

Comparison of the Cloud Computing Platforms Provided by Amazon and Google

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Abstract—Cloud computing is essential for online computing resources which are offered as services by different cloud providers with different prices. With the rise of the number of cloud providers which offer a lot of cloud services, lead in creating the difficulties to the users to choose the cloud computing platforms based on their needs, and it creates a competition between the cloud providers. The purpose of this paper is the comparison of the cloud computing platforms provided by Amazon and Google in terms of the offered categories, services, and prices per instance in the year 2014 and 2016 in order to help users and cloud providers with this computing paradigm.

Keywords—Comparison of the Cloud Computing Platforms; Amazon Aws Cloud Platform; Google Cloud Platform; Cloud Computing Services; Prices

I. INTRODUCTION

Computing is a model consisting of services that are delivered in a manner similar to traditional utilities such as water, electricity, etc. In this model, users access services based on their requirements without regard to where the services are hosted or how they are delivered to users. Delivery of this utility computing has promised computing paradigm such as Cloud computing [1]. The architecture of the cloud computing is presented in the Fig. 1

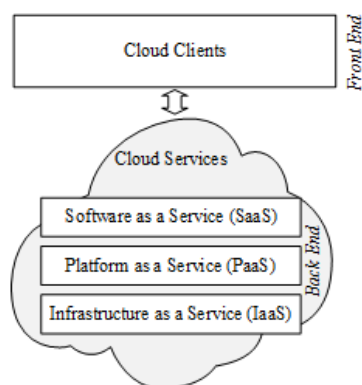


Fig. 1. Cloud Computing Architecture

As it is shown in the Fig. 1, the cloud computing architecture consists three layers of services (IaaS, PaaS, SaaS), and the cloud clients which consist of computer hardware and software for delivering the application, and the cloud services [4].

During the research conducted is identified that several papers presented the definitions of the cloud services in different ways, but we have selected the relevant papers which define cloud services more clearly. The authors Kulkarni, G. (2012) and Höfer, C. N., & Karagiannis, G. (2011) define Software as a Service (SaaS) as a model of software deployment which the application is hosted like a service in order to be provided to customers across the Internet. SaaS is the most common delivery model for many applications of business. A very well-known SaaS is the web-based e-mail. Most of the web-based applications are the software, cloud computing services which can be accessed from various client devices through the client interface (web browser) [2], [3]. While the authors Samimi, Parnia, & Ahmed Patel (2011) and Benedict, Michael (2013) have defined Platform as a Service (PaaS) as an application development and deployment platform distributed as a service to developers over the Web. This platform includes infrastructure, application servers, databases, development tools, and storage. We can say that PaaS is one of the great inventions for cloud computing [4], [5]. Also, the authors Höfer, C. N., & Karagiannis, G. (2011) define Infrastructure as a Service (IaaS) as a service that offers visualization platforms that are known for years as virtual private servers. Instead of having to setup servers, software, and data centers customers buy the resources in order to deploy, control, and manage their own software on the virtual machines. The virtual instances can be rented from costumers for as long as necessary, which can be as short as an hour [3]. These types of cloud services presented above are offered by different cloud computing platform providers; therefore, is very important the comparison of those cloud computing platforms provided by different providers. Based on the research conducted, the comparison of cloud computing platform is treated by Peng, J., Zhang, X., Lei, Z., Zhang, B., Zhang, W., & Li, Q. (2009, December). In their paper, they have done a comparison of several cloud computing platforms in order to help clients what to choose based on their needs [6]. Also, the authors Mazrekaj, A., Shabani, I., & Sejdiu, B. (2016) have presented a relevant paper which show that the reasonable prices to clients are very important in choosing cloud computing platform [17].

