

Research Article

Comparative Market Review and Analysis of Different Cloud Computing Providers for Hosting TAKDA WEBCPASMS PROTOTYPE

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ABSTRACT

Cloud computing has become essential for businesses, providing scalable, flexible, and cost-efficient solutions. As organizations increasingly rely on cloud-based infrastructure, selecting the most suitable provider for specific needs is crucial. This research evaluates four leading cloud platforms—SiteGround, Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP)—to determine the optimal platform for hosting the TAKDA WebCPaSMS proto-model. Using a comparative case study design and content analysis, the study examines provider reliability, security, scalability, cost-effectiveness, and technical support. Findings indicate that SiteGround is ideal for managed cloud hosting and small-scale applications due to its ease of use but lacks traditional compute, storage, and networking services. AWS provides the most comprehensive cloud solutions, Azure integrates best with Microsoft enterprise ecosystems, and GCP excels in AI, data analytics, and cloud-native applications. These insights help organizations select the best cloud platform for their needs.

Keywords: Cloud Computing, Analysis, Industry, Cloud Platform

1. INTRODUCTION

Cloud computing has transformed how organizations store, manage, and process data by providing scalable, cost-efficient solutions tailored to both business and academic demands. With the increasing reliance on digital infrastructure, selecting the most suitable cloud service provider is a critical decision that influences performance, security, and cost-efficiency (Kumar, 2017). The objective of this study is to conduct a comprehensive review and analysis of different cloud computing providers, namely SiteGround, Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP), to determine the optimal solution for hosting the TAKDA WebCPaSMS proto-model.

A comparative analysis will be conducted to evaluate each provider's scalability, security, cost-effectiveness, and ease of use. By examining these factors, this research aims to provide a data-driven recommendation for the most appropriate cloud platform for adoption. The study will also consider the advantages of cloud migration, including reduced operational costs, improved data management, and enhanced security measures (Piccoli et al., 2018).

Furthermore, a structured implementation and migration plan will be designed to guide organizations in transitioning to the recommended cloud provider. This plan will outline critical steps such as infrastructure assessment, data migration strategies, security configurations, and system optimization to ensure a seamless and efficient adoption process (Grepon et al., 2022). The findings and recommendations from this research will serve as a valuable resource for institutions and businesses aiming to enhance their cloud computing capabilities.

The study thoroughly reviewed leading cloud computing providers, analyzing their respective advantages and limitations. By evaluating critical factors such as cost, scalability, security, and ease of implementation, the research identified the most suitable platform for hosting the TAKDA WebCPaSMS proto model. Additionally, based on the insights gathered, a detailed recommendation was formulated to aid organizations in selecting the best cloud service provider tailored to their needs.

The rapid expansion of cloud service providers (CSPs) has necessitated the development of efficient strategies for

managing and optimizing cloud resource utilization. Cloud federation and multi-cloud architectures have been proposed as effective solutions to address these challenges, allowing organizations to leverage the strengths of multiple CSPs for enhanced efficiency and flexibility (Tricomi et al., 2020). These architectures provide businesses with the ability to select the most suitable providers based on their unique requirements, ensuring improved performance and cost-effectiveness.

A structured framework for comparing CSPs based on critical factors such as performance, security, cost, and customer support has been developed to facilitate informed decision-making (Deshmukh et al., 2018). This framework is particularly valuable for businesses seeking to host applications such as the TAKDA WebCPaSMS Protomodel, as it ensures a systematic evaluation of potential CSPs. Performance indicators, including uptime, latency, and response time, have been identified as crucial metrics for assessing the effectiveness of cloud services. By leveraging such insights, organizations can identify providers that excel in these areas, ensuring seamless application performance and operational efficiency (Deshmukh et al., 2018).

Security remains a major concern for organizations migrating to the cloud, making it a critical factor in the selection of CSPs. The study by Adamuthe et al. (2015) underscores the importance of solid security measures and compliance protocols to protect sensitive data. Security considerations are essential for hosting applications such as the TAKDA WebCPaSMS Protomodel, as inadequate security measures can lead to data breaches and unauthorized access. Therefore, evaluating CSPs based on their security capabilities and compliance with industry standards is crucial for mitigating risks and ensuring data integrity. The evolution of cloud computing has significantly transformed business operations by offering scalable and cost-efficient solutions. Research by Islam (2013) provides an overview of the leading CSPs, their service offerings, pricing structures, and performance metrics that influence customer choices. Key metrics such as uptime, response time, customer support services, and cost-effectiveness play an integral role in determining the most suitable cloud provider. These insights assist businesses in making data-driven decisions regarding CSP selection and resource allocation, thereby optimizing their cloud investments.

