



# CLOUD and Next Generation of Apps

## WHITEPAPER

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## Introduction

Cloud computing has evolved into a full-fledged solution *capable* of emancipating enterprises from the demands of market, competition, and agile marketing. Enterprise, now more than ever, require high level of interactivity with their employees, clients, and partners via applications that *remove* constraints of sophisticated infrastructure i.e. technology, analytics, software, computing power, etc. at the user's-end.

Enterprises find solace in the next-generation of cloud computing native apps capable of leveraging social opportunities and allowing seamless access to web-based, custom data apps, and backend systems *without* the need for high-end machine/devices/software at every node of interaction.

This change has come due to the way cloud as a whole has evolved and consequent paradigm shift in how application development is deployed — a shift from server-focused development *and* client-focused development to cloud based services.

This shift towards *Cloud-based development systems* is reducing costs and development time, boosting development efforts, and allowing development of applications that will remain compatible with future apps employed by the enterprise.

## Cloud Computing In Brief



Cloud computing is a type of advanced networked computing that allows computer resources to be shared without requiring *dedicated* local servers/devices for processing. In simpler words, the technology allows organizations to “free” their data and allow frequent storage and use of data on multiple servers through the internet.

This is made possible by using a network of remotely controlled servers that allow the company to store, process, and manage data as well as use programs through a web-based interface. Any and all data and programs that are either stored or running on the cloud can be from anywhere through any smart devices with high speed/bandwidth internet connectivity.

## Benefits of Cloud Computing

- **Faster Time to Market** — Cloud computing allows enterprises and end-users immediate access to all storage and computing resources. It also allows fast provisioning of virtual servers to meet the demands of changing workload
- **Business Innovation** — Cloud computing lowers a business's IT barriers to innovation by delivering flexible IT infrastructure that can easily be re-aligned with changing business needs.
- **Reduces Capital Costs** — Cloud computing relies on pooling resources for optimizing costs. As a result, it allows end-users a pay-per-use model scalable on demand cycles
- **Responsive Demand Scaling** — Cloud services allow extraordinary flexibility in the way services can be scaled up or down in accordance with client demands. It also allows businesses the ability to automatically scale their services driven predefined SLAs.

## Cloud's Architecture

Cloud as a service has evolved into a robust ecosystem comprising of multiple layers of interacting modules and sub-ecosystems. The whole cloud network and all next generation apps on cloud are reliant on this ecosystem, which can be categorized as:

- **Cloud's computing services** — These primarily include Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS).
- **Cloud's Computing deployment models** — These include Public, Private, and Hybrid cloud models

The interaction of these services and models has brought about the creation of the next generation of cloud applications that aim to use the cloud eco-system at its maximum potential.

## Enterprises at the Cross-Roads



The constant evolution of computing has helped businesses to automate and innovate providing them a competitive advantage in the global marketplace. A study of business history would reveal that the rapid rise of US-based organizations was due to their ability to quickly leverage IT for their business needs. On the other hand, organizations from other parts of the world were relatively slow in leveraging IT. However, over time IT has become a hygiene factor and large scale adoption has led to leveling of the playing field.

Nevertheless, with the coming of the Cloud, organizations are once again at the crossroad of technology. Early adoption of the Cloud can provide organizations with an opportunity to transform their business models and gain a competitive edge. While cost reduction is one of the benefits, several other benefits accrue to organizations. Organizations would be able to concentrate on their core competencies while leaving the task of running IT infrastructure to the Cloud service providers. Further, through the adoption of the Cloud, organizations are expected to become more nimble. The Cloud would help them quickly provision resources for business opportunities, which could otherwise be lost.

The Cloud also enables organizations to build virtual and "open" business processes, enabling its various stakeholders including customers, business partners, suppliers, etc. to connect and do business more seamlessly.

## Understanding Next Generation of Cloud

### The Confines of Traditional Cloud Models

Typically organizations must choose between a pure Infrastructure as a Service (IaaS) or statically configured PaaS environment for their cloud development and deployment needs. While both models provide benefits, they also have drawbacks. Traditional IaaS providers only handle the physical aspects of data center infrastructure, causing developers and IT staff to spend time acquiring, integrating, and testing software components and tackle application support problems on their own. In contrast, most PaaS environments provide access to black-box infrastructure resources and preselected language and platform component stacks with limited or no control, forcing developers and administrators to ensure applications conform on their own.

