Cloud Computing: A Techno-Legal Analysis of Data Security & Privacy Threats In India

[1] Dr. Gagandeep Kaur, [2] Ms Srushti Kumar Iyer

[1] Assistant Professor in Law (SG), School of Law, University of Petroleum & Energy Studies, Dehradun, India
[2] B.Tech. LL.B. (Hons.) Specialisation in Cyber Law, School of Law, University of Petroleum & Energy Studies, Dehradun, India

Abstract—Cloud computing is a concept that includes a set of software services on the network a standard (usually using the Internet) that contains remote data storage and online applications on remote virtual servers. Cloud architect has made miraculous progress in recent years by giving the benefits it offers like an increase in storage capacity and computing power with minimal investment. Collaborating on a computer shares information from one cloud to another cloud in an online environment. Often the private and public sectors use it. Organizations and businesses transmit information to the cloud. One user can use another user's information available in the cloud. The Indian market for cloud computing is very vibrant and consists of all varieties of cloud computing transactions taking place. The private sector is leading the way but the central government is also taking initiatives and actively considering and implementing various cloud-based computing services. While sharing information between user and server, there are risks of data attacks in the context of data security and privacy. This research paper is focused on firstly, the analysis of cloud computing service, types of delivery and the attacks that may arise and secondly, the legal control mechanism in India to mitigate the challenges. An attempt will be made to provide relevant suggestions for the better regulation of cloud computing services.

Index Terms— Cloud Computing, Data Security, Computing Services, Data Privacy, Legal Challenges

I. INTRODUCTION

Cloud computing may not be defined everywhere with the same standards, but a description of it that tends to explain the purpose of cloud computing would be to say that clouds, or clusters of distributed computers, provide on-demand resources and services over a network, usually the Internet, and the said services are not only of in bulk but also in a sequenced and protected manner as would be found in a data centre.[1] Cloud Computing clearly shows a change in the way technology is invented, developed, deployed, scaled, updated, maintained and paid for specifically with respect to Information Technology.[2]

Cloud computing represents a convergence of two major trends in information technology[3] -

(a) The efficiency of information technology to utilise both hardware as well as software resources to its fullest and

(b) The flexibility and agility of a business, so that the technology can be used as a rapid deployment, parallel batch processing, use of compute-intensive business analytics and mobile interactive applications that respond in real time to user requirements.

The basis of cloud computing is Transmission Control Protocol/Internet Protocol (TCP/IP) with the intention of integrating it with a smarter and faster microprocessor, further ensuring a very large amount of memory available with high-speed network and reliable system architecture.[4] 'Cloud computing' has 4 basic characteristics including needing flexibility, growing exponentially or demanding scalability, wanting to run economically and independent in nature.[5]

This paper covers, the challenges that we face with respect to cloud computing and the need to regulate the same with well-established laws that can help govern all cloud-related inventions and computing devices.

II. MOTIVATION AND OBJECTIVE

The objective and motivation of this paper is to address the various challenges in the area of cloud computing and to establish the various laws and policies in place to overcome the challenges addressed. Further, this paper's motivation is to make the readers think and worry about the regulatory policies and the reasons why improvements must be seen in order to implement new laws in the context of cloud computing services.

Challenges in Cloud-computing

1. Security

Security is the most major challenge in cloud computing. A lot of personal data is stored on clouds and this may happen knowingly or unknowingly. The issue with respect to cloud

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[1] Robert L Grossman, *The Case for Cloud Computing*, 23–27 (2009)
[2] Sean Marston et al., *Cloud computing - The business perspective*, 51 DECISION SUPPORT SYSTEMS 176–189 (2011), http://dx.doi.org/10.1016/j.dss.2010.12.006
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computing is also majorly because the customer using the services is not aware what part of their data is getting saved on their device and what is getting saved on their cloud. The simplest example that can help exhibit the problem would be- putting your data, running your software at someone else's hard disk using someone else's CPU. A lot of cases have come up in the past where the data was stolen from clouds or phishing attacks conducted through clouds and also botnet attacks majorly take place through clouds itself. For example, hackers are planning to use Cloud to organize botnet as Cloud often provides more reliable infrastructure services at a relatively cheaper price for them to start an attack.[6]

2. Costing

Since the technology was only developed a few years ago there are a lot of factors to consider like integration, computing and so on while deciding its costing. The costs increase drastically when a customer uses a cloud that is of hybrid nature that is uses computing resources of private, public as well community clouds.[7] Further the costs of integrating the data on various different clouds can also be very high as they often use protocols or interfaces that belong to someone else and therefore, must be bought. Therefore the user of the cloud computing devices must interact with various different APIs that are particularly owned by separate individuals who impose various charges to ensure confidentiality, integrity and availability of data.

