



Ad-Hoc Data Processing and its Relation with Cloud Computing in Finance Sector

Subhendu Chatterjee

Sri Satya Sai University of Technology & Medical Sciences, Sehore, Madhya Pradesh, India

Corresponding author: subhmahal@gmail.com

ABSTRACT

Ad-hoc data processing has proven to be a laborious illustration for Internet companies who process large quantities of unstructured data. However, the accuracy of cloud-based computing, where storage are outsourced to multiple third-parties across the world, expounded large gathered of highly distributed and evermore detonates data. Our secretion combines the power and ingeniousness of the MapReduce abstraction with a wide-scale of distributed stream processor. While our incremental MapReduce operators avoid data re-processing, the stream processor manages the allocation and anatomical data flow of the operators across the large volume of area. We display a distributed web indexing engine against which users can dedicate and spread continuous MapReduce jobs. An integration element illustrates both the incremental indexing and index searches in tangible time. I also discuss the factors that make cloud computing a striking option for financial services firm, argue the advantages of cloud computing by providing some examples of assumption by financial services firms, and provide our aspects on the ideal types of financial services systems that should be moved to a cloud.

Keywords: Cloud computing, NIST, finance, CRM, ERP, cloud model, hybrid cloud, green IT

Before went to the deep on to my article, at first we have to understand what Cloud Computing is and what Ad-Hoc data processing is.

The National Institute of Standards and Technology (NIST) defined cloud computing as: a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources such as networks, servers, storage, and those can be rapidly anticipated and discharged with minimum management attempts or service provider interaction. Cloud computing is a style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet.

I think cloud computing is expected to be one of the fastest-growing technologies in this era. Finance sectors will be the largest market for cloud services pending, with a gradual transition from on-premise to cloud-based services especially for general business applications like Customer Relationship Management (CRM) and Enterprise Resource Planning (ERP).

The ad-hoc data is stored in cash registers. Then, this stored data is analyzed with the help of the time-series. Hence, the behaviour like purchasing behaviour of individuals is analyzed from this ad-hoc data. According to a report, about 7 million pieces per second are accumulated at cloud centres.

The ad-hoc data is not equivalent to that is obtained in reality because of the fact that huge amount of the data is lost while moving to the cloud centres. Many researches are going on in order to reduce this data leakage.

In today’s world, several kinds of data are accumulated in a cloud environment as the cost of devices of information and communication technology is decreasing day by day. There is an urgent need to analyze these massive data so that it can be helpful for the business and society.



Fig. 1: Cloud for finance Sector^[6]

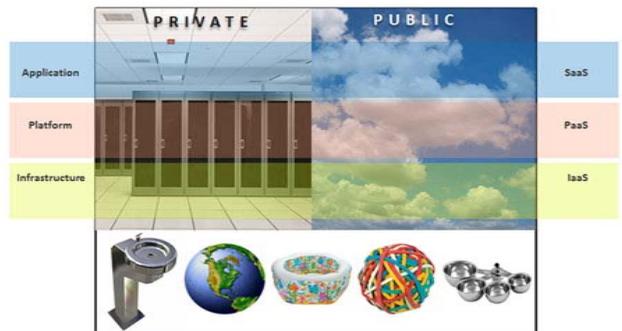


Fig. 2: The 5-3-2 principle Cloud Computing architecture^[6]

The essential characteristics of cloud computing are:^[10]

- ❖ **On-demand self-service:** a customer can have a provision of computing capabilities, such as server time and network storage, as they needed.
- ❖ **Broad network access:** wide range of network accessibilities by various client platforms.
- ❖ **Resource pooling:** the provider’s computing capabilities are pooled to serve different consumers using a different-tenant model. Resources are dynamically assigned and reassigned according to customers demand.^[9]
- ❖ **Rapid elasticity:** capabilities can be quick, elastically provisioned, and in some cases automatic. The consumers’ capabilities are available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.

- ❖ **Measured service:** cloud systems automatically control and optimize resources used by leveraging a survey capability.

Choosing the Right Model^[9]

Cloud service models offer financial institutions the option to move from a capital intensive approach to a more flexible business model that lowers operational costs. The solution to success remains in selecting the right cloud services model to adapt the business needs.

