Cloud Computing in Business Optimization:
A Case Study of GOOGLE APPS in Business Strategies

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ABSTRACT
Cloud computing is web based processing, whereby shared resources, software, and information are provided to computers and other devices (such as smartphone) on demand over the Internet. Most cloud computing infrastructures consist of services delivered through common centers and built on servers. Clouds often appear as single points of access for consumers' computing needs. Commercial offerings are generally expected to meet quality of service (QoS) requirements of customers, and typically include service level agreements (SLAs). Most everybody in IT is talking about cloud computing, and a number of companies -- including major players like Microsoft, Google and IBM. The major cloud service providers include Salesforce, Amazon, IBM and Google. Some of the larger IT firms that are actively involved in cloud computing are Fujitsu, Microsoft, Hewlett Packard, IBM and Dell. Enterprises are adopting cloud services and transforming their datacenters to deliver private cloud services in order to meet business demand for innovation and revenue growth and at the same time pay for IT infrastructure on an as-needed basis. To leverage the benefits of cloud, IT organizations must maintain application performance, availability, and security. This paper discusses the Optimizing Applications over the cloud, applications of cloud computing in business optimization. This paper introduced with emphasis the Google apps in Business strategies.

KEYWORDS
Cloud Computing; business optimization, Google apps

1. INTRODUCTION
The Cloud Computing is one kind of emerging business accounting model. "Cloud Computing," to put it simply, means "Internet Computing." The Internet is commonly visualized as clouds; hence the term “cloud computing” for computation done through the Internet. With Cloud Computing users can access database resources via the Internet from anywhere, for as long as they need, without worrying about any maintenance or management of actual resources. Besides, databases in cloud are very dynamic and scalable. Key Characteristic of cloud computing is- it is cost effective. Here, cost is greatly reduced as initial expense and recurring expenses are much lower than traditional computing. Maintenance cost is reduced as a third party maintains everything from running the cloud to storing data. Cloud is characterized by features such as platform, location and device independency, which make it easily adoptable for all sizes of businesses, in particular small and mid-sized. A simple example of cloud computing is Yahoo email or Gmail etc. You dont need a software or a server to use them. All a consumer would need is just an internet connection and you can start sending emails. The server and email management software is all on the cloud (internet) and is totally managed by the cloud service provider Yahoo, Google etc. The consumer gets to use the software alone and enjoy the benefits. The analogy is, 'If you only need milk, would you buy a cow?' All the users or consumers need is to get the benefits of using the software or hardware of the computer like sending emails etc. Just to get this benefit (milk) why should a consumer buy a (cow) software /hardware? The most prominent characteristic of this structure is that all functional parts are close integrated in the only conference server, which makes powerful control, effective management and efficient security.

2. CLOUD COMPUTING ARCHITECTURE
Cloud computing architecture, just like any other system, is categorized into two main sections: Front End and Back End. Front End can be end user or client or any application (i.e. web browser etc.) which is using cloud services. Back End is the network of servers with any computer program and data storage system. It is usually assumed that cloud contains infinite storage capacity for any software available in market. Cloud has different applications that are hosted on their own
dedicated server. Cloud has centralized server administration system. Centralized server administers the system, balances client supply, adjusts demands, monitors traffic and avoids congestion. This server follows protocols, commonly known as middleware. Middleware controls the communication of cloud network among them. This server follows protocols, commonly known as middleware. Middleware controls the communication of cloud network among them.

3.3 INFRASTRUCTURE SERVICES

The bottom layer of the cloud is the infrastructure services layer. Here, we see a set of physical assets such as servers, network devices, and storage disks offered as provisioned services to consumers. The services here support application infrastructure -- regardless of whether that infrastructure is being provided via a cloud -- and many more consumers. As with platform services, virtualization is an often used method to provide the on-demand rationing of the resources. Examples of infrastructure services include IBM® BlueHouse, VMware, Amazon EC2, Microsoft Azure Platform, Sun ParaScale Cloud Storage, and more. Infrastructure services address the problem provided on demand as services to users. Sometimes the services are free and providers generate revenue from things like Web ads, and other times application providers generate revenue directly from the usage of the service. Sound familiar? It probably does since almost all of us have used them. If you've ever filed your taxes online using Turbo Tax, checked your mail using GMail or Yahoo Mail, or kept up with appointments using Google Calendar, then you are familiar with the top layer of the cloud. These are just a couple of examples of these types of applications. There are literally thousands of SaaS applications, and the number grows daily thanks to Web 2.0 technologies.

Perhaps not quite as apparent to the public at large is that there are many applications in the application services layer that are directed to the enterprise community. There are hosted software offerings available that handle payroll processing, human resource management, collaboration, customer relationship management, business partner relationship management, and more. Popular examples of these offerings include IBM® Lotus® Live, IBM Lotus Sametime®, Unyte, Salesforce.com, Sugar CRM, and WebEx.

