DOI: https://doi.org/10.59503/29538009-2023.1.11-32

Armen Tshughuryan
Sc.D. in Economics, Professor, ASEU
Jarmen1@yandex.ru

Gevorg Yemenjyan
Master student, EUA
gevorg.jemen@gmail.com

ISSUES OF CHOOSING CLOUD COMPUTING PLATFORMS

Abstract: Cloud computing has become increasingly popular due to its cost-effectiveness, scalability, and flexibility. However, the selection of the right platform can be challenging, with various factors such as security, pricing, reliability, and functionality, among others, to consider. This study found that while all three platforms offer similar services, the selection of a platform depends on the specifics needs of an organization, and it is crucial to conduct a through evaluation of the different options to make an informed decision.

Keywords: cloud computing platform, factors of security, pricing, reliability, decision making

JEL classification: A12, L86

Research aim: to evaluate the critical factors that influence the selection of cloud computing platform, provide guidance for organizations to make informed decisions based on their specific needs.

Research novelty: identify the strengths and weaknesses of each platform concerning security, pricing, functionality and number of services in selecting appropriate cloud computing platform.

Introduction

In today's digital age, cloud computing has become a fundamental technology of organizations looking to improve their operations and reduce cost. The use of cloud computing platforms provides businesses with numerous benefits, such as increased flexibility, scalability and security. However, choosing the right cloud platform can be a daunting task, given the increasing number of options available in the market. Amazon Web Services, Google Cloud Platform, and Microsoft Azure are among the leading cloud platforms that offer a range of services and functionalities.

Overview of cloud computing and its significance to organizations. It then delves into a comparison of the three leading cloud platforms, highlighting their unique features and benefits. The study evaluates each platform's capabilities in c critical areas such as data secure, performance, pricing models and availability [1].

Research results

Businesses must conduct a thorough evaluation of the different platforms to make an informed decision based on their specific requirements [2].

Evaluate business requirements: Before selecting a cloud platform, assess business needs, such as the type of applications business run, storage and processing requirements, expected traffic volume, and budget. Understanding business requirements

will help you choose a cloud platform that meets business specific needs.

Evaluate security measures: Evaluate the security measures offered by each platform, such as data encryption, access controls, and compliance certifications. Choose a platform that provides robust security measures that align with security requirements.

Consider pricing: Consider the pricing models offered by each platform, such as pay-as-you-go and reserved instances. Choose a platform that offers a pricing model that aligns with budget and usage requirements.

Table 1. Pricing of AWS, GCP, MA as of April 15, 2023

Platform	Service	**Starting price**	Type
AWS	t4g.micro instance	$0.0058 per hour	VM
GC	e2-micro instance	$0.0057 per hour	VM
MA	B1s instance	$0.0059 per hour	VM
AWS	AWS S3	$0.023 per GB	OS
GC	GCP Cloud Storage	$0.02 per GB	OS
MA	Microsoft Azure Blob Storage:	$0.0225 per GB	OS
AWS	db.t3. micro instance	$0.017 per hour	RD
GC	db-f1-micro instance	$0.015 per hour	RD
MA	Basic tier instance	$0.0093 per hour	RD

Evaluate reliability: Evaluate the reliability of each platform in terms of uptime and availability. Choose a platform that offers a reliable service with high availability that aligns with business needs.

Evaluate functionality: Evaluate the functionality of each platform in terms of the range of services and features offered. Choose a platform that provides the necessary services and features that align with business requirements.

Evaluate scalability: Evaluate the scalability of each platform in terms of its ability to handle growth and increased demand. Choose a platform that offers scalable solutions that align with business growth plans.

First step. the initial articles of the report on the pricing (see table 1),having this information a organization can chose platform based on its budget. Next choosing platform based on security. Depending on the business needs for scalability and functionality.

Virtual Machine – VM, Object Storage – OS, Relation Databases - RD

The security measures implemented by AWS, GCP, and Microsoft Azure:

Identity and Access Management (IAM):

AWS IAM: AWS Identity and Access Management (IAM) enables you to manage access to AWS services and resources securely. You can create and manage AWS users and groups, and use permissions to allow and deny their access to AWS resources.

GCP IAM: Google Cloud Identity and Access Management (IAM) lets you authorize who can take action on specific resources, giving you full control and visibility to manage cloud resources centrally.

Microsoft Azure IAM: Azure Active Directory (Azure AD) is Microsoft's cloud-based identity and access management service. It enables you to manage access to Azure resources, as well as other Microsoft services, such as Office 365 and Dynamics 365.

Encryption:

AWS Encryption: AWS provides various encryption options for data at rest and in transit. AWS Key Management Service (KMS) allows you to create and control the encryption keys used to encrypt data.

GCP Encryption: Google Cloud Platform provides strong encryption for data at rest and in transit. Google Cloud KMS allows you to create and manage encryption keys that can be used to encrypt data.

Microsoft Azure Encryption: Azure provides encryption for data at rest and in transit. Azure Key Vault allows you to create and manage encryption keys, and store secrets such as passwords, connection strings, and API keys.

