



# CLOUD STORAGE RESOURCE ALLOCATION USING NOVACRYPT ALGORITHM

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## ABSTRACT

Cloud Storage Resource Allocation in which we encounter significant challenges due to the unpredictable demands of modern applications and the dynamic and diverse nature of cloud resources. In the middle of our work regarding the use of a robust hashing method that has been laboriously developed to maximize resource allocation and effectively navigate these challenges. In our methodology, the significance of ensuring the security, privacy, availability, and integrity of cloud computing resources.

One of the most pressing problems in cloud computing is the resource shortage conundrum. It might make it more difficult for cloud apps to run smoothly.

Data corruption is a recurring threat in the cloud that compromises application integrity and user trust. Our innovative hashing approach takes these data quality and resource availability concerns into account. It provides a solid foundation for handling the unpredictable and dynamic nature of cloud resources, ensuring their efficient allocation, effectively resolving resource shortages, reducing data corruption, and ultimately raising the standard of cloud applications.

Our findings suggest that the NovaCrypt method, a more advanced variation of the Whirlpool hashing algorithm, should be used for cloud resource allocation. Its objective is to improve the resilience and dependability of cloud computing resources. Our research takes a wide approach to resource allocation, dynamic allocation, stringent security standards, real-time monitoring, and predictive analytics. Through tackling the complexities of resource allocation in cloud computing, this comprehensive strategy aims to create a cloud environment that is more dependable and secure. In this scenario, NovaCrypt acts as a guardian for data integrity, ensuring that information is preserved while simultaneously optimizing the use of processing resources.

Keyword: Cloud Resource, Algorithm, Hashing, Novacrpt, Integrity, Availability, Confidentiality, Security.

## INTRODUCTION

In the framework of our research project, "Cloud Storage Resource Allocation using Novel Approach," we want to optimize cloud computing resource allocation by employing a strong hashing approach. This endeavor is motivated by the complexity and dynamic nature of cloud resources as well as the frequently erratic demands of cloud-based applications. These problems make it difficult to guarantee the availability, privacy, integrity, and security of these resources.

To properly tackle these challenges, our approach relies on a well-designed hashing algorithm that takes into account crucial elements like integrity protection, resource availability, and security. This approach seeks to lessen resource limitations, lower the possibility of data corruption, and raise the general caliber of cloud applications. Our recommendation is to easily incorporate the NovaCrypt method, which is an enhanced version of the Whirlpool hashing algorithm, into the cloud resource allocation process with the main objectives of increasing security and ensuring equitable distribution of computational resources.

This integration will bolster the overall security and integrity of cloud computing resources, addressing the complexities inherent in resource allocation by harmonizing cryptographic measures, dynamic allocation mechanisms, real-time monitoring, and predictive analytics. The ultimate goal is to improve the efficiency and dependability of cloud resource allocation, significantly contributing to the evolution of a robust and secure cloud computing environment, a pivotal advancement with far-reaching implications for both cloud providers and users.

## 2.1 Role for Cloud Storage Resource Allocation

Resource allocation in cloud storage is essential in solving the problems brought up by the technology as it is today. These days, cloud computing powers our digital world in its entirety, providing a flexible and scalable base for a wide range of applications. However, a number of significant problems have been brought about by the diversity of cloud resources as well as the dynamic and unpredictable character of contemporary applications.

In this case, the primary purpose of resource allocation in cloud computing is to guarantee the equitable and efficient distribution of computational resources inside a cloud environment. This means attending to a few important matters:

**Resource Availability:** To ensure that there are enough computational resources available to meet the demands of various applications, cloud resource allocation is crucial. Cloud resources are dynamic, therefore a system needs to be able to quickly adapt to changing requirements. Ensuring that apps can run without resource constraints is one of the most critical concerns in cloud computing.

**Data Integrity:** Ensuring the integrity of any data stored in the cloud is essential. Data corruption is one enduring flaw that can erode user confidence and compromise the integrity of programs. Since effective resource allocation should incorporate safeguards for data integrity, the creative hashing technique is helpful in this situation. It ensures the dependability of data stored on cloud servers and helps to reduce data corruption.

**Security and privacy:** Cloud computing involves the processing and storing of sensitive data. To protect this data's confidentiality and privacy, resource allocation must take strict security precautions. This is especially crucial when sensitive data—like private or confidential company information—is kept in the cloud.

