A Survey on Various Challenges and Security Issues in Cloud Computing

[1]Reenu Sindhu, [2]Dr. Aman Jain

[1]Research Scholar, Singhania University, Jhunjhunu, Rajasthan.

[2]Professor, Deptt. of Computer Science,
Maharishi Arvind Institute of Science and Management, Jaipur

Abstract: - *Cloud computing is a type of computing that is based on the internet. It provides various hosting and delivering services over the Internet. It provides the computational resources (Server, Storage, OS and Network) to user as service, based on the demand of user. Cloud computing has gained its popularity by providing cheap and easy access to IT (Information Technology). However, despite the fact that demand for cloud based resources is increasing day by day but on the other side security is regarded as a serious issue on which work has to be done. We also address the characteristics and applications of several popular cloud computing platforms. this paper, we described Cloud Computing, Architecture of Cloud Computing, Characteristics of Cloud Computing, and different Services and Deployment model of Cloud Computing. And we focus on the discussion of Ant Colony Optimization technique used by different authors.*

Keywords—CC, SaaS, PaaS, IaaS, Optimization Techniques.

I. INTRODUCTION

Cloud computing is a mixture of distributed, parallel, multi-tenant computing model founded on different technologies such as virtualization, grid, service and autonomic computing. Cloud computing technology allows users to acquire strong computing and memory resources and at the same time, user is not interested in location and settings of these resources. Using mentioned service, it is possible to provide efficient use of computing and memory resources at data centers, reduction of problem solution time and less loading of the network [1].

Today is the era of IT and internet which have converged various services related to hardware (servers, networks, storage etc), software (security and finance monitoring services, testing modules, CRM modules, ERP software and more), platforms and communications converge to a particular window. The entire these services jointly known as cloud. Cloud Computing represents the outsourcing of these services to an external service provider and involves three basic services [2]:

1. Resource Discovery- Among the pool of cloud resources, the one which satisfies the requests is selected.
2. Monitoring- it is important to monitor the usage of cloud resources so that they could be utilized efficiently and effectively.
3. Load Balancing- Each host must have balanced workload to ensure that hosts should neither be over-utilized nor under-utilized.

With help of cloud computing resource of software and hardware could be shared reasonably to avoid shortcomings of knowledge redundancy occurred in early distributed network [7].
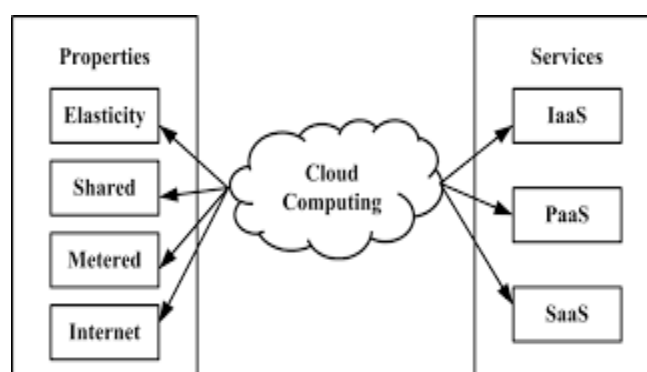

Fig.1 Cloud Computing Architecture

II. TYPES OF CLOUDS

Various type of clouds are private cloud, public cloud and hybrid cloud.

1. Private cloud: this cloud can be available for a single organization only. Infrastructure is managed for one organization. Private cloud reliable level of safety and confidentiality. Concur technology is example of private cloud.

2. Public cloud: public cloud computing resources are dynamically available for all the users over the internet via web applications. These are run by the third parties. These cloud can be used by general public. This type of cloud owned by Google or Amazon, Microsoft.

3. Hybrid cloud: Cloud is a combination of 2 or more cloud is known as hybrid cloud. It can too be defined as many clouds that are combined mutually in a way that allow data to be moved simply from one deployment system to another [3].

III. CHARACTERISTICS OF CLOUD COMPUTING

Cloud computing exhibit some key characteristics used for instance Cost is claimed to be reduced and in a communal cloud release model capital expenditure is transformed to operational expenditure. This is imagined to lower barriers to entry, as infrastructure is usually provided by a third-party and doesn't got to be purchased for one-time or infrequent intensive computing tasks. rating on a task computing resource is superior grained with procedure based alternative and less IT skills are compulsory planned intentional for implementation (in-house). As infrastructure is off-site (normally provided through a third-party) and accessed through the web, users will connect from all over. Virtualization technology allow server and storage space devices to be shared and use be improved. Applications is basically migrated from one physical server to a Several. Reliableness is superior if various unneeded sites are used, that build well-designed cloud computing right for business continuity and disaster perfection.