3. Legal Agreements

To ensure the quality, integrity, availability and confidentiality of the data being provided on the cloud it is important to have agreements in place that provide for an assurance to consumers that their data is being treated in the best possible way. This assurance gives a sense of relief to all the consumers using the said cloud computing service, even though the consumer does not have any particular rights in hand to change the methods of computing they must have some kind of relief in terms of the services being provided. This raises a lot of difficulties with respect to implementation of the cloud computing service.

4. Cloud interoperability issue

There is a phenomenon that exists that is called "Hazy cloud effect".[8] . This severely hinders the development of cloud ecosystems by forcing vendor lockin, which prohibits the ability of users to choose from alternative vendors/offering simultaneously in order to optimize resources at different levels within an organization. This is not limited to the operation of part of the cloud computing service but also extends to the entire service being offered. This issue proves to be a very major hinderance.

Cloud Regulation and Governance in India:

Time and again the advancements in technology has diminished the necessity for physical communication in the formation of important relationships in legal terms between the parties.[9]

The legal fraternity in India has been in front of a range of complexities in dealing with technological advancements. Hence, it is to the legal fraternity to settle the code of behavior to be followed in virtual world in sustaining trustworthy legal relationships. Prior to the enactment of Information Technology Act, 2000, 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 IT Act deals with a range of computer related works such as digital signatures, electronic governance, electronic records, regulation of certifying authorities, duties of subscribers, cyber regulations, the appellate tribunal, etc., and also offer for legal identification of electronic documents and transactions, the admissibility of electronic data/evidence in a court of law, penalty for cybercrimes, the institution of an appellate tribunal, and regulations regarding the maintenance of electronic records. The Act has extra-territorial jurisdiction as well as intra territorial jurisdiction to covers offences.[10]

In the current scenario, the government of India is considering a separate policy in order to create a separate legal framework for cloud computing. The Telecom Regulatory Authority of India released a consultation paper in 2016 on Cloud Computing in India and recommendations on cloud services in 2017 in furtherance of this.[11] The Ministry of Electronics and Information Technology (MEITY) addresses some aspects pertaining to cloud computing in its National Policy on Information Technology and the National Telecom Policy of 2012.[12] One of the objectives of these policies is to develop an ecosystem to allow India to emerge as a global leader in the development and provision of cloud services. This focus is further enhanced in the Draft National Digital Communications Policy, 2018 released for consultations by the Department of Telecommunications on 1 May 2018.[13] This policy, when finalised and notified, will form the overarching policy framework for all aspects of digital technologies in India over the next few years. The draft policy envisages establishing India as a global hub for

[6] Tharam Dillon et al., *Cloud computing: Issues and challenges*, PROCEEDINGS - INTERNATIONAL CONFERENCE ON ADVANCED INFORMATION NETWORKING AND APPLICATIONS, AINA 27–33 (2010)
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[10] The Information Technology Act, 2000 as amended in 2008.
[11]
https://trai.gov.in/sites/default/files/Recommendations_cloud_computing_16082017.pdf visited on 2 February, 2021
[12]http://www.nishithdesai.com/information/research-and-articles/nda-hotline/nda-hotline-single-view/newsid/4201/html/1.html?no_cache=1 visited on 4 February, 2021.
[13]http://www.nishithdesai.com/information/research-and-articles/nda-hotline/nda-hotline-single-view/newsid/4201/html/1.html?no_cache=1 visted on 6 February 2021.

cloud computing which includes a light touch regulatory approach to cloud computing. Hence, it seems reasonable to expect a growing and beneficial policy focus on cloud computing in India over the next few years.There is no legislation in India that specifically recognizes or deals with cloud computing. However, cloud computing services would fall under the ambit of the following:

Information Technology Act, 2000

As per notification by Government of India, the Information Technology (Reasonable security practices and procedures and sensitive personal data or information) Rules of 2011, for the protection of sensitive personal data or information of individuals or organizations by the entity who possesses, deals with or handles such data in a computer resource owned, controlled or operated by it. But various provisions of the rules are not applicable to entities providing services under a contractual obligation with any other entity located extraterritorially, unless such entity ensures the same level of data protection as laid down in the Rules.

