Presentation on

User-Driven Cloud Service Ranking: A Quality & Usability Approach

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A Unified Framework for User-Preferred Multi-Level Ranking of Cloud Computing Services Based on Usability and Quality of Service Evaluation

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Problem Statement

- Different providers use different pricing and features.
- Performance is measured in different ways.
- Users may end up choosing a service that doesn't meet their needs, leading to poor performance and financial losses.
- Users have different preferences for what matters most in a cloud service.

Objectives

- Take Cloud services and KPIs as input.
- Compare and rank the Cloud services.
- Output a ranked list showing which Cloud service is the best and which is the worst.

Introduction

- Cloud computing has become essential for businesses and individuals due to its flexibility, scalability, and cost-effectiveness.
- Choosing the right Cloud Service Provider (CSP) is critical, as different providers offer varying levels of performance, security, cost, and usability.
- Security and transparency concerns are important for organizations handling sensitive data, requiring CSPs to provide clear policies and protections.
- The paper aims to define key performance indicators (KPIs) to guide users in evaluating and selecting the most suitable CSP based on their needs.

Theoretical Framework

- A comprehensive evaluation model for cloud services
- Uses 8 key factors and 65 smaller details (KPIs).
- Helps users pick the best cloud service for their needs.

UCSMI

- A multi-criteria decision-making model
- Uses hierarchical ranking to evaluate cloud services

MAGIQ

The UNIFIED CLOUD SERVICE MEASUREMENT INDEX

The UCSMI framework evaluates Cloud services based on eight key categories :

1. Security and privacy

The KPIs to measure security and privacy are shown in Figure 1 .

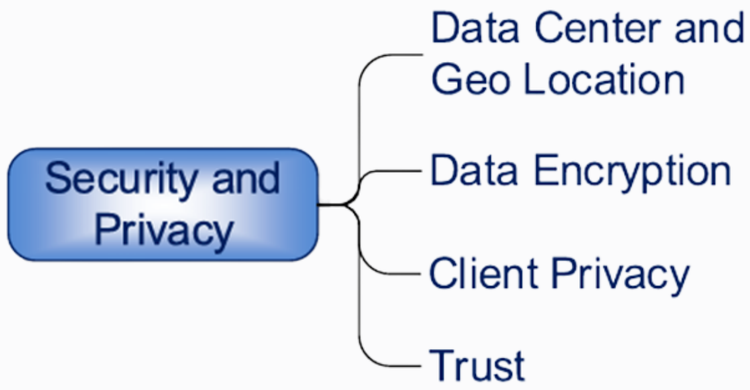


FIGURE 1: KPIs to evaluate the security and privacy of cloud services.

The UNIFIED CLOUD SERVICE MEASUREMENT INDEX (cont.)

2. Finances

The KPIs to measure the finances are shown in Figure 2 .

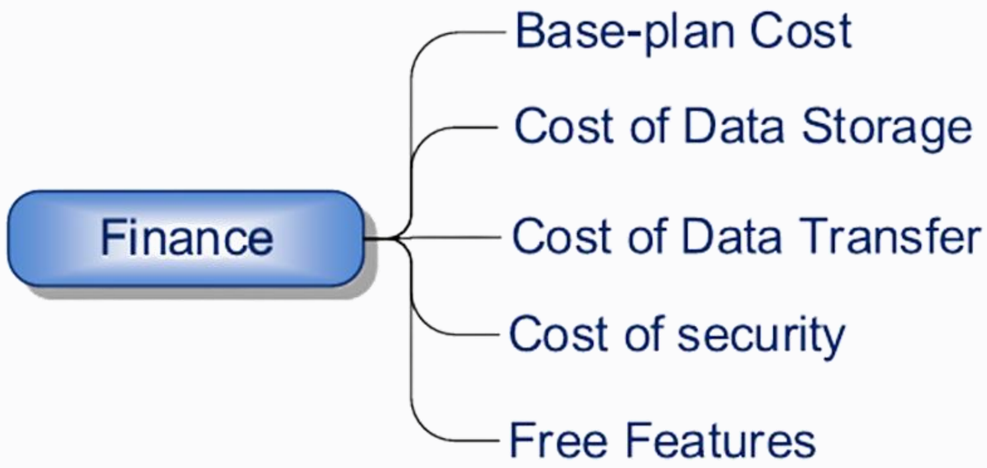


FIGURE 2: KPIs to evaluate the financial aspects of cloud services.

