



## Increasing Profit for Cloud Brokers Using Heuristic Algorithm

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### ABSTRACT

Cloud computing has revolutionized the way businesses leverage technology resources, offering flexibility, scalability, and cost-efficiency. Cloud brokers act as intermediaries between cloud service providers and consumers, assisting organizations in selecting and managing the most suitable cloud services. In this dynamic and competitive landscape, maximizing profit has become a critical objective for cloud brokers. This abstract presents key strategies and considerations for cloud brokers to optimize their profit margins in the realm of cloud computing. Firstly, effective resource allocation and management play a vital role in maximizing profitability. By accurately assessing customer requirements and efficiently allocating cloud resources, brokers can ensure optimal resource utilization, reducing costs and increasing revenue. Furthermore, intelligent pricing models are crucial for maximizing profit in cloud brokerage. Cloud brokers must develop pricing strategies that strike a balance between attracting customers and maintaining profitability. Techniques such as usage-based pricing, tiered pricing plans, and discounts for long-term contracts can help brokers align their pricing structures with customer demands while optimizing profit margins. Moreover, value-added services can significantly contribute to profit maximization for cloud brokers. By offering additional services like data analytics, security enhancements, and application optimization, brokers can differentiate themselves in the market, attract higher-value customers, and command premium pricing, thus enhancing profitability.

**Key Words:** Cloud brokers, Cloud server, Utilization, Maximization.

### I. INTRODUCTION

Cloud computing has revolutionized the way businesses manage and deliver their IT infrastructure and services. As companies increasingly adopt cloud technologies, the role of cloud brokers has become vital in facilitating seamless interactions between cloud service providers and consumers [1].

Cloud brokers act as intermediaries, helping organizations choose the most suitable cloud services, negotiate contracts, and optimize their cloud computing resources [2]. One significant advantage that cloud brokers bring to the table is their ability to increase profits for both service providers and consumers. By leveraging their expertise and knowledge of the cloud computing landscape, cloud brokers can unlock several avenues for profit enhancement. Here, the user will explore some key factors that contribute to the increased profitability of cloud brokers in the realm of cloud computing. Cloud brokers excel in identifying cost-effective solutions tailored to meet the specific needs of their clients [3]. They possess deep insights into the pricing models, service-level agreements, and performance metrics of various cloud providers. By carefully analyzing the requirements and budgetary constraints of their clients, cloud brokers can recommend the most cost-efficient cloud services and configurations. This optimization not only maximizes the clients' return on investment but also allows brokers to negotiate better deals with providers, often receiving referral commissions or discounts based on the volume of business they bring [4].

### II. PROBLEM STATEMENT

While cloud brokers play a critical role in facilitating cloud services and maximizing value for their clients, they face several challenges in increasing their own profitability within the cloud computing industry. Some key problem areas include:

**Intense Competition:** The cloud computing market is highly competitive, with numerous cloud brokers vying for clients' attention. This crowded landscape makes it challenging for individual brokers to stand out and attract a significant client base. Increasing profitability requires finding effective strategies to differentiate themselves and create a unique value proposition that sets them apart from competitors.

**Evolving Cloud Technologies:** Cloud computing is a rapidly evolving field, with new technologies, services, and providers continuously emerging. Keeping up with the latest developments and understanding the intricacies of various cloud platforms can be overwhelming for cloud brokers. To increase profitability, brokers must stay up to date with industry trends and possess comprehensive knowledge of the diverse cloud offerings to effectively guide their clients and recommend suitable solutions. Complex Pricing Models [5]. Cloud service providers often employ intricate pricing models that can be challenging to navigate. Brokers must comprehend the nuances of pricing structures, negotiate favorable contracts with providers on behalf of their

clients, and ensure that they are maximizing their own profitability in the process. The complexity of pricing can make it difficult for brokers to accurately predict and optimize costs, impacting their ability to increase profitability [6].

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### III. MODULES

The system after careful analysis has been identified to be presented with the following modules and roles.

