# Cloud Computing – Research Issues, Challenges, Architecture, Platforms and Applications: A Survey

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## ABSTRACT

*Cloud computing is the development of parallel computing, distributed computing, grid computing and virtualization technologies which define the shape of a new era. Cloud computing is an emerging model of business computing. In this paper, we explore the concept of cloud architecture and compares cloud computing with grid computing. We also address the characteristics and applications of several popular cloud computing platforms. In this paper, we aim to pinpoint the challenges and issues of cloud computing. We identified several challenges from the cloud computing adoption perspective and we also highlighted the cloud interoperability issue that deserves substantial further research and development. However, security and privacy issues present a strong barrier for users to adapt into cloud computing systems. In this paper, we investigate several cloud computing system providers about their concerns on security and privacy issues.*

## Index Terms

 (1) Cloud computing,

(2) architecture,

(3) challenges,

(4) cloud platforms,

(5) research issues.

## ARCHITECTURAL COMPONENTS

Cloud service models are commonly divided into SaaS, PaaS, and IaaS that exhibited by a given cloud infrastructure. It's helpful to add more Cloud service models are commonly divided into SaaS, PaaS, and IaaS that exhibited by a given cloud infrastructure. It's helpful to add more

## I. INTERODUCTION

Cloud computing is a complete new technology. It is the development of parallel computing, distributed computing grid computing, and is the combination and evolution of Virtualization, Utility computing, Software-as-a-Service(SaaS), Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS). Cloud is a metaphor to describe web as a space where computing has been pre installed and exist as a service; data, operating systems, applications, storage and processing power exist on the web ready to be shared.

To users, cloud computing is a Pay-per-Use-On-Demand mode that can conveniently access shared IT resources through the Internet. Where the IT resources include network, server, storage, application, service and so on and they can be deployed with much quick and easy manner and least management and also interactions with service providers. Cloud computing can much improve the availability of IT resources and owns many advantages over other computing techniques. Users can use the IT infrastructure with Pay-per-Use-On-Demand mode; this would benefit and save the cost to buy the physical resources that may be vacant.

**Organization.** The rest of the paper is organized as follows: In Section II, we define architectural components such as Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS) and Data as a Service (DaaS). Then, we compare cloud and grid computing.
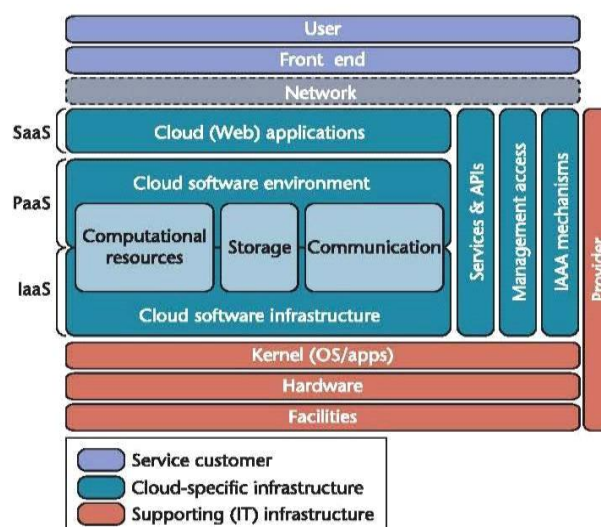


**Fig 1. The cloud reference architecture.**

## II. CLOUD COMPUTING

The basic term of cloud computing is used for storage and accessing the data of your computer hard drive. Basically the cloud computing is totally based on Internet computing.

## III. TYPES OF CLOUD COMPUTING ARCHITECTURE

### A.Software as a Service (SaaS)

**SaaS**: SaaS(software as a service) basically this service provide facility access to software and you can also using functions remotely as a web based service. And may also be referred to provide facility for hosted simply applications.
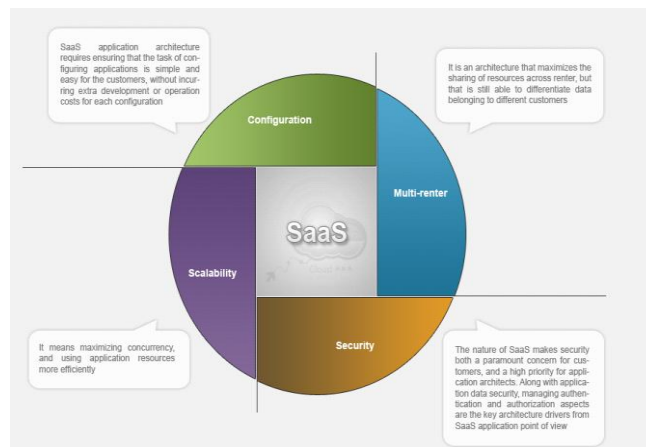
**Fig 2. SaaS Architecture**