Network Security:

AWS Network Security: AWS provides network security features such as Virtual Private Cloud (VPC), security groups, network ACLs, and Web Application Firewall (WAF) to help protect network resources.

GCP Network Security: Google Cloud Platform provides network security features such as VPC, firewall rules, load balancers, and Cloud Armor to help protect network resources.

Microsoft Azure Network Security: Azure provides network security features such as VNet, security groups, network security groups, and Azure Firewall to help protect network resources.

Compliance and Certifications:

AWS Compliance and Certifications: AWS has a wide range of compliance certifications, including SOC 1, SOC 2, ISO 27001, and HIPAA, among others.

GCP Compliance and Certifications: GCP has a wide range of compliance certifications, including SOC 1, SOC 2, ISO 27001, and HIPAA, among others.

Microsoft Azure Compliance and Certifications: Azure has a wide range of compliance certifications, including SOC 1, SOC 2, ISO 27001, and HIPAA, among others.

It's important to note that these security measures are just examples, and each cloud provider offers a wide range of security features and services. Before choosing a cloud platform, it's important to evaluate the specific security needs of business and ensure that the chosen platform meets those needs. Therefore, when choosing between them, it's important to evaluate specific security needs and consider factors such as:

Compliance requirements: If business needs to comply with specific regulations such as HIPAA or PCI-DSS, you should consider the compliance certifications offered by each provider. Identity and Access Management: Look at the IAM features offered by each provider to ensure that you can securely manage user access to resources. Encryption: Consider the encryption options offered by each provider to ensure that data is protected at rest and in transit. Network Security: Evaluate the network security features offered by each provider to ensure that network resources are protected. Support and Documentation: Consider the level of support and documentation offered by each provider to ensure that you have access to the resources you need to maintain the security of environment. Ultimately, the choice between AWS, GCP, and Microsoft Azure will depend on specific security needs and preferences. It's important to conduct a thorough evaluation of each platform before making a decision.

Second step: When choosing between AWS, GCP, and Microsoft Azure based on the number of services (see table 2) offered, it's important to keep in mind that the number of services alone may not be the best indicator of which provider is the best fit for your business needs. That being said, here are a few considerations to keep in mind: Specific service needs, Integration with existing systems, Ease of use [3].

Table 2. Number of services provided by AWS, GCP, and Microsoft Azure as of April 2023

Platform	**Number of services**	**Services**
AWS	200+	compute, storage, databases, networking, machine learning, analytics, security, and more
GCP	120+	
MA	200+	

It's important to note that the number of services offered by each provider may change over time as new services are introduced or existing services are updated or retired. Additionally, the specific features and capabilities of each service may vary depending on the provider. Therefore, it's important to conduct a thorough evaluation of each provider's services and compare them based on your specific business needs.

Third step: Strengths and Weaknesses of each platform, is the most crucial factor considering the platform for the business. Se the following list of perks [4]:

AWS:

Strengths: Largest cloud provider with the widest range of services and features. Strong presence in the market, with a 32% share of the cloud infrastructure market according to Synergy Research Group. High scalability and flexibility, with the ability to scale up or down quickly based on business needs. Strong security features, including identity and access management, encryption, and network security.

Weaknesses: Can be complex to use for some users, particularly those without a strong technical background. Can be expensive for smaller businesses, particularly if they are not using the services to their full potential.

GCP:

Strengths: Strong focus on machine learning and data analytics, with a wide range of services in these areas. User-friendly interface, with easy integration with other Google products. Good pricing model, with competitive pricing for many services. Good track record for reliability and uptime.

Weaknesses: Smaller market share than AWS and Microsoft Azure, with a 9% share of the cloud infrastructure market according to Synergy Research Group. Fewer services and features than AWS, although still a wide range of services are provided. Less established than AWS and Microsoft Azure, with fewer third-party tools and resources available.

Microsoft Azure:

Strengths: Good integration with other Microsoft products and services, such as Office 365 and Dynamics 365. Large range of services and features, with over 200 services available. Strong security features, including identity and access management,

encryption, and network security. Competitive pricing for many services.

Weaknesses: Can be complex to use for some users, particularly those without a strong technical background.

Can be more expensive than AWS for certain services.

Slightly smaller market share than AWS, with a 20% share of the cloud infrastructure market according to Synergy Research Group.

Conclusion

As more and more businesses move their operations to the cloud, choosing the right cloud platform becomes increasingly important. AWS, GCP, and Microsoft Azure are three of the leading cloud providers, each with their own strengths and weaknesses. In this article, we've taken a look at real data to help businesses make an informed decision on which cloud platform to choose. One of the key factors to consider when choosing a cloud platform is pricing. AWS, GCP, and Microsoft Azure all offer a range of pricing options, from pay-as-you-go to reserved instances. It's important to evaluate business needs and usage patterns to determine which pricing model will be most cost-effective. Real data shows, that GCP generally has competitive pricing for many services, although AWS also offers cost savings for larger workloads.