The factors influencing cloud adoption decisions within organizations extend beyond performance and cost. According to Tripathi and Mishra (2019), perceived usefulness, costs, risks, and benefits shape the decision-making process. A key finding from their study highlights that perceived risks negatively impact the behavioral intention to adopt cloud computing. This underscores the need for CSPs to address security and privacy concerns to enhance adoption rates. Furthermore, organizations must conduct thorough risk-benefit analyses to justify their cloud investments and develop sound business strategies. Comparative analyses of CSPs provide valuable insights into their strengths and weaknesses, aiding businesses in selecting the most suitable provider. A study by Deshmukh et al. (2018) examined the capabilities of major CSPs, focusing on service offerings, pricing models, and performance metrics. Their findings reinforce the importance of evaluating security, cost-effectiveness, and service quality as fundamental criteria in cloud provider selection. Such comparative studies are instrumental in navigating the rapidly evolving cloud market and ensuring that businesses align their cloud strategies with their operational needs.

The significance of CSP comparison is further emphasized in research conducted by Choudhary, Verma, and Rai (2022), which provides a comprehensive review of various CSPs, focusing on cost efficiency, security features, and service performance. Their study highlights the role of technological advancements in shaping the future of cloud computing, emphasizing the need for businesses to stay informed about industry trends. By understanding different CSP offerings, organizations can maximize value and optimize their cloud-based operations. Additionally, Chy and Ferdous (n.d.) conducted a comparative analysis of leading CSPs, including Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP). Their study examined crucial parameters such as pricing, performance, scalability, and security features, providing a structured overview of each provider's strengths and weaknesses. The findings highlight the competitive differentiation in service offerings and the impact of these differences on market positioning. Such analyses enable businesses to make strategic decisions regarding cloud adoption, ensuring that they choose a provider that aligns with their specific needs and long-term goals.

Conceptual/Theoretical framework

In figure 1 shows the conceptual framework that provides a structured approach for conducting a comparative analysis of cloud service providers. The process side of the framework is the "Comparative Analysis of Cloud Providers," which serves as the central theme. Key factors such as cloud service providers, market trends, and user requirements and preferences are considered on the input side. These elements are crucial for comprehending the landscape of cloud computing, encompassing the strengths and weaknesses of various providers, emerging trends, and the unique needs of businesses and individuals. On the output side, "Market Analysis" is highlighted, indicating that the study involves evaluating the competitive positioning of cloud service providers, their pricing strategies, service offerings, and overall market performance. This framework proposes a systematic approach to evaluating cloud platforms, incorporating both qualitative and quantitative factors to facilitate informed decision-making. By using this structure, researchers and businesses can compare cloud solutions like SiteGround, AWS, Azure, and Google

Cloud Platform based on relevant market insights and user needs.

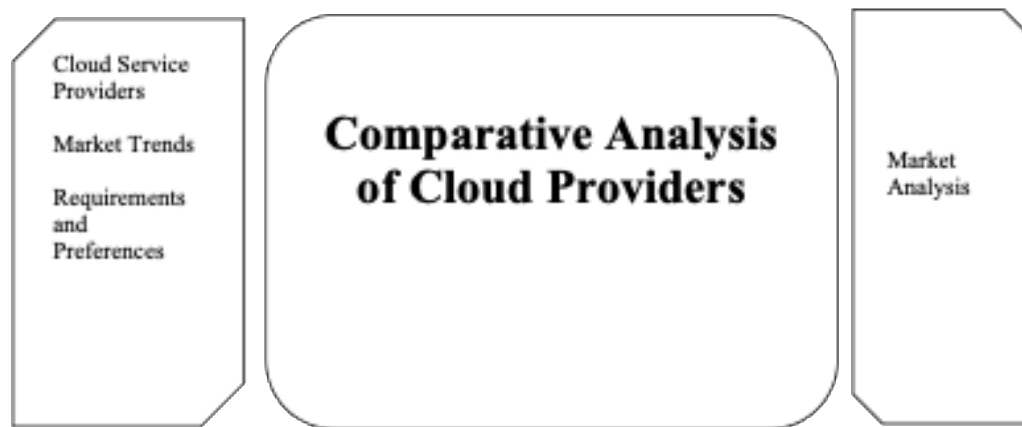


Fig. 1. Conceptual Framework

2. MATERIALS AND METHODS

Research Design

This research employs a comparative case study design to analyze different cloud computing providers, focusing on their offerings, pricing models, features, and performance. This approach facilitates an in-depth examination of each provider's strengths and limitations, ensuring a comprehensive evaluation.

