A Comparative Analysis of Scalable and Context-Aware Trust Management Approaches for Internet of Things

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1 Introduction

Cloud computing itself is a combination of the use of computer technology and Internet-based development. Based on cloud computing technology, all data is located and stored on servers and Internet applications or The software that users usually need, all software is on the server computer. Recently, interested entrepreneurs realized that cloud computing is very important for applications in the current work environment. A recent survey of 500 KPMG (KPMG) executives found that 42% of them believe that flexible working methods are the main factor in completing cloud computing. Even so, the survey results themselves indicate that 54% of executives expect cloud computing to increase productivity and employee satisfaction.There are two factors.The first is cloud computing, which has been growing recently. Inside In recent years, cloud computing was still in the testing phase, which made it very attractive to top management.Cloud computing can save company costs. The second factor is the economy. Although the current economy Compared to two years ago, it is better, and the need to keep company costs low is very important.

2 Service model, Virtual Machine example and Storage types that offered

Name	Google Cloud	Microsoft	Amazon Web Services
Service Model	Iaas (infrastructure as a service)	Iaas (infrastructure as a service)	Iaas (infrastructure as a service)
Virtual Machine	The largest instance provided by AWS includes 3.84 TB of RAM and 128 vCPUs, which cost approximately $3.97 per hour.	The largest instance provided by Azure includes 3.89 TB of RAM and 128 vCPUs. The hourly cost is approximately $6.79.	GCP leads here with its largest instance (including 3.75 TB of RAM and 160 vCPUs). The hourly fee is approximately $5.32.
Storage	GCP has an ever-	Microsoft Azure's	AWS storage

	growing menu of available storage services. Cloud storage is its unified object storage service, and it also has a "persistent disk" option. It provides a Transfer Appliance similar to AWS Snowball, as well as online transfer services.	basic storage services include Blob storage for REST-based object storage for unstructured data, queue storage for high-volume workloads, file storage, and disk storage. It also has a Data Lake Store, which is useful for big data applications.	services include Simple Storage Service (S3) for object storage, Elastic Block Storage (EBS) for persistent block storage used with EC2, and Elastic File System (EFS) for file storage. Some of its more innovative storage products include Storage Gateway and Snowball that support a mixed storage environment. Snowball is a physical hardware device that organizations can use to transmit PB-level data without actual Internet transmission.

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All major cloud computing services use the IaaS service model, or Infrastructure as a Service. This is because IaaS models offer computing resources reserved for a variety of tasks, such as storage, servers, network hardware and even maintenance and support. IaaS has many benefits, such as: cutting computing costs for a improved scalability and simple deployment. The pros of getting an IaaS model come when a company want control over the hardware offered, and the cost along with it reaches the middle ground of being cheaper than a non-cloud computing service and slightly more expensive than PaaS or SaaS models.

As is the case with virtual machines (VMs) in large cloud services, they all have some things in common. Google Compute Engine, Azure Virtual Machine , and Amazon EC2 calculator all offer general purpose VMs, count-VMs, unique-optimized VMs, and deployment VMs. What sets them apart is that by signing up for google you will get a mini VM that uses very little power, just enough for web surfing, office use, testing improvements. Azure still has low end-to-end computing options, but it still has the option of "financial" that stands between standard and low-end VMs.

Amazon also offers "economy" VMs tabs. Not only are they low cost clients, they also offer MAC based VMs that set them apart from the competition

As for storage in the cloud in this large industry, there are many options and variations to consider. Google makes it easy by asking a question, "Do you want to access your data multiple times incorrectly?" and has a simple each storage device that sets its value with the region and the data frequency. Azure [6] has an additional update that can guarantee you that the upgrade that the storage plan will save you costs, there is a choice whether this data is suitable for VM or not? And whether its hot storage or cold storage. Finally Amazon offers simple options like google do but it has a "smart" level that converts your data from hot storage to cool if you don't use it frequently, on top of it there are also many options that are designed to work well with other AWS operations.

3.OSEs offered, security, performance, and scalability

Name	Google Cloud	Microsoft Azure	Amazon EC2
Storage	Google cloud storage is actually used for object storage for companies of all sizes. It has unlimited storage with no minimum object size and also it has worldwide accessibility and worldwide storage locations.	Microsoft Azure storage is a solution for modern data storage scenarios. Core storage services offer a massively scalable object store for data objects, disk storage for Azure virtual machines (VMs), a file system service for the cloud, a messaging store for reliable messaging, and a NoSQL store.	Amazon EC2 storage is known for Temporary block storage volumes for Amazon EC2 instances.
OS environments offered	With the EOL of CoreOS, Google and Fedora introduced the Fedora CoreOS (FCOS) images on Google Cloud. Fedora CoreOS is a distribution that provides features that are needed to run modern infrastructure	Windows Azure isn’t actually a single operating system (OS), but is composed of several different OSs all working together. It is important to know the relationship between these OSs and how they interact with the	Amazon EC2 is preconfigured with a growing list of OSs. Users are also empowered to use their bundling tools to upload your own operating systems.

