

Dropbox

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ABSTRACT

In this paper about the Dropbox we begin with a small introduction about what is the Dropbox, followed by a student's review. We analyze the application in the light of the feedback given by multiple Dropbox users, who replied to a questionnaire we created.

Keywords

Dropbox, cloud computing, cloud storage, file sharing, backup

INTRODUCTION

Cloud computing [1] refers to the provision of computational resources on demand via a computer network. The Dropbox [2] is a virtual disk that uses cloud computing to enable users to store and share files and folders with others across the internet using file synchronization. It was founded in 2007 by Drew Houston and Arash Ferdowsi as a Y Combinator startup. Once your files are correctly uploaded to the Dropbox server, the files are going to be available from any place, with internet access.



Figure 1. Dropbox logo

One of the main benefits of the Dropbox, besides the fact that it is easy to use, is its compatibility with different uses. It is available using a simple web browser or through applications for Windows, Linux, Mac OS, Android, iPhone and Blackberry.

It is ready to use in English, French, German, Spanish and Japanese language, and it is available in different sizes. The free Dropbox account comes with 2GB that you can

use for as long as you like, but by referring the Dropbox to other people you can win 250MB for each affiliate, to a maximum of 1GB. If you need more space you can opt for the Pro 50 plan with 50GB which costs \$9.99/month or the Pro 100 plan with 100GB for \$19.99/month.

Dropbox uses Amazon's S3 storage system to store the files and SoftLayer Technologies for its backend infrastructure. With its success, power users have devised a number of innovative uses that expand Dropbox's functionality. These include: sending files to a Dropbox via Gmail; using Dropbox to sync IM chat logs; BitTorrent management; password management; remote application launching and system monitoring [3].

STUDENT'S REVIEW OF DROPBOX

As university students in computer science, we need to have all our work files at hand and backed up, and, eventually an easy and safe way to share files with other work colleagues. The Dropbox application handles all these needs very well. This is a multiplatform application which allows creating automatic backups of all of your files and allows access to them from every computer and smartphone with internet access from anywhere in the world.

The Dropbox is very easy to use. To get started simply download the application and it will create in your device a special folder/directory, in which every single file and directory is backed up into the server automatically when it detects any change to these (creation, edition and deletion). Having the Dropbox account set up in several devices, these special folders get automatically updated according to the latest change on the server. Also, via web browser, you can access these files from everywhere in the world even without having the application on your device.

What makes this application so simple, invisible and the perfect place to have your work files is that every file you create/edit/delete in the special folder gets automatically backed up. For example, if you create a new HTML file (using this as an example, as it is the same for every type of file or directory), it is automatically uploaded to the

server and, therefore in any other device with that same account set up. Now if you are editing the HTML file, and you save the changes to the file and keep editing, these changes are backed up to the server although you keep editing it (it is even possible in the web interface to recover any updated version of the files). The same happens for deletion as for creation.

The other week the Dropbox just saved my day. When I arrived home, my laptop would not start up. But as I saved all the important files in the Dropbox folder I was not too concerned with the fact that I had just lost the files after working a number of hours on the project for a course related with mathematics, because when I turned my desktop on, they were there.

One of the greatest features is to allow sharing specific folders/directories with any other Dropbox user you wish. It is ideal for group work eliminating the need for passing work from one to the other via email or USB pen drive swapping. Some other features are: a specific Dropbox folder named "Public" which allows getting a link to the file and sharing it with anyone even if not a Dropbox user, another special folder for photos where in the web browser application web site you can see the photos in albums, and the possibility to get even more features by getting extras from the web.

The Dropbox is a safe, fast, easy to use, invisible and scalable application. It is recommended to everyone even if all you want is to back up your files.

BACKGROUND WORK

As we did not find interesting papers about the Dropbox, we opted to search for background work about cloud computing and cloud storage, as the Dropbox is based on this concept.

Business Value Architecture

As referred by the authors of a white paper [5], the disruptive trends of Cloud Computing are expected to become a commonly-accepted model for running enterprise operations within the next 3-5 years.

Admittedly, Cloud computing brings significant cost advantages to consumers and much of the most popular benefits are what the article writers call as first generation benefits of Cloud computing.[5]

Introduction to cloud computing

The authors created this white paper [6] as an attempt to clarify the issues related with this topic by offering a comprehensive definition of cloud computing, and the benefits it can bring.