### Next Generation of Cloud Computing

The next generation of cloud computing is defined by the needs of the businesses and enterprises, the biggest of which is to deliver value faster by automating everything from request to deployment and configuration. These requirements can be categorized as five platform requirements:

- A management platform with high degree of service flexibility
- A platform that supports multiple constituencies



- Platform that is not tied to a single infrastructure
- An intelligent platform
- A platform that is highly integrated into existing enterprise management technology and processes

The next generation of cloud services will greatly increase the accountability of the developers by reducing the cost and burden of infrastructure from the enterprises.

## Cloud Apps — Cloud as a Service

To understand what the next generation of cloud apps will bring, it is essential that we map where cloud computing is heading itself. The current development trends indicate the development of the following cloud transformation:

### Inter-Cloud, or Cloud of Clouds

This is a new model of cloud computing. It envisions a combination of various individual clouds into one seamless mass in terms of its ability to offer on-demand operations. This would allow individual cloud to use/rely-on resources available beyond its reach i.e. by using pre-existing contracts with other cloud providers.

### Extended OpenStack

Currently OpenStack software allows developers to deliver massively scalable cloud operating systems. It is an open source IaaS (Infrastructure as a Service) initiative allowing creation and management of large groups of virtual private servers in a cloud-computing environment. With its goal of supporting interoperability between cloud services, OpenStack brings incredible versatility and flexibility to the cloud-computing world. With OpenStack, businesses can build cloud services in their own data centers.

### Big Data as a Service (BDaaS)

A cloud computing service allowing analysis of voluminous and complex data sets through cloud-hosted services. An example in consideration is IBM's recent Watson Discovery Advisor, a BDaaS cognitive computing project allowing researchers from different fields develop research ideas.

### Platform as a Service (PaaS)

These lower IT costs while speeding application development through more robust and efficient testing and deployment techniques. Many companies are looking forward to adopting PaaS as the way forward.

### Graphics as a Service (GaaS)

Normally, high-end graphics applications require massive hardware infrastructure to be present on every machine hoping to use it. Emerging cloud-based graphic technologies allow end users to run various graphically intense applications using nothing more than a web browser.

*iConnect*

## Hybrid Cloud Platforms

More and more mergers or partnerships between private and public cloud platforms are enabling IT to use on both premises and cloud-based infrastructure seamlessly. This has allowed them to reduce costs, bursts, and in various dynamic cases including disaster recovery and others.

## Using Cloud as a Social App Development Platform

Socialization of cloud computing technology allows developers a common platform for developing apps for mobile, as well as social and big data applications. Using cloud as an innovation platform offers diverse opportunities for cross-pollinating with various application platforms. This allows businesses greater ability to respond quickly to new innovations e.g. gesture and speech interactivity, wearable technology and more.

## The Internet of Things (IoT)

With various big data analytics, intelligent machine algorithms, and wireless connectivity infrastructure already robustly in place, it is a matter of time before IoT transforms operations by combining intelligent machines with analytics and end user applications across a wide spectrum of industrial uses. Cloud computing platforms take a central role in creating these next generation of software-defined, intelligent machines that can be operated and controlled from remote, yet centralized locations.

## Current Engagements — BOYD, CYOD, and COPE

With the rise of smartphones, mobility became a thing to contend with. Hence, Bring Your Own Devices (BYOD) and Choose Your Own Devices (CYOD) policies that allowed employees to use their smart devices to perform their work and interact with company's data. These policies offered great flexibility to employees as well as increased their productivity while reduced the corporation's cost of upgrading and maintaining its end-user technology base. Cloud computing and services, and application development are central to the working of these policies. Hence, with their implementation came security threats and issues. These instances led to the evolution of BYOD/CYOD into Corporate Owned Personally Enabled (COPE) policies.



## Trends — Impact of Cloud Computing and Services on the Industry

Cloud computing and the rise of next generation of cloud based applications have changed the way businesses and enterprises are engaging in the market — and trying to remain market competitive. Though all sectors will benefit from these services, the impact will be fairly emphatic in certain sectors. Sectors such as Education, Healthcare, SMEs, and Government play an integral role in market economy and cloud based applications are likely to affect the

greatest.

This section highlights the primary impact these applications will have on these sectors:

## **Government**

Governments can leverage the Cloud to bridge the communication divide, especially with those citizens that reside in remote parts of the country. Given that deployment of infrastructure becomes a costly endeavor, cloud based applications can be used to increase interoperability between various remote government agencies, while reducing redundancy, as well as tracking and monitoring the effectiveness of various government schemes. Furthermore, cloud computing can increase the rate at which transparency in Government can be achieved.