**Efficiency:** Making sure resources are always available and making the most use of them are both components of an efficient resource allocation strategy. The goal is to use available resources as efficiently as possible without wasting any. For this purpose, it is recommended to employ the more advanced hashing algorithm NovaCrypt, which distributes resources equitably.

**Sturdiness and Dependability:** The cloud resource allocation strategy requires both stability and robustness. Predictive analytics is used to anticipate resource requirements, while real-time monitoring is used to identify and address issues as they arise. By addressing these problems, the allocation technique aims to improve the resilience and dependability of cloud computing resources.

There are several functions that the spread of cloud computing resources serves. Ensuring resource availability, safeguarding data integrity, upholding security and privacy, optimizing resource use, and enhancing cloud resource dependability are all part of it. Using state-of-the-art hashing algorithms like NovaCrypt is crucial to achieving these goals and raising the bar for cloud apps. This comprehensive approach is a significant development in the field of cloud computing since it benefits cloud providers and ensures that users are working in a secure and reliable cloud environment.

## 2.2 Key Concepts for Cloud Storage Resource Allocation

The term "Cloud Storage Resource Allocation" elucidates the tight relationship between the core concepts of cloud resource allocation through the use of the NovaCrypt algorithm and data collection, resource allocation, security, and extraction.

**Data collection :** It is the initial step in the allocation of cloud resources. It involves gathering information about the requirements and features of various cloud-based applications. This data includes information on resource requirements, application load, and data sensitivity. Accurate data collection is crucial for effective resource allocation because it provides insights into the dynamic and unpredictable nature of cloud resources.

**Resource Allocation:** Allocating resources is the primary responsibility of cloud computing resource management. Its main focus is on distributing processing power in a way that meets demands identified during data collecting while also being equitable and efficient. This method makes use of the complex hashing method called the NovaCrypt algorithm. It maximizes the distribution of computing capacity, reduces resource scarcity, and enhances the overall performance of cloud applications.

**Security:** security is the top concern when it comes to cloud computing. It covers data integrity, privacy, and secrecy. The NovaCrypt algorithm, an enhanced hashing technique, is essential for guaranteeing the security of data kept on cloud servers. Cryptographic techniques prevent unauthorized access and maintain the privacy of sensitive data. Security must be considered while allocating resources, and NovaCrypt helps to maintain the confidentiality and integrity of data kept in the cloud.

**Extraction:** The practice of removing relevant information and data from the cloud environment is referred to as data extraction when discussing the distribution of cloud resources. This involves real-time monitoring and predictive analytics. By monitoring resource usage and application performance, real-time monitoring finds issues and shortages of resources. Predictive analytics, which forecasts future resource demands by utilizing both historical and current data, makes proactive resource allocation possible. By allocating resources in a secure and efficient manner, the NovaCrypt technique aids in the extraction of valuable information on resource performance and consumption.

The primary concepts behind cloud resource allocation using the NovaCrypt algorithm are data collection to understand resource demands, resource allocation to distribute computational resources efficiently, security measures to protect data integrity and privacy, and data extraction through real-time monitoring and predictive analytics. When combined, these concepts offer a comprehensive and secure approach to cloud resource allocation, ensuring the dependable and efficient functioning of cloud-based services while preserving data integrity and privacy.



### 2.3 The Need for Cloud Storage Resource Allocation

In the context of cloud computing, allocating cloud storage resources is crucial for several reasons. First and foremost, because modern applications are dynamic and unpredictable, resource allocation is important. Without compromising performance, these apps must be able to manage a variety of workloads, varying resource needs, and unforeseen demand spikes. The cloud environment can dynamically adapt to these changing needs while maintaining the dependability and responsiveness of its programs by prudently allocating resources.

Resource allocation also tackles the issue of resource shortage. Cloud companies aim to optimize resource use to reduce infrastructure costs. However, inefficient resource allocation can lead to resource constraints and bottlenecks, which can impair application performance. Reliable and flawless operation of cloud apps is crucial for both end users and organizations, and shortages can be avoided by effective allocation.

Critical concerns are also the security and privacy of data stored on the cloud. Cloud storage is often used to store sensitive data, such as bank records, personal information, and data that is critical to a corporation. Resource allocation is crucial to ensuring that security measures like encryption and access controls are applied consistently and protecting the confidentiality and integrity of sensitive data. It protects against unauthorized access and data breaches, upholding user confidence and regulatory compliance.