(i) Software as a Service (SaaS)^[9]

- ⊙ Google Docs— A suite of products that allows you to create different types of documents, work on them in real time with other people and store them, along with other files, online.
- ⊙ Salesforce.com— A cloud-based Customer Relationship Management (CRM) platform that can be used by a firm to connect with customers and employees.

(ii) Platform as a Service (PaaS)^[9]

- ⊙ Microsoft Azure— A platform cloud that helps developers build, host and scale applications through Microsoft datacenters.
- ⊙ Google App Engine— It is a platform cloud that enables the developers to build and host web applications on the same systems that powered by Google applications.

(iii) Infrastructure as a Service (IaaS)^[9]

- ⊙ Amazon EC2— An infrastructure cloud web service that provides resizable compute, storage and network capacity on the cloud.
- ⊙ Rackspace— An infrastructure organization that enables public, private and hybrid cloud hosting.
- ⊙ NYSE Euronext CMCP— Infrastructure cloud services offering aimed at NYSE Euronext's financial services customers.



Fig. 3: Cloud computing architecture^[8]

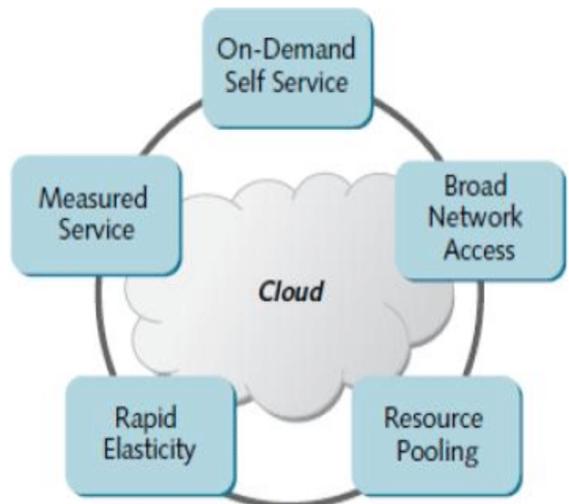


Fig. 4: Essential characteristics of cloud computing^[6]

(iv) **Business Process as a Service (BPaaS)**^[9]

- ⊙ ADP Employ ease— An Online business process services for HR, benefits administration and outsourcing.
- ⊙ AMEX Concur— An online business process that connects travel suppliers and mobile solutions from around the world to provide advanced travel and expense functionality.

(v) **Data as a Service (Daas)**^[9]

- ⊙ Google Public Data— A public data service that makes large datasets easy to explore, visualize and communicate.
- ⊙ Xignite Capital Markets Data— A platform that the above cloud services can be delivered through deployment models, such as:

- ❖ **Public Cloud**— A public cloud is available over the internet to everyone. The cloud provider manages and owns everything from operations and facilities to computing resources. There are various popular public clouds are present this time some of them are Microsoft Azure, Google App Engine and Amazon EC2.

- ❖ **Private Cloud**— A private cloud is available only to trusted users of an organization or a group. Every single thing in a private cloud should be managed either by the cloud provider or by the organization itself.

- ❖ **Community Cloud**— A community cloud is accessible to the members of a larger community comprised of different organizations or groups, and where partner organizations and the cloud provider co-manage everything from operations to facilities.

- ❖ **Hybrid Cloud**— A hybrid cloud is a mix of multiple public and private clouds and it addresses the challenges of a pure public or private cloud environment.

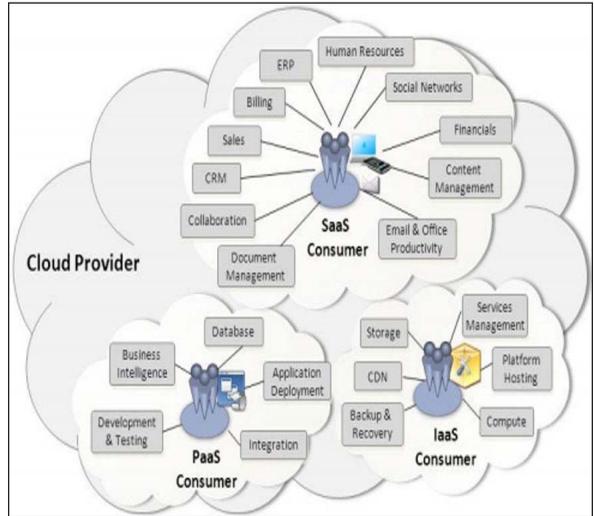


Fig. 5: Services available to a Cloud Consumer^[6]