The UNIFIED CLOUD SERVICE MEASUREMENT INDEX (cont.)

3. Performance

The Cloud service performance is measured using the KPIs shown in Figure 3.

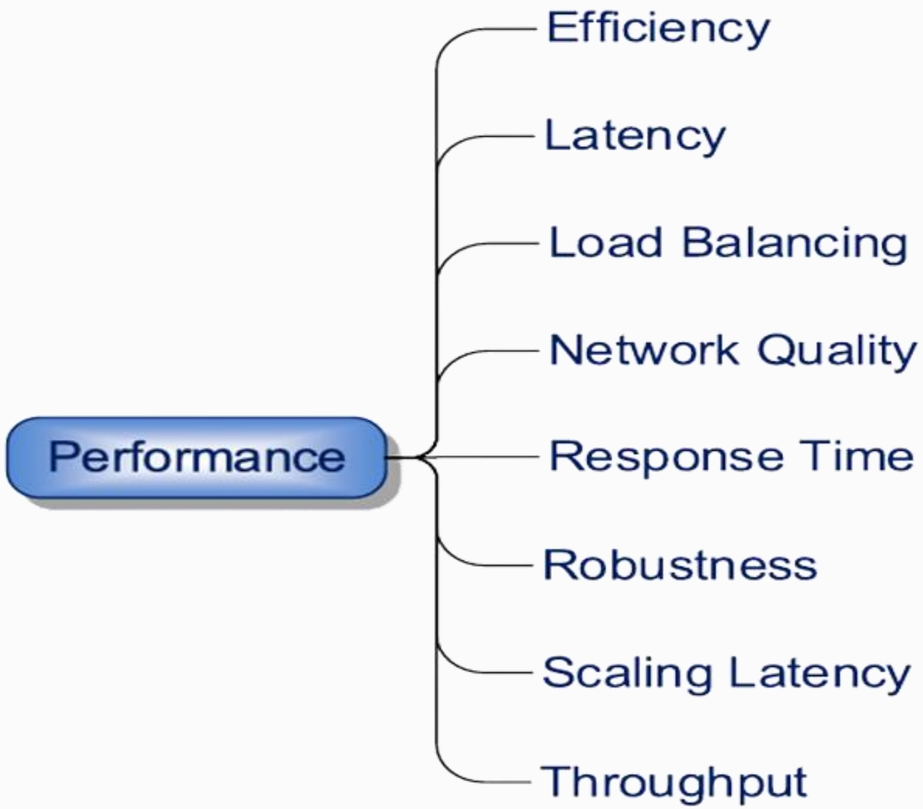


FIGURE 3: KPIs to evaluate Cloud service performance.

The UNIFIED CLOUD SERVICE MEASUREMENT INDEX (cont.)

4. Agility

The KPIs to measure agility are shown in Figure 4.