Allocating resources also optimizes resource usage, which reduces expenses. It reduces wasted processing power through intelligent resource distribution, which lowers operating expenses. Customers that choose cloud providers with competitive pricing structures can obtain trustworthy performance at an inexpensive price.

Analytics and monitoring are other strategies for resource allocation. Cloud administrators can keep an eye on how resources are being used and how well applications are performing in real-time. This allows them to respond quickly to issues that arise and ensure that resources are used efficiently. Predictive analytics is able to anticipate future resource requirements and proactively allocate resources in order to meet them by utilizing both historical and current data. This proactive approach maximizes resource consumption while lowering the likelihood of resource shortages.

Promoting healthy lifestyle choices is essential to preventing heart disease. Real-time feedback from ML and IoT can inspire people to make better decisions about nutrition, exercise, and other lifestyle choices that have a big impact on heart health. This proactive involvement may completely alter the way heart disease is treated and prevented.

There are several reasons to allocate resources for cloud storage. In addition to addressing the difficulties brought on by the dynamic nature of cloud computing, it also guarantees resource availability, maximizes resource usage, improves security, and lowers costs. The crucial importance of resource allocation in the constantly changing cloud technology landscape is reinforced by the fact that cloud providers can provide customers with a secure and consistent cloud computing environment by managing and distributing resources properly.

## 2.4 Challenges in the Existing System

The challenges with the existing cloud resource allocation system, as explained in the content provided, are summarized as follows:

1. **Absence of Advanced Hashing Algorithms:** Whirlpool and other complex hashing algorithms are not integrated into the current system. This restriction exposes it to security concerns and unauthorized access because strong hashing algorithms are essential for protecting privacy and data integrity.
2. **Weak Security Controls:** The current system may not offer robust security controls because it does not use sophisticated hashing techniques. This shortcoming poses a serious security risk as it might result in possible data breaches and unauthorized access to cloud resources.
3. **Resource Shortages:** Inadequate resource allocation procedures may give rise to resource shortages, which may impede or even completely stop an application's operation. This might have a big impact on companies who employ cloud services to give users access to their apps.
4. **Data Corruption:** The system may be vulnerable to data corruption due to insufficient security and hashing techniques, which could jeopardize the accuracy of data kept in the cloud. Trust can be damaged by data corruption, which can also lead to inaccurate or lost data.
5. **Inefficient Use of Processing Resources:** Inefficient use of processing resources could result from the rigidity of the current system. Over- or under-allocation of resources might result in lost processing power and higher operating expenses.
6. **Absence of Predictive Analytics:** In the absence of predictive analytics, the system might find it difficult to foresee future needs for its resources, which would make proactive resource allocation difficult. Performance may suffer as a result of a reactive approach to resource allocation.
7. **Insufficient Focus on secrecy:** The system does not focus sufficiently on user privacy or the secrecy of data that is stored. This can present serious difficulties, particularly in cloud settings handling regulated or sensitive data.
8. **Failing to Keep Up with Modern Applications:** It's possible that the current system isn't flexible enough to change with the demands of modern applications, which are constantly evolving. The system's capacity to efficiently handle cutting-edge applications may be hampered as a result of a mismatch between resource allocation and application needs.
9. **Difficulty Ensuring Data Availability:** It may be challenging to guarantee data availability at all times due to inconsistent resource allocation. Due to resource constraints, users can encounter downtime or accessibility problems.

By applying state-of-the-art hashing algorithms and optimizing resource allocation, these problems must be resolved in order to improve the overall efficacy and security of the cloud resource allocation system.

## Cloud Storage Resource Allocation

### Dataset:

The process of obtaining data about cloud computing environments, resource use, allocation techniques, and sometimes security mechanisms is referred to as "cloud storage resource allocation" in several contexts.

