

Использование теории принятия решений для выбора сервисов облачных вычислений

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Аннотация

В данной статье рассматриваются современные сервисы облачных вычислений Microsoft Azure, Amazon Web Services, Google Cloud Platform и Alibaba Cloud. Составлен список преимуществ и недостатков сервисов облачных вычислений в зависимости от специфики работы организации, а также определен набор критериев для оценки облачных сервисов в различных ситуациях. Рассмотрена возможность применения теории принятия решений, а в частности метод парных сравнений и метод экспертной оценки.

Ключевые слова: облачные вычисления, критерии оценки, облачные сервисы, сертификаты и стандарты, дорожная карта, надежность, проблемы безопасности

Using Decision Theory for Evaluating Cloud Computing Services

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Abstract

This article discusses about modern cloud services like Microsoft Azure, Amazon Web Services, Google Cloud Platform and Alibaba Cloud. It also analyzed and find out a list of advantages and disadvantages of cloud computing services, and also defined a set of criteria for evaluating cloud services in various situations. The possibility of applying the theory of decision making, and in particular the method

of pairwise comparisons and the method of expert evaluation, is also discussed here.

Keywords: cloud computing, cloud computing services, evaluate criteria, decision theory, paired comparison method, expert evaluation

Introduction

Cloud Computing makes it possible for us to store, manage and process data by using a network of remote servers hosted on the internet in a very cost effective way. It is considered as one of this technological revolution which growing in a larger scale. Now-a-days from business executives to technology entrepreneurs all are quite fond of different cloud computing services. Although there are few cloud computing services available for all of us.

Goal

Cloud computing is an emerging technology that almost every company switched to from on-premise technologies. Cloud computing lets us deploy the service quickly in fewer clicks. Storing the information in cloud allows us to access it anywhere, anytime. Once the data is stored in cloud it is easier to get the back up. Of course those wonderful advantages make our life easier but the biggest reason behind shifting to cloud computing is that it is cost effective than other systems we have at present. Now the question is which cloud computing services we are going to choose when it comes to take a decision. Our proposals, analysis and studies are going to draw a guideline to decide what cloud computing services we should use in different situations.

Cloud Computing Basics

Cloud Computing can simply describe as the virtualization and contract management of data center resources. From customer perspectives, it offers a way to gain new capabilities on demand without investing in new hardware or software. The wide range of services offered by cloud computing companies can be categorized into three basic types – Infrastructure as a Service (IaaS), Platform as a service (Paas), and Software as a service (SaaS). Based on a cloud location, we can classify cloud as public, private, hybrid and community [1].

Analysis of Different Cloud Services

Microsoft Azure: it provides SaaS, PaaS, IaaS and supports many different programming languages, tools and frameworks, including both Microsoft-specific and third-party software and systems. It continues to gain a lot of traction in the cloud storage and business worlds.

Amazon Web Services: It provides on demand cloud computing platforms to individuals, companies and governments, on a paid subscription basis. It acts as a window into the virtual computer, letting subscribers log-in, configure and use their virtual systems just as they would in a real physical computer.

Google Cloud Platform: It is a suite of cloud computing services which provides a series of modular cloud services including computing, data storage, data analytics and machine learning.

Alibaba Cloud: It is a Chinese cloud computing company, which provides cloud computing services to online businesses. It offers cloud services like data storage, rational databases, big-data processing and content delivery networks.

Decision Theory

Decision making is usually defined as a process or sequences of activities involving stages of detecting solutions from two or more alternatives. Definition offered by C.O.D. is, the mathematical study of strategies for optimal decision-making between options involving different risks or expectations of gain or loss depending on the outcome. The decision maker is forced to make compromises and the main aim of compromise is to fulfill the objective of the organization or management. A decision should be both subjectively and objectively rational. It would be “objectively” rational if it maximized the given values in a given situation, “subjectively” rational if it maximized attainment relative to the actual knowledge of the subject. An important characteristic of decision making is that it is always the product of several persons combined work.

Paired Comparison Method

It is a handy tool for decision making. Here all the potential options are compared visually, leading to an overview that immediately shows the right decision. If there is no objective data available for making the decision, then this method can be a very useful tool. [3] To apply paired comparison method we are going to use the following steps- creating table, Assigning letters, blocking cells, comparing options, rating option and listing results.

Expert Evaluation

It is also called heuristic evaluation. It is mostly used to review different products interface by two or more usability specialists. Here we are going to use published research data, industry-accepted usability principles and experience observing users in lab and field setting to evaluate the product. Feedback from target users can add an important dimension to some expert evaluations.

Current work and preliminary Results

We already studied four popular cloud computing services named Microsoft Azure, Amazon Web Services, Google cloud Platform and Alibaba Cloud. By doing this we identified the advantages and disadvantages of these cloud computing services.