Data Sources

Information was gathered from official provider websites, technical documentation, industry reports, and relevant literature. The primary cloud providers analyzed include SiteGround, a managed cloud hosting provider focused on ease of use and MySQL database services; Amazon Web Services (AWS), a leading cloud computing platform offering extensive compute, storage, and database solutions; Microsoft Azure, known for its integration with Microsoft products and flexible infrastructure; and Google Cloud Platform (GCP), a cloud provider specializing in innovation, scalability, and advanced data solutions.

Comparison Framework

This research assesses cloud service providers by examining essential features such as compute capabilities (e.g., virtual machines, serverless platforms, and container orchestration), storage options (including object and block storage as well as database storage), and database services that cover both relational and NoSQL solutions. Additionally, it examines networking services, including virtual networks, firewalls, and load balancing, as well as pricing models such as pay-as-you-go, reserved instances, and tiered plans. To illustrate the differences in service offerings and their suitability for various use cases, a comparative analysis table was developed.

Implementation Plan

To evaluate the feasibility of cloud migration, a case study involving Bicol University's Information Communications Technology Office (BUICTO) was conducted. The implementation plan focused on:

1. Infrastructure Assessment – Reviewing existing systems hosted on SiteGround and identifying potential limitations.
2. Cloud Assessment – Evaluating compatibility of workloads, including Project TAKDA, with cloud environments.
3. Cloud Strategy – Selecting the appropriate cloud model (public, private, hybrid) and migration approach (lift-and-shift, re-platforming, or refactoring).
4. Security Planning – Implementing encryption, access controls, and compliance with the Data Privacy Act of 2012.
5. Cost Optimization – Comparing *pricing* structures of AWS, Azure, GCP, and SiteGround to determine the most cost-effective solution.
6. Testing and Validation – Conducting functional, security, and performance testing to ensure system reliability post-migration.

Data Analysis

A content analysis approach was used to categorize cloud service providers based on their strengths and limitations. Comparative tables were utilized to summarize key features, enabling data-driven decision-making regarding cloud adoption. By following this methodology, the study ensures a systematic approach to evaluating cloud computing providers, ultimately aiding in the selection of the most suitable platform for Bicol University's cloud migration strategy..

3. RESULTS AND DISCUSSIONS

Provider Websites and Documentation

SiteGround is a web hosting company that offers a variety of hosting plans, including shared hosting, WordPress hosting, and WooCommerce hosting. They are known for their fast and reliable servers, as well as their excellent customer support [SiteGround, n.d.]. They have a variety of features to help businesses succeed online, including website security, marketing tools, and content creation resources.

Table 1 shows, that the provider offers four monthly billing plans: Jump Start, GrowBig, GoGeek, and Super Power (SiteGround, n.d.). While it doesn't provide traditional compute or storage services, it includes pre-configured MySQL databases with its hosting plans. These databases are optimized for the provider's platform, ensuring smooth website operation. Additionally, the provider offers a user-friendly control panel and takes care of server maintenance and database security. However, the lack of traditional networking services might be a limitation for businesses with complex networking requirements. Overall, the provider's offerings seem well-suited for businesses that prioritize pre-configured databases and ease of use, but may not be ideal for those requiring extensive compute, storage, or networking capabilities.

Amazon Web Services (AWS) is a comprehensive cloud computing platform offering a wide range of on-demand services that enable individuals and businesses to build, deploy, and scale applications and services on the cloud. AWS provides a flexible and scalable infrastructure, allowing users to pay only for the resources they use.