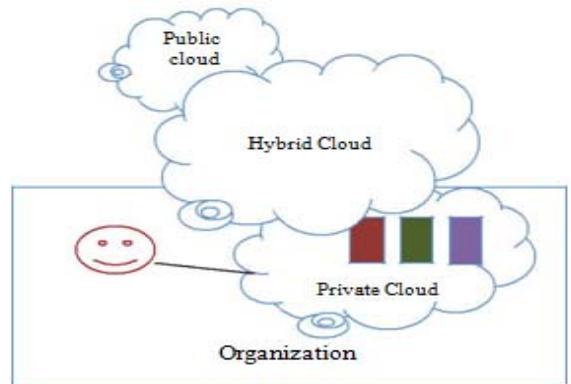


Fig. 6: Cloud Deployment Model ^[13, 14]

Now a day’s finance sectors are expected to enter the cloud computing arena carefully, with no single cloud services distribution model being a silver bullet for best meeting their demanding business needs. Cloud computing can offer financial institutions a number of advantages, including:

- ❖ Cost savings
- ❖ Usage-based billing

- ❖ Business continuity
- ❖ Business velocity and Focus
- ❖ Green IT

Why we use Cloud computing for finance Sector? ^[10]

Cloud computing can help financial institutions to improve performance in a number of ways.

Cost Savings and Usage-based Billing

With cloud computing, financial institutions can turn a large up-front capital expenditure into a smaller, ongoing operational cost. There is no need for massive investments in new hardware and software. In addition, the identical nature of cloud computing allows financial institutions to pick and choose the services required on a pay-as-you-go basis.

Business Continuity

With cloud computing, the provider is liable for managing the technology. Financial firms can avail a upper level of data protection, error tolerance, and inversion recovery. Cloud computing also provides a high level of redundancy and back-up at lower price than consecutive managed solutions.

Business velocity and Focus

The flexibility of cloud-based operating models permits all financial institutions accustomed shorter development cycles for new products. It supports faster and efficient responses to the needs of the banking customers. Since the cloud is available on-demand, less infrastructure investments are required, saving opening set-up time. Cloud computing also allows a new product development to move onwards without Primary capital investment. Cloud computing also allows businesses to move non-critical services, including software patches, maintenance, and other computing issues to the cloud.

Green IT

Organizations can use cloud computing to transfer their services to a virtual environment that reduces the energy consumption and carbon footprint that comes from setting up a physical infrastructure. It also leads to more efficient utilization of computing power and less idle time.

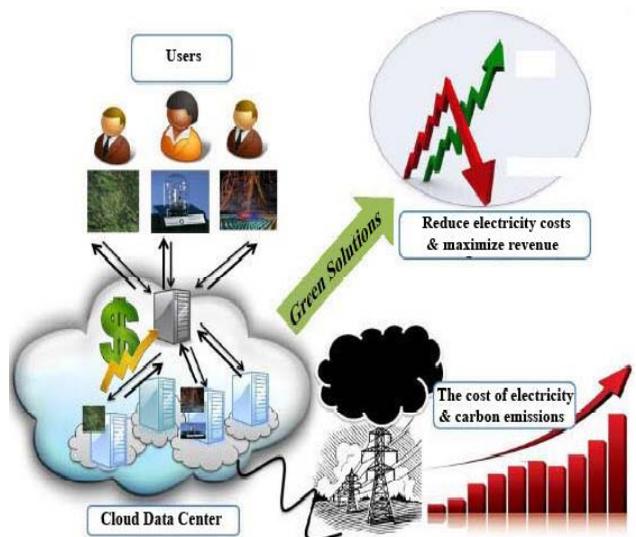


Fig. 7: Green IT ^[8]

Applications to Consider for the Cloud^[10]

At first, financial organisations would be likely move non-principal business applications to the cloud. Many software providers such as Oracle, IBM have available for their leading financial services applications for cloud solutions. Areas that would be gain from cloud computing include:

- ❖ Customer relationship and analytics management. Vendors with cloud solutions include Salesforce.com and Pegasystems.
- ❖ Browser-based technologies such as enterprise content management. Vendors with cloud solutions include IBM and EMC.
- ❖ IT development and application infrastructure. Since these functions are highly outsourced, banks can achieve cost savings through the cloud.

