



A Systematic Review Of Cloud Computing In Healthcare Domain

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Agenda:

- ✓ Introduction
- ✓ Objectives
- ✓ Methodology
- ✓ Review of Literature
- ✓ Result
- ✓ Conclusion



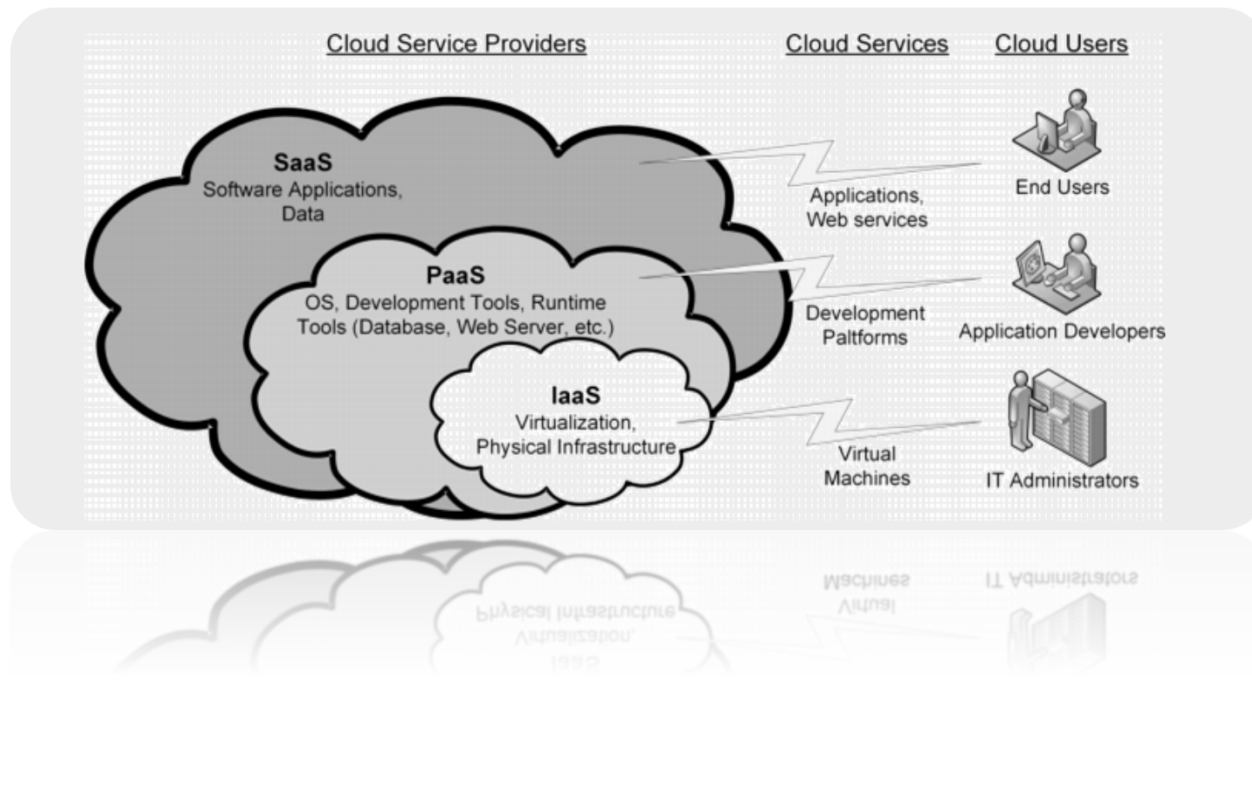
Introduction:

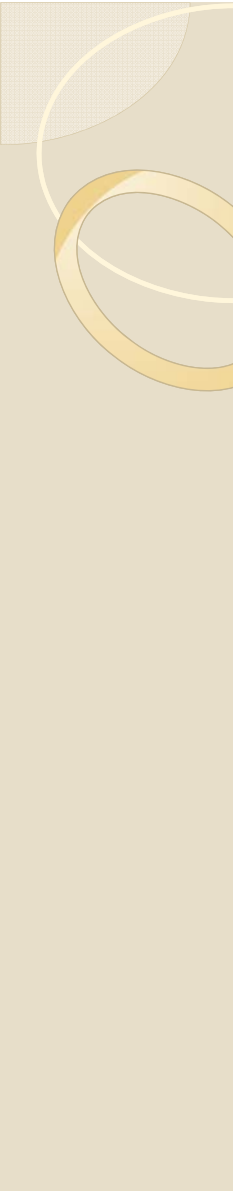
The term cloud computing is defined as “A *model for enabling ubiquitous, convenient, on demand access to a shared pool of configurable computing resources*” ¹.

Cloud computing is an evolving approach to shared infrastructure in which huge pools of systems are connected together in private or public networks to provide IT services.



Service Models of Cloud Computing:





Deployment Models of Cloud Computing:

Private cloud- Managed by the company or could be done by a third party. The servers may exist on premises of the company or off premises i.e. on a different geographical location.

Community cloud- Shared by many groups or companies and supports a particular community which has communal concerns like security requirements, mission, compliance and policy considerations.

Public cloud- Infrastructure is available to public as well as to an industry group but is owned by an organization selling the services of the cloud. The servers are off premises.

Hybrid cloud- Infrastructure is alignment of two or more than two clouds (community, private or public) that remain an exclusive entity but are bound together by proprietary technology or standardized, which supports application and data portability like cloud bursting for load balancing between clouds.



Research Question:

- What is the current scenario and trends of cloud computing in healthcare domain?
- What is the extent of use of healthcare It products with cloud computing in various locations?



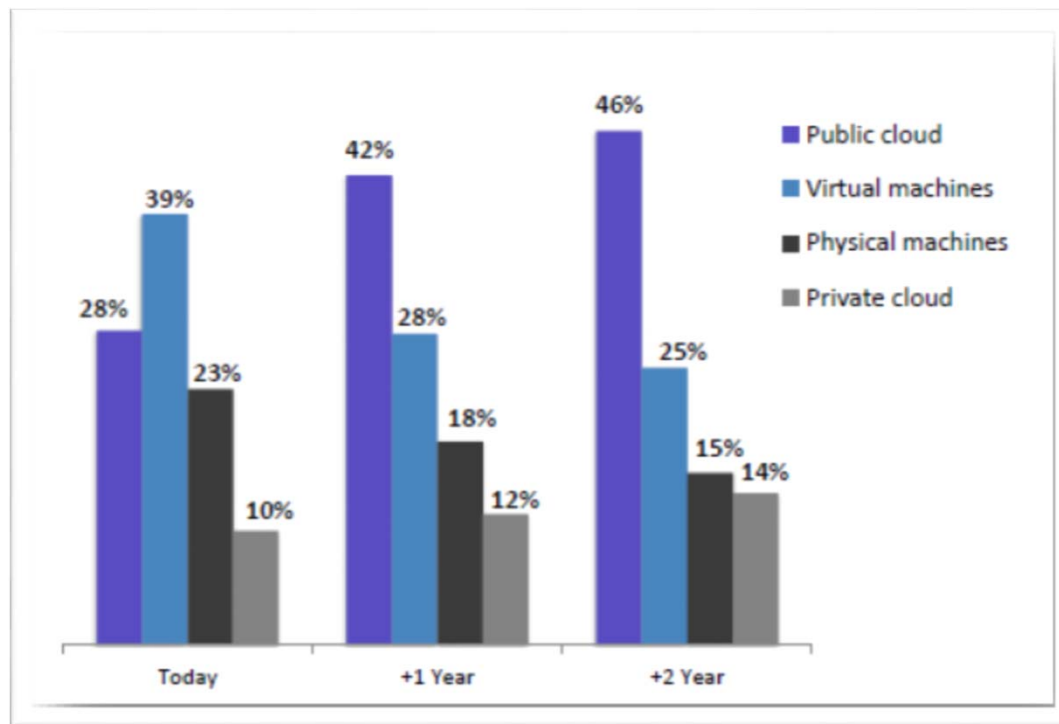
Objectives:

- i. To understand the current scenario & trends of cloud computing in healthcare.
- ii. To identify the challenges and opportunities of cloud computing in healthcare.
- iii. To compare cloud computing in healthcare among various locations.
- iv. To analyze various healthcare IT products that utilize cloud computing.

Methodology:

A descriptive study was carried out for three months i.e. February 2017 to May 2017 in which relevant articles, journals, e-books, projects and papers published on the topic were reviewed.

“We are witnessing a shift from legacy IT services to cloud-based services. Cloud services are growing due to organizations pursuing a digital business strategy” says Sid Nag, Research Director, Gartner.



CAGR 21.24%
of during 2017-
2024. ⁴

USD 13
billion by
2023. ⁴

Review of literature-

- Current trends aim towards retrieving information anytime, anywhere, which can be achieved when moving information to the cloud.
- The new delivery model can make healthcare more efficient and effective at a lower cost to budget.
- In situations characterized by growing aging populations, decreasing resources, rising costs there is a rising interest in the conveniences provided by cloud computing for expansion of a patient-centered healthcare process and e-Health.
- Smart items available in the healthcare sector can be utilized in stationary care scenarios.



It extends the cloud to be closer to the device that act on and produces data.



- Modular Applications
- Application modules
- Big Data Access
- Smart Objects
- Embedded Systems
- Sensors and Detectors
- Adaptable Devices and WLAN
- Rich (mobile) Clients



It is concerned with the distribution of workloads between local computers and cloud servers.

A peer-to-peer (P2P) distributed ledger technology for a new generation of transactional applications that establishes transparency and trust.



Cloud computing play a critical role in comprising healthcare integration costs, leading in an era of innovations and optimizing resources.

This new delivery model can make healthcare more efficient and effective, at a lower cost to budgets, but also it brings some obstacles due to apprehensions related with safety of confidential patient information and compliance with regulations such as HIPAA.





Challenges of Cloud Computing in Healthcare:

Technical Challenges

- Availability.
- Data Management.
- Interoperability.
- Security and Privacy.

Non-Technical Challenges

- Organizational change.
- Legal Standards.
- Data Ownership.
- Service Level Agreement (SLA).
- Acceptance by user.

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- The rising maturity of healthcare IT is also helping spur chances for cloud healthcare solutions, since hospitals consider migration to the cloud only after automation, standardization and centralization of their processes.
 - North America is a foremost contributor to the cloud computing across the global market in the healthcare sector.
 - North American market, CAGR of 23.40% from 2012 to 2018.
 - The Healthcare Payer IT market for European market was at \$2908.69 million in 2013 is projected to grow to around \$3686.13 million by 2018
 - European market, CAGR of 4.9% from 2013 to 2018.
 - Asia Pacific region, will witness a faster growth rate of 7.7% per annum to reach \$4.0 billion by the end of 2015 and currently has a market size of \$3.2 billion.
 - Due to increasing EMR technology adoption, it is anticipated a spike in the next decade EMR market is expected to increase through 2025 at a CAGR of 6.2%.

Regional EMRAM Adoption Model 2015:

Stages	Cumulative Capabilities	North America	Europe	Asia Pacific
Stage 7	Complete EMR; CCD transactions to share data; Data warehousing; Data continuity with ED, ambulatory, OP	4.2%	0.1%	0.5%
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), closed loop medication administration	27.1%	4.6%	3.9%
Stage 5	Full R-PACS	35.9%	17.5%	7.4%
Stage 4	CPOE, Clinical Decision Support (clinical protocols)	10.1%	5.5%	1.7%
Stage 3	Nursing/clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology	16.4%	3.2%	0.6%
Stage 2	CDR, Controlled Medical Vocabulary, CDS, may have Document Imaging; HIE capable	2.6%	30.2%	32.7%
Stage 1	Ancillaries - Lab, Rad, Pharmacy - All Installed	1.7%	14.2%	4.9%

INDIA:



- Online Registration System (ORS), a framework that links hospitals across the country for Aadhar based appointment system and online registration.