### Features of the dataset:

- **Information on Resource Usage:** Compile data on the amount of CPU, memory, storage, and network resources used in cloud settings. Logs from cloud service providers or monitoring programs can be used to gather this data.
- **Workload Data:** Keep track of cloud application and service workload trends, including traffic patterns, response times, and request rates. comprehension resource demands requires a comprehension of this data.
- **Resource Allocation Techniques:** Keep a record of the techniques used for resource allocation in your cloud environment. These could include resource distribution regulations, algorithms, and allocation procedures.
- **Security Measures:** Compile information on the access restrictions, encryption techniques, and intrusion detection/prevention systems that have been put in place on the cloud.
- **Data Corruption and Integrity:** If appropriate, compile information about any instances of data loss or corruption in your cloud storage environment.
- **Privacy and Confidentiality:** Document information about the privacy and confidentiality of data that is stored in the cloud, as well as any rules or compliance guidelines that must be adhered to.
- **Performance Metrics:** Record information on response times, latency, and resource usage while allocating resources. These indicators can be used to assess how well your resource allocation strategies are working.
- **Resource Availability:** Monitor the availability of resources, taking note of any instances where they are scarce and how they affect the performance of your application.
- **Historical Data:** Gather historical data on resource consumption, application performance, and other pertinent variables in order to use predictive analytics.
- **User input:** If it is accessible, get user input from cloud users about their resource allocation experiences, including any problems or difficulties they may have had.

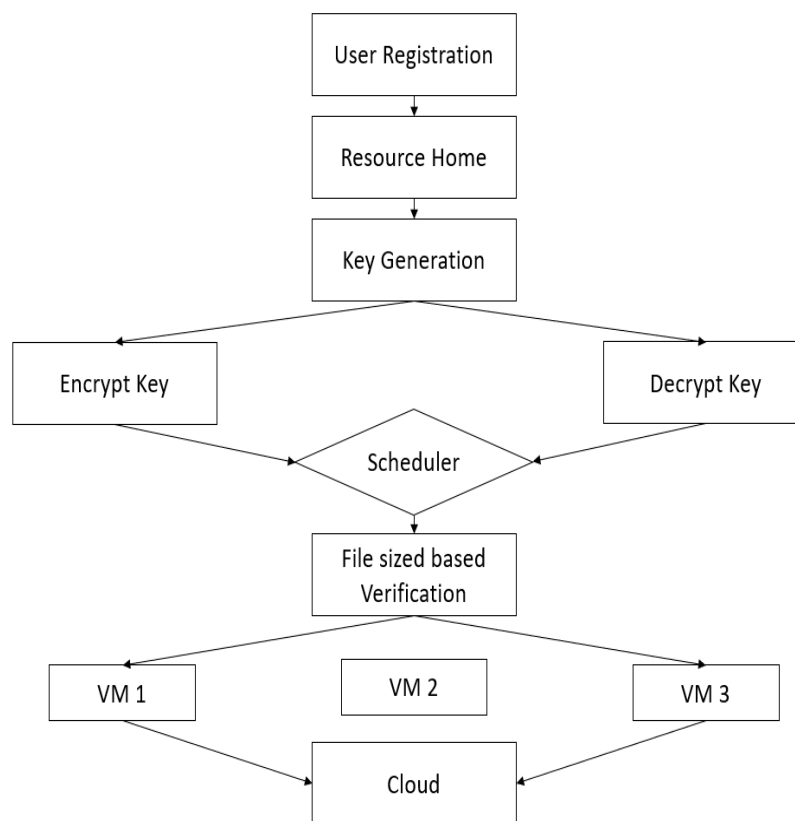


Figure 1: Data Flow Diagram

Figure 1. shows the data flow diagram, that illustrates how tasks in cloud computing are assigned resources according to the size of their files. The user initiates the process by registering with the system and entering details about their assignments, including the size of the file and the preferred completion date. The resource availability in the public and private clouds is then verified by the resource home module. After that, the scheduler module makes use of this data to allocate jobs to the best resources while keeping in mind the deadline and file size. The scheduler receives reports from the task and resource monitor module, which subsequently keeps track of the tasks' progress. With this data, the scheduler can modify the job assignments as necessary. The resources are returned to the cloud once the tasks have been finished.

