iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** I **Month of publication:** January 2019

DOI: http://doi.org/10.22214/ijraset.2019.1003

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue I, Jan 2019- Available at www.ijraset.com

An Optimal Cloud Resource Provisioning (OCRP) Algorithm on-Demand and Reservation Plans

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Abstract: ***In cloud computing, cloud providers can offer cloud consumers two provisioning plans for computing resources, namely reservation and on-demand plans. In general, cost of utilizing computing resources provisioned by reservation plan is cheaper than that provisioned by on-demand plan, since cloud consumer has to pay to the provider in advance. With the reservation plan, the consumer can reduce the total cost of the resource provisioning. However, the best advance reservation of resources is difficult to be achieved due to the uncertainty of consumer's future demand as the reservation may lead to either under provisioning or over provisioning and providers' resource costs. The on-demand resource provisioning is very expensive. To address this problem, an optimal cloud resource provisioning (OCRP) algorithm is adopted. The demand and price uncertainty is reviewed***

Keywords: OCRP, Cloud Computing, Resource Provisioning

I. INTRODUCTION

A. *Cloud Computing*

Cloud computing is a large-scale distributed computing paradigm in which a pool of computing resources is available to users called cloud consumers via the Internet. Computing resources, e.g., processing power, storage, software, and network bandwidth, are represented to cloud consumers as the accessible public utility services. Infrastructure- as-a-Service (IaaS) is a computational service model widely applied in the cloud computing par diagram .In this model, virtualization technologies can be used to provide resources to cloud consumers. The consumers can specify the required software stack, e.g., operating systems and applications; then package them all together into virtual machines (VMs). The hardware requirement of VMs can also be adjusted by the consumers. Finally, those VMs will be outsourced to host in computing environments operated by third-party sites owned by cloud providers. A cloud provider is responsible for guaranteeing the Quality of Services (QoS) for running the VMs. Since the computing resources are maintained by the provider, the total cost of ownership to the consumers can be reduced.

B. *Resource Provisioning*

In cloud computing, cloud providers can offer cloud consumers, provisioning plans for computing resources. E.g., processing power, storage, software, and network bandwidth, are represented to cloud consumers as the accessible public utility services. Modality of computing characterized by on demand availability of resources in a dynamic and scalable fashion are achieved by cloud computing. The term resource here represents infrastructure, platforms, software, services, or storage [2]. This cloud computing services allow users to lease computing resources from large scale data centres operated by service providers. Infrastructure as a Service (IaaS) is providing general on-demand computing resources such as virtualized servers or various forms of storage. To manage its resources in inefficient way is the responsibility of the cloud service provider, so that the cloud user needs can be met when needed.

II. REQUIRNMENT ANALYSIS AND SYSTEM DESIGN

A. *Existing System*

The main focus of this project is search logs, our results apply to other scenarios as well. For example, consider a retailer who collects customer transactions. Each transaction consists of a basket of products together with their prices, and a time-stamp. This case can be applied to publish frequently purchased products or sets of products. This information can also be used in a recommended system or in a market basket analysis to decide on the goods and promotions in a store.

1) *Disadvantages:* The results show that yields comparable utility to OPSE while at the same time achieving much stronger privacy guarantees.

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B. Adopted System

The adopted system is an optimal cloud resource provisioning (OCRP) algorithm to provision resources offered by multiple cloud providers. The optimal solution obtained from OCRP is obtained by formulating and solving stochastic integer programming with multistage recourse. We have also used Benders decomposition approach to divide an OCRP problem into sub problems which can be solved parallel. Furthermore, we have used the SAA approach for solving the OCRP problem with a large set of scenarios. The SAA approach can effectively achieve an estimated optimal solution even the problem size is greatly large. From the results, the algorithm can optimally adjust the trade-off between reservation of resources and allocation of on-demand resources.

