



Cloud Computing using Amazon Web Services

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ABSTRACT

Cloud Computing is a recently emerged model which is becoming popular among almost all enterprises. It involves the concept of on demand services which means using the cloud resources on demand and we can scale the resources as per demand. Cloud computing undoubtedly provides unending benefits and is a cost effective model. The major concern in this model is Security in cloud. This is the reason of many enterprises of not preferring the cloud computing. This paper provides the review of security research in the field of cloud security. After security research we have presented the working of AWS (Amazon Web Service) cloud computing. AWS is the most trusted provider of cloud computing which not only provides the excellent cloud security but also provides excellent cloud services. The main aim of this paper is to make cloud computing security as a core operation and not an add on operation.

KEYWORDS: Cloud Computing, Web Services, Security

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I. INTRODUCTION

Amazon Web Services (AWS) provides on-demand computing resources and services in the cloud, with pay-as-you-go pricing. For example, you can run a server on AWS that you can log on to, configure, secure, and run just as you would a server that's sitting in front of you. Using AWS resources instead of your own is like purchasing electricity from a power company instead of running your own generator, and it provides many of the same benefits: capacity exactly matches your need, you pay only for what you use, economies of scale result in lower costs, and the service is provided by a vendor experienced in running large-scale networks.

1.1 Security

AWS provides a secure global infrastructure, plus a range of features that you can use to secure your data in the cloud. The following are highlights:

- Physical access to AWS data centers is strictly controlled, monitored, and audited.
- Access to the AWS network is strictly controlled, monitored, and audited.
- You can manage the security credentials that enable users to access your AWS account using AWS Identity and Access Management (IAM). You can create fine-grained permissions to AWS resources and apply them to users or groups of users.
- You can apply ACL-type permissions on your data and can also use encryption of data at rest.
- You can set up a virtual private cloud (VPC), which is a virtual network that is logically isolated from other virtual networks in the AWS cloud. You can control whether the network is directly routable to the Internet.
- You control and configure the operating system on your virtual server.
- You can set up a security group, which acts as a virtual firewall to control the inbound

and outbound traffic for your virtual servers.

- You can specify a key pair when you launch your virtual server, which is used to encrypt your login information. When you log in to your virtual server, you must present the private key of the key pair to decrypt the login information.

II. HISTORY

Officially launched in 2006, Amazon Web Services provides online services for other web sites or client-side applications. Most of these services are not exposed directly to end users, but instead offer functionality that other developers can use in their applications. Amazon Web Services' offerings are accessed over HTTP, using the REST architectural style and SOAP protocol. All services are billed based on usage, but how usage is measured for billing varies from service to service.

In late 2003, Chris Pinkham and Benjamin Black presented a paper describing a vision for Amazon's retail computing infrastructure that was completely standardized, completely automated, and would rely extensively on web services for services such as storage, drawing on internal work already underway. Near the end they mentioned the possibility of selling virtual servers as a service, proposing the company could generate revenue from the new infrastructure investment. The first AWS service launched for public usage was Simple Queue Service in November 2004. Amazon EC2 was built by a team in Cape Town, South Africa, under Pinkham and lead developer Chris Brown.

In June 2007, Amazon claimed that more than 180,000 developers had signed up to use Amazon Web Services.

In November 2010, it was reported that all of Amazon.com retail web services had been moved to AWS.

On April 20, 2011, some parts of Amazon Web Services suffered a major outage. A portion of volumes using the Elastic Block Store (EBS) service became "stuck" and were unable to fulfill read/write requests. It took at least two days for service to be fully restored. On June 29, 2012, several websites that rely on Amazon Web Services were taken offline due to a severe storm of historic proportions in Northern Virginia, where AWS' largest datacenter cluster is located.

On October 22, 2012, a major outage occurred, affecting many sites such as Reddit, Foursquare, Pinterest, and others. The cause was a latent memory leak bug in an operational data collection agent. On December 24, 2012, AWS suffered another outage, causing websites such as Netflix instant video to be unavailable for customers in the Northeastern United States. AWS later issued a statement detailing the issues with the Elastic Load Balancing service that led up to the outage.

In November 2012, AWS hosted its first customer event in Las Vegas. On April 30, 2013, AWS began offering a certification program for computer engineers with expertise in cloud computing. AWS revenue was not stated separately in the past, but in 2012 it was estimated by industry watchers at over \$1.5 billion.

On May 13, 2013, AWS was awarded an Agency Authority to Operate (ATO) from the U.S. Department of Health and Human Services under the Federal Risk and Authorization Management Program. In October 2013, it was revealed that AWS was awarded a \$600M contract with the CIA. During August 2014, AWS received Department of Defense-Wide provisional authorization for all U.S. Regions.

