Future of Cloud Computing

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Abstract - Today almost everyone talking about"Cloud Computing" whoever belongs to technology world? The term refers to computing capabilities provided to organizations that operate over the Internet. Businesses and governments are using "the cloud" to provide more and more services as it allows for greater flexibility, efficiency and lower costs. Whether data or software sits on an organization's own computers or on a cloud service provider's computers, online services like web-hosted e-mail, document sharing sites and social networking will operate in much the same way they do today. For delivering the vision of Cloud computing, this paper explains the Market growth of cloud computing, Benefit, future of Cloud Computing technology. We would summarize aspect of current Cloud Computing Scenario. We would pay much attention on future aspects like Secure, fast, real time access. We would propose some future possibility of Cloud Computing.

Keyword:- Cloud Computing, Computing,Virtualization, latest computing paradigm.

I.INTRODUCTION

Today mostly people use internet services for their work. Cloud computing is a general term for anything that involves delivering hosted services over the Internet. It is a system whereby software programs and storage space can be accessed via the Internet. We can save our data on internet with the help of Cloud Computing. With help of Cloud Computing user can access number of server and as much as application.it provide a fast access platform to user. Cloud computing evolved from the knowledge and experience of managed services, Internet services, application service providers. End users access cloud-based applications through a web browser or a light-weight desktop or mobile app while the business software and user's data are stored on servers at aremote location. Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, Servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction

II.CLOUD COMPUTING CONCEPT

Cloud computing is way of computing in which resources, software, platforms etc. are provided to the users on request over the world wide network.
  A) Need of Cloud Computing

Traditional business applications have always been very complicated and expensive. The amount and variety of hardware and software required to run them are daunting. We need a whole team of experts to install, configure, test, run, secure, and update them. With cloud computing, you eliminate those headaches because you're not managing hardware and software—that's the responsibility of an experienced vendor. The shared infrastructure means it works like a utility. You only pay for what you need, upgrades are automatic, and scaling up or down is easy. As cloud computing grows in popularity, thousands of companies are simply rebranding their non-cloud products and services as "cloud computing." Cloud computing offers a variety of ways for businesses to increase their IT capacity or functionality without having to add infrastructure, personnel, and software.
  B) Deployment types of Cloud
  1) *Private Cloud:* - Private Cloud are ownedby the respective enterprise or leased for exclusive use by a single organization. Private clouds are of two types: On-premise private clouds and externally hosted private clouds. Example: eBay.
  2) *Public Cloud:*-public Cloud isprovisioned to the general public. Application is hosted on the Hosting Providers location (Vendors). The computing infrastructure is shared between any organizations. Example: Amazon, Google Apps, Windows Azure.

3) *Community Cloud:*-Community Cloud isprovisioned for the exclusive use of a specific community. It provides the Cloud infrastructure to group of organizations. Community clouds show some overlap with GRIDs technology.

4) *Hybrid Cloud:* -Hybrid cloud is anycombination Public and private cloud infrastructures so as to achieve a maximum of cost reduction through outsourcing whilst maintaining the desired degree of control. IBM uses such type of Cloud.

5) *Meta Cloud:*- Meta Cloud incorporatesmultiple cloud infrastructures to allow for the provisioning of meta-services across boundaries and layers. It differs from Hybrid Cloud because it is independent of the underlying deployment types.

C) *The Categories of Cloud Computing Services*
   Normally Cloud Computing services divide in to following 4 categories:-

1) *Infrastructure-as-a-Service (IaaS):*-CloudProviders offering Infrastructure as a Service tout data-center space, and servers; as well as network equipment such as routers/switches and software for businesses. In essence, you rent a physical server or server colocation; you can use it as per requirement. Examples: Amazon S3, SQL Azure.

2) *Platform-as-a-Service(Paas):*- Provisioning a full hardware architecture and software framework to allow applications to run is the essence of Platform-as-a-Service. Their developers can write their code regardless of the OS behind it. Platform solution, including application development, interface and database, storage, test and so on, available to subscribers on a hosted platform remotely. Examples: Force.com, Google App Engine, Windows Azure (Platform).