Quality and elasticity through dynamic ("on-demand") provisioning of possessions on a fine grained, self service source secure to period of time, Even as not users having to engineer for peak masses. Performance is monitored, and reliable and loosely coupled architectures are made mistreatment internet services since the system interface. Maintenance of cloud computing applications is simpler, as a result of they are doing not ought to be put in on every user's pc and may be accessed from completely different places.

Cloud computing acquire the following key characteristics [4] :

1. On demand self service : A consumer will unilaterally situation computing ability,such as server time and network storage space, as compulsory automatically even if not require human interaction with every service's supplier.

2. Broad network access : Cloud computing provide the users with numerous capabilities above the network that are accessed through ordinary mechanisms that promote use through heterogeneous skinny or broad consumer platforms (e.g., mobile phones, laptops etc.).

3. Resource pooling : The provider's computing resources are pooled to currentley few consumers through a multi-tenant model, through totally dissimilar physical and virtual resources dynamically appointed and reassigned in keeping with client demand. sample of resources embody processing, storage, memory, network bandwidth, and virtual machines.

4. Rapid elasticity : Capabilities are commonly quick and elastically provisioned, in fewl cases automatically, to speedily scale out, and speedily free to quickly scale in. To the buyer, the capabilities offered for provisioning usually seem to be unlimited and might be purchased in any amount at any time.

IV. CHALLENGES OF CLOUD COMPUTING

Cloud computing: A cloud computing is emerged as a very important answer providing enterprises a price effective model to ease their computing wants. due to this emergence technologies, cloud computing has placed several challenges in several aspects.

Some of these challenges are:

Security and Privacy: This aims to provide data security protection through cloud. This security and privacy issues may be defeat with employing encryption, security hardware and security application.

 Portability: It the flexibility to move applications and its associated information between one cloud supplier and another or between public and personal cloud environments.

Interoperability: Application on one platform ought to be ready to incorporate services from another platform. The incorporation is created potential through net services.

Computing Performance and Bandwidth Cost: More money is spent for the bandwidth rather than that spent for the hardware. In order to deliver data intensive applications on cloud requires high network bandwidth, which results in high cost. If delivery of information is completed at low bandwidth, then it doesn't meet the desired computing performance of cloud application.

Reliability and Availability: It is necessary for cloud systems to be reliable and strong as a result of most of the companies are currently changing into passionate as regards services provide through third-party.

V. CLOUD COMPUTING SECURITY ISSUES

Cloud computing security as "Cloud Computing security (sometimes stated merely as cloud security) is an evolving sub-domain of pc security, network security, and, additional broadly, data security. It relatess to a broad set of tecniques, technologies, and controls deployed to defend data, applications, and additionally the associated infrastructure of cloud computing.
The cloud system is operation on internet and the security tribulations in the internet as well can be set up in the cloud system. The cloud system is not different than the traditional system in the PC and it can meet other special and new security problems. The main concern regarding cloud computing are security and privacy.

A. Gartner's Seven Security problems with Cloud Computing Well-known Gartner's seven security problems that cloud purchasers ought to avert are mentioned below : Privileged user access: an inherent level ofrisk is brought on once sensitive knowledge processed outside the enterprise as outsourced services bypass the physical, logical and personnel controls IT shops exert more in house programs.

Regulatory compliance: Even once the info is control by a service supplier, customers are control accountable for the safety and integrity of their own knowledge. Rational service providers are subjected to external audits and security certifications

Data location: Users don't know exactly where their data is hosted while using the cloud. Distributed information storage may be a usual manner of cloud suppliers that may cause lack of management and this is often not sensible for purchasers who have their information in native machine before moving from native to cloud.

Data segregation: Data within the cloud is typically• within the shared atmosphere aboard information from different customers. encryption is effective however isn't an efficient cure. encryption and decoding could be a classic way to cover security problems however it couldn't guarantee to supply excellent answer for it.
Recovery: Various queries like if a cloud• supplier broke or some issues cause failure in cloud server what's going to happen to users' knowledge? will cloud supplier restore information completely? furthermore purchasers like don't get permission to third- party firms to manage their data. This problem will reason an impasse in security. Investigate support: because of logging and knowledge for multiple customers even be|is also} co-located and should also be unfold across an ever dynamic set of hosts and knowledge centres, Cloud services becomes especially difficult to investigate.
 Long-term viability: The purchasers should make certain their information can stay obtainable if by any probability cloud computing supplier go broke or get acquired by a bigger company with may be new policies.

