# CLOUD ADOPTION IN INDIA - AN INDUSTRY REPORT

## AN INDUSTRY REPORT

BY INDUS NET TECHNOLOGIES


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*"I don't need a hard disk in my computer if I can get to the server faster... carrying around these non-connected computers is byzantine by comparison."*

***- Steve Jobs***

***Late Chairman and Co-Founder of Apple***

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## What is cloud computing?

Cloud computing is changing face of IT environment. Enterprises and users can conveniently access on-demand network and computing resources including servers, storage, applications, platforms etc. Businesses can run, develop and operate their applications in the cloud and all these services are delivered through internet. Cloud's inherent ability is to improve operational efficiency and has a huge potential to encourage innovation within the organization. Enterprises will be able to reach their customers faster and efficiently through innovative solutions.

## Cloud computing growth in India

Cloud computing in India has surpassed the early adoption stage of the product adoption lifecycle in 2014. According to research by TechSci, the cloud services market in India is estimated to grow at a CAGR of 22% during 2015-2020. Indian enterprises both small and big have shown greater acceptance to the cloud platform as reflected in their growing spend on public cloud services.

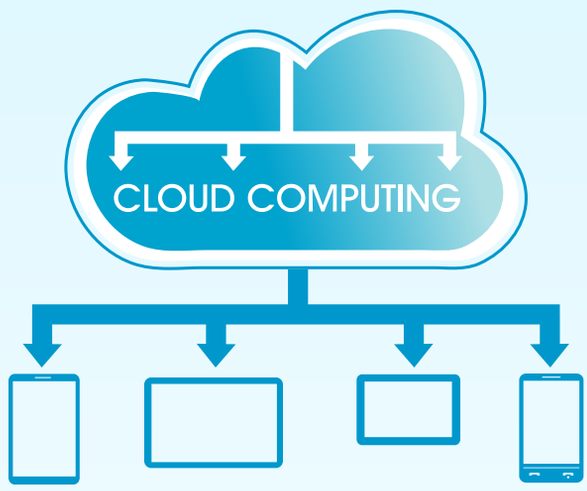
Cloud computing has shifted the burden of data storage from desktops to virtual servers and data can be accessed anytime and anywhere. With more than 47 million small and medium enterprises, cloud computing represents a huge market in India. Low upfront cost associated with hardware / software, high business flexibility and scalability have encouraged the organizations to incorporate on-demand computing as an integral part of their IT system.

According to Gartner, the public cloud services market in India was valued at an estimated $556.8 million in 2014. It is expected to expand at over 30% and reach $1.7 billion by 2018. Software-as-a-Service is the biggest segment of the public cloud services market and is witnessing a strong growth across the sector including BFSI, telecom, retail, education, healthcare and government. Application hosting and email remain the top services utilizing cloud technology. According to a report by IDC, over 85% of applications are built for the cloud today.

## Key drivers for cloud computing growth in India

According to the research firm IDC, the cloud adoption rate in India is 67%. Indian companies are adopting cloud computing for strategic purposes like collaboration solutions, disaster recovery, supply chain management etc. despite lingering security concerns. The primary drivers are cost effectiveness, agility and scalability offered by cloud solutions. The growing pressure on CIOs to deliver and show quick ROIs on IT infrastructure investment is also making a lot of difference in India. On the flip side, countries like Singapore, New Zealand are treading cautiously by only hosting basic applications like database hosting; email hosting, back-up, servers and storage on cloud.

An increasing number of enterprises are prepared to accept cloud-based solutions today due to growing awareness, increasing use of mobile devices and benefits of cloud computing. Since cloud adoption has registered an impressive growth, cloud computing holds a promising future in India. Many small-scale organizations traditionally tied up with on-premise systems have realized that cloud is the only way to beat market complexities and offer solutions at competitive prices. Moreover, cloud technology is easy to implement. Technologies like Internet of Things, high speed broadband internet, mobile internet technologies (3G/4G), and big data have sparked the growth of cloud computing in India. Central government flagship program "Digital India Project" will further accelerate cloud adoption at a cost of $19 billion between 2014 and 2018.