In April 2015, AWS was reported to be profitable, with sales of \$1.57 billion in the first quarter of the year, and \$265 million of operating income. Founder Jeff Bezos described it as a fast-growing \$5 billion business; analysts described it as "surprisingly more profitable than forecast". In October 2015, Amazon.com said in its Q3 earnings report that AWS's operating income was \$521 million, with operating margins at 25 percent. AWS's Q3 2015 revenue was \$2.1 billion, a 78% increase from Q3 2014's revenue of \$1.17 billion. Q4 2015 revenue for the AWS segment increased 69.5% y/y to \$2.4 billion with 28.5% operating margin, making AWS a \$9.6 billion run rate. In Q1 2016, revenue was \$2.57 billion with net income of \$604 million, a 64% increase over Q1 2015 that resulted in AWS being more profitable than Amazon's North American retail business for the first time.

In 2015, Gartner estimated that AWS customers are deploying 10x more infrastructure on AWS than the combined adoption of the next 14 providers. During the 2015 re:Invent keynote, AWS disclosed that they have more than a million active customers every month in 190 countries, including

nearly 2,000 government agencies, 5,000 education institutions and more than 17,500 nonprofits. AWS adoption has increased since launch in 2006. Notable customers include NASA, the Obama presidential campaign 2012, Kempinski Hotels, and Netflix. In 2016, AWS engineer James Hamilton created a ten-year timeline of the online service. In 2016, AWS founder Andy Jassy was named CEO of the division. In the first quarter of 2016, Amazon experienced a 42% rise in stock value as a result of increased earnings, of which AWS contributed 56% to company's profit. With a 50% increase in revenues the past few years, it is predicted AWS will have \$13 billion in revenue in 2017.

III. AVAILABILITY ZONES

AWS has reported another 3 Regions (and 7 Availability Zones) in China, India, and the United Kingdom coming on the web all through 2017. Each Region is entirely contained inside a solitary nation and the majority of its information and administrations remain inside the assigned Region. Every Region has different "Accessibility Zones", which are unmistakable server farms giving AWS administrations. Accessibility Zones are separated from each other to keep blackouts from spreading between Zones. A few administrations work crosswise over Availability Zones (e.g., S3, DynamoDB) while others can be designed to imitate crosswise over Zones to spread request and keep away from downtime from disappointments. As of December 2014, Amazon Web Services worked an expected 1.4 Million servers crosswise over 28 accessibility zones. The worldwide system of AWS Edge areas comprises of 54 purposes of nearness around the world, incorporating areas in the United States, Europe, Asia, Australia, and South America.

In 2014, AWS focused on accomplishing 100% renewable vitality utilization. As a major aspect of this exertion in the United States, AWS dispatched with Community Energy of Virginia a sun oriented homestead coming on the web in 2016 to bolster the US East locale. In January 2015, AWS declared it has cooperated with Pattern Development to build and work Amazon Wind Farm Fowler Ridge. In July 2015, AWS reported that it has contracted with Iberdrola Renewables, LLC to build and work Amazon Wind Farm US East. In November 2015, AWS reported that it has contracted with EDP Renewables to build and work Amazon Wind Farm US Central. AWS is likewise working with Tesla

Motors to apply battery stockpiling innovation to address some power needs in the US West (Northern California) locale.

IV. LIST OF SERVICES

4.1 Compute

Amazon Elastic Compute Cloud, otherwise called "EC2" is an IaaS benefit giving virtual servers controllable by an API. Xen. Proportional administrations incorporate Google Compute Engine and Rack space or on-premises reciprocals, for example, OpenStack or Eucalyptus. Amazon Elastic Beanstalk gives a PaaS administration to facilitating applications, equal administrations incorporate Google App Engine or Heroku or OpenShift for on-premises utilize. Amazon Lambda (LAMBDA) runs code in light of AWS inner or outer occasions, for example, http asks for straightforwardly giving the asset required. Lambda is firmly incorporated with AWS however comparable administrations, for example, Google Cloud Functions and open arrangements, for example, OpenWhisk are beginning to exist.

4.2 Networking

Amazon Route 53 gives an adaptable Managed DNS benefit giving Domain Name Services. Amazon Virtual Private Cloud (VPC) makes an intelligently secluded arrangement of AWS assets which can be associated utilizing a VPN association. This goes up against on-premises arrangements, for example, OpenStack or HPE Helion Eucalyptus utilized as a part of conjunction with PaaS programming. AWS Direct Connect gives devoted system associations into AWS server farms. Amazon Elastic Load Balancing (ELB) naturally circulates approaching activity over different Amazon EC2 occasions. AWS Elastic Network Adapter (ENA) gives up to 20Gbit/s of system data transfer capacity to an Amazon EC2 instance.