The modules involved are:

- Data owner
- Delegator
- Court
- Cloud Server

#### Data Owner

The term data owner refers to the entity or individual that has legal ownership and control over the data stored and processed within a cloud environment. The data owner is typically the organization or individual that generates, collects, or owns the data and decides how it is utilized, shared, and managed. The data owner holds legal rights and ownership over the data. This ownership includes the authority to determine how the data is accessed, used, stored, shared, and deleted. The data owner may be an individual, a business, or an organization, depending on the context. The data owner is responsible for establishing data governance policies and ensuring compliance with relevant regulations and industry standards. This includes defining data access controls, privacy requirements, data retention policies, and data classification guidelines. The data owner sets the rules for how data should be handled within the cloud environment [7]. Protecting the data from unauthorized access, breaches, and data loss is a critical responsibility of the data owner. This involves implementing appropriate security measures, such as encryption, access controls, and authentication mechanisms, to safeguard the data's confidentiality, integrity, and availability. The data owner may collaborate with the cloud service provider to establish robust security measures and monitor compliance [8].

#### Delegator

The user refers to individuals or organizations who utilize cloud services and resources to store, process, and access their data and applications. Users can include individual, consumers, businesses, government entities, and any other entities that leverage cloud computing technologies to meet their computing needs. Users are responsible for selecting the appropriate cloud services that align with their specific requirements [9]. They evaluate the offerings of different CSPs, considering factors such as cost, performance, scalability, security, and compliance. Once a cloud service is chosen, users provision the necessary resources and configurations to start using the service. User store, manage, and process their data and applications within the cloud environment. They upload and organize data, configure access controls, and manage user permissions. Users also deploy and manage applications, including custom software, off-the-shelf software, and web-based applications, leveraging the cloud infrastructure and platforms provided by the CSP [10]. Cloud users have the flexibility to scale their computing resources based on their changing needs. They can adjust the number of virtual machines, storage capacity, and network resources to match the demands of their applications or workload. Users can also monitor resource usage, performance, and cost, making optimizations and adjustments required [11].

#### Court

The term court typically refers to the legal and regulatory aspects associated with the storage, processing, and access to data in the cloud. Courts may become involved in cloud computing scenarios when disputes arise concerning issues such as data privacy, security breaches, contractual agreements, intellectual property rights, or compliance with relevant laws and regulations [12].

#### Cloud server

Cloud servers are virtual machines created through virtualization technologies. They are created and managed on physical servers within the cloud infrastructure. Virtualization allows for the efficient utilization of hardware resources by running multiple virtual servers on a single physical machine, enabling better scalability and flexibility. Cloud servers can be provisioned on-demand, allowing users to quickly scale up or down their computing resources as needed. Users can create, deploy, and configure cloud servers with their desired operating system, applications, and computing specifications through self-service interfaces or APIs provided by the cloud service provider. Cloud servers offer elasticity and scalability, allowing users to dynamically adjust the capacity of their computing resources [13]. This means users can easily scale up or down the number of cloud servers based on changing demands, whether it's handling increased traffic, supporting peak workloads, or reducing resources during periods of low activity. This flexibility eliminates the need for upfront infrastructure investment and allows users to pay for resources consumed on a pay-as-you-go basis. Cloud servers are designed to provide high availability and fault tolerance [14]. Cloud service providers typically implement redundancy and failover mechanisms to ensure that if one physical server or component fails, the cloud server instances are automatically migrated or restarted on another available server. This minimizes downtime and ensures the continuity of services. Cloud servers can be managed by users themselves or by the cloud service provider as part of a managed service offering. Managed services may include automated backups, security patching, monitoring, load balancing, and other administrative tasks that offload some of the operational responsibilities from the user. Cloud servers can be deployed in multiple geographic locations by the cloud

service provider [15]. This allows users to choose server instances closer to their end-users or comply with data residency requirements. The ability to deploy cloud servers across different regions enhances performance, reduces latency, and provides better disaster recovery options. Cloud servers are virtualized computing resources provisioned and managed within a cloud environment [16]. They offer on-demand provisioning, resource allocation, scalability, and high availability. Cloud servers enable users to deploy and run applications efficiently, providing flexibility and cost-efficiency compared to traditional on-premises infrastructure [17].