3) *Software-as-a-Service(SaaS):*-Software-as-a-Service is the process of provisioning commercially available software but giving access over the net. The customer doesn't have to think about software licenses, because that is handled by the service provider. The provider also handles upgrades, patches, or bug fixes. Examples: Google Docs, Sales force CRM, SAP Business by Design.

4) *Development-as-a-service (DaaS):*- Development as a service is web based, community shared development tools. This is equivalents to locally installed development tools in the traditional (non-Cloud Computing) delivery of development tools.

Apart from these basic 4 services, other services commonly known as*aaS (Everything as a Service). Cloud computing use as below mention services also:-

1) *Storage as a Service:* - It provides theability to use storage that physically exists in a remote site.

2) *Database as a Service*: -it provides theAbility to use the services of a database hosted remotely, sharing it with others. It saves user money which he may use for purchase hardware and software

licenses.

3) *Information as a Service:* - Ability toconsume any type of information, hosted remotely, through a well-defined interface, such as an API.

4) *Integration as a Service:* - Ability toprovide a complete integration stacks from the cloud, including interfacing with applications, semantic mediation, flow control, design integration and so on.

5) *Security as a Service:* - Ability to provideessential security services remotely via the Internet. Most of the security services available are rudimentary, but some more sophisticated are also offered by cloud provider.

6) *Management / Governance as service:* - Any service that enables on-demand manages one or more cloud computing services, such as time management activity, topology, resource utilization and virtualization.

7) *Testing as a Service:-* Ability to test localsystems or using software provided cloud and testing services hosted remotely.

D) *Implementation Requirement of Cloud Computing*

When we implement or deploy anything, we need to have some basic component to deploy specific thing. Successful implementation of cloud computing requires proper implementation of certain components.

1) *The End User (Client):-*The hardwarecomponents, the application and everything else developed for cloud computing will be used by client.
2) *The Service – the Functions in Cloud Computing:-*With the help of cloudcomputing we can easily implement business processes. The processes and the services launched through cloud computing always have to deal with processes with an expected output.

3) *The Application – Backbone of Service:* -The service is often though as the application. Cloud application services deliver software as a service over the internet. On Cloud Computing platform software developers have to focus in terms of ensuring the application will work as expected. Optimization of the application is based the actual coding of developers.

4) *The Platform – "Soft Infrastructure" for the Application:-*Cloud computingplatform deliver a computing platform or solution stack as a service. It facilitates deployment of application without the cost & complexity of buying & managing the underlying hardware and software platform.

5) *The Storage – The Warehouse of Cloud Computing:-*Every application provided byservice is need to be store. Cloud computing have consistency and availability of service which will naturally require thestorage to be available all the time.

6) *The Infrastructure – The Backbone of Cloud Computing:-*Every function, serviceand the ability of storage to provide the needed data are only possible through optimized infrastructure.

III. IMPACT OF CLOUD COMPUTING

The concept of cloud computing has spread rapidly through the information technology industry. The ability of organizations to tap into computer applications and other software via the cloud and thus free themselves from Building and managing their own technology infrastructure seems potentially irresistible.

Phill Robinson, chief executive of IT services and software company Iris Software say

"We're moving to cloud computing because it's a better economic model,"

The research shows that more than 30% of enterprises worldwide are deploying at least one cloud solution. Why Companies move towardacquiring Cloud Computing?

Here is a rundown on most of the current reason for acquiring cloud computing by the companies.

1) *Data backup:* -All the major cloudstorage providers have robust backup procedures giving a level of

redundancy that most small & medium sized businesses and personal users.

2) *Security:-*A major cloud provider hasdedicated security IT; provide regular updates to the software and operating systems. Client need not be affording to own security professionals to maintain an internal system. Your systems are going to be more secure with a dedicated Cloud supplier.

3) *Money Saving:-*The cost of purchasingyour servers, UPS and networking gear; the floor space to store them; the electricity to keep them cool; plus an administrator to keep them running all adds up to a hefty bill at the end of the month.

4) *Deploy Projects Faster*:–Becauseservers can be brought up & destroyed in a matter of minutes, the time to deploy a new application drops dramatically with cloud computing. Rather than installing and networking a new hardware server, the new server can be dialed up and imaged in through a self-serve control console.

