific research method trend, where the objective is to understand the targets quality, features, and significances comprehensively and it is used in addition to quantitative research. In quantitative research, it is intended to interpret the researched phenomena, thoughts, emotions, and motives. (Jyväskylän yliopiston Koppa 2014).

3. A Brief History of Cloud Computing

Since the 1950s, the concept of time sharing or computer sharing has been steadily evolving into what is known as cloud computing today. In times when computers were still in their beginnings, and therefore expensive, the need arose to find a way for computers to be used by more than just one user or company at a time. Thus, the concept of time sharing was created to fully utilize the potential of computers at that time (Time 2015).

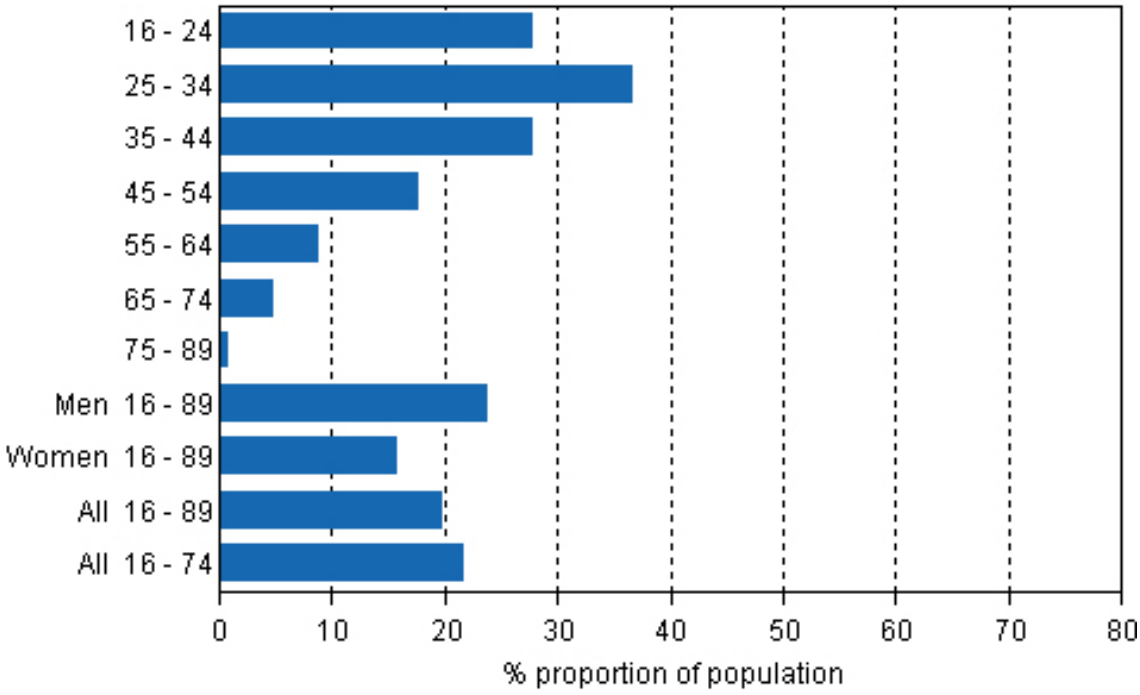
From the year 1960 to the year 1970 the idea of service bureau was emerged, where the users are able to share the capacity of computers between users. The users had their own terminals with which the users were able to use their applications. In order to get the connection between the remote terminal and the computer, a specific protocol and an application was required. The connection was a 2-way connection, which means that there is a request message and response message in the process. In principle, this works similarly as it works nowadays, the connection was established via fixed connections but opposed to today, during 60 and 70, there were no modems and certainly not wireless signals. The U.S Department of Defense created ARPANET for the networking systems, which later evolved into the idea that we know today as the Internet. At the same time, the size of the computers became smaller and the energy consumption decreased. New applications arose, which were easier to program (Time 2015).

In the 1980s, a concept named micro computer was created. People started to use their own, personal computers and with this, the use of centralized data centres was decreased. And as time passed, these personal computers were able to be connected into the network and via this into the internet. As soon as the wireless devices became popular, the idea of cloud computing was found. Even though the smartphones today have a lot of computing power, they lack the capacity in storage. This is the very reason, why today we need modern “time-sharing” system which in essence is cloud computing. The user of smartphones may synchronize pictures, data, user profiles and various other services into the cloud. In this way, the information is kept updated and the information is being stored in a centralized place. This cloud service can be used with various different terminals (Time 2015).

According to the information on Tilastokeskus, the users of internet have almost doubled from year 2000 (50%) to year 2010 (86%). One could assume that the advent of smartphones and tablet computers only further accelerated this development. In contrast, in the year 2014, the internet was utilised by 86% of the population between the ages of 16 and 89 (Tilastokeskus 2013).

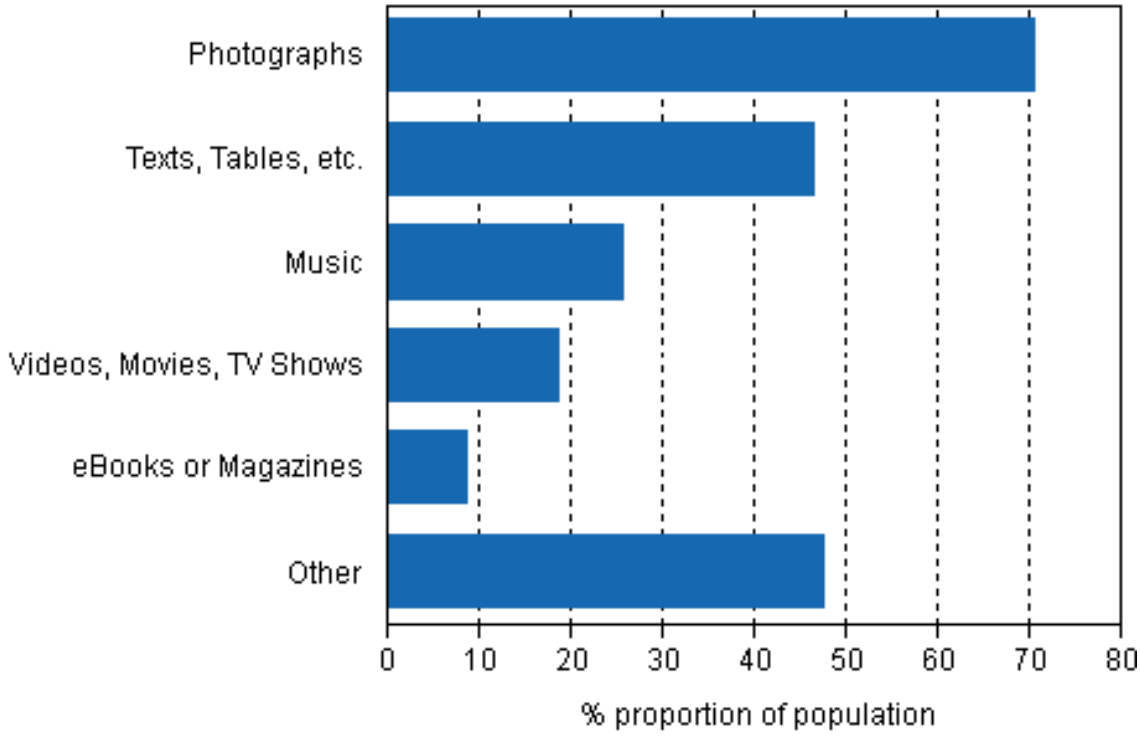
4. Usage of Cloud Computing

Diagram 1: Frequency of saving to cloud storage (2013)



