# India's New Cloud Computing Policy: Localization Of Data

## Parul[1]

MD University Rohtak

*Abstract:* The rapid evolution of processing power, storage technologies and availability of high quality broadband speed and big data have enabled the realization of a new computing model called cloud computing. In cloud computing, resources such as computing power &infrastructure, application platforms, and business processes are provided through the internet as general utilities to users in an on demand fashion. Business enterprises are now increasingly seeking to reshape their business models to gain benefits from this new paradigm of resource sharing.

*Keywords—* Computing power, Resources, Business models etc.

## I. INTRODUCTION

In a cloud computing environment, the traditional role of service provider is divided into three: the infrastructure providers who manage platforms in the internet cloud and lease resources according to a usage-based pricing model; service providers who rent resources from one or many infrastructure providers to serve the end users and service providers who offer cloud services. Services to citizens such as banking, insurance, healthcare, education and governance are increasingly moving to the cloud, mainly because it is cheaper, had infinite storage capacities and ensures mobility. But the main challenge is to come out with the right policies enabling cloud computing in India, with a regulatory framework to be able to offer citizen services. The National Telecom Policy 2012 is one such step in right direction in the era of technology. The growing number of Internet users and increase in mobile device adoption in India is a key factor for its cloud growth, neither of which shows much sign of slowing down over the next few years.

## II. ATTRIBUTES OF CLOUD

Cloud Computing has four attributes mentioned below:-

(a) Data Intensive: The focus is on data rather than computation. Therefore, input/output (I/O) is more important resource metric than CPU utilization. Such data intensive cloud computing systems store enormous amounts of data at data centres and use computer nodes for computation services.

(b) Resource Pooling: Resource pooling or multi-tenancy characteristic of a software program enables an instance of the program to serve different consumers (tenants) whereby each is isolated from the other. IT resources can be dynamically assigned or reassigned; according to consumer demands. A cloud provider pools its IT resources using multi-tenancy models that frequently rely on the use of virtualization technologies.

(c) Adaptability & Rapid Elasticity: Cloud computing platforms are usually highly scalable and elastic due to their inherent resource sharing behaviour. Adaptability is the automated ability of a cloud to scale IT resources, as required in response to runtime conditions or as pre-determined by the cloud consumer or cloud provider. Elasticity is often considered as scalability supported with optimized utilization of resources as well as cost optimization.

(d) On demand access: A cloud consumer can unilaterally access cloud-based IT resources giving him the freedom to selfprovision these resources. Once configured, usage of the selfprovisioned resources can be automated, requiring no further human involvement by either the cloud consumer or cloud provider. This results in an on-demand usage environment. In other words, it deploys pay-as-you-go approach with no upfront commitments.

## III. Service Models

There are three main service models in cloud computing, as under:

(a) Software as a Service (SaaS): It is a software distribution model through which a consumer can use the provider's applications (software) running on a cloud infrastructure. The applications are accessible from various client devices such as a web browser (e.g., web-based email). The consumer does not manage or control the underlying cloud

infrastructure, with the possible exception of limited user-specific application configuration settings. Software testing takes place at a faster rate and IT operational costs are drastically reduced.

(b) Platform as a Service (PaaS): The service provides the consumer hardware and software infrastructure to deploy onto the cloud infrastructure consumer-created or acquired applications and tools supported by the provider. The consumer does not manage or control directly the underlying cloud infrastructure but has control over the deployed applications and possibly application hosting environment configurations. Such services enable the integration of web services and databases.
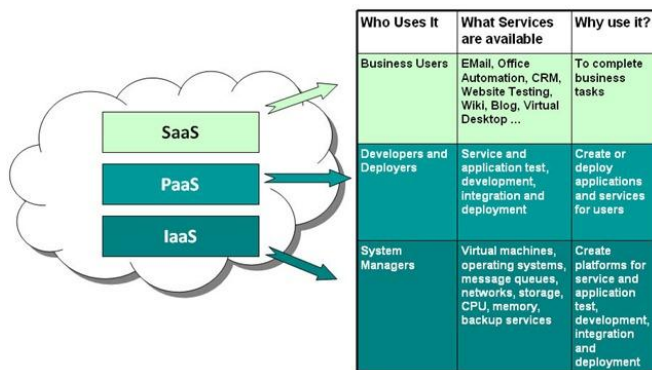


(c) Infrastructure as a Service (IaaS): It provides the consumer ability to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run one's own software, which can include operating systems and applications. It provides substantial amount of flexible computing and storage infrastructure through virtualization.