B. Three Parties' Security problems with Cloud Computing
The analysis of the safety risks of cloud computing from the attitude of client, service supplier and government are as follows.

- Security risks confronted by clientsThe security risks that customers have to be compelled to confront in cloud computing atmosphere includes the period of cloud computing atmosphere that brings nice depress to the boldness of shoppers can't be avoided totally; the leak of economic secrets which means a nightmare for customer cannot be avoided totally and how to face the privilege status of cloud service provider and the security concerns such as fault elimination, damage compensation and business migration etc.
- The security risks confronted by service suppliers. the safety risks that service suppliers got to confront in cloud computing atmosphere includes the way to assure the long-term secure operation of the cloud information centre and isolate the fault to cut back its influence to a smallest extent are the safety risks that service suppliers ought to face with; the way to fight against varied the lots of} and aggressive network hackers might be a disturbing security drawback and intended for purchasers among a choice of demands, the technique to effectively and strongly control these customers and identify and block the malicious customers is any more unavoidable task. the protection risks confronted through government.

- The security risks that government administrators require to confront in cloud computing atmosphere includes how to enhance the security safety of a massscale data centre is one important concern; how to securely manage the numerous and various scale cloud service providers and how to evaluate and rank the security level of cloud service providers and the security credit of cloud customers, and publish the proactive alarm of malicious programs.[6]

VI. ACO

A. Ant Colony Optimization (ACO) [7]:

Dorigo et.al. adopted the idea of ants' hunting behaviour and planned a man-made colony of ants algorithmic rule. The algorithmic rule was referred to as the ant Colony optimisation (ACO), and aimed toward resolution tough combinatorial improvement issues. The ACO was originally applied to resolve the classical spokesperson drawback, wherever it absolutely was shown to be an efficient} tool find good solutions. The ACO has also been with success applied to different improvement issues as well as data mining and telecommunications networks.

VII. SECURITY IN CLOUD COMPUTING

Data security According to the survey through previous papers, Data security is regarded as an important research topic in cloud computing. The major issues related to data security include data integrity, data availability, data confidentiality, transparency of data and control over data where data resides. There are various aspects for providing data security such as by providing access controls and encryption methods. The service provider must be ensuring that their infrastructure that providing is secure and client's data remain protected. On the side of client, they should look into the security measures related to data that what are the security techniques are provided by cloud provider. Techniques provided are the choice of cloud provider. Techniques comprise of various encryption methods like various algorithms are there such as AES, RSA etc. As data is stored in the cloud, there is threat to the data from the unauthorized user. To prevent this access control mechanisms should not be ignored . Cloud provider should provide authentication method which checks the authenticity of the user to prevent threat to critical data. There are various authentication schemes such as SSL, PKI, CHAP which checks authenticity of the user. After authentication, authorization can be provided which limits the access of the user [8].

VIII. LITERATURE SURVEY

Dam S et al. [9], in this paper, proposed an Algorithm is based on GA for solving load balancing problem among Vms through a combination of a GA and gel (gravitational emulation local search). GA has global nature towards the problem space where a gel searches. Authors find 2 fitness functions then apply mutation, crossover and selection.

Pan K, et al. [10], in this paper, proposed an Algorithm is based on PSO Which is used by readjusting the definition of particle's position and velocity and rules for updating, correspondingly modifying its fitness value. This mechanism takes the characteristics of complex networks into consideration to establish a corresponding resource-task allocation model.

Pardeep Kumar et al. [11], in this paper, states that planning may be a vital drawback in Cloud computing, as a result of a cloud supplier should serve several users in Cloud computing system. thus planning is that the major issue in establishing Cloud computing systems. a decent planning technique additionally helps in correct and efficient utilization of the resources. several planning techniques are developed by the researchers like Genetic algorithmic rule, Particle Swarm improvement, Min-Min, Max-Min etc. This paper proposes a replacement planning algorithmic rule that is an improved version of Genetic algorithmic rule. within the planned scheduling algorithmic rule the Min-Min and Max-Min planning strategies are incorporate in normal Genetic algorithmic rule. they need designed and tested an algorithmic rule that is in a position to schedule multiple jobs on multiple machines in an efficient manner specified the roles take the minimum time for completion.

Djabir Abdeldjalil Chekired et al. [12] This paper considers the problem of plug-in EVs at public supply stations (EVPSS). A new communication architecture for smart grid and cloud services is introduced. Scheduling algorithms are proposed in order to attribute priority levels and optimize the waiting time to plug-in at each EVPSS. To the best of our knowledge, this is one of the first papers investigating the aforementioned issues using new network architecture for smart grid based on cloud computing. We evaluate our approach via extensive simulations and compare it with two other recently proposed works, based on real supply energy scenario in Toronto. Simulation results demonstrate the effectiveness of the planned approach once considering real EVs charging-discharging masses at peak-hours periods.