Table 1. SiteGround Features

Feature	Services
	offers four Cloud hosting plans, which are billed monthly
<i>Pricing Model</i>	• Jump Start - \$100/month • GrowBig - \$200/month • GoGeek - \$300/month • Super Power - \$400/month
<i>Compute Services</i>	Does not offer traditional cloud compute services
<i>Storage Services</i>	Does not offer traditional storage services
<i>Database Services</i>	• Cloud hosting plans come with built-in MYSQL databases • Pre-configured and optimized for their platform, ensuring smooth operation for your website. • User-friendly control panel • Takes care of server maintenance and database security
<i>Networking Services</i>	Does not offer traditional networking services

Table 2. Amazon Web Services Features

Feature	Services
<i>Pricing Model</i>	- The majority of AWS services follow a pay-as-you-go model. - Only pay for the resources you use. - Amazon Elastic Compute Cloud (EC2) - Amazon Elastic Container Service (ECS)
<i>Compute Services</i>	- AWS Lambda - Amazon Lightsail - AWS Batch - Amazon EC2 Spot Instances - AWS Auto Scaling Does not directly offer cloud storage services. Instead, Amazon Web Services (AWS), a subsidiary of Amazon.com, provides a comprehensive suite of cloud storage solutions.
<i>Storage Services</i>	- Amazon Simple Storage Service (S3) - Amazon Elastic Block Store (EBS) - Amazon Elastic File System (EFS) - Amazon Glacier - AWS Storage Gateway - Choice for users familiar with traditional relational databases like - MySQL, PostgreSQL, or Oracle. - A highly performant, NoSQL database service ideal for high-traffic web applications, mobile backends, and gaming applications.
<i>Database Services</i>	A MySQL and PostgreSQL compatible relational database service offering high performance, scalability, and availability.
<i>Networking Services</i>	Does not offer traditional networking services

Table 2 presents an overview of the core services and features available through Amazon Web Services (AWS). AWS primarily operates on a pay-as-you-go pricing structure, enabling users to pay based on actual resource usage (Amazon Web Services, n.d.-a). Its compute offerings are diverse, featuring solutions like Amazon EC2 for virtual machines, Amazon ECS for managing containers, AWS Lambda for serverless execution, and Amazon Lightsail for more straightforward cloud deployments (Amazon Web Services, n.d.-b; Amazon Web Services, n.d.-c). In terms of storage, AWS delivers a robust range of options, including Amazon S3 for object storage and Amazon EBS for block-level storage. Amazon Elastic File System (EFS), Amazon Glacier, and AWS Storage Gateway (Amazon Web Services, n.d.-b). Finally, for database services, AWS offers options like Amazon Relational

Database Service (RDS) for traditional relational databases and Amazon DynamoDB for NoSQL databases, catering to various application requirements (Amazon Web Services, n.d.-d).

Microsoft Azure is a cloud computing platform that offers a comprehensive set of services to help businesses build, deploy, and manage applications and services. It provides a flexible and scalable infrastructure, enabling organizations to innovate and achieve their goals. [Kavis, M. (2014)]

Table 3. Microsoft Azure Features

Feature	Services
<i>Pricing Model</i>	- Flexible pricing mode - Azure services are billed on an hourly or minute basis, providing granular control over your costs.

	• There are no upfront fees or long-term commitments required. • Prices may vary based on the region • Virtual Machines (VMs) • Azure App Service • Azure Functions • Azure Kubernetes Service (AKS) • Azure HPC Cloud
Compute Services	
	Offers a comprehensive set of storage services to meet various data storage needs
Storage Services	• Blob Storage • File Storage • Table Storage • Disk Storage • Azure SQL Database • Azure SQL Managed Instance • Azure Cosmos DB • Azure Database for PostgreSQL • Azure Database for MySQL • Azure MariaDB
Database Services	
	Offers a comprehensive set of networking services
Networking Services	• Virtual Networks (VNet) • Azure Firewall

Table 3 shows the key features and services offered by Microsoft Azure. In terms of pricing, Azure employs a flexible model where services are billed on an hourly or minute basis, allowing for granular cost control and eliminating the need for upfront fees or long-term commitments (Microsoft, n.d.-a). For compute services, Azure offers a diverse range of options, including Virtual Machines (VMs), Azure App Service, Azure Functions, Azure Kubernetes Service (AKS), and Azure HPC Cloud, catering to various computational needs (Microsoft, n.d.-b). For storage, Azure provides a comprehensive set of services such as Blob Storage, File Storage, Table Storage, and Disk Storage, designed to accommodate different data requirements (Microsoft, n.d.-c). Azure's database services include a variety of options like Azure SQL

Database, Azure SQL Managed Instance, Azure Cosmos DB, Azure Database for PostgreSQL, Azure Database for MySQL, and Azure MariaDB, supporting both relational and NoSQL databases (Microsoft, n.d.-d). Lastly, Azure offers networking services, including Virtual Networks (VNet) and Azure Firewall, to ensure secure and scalable network connectivity within the cloud environment (Microsoft, n.d.-e).