Seeing the comparison of the cloud computing platforms which was made in 2009, and the importance of the reasonable prices offered to clients, we consider to focus in this paper in comparison of the cloud computing platforms provided by Amazon and Google in terms of the offered categories, services, and prices per instance of virtual machines in the year

2014 and 2016, in order to help users to choose the cloud computing platforms based on their needs. Also, our intention in this paper is to help providers to have an overview of their offered categories, services, and prices per instance of virtual machines in the year 2014 and 2016, and a comparison between offered services of these two cloud providers.

The rest of the paper is organized as follows. Section 2 presents Overview of Cloud Computing Platforms. Section 3 describes Amazon and Google Cloud Computing Platforms. Section 4 present Comparison of the Amazon and Google Cloud Computing Platform. Section 5 presents Conclusion. And the last section present References used in this paper.

II. OVERVIEW OF CLOUD COMPUTING PLATFORMS

Since 1950s dates back the cloud computing concept, when large-scale mainframe became available in corporations and academia, accessible via clients (terminal computers). Also, in 1960 John McCarthy expressed his opinion that someday the computation may be organized as a public utility and the term Cloud was already in commercial use in the early 1990s by referring to the largest ATM networks. By the turn of the 21st century, cloud computing solutions had started to appear on the market [7], [8], [9].

One of the first providers of the cloud computing platforms was Salesforce.com, which in the year 1999 introduced the concept of enterprise applications by delivering it from a simple website. The next provider was Amazon where it launched the Amazon Web Service in the year 2002. Then Google Docs came in the year 2006 which brought the cloud computing to the forefront of the public consciousness. Also, the Amazon in this year has introduced the commercial web service called Amazon's Elastic Compute cloud (EC2) which allowed individuals and companies to rent computers to run their own computer applications. In 2008, the Eucalyptus was the next provider where has introduced the first open source for deploying private clouds called AWS API compatible platform. In the same year, the OpenNebula introduced the first open source software which is used to deploy private and hybrid clouds. While, in 2009 the Microsoft's entry into cloud computing with the launch of Windows Azure, suddenly, it is becoming the major players jumping on to cloud computing [8], [10].

III. AMAZON AND GOOGLE CLOUD COMPUTING PLATFORM

With entry of technology giants Amazon and Google the war of the cloud is getting more intense every day.

As is mentioned in the overview section, AWS has been operating since 2006 and from that time it had spent millions of dollars for building and managing the IT infrastructure that powered one of the world's largest online retail platforms. Now the Amazon serves hundreds of thousands of customers worldwide [8], [11]. Actually, the AWS provides the following category of services: Compute, Storage and Content Delivery, Database, Networking, Analytics, Enterprise Applications, Internet of Things, Mobile Services, Developer Tools, Management Tools, Security and Identity, Application Services, Game Development, and Software [12]. Also, the Google Cloud Platform has been operating since 2006. It keeps data safe and makes it available fast. Its services are advanced

for analyzing large amount of data. Its focus is also on managing infrastructure, provisioning servers and, configuring networks for their clients [8], [13]. The Google Cloud Platform provides the following category of services: Compute, Storage and Databases, Networking, Big Data, Machine Learning, Management Tools, Developer Tools, Identity & Security [14].

Since the seven of the categories are offered by both providers Amazon and Google, we will start with the short description of those seven categories, and the other categories listed above in order to show what kind of services are offered under those categories [12], [14].