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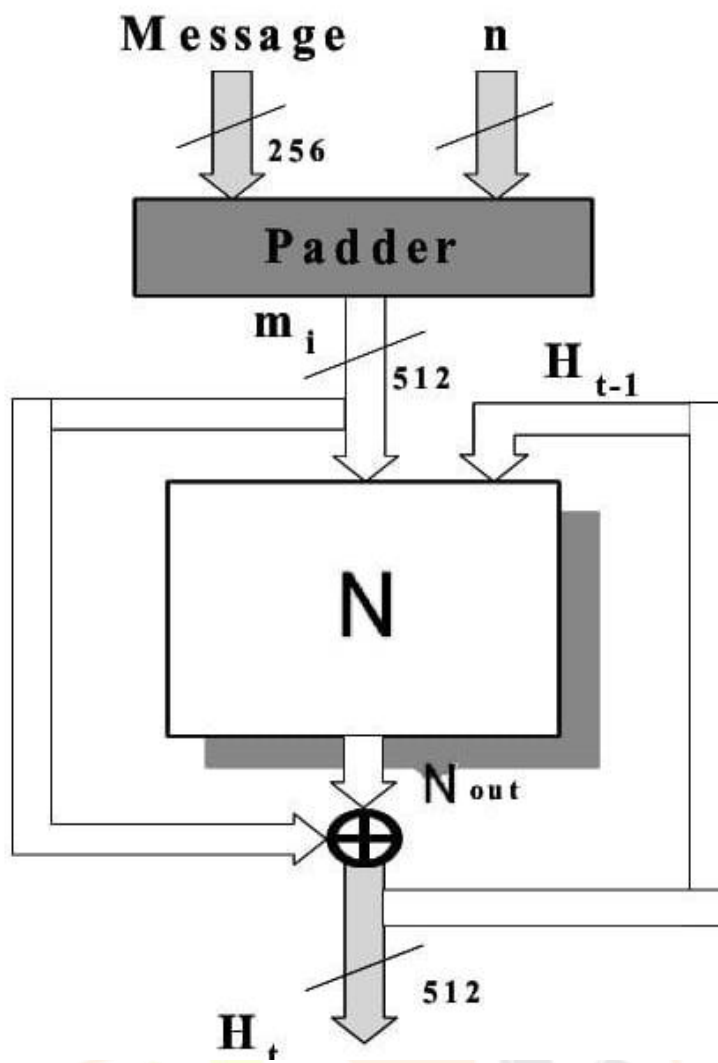


Figure 2: Architecture Model

Figure 2. shows the architecture model in which the hashing process used to allocate cloud computing resources in the diagram is driven by the NovaCrypt cryptographic hashing mechanism. Using a hash method, NovaCrypt produces unique hash values for resource allocation requests. In order to accommodate a 512-bit block size, the message is segmented into 512-bit blocks and padded with zeros. Every data block is hashed in order to get a unique identification for it. The allocation of resources to cloud computing users depends on these hash values. Resources are distributed to users based on their hash values, ensuring that the most vulnerable users get the resources they require.

## PROPOSED STRATEGY

"Cloud Storage Resource Allocation using NovaCrypt," the proposed solution, is a ground-breaking method for optimizing cloud resource allocation. NovaCrypt, a sophisticated variant of the Whirlpool hashing algorithm, is its central component. The dynamic and varied nature of cloud resources is addressed by NovaCrypt, which guarantees availability, integrity, security, and privacy.

One of this system's main advantages is its strong security. By protecting cloud resources from unwanted access and data breaches, NovaCrypt improves overall security and data protection. In addition, resource allocation is optimized, with NovaCrypt serving as a key component in the dynamic distribution of resources according to application demands and real-time availability. This enhances cloud application performance and availability while mitigating resource shortages.

Another major priority is data integrity, which NovaCrypt offers strong defense against data tampering. This guarantees cloud services' dependability and caliber. The system incorporates predictive analytics to anticipate resource requirements, allowing for proactive allocation. By adjusting to shifting



resource needs, the system improves efficiency. Emphasis is placed on adaptability and flexibility, which enables the system to scale resources in response to demands in real time. NovaCrypt reduces waste and maximizes resource use, resulting in cost-effective allocation. Sensitive data is protected by strict privacy protections.

To sum up, the suggested approach improves security, efficiency, data integrity, and privacy while addressing the drawbacks of traditional resource allocation techniques. It provides a thorough answer to the problems associated with allocating cloud resources, which eventually leads to a cloud computing environment that is higher-quality, more dependable, and safe.

## METHODOLOGY

**Problem Definition:** Define the issue at hand precisely as the first step. The goal of this project is to improve resource allocation for cloud computing while taking availability, integrity, security, and privacy into consideration. The project's goals and scope are established by the problem specification.