Table 4. Google Cloud Platform Features

Feature	Services
Pricing Model	• Pay for what you use, with no upfront commitments. • Most resources are priced on a per-hour basis, providing flexibility.
Compute Services	• Compute Engine • App Engine • Kubernetes Engine (GKE) • Cloud Functions • Cloud Run • Cloud Storage • Cloud SQL
Storage Services	• Cloud Bigtable • Cloud Filestore • Cloud Spanner

<i>Database Services</i>	• Cloud SQL- A fully managed relational database service that supports MySQL, PostgreSQL, and SQL Server. It offers high availability, automatic backups, and point-in-time recovery. • Cloud Bigtable- A wide-column NoSQL database • Cloud Datastore - A schema-less NoSQL database • Cloud Firestore - A flexible, scalable NoSQL database
<i>Networking Services</i>	• Virtual Private Cloud (VPC) • Cloud Load Balancing • Cloud DNS • Cloud VPN • Cloud Interconnect • Cloud Firewall

Table 4 outlines the primary features and services available through Google Cloud Platform (GCP). Regarding its pricing structure, GCP adopts a pay-as-you-go approach, which enables users to pay solely for the resources they utilize, removing the necessity for upfront investments (Google Cloud, n.d.). For computing needs, GCP offers a wide array of services, including Compute Engine for virtual machines, App Engine for serverless applications, Google Kubernetes Engine (GKE) for managing containers, Cloud Functions for event-driven serverless computing, and Cloud Run for serverless container deployments (BlueXP, 2023). When it comes to storage, GCP delivers a robust suite of options: Cloud Storage for object-based storage, Cloud SQL for relational databases, Cloud Bigtable for wide-column NoSQL databases, Cloud Filestore for managed file storage, and Cloud Spanner for globally distributed, strongly consistent relational databases (Google Cloud, n.d.). GCP's database offerings include Cloud SQL, which supports MySQL, PostgreSQL, and SQL Server, along with features such as automated backups, high availability, and point-in-time recovery (Google Cloud, n.d.). In addition, it supports NoSQL solutions like Cloud Bigtable, Cloud Datastore, and Cloud Firestore (BlueXP, 2023). To support networking, GCP includes a comprehensive range of services such as Virtual Private Cloud (VPC), Cloud Load Balancing, Cloud DNS, Cloud VPN, Cloud Interconnect, and Cloud Firewall, all designed to ensure secure and scalable cloud connectivity (BlueXP, 2023).

Industry Reports and Analysis

The cloud computing industry has witnessed remarkable growth in recent years, driven by the increasing demand for scalable, flexible, and cost-effective IT solutions. Among the leading players in this space are SiteGround, Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP). This report provides an analysis of these four major providers, considering factors such as market share, service offerings, pricing, and customer satisfaction.

Market Share and Leadership

AWS, being the pioneer in the cloud computing market, continues to hold a dominant position. According to research firm Gartner, AWS maintained a significant market share in 2023, followed by Microsoft Azure and Google Cloud Platform (Gartner, 2023). However, the competitive landscape has intensified, with Azure and GCP making significant strides in terms of feature parity and customer acquisition.

Service Offerings and Capabilities

Each provider offers a comprehensive suite of cloud services, including compute, storage, networking, databases, analytics, and machine learning. AWS boasts a vast ecosystem of services and tools, making it a popular choice for enterprises of all sizes. Azure, leveraging Microsoft's extensive technology stack, provides strong integration with Windows-based applications and tools. GCP, backed by Google's expertise in data analytics and artificial intelligence, excels in data-intensive workloads and machine learning applications.

Pricing and Cost Considerations

Cloud providers offer different pricing structures, including pay-as-you-go, reserved, and spot instance models. While AWS is known for its competitive rates, both Azure and GCP have implemented diverse pricing tiers and discount strategies to appeal to users. Organizations must thoroughly assess their unique requirements and usage habits to identify the most economical solution.

Customer Satisfaction and Support

Customer satisfaction is a crucial factor when selecting a cloud provider. AWS has a strong reputation for its customer support and community forums. Azure and GCP have also made significant investments in improving their customer experience. Factors such as reliability, performance, and security are also essential considerations for organizations. The cloud computing market is dynamic and competitive, with SiteGround, AWS, Azure, and GCP leading the way. The choice of provider depends on various factors, including specific business requirements, budget constraints, and desired level of support. Organizations should carefully evaluate their needs and conduct thorough research to select the most suitable cloud platform for their long-term success.