- *Compute* – under this category are offered services for application platform, container management, virtual server hosting, and Server-less Computing.
- *Storage and Content Delivery* – the offered services in this category are related with storage, which enable to storage all data in reliable, scalable, and secure place.
- *Database* – the database category offer services for managing relational databases, NoSQL databases, data warehouses, and in-memory cache.
- *Networking* – the offered services under this category allow you to connect with the world by global fiber network. This category offer services for virtual private cloud, load balancing, direct connection and, DNS.
- *Developer Tools* – the offered services in developer tools category allow to host code and build, test, and deploy automatically the application.
- *Management Tools* – in this category are offered services that allow to manage, monitor, and configure the infrastructure and applications. Also, offered services allow to monitor, track, and enforce the compliance and security.
- *Security & Identity* – this category offered services for access control, key storage and identity management, security assessment, SSL/TLS Certificates, and Web Application Firewall.
- *Analytics* – the offered services under this category allow data to be processed, analyzes, and visualized easily and cost-effectively.
- *Big Data* – the big data platform offered services for data-driven application. This platform is integrated and Serverless.
- *Enterprise Application* – this category offered services for desktop virtualization, email & calendaring, document sharing & feedback.
- *Internet of Things* – the offered services which are related with Internet of Things Platform lets devices to connect easily and securely in order to interact with cloud applications and other devices.
- *Mobile Services* – this category offered services with allow mobile development, API Management, Application Testing, Mobile Analytics, Identity, and Notifications.

- *Application Services* – the offered services under this category are related with building, deploying, and managing application. Also, the offered services allow application streaming, searching, transcoding, email, notifications, queueing, and workflow to coordinate components of application.
- *Game Development* – this category is different from the other categories because only one service is offered for it, the service is called Amazon Lumberyard.
- *Software* – this category like game development category offer only one service called AWS Market place. This service makes it easy and simple to find, buy, and start using a wide variety of software and services.
- *Machine Learning* – this category offer services which allow image search, voice search, and smart reply.

Based on this short description, it is clear that each category of services provided by Amazon and Google provider, contains one or more services in category. These services are presented in the following section of the comparison of the Amazon and Google Cloud Computing Platforms. In the following section

are not presented only existing categories and services provided in this year 2016 by Amazon and Google, but also shall be presented the categories and services provided in the year 2014 in order to compare the number of offered categories and services in the year 2014 and 2016 by these two providers. Also, in the following section shall be presented prices per instances of virtual machines offered in the year 2014 and 2016 by providers Amazon and Google.

IV. COMPARISON OF THE AMAZON AND GOOGLE CLOUD COMPUTING PLATFORM

Based on the research conducted in the year 2014 and 2016 in this section are presented the comparison of the offered categories, services which belong to the categories, and prices per instance of virtual machines by two providers of the cloud computing platforms, Amazon and Google. In the following table 1 are presented the research result of the offered categories and services which belong to these categories by providers of cloud computing platforms: Amazon and Google in the year 2014 and 2016 [12], [14]. The purpose of this research result is to help clients to choose based on their needs between cloud computing platform providers and services that they offered.

TABLE I. SERVICES OF AMAZON CLOUD AND GOOGLE CLOUD PLATFORM

CLOUD SERVICES		2014		2016	
		Amazon AWS Cloud Platform	Google Cloud Platform	Amazon AWS Cloud Platform	Google Cloud Platform
COMPUTE	Amazon Elastic Compute Cloud (EC2)	✓		✓	
	Auto Scaling	✓		✓	
	Elastic Load Balancing	✓		✓	
	Amazon WorkSpaces	✓			
	Compute Engine		✓		✓
	App Engine		✓		✓
	Container Engine				✓(+)
	Container Registry				✓(+)
	Cloud Function ^{alfa}				✓(+)
	Amazon EC2 Container Registry			✓(+)	
	Amazon EC2 Container Service			✓(+)	
	AWS Elastic Beanstalk			✓(+)	
	AWS Lambda			✓(+)	
	Amazon VPC				
APPLICATION SERVICES	Amazon AppStream	✓		✓	
	Amazon CloudSearch	✓		✓	
	Amazon Simple Workflow Service (Amazon SWF)	✓		✓	
	Amazon Simple Queue Service (Amazon SQS)	✓		✓	
	Amazon Simple Notification Service (Amazon SNS)	✓		✓	
	Amazon Simple Email Service (Amazon SES)	✓		✓	
	Amazon Elastic Transcoder	✓		✓	
	Amazon API Gateway			✓(+)	
	Amazon FPS			✓(+)	
	Cloud Endpoints		✓		
	Translate API		✓		
	Prediction API		✓		
DATABASE	Amazon Relational Database Service (Amazon RDS)	✓		✓	
	Amazon Redshift	✓		✓	