In both cases, applications delivered via the SaaS model benefit consumers by relieving them from installing and maintaining the software, and they can be used through licensing models that support pay for use concepts.

3.2 PLATFORM SERVICES

This is the layer in which we see application infrastructure emerge as a set of services. This includes but is not limited to middleware as a service, messaging as a service, integration as a service, information as a service, connectivity as a service, and so on. The services here are intended to support applications. These applications might be running in the cloud, and they might be running in a more traditional enterprise data center. In order to achieve the scalability required within a cloud, the different services offered here are often virtualized. Examples of offerings in this part of the cloud include IBM® WebSphere® Application Server virtual images, Amazon Web Services, Boomi, Cast Iron, and Google App Engine. Platform services enable consumers to be sure that their applications are equipped to meet the needs of users by providing application infrastructure based on demand.

3.1 APPLICATION SERVICES

This layer is perhaps most familiar to everyday Web users. The application services layer hosts applications that fit the SaaS model. These are applications that run in a cloud and are

Fig 2: The cloud Anatomy

The layers that make up a cloud include:

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of properly equipping data centers by assuring computing power when needed. In addition, due to the fact that virtualization techniques are commonly employed in this layer, cost savings brought about by more efficient resource utilization can be realized.

4. COMPARISONS
Cloud computing derives characteristics from, but should not be confused with:
4.1 Autonomic computing — "computer systems capable of self-management"
4.2 Client-server model – client-server computing refers broadly to any distributed application that distinguishes between service providers (servers) and service requesters (clients)
4.3 Grid computing — "a form of distributed computing and parallel computing, whereby a 'super and virtual computer' is composed of a cluster of networked, loosely coupled computers acting in concert to perform very large tasks"
4.4 Mainframe computing — powerful computers used mainly by large organizations for critical applications, typically bulk data-processing such as census, industry and consumer statistics, enterprise resource planning, and financial transaction processing.
4.5 Utility computing — the "packaging of computing resources, such as computation and storage, as a metered service similar to a traditional public utility, such as electricity"
4.6 Peer-to-peer – distributed architecture without the need for central coordination, with participants being at the same time both suppliers and consumers of resources (in contrast to the traditional client–server model)

5. APPLICATIONS AND BENEFITS OF GOOGLE APPS IN BUSINESS:
Businesses get these customizable security features with Google Apps:
(i) Custom spam and inbound mail filtering tools, powered by Postini, to complement powerful spam filters that automatically work with no up-front configuration.
(ii) Custom outbound mail filtering tools to prevent sensitive information from being distributed, powered by Postini.
(iii) Custom information sharing rules to determine how broadly employees are allowed to share with Google Docs, Google Calendar, and Google Sites.
(iv) Custom password length requirements and visual strength indicators to help employees pick secure passwords.
(v) Enforced SSL connections with Google Apps to ensure secure HTTPS access.
(vi) Optional email archiving, up to 10 years of retention.
(vii) Google’s search tools allow users to efficiently search through vast amounts of web-based information, organizing and delivering results based on relevance. It also has a long and growing list of products in many other areas of computer applications. Consumer usage of its products is free, financed through advertising (97% of Revenues) and licensing (3% of Revenues) sales.
(viii) Manage distributed teams and projects where members post status updates Cloud based file and knowledge sharing from web & mobile

These are the FEATURES of Google apps in Business:
(i) Login with your Google Apps or Gmail account
(ii) Post status updates by attaching files, Google Docs, Google Calendar
(iii) Share and preview all your files and organization information from mobile and web
(iv) Access all features of Socialwok from Gmail using Gmail Gadget
(v) Search across posts, feeds, people and Google Apps
(vi) Realtime notification by email or Google Talk IM messages
(vii) Share, collaborate and archive all your communications with external parties in one single location

6. OPTIMIZING APPLICATIONS OVER THE CLOUD
Enterprises are adopting cloud services and transforming their datacenters to deliver private cloud services in order to meet business demand for innovation and revenue growth and at the same time pay for IT infrastructure on an as-needed basis. To leverage the benefits of cloud, IT organizations must maintain application performance, availability, and security. WAN application delivery is a key technology in the network manager's arsenal of solutions to meet business demands for bandwidth optimization and datacenter consolidation. IDC believes that we are entering a new wave of innovation for WAN application delivery as its use cases expand to include optimizing new application.