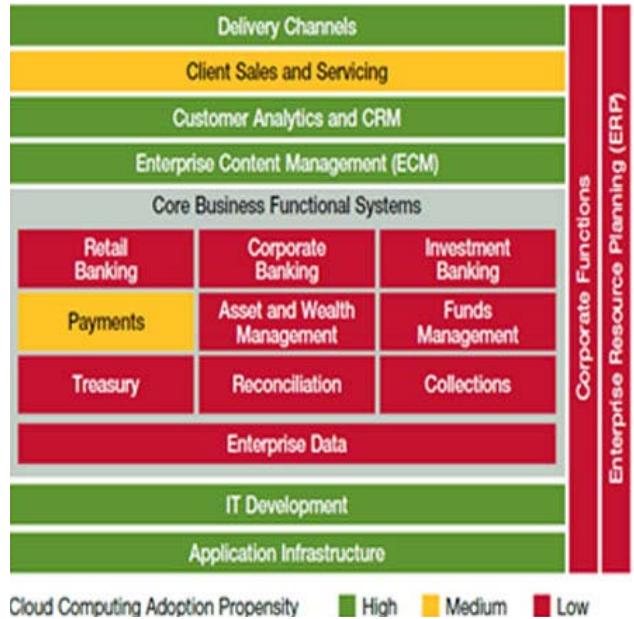


Fig. 8: Cloud computing adoption propensity

Benefits of Cloud Computing in various banking IT service areas^[13]

Analytics: Integrating customer data across all banking platforms to enable near real-time insights.

Cost Savings and Usage-based Billing:

With the cloud computing, all financial institutions can turn a large up-front capital expenditure into a smaller, ongoing operational cost. There is no need for substantial investments in a new hardware as well as softwares.

- ❖ **Collaboration:** Enabling employees across distributed branches to access trading and banking systems through a security-rich cloud infrastructure
- ❖ **Development and testing:** Enabling a bank’s development teams to quickly and easily create virtual environments thus increasing the agility of development and testing.
- ❖ **Infrastructure compute:** Allowing capacity to be allocated, expanded and reallocated efficiently gives banks flexibility and agility while resolving the issues of complexity and cost increases related to scaling up traditional network models to accommodate future growth.
- ❖ **Desktops and devices:** Deploying a private cloud to centralize management of desktops allows for greater remote flexibility without sacrificing control, while enabling banking employees to access the applications and data they needed.
- ❖ **Infrastructure storage:** Providing scalable storage solutions to ensure that the real-time demands of today’s trading and analytics processes are maintainable.

- ❖ **Managed backup:** Backing up a bank's critical business data to ensure that in the event of a disaster a bank can bounce back rapidly and easily.
- ❖ **Industry applications:** Enabling payment providers to standardise and modernise transaction processing.
- ❖ **Security:** Enforcing active security and endpoint management to ensure corporate governance and banking IT policies are maintained.

Security risks cloud for computing^[11]

Cloud computing represents a very dynamic area at the present time, with new suppliers and new offerings arriving all the time. There have some number of security risks integrated with cloud computing that should be suitable addressed.

Loss of governance

Responsibility ambiguity

- ❖ **Isolation failure:** called guest-hopping attacks as this risk category covers the failure of separating the usage of storage, memory, routing and even reputation between different tenants.
- ❖ **Vendor lock in:** Services that do not support portability of applications and data to other providers increase the risk of data and service unavailability.
- ❖ **Compliance and legal risks:** by migration to use cloud computing if the cloud provider cannot provide evidence of their own compliance with the relevant requirements or if the cloud provider does not permit audit by the cloud consumer.
- ❖ **Handling of security incidents.**
- ❖ **Management interface vulnerability.**
- ❖ **Data protection.**
- ❖ **Malicious behaviour of insiders.**
- ❖ **Business failure of the provider:** data and applications to the consumer's business unavailable.
- ❖ **Service unavailability:** software failures in the Provider's data centre, through failures of the Communications between the consumer systems and the provider services.
- ❖ **Insecure or incomplete data deletion:** Requests to delete cloud resources. If the above mentioned security risks necessity to be addressed, afford chances to use of cloud computing for transformation in provisioning security services that should retain the expectation of enhancing the global security of many financial institutions.
- ❖ Cloud service providers should be able to offer advanced facilities for supporting security and privacy due to their economies of scale and automation capabilities potentially a boon to all consumer organizations, especially those who have limited numbers of personnel with advanced security skills.