	stacks. Fedora CoreOS uses Linux containers to manage the services at a higher level of abstraction. Compute Engine provides Fedora CoreOS images built and supported by Fedora.	development tools you are using whilst you are maintaining your Windows Azure solutions.The main root partition of the server is running an operating system that is known as the host OS and is maintained by Microsoft. This host OS is responsible for managing the resources of the server, and for running the Windows Azure Agent that is used to communicate with the Windows Azure Fabric Controller. The Fabric Controllers monitor and control large segments of the data centers. As and when deployments are performed, the rest of the resources on the physical servers are carved up into one or more child partitions. These child partitions run their own OS, referred to as the guest OS.	
Security	Google Cloud's security model, world-scale infrastructure, and unique capability to innovate will help keep your organization secure and compliant.	Azure Defender, integrated with Azure Security Center, protects your hybrid cloud workloads including servers, data, storage, containers and IoT. Safeguard Windows servers and clients with “Microsoft Defender for Endpoint (servers)”	Amazon EC2 security provides a Controlling network access to user instances, through configuring users VPC and security groups. It also lets users manage their credentials used to connect to their instances.

		and protect Linux servers. Assess application vulnerabilities in virtual machines.	

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4.Pricing model, automatic / flexibility sizing, monitoring tools / service provided.

Name	Google Cloud	Microsoft Azure	Amazon Web Services
Pricing Model	Pricing is an area where Google has tried to stand out from the crowd by making their design pricing a little easier and more accessible to consumers. They strive to beat the costs offered by most cloud service providers and provide discounts and other incentives to beat the market. Google's high-level support includes an F1-micro instance from month to year. If you are looking for an easy way to navigate, a	The pricing options are mainly circumstantial in an effort to meet the unique needs of each customer. Like AWS, Azure offers 750 hours of adding Windows or Linux B1S to its core computing platform, virtual machines, annually (you ca n try it for free, which is good for any company that wants to test the "water" of the cloud).	The pricing structure is so complex, we recommend using a third-party management app to help you navigate your options and contain costs. They offer 750 hours of EC2 service per month for up to 12 months as part of their free tier.

	budget service that shows potential growth, this is the platform for you.		
Elasticity	GCP's primary strengths lie in machine learning, big data tools, and comprehensive container support. Other benefits of the Google Certified Partner program include: Strong reputation with an open source community Flexible and affordable pricing model A history of innovation in the world of technology with an established computing reputation User-friendly interface Integration with Python, Java, and Ruby	Specialization in customer service for the institution Focus on hybrid infrastructure solutions for optimal interoperability An easy transition for organizations already using and familiar with Microsoft services Discounts on moving to Azure when you have existing licenses from Microsoft Flexible pricing options with Azure pay-as-you-go or prepaid "reserved instance" Additionally, Azure is available in 54 regions, representing a wider reach in global markets compared to AWS and GCP.	Extensive, mature cloud service options that serve SMEs to large enterprises Unlimited server capacity Instant scalability Trusted vendor with reliable stability of services Training and certification resources Pay-per-use and pay-as-you-go pricing plans AWS's size and dominance in the cloud ecosystem make it a great choice for businesses of all sizes, including enterprise-level customers who need extensive and reliable computing capabilities with the flexibility to scale.
Monitoring tools	Google Cloud services generate metrics that provide information about how the service is operating. For example, Compute Engine reports the CPU usage and CPU utilization of each VM instance, it also reports the count of bytes and packets	Azure Monitor Detect and diagnose issues across applications and dependencies with Application Insights. Correlate infrastructure issues with Azure Monitor for VMs and Azure Monitor for Containers. Drill into your monitoring data with Log Analytics for troubleshooting and	monitor the AWS systems required to use your instance to ensure that they are working properly. These checks detect problems with your instance that require AWS involvement to repair. When a system status check fails, you can choose to wait for AWS to fix the issue or you can

	dropped by the firewall. For a complete list, Cloud Monitoring collects metrics, events, and metadata from Google Cloud, Amazon Web Services (AWS), hosted uptime probes, and application instrumentation.	deep diagnostics. Support operations at scale with smart alerts and automated actions. Create visualizations with Azure dashboards and workbooks. Collect data from monitored resources using Azure Monitor Metrics.	resolve it yourself (for example, by stopping and restarting or terminating and replacing an instance). Examples of problems that cause system status checks to fail include: Loss of network connectivity Loss of system power Software issues on the physical host Hardware issues on the physical host that impact network reachability

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Conclusion:

This report shows the google cloud, Microsoft Azure and Amazon Web Services details and functions, also pricing models and security systems.
Google cloud platform is a medium with the help of which people can easily access the cloud systems and other computing services which are developed by Google. The platform includes a wide range of services that can be used in different sectors of cloud computing, such as storage and application development. Anyone can access the Google cloud platform and use it according to their needs. Azure is Microsoft's cloud platform, just like Google has it's Google Cloud and Amazon has it's Amazon Web Service or AWS.000. Generally, it is a platform through which we can use Microsoft's resources. For example, to set up a huge server, we will require huge investment, effort, physical space and so on. In such situations, Microsoft Azure comes to our rescue. It will provide us with virtual machines, fast processing of data, analytical and monitoring tools and so on to make our work simpler. And Amazon Web Services(AWS) is

a cloud service from Amazon, which provides services in the form of building blocks. These building blocks can be used to create and deploy any type of application in the cloud.