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CLOUD COMPUTING AND SOCIAL NETWORKS: A COMPARISON STUDY OF MYSPACE AND FACEBOOK

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Abstract: Social networks provide a virtual place where people can interact and share. With the increasing user base and the competition social networks needed a scalable, cost-effective backend architecture and efficient business model .All these objectives can be accomplished by adopting cloud computing architecture at the backend and the SaaS business model. In this paper, we will try to analyze the underlying SaaS business models and backend cloud computing architecture deployed by MySpace and Facebook to support large social networks

Index Terms: SaaS, Cloud, Architecture, IaaS, PaaS, Business Model, Networks. File System

INTRODUCTION

In today's world social networks has become an integral part of people's lives. People share their personal lives with friends and indulge in other activities like discussions, gaming and various others. In recent years social networks have gained popularity and have grown at fast pace [20]. This growth has posed many challenges of scalability, better service, management, and maintenance issues for the social networks. This is where comes the cloud computing and the SaaS business model.

The Software as a Service is a business model which provides on demand software delivery to the clients. In SaaS the data resides at a central location on the cloud. In clouds data is stored at a central location and its three backup copies are maintained hence decreasing the management and maintenance cost. In the traditional architecture the new servers were brought in the scenario as demands rise but when there is a need to respond to millions of user's requests, manage their updates and accounts on daily basis then there is a need of distributed backend architecture for dealing with the scalability problems.

In mid 2006 due to rapid growth of users on Facebook site and heavy load servers went down. It was the worst outage Facebook faced due to lack of scalability. And hence Facebook moved to the distributed cloud architecture. In the mid 2008 when new and heavy features like video player, music player were added to the MySpace, the site became very slow and sluggish. This all happened due to insufficient testing and hence MySpace moved to the clouds for testing environment.

In figure 1 we have shown the traditional non distributed architecture used in Social Networks and in figure 2 we have shown the current distributed architecture used by Social Networks

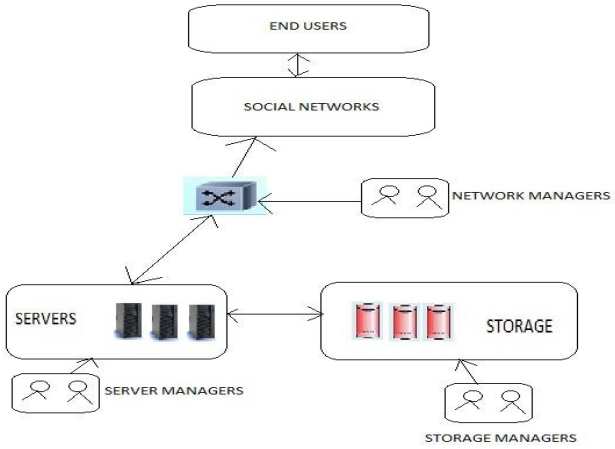


Figure 1: Traditional Architecture

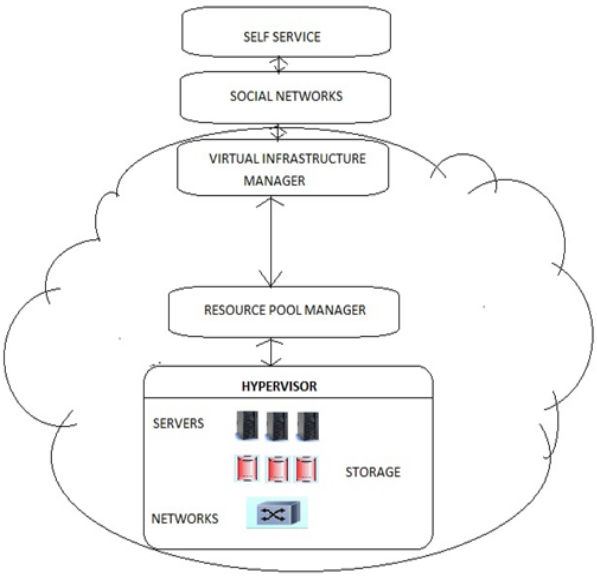


Figure 2: Current Architecture

BACKGROUND

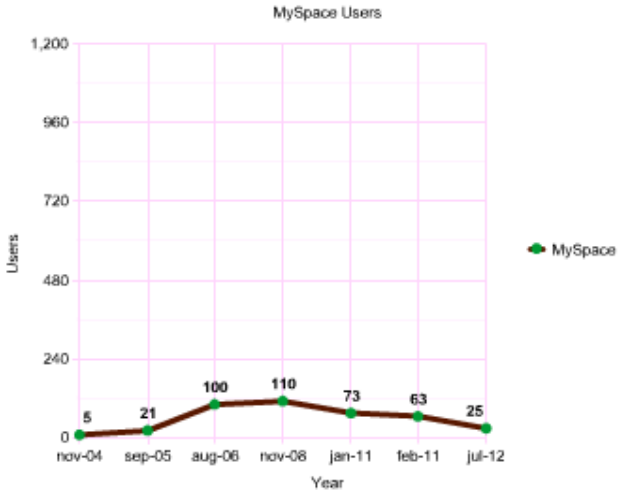
MySpace was developed by eUniverse employees and the Facebook came from Harvard University developed by

students. As we can see in the Table 1 that the revenue is much more for the Facebook then the MySpace .Same is the case for Alexa rankings. But this was not the case a few years back. We can see there was not much difference between the launch times of both but MySpace was more popular in the older times.