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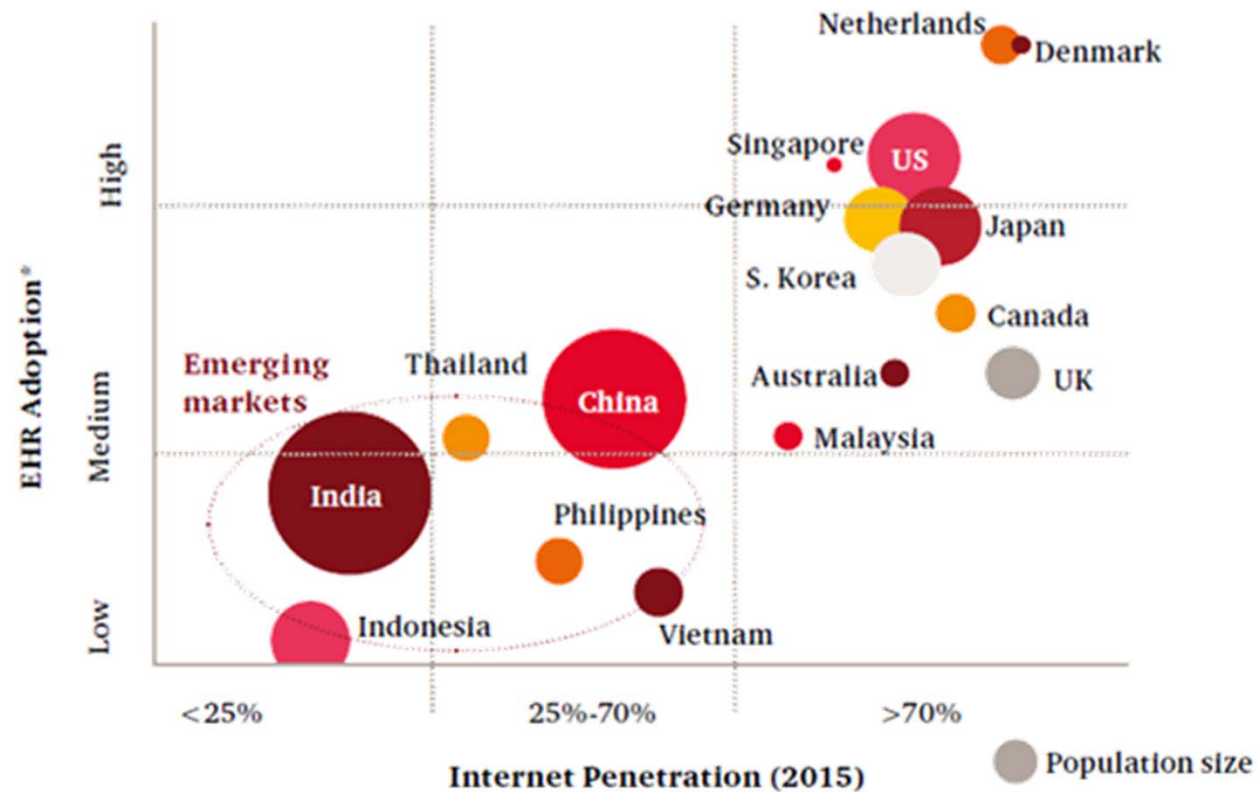


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Comparison of Internet Availability and EHR Adoption:



11) Source: The Digital Healthcare Leap, August 2016 By PWC ¹¹