(Tilastokeskus 2013)

Diagram 2: Information stored on cloud storage in the last 3 months (2013)



(Tilastokeskus 2013)

4.1. Cloud-based Communication Services

By using cloud computing services, users may use several services within the same service environment. The services that the user may use within the same application are services such as e-mailing, voice calling, file sharing and lastly instant messaging. There are various service providers for the before mentioned services. Some of the providers offer these services interconnected with each other like Microsoft, Microsoft offers all the services that were mentioned earlier. Some of the providers only offer one service or a couple of the services.

4.1.1. Example: Microsoft (Outlook, Skype)

The e-mail service Outlook.com has been integrated into the Skype service in 2010 after Microsoft purchased the company.
In order to use this service, the user must either register a user account for Outlook.com or for Skype. After that, the user must log in with this account. If the user has used different account with these services, the user may import his existing Skype contacts into Outlook. To be able to communicate with another user, the user must search and add his or her friend by using the search function. The other party must have registered account as well. The User can e-mail, text, phone, and video call simultaneously. It is up to the user to decide, which of these options suits his or her needs best regarding the current situation. Skype can also be used for group chats, group voice calls and group video calls. The services can be used on different devices such as desktops, laptops, mobile phones, and tablets.

One may use this service at work as well as during free time, it is also entirely free service. It does not take long to learn how to use it and it is rather easy to get into. When these various services have been integrated together, it gives wide possibilities to be able to use them simultaneously. Since these services are very mobile to use, the service is also independent of time and place. One must also know that the services can be used by a bigger group at the same time.

Users must practice caution regarding whom they accept as their friends, so it is recommended to only accept people that you know and you feel can be trusted, also remember to avoid opening trash mails with your e-mail. Even though the service itself is free, user must realize that the telecommunication is most likely a paid service, depending on the type of connection used, e.g. home connection or public Wi-Fi connection.

4.2. Cloud-based Healthcare Services

The user may also take advantage of cloud services during personal activities. At present, there are many different options to doing this.
The user needs to have a smart mobile phone, smartwatch or any kind of activity tracker and a user account for the cloud service. The smart device then records the data during the activity. Smart devices will send the data to the cloud service directly or in case of activity trackers, the device will synchronize the data to the smartphone first which then uploads it to the cloud service account.

4.2.1. Example: Alcatel OneTouch Cloud Service (Activity Tracking)

Here is an example of the Alcatel's OneTouch Cloud service which can be used with the Alcatel OneTouch Watch. It features an accelerometer, gyrometer, altimeter, and a heart rate sensor. In addition, it is IP67 water proof and dust resistant.
One can track their daily activities and data including steps, heart rate, calories and sleep. Includes also a compass, time taking and notifications of phone messages and weather information.

Figure 1: Steps

Figure 2: Calories

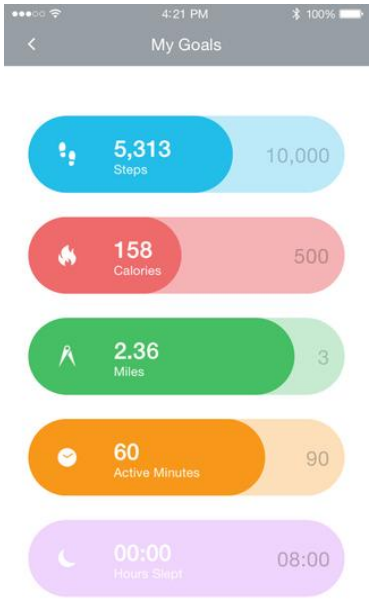


Figure 3: My Goals

The service includes a watch and a smartphone application as well as a web-based application that is available through the internet. The watch itself is relatively cheap, the price is approximately 100 € and the applications are free. One can follow and monitor their personal welfare with the help of the smartwatch by increasing or decreasing personal activity, e.g. being more active and less idle. With a quick glance at the smartwatch, users can also conveniently check text messages that the smartphone has. It can also forward the weather forecasts from the smartphone.

The battery lasts approximately three days and the charging is done by connecting the smartwatch to a USB-connector. It is relatively simple to understand how to use the smartwatch because the intuitive user interface is touch screen based.
The application of the smartphone is easy to use; the user can find the information needed quickly. With the application, the user can view events in a graphical and numerical format. The application of the smartphone can also be connected to a cloud service, where the user can monitor the data and statistics that were taken by the smartwatch. The cloud service must be used with a web browser. It is a more efficient way to handle the collected data.

The smartwatch does not include voice control which means that it is not possible to receive phone calls or control the smartphone with it. For the time being, it is also not possible to add external applications so the user must settle with the built-in applications.

4.3. Cloud-based Payment Services

Laws in Finland regulate the use of electronic currency. Within the European Union, the use of electronic currency is regulated by a directive (see Directive 2007/64/EC). Electronic currency means virtually stored monetary value as represented by a claim on the issuer which is issued on receipt of funds for the purpose of making payment transactions as defined in point 5 of Article 4 of Directive 2007/64/EC, and which is accepted by a natural or legal person other than the electronic money issuer.

E-Cash is suitable for small amounts of purchases. The user of e-Cash will purchase money electronically from the appropriate issuer. The funds will be deposited into an electronic wallet, which can be accessed via smartphone, tablet, laptop, desktop or issuers servers via their webpage.
One of the most common e-Cash payment method is called local payment. Local payment is a method where the distance between customer and point of sale is very short. The customer uses a payment card and the point of sale requires a payment terminal which supports local payments. The purchases under EUR 25.00 may be done without PIN (personal identification number).
Local payment can be considered safe and it is based on chip payment technology. Local payment uses NFC technology (Near Field Communication) which means encrypted data traffic. Many shops offers this local payment possibility, it is easy, convenient and safe way to pay small purchases (Korttiturvallisuus 2015).

4.3.1. The principle of use of eCash

The payment method e-Cash is based on algorithms and public keys. The merchant creates a contract of the approval of the money with the issuer. The Client then pays the issuer for the eCash. Next, the client loads money into the electronic wallet and purchases a product electronically. The application of the wallet will then send the required amount of virtual coins for the merchant.
The merchant resends these coins to the issuer who will then undertake a validity check of the authenticity of the coins. If it passes the validity check, the issuer will invalidate them in order to prevent them from being reused. The merchant receives a notification of the validity of the coins and delivers the product to the client. The issuer transfers “real” money in to the merchants' bank account. The merchant manages his own bank account. The issuer of currency can be a conventional bank (Finnish Online UAS 2003).