6.1 TYPES AND THE EXPANDING USE OF CLOUD SERVICES.
The WAN application delivery market will continue to grow based on the following key factors:
(i) Globalization of the enterprise and the need to provide the same end-user experience for remote employees
(ii) The proliferation of all content types on the network that continues to feed the insatiable demand for bandwidth
(iii) The demand for application visibility to prioritize and secure network traffic
(iv) Support for growing managed, hosted and cloud services opportunities
(v) Application centralization efforts that will necessitate the need for acceleration on the WAN

7. MARKET TRENDS
Server virtualization is reshaping the IT and network landscape. The use of virtualization for desktops. Additionally, form factors for WAN application delivery are changing to leverage the benefits of server virtualization. Branch platforms are emerging that will enable multiple virtual network and IT
services to coexist on a single consolidated server. The movement to consolidate and centralize is increasing the dependence on the network. IT organizations are willing to pay for network equipment and services that offer a higher level of resiliency and performance. This is one of the key drivers of WAN application delivery market growth. Enterprise customers are considering cloud computing suppliers to reduce IT costs and accelerate deployment of business applications. The use of cloud datacenters will dictate the need for network intelligence to fully leverage and integrate cloud services into the IT infrastructure for an organization. WAN application delivery will play a key role in accelerating and securing the traffic from a cloud service provider to the enterprise. Datacenter consolidation is continuing. High-end customers are reducing the number of datacenters worldwide. These customers will put a premium focus on speed/performance and flexibility for these new consolidated datacenters. Like google apps Biznet network is most popular in Indonesia Biznet is a business entity that focus on telecom & multimedia business. Biznet Networks is the leading network provider in Indonesia, delivering end-to-end fiber optic infrastructure for the most reliable and the best performance network available in the market today. Biznet has deployed thousands of kilometers of fiber optic cable in several major cities in Indonesia since 2005. Biznet Networks Global IP Network has direct connectivity to major cities and Internet Exchanges in the world to minimize the route to reach the destination for shorter hops. Biznet Networks has used various technology such as Metro Ethernet and Metro FTTH (Fiber To The Home) for our InnerCity Network and NG-SDH (Next Generation - Synchronous Digital Hierarchy) for our InterCity Network supplied by world's best vendors. With these technologies, Biznet able to deliver the fastest network to deliver bandwidth hungry applications for today and tomorrow. Biznet has a commitment to build modern telecom infrastructure to support Indonesian people, business and education Biznet will provide more advanced technology and services to Indonesian people to lower the digital gap with other developed countries.

8. RED HAT - CLOUD COMPUTING SOFTWARE TOOLS

customers can build private clouds using Red Hat Enterprise Virtualization or VMware ESX Server. They can run and manage their own cloud data centres or use Red Hat certified public cloud services like Amazon EC2. Customers can also use Red Hat's open source interoperable cloud architecture so they won't be tied to a single cloud computing service provider's stack. Red Hat is at the forefront of the industry with a broad portfolio of enterprise cloud solutions, and is driving the expansion of the cloud for new users, from developers to enterprises.

9. APPLICATIONS OF IBM IN BUSINESS:

CSI used IBM's cloud environment to develop, test, and deliver a collaboration portal product -- with its partner Spencer Trask Collaborative Innovations (STCI) -- to the Department of Education, connecting teachers, administrators, education experts, and charitable foundations to request, propose, and refine ideas to improve public education in the United States. Typically the software gets implemented as a service and it takes weeks to get the development environment up and running. "With the IBM cloud, that literally happens in minutes." When you have very dynamic applications, or communities where needs can change very rapidly, or you want to experiment with something, you can put it in place in a matter of hours. "It is remarkably powerful and flexible." IBM WebSphere CloudBurst Appliance for Development & Test is a pre-integrated set of hardware, storage, virtualization and networking, with a built-in service management system to allow clients to rapidly deploy an internal/private cloud environment; IBM Smart Business Development & Test Cloud is a private cloud service behind the client’s firewall, built and managed by IBM, including enhanced capabilities for collaborative cloud development using Rational Software Delivery Services for Cloud Computing; and IBM Smart Business Development & Test on the IBM Cloud is an application development and test featuring Rational Software Delivery Services for Cloud Computing over IBM’s cloud. In addition, IBM is introducing Rational Software Delivery Services for Cloud Computing v1.0, which includes a collection of Rational’s products and capabilities. The online cloud computing resource center on IBM DeveloperWorks is billed as the industry's largest technical resource with 8 million registered developers, IT professionals, and students worldwide. Launched last month to Tivoli partners at Pulse2010, Big Blue will continue its cloud computing workshops at its 40 global Innovation Centers to support ISV business partners seeking cloud skills.

10. CONCLUSION

We present an open source implementation of the Google App Engine (GAE) Datastore API within a cloud platform called AppScale. The implementation unifies access to a wide range of open source distributed database technologies and automates their configuration and deployment. However, each database differs in the degree to which it implements the API, which we analyze herein. We describe this implementation and use the platform to empirically evaluate each of the databases.

11. FUTURE SCOPE

Cloud computing is the hot research area today. Almost all the business entity wants to take maximum benefits from this concept. This research paper is a review of where the huge computing companies use this concept to aware the researcher to continue his study in this context. Moreover this paper concise its study area in business domain and analyse how and where Google use cloud computing. Thus with the help of this paper The researcher can analyse how other big companies used this concepts in order to find the loop holes so that they can be improved in order to maximize the benefits.
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