#### IV. RESULT

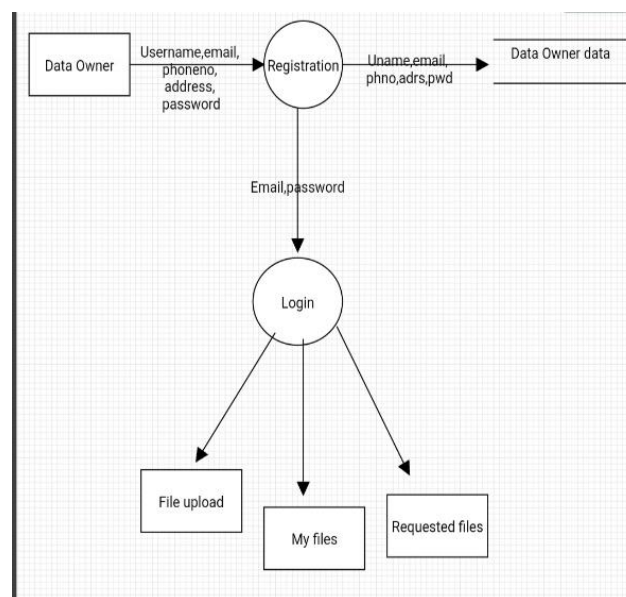
In the result the strategies allow them to position themselves as trusted advisors, generate recurring revenue through client retention, and showcase their expertise in addressing clients' unique needs. By successfully addressing these challenges and implementing effective strategies, cloud brokers can increase their profitability in the dynamic cloud computing industry. As the demand for cloud services continues to grow, cloud brokers who adapt and thrive in this evolving landscape have the opportunity to capitalize on the increasing market potential and build sustainable profits.

$\lambda_{max}$	Derivation Optimal				
	$n_{opt}$	$\beta_{opt}$	$Pro_{opt}$	User Cost	Cost Saving Rate
60	128	6.5223	263.3711	53.8262	29.725%
70	150	6.5004	312.1968	53.6455	29.961%
80	171	6.4971	361.4982	53.6182	29.997%
90	192	6.4923	411.2474	53.5787	30.048%
100	205	6.5865	460.6158	54.3558	29.034%
110	234	6.4899	510.7347	53.5586	30.074%
120	252	6.5140	561.4408	53.7575	29.815%
130	276	6.4852	611.2303	53.5194	30.126%

#### V. DIAGRAM

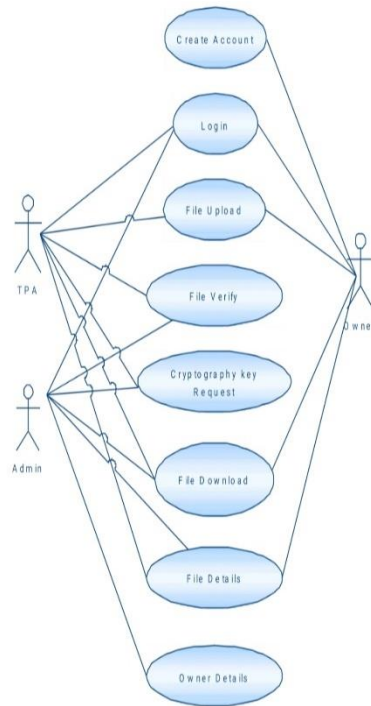
##### 1. DATA FLOW DIAGRAM

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination.



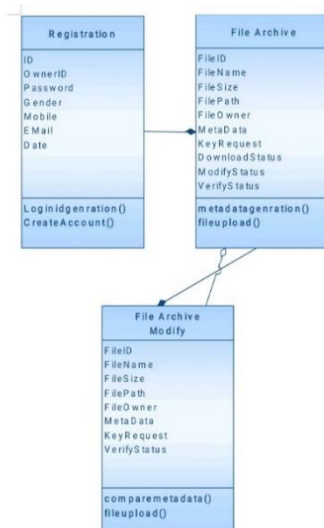
### 2. USECASE DIAGRAM

Use case diagrams model behavior within a system and helps the developers understand of what the user require. The stick man represents what's called an actor. Use case diagram can be useful for getting an overall view of the system and clarifying who can do and more importantly what they can't do.



### 3. CLASS DIAGRAM

The class diagram is defined as the property of the objects in the given class, function and the attributes. Also the class diagram is used to find the flow and execution of the project.



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## VI. CONCLUSION

In conclusion, increasing profitability for cloud brokers in the cloud computing industry requires strategic approaches and addressing key challenges. By differentiating themselves in a competitive market, staying updated with evolving cloud technologies, navigating complex pricing models, balancing cost optimization with quality services, managing scalability and resource allocation, and demonstrating value-added services, cloud brokers can enhance their profitability and success.

## VII. FUTURE ENHANCEMENT

In summary, future enhancements for cloud brokers to increase profitability involve specializing in niche areas, catering to multi-cloud and hybrid needs, offering enhanced security and compliance services, integrating edge computing and IoT, leveraging data analytics and AI capabilities, focusing on exceptional customer experience, and forming strategic partnerships. Embracing these trends and proactively adapting to emerging technologies and client demands will position cloud brokers for sustained growth and profitability in the evolving cloud computing landscape.

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