# Following are the key drivers for cloud adoption in India:

## » Positive market sentiment

With rising competition and profit margins getting thinner, cloud computing has given a ray of hope to small scale businesses. They can compete with their larger counterparts by offering innovative solutions based in cloud. A growing number of symposiums and conferences by industry chambers and government have encouraged the reluctant small-scale business owners to experiment with the cloud.

## » Effective communication

Though end-consumer cloud applications were being adopted at a faster rate, the idea of operating enterprise applications in the cloud had turned away many business owners in the past. Service providers have played a major role in alienating the data security concerns of enterprises. Though data security and privacy concerns still remain, organizations clearly understand the pros and cons of operating applications in the cloud.

## » Size of small and medium enterprises

India has the largest SME size in the Asia-Pacific region. SaaS has given SMEs access to technology that has cut down the IT liability of organizations. Fast deployment, scalability and pay-as-you-go model suits the need of modern entrepreneurs in India. SaaS vendors entering this market space have a unique opportunity to tap both traditional and start up enterprises.

## » Maintaining enterprise data center

Maintaining an enterprise data center is a costly affair. Organizations have to spend significant amount of money every year to pay for electricity in order to run and cool the center. An enterprise data center in India occupies an average space of 1000 to 1500 sq ft and buying or renting this much space is nothing but wastage of money and adding to carbon footprint of the nation. Besides, data center security is crucial for an organization. They have to make proper security arrangements to prevent unauthorized access to the facility. On the other hand, data center consolidation and virtualization is propelling the demand for public cloud.

## » Traditional IT models are becoming unviable

Operating a business solely on traditional on-premise system gives no opportunity for gaining competitive edge and it is a mark of stagnant business. Growth rate of traditional IT systems has seen a significant decline since 2008. Vendors are increasingly adopting innovative business models to overpower their rivals. Hybrid business model is finding unanimous acceptance among businesses as it uses a mix of traditional IT system and cloud services. While mission critical applications are run on on-premise systems, less critical applications are economical to run on cloud.

## » Lack of regulatory laws

Unlike the western world, Indian enterprises don't have to take permission from government authorities while moving data, services or applications on cloud. For instance, in Europe, enterprises are supposed to take permission from government to store data out of physical geography of the country. In India, on the contrary, there are no guidelines for data security and privacy. Focused more upon incorporating cloud technology, Indian entrepreneurs are yet to realize the growing challenge of data security.

## » Huge number of independent software vendors

Most of the independent vendors have limited resources but cloud computing model has empowered them to utilize resources available at low cost. As a result, vendors have developed capability to offer innovative solutions to enterprises of different sizes with different requirements.

## » Challenges faced by mobile workforce

The number of mobile workforce is increasing at a rapid pace. To survive stiff competition, mobile workers must have an access to real-time customer information so that they can monitor key performance metrics like bookings, revenue, expenditure, customer feedback, instant access to routine tasks, and gain insight by generating analytical reports. Cloud technology provides real-time access to such data delivered on mobile devices like smartphones, tablets, and laptops through synchronized applications and is, thus, prepared to improve co-ordination, productivity and responsiveness within the organization.

## » Rapid growth in mobile applications

With the increase in the number of smartphone users, there has been a rapid growth in the demand for mobile applications. All the leading e-commerce stores have developed a mobile application to make it convenient for consumers to buy from their store. A large number of cloud storage, ERP and CRM applications are available on mobiles. Thus, mobile applications are facilitating the users to share and have instant access to content through cloud technology.