5) *Scale as Needed*–As your applicationsgrow, you can add storage, RAM and CPU capacity as needed. This means you can buy "just enough" and scale as the application demands grow.
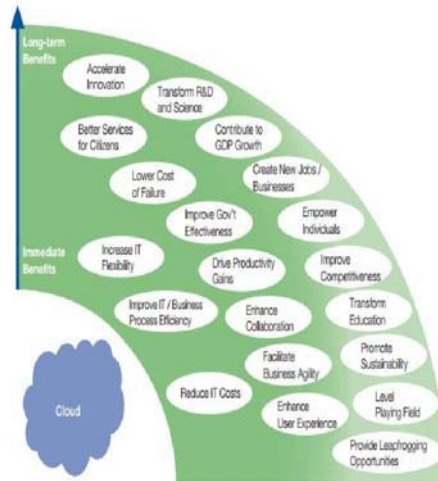
6) *Efficiency: -* Reallocating informationmanagement operational activities to the cloud offers businesses a unique opportunity to focus efforts on innovation and research and development.

7) *Environmentally Friendly:*Usage ofready-made resources tailored to your needs helps you reduce the electricity expenses. While you save on electricity, you also save on resources required to cool off computers and other components.

IV. SCENARIO OF CLOUD MARKET

"If you go forward to the 2020s a successful enterprise will probably have no chief executive, no headquarters and no IT infrastructure," Dr. James Bellini said.

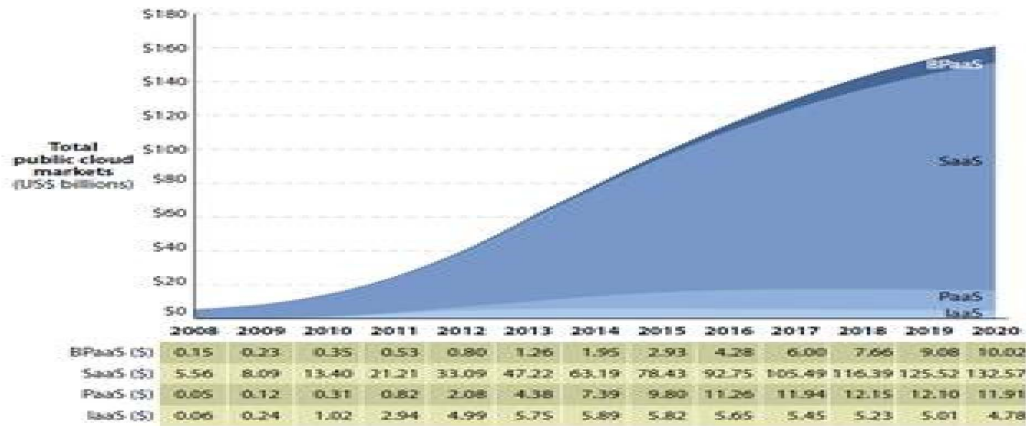*There are mostly two type of service acquire the market.*
SaaS Market:-

software as a service (SaaS) as the primary type of cloud investment with 82 percent citing usage today and 84 percent looking to SaaS as the deployment model for new applications. Some examples of SaaS services are salesforce.com (for sales force applications), Oracle/Siebel (CRM applications), Workday (for ERP applications), Citrix (meeting applications), and numerous others.
PasS Market:-

The Companies interest in PaaS as the foundation for building new applications with 75% of respondents expecting to build new apps on a PaaS platform over the next five years. Some examples of PaaS services are

PaaS salesforce.com (Force.com), Coghead, Google (Google App Engine), Yahoo (Pipes), and Dapper.net Google's application development platform, Google App Engine.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BPaaS ($)	0.15	0.23	0.35	0.53	0.80	1.26	1.95	2.93	4.28	6.00	7.66	9.08	10.02
SaaS ($)	5.56	8.09	13.40	21.21	33.09	47.22	63.19	78.43	92.75	105.49	116.39	125.52	132.57
PaaS ($)	0.05	0.12	0.31	0.82	2.08	4.38	7.39	9.80	11.26	11.94	12.15	12.10	11.91
IaaS ($)	0.06	0.24	1.02	2.94	4.99	5.75	5.89	5.82	5.65	5.45	5.23	5.01	4.78

A) Expected Future market status By IDC:-

The cloud computing forecasts as can be seen from some of the huge growth rates and market size estimates. First cloud computing survey focused exclusively on servers, IDC predicted that server revenue in the public cloud category will grow from $582 million in 2009 to $718 million in 2014. Server revenue for the much larger private cloud market will grow from $7.3 billion to $11.8 billion [about 62 percent] in the same time period, IDC said.