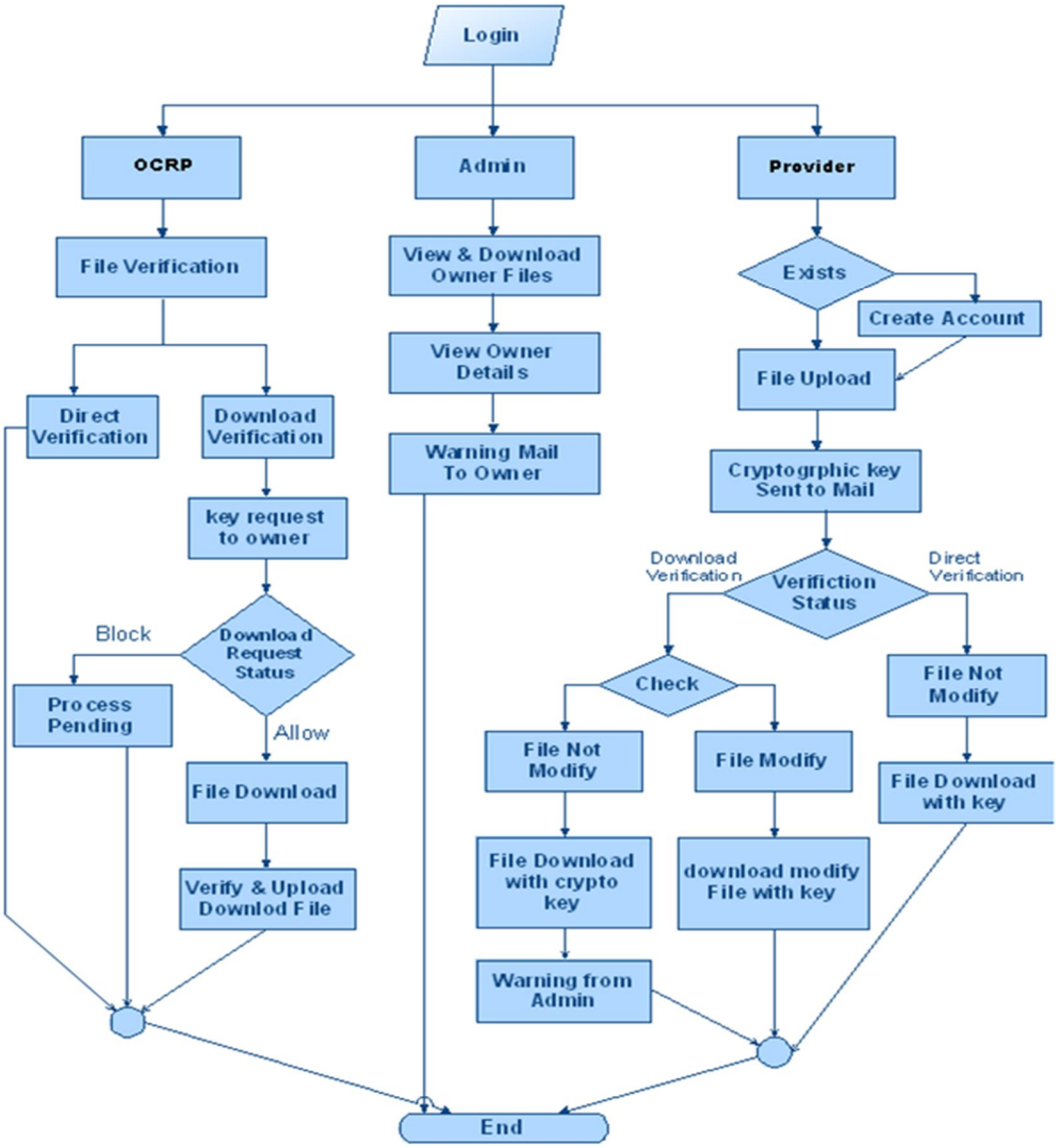

Fig 2.1 Overall Flow diagram

C. System Design

The DFD is also called as bubble chart. It is a simple graphical formalism that can be used to represent a system in terms of input data to the system, various processes are carried out on the data, and the output is generated by the system.

1) *Data Flow Diagram:* Data flow diagram describes the flow in which the project works. The first step is login by either admin, broker (OCRP), provider or user. The OCRP does the file verification directly or by download verification. The OCRP decides the authority to both the user and the provider. The admin acts as the overall administrator of the cloud. Provider is the one who provisions the data for the cloud. There can be multiple providers for a cloud. The users are simply the end recipients who access the file. They only have the authority to download and not to upload files

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III. SYSTEM IMPLEMENTATION

A. *System Implementation*

Implementation is that stage of the project when the theoretical design is turned into a working system. After testing the modules successfully, the necessary privileges are given to the users. All the users are requested to handle the system carefully. The real time problems that occur are successfully solved. The objective is to put the tested system into operation.