*"Cloud computing is often far more secure than traditional computing, because companies like Google and Amazon can attract and retain cyber-security personnel of a higher quality than many governmental agencies."* **Vivek Kundra, Executive Vice President, Industries, Salesforce.com**


# Barriers to cloud adoption in India

## » Connectivity constraints

Internet connectivity is a major constraint. According to a study conducted by Pew Research Center, only 20% Indians are connected to Internet. The Digital India campaign of government has targeted to provide internet connectivity to 2,00,000 Gram Panchayats of India to facilitate e-services across the country. Ever since the campaign started in late 2011 with the laying of optical fiber network, only 20,000 villages have been connected till April 2014. With government planning to incorporate cloud technology for inclusive development, the pace of internet penetration is quite sluggish and it is going to take a lot of time before actual benefits of cloud are realized.

In urban India, the statistics are not very good either. According to NSSO report published in 2011, only 6% urban households were connected to internet. There is a huge gap that needs to be plugged. The internet connectivity must be improved at a faster rate both in rural and urban areas. Providing consistent high speed connectivity at low cost should be the aim of the government to get users and businesses connected to internet and subsequently to cloud technology. Thus, bandwidth limitation will remain a major challenge for cloud service providers to provide service to Indian consumers.

## » Data security and privacy

Data security in cloud remains the topmost concern among most IT leaders, service providers and customers. Loss of data can severely impact businesses, brand reputation, customers and suppliers trust. Securing critical data and trade secrets is a big challenge especially for large organizations. The level of security enabled by an organization determines their competitive edge in the market. Since a cloud server is multi-tenancy in nature, hackers are tempted to steal data of all the organizations hosted on the server.

It is very important for customers to know how service providers handle their privacy concerns. Since data in cloud computing may be stored at more than one legal location, data can be moved from one jurisdiction to another, one machine to another without the knowledge of customers. Apart from that, there are many security operation factors like data availability, data monitoring, data governance, policy enforcement, data liability, data ownership and auditing rights which user organizations want to incorporate in SLAs (Service Level Agreements) and service providers find it difficult to cater to such requirements.

## » Regulatory compliance

In cloud computing, geographical location of data storage and processing is not defined unlike traditional IT systems. This engenders compliance challenges owing to data flow, business continuity, data retention requirements. Cloud service providers tend to deny user organizations to conduct network scans on public cloud infrastructure. Auditing and security certifications of cloud infrastructure remain a critical challenge for many enterprises as opposed to traditional IT system.

## » Lack of SaaS integration

Though cloud models offer great advantage to business owners, there are a number of businesses that expect seamless interoperability between in-house infrastructure and cloud. There are many cloud platforms that use different technologies and configuring them with traditional IT system is complicated or impossible. SaaS integration is the best way forward to integrate various cloud applications with the legacy systems but due to lack of awareness among both service providers and user organizations, SaaS integration is going to take a long time before majority deploys it.

## » Lack of server control

Enterprises feel crippled owing to lack of control over public cloud infrastructure by hosting their data and applications on cloud servers. In case of a downtime, enterprises will have to depend upon the service providers to take necessary steps instantly. While in case of traditional systems, business owners can control IT infrastructure and internal IT teams are capable to recover the system without losing much time. Cloud servers are also subjected to overload due to a number of users exploiting the system and owners can't exercise any control over the number of hosts on public cloud. To circumvent this issue, many organizations are deploying dedicated servers to cater to their specific IT needs. But unfortunately, it is an expensive choice to be made by selective organizations.

## » Lack of cloud understanding

Cloud deployment models are complex to understand. There are a range of cloud services like SaaS (Software-as-a-Service), IaaS (Infrastructure-as-a-Service) and PaaS (Platform-as-a-Service) that can be operated in different cloud environments like public cloud, private cloud, hybrid cloud, and community clouds. Educating the entire business community about the intricacies and benefits of cloud infrastructure, leave apart data security concerns (which in any case is going to deter them), is going to take a long time in Indian context.