## IV.    WHY DATA LOCALIZATION IS NEEDED

Digital transformation has been recognized as a vital component of our country. This transformation has enjoyed the unanimous approval and contribution from all the stakeholders including Micro small and medium enterprises, government bodies, countrymen's etc.    Digital India envisions creating high speed highways that will surely impact trade and create digital footprint for every citizen. Technologies based on mobility, IOT (Internet of things), analytics and cloud technologies. Localization of cloud data and any such data that is stored information of Indian entities and data generated in India must be available for investigative agencies and various national security agencies. In this case local data storage requirements for digital payments and e-commerce sectors are also being planned. Basically the authorities want the information stored locally so that they can easily access to it whenever required for the sake of national security or conducting security

investigations. India emphasized for localization of data at a time when in July, 2018 federal police had begun probing Cambridge Analytica's misuse of Face book used data, when New Delhi suspects included information on Indian users. Data localization will increase costs for public cloud companies as they might need to expand data center capacity to fit customer data currently hosted outside form India and perhaps it would bring new ideology. While there may be challenges in integrating old or current tools with new technologies and the corresponding level of services, the benefits will outweigh the inhibition to move to the cloud. According to the industry, healthcare will be a growing market in the coming years, running into the billions. [1]

There are also other service models like Data as a Service (DaaS), Identity and Policy Management as a Service (IPMaaS), Network as a Service (NaaS), Video as a Service (VaaS) or Hardware as a service (HaaS) amongst others

Hybrid Clouds are bound together by standardized or proprietary technology that enables data and application portability (e.g. cloud bursting for load balancing between clouds). [2]

Cloud computing accounted for about 33% of the total IT expenditure in 2015 across the world. Analysts project that from 2013 to 2018, the cloud computing market will grow at a 9.7 % annual rate. Also, by 2019, cloud IT infrastructure spending is expected to be $52 billion, or 45% of total IT infrastructure spending [4]. While new innovative and successful vendors are emerging; traditional big vendors are also investing massively in developing and acquiring on demand solutions. In the SaaS segment, the strongest markets in terms of size and growth are Content, Communication and Collaboration (CCC), Customer Relationship Management (CRM), Integration-as-a-Service, Enterprise Resource Planning (ERP), and Supply Chain Management (SCM). The use of SaaS, PaaS and IaaS has been evolving and becoming popular during the past years. Cloud server technologies to grow include fatter servers that allow larger instances or more virtual machines (VMs) per server; in-memory database instances with as much as 2 TB DRAM and remote direct access memory (RDMA) over Ethernet.

## PRIVACY ISSUES: WHAT CAN THE CLOUD PROVIDER DO WITH THE USER DATA

Cloud providers often manage huge amount of personal data from millions of users of cloud service, and the data from one user commingles with the data of other users. There was a debate on cloud computing and privacy from a settlement in Author's Guild, Inc. v. Google Inc. [5] The stipulations of the agreement permitted Google to keep on offering copies of books on their cloud-based Google Books platform in return for a stipulated amount to the authors. Although privacy was not the main concern in the settlement, many

public interest organizations were alarmed that the agreement did not acknowledge the security of the privacy of its users. The issue raised by Consumer Watchdog in 2010 was that the settlement "still contained no restrictions on what data could be gathered, and contained only limited restrictions on how that data cloud be shared". The settlement agreement did not address whether a user's reading preferences could be shared with news outlets or governmental units acting without a search warrant. Consumer Watchdog was concerned that the settlement gave Google a monopoly over the book-search and book-subscription markets and at the same time gave it unrestrained authority to share private information about users with outside entities. Indian legal and policy frameworks must focus on ensuring that data generated from India can be utilized for the benefit of Indian citizens, governments and private players and can be used by national investigating agencies as required. The government panel's draft listed various multinational giants like Amazon, IBM and Microsoft among key companies already registered under a government initiative on cloud computing. It also includes Alphabet Inc's Google, Oracle and Salesforce.com Inc as those with "significant presence and Amazon says that tens of thousands of customers in India are using its AWS cloud service platform due to increasing requirements of data hosting , India would need rapid establishment of data centers and related technological infrastructure. [3]

## V.    JURISDICTION CONFUSION: LAW RELATED TO THE DATA IN THE CLOUD?

The amorphous nature of the collection of servers, applications, and data that makes up "the cloud" lends itself to potential jurisdiction conflicts. The jurisdictional question is an important one because of the display in privacy laws; if a company does not know which jurisdiction its data is subject to, how can it know which laws apply? In the United States, for example, the Patriot Act gives the government broad latitude to intercept suspicions [7] electronic data that comes through the country. "European and Asian companies have expressed concerns about having their data stored on computers in the U.S.A. which fall under the jurisdiction of the USA Patriot Act, allowing the U.S government to access that data very easily." In the European Union, on the other hand the data protection directive puts stringent standards on the collection of electronic data by the government [8] and by any other entity. Because of these distinctions, it is important that cloud computing or SaaS (Software as a service) agreements specify where the data is physically located and which laws apply.