Data Analysis

- SiteGround focuses on managed cloud hosting, offering limited compute, storage, and networking options. It supports MySQL databases and has a tiered pricing model that scales based on user needs (SiteGround, n.d.).
- Amazon Web Services (AWS) provides a broad range of services, including extensive compute options such as EC2, ECS, and Lambda, as well as storage solutions like S3, EBS, and Glacier. It offers a variety of databases, including RDS for relational data and DynamoDB for NoSQL, along with comprehensive networking solutions, all under a pay-as-you-go pricing model (Amazon Web Services, n.d.).
- Microsoft Azure emphasizes integration with Microsoft products, offering virtual machines (VMs), App Service, and Azure Kubernetes Service (AKS) for compute, along with Blob Storage and Disk Storage for storage needs. Azure also supports relational databases like Azure SQL and Cosmos DB for NoSQL, with a flexible pricing structure (Microsoft Azure, n.d.).
- Google Cloud Platform (GCP) is recognized for its focus on innovation and scalability, offering services such as Compute Engine, App Engine, and Cloud Functions for compute, as well as Cloud Storage and Bigtable for storage. GCP also supports various database services, including Cloud SQL for relational data and Bigtable for NoSQL, alongside networking services like VPC and Cloud Load Balancing, under a pay-as-you-go model (Google Cloud, n.d.).

Table 5 shows a comprehensive comparison of four major cloud computing platforms: SiteGround, Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP). Each platform is evaluated based on its focus, compute capabilities, storage options, database support, networking features, and pricing model. SiteGround, primarily a managed cloud hosting provider, offers limited compute and storage resources. It specializes in MySQL databases and provides tiered pricing plans (SiteGround, n.d.). AWS, on the other hand, is a versatile platform with a broad range of services, including extensive compute options (EC2, ECS, Lambda), storage solutions (S3, EBS, EFS), and both relational (RDS) and NoSQL (DynamoDB) databases. It adopts a pay-as-you-go pricing model (Amazon Web Services, n.d.). Microsoft Azure, known for its integration with Microsoft products, offers a wide array of compute resources (VMs, App Service, Functions, AKS, HPC Cloud), storage options (Blob Storage, File Storage, Table Storage, Disk Storage), and a diverse range of databases (Azure SQL Database, Cosmos DB, PostgreSQL, MySQL, MariaDB) (Microsoft Azure, n.d.). Azure also provides flexible pricing options. Lastly, Google Cloud Platform (GCP) focuses on innovation and scalability, offering compute resources like Compute Engine, App Engine, GKE, and Cloud Functions, along with storage solutions (Cloud Storage, Cloud SQL, Bigtable, Filestore, Spanner) and databases (Cloud SQL, Bigtable, Datastore, Firestore) (Google Cloud, n.d.). GCP also employs a pay-as-you-go pricing model. In summary, the table highlights the distinct strengths and offerings of each platform, allowing users to make informed decisions based on their specific requirements and preferences.

Choosing the Right Cloud Provider

The best cloud provider for you depends on your specific needs and requirements. Here are some factors to consider:

- **Cost:** AWS, Azure, and GCP all offer pay-as-you-go pricing models, but their pricing structures can vary depending on your usage. SiteGround offers tiered plans, which can be more predictable but may not be as cost-effective for high-usage scenarios.
- **Services:** AWS offers the broadest range of services, while Azure is strongest in integration with Microsoft products and GCP focuses on innovation and scalability. SiteGround offers a more limited set of services but may be sufficient for basic web hosting needs.
- **Scalability:** All four providers offer scalable cloud solutions. However, GCP and AWS may be better suited for highly scalable applications due to their extensive range of compute and storage options.
- **Ease of Use:** SiteGround is known for its user-friendly interface, while AWS, Azure, and GCP can have a steeper learning curve due to the wider range of services and features they offer.