1) *OCRP Algorithm:* The Optimal Cloud Resource Provisioning algorithm is adopted for the virtual machine management. The optimization formulation of stochastic integer programming is adopted to obtain the decision of the OCRP algorithm as such the total efficiency of resource provisioning in cloud computing environments is improved. The formulation considers multiple provisioning stages with on demand uncertainties. The solution methods based on Benders decomposition and sample-average approximation algorithms are used to solve the optimization formulation in an efficient way. The performance evaluation reveals the importance of optimal computing resource provisioning. The analysis will be useful to the cloud consumers (e.g., organization and company) for the management of virtual machines in cloud computing environment. The proposed OCRP algorithm will facilitate the adoption of cloud computing.

B. *Modules Description*

1) *Cloud Storage:* Data outsourcing on cloud storage servers is raising trend among many firms and users owing to its economic advantages. This essentially means that the provider (client) moves his data to a third party cloud storage server, who faithfully stores the data and provide it back to the provider whenever required.
2) *Cloud storage Archives:* This problem tries to obtain and verify a proof that the data stored by a provider at remote data storage in the cloud (called cloud storage archives or simply archives) is not modified by the archive and thereby the integrity of the data is assured. Cloud archive should not cheat the provider. If cheating, in this context, means that the storage archive might delete some of the data or may modify some of the data. While developing proofs for data possession at unauthorised cloud storage servers we are often limited by the resources at the cloud server as well as the client.
3) *Sentinels:* In this scheme, unlike in the key-hash approach, only a single key can be used irrespective of the size of the file or the number of files whose retrieval is to be verified. Also the archive needs to access only a small portion of the file F unlike in the key-has scheme which requires the archive to process the entire file F for each protocol verification. If the provider has modified or deleted a substantial portion of F, then with high probability it will also have suppressed a number of sentinels.
4) *Verification Phase:* The verifier before storing the file at the archive pre-processes the file and appends some Meta data to the file and stores at the archive. At the time of verification the verifier uses this Meta data to verify the integrity of the data. It is important to note that our proof of data integrity protocol just checks the integrity of data i.e. if the data has been illegally modified or deleted. It does not prevent the archive from modifying the data.

IV. TESTING AND RESULTS

A. *Testing Objectives*

The main objective of testing is to uncover a host of errors, systematically and with minimum effort and time. Stating formally, we can say,

1) Testing is a process of executing a program with the intent of finding an error.
2) A successful test is one that uncovers a yet undiscovered error.
3) A good test case is one that has a high probability of finding error, if it exists.
4) The tests should be adequate to detect errors present.

B. *Testing Strategies*

A strategy for software testing integrates software test case design methods into a well-planned series of steps that result in the successful construction of software.

1) *Unit Testing:* Unit testing focuses verification effort on the smallest unit of software that is the module. Using the detailed design and the process specifications testing is done to uncover errors within the boundary of the module. In this project each service can be thought of a module. There are so many modules like Login, New Registration, and Change Password. When developing the module as well as finishing the development so that each module works without any error. The inputs are validated when accepting from the user. The table 4.1 shows the Unit testing.

The table 4.1 shows the unit testing

Unit tested	Remarks
Login of the admin	Enters the admin profile
Admin profile	Shows the details of provider and user
OCR login	Enters the OCR profile
OCR profile	Shows the file verification and file details
File verify in OCR	Verifies the file uploaded by the provider
Provider login	Enters the provider profile
Upload in provider	Uploads the file by the provider
User login	Enters the file search area
User search key	After entering the secret key, file is downloaded by the user.

2) Login and password Testing

The Table 4.2 Shows The Login And Password Verification

User Name	Password	Verification	Navigation
Admin	Admin	Yes	Admin Profile
Ocr	Ocr	Yes	Ocr profile
Provider	Provider	Yes	Provider profile
User	User	Yes	User Profile

The table 4.3 shows the search box results

File Name	Number of matches	Availability
Cloud	4	Found
Unknown	-	Not found

a) Step 1

The Table 4.4 Shows The Sample Snapshot Of Database Of Wildlife

File Id	File Name	File Subject	File Type	File Owner	Date	Verify Status	View
19	SNAKES.docx	Snakes	.docx	Ministry	20-04-2013	NO	View
20	Lions.docx	Lion	.docx	Ministry	20-04-2013	NO	View
21	Peacock.docx	Peacock	.docx	Ministry	20-04-2013	YES	View
22	fox.docx	Fox	.docx	Ministry	20-04-2013	NO	View
23	Monkeys.docx	Monkey	.docx	Ministry	20-04-2013	NO	View

b) Step 2: The user requests for the data and enters the search data in enter search data tab. If the data is available all related matches will be displayed and it can be downloaded by using the user's secret key. If there is no match regarding the search area, then the message 'no files found' will be displayed.