	Amazon ElastiCache	✓		✓	
	Amazon SimpleDB	✓			
	AWS Database Migration Service			✓(+)	
	Amazon Dynamo DB			✓(+)	
	Cloud SQL		✓		✓
	Cloud Datastore		✓		✓
	Bigtable				✓(+)
STORAGE & CONTENT DELIVERY	Amazon Simple Storage Service (Amazon S3)	✓		✓	
	Amazon Glacier	✓		✓	
	AWS Storage Gateway	✓		✓	
	Amazon Elastic Block Store (Amazon EBS)	✓		✓	
	AWS Import/Export	✓		✓	
	Amazon Cloud Front	✓		✓	
	Amazon Elastic File System			✓(+)	
	Cloud Storage		✓		✓
	Persistent Disk				✓(+)
BIG DATA& ANALYTICS	Amazon Elastic MapReduce (Amazon EMR)	✓		✓	
	AWS Data Pipeline	✓		✓	
	Amazon Kinesis	✓		✓	
	Amazon DynamoDB	✓			
	Amazon Elasticsearch Service			✓(+)	
	Amazon Machine Learning			✓(+)	
	Amazon Quick Sight			✓(+)	
	Amazon Redshift			✓	
	BigQuery		✓		✓
	Cloud Dataflow				✓(+)
	Cloud Dataproc				✓(+)
	Cloud Datalab				✓(+)
	Cloud PUB/SUB				✓(+)
	Genomics				✓(+)
DEPLOYMENT & MANAGEMENT TOOLS	AWS Identity and Access Management (IAM)	✓			
	AWS CloudTrail	✓		✓	
	Amazon CloudWatch	✓		✓	
	AWS Elastic Beanstalk	✓			
	AWS CloudFormation	✓		✓	
	AWS OpsWorks	✓		✓	
	AWS CloudHSM	✓			
	AWS Config			✓(+)	
	AWS Service Catalog			✓(+)	
	Trusted Advisor			✓(+)	
	AWS Command Line Tool			✓(+)	
	AWS Management Console			✓(+)	
	Stackdriver Overview ^{Beta}				✓(+)
	Monitoring ^{Beta}				✓(+)
	Logging ^{Beta}				✓(+)
	Error Reporting ^{Beta}				✓(+)
	Trace				✓(+)
	Debugger ^{Beta}				✓(+)
	Deployment Manager				✓(+)
	Cloud Console				✓(+)
	Cloud Shell				✓(+)
	Cloud Mobile App				✓(+)
	Billing API				✓(+)
	Cloud APIs				✓(+)
PAYMENT& BILLING	Amazon FPS	✓			
	Amazon DevPay	✓			
SOFTWARE	AWS Marketplace	✓		✓	
SUPPORT	AWS Support	✓			