Local payment is becoming more conventional nowadays. Many stores implemented some kind of local payment as an additional payment method in 2014. Local payment in practice is relatively simple; the process is the same as with the regular chip-based card. However, during the payment process, the card is not inserted into the card reader but instead the card will be put at the side where the local payment symbol is located on the payment terminal. The same symbol is also located on the card; it features arched lines which resemble radio frequencies. The card is held a couple of centimetres away from the symbol. The monitor of the payment terminal will then show a notification of a successful payment process (RFID Lab Finland 2015).

The payment limit for local payment is EUR 25.00. Any sum exceeding this limit will be processed with a conventional chip card using the PIN. The limit brings extra security for local payments. With this, local payments are very secure. The data transmitted via radio frequencies is very well protected. The range of the local payment system is only a couple of centimetres, thus ensuring that the user will not accidentally pay bystanders' purchases.
The card has been designed in such a way that it is impossible to be copied within short distance. The local payment card queries the PIN randomly during payment process. This ensures that the card is being used by its rightful owner.

Local payment is a very quick payment method. Therefore, the queues will move faster and the payments will be processed quicker which is much more convenient. The card also does not bear the disadvantage of chip cards, meaning, for example, if the card's chip is dirty or damaged, it might not work at all. Local payment cards do not have these chips. Elderly users can also cherish the use of local payment cards, simply because it can be held and kept in whatever direction, as long as the card is being held at the required distance from the symbol (MTV Internet 2014).

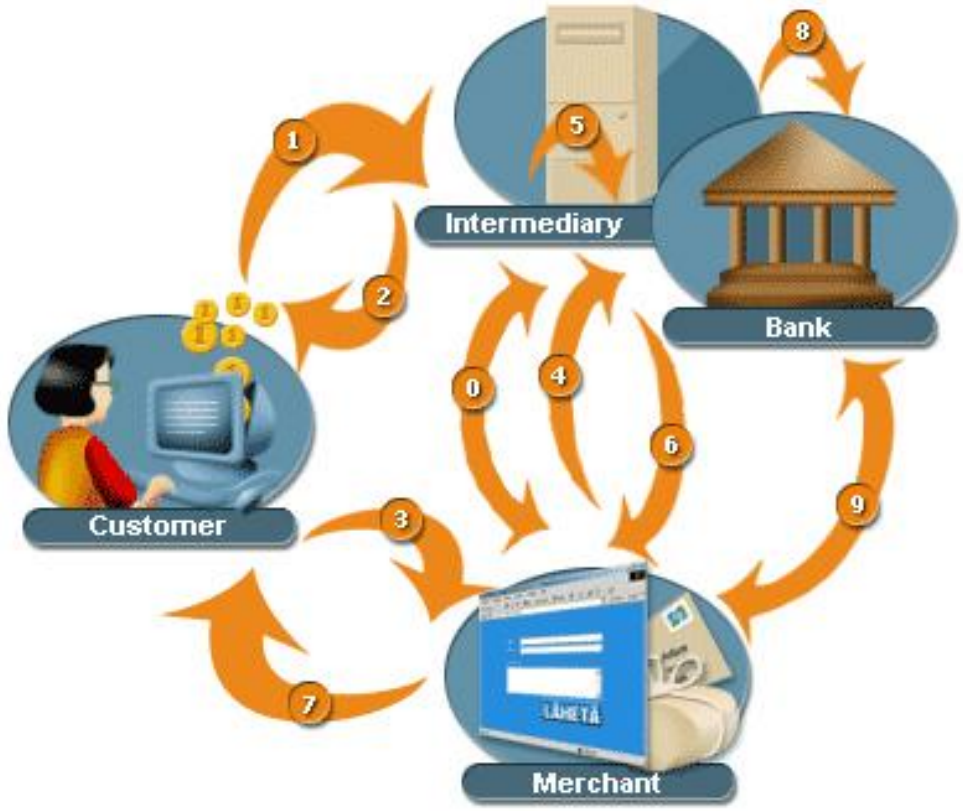


Figure 4: The principle of eCash

Elisa Lompakko is one of the electronic wallet options provided by Elisa, for the use of eCash payment method. Their wallet is based on the payment method of a Mastercard's Paypass. With this wallet, the user can pay locally with the help of a payment sticker, pay by mobile phone by text messaging under their phone number, and do online purchasing with their virtual Mastercard creditcard.

DNA Täpäkkä Credit is yet another option of the electronic wallets which is provided by DNA. This wallet has been expanded to have a local payment feature. With this, the use of monetary messages is not possible at the moment. According to DNA, however, this feature will be available in the future with their upcoming service.

The third option of electronic wallets is provided by Danske Bank and is called MobilePay. This is a monetary messaging service which is available across all the banks in Finland. The implementation of the service has been free for the time being. Moreover, the use of the service is free. Transactions are limited to EUR 250.00 per day and EUR 15,000.00 annually. This service features no local payment possibilities. Danske Bank has promised to showcase their payment service at shops later in the future.

4.3.2. Example: e-Passi

One of the e-Cash payment methods available today is e-Passi. The service provider offers a payment method between employees and employers. The employer registers the employee into the service. The employee will then take the account into use via the registration service of the service provider.
The service is mainly being used via a mobile application. The payment can be completed via a text message, calling to the service number, or via the online service of the service provider. This service also offers the possibility to do local payment via a NFC token.