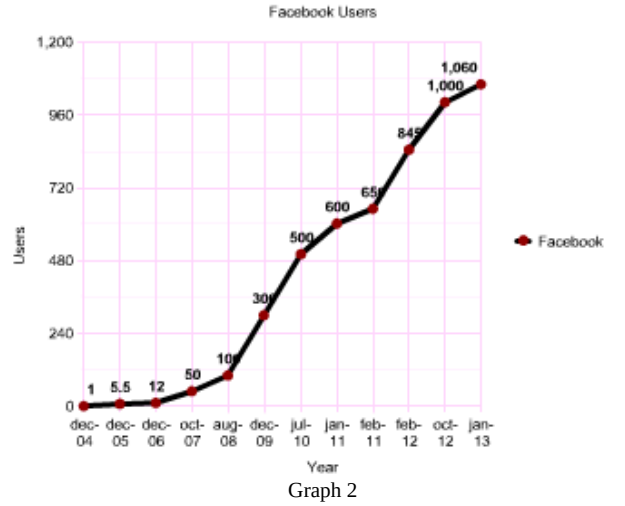
Table 1: MySpace vs. Facebook background information [1, 2]

	myspace	facebook
Launched	August 2003	February 04, 2004
Alexa Traffic Rank	252	2
Revenue(2012)	$15 million	$5,042 million
Market Cap(2012)	$71,143.25 million	$60,934.99 million
Type of Site	Social Networking Site	Social Networking Site
Type of Services (major)	Social Network, Entertainment	Social Network

By the late 2007 the MySpace was the most popular social networking website of the time as we can depict it from the graph 1 shown in fig. 3[9] and Facebook was not that popular. But Facebook overtook MySpace on April 19, 2008 and since those times user base decreased for MySpace. But now MySpace has made ties with the Facebook and it has increased the user's registration on MySpace. On the contrary, users have increased tremendously for the Facebook as we can see in the graph 2 shown in fig 3[10].



Graph1



Graph 2

Figure 3: MySpace vs. Facebook users

CLOUD COMPUTING MODEL COMPARISON

The cloud computing architecture is divided into the three architectural layers: SaaS (Software as a Service), PaaS (Platform as a Service) and IaaS (Infrastructure as a Service) [16]. We will cite the comparison in MySpace and Facebook cloud architectures on all these layers. Depending upon the SaaS business model adopted by the organization the PaaS and IaaS layers elements may differ.

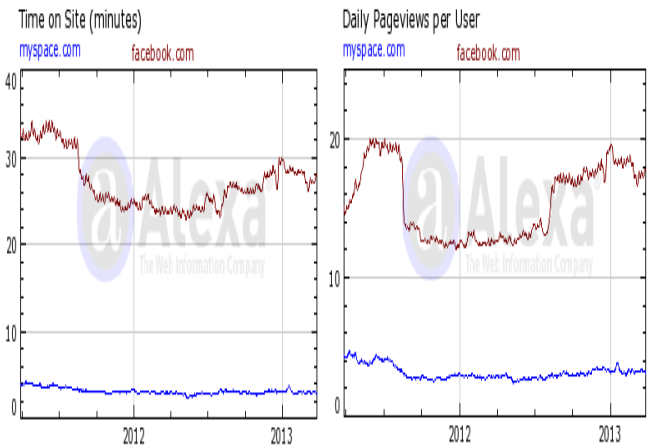
SaaS Business Model:

MySpace used a freemium SaaS business model in which it let the users use some of its features for free and if they wanted advanced features then users need to pay some fixed amount for the services used by them i.e. they need to pay some premium amount for additional features. Instead Facebook adopted old internet business model: display ads. It made its services to be used completely for free and they relied on the banner ads to generate the revenue. The comparison of business model features [11] of both the social networking sites is given in Table 2.

Table 2: SaaS Business Model Comparison

	myspace	facebook
Business Model	Freemium, Advertising	Internet Advertising
Services Offered	Social Network, Entertainment	Social Network
Earning Source	Music purchase, Banner Ads	Banner Ads
Customer Selection	Based on age, sex, interest and location	Based on age, sex, likes, interest and location
Advertising Model	Pay per Click(PPC)	PPC
PPC Budget(2013)	$61-$107	$44,179-$62,195
Avg Ad position	3(2013)	3(2013)
Google PPC words	3(2013)	1,754(2013)
Yahoo PPC words	9(2013)	1,849(2013)

MySpace is ranked #252 and Facebook has ranked #2 in the world according to the three-month Alexa traffic rankings. The 46% of visits to the MySpace consist of only one pageview (bounce ate). When compared with the overall internet population, the fraction of visits to MySpace referred by search engines is approximately 22%.The time spent in a typical visit to the MySpace is about 3 minutes and in Facebook it is about 28 minutes, with 44 seconds spent on each pageview. Most of the visitors to the site view an average of 18.1 unique pages per day. The other traffic statistics for 2012-2013 are depicted below in figure 4.