WEB TRAFFIC	Alexa Web Information Service	✓			
	Alexa Top Sites	✓			
WORKFORCE	Amazon Mechanical Turk	✓			
DEVELOPERS TOOLS	Amazon CodeCommit			✓(+)	
	AWS CodeDeploy			✓(+)	
	AWS CodePipeline			✓(+)	
	AWS Command Line Tool			✓(+)	
	Google Cloud SDK		✓		✓
	Push-to-Deploy		✓		
	Cloud Playground		✓		
	Android Studio		✓		✓
	Google Plugin for Eclipse		✓		✓
	Deployment Manager				✓(+)
	Cloud Source Repositories ^{BETA}				✓(+)
	Cloud Endpoints				✓(+)
	Cloud Tools for IntelliJ				✓(+)
	Cloud Tools for Powershell				✓(+)
	Cloud Tools for Visual Studio				✓(+)
	Cloud Test Lab				✓(+)
NETWORKING	Amazon Route 53	✓		✓	
	AWS Direct Connect	✓		✓	
	Amazon Virtual Private Cloud (VPC)	✓		✓	
	Elastic Load Balancing			✓(+)	
	Cloud Virtual Network				✓(+)
	Cloud Load Balancing				✓(+)
	Cloud CDN (Content Delivery Network)				✓(+)
	Cloud Interconnect				✓(+)
	Cloud DNS (Domain Name System)				✓(+)
ENTERPRISE APPLICATION	Amazon Workspaces			✓	
	Amazon WorkDocs			✓(+)	
	Amazon WorkMail			✓(+)	
INTERNET OF THING (IOT)	AWS IoT			✓(+)	
MOBILE SERVICES	Amazon Mobile Hub			✓(+)	
	Amazon API Gateway			✓(+)	
	Amazon Cognito			✓(+)	
	Amazon Device Farm			✓(+)	
	Amazon Mobile Analytics			✓(+)	
	AWS Mobile SDK			✓(+)	
	Amazon SNS			✓	
SECURITY & IDENTITY	AWS Identity and Access Management (IAM)			✓	
	AWS Directory Service			✓(+)	
	Amazon Inspector			✓(+)	
	AWS CloudHSM			✓	
	AWS Key Management Service			✓(+)	
	AWS WAF			✓(+)	
	AWS Certificate Manager			✓(+)	
	Cloud Identity & Access Management				✓(+)
	Cloud Resource Manager				✓(+)

	Cloud Security Scanner				✓(+)
	Cloud Platform Security Overview				✓(+)
GAME DEVELOPMENT	Amazon Lumberyard			✓(+)	
MACHINE LEARNING	Cloud Machine Learning Service Beta				✓(+)
	Vision API				✓(+)
	Speech API ^{Beta}				✓(+)
	Natural Language API ^{Beta}				✓(+)
	Translate API				✓(+)

* The symbol ✓ shows offered service by platform in the year 2014 and 2016.

** The symbol ✓(+) shows new offered service by platforms in the year 2016.

Based on the presented information in table 1, both Amazon and Google provider in their cloud computing platform in the year 2016 offers services for seven categories as Compute, Storage, Database, Networking, Developer Tools, Management Tools, and Security & Identity. While in the year 2014, both cloud providers provide services for three categories as Compute, Storage, and Database. If we compare the services that have been offered by providers, you can see that in the year 2014 offered services for the Networking and Management Tools category was made only by Amazon, whereas the Developer Tools category was provided only by Google. The category of services Security and Identity is not offered neither from Amazon or Google provider in the year 2014, this category is new in the year 2016 for both cloud providers.

The other categories of services which are offered by the Amazon provider in the year 2014 are: Application Services, Analytics & Big Data, Deployment, Payments & Billing, Software, Content Delivery, Support, Web Traffic, and Workforce. Some of these categories of services are not provided in the year 2016 such as Web Traffic, Workforce, Support, and Payment & Billing. Furthermore, Web Traffic and Workplace are not listed in category as services in the year 2016, but they exist as non-categorizes services. Except excluding some old categories of services from the Amazon AWS Cloud Platform, in the year 2016 are added new categories of services such as Enterprise Applications, Internet of Thing, Developer Tool, Security & Identity, and Game Development. Also, the Google Platform in the year 2016 has added two new categories of services such as Management Tools, Networking, and Machine Learning.

In the year 2016, Amazon has added also new services under the existing category of services in its cloud platform. These services are presented in the following:

- *Compute* – Amazon EC2 Container Registry, Amazon EC2 Container Service, AWS Elastic Beanstalk, AWS Lambda.
- *Application Services* – Amazon API Gateway, Amazon FPS.
- *Database* – AWS Database Migration Service.
- *Storage* – Amazon Elastic File System.
- *Analytics* – Amazon Elasticsearch Service, Amazon Machine Learning, Amazon Quick Sight.