Until the Information Technology Act, 2000 was enacted; there was no law with respect to the usage of computers, computer systems and computer networks, as well as data and information in an electronic form in India. The primary aim of the Information Technology Act 2000 is to present

legal gratitude to e-commerce, which involves the use of electronic means of communication and storage of information, and to facilitate the electronic filing of documents with government agencies. The Act has extra-territorial jurisdiction so it also covers offences committed outside India.

## VI.    MEGRAJ CLOUD INITIATIVE OF INDIA

In order to utilize and harness the benefits of Cloud Computing, Government of India has embarked upon an ambitious initiative - "GI Cloud" which has been named as 'MeghRaj'. The focus of this initiative is to accelerate delivery of e-services in the country while optimizing ICT spending of the Government. This will ensure optimum utilization of the infrastructure and speed up the development and deployment of eGov applications. The architectural vision of GI Cloud encompasses a set of discrete cloud computing environments spread across multiple locations, built on existing or new (augmented) infrastructure, following a set of common protocols, guidelines and standards issued by the Government of India. Two Policy reports viz., "GI Cloud Strategic Direction Paper" and "GI Cloud Adoption and Implementation Roadmap" have been prepared by DeitY.

Components of Meghraj:

- Setting up of State and National Clouds
- Set up an e-Gov Appstore
- Empanelment of Cloud Service Providers
- Empanelment of Cloud Auditors
- Setting up of Cloud Management Office
  - o Setting up an eco-system for Cloud proliferation (Policies, Guidelines, templates, security norms, certification, business models for applications, tariff & revenue models for private sector Cloud services)
  - o Awareness workshops, training programs and migration support for cloud adoption by departments
- MeghRaj (GI-Cloud) service Directory
- Setting up of Clouds by other Government entities

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GI Cloud Architecture

¹ Single Portal for Service Delivery
² Built by private cloud providers
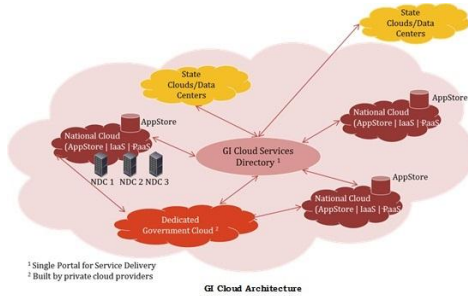
The architectural vision of GI Cloud as mentioned above consists of a set of discrete cloud computing environments spread across multiple locations, built on existing or new (augmented) infrastructure, following a set of common protocols, guidelines and standards issued by the Government of India. The government of India GI cloud has already assured to reduce the costs and increase information technology adoption in the public sector. The idea is somewhat different that government bodies will used shared infrastructure and have access to the same approved applications in the cloud, which promises to cut costs and accuracy. The state of readiness and individual will of state governments to be differ in the state level implementation in many ongoing integrated projects. Local issues may encounter the process such as migration from different legacy systems, different in process, inconsistency in standards operating procedures.

## VII. CHALLENGES

Cryptography is the technology of using Mathematical calculations to encrypt and decrypt the confidential data [9]. The Indian public cloud service market is on set to more than double to $7 billion by 2022 according to the draft regulations. It's enumerated that enterprise spending on data center infrastructure software will rise to approximate 10 % to $3.6 billion in 2018. It also highlighted that more than 80% of India's data center supply is concentrated in only five cities. It recommended conducting a new study to identify new conducive locations for such infrastructures. The panel also plans to recommend development of a "national cloud strategy" that could bring cloud service providers under a single regulatory and policy framework. Indian government's data localization push has already jostled US entities, who are in fear that this step will drive up costs and shake their business in India. To persuade those giants India government has to plan a new strategically framework.

## VIII. CONCLUSION AND FUTURE SCOPE

The foremost reason why organisations adopt cloud computing over any other course of storage is that information is being stored online and elimination the risk of data being lost or destroyed. Experts in the field maintain that cloud computing is more safe than the many traditional means of data storage such as hard disks, servers etc., though companies still take the menace of data being stolen by any outsider hacking into the security scheme of the cloud. The foremost ground why companies are not selecting cloud services is the lack of protection or security. Then again, the traditional storage means also present dangers like the servers can also be hacked into by outsiders and hard disks could crash and destroy the stored data. Cloud Computing and its contribution to development and making technology available to all is going to be the highlight of this decade's technology. New equipment, new locations, new telecomm, new applications, new access models—these are all tough challenges, however, one of the thorniest challenges and Throughout all these changes, you must be able to rapidly move data from application to application, from data center to data center, from on premise to the cloud— even from production to archive. Perhaps India need strong strategically framework and healthy discussion over the localization of data.

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**Authors Profile**

*Ms. Parul* has completed her Master of Technology in the field of Computer Science and Engineering from Mahrishi Dayanand University, Rohtak. She has worked as Assistant Professor at Baba Mast Nath University Rohtak. She has published More than 15 research articles in the field of Computer Science in various national and international reputed journals. Her main research was related with airline yield optimization using genetic algorithms, Software capability and related topics.