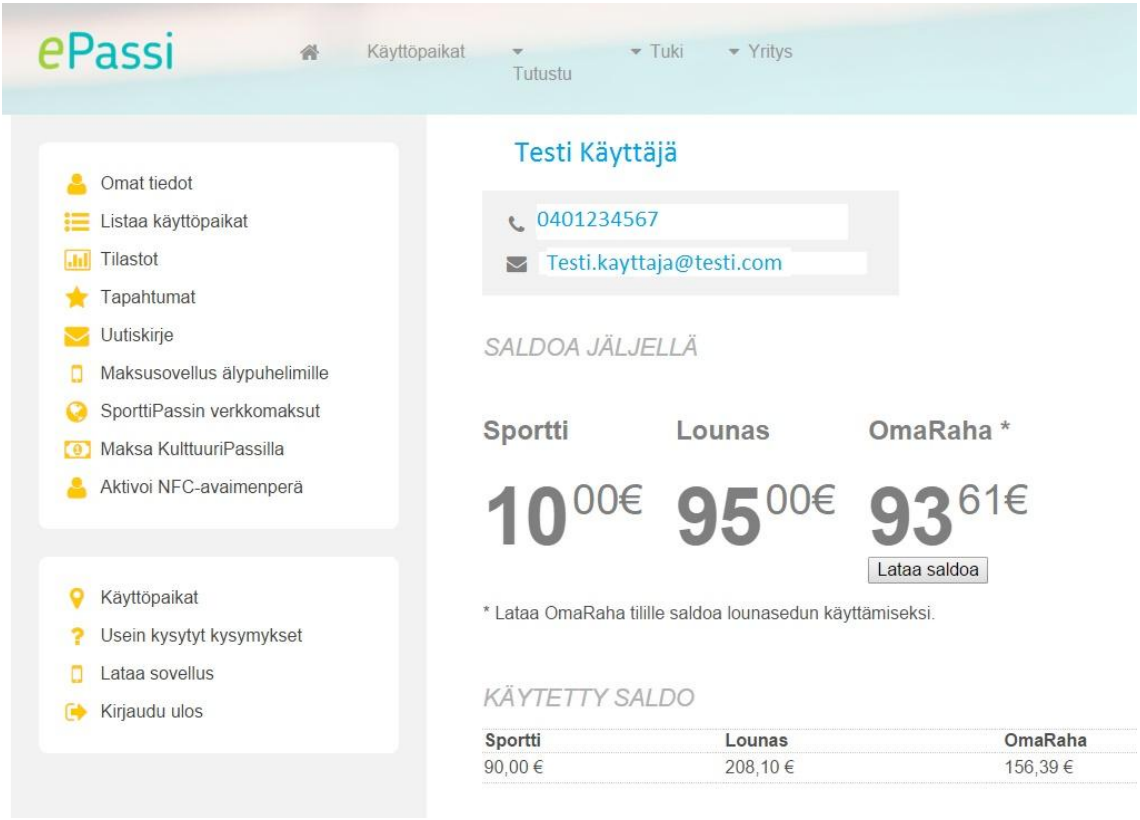


Figure 5: ePassi User Interface

The service provides the following features:

- SportPassi
  SportPassi is a method where the user can handle payments at the places where sports activities are being offered.
- KulttuuriPassi
  KulttuuriPassi is a method which can be used at places where cultural services are being offered.

- TyöMatkaPassi
  TyöMatkaPassi is a method that may be used for public transportation services via VR, Matkahuolto and RKioski.
- LounasPassi
  LounasPassi is a method that can be used as a payment method at different lunch places like for example for work lunch. LounasPassi is actually a method for the employer to provide lunch benefit for the employee. Employee may pay his lunch conveniently via a mobile application.
- HyvinvointiPassi
  HyvinvointiPassi is a method which can be used to handle payment processes for different wellbeing services. This pass covers the wellbeing services that the employer offers for the employee. Tax free benefits may be offered to improve the wellbeing of work community which means that the whole personnel can have this as their work benefit. Services are for example physical care, massages, healthcare services that the normal work healthcare does not cover (eye, dental and other special healthcare cases), optician services and the care of ill child.

Epassi is a very user friendly prepaid method to pay for services. The user does not need cash capital nor payment card but instead the payment happens via smartphone or NFC-sticker. Customers need to keep a positive balance in their Epassi account. Epassi only allows one time purchases that are under EUR 25.00. This brings more security to this payment method. If ePassi gets lost or becomes a target of thievery, one can follow their account transaction logs via cloud services.

4.4. Cloud-based Media Streaming Services

Nowadays, media streaming services gain a lot of traction. Broadcast providers offer their services with a specific application for each different device. Devices are smartphones, tablets, DVD/Blu-ray-Players, and televisions. Modern consumer electronics like televisions can connect to the internet and most have inbuilt smart TV functions. These smart TVs hold all kinds of applications. The user can watch either live or recorded broadcasts. Broadcasters provide various channel packages. There are movie rental services available as well.

TV services provided by Finland can be differentiated into three categories: TeleOperators, broadcasters, and other services.

TeleOperators provide the following services. DNA offers their DNA TV service. User may use the application to watch live TV broadcasts and record TV programmes, which can be later watched at own leisure. Recording feature is a standard feature amongst TV service providers, one should know that current Smart-TVs have the recording feature build into them. In addition to this, one may also watch paid service such as CMore and Viasat.

Sonera offers their Sonera Viihde service, which is relatively similar to the services that which DNA TV provides. Furthermore, Sonera Viihde offers SFAnytime, which DNA TV does not, this is also a paid service.

Elisa offers their Elisa Viihde service, which is yet another very similar to the two TV services mentioned above. Elisa Viihde also offers CMore as their paid service just as DNA TV service does.

Within Finland, there are three main TV programme operators and they are Yle Areena, Mtv3 Katsomo and Nelonen Ruutu. All these three offer their own cloud based streaming services, that offer their live broadcasts as well as recorded broadcasts. These services may be watched via Smart-TV, internet browser, mobile and tablet applications.

There are also various international cloud based media streaming service providers. The most popular services are Netflix, Watson, HBO Nordic, ViaPlay, and Boox TV. Each of them offer their own content, movies and tv shows, which can be watched at anytime and also via Smart-TVs, internet browser, mobile and tablet applications. All these services are paid services and this thesis will cover Netflix more in depth to give the reader a basic understanding of these services.

4.4.1. Example: Netflix

Netflix is a paid TV service. The user can try the service for a free 30-day trial period. Netflix offers three different packages: Basic, Double, and Family. The following table will illustrate the different features of the packages.

SERVICE	BASIC	DOUBLE	FAMILY
Monthly Price	EUR 7.99	EUR 9.99	EUR 11.99
HD available	no	yes	yes
Ultra HD available	no	no	yes
Screens you can watch on at the same time	1	2	4
Cross platform support	yes	yes	yes
Unlimited movies and TV shows	yes	yes	yes
Cancel anytime	yes	yes	yes
First month for free	yes	yes	yes

Table 1: Overview of the Packages offered by Netflix

After deciding which package to choose, the user must create an account with Netflix. Users may use Netflix with compatible smartphones, tablets, computers, or smart televisions. Now, the user can browse Netflix for the desired content and hit the play button. The biggest advantage of Netflix is that the user may watch the TV shows or movies wherever and whenever. Netflix has a smart feature that tracks the progress of a movie or TV show. The user can then continue playback on any device.
Another noticeable feature of Netflix is its multilingual use. In French, German or Spanish speaking countries, these languages are available in addition to English – unless English is not the original language of the content. In Finland, on the other hand, the user only gets the original audio of the content but has the opportunity to enable subtitles in Finnish and sometimes other Scandinavian languages.

Figure 6: Language Availability on Netflix

Netflix is easy to get started with, by just creating an account and choosing the proper subscription plan. Netflix is rather user friendly; it is easy to navigate through its interface. If you pause or close off Netflix while your movie or TV show episode is still unfinished, Netflix will remember the timestamp and let you continue right where you left off. You can also change your devices in between and it will still remember the progress. The same goes for watched episodes so you can keep track of your TV-show progress. Netflix also has a convenient way to change the spoken audio language as well as subtitle language.

Netflix is easily the best amongst its competitors. Few notable competitors to mention are: Viaplay, C more, and HBO Nordic. Streaming providers mostly have the same features and only differ content wise. In addition, Netflix also produce their own TV shows. Netflix is usually preinstalled across most of the smart TVs for general consumers, also consoles current generation consoles all have Netflix preinstalled on them. Netflix has a wide variety of TV shows and movies in their directory. They add new content with a relatively okay pace.