They start by answering the question "What is cloud computing?" by mentioning that many people are

confused as to exactly what cloud computing is, especially as the term can be used to mean almost anything. Roughly, it describes highly scalable computing resources provided as an external service via the internet on a pay-as-you-go basis. The cloud is simply a metaphor for the internet, based on the symbol used to represent the worldwide network in computer network diagrams. The author also mentions that economically, the main appeal of cloud computing is that customers only use what they need, and only pay what they actually use. Resources are available to be accessed from the cloud at any time and, there is no need to worry about how things are maintained behind the scenes. This new generation of computing utilizes remote servers housed in highly secure data centers for data storage and management.

After a well written introduction to cloud computing, the authors point out other interesting sub-topics, but for this Ubicomp article we are only interested in "What services can be used in the cloud?", "Why switch from traditional IT to the cloud?" and, "Should I be concerned about security?".

In the sub-topic "What services can be used in the cloud?" we have that there are numerous services that can be delivered through cloud computing, taking advantage of the distributed cloud model. The most popular cloud-based IT solutions are: Hosted Desktops, Hosted Email, VOIP, Cloud Storage and Dynamic Servers. The Dropbox can be classified as Cloud Storage service, as Cloud storage is basically the delivery of data storage as a service, from a third party provider, with access via the internet and billing calculated on capacity used in a certain period (e.g. per month).

To ask the question "Why switch from traditional IT to the cloud?", the author mentions the following reasons: removal / reduction of capital expenditure, reduced administration costs, improved resource utilization, economies of scale, scalability on demand, quick and easy implementation, quality of service, guaranteed uptime, anywhere access and disaster recovery / backup.

The number one concern of the users and companies who adopt cloud computing technology is the security and, this article covers this aspect with the answer to the question "Should I be concerned about security?". They point out some important tips, like: privileged user access, regulatory compliance, data location, recovery, investigative support and long-term viability.[6]

Cloud Storage for Cloud Computing

In [7] a Cloud Storage overview is given. It mentions that just like Cloud Computing, Cloud Storage has also been increasing in popularity recently due to many of the same reasons as Cloud Computing. Cloud Storage delivers virtualized storage on demand. There is no need to

purchase storage or in some cases even provision it before storing data.

After a brief overview about what is Cloud Storage, the authors start mentioning some of the use cases, for

example: local data (such as on a laptop) can be backed up to cloud storage; a virtual disk can be “synched” to the cloud and shared to other computers. [7]

COMPARISON WITH OTHER SIMILAR SERVICES

After the Dropbox’s success, it started to appear new startups with the same concept of cloud storage. Some of them offer for free more space than the Dropbox and have different functionalities.

	Dropbox	SugarSync	ZumoDrive
Free Plan	2GB (but you can win 1GB by referring it to your friends)	5GB	2GB
Paid Plans	50GB - \$9.99/month 100GB - \$19.99/month	30GB - \$4.99/month 60GB - \$9.99/month 100GB - \$14.99/month 250GB - \$24.99 / month	10GB - \$2.99/month 25GB - \$6.99/month 50GB - \$9.99/month 100GB - \$19.99/month 200GB - \$37.99/month 500GB - \$79.99/month
Language(s)	English, Japanese, German, French and Spanish	English, Japanese, German, Spanish and Chinese	English, Japanese, French, Spanish, Italian, Portuguese, Korean and Chinese
Public Internet file hosting	Yes	Yes	Yes
Maximum per-file size	300 MB on the web interface; none for the desktop app	-	No Limit
Server location(s)	USA	-	USA
Supports	Windows, Linux, Mac OS, iPhone, Android and Blackberry	Windows, Mac OS, iPhone, iPad, Android, Blackberry, Windows Mobile and Symbian	Windows, Linux, Mac OS, iPhone, Android, Palm Pre
Website	http://www.dropbox.com	http://www.sugarsync.com	http://www.zumodrive.com

Table 1. Comparison between Dropbox, SugarSync and ZumoDrive [4]

DESCRIPTION OF YOUR METHOD/SYSTEM

As previously mentioned, the purpose of this study is to get feedback from the Dropbox users. To accomplish this goal, we performed a quantitative study by creating a simple online questionnaire on Google Docs in Portuguese and English. As the Dropbox hit the mainstream market in 2009, finding users to participate in our questionnaire was easy. After creating the questionnaire we started spreading the word on twitter,

Facebook and Moodle. Figure 1 shows how we motivated our friends on Facebook to answer our questionnaire.