Some Success Factors for Cloud Implementations^[10]

When considering cloud solutions for financial services, banks should partner to achieve cloud competence. Cloud services providers should have:

- ❖ A patently defined cloud strategy.
- ❖ Verifiable return on investment.
- ❖ Evince cloud service conveyance capabilities.

Capgemini has experience illuminating large financial institutions on cloud computing. We are developed four numbers of key success factors that financial institutions should consider when launching cloud capabilities:

- ❖ **Clearly define the ROI for cloud-based projects:** Not only Banks but also all financial institutions should be aware about making consequential venture in cloud computing until

substantial interest are available. In a first step, cloud providers should describe the costs and inference of drifting existing banking applications and foundation to the cloud.

- ❖ **Choose service providers with demonstrative proficiency in cloud services management:** Banks as well as all financial institutions should use an interpretation to best govern cloud services transportation programs. Service providers who have spent in experimental projects will have real-world experience and trading cases for cloud computing resourcefulness. Banks and all financial institutions can start little with less critical applications such as Customer Relationship Management (CRM) and then move on to central Trading applications.
- ❖ **Sign outsourcing contracts that use pay-per-use cloud delivery models:** For the cloud capability, financial institutions need service level agreements (SLAs) that links billing to steady system performance.
- ❖ **Understand data confidentiality and regulatory demands:** All financial institutions may be needed to keep delicate data within firewalls to fulfil local regulations and customer confidentiality demands. Hence, private cloud-based operating models are now the first choice than public or hybrid cloud model. As public clouds gain assurance and trust among customers, financial institutions as well as banking sector can moderately transition to above models. Strategy such as the Cloud Security is looking at these concerns. But to best take advantages of cloud computing, financial institutions must have a clear understanding of privacy and regulatory affair to make enlightened resolution.

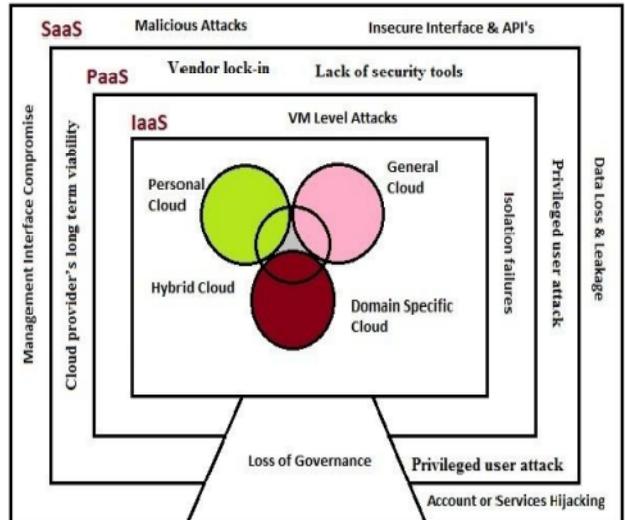


Fig. 9: Cloud computing security risks categories^[12]

CONCLUSION^[8]

Continuous improvement of cloud computing within the financial institutions will require trader and banks to conquer its challenges together. When arrangement of cloud computing initiatives in the near future, financial sectors should select service and delivery models that foremost match requirements for working flexibility, cost effectiveness, and pay-as-you-use models. Financial institutions should choose a progressing evolutionary motion towards cloud computing services, scrutinizing each project based on the type of data. Underneath risk projects may include customer relationship management (CRM) and Enterprise Content Management (ECM). High-level risk projects will involve primary business usefulness systems such as wealth management or core banking.

In the lengthy term financial institutions will have an application portfolio mix of on-premise and cloud-based services distributed across an integration of private, hybrid, and public cloud based deplorable models with the allowance of cloud services moderately increasing in the service blend. Private clouds are awaited to increasingly become the deplorable model for cloud services among banks as well as financial institutions to full manage through ownership and operations of cloud systems.

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