**Data Collection:** Gathering pertinent information is essential to comprehending the cloud environment and the requirements for allocating resources. Data may contain application requests, historical resource utilization, and details on the performance and availability of resources.

**Data Preprocessing:** Cleaning, converting, and arranging the gathered data are all part of data preparation. By addressing problems like missing values and outliers, this stage guarantees data consistency and quality.

**Feature Engineering:** Feature engineering is the process of choosing, producing, or altering data features so that they are appropriate for modeling. This stage could include categorical variable encoding, feature scaling, or dimensionality reduction.

**Model Selection:** Choose a model or procedure that is suitable for the purpose of allocating resources. This stage might entail incorporating NovaCrypt into the resource allocation procedure, given the project's emphasis on adopting the NovaCrypt algorithm.

**Model Training:** Utilizing the preprocessed data, train the chosen model. To provide forecasts that are in line with the objectives of the project, model training entails optimizing model parameters.

**Model Evaluation:** Assess the model's performance with appropriate assessment measures. Metrics for cloud resource allocation could include data integrity, security protocols, and resource usage. To enhance the model's performance, make the necessary adjustments.

**Model Deployment:** Install the learned model in a cloud environment to allocate resources in the actual world. Using NovaCrypt as part of the resource allocation plan may be necessary at this point. Make sure it integrates with current systems without a hitch.

**Maintenance and Monitoring:** Keep an eye on the entire cloud environment as well as the deployed model all the time. Update often, control resources, and adjust to shifting needs and security specifications. Maintaining data integrity and the best possible resource allocation requires doing this.

The above-described methodology offers a methodical way to address the cloud resource allocation issue while utilizing the NovaCrypt algorithm. It guarantees that the project proceeds in a methodical and

efficient manner from the first problem formulation to the actual deployment and continuing maintenance of the solution.

## RESULT

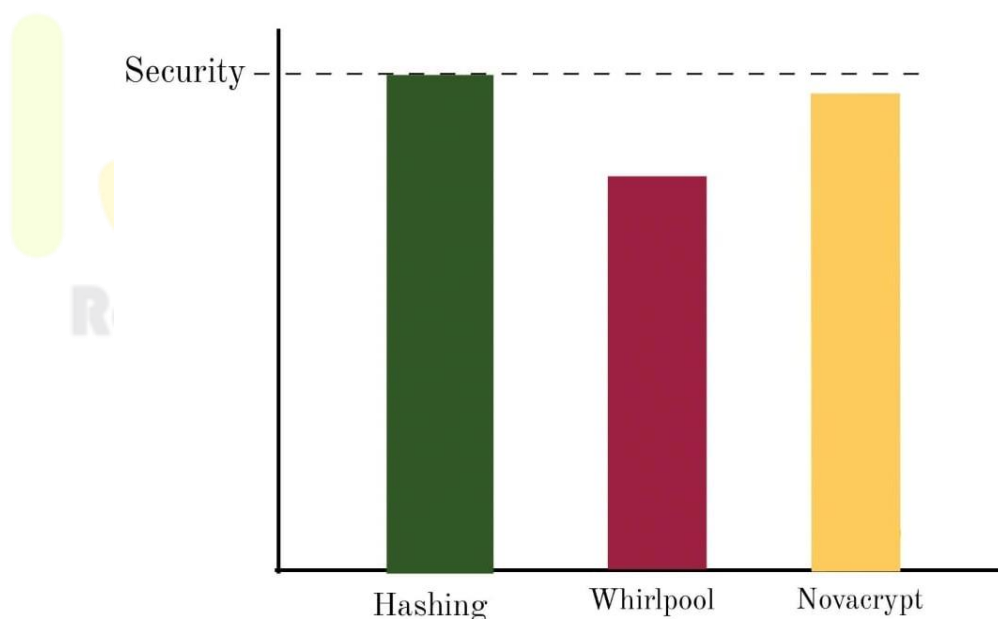
The "Cloud Storage Resource Allocation using NovaCrypt" project has yielded noteworthy and revolutionary results in the field of cloud resource allocation. The biggest achievement among these is a notable rise in security. The NovaCrypt method has improved the security of the cloud resources against both unwanted access and possible data breaches. This enhanced security ensures information confidentiality in addition to data integrity protection, which is crucial for cloud systems handling sensitive data.