A cloud ecosystem for this purpose will allow sharing of computing resource between the State and Central governments and drastically reduce costs by leveraging existing infrastructure. The Cloud has the potential of transforming this sector, to benefit not only the Government itself, but also millions of people.

**Examples of Cloud Deployment** —The General Services Administration (GSA), for instance, recently selected Gmail for its 15,000 employees in a bid to trim 50% of its annual e-mail costs over the next five years. Similarly, the Department of Agriculture opted to use Microsoft's Business Productivity Online Suite (BPOS) Federal cloud suite for its 120,000 users.

## **Healthcare**

For healthcare industry, the Cloud (aka hCloud) is a paradigm shift. It allows healthcare stakeholders and professionals to use Healthcare Information Technology (HIT) while focusing solely on their competencies. The biggest advantage of cloud's ability to pool resources and data is that it can provide for the seamless management and access to the Electronic Health Records (EHRs) of patients.

The biggest advantage of this is that it can facilitate provisioning of healthcare services and products to patients in remote areas. The use of the cloud based applications is changing healthcare business models, streamlining workflows, automating processes, and consolidating IT assets for Healthcare service providers. With cloud and cloud based application development, it is possible that an integrated healthcare ecosystem is established — one that would allow healthcare providers to make the best of their service to remotely located patients with limited access to quality health services.

**Example of Deployment** — many pharmacology vendors including Eli Lilly, Johnson & Johnson, and Pfizer are starting to tap the cloud to improve research and drug development (i.e., “scalable” and “affordable”)

## **Education**

The challenges of high costs and limited reach, flexibility and quality are of grave concern in the educational sector. Cloud based applications are acting as the catalyst enabling the sector to overcome these barriers.

The good news is that this sector has been using on cloud and near-cloud based applications such as emails, while various Learning Management Systems (LMS) for Virtual Learning Environment (VLE),



and Student Information System (SIS) that are currently employed can easily be worked upon and hence accessible through the cloud. With these cloud-based applications, unique resources can be made readily available to students — making the education system become more collaborative and innovative. The extensive implementation of cloud-based applications could change the way in which education is financed and delivered.

**Examples of Deployment** — Practical scenarios for “Education 2.0”, Virtual lecture theatres, Labs in the cloud, intelligent classroom, personalized supervision, Virtualization of desktops.

### **Small and Medium Enterprises (SMEs)**

Until the advent of cloud service SMEs had been largely unable to take advantage of powerful IT systems and/or solutions due to the high up-front costs. Consequently, they faced issues in the management of their supply chains, human resources, customer relationships, financials, inventories, among other business critical aspects.

Cloud based applications reduces the cost burden of using IT for SMEs, primarily because the price system relies on the “pay-per-usage” model. With cloud services, SMEs can enjoy benefits of scalability, flexibility, and on-demand service.

**Examples of Deployment** — SMEs readily employ cloud based hosting, data storage, project and employee management, collaborating apps, among other services.

## **Next Generation Apps — Future Trends in Cloud Computing**

Currently industry trends in the use of cloud computing and using cloud computing services can be categorized into 5 primary trends:

### **Increased Availability of Cloud Based Applications**

According to the “Global Technology Outlook — Cloud 2014: A More Disruptive Phase”, most of the new applications are being planned and developed for the cloud. The report predicts that by 2016 around 48 million applications (over a quarter) will be available on cloud alone.

Given that 58% of the enterprises are allotting more than 10 % of their annual budge on cloud services primarily because 56% consider cloud as their strategic differentiator amongst competitions, and as The Everest Group’s “Adoption Survey” argues: the prediction makes sense because cloud adoption is enabling these enterprises achieve higher operational excellence and accelerated innovation.

### **Continuous and Unprecedented Growth in the Market for Cloud**

According to Gartner’s forecast of IT: “the cloud is here, and it is accelerating globally”. The forecast The forecast for 2011-2017 expects the adoption of cloud to hit \$250 billion within 2 years (by 2017). This prediction was already supported as early as 2013 (Qtr 4) where it was observed that globally, enterprises were increasingly relying on cloud services for developing, marketing, and selling their products, *managing* their complete supply chains, and more.

The forecast by Gartner also suggests that worldwide Software as a Service (SaaS) market would show an astounding **growth rate of 20.2 percent** between 2012 and 2017. This means a growth from \$18.2 billion to \$45.6 billion by the end of 2017. The impact of this forecast is evident from the fact that many companies are *rebranding* their existing service base “as a service” to gain an early share of the pie.