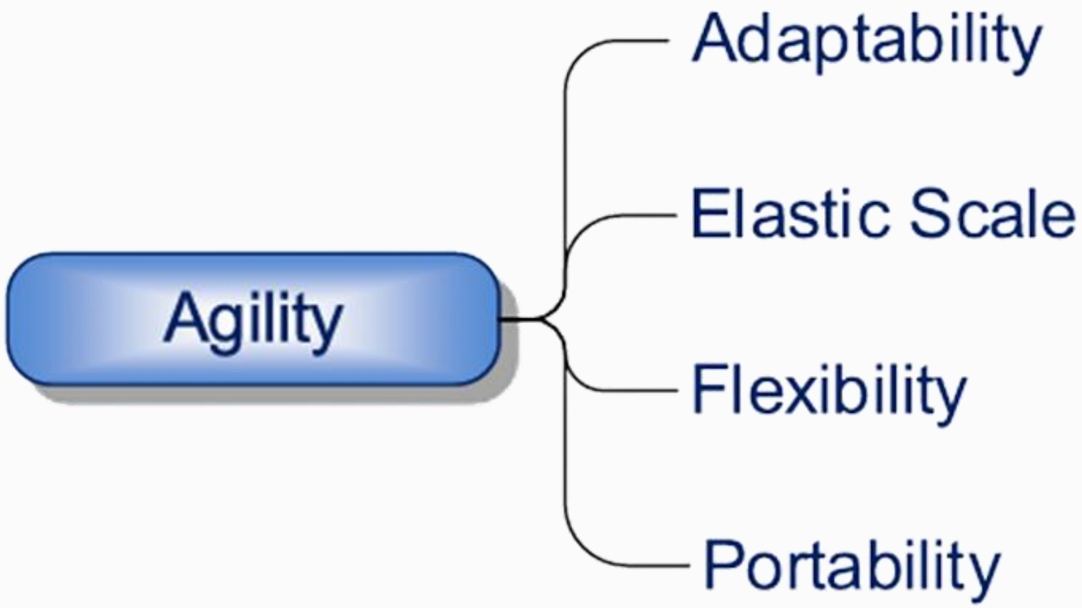


FIGURE 4: KPIs to evaluate the agility of cloud services.

The UNIFIED CLOUD SERVICE MEASUREMENT INDEX (cont.)

5. Usability

Usability of Cloud service is usually measured in terms of the KPIs shown in Figure 5