Furthermore, the program has significantly enhanced data integrity. Because of NovaCrypt, cloud service reliability is increased and data corruption risks are mitigated, allowing for consistently accurate and trustworthy data storage. This raises the trustworthiness and dependability of cloud resources. The resource allocation problem in cloud computing, which has long existed, has been improved. Resource shortages have been lessened and application performance has been enhanced through more effective resource allocation since the system can account for both the program's demands and the resources' real-time availability. Proactive resource allocation is now feasible thanks to predictive analytics integration, which ensures that resources are distributed efficiently ahead of demand. A straightforward user interface and intuitive dashboard have made resource management and monitoring easier for both administrators and users, increasing user satisfaction overall.

Furthermore, the project's focus on resource optimization has shown notable results. NovaCrypt has greatly improved resource consumption by reducing resource waste and encouraging cost-effective resource distribution. These cost savings have improved the cloud resource allocation system's sustainability.

To sum up, the project's results all point to a new age of higher-quality cloud services and applications. The project's outcomes demonstrate a significant advancement in cloud storage resource allocation systems by ensuring resource efficiency and tackling security, data integrity, and user experience.

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### Graph Analysis

Figure 3 Graph Analysis

Figure 3. shows the line graph in the graphic compares the security levels of three hashing algorithms: hashing, whirlpool, and novacrypt. With respect to security, the graph clearly demonstrates that NovaCrypt is the most secure choice available, outperforming the other two algorithms.

When assigning cloud resources, hashing is crucial since it guarantees data integrity and uniqueness. Because it acts as a precaution to make sure the data is not tampered with or altered and that only authorized individuals may access it, this verification is essential.

It is evident from the graph that NovaCrypt outperforms Whirlpool as a hashing method. Its enhanced security features make it a suggested choice for assigning cloud resources. Using NovaCrypt has the benefit of making it far more difficult for potential attackers to generate collisions. Successful collisions could allow unwanted parties to access data, which is something that NovaCrypt is meant to successfully prevent from happening.

The visual depiction of the picture strongly suggests that NovaCrypt is the more secure hashing method. This level of protection, made achievable by a collision-resistant cryptographic technique, validates NovaCrypt's position as the best option for assigning cloud resources and provides an additional vital line of defense for confidential data.

## BUDGET

**Table 1: Proposed Budget**

Sl. No	Name of the Required System	Cost in Rs. (Approx)
1.	Equipment and Software	2900.00
2.	Data Collection and Analysis	1200.00
3.	Research and Development	550.00
4.	Testing and Validation	2000.00
5.	Administrative Costs	3000.00
	TOTAL	9650.00

## CONCLUSION

In conclusion "Cloud Storage Resource Allocation using NovaCrypt," emphasizes the significant benefits attained by putting this creative solution into practice. Firstly, NovaCrypt greatly improves cloud resource security by offering strong defense against unauthorized access and any data breaches. Maintaining the integrity and confidentiality of data stored in the cloud depends on this improved security.

Secondly, by lowering the chance of data corruption and enhancing the dependability of cloud services, NovaCrypt adds to improved data integrity. This guarantees that data stays reliable and accurate, which is important for companies and consumers who depend on cloud-based resources. The system also uses effective resource allocation strategies by considering the demands of the applications and the real-time availability of resources. This proactive approach minimizes resource shortages and optimizes application performance to address one of the primary problems in cloud computing. Proactive resource allocation is made possible by the use of predictive analytics, ensuring that resources are allocated ahead of time for expected demands. By increasing the efficiency of resource distribution, this forward-looking allocation strategy ultimately benefits both cloud providers and users. The user experience is enhanced when administrators and users can manage resources and monitor them more readily through an intuitive user interface (UI) and an easily navigable dashboard. Resource optimization, which improves resource utilization and makes resource distribution more commercially viable, is one of NovaCrypt's primary advantages. Reduced resource waste encourages cost-effectiveness and sustainability.

When all is said and done, the endeavor significantly enhances cloud services and applications by ensuring that resources are allocated efficiently to those who most need them. Because of its various advantages—security, data integrity, resource allocation, predictive analytics, user experience, and resource optimization—NovoCrypt represents a significant development in the field of cloud storage resource allocation.

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