5. Security and Privacy Concerns

Regarding security over internet, general guidelines apply for Cloud computing as well when the users are consumers. User must make sure that the password is adequately strong and the password must be secured safely and carefully. User should make him or herself known of the service and its features in order to avoid doing anything silly mistakes to jeopardize the information security of the service, for example private information must be kept private and the public information public.

The terminals that the user is using must also be safe to use and secured properly. The applications that the user downloads into the terminals must be safe and the proper antivirus measures must be applied, antivirus software and a firewall. Using a wireless internet (Wifi) over a public place, user must ensure that there are no malicious bystanders looking to fish confidential information from the terminals screen, such as passwords or banking information. It is also vital for the sake of the terminals security, to make sure that the wireless internet connection will not bring any malicious files into the terminal. Today mobile connections have much better levels of security compared to regular public wireless internet connections. The most advanced users may always establish their own VPN-connection (Virtual Private Network-connection) by turning their home router into a VPN-server. Keep in mind, that also some internet security providers provide the very same feature, if the knowhow on how to do this is lacking.

Service providers must ensure that the terminals are protected from external threats on both levels, physical as well as network internal level. For the continuity of the service, a backup power source is vital.

6. Survey

6.1. Cloud-computing online survey

The survey consisted of four sub categories:

- Communication Services
- Payment Services
- Media Streaming
- Healthcare Tracking

The survey was created by using a free online tool called SurveyGizmo which can be found at www.SurveyGizmo.com. It was being distributed to relatives, friends and families through social media. The survey was distributed from 16.11.2015 to 15.12.2015. There were a total of 128 respondents which may be considered a good sample size. Responses came from 21 different countries.
In hindsight, the first survey question was unnecessary because it is implied in question 2.

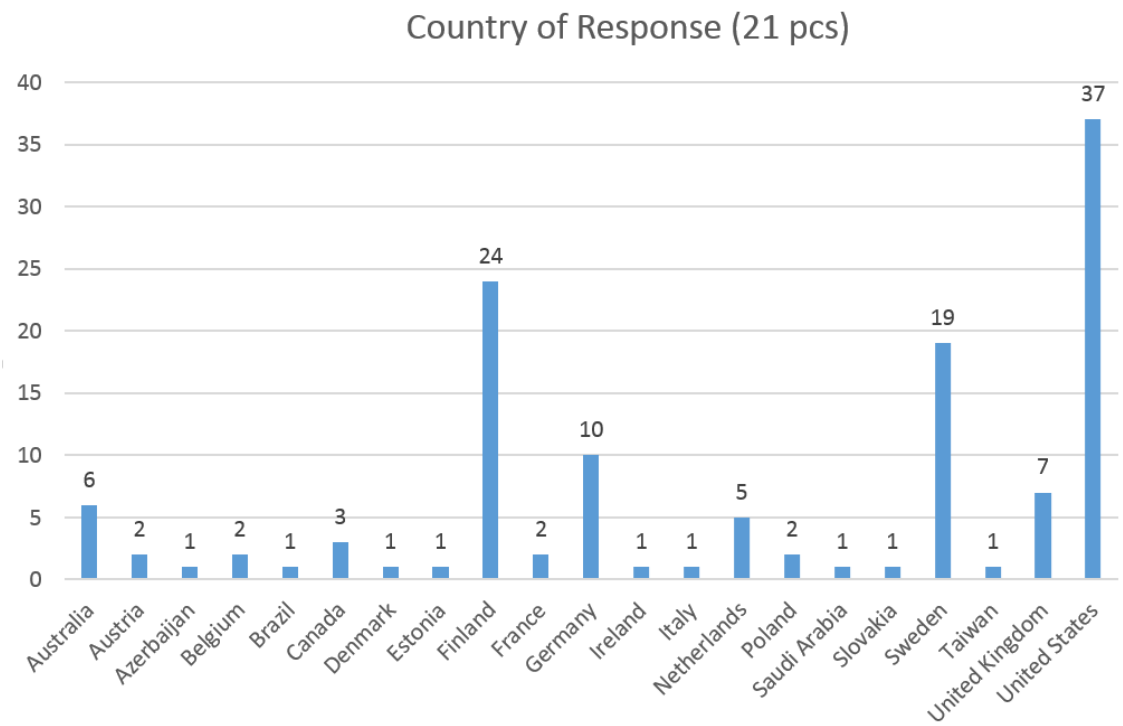


Diagram 3: Country of Response

Question 2: How often do you use these Cloud Services?

Based on the responses, almost all of the respondents are using communication services and media streaming services on a daily basis. Healthcare services on the other hand were used by only a few. The dispersion of payment services is rather huge.

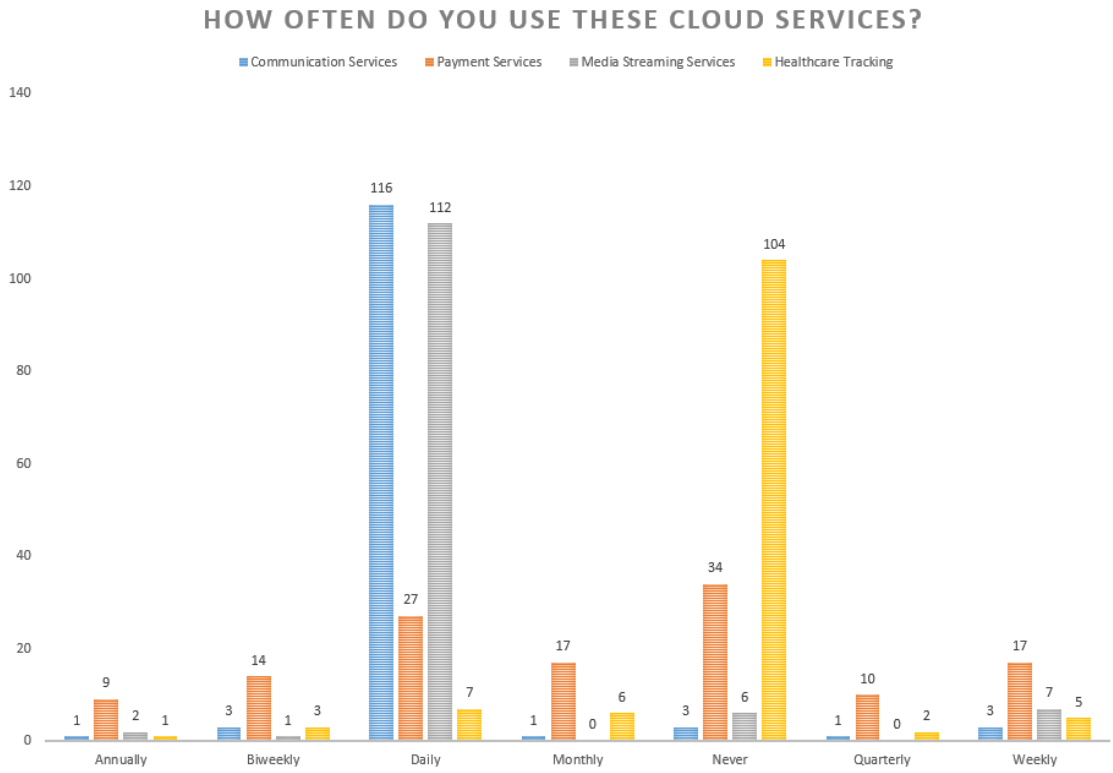


Diagram 4: How often do you use these cloud services?