Table 1 – Advantages and Disadvantages of cloud computing Services

Cloud Computing Services	Advantages	Disadvantages
Azure	• High Availability- Unlike	• Requires

	<p>other vendors, the Microsoft Azure cloud offers high availability and redundancy in data centers on a global scale.</p> <ul style="list-style-type: none"> • Security: Microsoft Azure has a strong focus on security, following the standard security model of Detect, Assess, Diagnose, Stabilize and Close. • New Call-to-action Scalability: Scalability is the backbone of any good cloud provider, and Azure is no different. • Cost-Effectiveness 	<p>Management: As with most cloud service providers, Azure needs to be expertly managed and maintained, which includes patching and server monitoring.</p> <ul style="list-style-type: none"> • Requires Platform Expertise: As more and more businesses continue to move their data to the cloud, it can be difficult to track which provider is best for our business.
AWS	<ul style="list-style-type: none"> • Easy to Use: This is possible due to the AWS Management Console or well-documented web services. • No Capacity Limit: Through this benefit, their workload is decreased and they can focus and built different ideas. • Provides Speed and Agility: With this, we can quickly deploy our application. 	<ul style="list-style-type: none"> • Limitations of Amazon EC2: AWS sets default limits on resources which vary from region to region. However, we can request to increase the limit. • Security Limitations • Technical Support Fee • General cloud Computing Issues
Google Cloud	<ul style="list-style-type: none"> • Higher Productivity is gained through Quick Access to Innovation • Less Disruption is Caused When Users Adopt New Functionality[5] • Allows Quick Collaboration • Less Data has to be stored on Vulnerable Devices • Higher Uptime and Reliability 	<ul style="list-style-type: none"> • requires a complete switch of mindset • Cost relates not to physical provisioning but to data volume and number of generated events, and this can make the people responsible for budgets very uncomfortable. • often have quite low limits at first

	<ul style="list-style-type: none"> • Control and Flexibility • Work From Anywhere 	<ul style="list-style-type: none"> • Services, patterns and best practices are changing faster than usual.
Alibaba Cloud	<ul style="list-style-type: none"> • instant access to a countless number of global suppliers • Organizers do a good job of organizing products and categories so we can find what we want fast. • use of community features, and their messaging system gives a friendly look 	<ul style="list-style-type: none"> • reputation is not top-notch • complaints filed against this cloud computing services • Problems with a product or service, but there are also billing, advertising and delivery complaints too.

For cloud service evaluation we can consider criteria like reliability, scalability, availability, service roadmap, technologies, business policies, disaster recovery etc.

We also used paired comparison methods in a simple way to understand the basic. A simple example of paired comparison method's (step by step) implication is given below.

Step 1: List of Cloud Platforms

Table 2 – Cloud Computing services and criteria for evaluation

	Azure	AWS	Google	Alibaba
Availability				
Service Roadmap				
Reliability				
Technologies				
Data Security				
Data Governance				
Business policies				
Scalability				
Disaster Recovery				
Dependencies				
Performance				
Migration Support				
Vendor Lock in & Exit Planning				
Competitively				
Market Research				
Total				

Step 2: Compare the cloud platform & sum the total

1 row of the best cloud platform
0 row of the not best cloud platform

Table 3 – Compare cloud computing Services depending on various criteria

	Azure	AWS	Google	Alibaba
Availability	1	0	0	0
Service Roadmap	0	1	0	0
Reliability	1	0	0	0
Technologies	1	0	0	0
Data Security	0	0	1	0
Data Governance	0	1	0	0
Business policies	0	0	0	1
Scalability	1	0	0	0
Disaster Recovery	0	0	1	0
Dependencies	0	1	0	0
Performance	1	0	0	0
Migration Support	0	0	1	0
Vendor Lock in & Exit Planning	1	0	0	0
Competitively	0	1	0	0
Market Research	0	0	0	1
Total	6	4	3	2

Step 3 Rank Cloud Platforms

- Microsoft Azure,
- Amazon Web Service,
- Google Cloud Platform,
- Alibaba Cloud.

Proposed objectives and approaches for Evaluate cloud computing services: Main objective is to draw a precise and concise guide line for evaluating cloud computing criteria. To do so we are using different decision theory methods.

Our approaches for evaluating the research proposal are given below:

- Detect advantages and disadvantages of different cloud computing services;
- Finding Parameters or criteria for evaluating cloud computing;
- Using Different decision Theory Methods to evaluate our proposal.

Summary

Some surveys show that more than a half of all applications in digital world will be connected via the cloud. With this success of cloud computing, new questions and issues have already started to rise. Up to date guidelines are essential to solve these issues. Still there is no specific guideline or methodology to evaluate cloud computing services. This is why our proposal and successful research will guide clients to decide which service they should use depending on their demand.

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