So a cloud computing service company, before trading with "sensitive personal information" having a link to India, has to make sure to be in observance with the Rules as any noncompliance would invite penalties, and imprisonment in the case of any breach of contractual obligations under the Information Technology Act 2000. Hence, cloud service companies have to make sure that both the rules and terms of contract entered into with the customers are complied with.

Under Section 43A of the Information Technology Act,2000 (the IT Act) read with the Information Technology (Reasonable security practices and procedures and sensitive personal data or information) Rules 2011 (the Privacy Rules) provide guidelines for the collection, use and protection of any sensitive personal data or information of natural persons by a body corporate that possesses, deals with or handles such data. The IT Act and the Privacy Rules together set out the regulatory framework for creation, collection, storage, processing and use of electronic data (including personal and sensitive personal information recorded in electronic form) in India. Cloud computing services that deal with personal or sensitive personal information need to comply with the requirements set out under the Privacy Rules relating to security, encryption, access to data subject, disclosure, international transfer and publication of policy statements. Cloud service providers in India may also be required to comply with the Information Technology (Intermediaries Guidelines) Rules 2011 (Intermediary Guidelines) prescribed under the IT Act.

Section 2(1)(w) of IT Act defines Intermediary as "Intermediary" with respect to any particular electronic records, means any person who on behalf of another person receives, stores or transmits that record or provides any service with respect to that record and includes telecom service providers, network service providers, internet service providers, web hosting service providers, search engines, online payment sites, online-auction sites, online market places and cyber cafes."[14]

The IT Act and Privacy Rules prescribe payment of damages on account of failure to or in case of negligence in implementing or maintaining reasonable security practices to protect any sensitive personal information. The non-compliant entity is required to pay damages to the aggrieved party to the extent of wrongful loss or damage suffered by the aggrieved party. Further, any person who has received any personal or sensitive personal information for performing any services, and discloses it with a mala fide intent is liable to a fine of up to 500,000 rupees or imprisonment of up to three years, or both.

Personal Data Protection Bill, 2018

The government of India has a published a Personal Data Protection Bill, 2018 (the Bill) which if notified will overhaul the existing privacy and data protection framework in India. The Bill is in many respects similar to the EU's General Data Protection Regulation and it, inter alia, enhances the stringency of obligations and corresponding penalties governing data protection from a customer perspective. The Bill has also set high standards for the processing of personal data within India and abroad and is expected to replace or amend the IT Act and the Privacy Rules in these respects.

RBI's guidelines

In addition to the IT Act and Privacy Rules, the use of cloud computing in the banking and insurance sectors is subject to specific restrictions. The RBI's guidelines on Managing Risks and Code of Conduct in Outsourcing of Financial Services by Banks read along with the Report of Working Group of RBI on Electronic Banking set out specific requirements to be complied with by banks while engaging cloud service providers.[15] These requirements, inter alia, relate to vendor selection, data security, form of agreement, business continuity and disaster recovery or management practices.

The Insurance Regulatory and Development Authority of India's Guidelines on Information and Cyber Security for Insurers require insurers to comply with requirements, inter alia, in relation to data, application and network security, incident management, and information security audit while using services from a cloud service provider. The government retains the authority to intercept any information transmitted through a computer system, network, database or software for the prevention of serious

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[14] Section 2(1)(w), INFORMATION TECHNOLOGY ACT, 2008.

[15] https://www.rbi.org.in/Scripts/PublicationReportDetails.aspx?UrlPage=&ID=892 accessed on 7 February 2021.

crimes or under grave circumstances affecting public order and national security.[16]

Telecom Regulatory Authority issues Recommendations on Cloud Services

Since 2012, when the National Telecom Policy was introduced, Cloud computing has been on the Government radar, 2012 policy referred to cloud computing as " *means to improve the delivery of services, participative governance, e-commerce at globally competitive prices".*[17] In India, the concept and benefits of cloud computing have been acknowledged in the National Telecom Policy, 2012. In end-2012, the Department of Telecommunications (DoT) had sought recommendations from the Telecom Regulatory Authority of India (TRAI) on various licensing and regulatory issues arising from cloud services. The Ministry of Communications & Information Technology in December 2012 issued a reference to The Telecom Regulatory Authority of India ("**TRAI**") asking for recommendations in regard to cloud based services and its various aspects and challenges. Under Section 11(1) of the Telecom Regulatory Authority of India Act, 1997 the reference was made. Following this, TRAI issued a consultation paper in June 2016, seeking detailed inputs on various issues raised by stakeholders. Most of the stakeholders have raised concerns related to the implementation of quality of service (QoS) standards, prescription and enforcement of service level agreements (SLAs), transparent billing and metering of cloud services, data protection, security and the framework for the redressal of grievances of cloud users. Some of them are of the opinion that the licensing/registration of service providers is not required at this stage as it may be counterproductive and restrict inventions.