Question 3: For how long have you used it?

Respondents have been using communication services as well as media streaming services for longer than a year. Quite many of the respondents are not using health care services at all. However, one third have not used payment services and two third of the respondents have used payment services for more than a year.

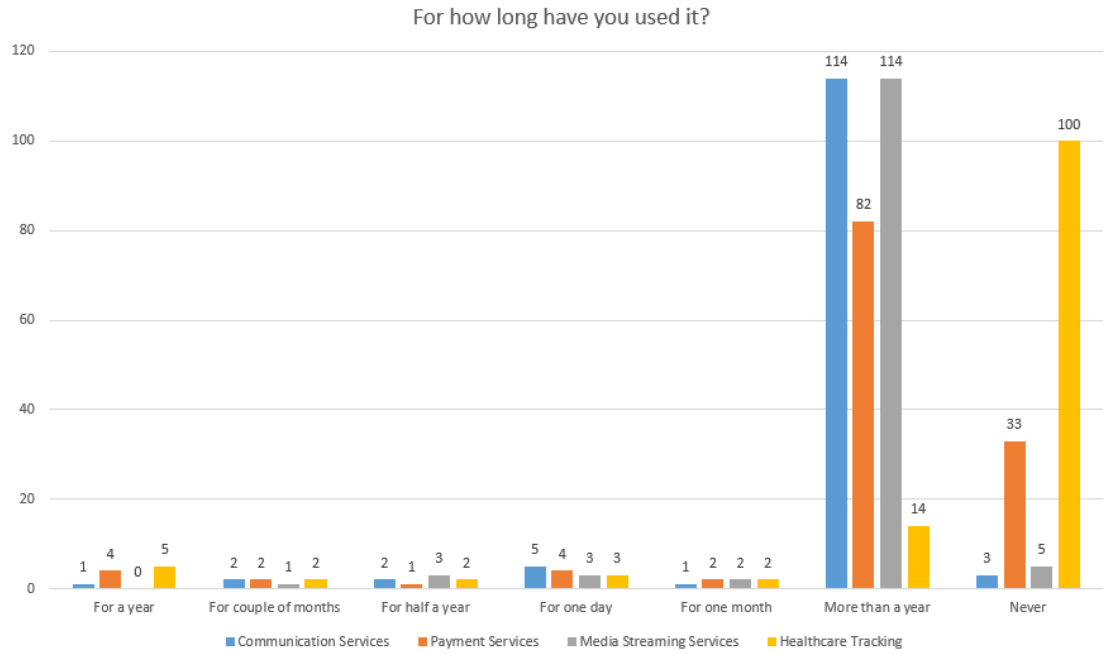


Diagram 5: For how long have you used it?

Question 4: Did your usage increase?

In the case of communication services, one third of the respondents' usage did not increase and two third of the respondents' usage did. For payment services, almost half of the respondents increased the usage of the service and little less than half of the respondents did not increase their usage of the service. Most of the respondents have had increased their usage of media streaming services and few of the respondents did not increase their usage of video streaming services. Almost all of the respondents did not have their usage of healthcare tracking increased and only few did have their usage increase.

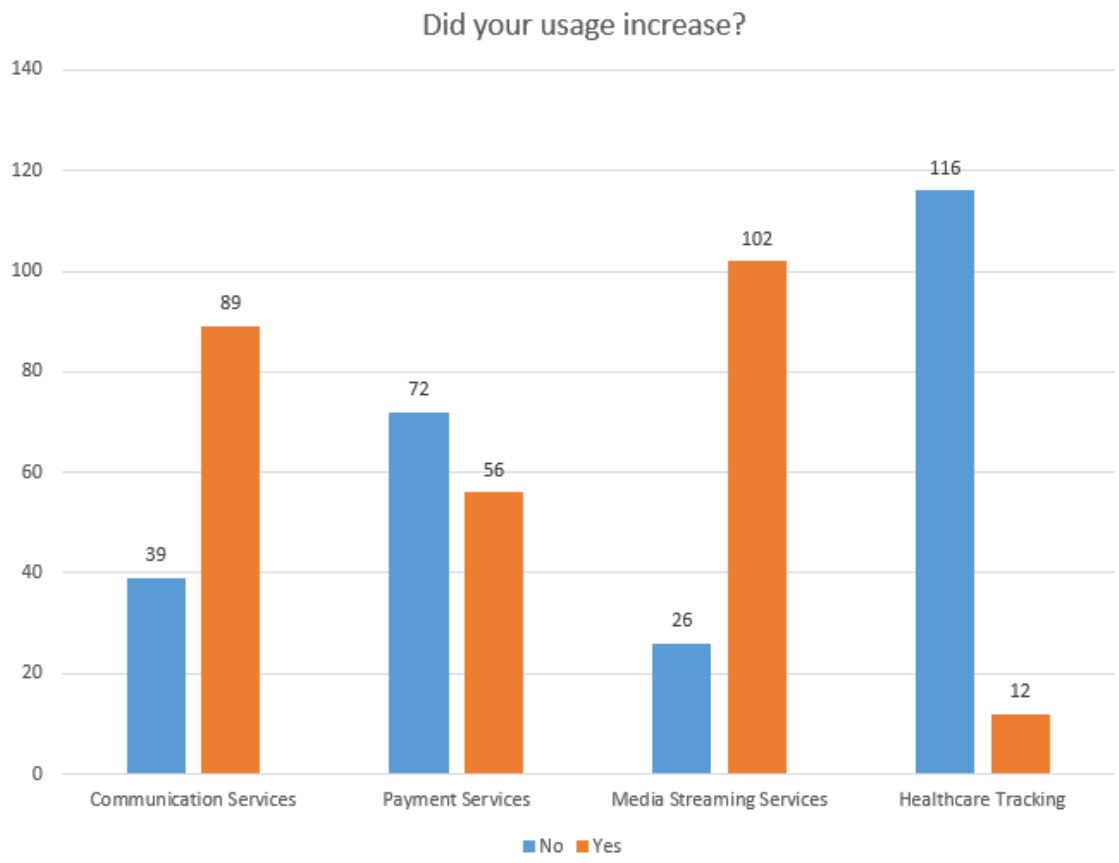


Diagram 6: Did your usage increase?

Question 5: Since when did the usage increase?

Half of the users of communication services increased their usage over a year ago and one third either is not using it or did not increase their usage. Half of the users of payment services did not increased their usage or are not using it at all, and one third of the users increased their usage more than a year ago. Half of the users of media streaming services increased their usage more than a year ago and one of fifth did not or is not using it at all. The rest of the users increased their usage within a year.