Here some more point about Cloud Computing market value:-

1) Mobile SaaS Market will reach $1.2 billion in 2011 and grow to $3.7 billion by 2016, with a five-year compound growth rate (CAGR) of 25.8 percent.
2) The US cloud computing market for medical imagery was at $56.5M in 2010 and is forecast to grow at a Compounded Annual Growth Rate (CAGR) of 27% during 2010-2018.
3) According to IDC, by 2015, about 24% of all new business software purchases will be of service-enabled software with SaaS delivery being 13.1% of worldwide software spending.
4) Deloitte is predicting cloud-based applications will replace 2.34% of enterprise IT spending in 2014 rising 14.49% in 2020.
5) Cisco predicts that Global cloud IP traffic will increase twelvefold over the next 5 years, accounting for more than one-third (34 percent) of total data center traffic by 2015
6) Gartner predicts Small & Medium Business (SMB) in the insurance industry will have a higher rate of cloud adoption (34%) compared to their enterprise counterparts (27%).
7) Gartner is predicting that the cloud system infrastructure (cloud IaaS) market to grow by 47.8% through 2015.

B)Expected Future market status By NorthBridge Venture Partners:-

North Bridge Venture Partners Conduct a survey on Future of Cloud Computing .in this survey, a total of 785 respondents spanning industry experts, users and vendors participated. Respondents were asked about a wide range of key issues impacting cloud computing, including drivers for cloud computing, inhibitors, best practices, sourcing, hiring, total cost of ownership(TCO), cloud's impact on multiple business sectors, and emerging cloud technologies. The survey provides many insights into the adoption of cloud computing, including the cloud configurations and applications that are forming around specific business needs including Big Data, business continuity, collaboration and storage.

Key Findings in the Survey include:-
1) Companies are accelerating their *trust incloud solutions*, with 50 percent ofrespondents confident that cloud solutions are viable for mission critical business applications.
2) *Scalability* remains the top reason foradopting the cloud, with 57 percent of companies identifying it as

the most important driver for cloud adoption.

3) *Security* remains the primary inhibitor toadoption in the burgeoning cloud marketplace with 55 percent of respondents identifying it as a concern, followed by regulatory compliance (38%) and vendor lock-in (32%).

4) *Software as a service (SaaS)* is currently82 percent of respondents citing it as in use today, and 88 percent expecting to use it five years from now.

5) *Platform as a service (PaaS)* will seesignificant growth in the next five years, with PaaS growing from 40 percent to 72 percent.

6) *Infrastructure as a service (IaaS)* will seesignificant growth in the next five years, IaaS growing from 51 percent to 66 ercent.

7) The top 3 areas in which "cloud formations" are coming together are backup and archiving (43 percent), business continuity (25 percent), collaboration tools (22 percent), and big data processing (19 percent).

8) Currently, 40 percent of respondents' are deploying public cloud strategies, with 36 percent emphasizing a hybrid approach

9) Within five years, hybrid clouds will be the emphasis of 52 percent of respondents' cloud strategies.

10) With an increase in trust of the cloud, big data is emerging as a major focus for vendors and end-users alike.

11) 80 percent of respondents identify big data as the most likely sector to be disrupted by cloud computing

12) The majority of respondents (53 percent) believe that cloud computing maintains a lower Total cost of ownership (TCO) and creates a less complex IT workflow.

V. FUTURE OF CLOUD COMPUTING

By 2020, cloud is going to be a major and permanent part of the enterprise computing infrastructure.

