

Is cloud computing secure for mass storage?

Cloud Storage vs. Physical Servers

HONOR PLEDGE

I acknowledge that the Capstone Project is an independent study project to be completed individually. On my honor, I have not received aid on my Capstone Project other than what was provided by my faculty mentor and any persons explicitly cited in my work. I further acknowledge that if I have given any aid to another student in this course, the instructor of this course was made aware of my contributions.

Table of Contents

Title Page	1
Table of Contents	2
Objective	3
Client	4
Advisor	5
Project Plan	6
Resources	7
Project Details	8
Applied Knowledge	9
Risk Factors	10
Work performed by others	11
References	12

Objectives

Is cloud computing the future of data storage? Has cloud computing advanced enough to become the future of all data storage, or are there security or cost flaws that prevent it from being the next mass form of data storage.

- The objective of my research, and this report is to conclude whether or not data security, and cost effectiveness of cloud computing is reliable enough to make it the “next big thing” in data storage.
- Test hypothesis (I believe that there are currently too many security flaws with cloud computing to make it a candidate for all future data storage.)
- Analyze whether or not cloud-stored data is safe, and explore the possibility or probability of hackers gaining unwarranted access.
- Explore how prevalent data loss is in cloud storage.
- Since cloud servers are online, and network based, can someone DoS or DDoS attack a cloud server?

Cloud computing has become a hot topic in recent years, especially in Business, IT specifically. Cloud computing gives PC and other internet users the ability to save, store, and download data and programs over the internet instead of using storage space on the user’s hard drive. Cloud computing has become so popular because its costs and efficiency outweigh those of the speed and cost ratio of using local hard drives. Because all information stored on a cloud is available online, cloud computing has “unique attributes that require risk assessment in areas such as data integrity, recovery, and privacy, and an evaluation of legal issues in areas such as e-discovery regulatory compliance, and auditing.” In plain English, information stored online (cloud) is more vulnerable to outside attack vs. information you have saved on your local hard drive. My hypothesis is that I don’t believe cloud computing has advanced enough to be used for all future data storage. I will be exploring whether there are serious security flaws with current cloud computing standards to see if my hypothesis is true, or whether cloud computing is a reliable source for future data storage.

Client

For this report, I have not chosen a particular company or organization, but this report can be applied to any business that is debating the use of cloud storage software for their data. The report will point out the benefits of cloud computing, security vulnerabilities created by using the cloud, and pros and cons of cost and user effectiveness vs. traditional network storage (physical network drives).

My testable hypothesis states that there are too many flaws with cloud storage for it to be used effectively. I came to this conclusion without doing any research, just from reading articles about data breaches, and lost or missing files that were stored on cloud servers. I plan on researching cloud storage in depth to come to an accurate and thorough conclusion on whether or not cloud storage is safe, it's cost effectiveness vs. traditional storage, and the future of cloud computing.

Advisor

Dr. Tom Narock

Academic Credentials:

BS, UMD College Park

MS, John Hopkins University

PHD, UMD Baltimore County

Dr. Narock's teaching areas include web development, data sciences, mobile app development, and information systems.

Prior to joining the Marymount faculty in 2014, Dr. Narock worked as a research scientist at NASA. His research interests focus on intelligent information systems and Big Data problems. He has a particular research interest in the intersection of science and technology and enjoys working with students in this context. Applications of his work have involved computational reasoning to enhance search and retrieval within the Earth sciences and Data Science applications in the geosciences.

Dr. Narock is also active in information technology professional societies and serves on the editorial board of peer-reviewed journals.

Project Plan

Due Dates:

Peer Review 2 Friday November 6, 2015 by midnight

Final Report Friday December 4, 2015 by midnight

Project Presentation Will be scheduled 12/7 thru 12/11

Project Retrospective Friday December 11, 2015 by midnight

Timeline:

Peer Review 2 – Complete 11/4

Final Report – Complete by 12/1 then revise before 12/4

Project Presentation – Schedule for 12/9 Wednesday

Project Retrospective – Wednesday 12/10

By 11/5 I plan on having the work performed by others page completed. I plan on finishing the project details page Thanksgiving weekend, around the same time I complete all my research. I did not want to begin writing my project details before I finished my research, to avoid making contradictions in my report.

I plan on finishing all research by Thanksgiving weekend, where I will make final adjustments based on the peer review, and also adding more information gathered from the conclusion of my research. After this I plan on submitting a copy of my report to Dr. Narock for final proofreading/evaluation and will make final corrections based on his comments.

Before turning in the report, I plan on changing all references from links to APA cited sources.

Resources

For any organization looking into using cloud storage as a means of data storage instead of physical servers, they will need to find a service provider, usually the bigger name, the better, and they will need to either purchase, or start a subscription for a cloud server. Prices range depending on the organization's needs, amount of space, and type of support and attention they will need. Remember that choosing a well-known cloud provider is imperative for your data security:

“Imagine, for example, that you can't afford a to run a central server in your business, meaning all customer, financial, IP and other data is stored on your or your employees' laptops or USB drives. It's not only a less efficient way of working but it increases the chances of data loss, and the regulatory financial penalties, loss of business and more importantly reputational damage that will ensue.