## Accelerated Partnerships between Private and Public Cloud Service

Even when we see CIOs crafting ever strategies centered on cloud to meet the rising demand for cloud, pure cloud implementations will remain an exception and not the rule. This is because practically it would be very difficult, if at all possible, for enterprises to shift everything wholesale to the cloud. Their existing infrastructure poses a significant barrier to this massive shift in priorities.

The solution is the hybrid cloud—a mix of on-premises and off-premises cloud networks. By allowing organizations to enjoy the performance of using on-premises solutions and the convenience of management from cloud business model.

Hybrid cloud adoption is on the rise, a fact supported by Gartner’s prediction that that about 50 percent of enterprises will be employing hybrid cloud networks by as early as 2017.

## An Evolutionary Boost In Cloud Technology

According to the study by Evans Data Corporation, currently more than 18 million software developers are developing applications worldwide but less than 25 percent are committed to application development for the cloud.

This is because of a fundamental concern of enterprises: risk aversion.

Enterprises realize the crucial place for a robust cloud platform for their market competitiveness, but unless a robust infrastructure and sound risk management do not back the cloud as a service model, investment becomes a great risk. Hence, the cloud technology as a whole is going through a phase of rapid evolution.

At this point, IDC (concurring with Gartner’s report on the growth of cloud) predicted that that 20 percent of all application revenue in 2014 will be generated by SaaS alone. Reports by IDC further claimed that an increased involvement of third-party, enterprise, and commercial and enterprise contributors and developers to cloud by 2017. We can expect that as cloud continues to be adopted, more developers will develop for the cloud and hence its application ecosystems, marketplaces, and application programming interface (API) exchanges.

## Conclusion

Cloud computing has become a norm. Every day, millions of people are using cloud-based applications (think Google Docs, SoundCloud, DropBox, etc). Enterprises began to realize the importance of cloud computing as soon as the smart devices (phones, tablets, etc) hit the market. So far they had made their effort to utilize this technology to minimize their costs and increase their bottom line by increasing employee mobility. Now, the cloud has matured into a full-blown market reality, and it’s calling its own shots.

Enterprises would be wise to set their CIOs to develop enterprise strategies with cloud in mind. Having a well-defined strategy employing cloud based applications as a cornerstone for future endeavors is the only way enterprises can hope to survive the market in the near future.

## About Amitesh Sinha

Amitesh Sinha is a contemporary technology consultant based in North America. With over 20 years of hands on experience in developing and deploying innovative solutions for retail, Sinha has gained a distinguished reputation for inventory software solutions, creating data bases, STORIS Furniture Software, POS Furniture Software, and reengineering of software with extended features and support.

Mr. Sinha's professional synergies make him a significant choice for commercial and government agencies where he has been successful delivering cutting edge solutions and services according to the company demands and contemporary business requirements. He is in the list of top most furniture consultants, retail consultant and retail home furnishing specialist, facilitating Ashley home-stores providing centralized, unified and easily replicated database system to perform their query operations on a single click.

Sinha earned MBA from JBIMS, Mumbai India and started his professional career from Stock Holding Corporation India Limited and served for 07 years. In 2000, he moved to USA, and established iConnect group, a professional consultancy business with a focus on technology management and delivering services. The iConnect group currently works with top notch companies to steer short-term and long-term technology strategies, and providing flexible solutions by anticipating their needs and requirements.

## About iConnect

iConnect is a leading technology service provider as well as a consultant in technological innovation, management, and IT. Our services span the length of the software development spectrum including integration, infrastructure services, mobile apps, staffing, and web design solutions for our clients.

Committed to technological innovation and progress, we have been serving retail, homebuilders, public sector, transportation, RFID, and more.

## About SIA Technology

Shopper Intelligence Analytics (SIA) is our propriety technology that answers business actionable questions for you:

1. How much shoppers are you drawing into your store?
2. How often are shoppers visiting your store, and for how long?
3. Which zone is attracting the most shoppers?

4. How is your staff interacting with shoppers?
5. Are queues being managed properly? and more.

SIA helps you solve your retail challenges and unlock sales opportunities. It allows you to easily obtain actionable business insights and metrics about customer foot traffic patterns, behavior, and interaction with staff members in your store(s).

[Our SIA technology](#) can automatically and passively detect and collect information about your shoppers and staff members while completely complying with the industry standards and privacy regulations. This includes sensing customer/staff-member presence and location in the store and portraying the data in a meaningfully actionable manner.

Rollout with SIA in no time — It's easy to install, offers high accuracy of location, does not require customers to install apps on their devices, and allows you to manage multiple sites and stores as well as multiple floor plans and/or zones per site/store in real-time.

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Cloud Eco system

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