Figure 1. Method used to motivate users to answer the Dropbox questionnaire

The online questionnaire was easy to answer and had the participation of 115 users in total, from around the World. The questions included in the questionnaire were:

1. How old are you?
2. How have you found the Dropbox?
3. Why do you use the Dropbox? (choose one or more options)
4. Type of use
5. Are you happy with the Dropbox?
6. Rate the application in the following characteristics
 - a. Usability
 - b. Invisibility (your awareness that the application is running)
 - c. Portability
 - d. Available space

DISCUSSION

Some results from our online questionnaire were the following:

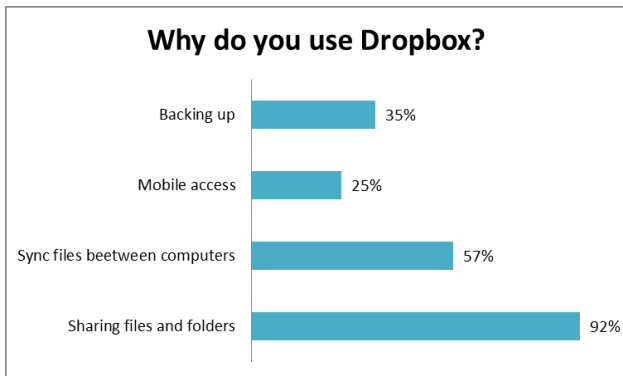


Figure 2. Why do you use Dropbox?

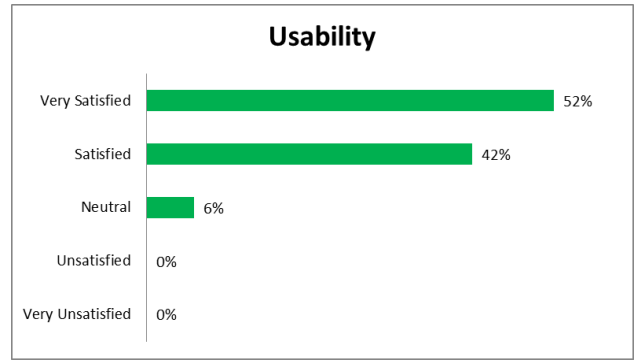


Figure 3. Rate the application in terms of Usability

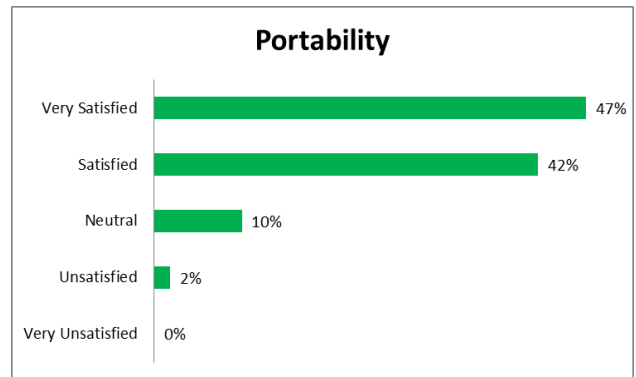


Figure 4. Rate the application in terms of Portability

First of all, the vast majority of the Dropbox users that replied to our questionnaire are between 19 and 29 years old, and most of these users found Dropbox through friends.

About the happiness with the application, two thirds of the users are pleased with the experience that Dropbox provides and also a similar portion of users have been advised by friends to use or check Dropbox. We can also check that there is an even use of the application in the professional and academic environment with the users bringing the application benefits in for a domestic use.

When confronted with some of characteristics such as usability, portability, invisibility and space, it is clear that there is a general good satisfaction with Dropbox. Users are least satisfied with the available space which comes with each free account. In the remainder characteristics users seem to share the same opinion about the value that this simple app offers. Most of the users are very satisfied or satisfied with the invisibility, portability and usability.

CONCLUSION

From the data retrieved from the questionnaire, we conclude that Dropbox is very popular between young

people, mainly students and workers, who see the application as an easy and safe tool to share and have the files safe and available in several locations. We also can get to the conclusion that most of the users are happy with the features already provided with Dropbox, sharing the same opinion in terms of usability, portability and invisibility (some of the characteristics of a ubiquitous system). The overall disappointment is on the space provided for the free account, which could be bigger as Dropbox's competitors.

This application takes the best of cloud computing to provide an easy, fast and safe tool to share and backup our academic, professional and domestic life. We conclude that Dropbox is a ubiquitous system and its use is recommended to everyone.

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