Table 5. Comparative Analysis

Feature	SiteGround	Amazon Web Services (AWS)	Microsoft Azure	Google Cloud Platform (GCP)
Focus	Managed Cloud Hosting	Broad Range of Services	Integration with Microsoft Product	Innovation and Scalability
Compute	Limited	Extensive (EC2, ECS, Lambda, etc.)	VMS, App Service, Functions, AKS, HPC Cloud	Compute Engine, App Engine, GKE, Cloud Functions, Cloud Run
Storage	Limited	S3, EBS, EFS, Glacier, Storage Gateway	Blob Storage, File Storage, Table Storage, Disk Storage	Cloud Storage, Cloud SQL, Bigtable, Filestore, Spanner
Database	MySQL (managed)	RDS (relational), DynamoDB (NoSQL)	Azure SQL Database, Cosmos DB, PostgreSQL, MySQL, MariaDB	Cloud SQL (relational), Bigtable (NoSQL), Datastore (NoSQL), Firestore (NoSQL)
Networking	Limited	Comprehensive	VNet, Azure Firewall	VPC, Cloud Load Balancing, Cloud DNS, VPN, Interconnect, Firewall
Pricing	Tiered Plans	Pay-as-you-go	Flexible (hourly/minute)	Pay-as-you-go

Implementation

To ensure a successful cloud migration, a comprehensive plan must be developed addressing key areas: infrastructure assessment, data migration strategy, security and compliance, and training and support.

1. Assessment and Strategy

This assessment evaluates that Bicol University's Information Communications Technology Office (BUICTO) has current infrastructure, focusing on network components and the use of SiteGround as the cloud provider, where some web applications are being deployed. The analysis also considers the potential risks associated with developing applications that are not PHP-based. Based on these findings, recommendations are made to optimize the infrastructure, evaluate cloud providers, and address the challenges of non-PHP application development.

2. Cloud Assessment

To plan for cloud migration, a crucial step is identifying workloads suitable for transition, such as the hosting of Technology Application and Knowledge Development Approach (Project TAKDA)—a web-centric paper submission and monitoring system developed specifically for the Bicol University Research & Development (BU R&D) Journal. This process begins with evaluating the existing infrastructure and applications to assess their compatibility with cloud environments. Security and compliance requirements are then carefully reviewed, ensuring that Project TAKDA, along with other sensitive systems, will be adequately protected and compliant with regulatory standards in a cloud setup. Additionally, analyzing potential cost savings and performance improvements helps clarify the financial and operational advantages of migrating Project TAKDA and similar workloads, aiding in the prioritization of resources that will most benefit from cloud migration.

3. Cloud Strategy

A robust cloud strategy is fundamental to successfully developing and deploying technology solutions, especially for initiatives like Project TAKDA. This web-centric paper submission and monitoring system for BU R&D Journal necessitates carefully selecting the most suitable cloud provider type—public, private, or hybrid—considering scalability, security, and cost-effectiveness (Zhu, 2010). When formulating the migration strategy, Bicol University must determine whether to employ a lift-and-shift approach, re-platform the system, or refactor existing components to optimize efficiency and performance within the cloud environment (Foxt et al., 2010). Moreover, establishing a rigorous security and compliance framework is essential to safeguard sensitive research data and ensure adherence to regulatory. Lastly, implementing a comprehensive governance model will aid in regulating cloud usage, tracking costs, and maintaining standards for system performance and data management. By adopting a well-defined cloud strategy, Project TAKDA can effectively harness cloud resources to enhance research capabilities and streamline

the paper submission and monitoring processes for BU R&D.

4. Planning and Design

The architecture design for this web applications outlines a robust and scalable cloud infrastructure, encompassing key elements such as network topology, storage solutions, and compute resources. The design ensures seamless integration of these components to deliver high availability, performance, and security, while optimizing resource allocation for future growth (Amazon Web Services, 2023). A key focus is on implementing a resilient disaster recovery and business continuity plan, which guarantees minimal downtime and data loss during unexpected failures (ITPro Today, 2023). This strategic approach ensures that web applications can recover quickly from disruptions, maintaining business operations without significant impact. In addition, the project includes well-defined data migration strategies and the selection of appropriate tools to facilitate a smooth and efficient transition to the cloud. These strategies ensure that data is migrated with minimal risk and disruption, supporting the long-term success and reliability of the cloud infrastructure (Microsoft Azure, 2023). Overall, the architecture and its implementation are designed to meet specific needs, ensuring scalability, security, and continuous availability in a dynamic cloud environment.

5. Security Planning

Security planning will be a core element in the design and implementation of the web system, ensuring it is secure, reliable, and compliant with regulations. To protect sensitive data, robust security measures will be implemented, including advanced encryption for data in transit and at rest, and role-based access controls. Intrusion detection and prevention systems (IDPS) will monitor network traffic for threats, and a comprehensive incident response plan will address security breaches and data loss. The system will also focus on maintaining availability and integrity under various threats. To comply with the Philippine Data Privacy Act of 2012, the system will implement robust security measures, conduct regular audits, and monitor activities, prioritizing data privacy and security to protect user information and maintain regulatory compliance.