- *Management Tool* – AWS Config, AWS Service Catalog, Trusted Advisor, AWS Command Line Tool, AWS Management Console.

Also, in the year 2016, the Amazon AWS Cloud Platform has excluded some of the services from categories, and some others services have moved from one category to another one. These services are presented in the following:

- *Excluded services from the categories of services*
 - The Amazon DevPay, and
 - The Amazon SimpleDB.
- *Moved offered services from one category of services to another one:*
 - The services as Amazon DynamoDB and Amazon Redshift in the year 2014 are offered in Database category, while in 2016 are offered in Analytics.
 - The services as AWS Identity and Access Management (IAM), and AWS CloudHSM in the year 2016 are offered in the Security category, they were in Deployment & Management category in the year 2014. While, the AWS Elastic Beanstalk service is offered in the Compute category in the year 2016.
 - The service Amazon FPS in the year 2014 was in Payment & Billing category, while, in the year 2016 it is in the Application Service category.

A case which is relevant to mention was that the Amazon AWS Cloud Platform, in the year 2016, has offered the same services in more than one category of services.

- *The Elastic Load Balancing service belongs to the Networking and Compute category of services.*
- *The Amazon API Gateway and Amazon SNS services belong to the Mobile Service and Application Service Category.*

Like the Amazon, also the Google has added new services in the existing category of services in its cloud platform:

- *Compute* – Container Engine, Container Registry, Cloud Function ^{Alfa},

- *Storage* – Persistent Disc
- *Database* – Bigtable
- *Big Data* – Cloud Dataflow, Cloud Dataproc, Cloud Datalab, Cloud PUB/SUB, Genomics
- *Developer Tool* – Deployment Manager, Cloud Source Repositories^{BETA}, Cloud Tools for IntelliJ, Cloud Tools for Powershell, Cloud Test Lab, and Cloud Tools for Visual Studio.

Contrary to Amazon, the Google has excluded only one service from Application Service category called Prediction API.

In the following Fig. 2 is presented the comparison of number of offered services by Amazon and Google Cloud Platform in the year 2014 and 2016.

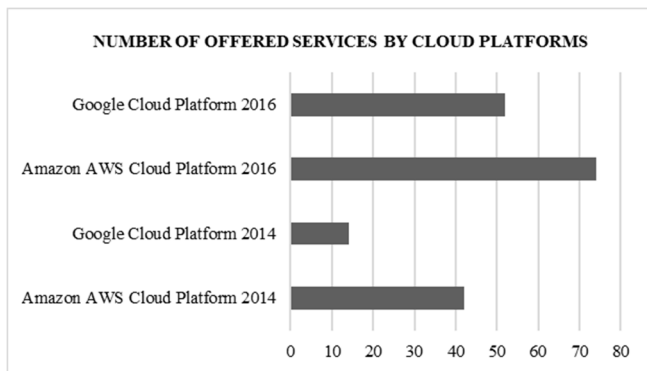


Fig. 2. Number of offered services by cloud platforms

Based on Fig.2, the Amazon AWS Cloud platform in 2014 offered 28 services more than Google Cloud Platform which offered only 14 services in that year.

If we compare the services offered by Amazon in 2014 and 2016, we can see that the number is increased from 42 to 74 services, while in Google this number is increased from 14 to 52 services.

During the year 2016, the Google Cloud Platform has added 38 new services, whereas the Amazon AWS Cloud Platform has added 32 new services in different categories of services.

Both Amazon AWS Cloud Platform and Google Cloud Platform have their way how the users have to pay services that they offer: “Pay-as-you-go” for Amazon and “pay only for what you use” for Google [15], [16].

In the following table 2 are shown the prices per machine type (instance) of Amazon EC2 and Google Compute Engine, which services are offered by Amazon and Google Cloud Platform for Europe Region [18], [19].