The majority of the users of healthcare tracking did not increase their usage at all or they are not using the service altogether, and only a few of the users have increased their usage of the service within a year.

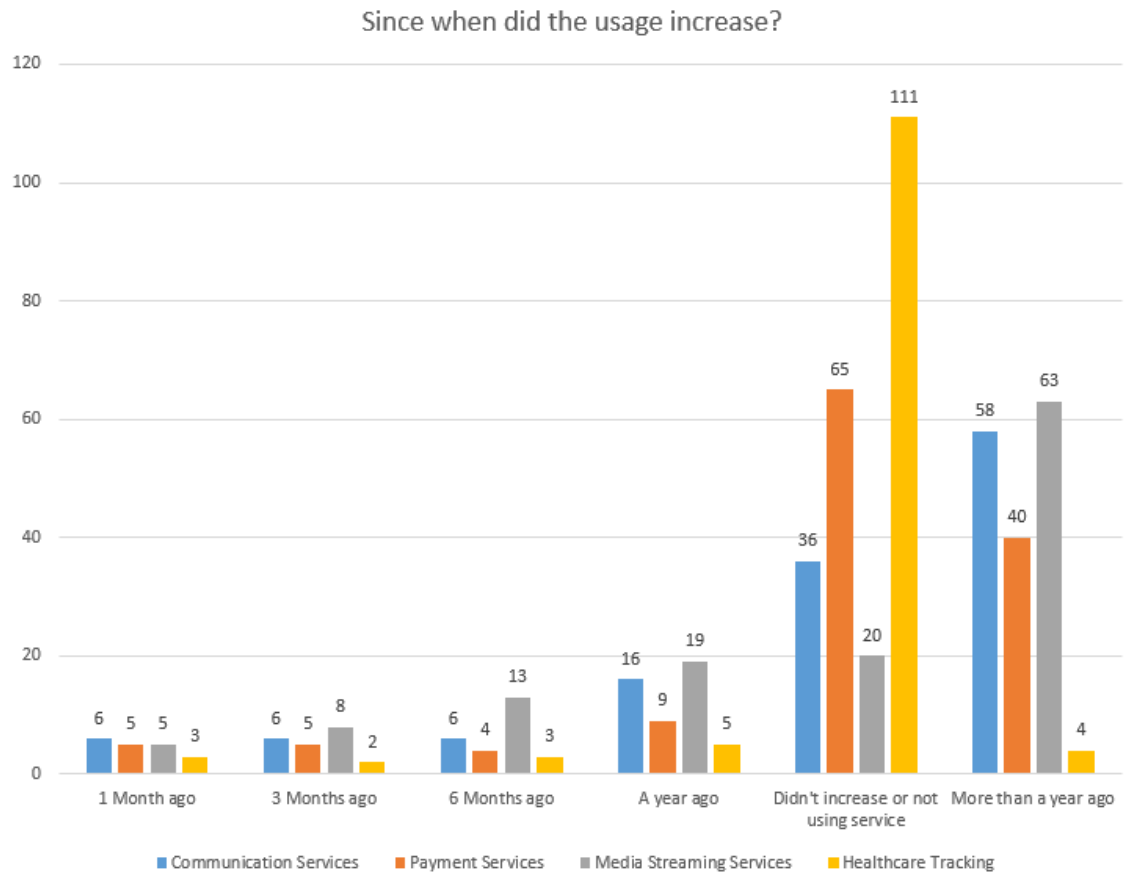


Diagram 7: Since when did the usage increase?

Question 6: Do you plan to check out any of the other mentioned services which you have not used already?

The majority of the users are unsure whether they are planning to check it out or they are already using communication services and payment services, one third are not planning to check the services out, and only a few are planning to check the services out. One fifth of the respondents are planning to check out media streaming services. Regarding healthcare services, the majority of the users are not planning to check out the service, and only a few are planning to check it out in the future.

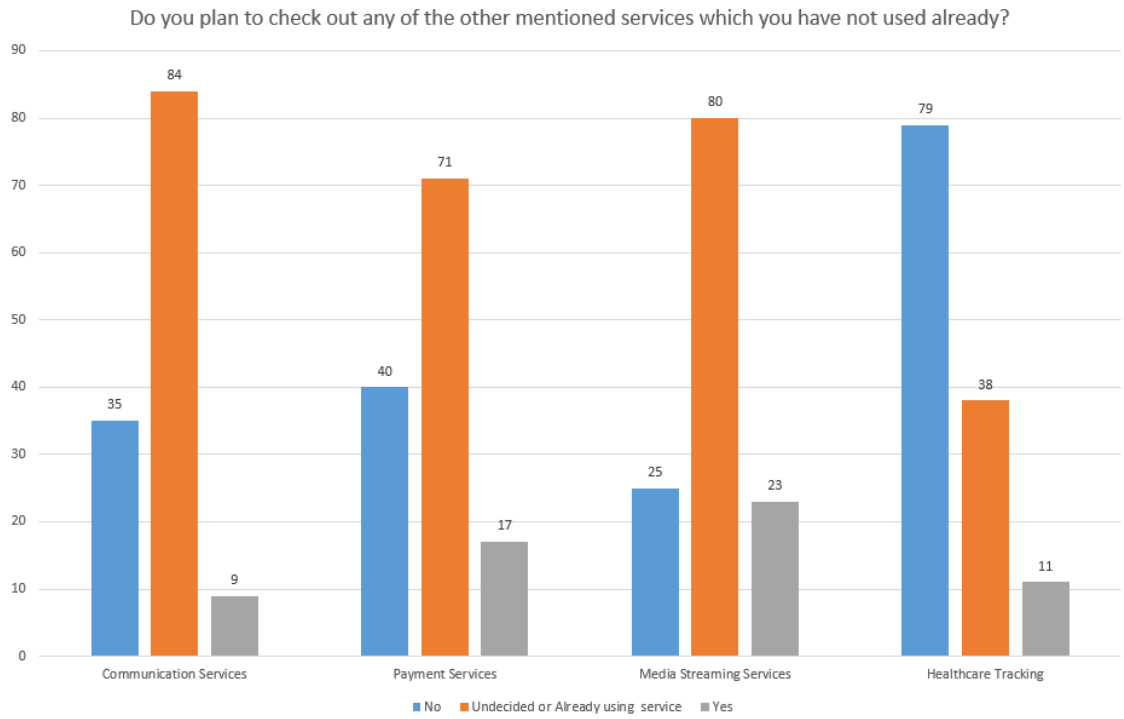


Diagram 8: Do you plan to check out any of the other mentioned services which you have not used already?

Question 7: Are you concerned about security and privacy?

Half of the users are very concerned about the security and privacy of cloud streaming services, one third of the users are slightly concerned about the security and privacy of cloud streaming services, one fifth are not concerned at all about the security and privacy, and only a few have no opinion about the matter.