6. Cost Optimization

Cost optimization is crucial for efficient cloud resource management, involving strategies like rightsizing instances and utilizing reserved instances to reduce costs (Nodeari, 2015). Implementing cost monitoring tools further enhances efficiency by tracking and preventing overspending (Velinov, 2023). For the “A Web-Centric Paper Submission and Monitoring System for Bicol University Research and Development (BU R&D) Journal,” a comparative analysis of cloud providers is essential. SiteGround offers cost-effective solutions for smaller projects with intuitive management, while Azure and AWS provide robust infrastructure with flexible pricing. Google Cloud enables granular cost control through custom machine types and per-second billing. Ultimately, the project aims to balance performance, scalability, and cost efficiency by strategically leveraging the unique strengths of each provider, particularly SiteGround’s affordability.

7. Implementation and Migration

The planning of migrating for the “Web-Centric Paper Submission and Monitoring System for Bicol University Research and Development (BU R&D) Journal,” it is crucial to develop a thorough migration strategy that encompasses all phases of the process. The plan should outline clear timelines and dependencies, detailing each step necessary for a seamless transition (Chang et. al, 2015). Before executing the migration, rigorous testing procedures should be conducted in a controlled environment to ensure the system’s functionality and compatibility with the chosen cloud infrastructure (Mullen, 2018). In addition, a robust rollback plan must be established to address any unforeseen issues or disruptions, allowing for a swift and safe reversion to the previous system if necessary (Hamadah, 2019). Furthermore, it is essential to evaluate the migration costs across various cloud platforms, including Azure, SiteGround, Google Cloud, and Amazon Web Services (AWS). This includes analyzing pricing models for compute resources, storage, data transfer, and additional services required by the BU R&D Journal. The cost analysis should factor in scalability, performance, and long-term sustainability to select the most cost-effective solution that meets the specific needs of the journal’s operations and growth (Alharthi et al., 2017).

8. Testing and Validation

Testing and validation for the “Web-Centric Paper Submission and Monitoring System for Bicol University Research and Development (BU R&D) Journal” is essential to ensure the application’s functionality, security, and performance across cloud environments. Functional testing focuses on assessing the application’s core features and overall performance in the cloud, verifying that it meets the desired specifications and maintains data integrity and security. Security testing involves conducting vulnerability assessments and penetration testing to uncover potential weaknesses, as well as ensuring the system complies with relevant security standards and regulations (Ramachandran, 2014). Performance testing measures the system’s speed and responsiveness, identifying any bottlenecks that may hinder its performance. Based on the testing outcomes, adjustments like configuration changes or scaling may be required to optimize the application’s performance.

Regarding the costing for the cloud infrastructure, a comparison of services across Azure, SiteGround, Google Cloud, and Amazon Web Services (AWS) needs to be made to determine the most cost-effective option. Each provider offers various pricing models depending on factors like storage, computing power, and bandwidth, which will be crucial in determining the long-term sustainability of hosting the BU R&D Journal platform. Detailed pricing analysis of these providers should be performed to select the right service that balances cost and performance effectively (Chinamanagonda,, 2020).

4. CONCLUSION

This research presents a detailed comparison of four leading cloud service providers—SiteGround, Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP)—highlighting the distinct advantages each brings to meet varying business requirements.

SiteGround is an excellent choice for managed cloud hosting and smaller web projects, thanks to its user-friendly interface, though it does not provide the full range of compute, storage, and networking services. Amazon Web Services (AWS) offers the broadest set of cloud capabilities, including robust computing, storage, and networking options, all available through a flexible pay-as-you-go pricing model. Microsoft Azure is particularly well-suited for organizations that rely on Microsoft products, offering smooth integration with Windows-based tools. Google Cloud Platform (GCP) stands out for its strong focus on innovation, scalability, and advanced solutions in AI, data analytics, and cloud-native development.

Choosing the right provider depends on factors such as cost, scalability, ease of use, and service offerings. Businesses should carefully assess their needs to select the most suitable cloud platform. Additionally, organizations must implement strategic planning, security measures, cost optimization, and testing for successful cloud adoption to ensure seamless migration and operational efficiency.

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