TABLE II. MACHINE TYPE (INSTANCE) PRICING

Machine Type (Instance)	2014			2016		
	Virtual CPUs	Memory(GB)	Price per hour (USD)	Virtual CPUs	Memory(GB)	Price per hour (USD)
Amazon AWS Cloud Platform	t2.micro	1	\$0.019	1	1	\$0.19
	t2.small	1	\$0.038	1	2	\$0.038
	t2.medium	2	\$0.076	2	4	\$0.076
	m3. medium	1	\$0.133	1	3.75	\$0.129
	m3. large	2	\$0.266	2	7.5	\$0.258
	m3. xlarge	4	\$0.532	4	15	\$0.517
	m3.2xlarge	8	\$1.064	8	30	\$1.033
	t2. nano			1	0.5	\$0.0093
	t2. large			2	8	\$0.142
	m4. large			2	8	\$0.244
	m4. xlarge			4	16	\$0.488
	m4.2xlarge			8	32	\$0.976
	m4.4xlarge			16	64	\$1.952
	m4.10xlarge			40	160	\$4.881
	m4.16xlarge			64	256	\$7.81
Google Cloud Platform	n1-standard-1	1	\$0.077	1	3.75	\$0.042
	n1-standard-2	2	\$0.154	2	7.5	\$0.084
	n1-standard-4	4	\$0.308	4	15	\$0.168
	n1-standard-8	8	\$0.616	8	30	\$0.336
	n1-standard-16	16	\$1.232	16	60	\$0.672
	n1-standard-32			32	120	\$1.344

As it is shown in the table 2, the instance with lowest performance offered by Amazon in the year 2014 wast2.micro with 1 CPU, 1 GB of memory, and price per hour was \$0.019. The Amazon also offers the instance with lowest performance in the year 2016, it is t2.nano, it has 1 CPU, 0.5 GB of memory, and price per hour is \$0.0093. In the year 2014, the instance with the largest performance offered by Amazon was m3.2xlarge with 8 CPU, 30 GB of memory, and price per hour was \$1.064. While, in the year 2016, the instance with

largest performance is m4.16xlarge with 64 CPU, 256 GB of memory, and prices per hour \$7.81.

Also, in the table 2 are shown offered instances by Google, where the instance with lowest performance isn1-standard-1 with 1 CPU and 3.75 GB of memory, it is same for the year 2014 and 2016, but the price in year 2014 was \$0.077, while price in year 2016 is \$0.042. In the year 2014, the instance with the largest performance offered by Google was n1-standard-16 with 16 CPU, 60 GB of memory, and price per hour was \$1.232. While, in the year 2016, the instance with largest performance is n1-standard-32 with 32 CPU, 120 GB of memory, and prices per hour \$1.344.

Comparing offered instances by Amazon and Google in the year 2014 and 2016, the Amazon has added those general purpose instances: t2.nano, t2.large, m4.large, m4.xlarge, m4.2xlarge, m4.4xlarge, m4.10xlarge, m4.16xlarge. While, the Google has added only one standard machine: n1-standard-32.

If we compare offered prices per instance in the year 2014 and 2016, the Amazon has almost the same prices in both years for same instances, while the Google has decreased prices for the same instance in the year 2016.

V. CONCLUSION

In this paper, we have compared Cloud Computing Platforms provided by Amazon and Google in terms of the offered categories, services, and prices per instance of virtual machines in the year 2014 and 2016. Considering this comparison, we conclude that the Amazon offers a greater number of services than Google, even though the Google has increased the number of offered services from the year 2014 to 2016. Also, we conclude that the prices per instance offered by Google are lower than the prices per instance offered by Amazon in the year 2014 and 2016.

Based on our conclusion, the clients can choose Amazon cloud platform if they want more number of categories of services, otherwise if they want lower prices per instance, than the clients can choose Google cloud platform.

In general, both of cloud providers offer a lot of categories, services, and different prices per different instance, which shows even more competition between them.

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