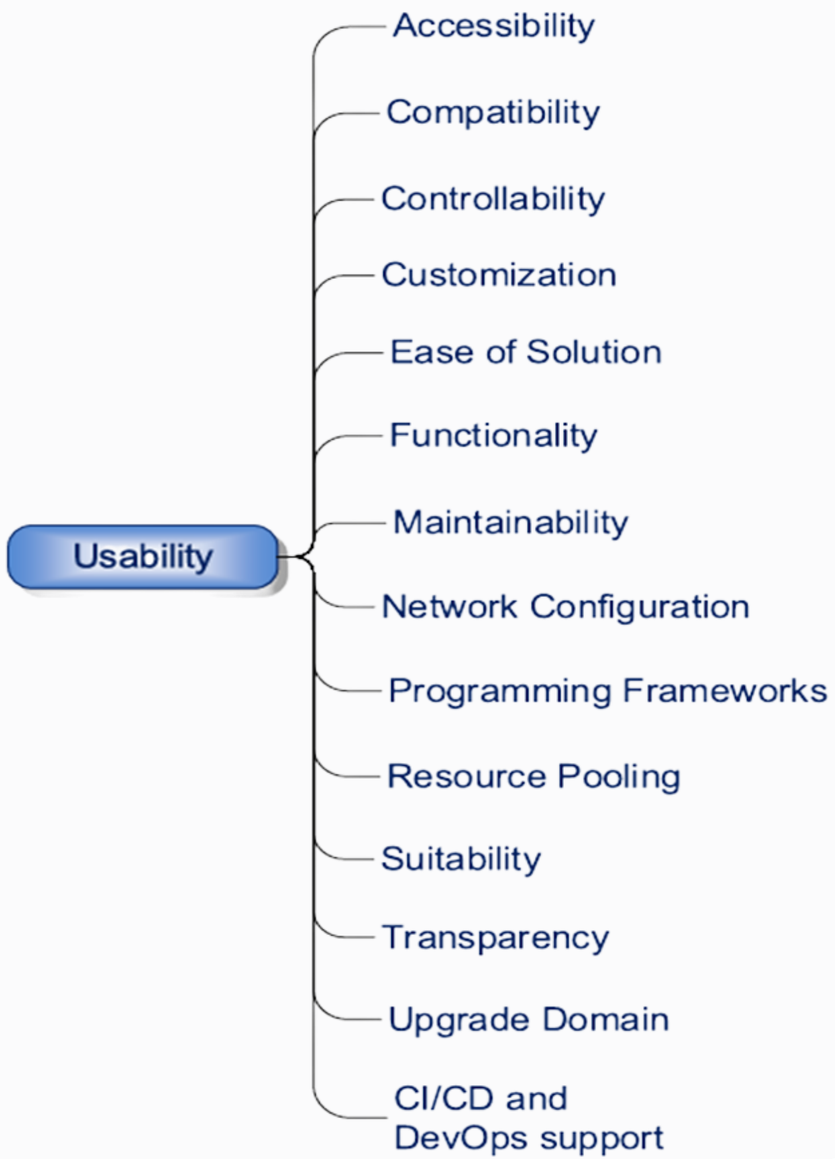


FIGURE 05: KPIs to evaluate the usability of cloud services.

The UNIFIED CLOUD SERVICE MEASUREMENT INDEX (cont.)

6. Accountability

The KPIs to measure accountability are shown in Figure 6.

FIGURE 6: KPIs for evaluation of accountability of cloud services.

The UNIFIED CLOUD SERVICE MEASUREMENT INDEX (cont.)

7. Assurance

The KPIs to measure assurance are shown in Figure 7.

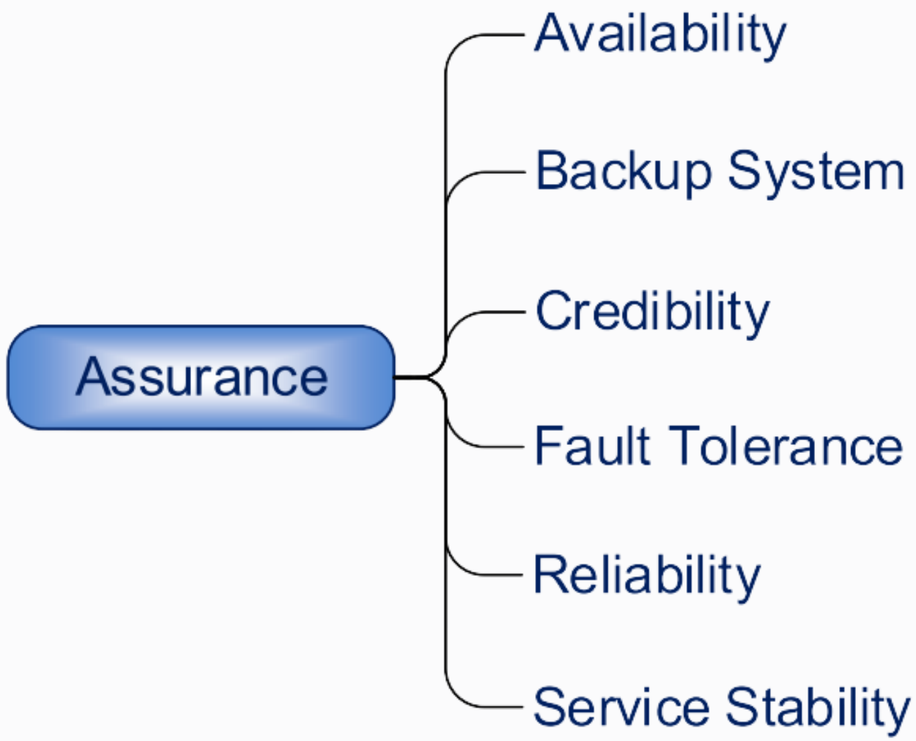


FIGURE 7: KPIs for evaluation of assurance of cloud services.

The UNIFIED CLOUD SERVICE MEASUREMENT INDEX (cont.)

8. Management

The KPIs to measure management are shown in Figure 8.