Compare this with a reputable cloud provider, which is fully regulated and certified by independent standards bodies to a high degree, and as a result would be protected by state-of-the-art security systems preventing data theft. Back up is continuous and if you lose your machine there's no need to worry because all the data is stored in the service providers' data centers. If they go down for some reason there should be another back up plan to ensure business continuity. Cloud computing & small businesses security [12]”

Project Details

After doing some research I have come to a few conclusions. I believe that my hypothesis was incorrect, and it seems cloud storage is a fair alternative to physical servers. It seems that cloud storage has become seemingly more advanced, with huge growth between 2012-2014. Cloud storage security depends on the provider, type of service, and form of authentication. IE: bigger well-known third party providers tend to be safer than smaller cloud storage companies, cloud storage using encrypted data transfers tend to be safer, but there are always chances of cloud passwords being hacked. As far as data attacks, I have read that most of the targets for these attacks are the actual cloud storage data centers, vs. the end users who are uploading, or accessing cloud information, so choosing a reputable company could mean a huge difference security wise. As far as data loss, the third party company providing your cloud storage should conduct regular backups to prevent deleted or missing files in case of any type of failure. When researching costs, I noticed that physical servers tend to have a very linear pricing, and also include the maintenances upkeep and upgrading of your system bi-annually (estimate) this is all on top of paying an employee to monitor and handle all these requests. As far as cloud computing goes, it tends to be a lot cheaper storage wise, and you don't have to worry about anything that pertains to the server, or managing the stored data. Also, the more storage you purchase, the more the cost goes down, sometimes falling to around 50% of a single GB, if you buy 100+ at a time.

(This is just some points I've touched on in my research, and will be going further in depth in the coming weeks. Is there any other topics of cloud storage you believe I should look into, or should I just worry about backing up the points I previously mentioned with facts and data from my research?)

Applied Knowledge

There are a number of courses that I believe helped prepare me for the type of research I am conducting for the purpose of this report, some of which include: Database Technology, Software Testing, Software Engineering, and Security in the Digital Age.

When researching a topic like cloud computing, it is important to have a strong understanding in how hacking, or coding works, so knowledge of software engineering, testing, and databases is helpful to form an idea of how one would go about hacking a cloud server. Security is also another big topic one must be knowledgeable on before researching this topic, in addition to knowing how and why cloud storage works, and how it can be penetrated; one must know how these issues can be avoided.

I feel like personally, I will need to learn more about how cloud storage hacking is conducted, so I can try to figure out if it's common, easy, and how big of a target a company sharing sensitive data through the cloud is.

Risk Factors

My research, and report both focus primarily on risk. The whole idea of cloud computing in itself is a risk. There are many things that could go wrong for an organization using cloud computing. As far as risks in terms of my research, the data and previous research is already there, the only risk for me is that any day, there could be a new cloud computing standard, which could possibly make cloud computing safer, which isn't a bad thing, but it makes all my research null.

As far as for the client or organization using the cloud as a form of storage, the risks have already been previously outlined in this report. There are chances of data going missing; DoS or DDoS attacks on the cloud server, hacked data, and corrupt back-ups.

I believe the rewards of cloud computing outweigh the risks, with new security standards still being developed everyday, and cloud storage itself still being fairly young, within a few years the concept of secure cloud storage should be easily perfected.

Work Performed by Others

I will be using multiple scholarly, book, website, and newspaper articles and journals to form my own fact-based opinions of cloud computing. I will be using approximately 15 different sources with differentiating views to try to conclude whether or not cloud computing is a safe alternative to physical data storage. The only work I will be conducting is research. I will be using other peoples' findings, and research and elaborating on them to form a conclusion.

References

- 1) <http://www.forbes.com/sites/louiscolumbus/2015/04/05/predicting-the-future-of-cloud-service-providers/>
- 2) <http://www.infoworld.com/article/2613560/cloud-security/cloud-security-9-top-threats-to-cloud-computing-security.html>
- 3) <http://dl.acm.org/citation.cfm?id=1594816>
- 4) <http://www.sciencedirect.com/science/article/pii/S0167739X08001957>
- 5) <http://dl.acm.org/citation.cfm?id=1693134>
- 6) http://www.idi.ntnu.no/emner/tdt60/papers/Cloud_Computing_Security_Risk.pdf
- 7) http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=5189563&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxppls%2Fabs_all.jsp%3Farnumber%3D5189563
- 8) <http://www.bdc.ca/EN/articles-tools/technology/invest-technology/Pages/what-cloud-computing.aspx>
- 9) <http://www.thesba.com/2013/10/23/is-cloud-computing-cost-effective-for-smbs/>
- 10) <https://cloud.google.com/storage/pricing>
- 11) <http://www.cnet.com/news/google-microsoft-agree-cloud-is-now-safe-enough-to-use/>
- 12) http://www.trendmicro.com/cloud-content/us/pdfs/security-intelligence/sb_cloud-computing_small_business-pros-and-cons.pdf
- 13)