Integrated Goods and Services Tax Act , 2017

'Cloud services' have been specifically recognized under the Integrated Goods and Services Tax Act 2017 (the GST Act) under 'online information and database access or retrieval services' and therefore the services rendered by cloud services providers would be subject to goods and services tax. The section 2(17) of the IGST Act, 2017 states that, "Online information and database access or retrieval services" mean "services whose delivery is mediated by information technology over the internet or an electronic network, nature of which renders their supply essentially automated, involving minimal human intervention & impossible to ensure in the absence of information technology and includes electronic services such as, advertising on the internet; Providing cloud services; Provision of movie, software, e-books, music, and other intangibles through telecommunication networks or internet; Providing data or information, retrievable or

otherwise, to any person in electronic form through a computer network; Online supplies of digital content (movies, television shows, music and the like); Digital data storage; and Online gaming."[18] This includes and recognizes cloud services with in its ambit as OIDAR (Online information and database access or retrieval services).

MeghRaj Policy

"The Ministry of Electronics and Information Technology (MEITY) has started implementation strategies of cloud services in Central and State Government organizations through its MeghRaj initiative."[19] The Indian government has taken the initiative to control the cloud by developing a strategic policy known as the Meghraj Policy. Its vision is clear on the goal of speeding up the delivery of e-services by the government and improving government spending on ICT. This policy is based on three principles[20]:

- All government clouds to follow the standards and guidelines set by the Government of India

- During consideration of any new Mission Mode Project (MMP) or another government project, the existing services (IaaS, PaaS, SaaS) of GI Cloud will be pre-tested for use.

- All new apps are cloud-ready

Highlights of the Meghraj Policy are the use of Optimum infrastructure, Accelerated development and distribution of eGov applications, easy duplication of effective applications in all provinces to avoid duplication of effort and expense in developing similar applications, and access to certified applications that follow common standards in one place. Government is very much focused on this Policy because changing the strategy and implementing a variety of factors including the governance system to ensure the expansion of Cloud Government.[21]

III. CONCLUSION

This paper is a collated research of all the existing laws and policies in India that are particularly implemented with cloud computing in mind in India. The research helps establish that even though there are existing laws and policies in place with respect to cloud computing, all the challenges of cloud computing cannot be overcome within the scope of existing laws. There is a need to develop better laws and standards with respect to cloud computing and only then can the challenges be overcome. The regulatory measures of cloud computing have never been a topic that has been discussed often and a collation of the same is something that has been done for the very first time in

[16]https://www.meity.gov.in/writereaddata/files/Work%20Item8_End%20user%20guide%20for%20adoption%20of%20Cloud%20services.pdf visted on 7 February 2021.
[17] Home, DEPARTMENT OF TELECOMMUNICATIONS | MINISTRY OF COMMUNICATION | GOVERNMENT OF INDIA, http://dot.gov.in/cloud-computing.

[18] Section 2(17), INTEGRATED GOODS AND SERVICES TAX ACT, 2017.
[19] GI Cloud (MeghRaj) | Ministry of Electronics https://meity.gov.in/content/gi-cloud-meghraj
[20] Meity, Government of India's GI Cloud (Meghraj) Strategic Direction Paper, (2013). https://www.meity.gov.in/writereaddata/files/GI-Cloud%20Strategic%20Direction%20Report%281%29_0.pdf
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India. The importance of the same clearly lies in the fact that with every right comes forth many responsibilities which must be always be highlighted.

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[14] Section 2(1)(w), INFORMATION TECHNOLOGY ACT, 2008.

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[16] https://www.meity.gov.in/writereaddata/files/Work%20Item8_End%20user%20guide%20for%20adoption%20of%20Cloud%20services.pdf visted on 7 February 2021.

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