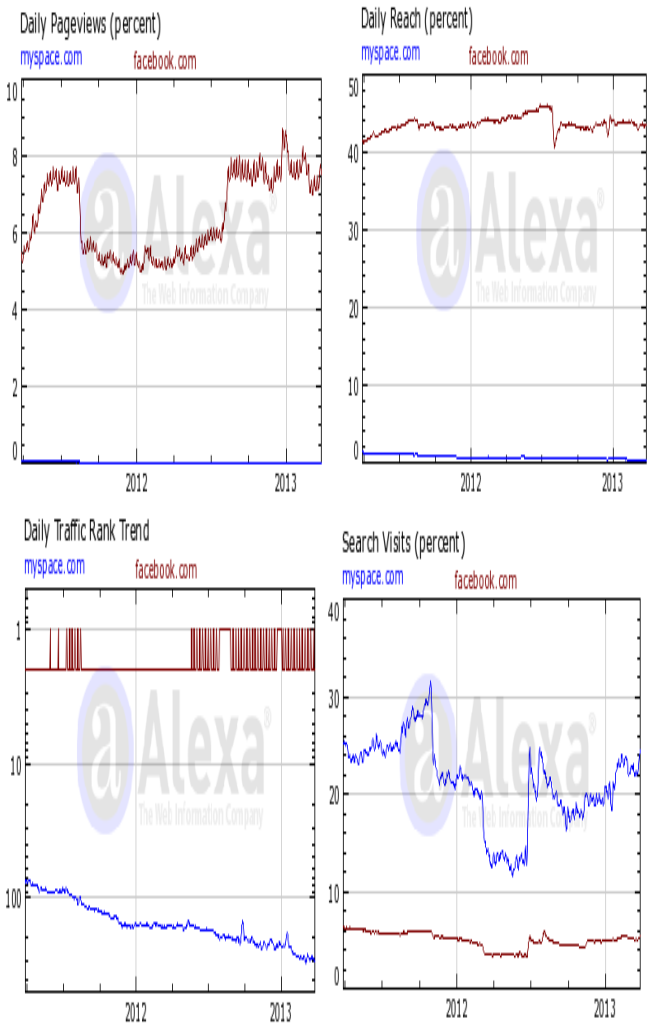


Figure 4: Traffic Stats[3,4]

PaaS Layer:

In PaaS platform is made available for the development and deployment of applications [12]. In the table 3 we have shown the comparison of PaaS layer of these social networking giants [18].

Table 3: PaaS Model Comparison

	myspace	facebook
Client	Thin Client	Thin Client
Platform	.Net(Microsoft)	Linux
Amazon EC	Yes	Yes
Programming Model	MapReduce	MapReduce
Coupling	Tight	Loose
Development	In-house	Allowed outside developers to build new apps

The MySpace made the users profile highly customizable so that users can make their profiles look as they want but Facebook don't provide much customization options to the users and keep it simple.

IaaS Layer:

In IaaS physical resources are provided to the users on demand which helps to scale up and scale down [17] as per the varying requirements of the users. Some of these physical resources are storage, servers, load balancers, network and there are many more [13]. The comparison according to these features is given in table 4[6, 7, 8].

Table 4: IaaS layer comparison

	myspace	facebook
Servers	Rackable System	Rackable Systems of zinc plates
Processors	Quad Core	Quad Core
Machines	Commodity	Commodity
File System	HDFS, WinDFS	HDFS
Backup	UPS with two sets of battery unit packs	Battery(No UPS)
Lighting	Motion Based LED	Motion sensitive LEDs
Load Balancer	MetaCDN Load Redirector	MetaCDN Load Redirector
DBMS	Horizontal scaling	Horizontal scaling
Cooling Mechanisms	DX(Direct Expansions) cooling units, Adiabatic cooling, Air handlers	Air Handlers, Water
Air flow management	Manage air pressure	Water cooling
PUE(power usage effectiveness)	1.8	1.10
Network	Internet	Internet

The rackable servers are used by both for efficient power distribution, flexibility and ease of serviceability [14]. HDFS (Hadoop Distributed File System) is a distributed file system used by both to provide high throughput access to application data hence improving response time[19]. In addition MySpace uses WinDFS which is a distributed storage service for the .NET platform and which provides an object based interface with a flat namespace to manage the stored data [15].

The power backup method used by MySpace lets it save its energy in power distribution system by eliminating the power losses resulting from multiple ac to dc power supply conversions which were there in centralized UPS systems. On the other hand, Facebook saves the investment in UPS by using battery power only [21].

Both are using the green computing compliance mechanisms and hence are using environment friendly mechanisms.

CONCLUSION

In this paper we have shown the comparison in the MySpace and Facebook cloud computing architectural layers. This comparison results in the conclusion that both the social networking sites are deploying the efficient cloud computing technologies for deriving the benefits and improving the

revenue figures. Some of the technologies of one are more efficient than others and hence both can learn from each other and can enhance there efficiency.

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