The table 4.5 shows the user request for an available resource

User Search Area	Status	No. of Files Available
lion	Available	2
cat	No files found	-
Peacock	Available	1

V. CONCLUSION

An Optimal Cloud Resource Provisioning (OCRP) algorithm to provision resources offered by multiple cloud providers. The obtained results provide resource for the consumers with more efficiency. Various inputs have been given and tested for their acceptance. The approach can be used as a resource provisioning tool for emerging the cloud computing market in which the tool improves the efficiency to optimize the resources

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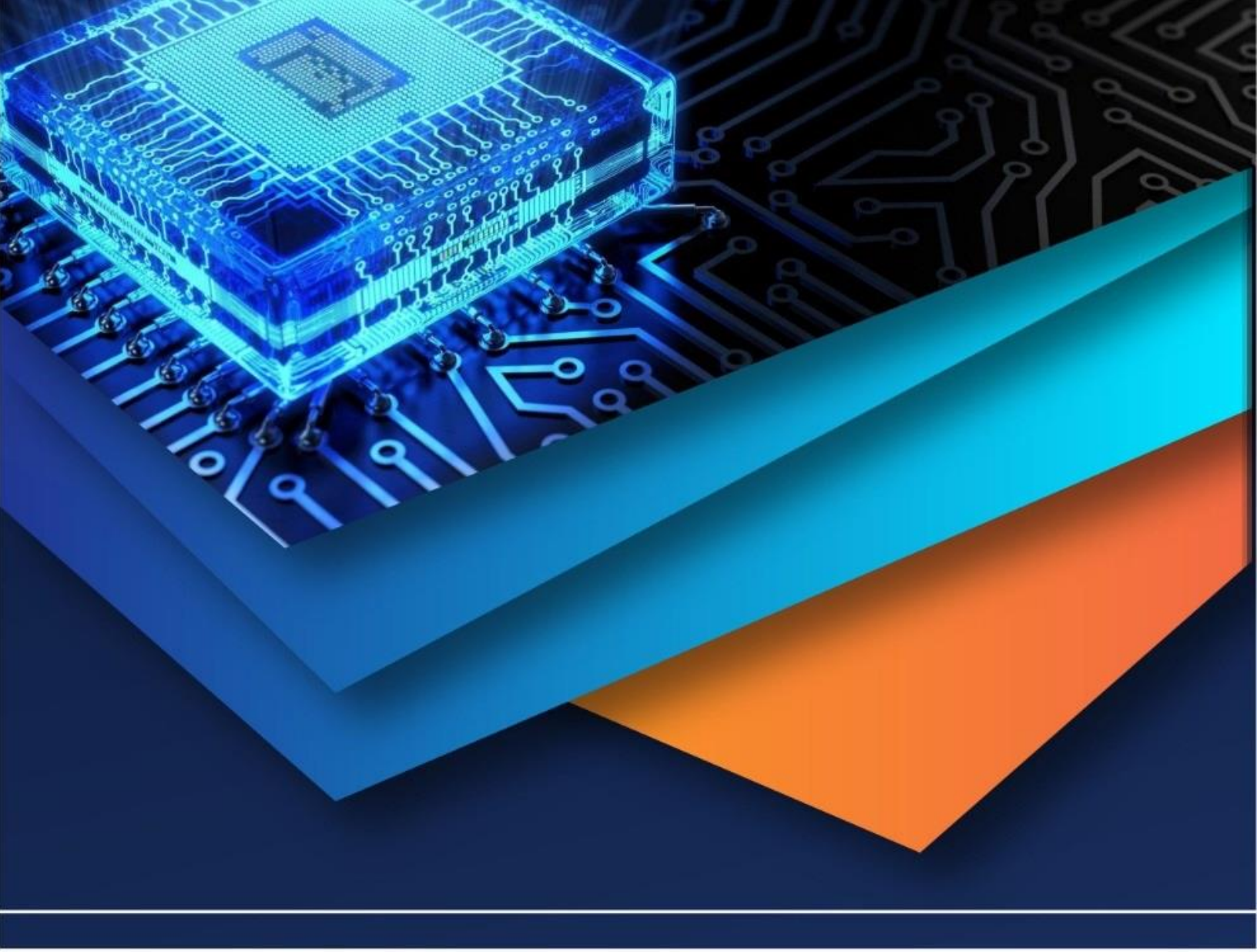

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