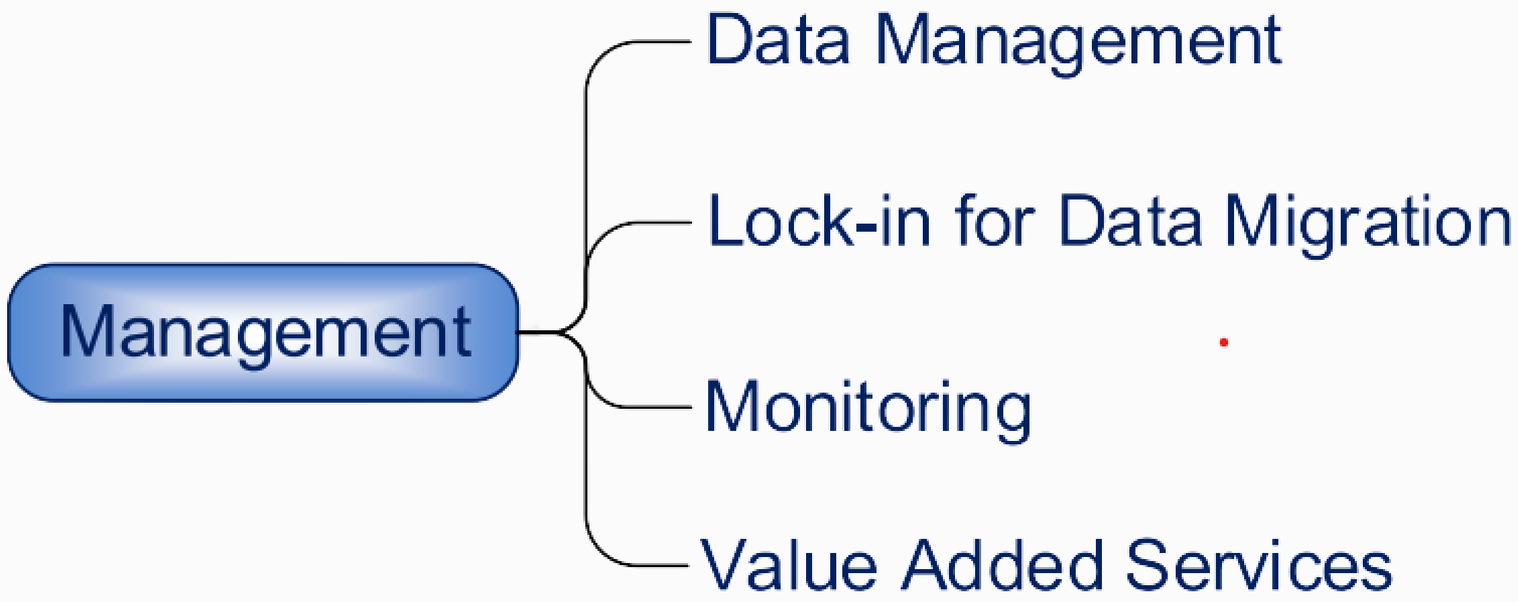
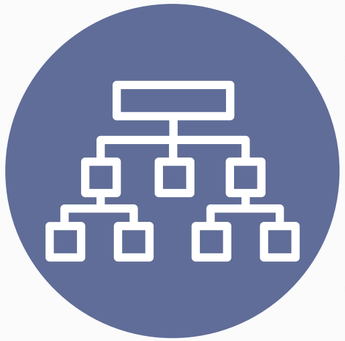


FIGURE 8: KPIs for evaluate management of cloud services.

MAGIQ Ranking Method

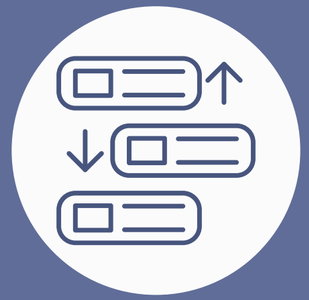
The paper describes the Multi-Attribute Global Inference of Quality (MAGIQ) Ranking Method as follows:

1. Hierarchical Evaluation



- Cloud services are ranked using a structured hierarchy of attributes and KPIs.
- Users can prioritize the attributes most important to them.

2. Weight Assignment Using Rank Order Centroids (ROC)



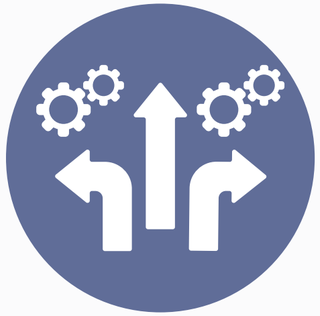
- MAGIQ assigns weights to different attributes based on their importance.
- The higher the rank, the higher the weight in calculations.