"In the future we will neither know, nor care where our data resides. In fact, our data will be distributed in the cloud, where it can be accessed any time, any place, on any device, by any authorized user." –Hal Varian, chief economist of Google and on the faculty at the University of California-Berkeley.

Here we are describing 10 ways in which the cloud of 2020 will look radically different to the way it does today.

1) *Software floats away from hardware:* -Company infrastructure will be a "highly abstracted space", where software is written in such a way that it goes throughseveral filters before it interacts with hardware. This means that front-end applications, or applications built on top of a platform-as-a-service, will be hardware agnostic. By 2020, if you were to ask a CIO to draw a map of their infrastructure, they would not be able to, says David Merrill, chief economist of Hitachi Data Systems. "He will be able to say 'here are my partner providers'," he says, but he will not be able to draw a diagram of his infrastructure.

2) *Modular software:*-With the growth in thesize and complexity of individual programs, the software development process will place an emphasis on modular software so that large applications with components that can be modified without shutting down the program.

3) *Social software: -* The infrastructure andsoftware of a datacentre will mould itself around the task required. Developers will no longer need to worry about provisioning storage, a server and a switch, all of this will happen automatically. It will be a social-media evolution," Merrill says.

4) *Commodity: -* "Servers and storagedevices will look like replaceable sleds," says Frank Frankovsky, Facebook's VP of hardware design hardware rules, by breaking infrastructure down into its basic components, replacements and upgrades can be done quickly.

5) *Low-power processors and cheaper clouds:*-We're around a year away from low-power ARM chips coming to market with a 64-bit capability, and once that happen then enterprise software will bedeveloped for the RISC chips, allowing companies to use the power-thrifty processors in their datacentres, and thereby cut their electricity bills by an order of magnitude.

6) *Fasterinterconnect: -* Joseph Reger, chieftechnology officer of Fujitsu Technology Solutions Predict there

will be a "very rapid commodification" of high-end interconnect technologies, leading to a very cheap, very high-performance interconnect. This will let information be passed around datacenters at a greater rate than before, and at a lower cost, letting companies create larger applications that circulate more data through their hardware, potentially allowing developers to build more intelligent, automated and complex programs.

7) *Datacentres become ecosystems:* - Clouddatacentres will "become much like a breathing and living organism with different states", Reger says. datacentres function much more like ecosystems, with an over-arching system ruling equipment via software, with hardware controlled from a single point, but growing and shrinking according to workloads. In Data centers changes and corrections will be automatically made.

8) *Clouds consolidate:* - there will be adegree of consolidation in the cloud provider market because *of* huge capital costs associated with running clouds.

9) *The generational shift:*-By 2020, a newgeneration of CIOs will have come into companies, and they will have been raised in a cloudy as-a-service world. There will be an expectation that things are available "as-a-service". Merrill says: "Our consumption model is changing as a generational issue and we have these archaic, tax-based, accounting-based rules that are prohibiting innovation,"

10) *Clouds will stratify:*-Today clouds aredifferentiated by whether they provide infrastructure-as-a-service, platform-as-a-service or software-as-a-service capabilities, but by 2020 more specialized clouds will have emerged. According to Forrester, we can expect things like 'middle virtualization tools' and 'dynamic BPO services' to appear by 2020, along with a host of other inelegant acronyms. In other words, along with some large providers offering basic technologies like storage and compute, there will also be a broad ecosystem of more specific cloud providers, allowing companies to shift workloads to the cloud that would be dealt with by very specific on-premise applications.

VI. CONCLUSION

Independent research firm Forrester Research expects the global cloud computing market to reach $241 billion in 2020 compared to $40.7 in 2010, according to a new Forrester report called "Sizing the Cloud" he cloud computing market is therefore forecast by Visiongain to record strong and continuous growth over the next five years, especially in the developed world. The research shows that more than 30% of enterprises worldwide are deploying at least one cloud solution. There are many benefits of migrate toclouds due to outstanding characteristics like Cost savings, power savings, green savings, Pay peruse, Instant Scalability, Advanced security technologies, Reliability, Broad network access, Virtualization, increased agility in software deployment. So, with these lots of characteristics of cloud we able to say this technology are future of computer science development and required much and much research.

VII. ACKNOWLEDGMENT

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