Security is another important consideration when choosing a cloud provider. All three providers offer strong security features, including identity and access management, encryption, and network security. Microsoft Azure has a particularly strong focus on security, with a range of security certifications and compliance standards. Real data shows that all three providers have a good

track record for reliability and uptime, although AWS has had some high-profile outages in the past. Another key factor to consider is the range of services and features offered by each provider. AWS has the largest market share and the widest range of services, making it a popular choice for businesses of all sizes. GCP, on the other hand, offers a strong focus on machine learning and data analytics, as well as a user-friendly interface and competitive pricing. Microsoft Azure offers good integration with other Microsoft products and services, a wide range of services, and strong security features. Real data shows that AWS has over 200 services available, compared to GCP's 120+ and Microsoft Azure's 200+.

When deciding between AWS, GCP, and Microsoft Azure, it's important to consider your specific business needs and use cases. For example, if you have a large workload and require a wide range of services, AWS may be the best choice for you. If you have a focus on machine learning and data analytics, GCP may be the best choice. If you already use other Microsoft products and services, Microsoft Azure may be the best choice for integration purposes.

In conclusion, choosing between AWS, GCP, and Microsoft Azure requires a thorough evaluation of each provider's pricing, security, and range of services and features. Real data shows that each provider has its own strengths and weaknesses, and the choice will ultimately depend on your specific business needs and use cases. With the right choice, businesses can take advantage of the flexibility, scalability, and cost-effectiveness of cloud computing to drive innovation and growth.

References:

1. **Gevorg Yemenjyan,** Application of Digital Technologies in Business, Master thesis pp. 12
2. The Engineering Behind A Successful Supply Chain Management Strategy: An Insight into Amazon.Com 2019 by Samrat Bharadwa
3. The Fourth Industrial Revolution 2016 by Klaus Schwab
4. Digital Transformation Now!: Guiding the Successful Digitalization of Your Business Model (SpringerBriefs in Business) 1st ed. 2018 Edition ttps://www.amazon.com/Digital-Transformation-Now-Digitalization-SpringerBriefs/dp/3319728431

Արմեն Ճուղուրյան
տ.գ.դ., պրոֆեսոր, ՀՊՏՀ

Գևորգ Եմենջյան
մագիստրոս, Հայաստանի եվրոպական համալսարան

ԱՄՊԱՅԻՆ ՀԱՇՎՈՂԱԿԱՆ ՀԱՐԹԱԿՆԵՐԻ ԸՆՏՐՈՒԹՅԱՆ ՀԻՄՆԱԽՆԴԻՐՆԵՐԸ

Բանալի բառեր - ամպային հաշվողական հարթակ, անվտանգության գործոններ, գին, հուսալիություն, որոշումների կայացում

Ներկայումս ավելի ու ավելի շատ բիզնեսներ տեղափոխում են իրենց գործունեության տեղեկատվական հոսքերը դեպի «ամպեր» և ամպային հարթակի ճիշտ ընտրությունը դառնում է ավելի կարևոր: AWS-ը, GCP-ն և Microsoft Azure-ը ամպային առաջատար մատակարարներից երեքն են, որոնցից յուրաքանչյուրն ունի իր ուժեղ և թույլ կողմերը: Այս հոդվածում ուսում-

նասիրվել են իրական տվյալները՝ օգնելու բիզնեսին տեղեկացված որոշում կայացնել, թե որ ամպային հարթակն ընտրել: Ամպային հարթակ ընտրելիս հաշվի առնելու հիմնական գործոններից մեկը գնագոյացումն է: AWS-ը, GCP-ն և Microsoft Azure-ը բոլորն առաջարկում են գնագոյացման մի շարք տարբերակներ՝ սկսած լիարժեք վճարումներից մինչև վերապահումներ: Կարևոր է գնահատել բիզնեսի կարիքները և օգտագործման ձևերը՝ որոշելու համար, թե գնագոյացման որ մոդելը կլինի առավել ծախսարդյունավետ: Իրական տվյալները ցույց են տալիս, որ GCP-ն, ընդհանուր առմամբ, ունի մրցակցային գներ շատ ծառայությունների համար, չնայած, AWS-ն նաև առաջարկում է ծախսերի խնայողություն ավելի մեծ ծանրաբեռնվածության համար:

Ամպային հաշվողական հարթակները դառնում են ավելի ու ավելի տարածված՝ շնորհիվ իրենց ծախսարդյունավետության, մասշտաբայնության և ճկունության: Այնուամենայնիվ, ճիշտ պլատֆորմի ընտրությունը կարող է դժվար լինել՝ հաշվի առնելով տարբեր գործոններ, ինչպիսիք են անվտանգությունը, գները, հուսալիությունը և ֆունկցիոնալությունը: Այս ուսումնասիրությունը ցույց տվեց, որ, չնայած, բոլոր երեք հարթակներն առաջարկում են նմանատիպ ծառայություններ, այնուամենայնիվ, պլատֆորմի ընտրությունը կախված է կազմակերպության առանձնահատկություններից, և շատ կարևոր է իրականացնել տարբեր գնահատումներ՝ տեղեկացված որոշում կայացնելու համար:

Submitted: 30.01.2023
Accepted for publication: 30.04.2023