## » Legal constraints

Since data is stored and processed at various geographical locations in cloud environment, the contractual requirements under such circumstances are very different. Service providers and user organizations often have disagreement on implied duties and obligations. As the stake in cloud infrastructure becomes high, legal complexities escalate as well.

## » Vendor lock-in

Entrepreneurs gradually exposing themselves to cloud environment are often trapped due to vendor lock-in in cloud services. The complexities of cloud migration deter user organizations to move to a new service provider. Ideally, the data needs to be imported to user organization first and then transferred to new service provider. This may also lead to data alteration during the migration process if not done systematically. In such a scenario, users choose to stay with the same service provider even if their needs are not fully met. To be on the safer side, customers should carefully read service provider policy and find out about the system in place to migrate data.

In India, TCS (Tata Consultancy Services) has been appointed as certification service and test provider for Cloud Data Management Interface (CDMI) conformance testing by Storage Networking Industry Association (SNIA). CDMI is applicable to all types of cloud facilitating users to operate between multiple clouds under industry approved standard for data storage, migration and security. Enterprises should only choose those service providers who pledge to use these industry standards.

## » Upgrades required in existing infrastructure and IT department

Indian market has always been a price-sensitive market. Organizations that have investment in traditional IT systems a few years back will take a long time to invest in new technology, at least not before they get significant ROI. On the other hand, enterprises with hands-on experience with traditional IT systems are reluctant to invest in cloud and reshuffle their IT environment. Most of them realize the upgrades required in existing infrastructure to adapt to cloud technology but fear to invest and choosing to wait and watch. Therefore, there are still a couple of years for many small-scale entrepreneurs to adopt cloud technology and renounce their traditional IT systems.

Moreover, with cloud technology, the role of existing IT personnel will be changed dramatically due to which traditional IT personnel show resistance to new technology. The new IT team will be the one that understands cloud completely, facilitates integration, improves organizational efficiency and cost-effectiveness by transitioning to cloud.

*"Cloud computing is really a no-brainer for any start-up because it allows you to test your business plan very quickly for little money. Every start-up, or even a division within a company that has an idea for something new, should be figuring out how to use cloud computing in its plan."*

***- Brad Jefferson, CEO and Co-Founder of Animoto***

# Predictions for cloud computing in India

## » Accessing cloud through mobile

With organizations going mobile, cloud will become pivotal to gain strategic competence. Cloud technology clubbed with mobile technologies will empower sales and marketing employees to upgrade their market intelligence. Organizations are striving to ensure that their remote employees are connected with the organization irrespective of their location and time.

## » PaaS to gain traction

Cloud is catching up with Indian enterprises at a steady rate. Though SaaS model is going to be popular among the masses, a large number of organizations are going to rely on PaaS in order to develop; market products; and manage supply chain through cloud infrastructure. According to Global Technology Outlook's Cloud 2014; over a quarter applications built will be on cloud by 2016. This proclaims the growing importance of PaaS.

## » Hybrid cloud will be the game changer

Going forward, majority of the organizations will operate in hybrid cloud. A Gartner survey found out that 50% of enterprises will operate hybrid model by 2017. Hybrid cloud is a mix of both private and public cloud. Mission critical applications are run on on-premise / dedicated servers while the remaining applications are run on public cloud. This helps the organizations to maintain a fine balance between cost-effectiveness and performance.

## » Rise of on-demand capabilities in private cloud

Organizations with critical regulatory and compliance needs will continue to adopt private cloud. Though meeting on-demand requirements forms the basis for scalability of public cloud, the same phenomenon will be seen replicated in private clouds or dedicated servers. Customers expect flexibility to self-provision and deploy infrastructure without losing time, saving cost and to keep IT infrastructure under their control. Service providers who can configure all this within dedicated servers will be in high demand.

## » Cross-cloud orchestration

As enterprises sign up for a number of cloud applications with different cloud service providers, the need for cross-cloud orchestration will climb sharply. Service providers offering cross-cloud orchestration will allow their customers to manage their infrastructure across the providers through a single web interface.