MAGIQ Ranking Method (cont.)

3. Performance Calculation

- Each cloud service is evaluated based on KPI measurements.
- Scores are aggregated to compute a final ranking.

4. Flexibility



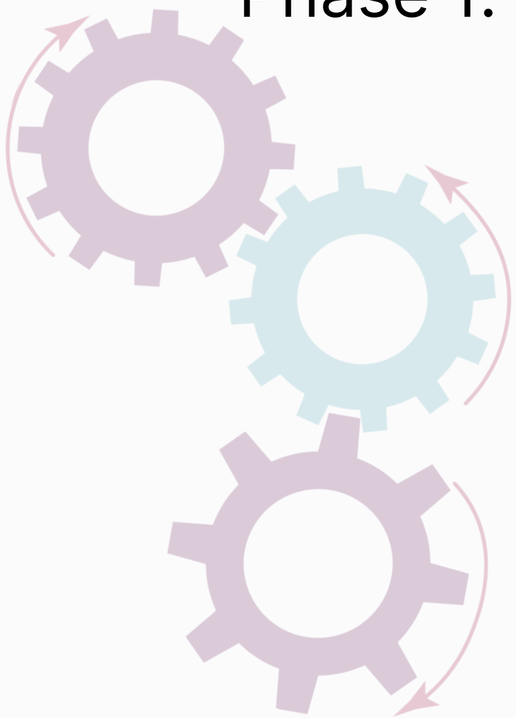
- Users can choose all or only some attributes for ranking.
- Works for both technical and non-technical users.

MAGIQ Ranking Method (cont.)

4. Final Ranking

- The cloud service with the highest overall score is ranked as the best option.

Case Study – Ranking Cloud Services



Phase 1: Ranked 6 cloud services based on real data.

Phase 2: Steps:

1. Pick services.
2. Choose ranking factors.
3. Assign scores using MAGIQ.
4. Get final ranking.

Phase 3: Results show best and worst cloud services.

Result Analysis

Cloud Services	Security (0.61)		Performance (0.28)		Finance (0.11)		Overall Rank
	Data Encryption (0.75)	Client Privacy (0.25)	Efficiency (075)	Response Time (0.25)	Base-Plan Cost (0.75)	Cost of Data Storage (0.25)	
CS1	0.41	0.03	0.41	0.03	0.41	0.03	0.31
CS2	0.24	0.06	0.24	0.06	0.24	0.06	0.20
CS3	0.16	0.10	0.16	0.10	0.16	0.10	0.14
CS4	0.10	0.16	0.10	0.16	0.10	0.16	0.12
CS5	0.06	0.24	0.06	0.24	0.06	0.24	0.11
CS6	0.03	0.41	0.03	0.41	0.03	0.41	0.12
						Sum	1

Figure 9: Weights and overall rank of six Cloud services based on three top-level attributes and two KPIs for each attribute.

Result Analysis

Evaluation of Performance

- Some cloud services were **more secure and reliable** but also more **expensive**.
- Others were **cheaper** but lacked features like **strong encryption or customer support**.
- The best cloud service varied based on user needs.
- **Businesses** preferred **security & scalability**, while **individual** users prioritized **cost**.

Result Analysis

Key Findings

- The MAGIQ method effectively ranked cloud services in a user-centric way.
- No single cloud service was best for everyone—ranking depends on what users value most.

Result Analysis

Why UCSMI + MAGIQ is Better

- Other methods are rigid and complex.
- UCSMI + MAGIQ is flexible & user-friendly.
- Works for all types of cloud services.

Future Works

- The future includes using other evaluation and ranking methods that can exploit fuzzy as well as non-quantifiable performance information.
- Also separate models for functional and nonfunctional KPIs can be developed

Conclusion

Cloud services play an important role in modern computing, and choosing the right one can be challenging. This study introduced UCSMI and MAGIQ as effective methods for ranking cloud services based on user preferences. The framework provides a simple, flexible, and accurate way to compare services, helping users make better decisions. By considering key factors such as security, performance, and cost, users can select the cloud service that best fits their requirements.

Thank You

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