## B. Platform as a Service (PaaS)

**Paas:** PaaS(platform as a service) this is the second component of cloud computing environment.paas is provides environment and platform that you can bulid applications and services above the internet. and paas is also provide facility for user purpose for hosted in cloud service and accessed via a web browser. it is abstracted the lower-level infrastructure facility provide.
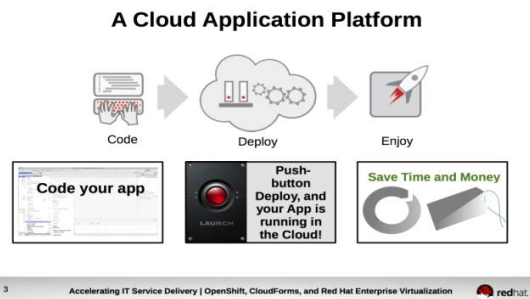


**Fig 3. PaaS Architecture**

## C. Infrastructure as a Service (IaaS):-

**IaaS**: This is a basic layer of cloud computing architectural component. iaas(infrastructure as a service)basically use for that provides virtualized computing resources belong to the internet.

IaaS is provides for most important hardware,servers,software,storage and network

components also provides by IaaS service.and you can also include any type of software in IaaS service.
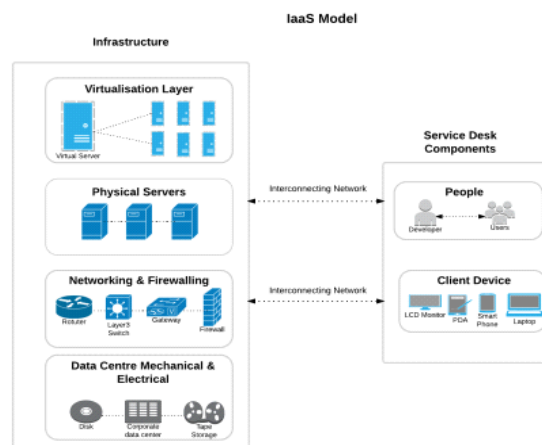
**Fig 4. IaaS Architecture**

## D. Data as a Service (DaaS)

**DaaS:** DaaS(data as a service) the data as a service is a cousin of (SaaS)software as a service. Data as a service is provide information for distribution model in which files (including like text, images, sounds and videos)are available to costumers over a network & typically the internet.
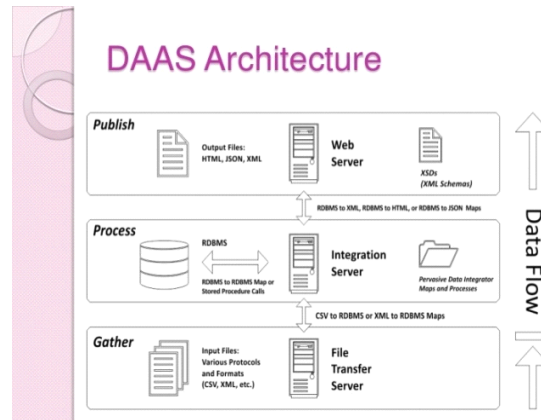


**Fig 5. DaaS Architecture**

## IV. CHARACTERISTICS OF CLOUD COMPUTING

(1) Applications programming interface.

(2) Device and location independence.

(3) Virtualization.

(4) Reliability.

(5) Maintenance.

(6) Security.

(7) Performance.

(8) Agility.

**Types of Cloud**

(1) Public Cloud

(2) Private Cloud

(3) Community Cloud

(4) Hybrid Cloud

(1) **Public Cloud**: - A public cloud model is standard cloud computing model. The basic use of public cloud model is applications and storage. This service is providing free or pay-per-usage policy for any type of users.

(2) **Private Cloud**: - A private cloud is a $2^{nd}$ type of cloud computing. The private cloud is similar is to a public cloud because they provide scalability and self-service facility.

(3) **Community Cloud**: - The community cloud is a multi-tenant infrastructure. They provide specific community for common levels of security, compliance, jurisdiction, privacy etc.

(4) **Hybrid Cloud**: - The Hybrid cloud is a mixture of public or private cloud. The hybrid cloud provides facility for allowing data and applications shared them for using two different platforms public or private.
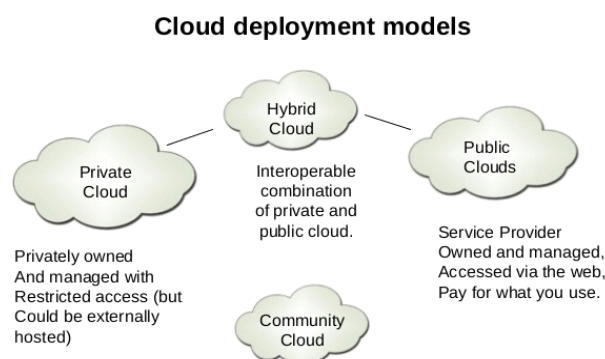
**Cloud deployment models**



**Fig 6. Three-Basic-Cloud-Computing-Infrastructure- Models**

## V. CONCLUSION

This paper discussed the architecture and popular platforms of cloud computing. It also addressed challenges and issues of cloud computing in detail. In spite of the several limitations and the need for better methodologies processes, cloud computing is becoming a hugely attractive paradigm, especially for large enterprises.

Cloud Computing initiatives could affect the enterprises within two to three years as it has the potential to significantly change IT.

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