# Cloud computing trends and applications in India

It is ironical that India being a global leader in IT/ ITES services has restricted access to resources. Cloud computing has provided an exciting new opportunity for IT organizations to access hardware and software through internet.

Enterprises across verticals in India have shown greater inclination towards PaaS and IaaS models over the last year. Large enterprises are ardently advancing towards hybrid cloud which allows interoperability between public and private cloud thereby creating a single platform for applications to run smoothly. Cloud services have received unanimous acceptance across government, educational institutions, individual users and enterprises across verticals.

## » Government

The National Cloud, MeghRaj, has been launched to cost effectively and efficiently deliver e-services across the country. MeghRaj will ensure effective deployment of e-Gov applications under the existing infrastructure. It will be spread across multiple locations and follow a set of guidelines issued by the Indian government. Common features under this cloud include self-service portal, multiple cloud solutions, and secured VPN access.

Furthermore, the cloud will help in bridging the gap between rural and urban India. About 70% of Indians reside in rural areas; for rural economy to grow, it is important to connect them with the essential services. A number of services like weather forecast, banking, telemedicine, agricultural information, e-learning etc can be delivered through robust combination of internet, cloud and mobile technology. BSNL is toiling to provide broadband connectivity up to Taluka level to enable rural communities connect with the cloud. E-governance services delivered through cloud computing will help in quick delivery of government schemes & initiatives and eliminate middlemen from the delivery process. Recently, Air India, India's national carrier has decided to move its applications to cloud to avail the benefits of Opex and Pay-per-use model.

## » Educational institutions

Microsoft has launched Edu-Cloud in India to enhance digital learning and teaching in schools and higher education institutions. Cloud computing will help the students to create, deliver and manage content from any device, anywhere and anytime. Learning is going to be exciting and easy for them. This initiative is expected to benefit one million teachers and six million students in 1,500 institutions over a span of 18 months. Currently, Edu-cloud has been successfully deployed across 80 Sri Chaitanya Schools. Teachers and students will use 14,000 Windows-powered tablets to access content from Microsoft Cloud. With Edu-cloud, students will not only have free access to Office 365 but can also access eDevelop, a learning management solution developed by Microsoft's partner Mobiliya.

## » Manufacturing

Manufacturing sector in India has adopted cloud models with open arms. It can be seen through wide applications deployed in CRM and supply chain processes. Business intelligence and analytics is vital for manufacturing for better product range forecasting and provide analysis for future investments. Apart from that, cloud computing helps in global collaboration, workflow automation, product designs and new product development, customer service integration and devising ERP strategies. For instance, Jindal Steel has adopted cloud model for HMI (Human Machine Interface) applications where IT applications like ERP are integrated with Manufacturing Execution Systems (MES).

# Case study Oracle

Oracle is a leading cloud service provider offering more than 100 applications on cloud. The company which caters to all sizes of enterprises believes in determining the suitability of applications before deploying them in the cloud. They also believe that applications with large user base are more likely to be productive and cost effective under the cloud. According to a Forbes report, Oracle's cloud subscription revenue increased by 22% to $513 million, during Apr-Sep 2014 as compared to 2013. The company has registered a triple digit growth in Fusion Cloud applications.

The report clearly indicates that despite some barriers, cloud adoption rate is booming in India and there is nothing that can seize the growth of cloud technology.

# Conclusion

It is interesting to note that private cloud has grown at a tremendous CAGR of 50% in India during 2010-2014. This phenomenal growth is largely attributed to enhance data security features and greater control over the cloud environment. Private cloud has been primarily adopted by large enterprises while SMEs are deterred to use it due to high initial investment. Since public cloud is affected by security and reliability concerns, a hybrid model consisting of both public and private has been rapidly evolving in the Indian market. This trend will only continue to accelerate.

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