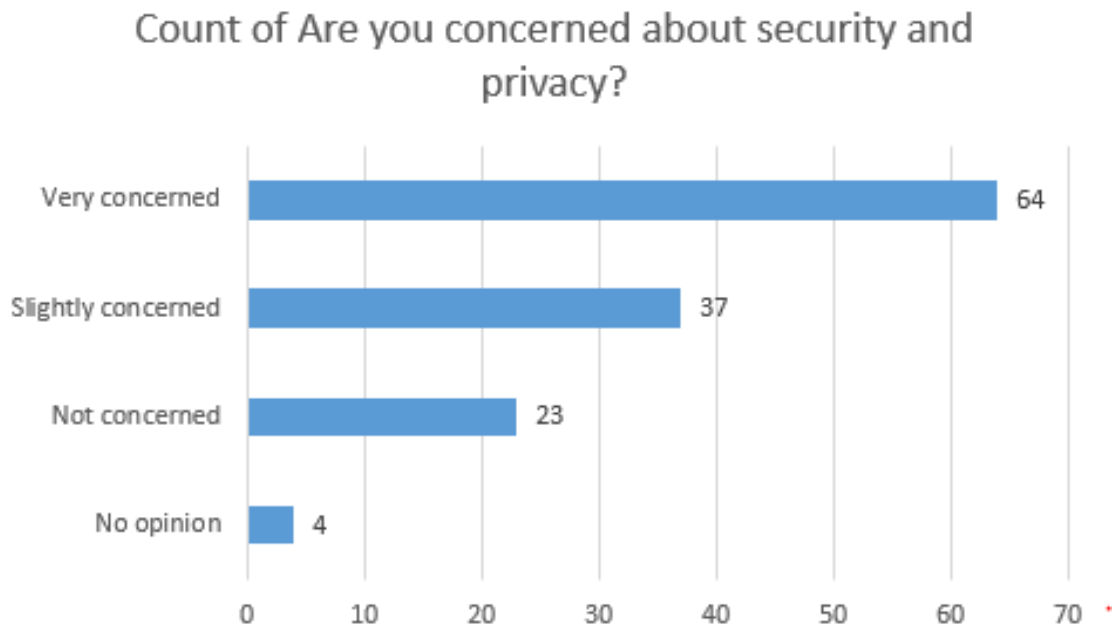


Diagram 9: Count of Are you concerned about security and privacy?

6.2. Survey Data Analysis

Communication services have been used very frequently and for a long time already. Nowadays, the usage has reached a kind of culmination point where the growth has slowed. Customers have realised that they can make use of these services on a daily basis, for their personal and professional use. The services in itself are mostly free which makes it easier for customers to get started on using them.

Media streaming services follow the same pattern. The same development applies. With these services, users can easily switch around between different media streaming service providers. It is not hard to delete or cancel a subscription and start a new one right after the cancellation of the previous one. Furthermore, it is possible to use them all at the same time.

Health care services have been used only sporadically in the past and the growth has not exactly started to increase either. It seems that the customers still have not found these services useful. This may be due to the lack of advertisement, and therefore they do not understand easily what the services are used for.

Payment services are being used to a certain extent. They have been used for a long time and some growth can be predicted for the future. There is always a certain security question regarding payment services. It is hard to trust your capital to these services which probably is the reason why these are used only by a small minority.

7. Conclusion

The topic of the thesis was chosen so that the information was available from public resources and that this thesis was written from standpoint of the consumer. For the research topic, I chose partially familiar topics for me but some of them were unfamiliar to me. This thesis was made in that perspective, that the person who does not know the topic in advance, will be able to at the very least start using the cloud computing services. Several use cases were also addressed to properly exemplify the services to the reader. I reviewed the usability and functionality of the services, by searching public reviews from public sources.

I devised a survey, which main questions were: how cloud computing services are being used, which cloud computing services are being used and how often they are being used and to which direction the services are developing. A conclusion can be drawn that some of the services are being used a lot and very often, whereas some of the services are less known and rarely used. Regarding these less known services, it appears that the users are not going to be starting to increase their use any time in the future. The more known services already have a good customer base.

It is rather difficult to precisely evaluate the meaning of cloud computing for its users. Ultimately, every user must decide according to their own personal needs. In general, communication services bring people closer and make it easier to stay in touch. Media streaming services provide a lot of content for the users' free time. Payment services ease the process of payments. Healthcare tracking helps users to monitor their own welfare. Due to peer pressure, services are also gaining more and more customers. Social media sites especially help in this matter.

Based on my own research, communication services and media streaming services are high in demand. Whereas payment services and healthcare tracking services have not reached the same level of user base. This indicates that these service providers have to market their services better or more.

Because the sources of the thesis were public, the progress of the thesis was completely self-dependent. The end results satisfy me, because I was able to collect all the necessary information that I planned to in the start of the thesis.

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Figures

Tables

Diagrams

Appendix

Survey:

Cloud Services and their Usage

Cloud Services and their Usage

1. Do you use Cloud Services? *

- ☐ Communication Services (E-Mail, Facebook, WhatsApp, iMessage, Skype, iCloud)
- ☐ Payment Services (PayPal, ApplePay, AndroidPay, e-Passi)
- ☐ Media Streaming Services (Netflix, Hulu, YouTube, Twitch, Amazon Prime, Katsomo, Ruutu, Spotify, AppleMusic)
- ☐ Healthcare Tracking (Polar, FitBit, Withings, JawBone, Misfit, Smartphone Tracking)

2. How often do you use these Cloud Services? *

	Daily	Weekly	Biweekly	Monthly	Quarterly	Annually	Never
Communication Services	○	○	○	○	○	○	○
Payment Services	○	○	○	○	○	○	○
Media Streaming Services	○	○	○	○	○	○	○
Healthcare Tracking	○	○	○	○	○	○	○

3. For how long have you used it? *

	For one day	For one month	For couple of months	For half a year	For a year	More than a year	Never
Communication Services	○	○	○	○	○	○	○
Payment Services	○	○	○	○	○	○	○
Media Streaming Services	○	○	○	○	○	○	○
Healthcare Tracking	○	○	○	○	○	○	○

4. Did your usage increase? *

	Yes	No
Communication Services	○	○
Payment Services	○	○
Media Streaming Services	○	○
Healthcare Tracking	○	○

5. Since when did the usage increase? *

	1 Month ago	3 Months ago	6 Months ago	A year ago	More than a year ago	Didn't increase or not using service
Communication Services	○	○	○	○	○	○
Payment Services	○	○	○	○	○	○
Media Streaming Services	○	○	○	○	○	○
Healthcare Tracking	○	○	○	○	○	○

6. Do you plan to check out any of the other mentioned services which you have not used already? *

	No	Yes	Undecided or Already using service
Communication Services	☐	☐	☐
Payment Services	☐	☐	☐
Media Streaming Services	☐	☐	☐
Healthcare Tracking	☐	☐	☐

7. Are you concerned about security and privacy? *

- ○ Very concerned
- ○ Slightly concerned
- ○ Not concerned
- ○ No opinion