Lihui Luo et al. [13] In this study, we take advantage of the software and hardware resources of the Science Cloud to establish a prototype system for LSM applications. First, pre-processing and post-processing are crucial elements of LSMs, thus we tend to specifically designed a freely obtainable integrated software package known as "PPLSMS" (for

the pre- and post-processing of LSMs) with completely different scripting languages and datasets, which may be designed on the cloud computing platform. Second, we tend to developed a dedicated internet portal for LSMs supported the cloud computing platform with the representational State Transfer (Restful) application programming interface, which allows the operation of functions such as parameter and data selection, model configuration, as well as customization of the output, statistics and visualization through a Web browser. Ultimately, various basic steps were on hand to operate the Web portal for LSM applications. The system integrated datasets and approaches may serve as a practical means to facilitate the simulation of LSMs.

Albert Jonathan et al. [14] in this paper, we tend to present Nebula: a spread edge cloud infrastructure that explores the utilization of voluntary resources for each computation and knowledge storage. We tend to describe the light-weight Nebula design that allows distributed knowledge-intensive computing through variety of optimisation techniques together with location responsive data and computation assignment, reproduction, and improvement. We tend to valuate Nebula performance on an emulated volunteer platform that spans over fifty Planet research laboratory nodes distributed across Europe, and show however a typical data-intensive computing framework, Map Reduce, is simply deployed and run on Nebula. We show Nebula Map Reduce is robust to a wide array of failures and substantially outperforms other

wide-area versions based on emulated existing systems.

Justinas Januleviþius et al. [15] This paper deals with cloud computing security management. It offers an ontology, designed by the authors of the paper, specifically built to deal with cloud security controls covering the most important documents of the domain of cloud security management and the implementation of the proposed ontology to an enterprise architecture modelling language.

Lei Zhang et al. [16] this paper puts forward a non-cooperative game based task scheduling and computing resource allocation algorithm NG TSRA. Firstly, we use non-cooperative game to model the task scheduling and computing resource allocation process of the servers in the cloud computing system, and the server's utility function is modeled as unit power efficiency, then we prove the existence of Nash Equilibrium point of the game, and finally use a Lagrange multiplier-based distributed iteration algorithm to resolve the game. The experimental results show that the proposed algorithm can improve the average power efficiency of the cloud computing system.

IX. EXPERIMENTAL RESULT AND ANALYSIS

For implementing the proposed algorithm, CloudSim toolkit has been used for modelling in a cloud environment. Extensive experiments have been performed on the basis of simulation strategy. To verify the effectiveness of the proposed LB-ACO algorithm, our present the evaluation comparisons to the most popular algorithm.

A. Simulation Model: To get our results of LB-ACO, we used Intel Core i5- 3373U CPU @ 1.8 GHz CPU and 6 GB RAM system. The LB-ACO is simulated using Cloudsim Toolkit and the performance is evaluated in terms of Load balancing and makespan. For the experiment, independent tasks are considered, so no task is dependent on other tasks. The transmission rates of the links are presumed to be distributed uniformly between 40-10000 Mbps The parameters used for simulation analysis are detailed in Table 1.

```
<terminated> Main [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (Nov 28, 2017, 1:49:58 PM)
------------------ANT COLONY OPTIMIZATION------------------
Use the parameter '-p' for custom settings.
Otherwise the default values will be:
Ants per epoch:          100
Epochs:                  100
Evaporation Rate:        0.1
Alpha (pheromone impact): 1
Beta (distance impact):   5
```

Table 1: Scheduling based on ACO parameters

α	β	ρ	τ	ξ	Imax	Ants	Task	VM
1	5	0.4	0.5	0.1	2	10	20-100	9-25

CONCLUSION

Cloud computing could be a computing service paradigm that charges underneath the premise of the quantity of resources consumed i.e. pay per use constraint. Cloud computing make possible to access application and data from somewhere so this has become new technology. CC can be defined as distributed system. There is an amount of inter-connected computer in cloud. It is a model that facilitates On-Demand access and charges under the basis of quantity of resources consumed. Cloud allows the client to access the information anywhere at any place all over the world. Instead of maintaining all the in own drive or updating application for your own requirements, you can use a service over the internet. CC allows survives to individuals and to businesses to use of s/w and h/w. These services are controlled by the third parties. Cloud services include online file storage, web mail, and online business applications.

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