4.3 Storage and Content delivery

Amazon Simple Storage Service (S3) gives Web Service based capacity. Amazon Glacier gives long haul stockpiling alternatives (contrasted with S3). High repetition and accessibility, yet low-visit get to times. Proposed for chronicling information. AWS Storage Gateway, an iSCSI square stockpiling virtual apparatus with cloud-based reinforcement. Amazon Elastic Block Store (EBS) gives persevering piece level stockpiling volumes for EC2. AWS Import/Export, quickens moving a lot of information into and out of AWS utilizing versatile capacity gadgets for transport. Amazon Elastic File

System (EFS) a record stockpiling administration for Amazon Elastic Compute Cloud (Amazon EC2) occasions.

4.4 Database

Amazon DynamoDB gives a versatile, low-inertness NoSQL online Database Service upheld by SSDs. Amazon ElastiCache gives in-memory storing to web applications. This is Amazon's execution of Memcached and Redis. Amazon Relational Database Service (RDS) furnishes versatile database servers with MySQL, Oracle, SQL Server, and PostgreSQL support. Amazon Redshift gives petabyte-scale information warehousing with segment based capacity and multi-hub register. Amazon SimpleDB permits engineers to run questions on organized information. It works working together with EC2 and S3. AWS Data Pipeline gives dependable support of information exchange between various AWS register and capacity administrations (e.g., Amazon S3, Amazon RDS, Amazon DynamoDB, Amazon EMR). At the end of the day, this administration is essentially an information driven workload administration framework, which gives an administration API to overseeing and checking of information driven workloads in cloud applications. Amazon Aurora gives a MySQL-good social database motor that has been made particularly for the AWS framework that cases quicker speeds and lower costs that are acknowledged in bigger databases.

4.4 Deployment

AWS CloudFormation gives a definitive format based Infrastructure as Code model for designing AWS. AWS Elastic Beanstalk gives organization and administration of utilizations in the cloud. AWS OpsWorks gives setup of EC2 administrations utilizing Chef. AWS CodeDeploy gives mechanized code arrangement to EC2 occurrences.

4.4 Management

Amazon Identity and Access Management (IAM) is a verifiable administration, the verification framework used to validate access to the different administrations. AWS Directory Service an oversight benefit that permits association with AWS assets with a current on-premises Microsoft Active Directory or to set up another, remain solitary index in the AWS Cloud.

Amazon CloudWatch, gives observing to AWS cloud assets and applications, beginning with EC2. AWS Management Console (AWS Console), An electronic indicate and snap interface oversee and screen the Amazon foundation suite including (yet not

constrained to) EC2, EBS, S3, SQS, Amazon Elastic MapReduce, and Amazon CloudFront. A versatile application for Android which has bolster for a portion of the administration highlights from the support. Amazon CloudHSM - The AWS CloudHSM benefit meets corporate, legally binding and administrative consistence necessities for information security by utilizing committed Hardware Security Module (HSM) apparatuses inside the AWS cloud. AWS Key Management Service (KMS) an oversight administration to make and control encryption keys.

Amazon EC2 Container Service (ECS) a profoundly adaptable, quick, compartment administration benefit, utilizing on Docker holders.

4.4 Miscellaneous

Amazon MWS - Marketplace web benefit permits clients to oversee finish shipment prepare from making leaning to downloading shipment name utilizing API. Amazon Fulfillment Web Service gives an automatic web administration to venders to ship things to and from Amazon utilizing Fulfillment by Amazon. This administration will never again be bolstered by Amazon. The majority of the usefulness of this administration is presently exchanged to Amazon commercial center Web benefit. Amazon Historical Pricing gives access to Amazon's authentic deals information from its partners. (It creates the impression that this administration has been suspended.) Amazon Mechanical Turk (Mturk) oversees little units of work conveyed among numerous people. Amazon Product Advertising API in the past known as Amazon Associates Web Service (A2S) and Amazon E-Commerce Service (ECS), gives access to Amazon's item information and electronic business usefulness. Amazon Gift Code On Demand (AGCOD) for Corporate Customers empowers organizations to appropriate Amazon blessing cards (blessing codes) right away in any group, coordinating Amazon's blessing card innovation into client reliability, representative motivating force and installment dispensing stages. AWS Partner Network (APN) gives innovation accomplices and counseling accomplices with the specialized data and deals and promoting backing to expand business openings through AWS and with organizations utilizing AWS. Propelled in April 2012, the APN is comprised of Technology Partners including Independent Software Vendors (ISVs), instrument suppliers, stage suppliers, and others. Consulting Partners incorporate System Integrators (SIs), offices, consultancies, Managed

Service Providers (MSPs), and others. Potential Technology and Consulting Partners must meet specialized and non-specialized preparing prerequisites set by AWS. Amazon Lumberyard is a freeware triple-A amusement motor that is coordinated with AWS.

V. CONCLUSION

Online education is reconfiguring the delivery of schooling and the activities that students experience on a daily basis. However, our analyses show that the analyses also support what charter advocates have long suspected; that e-schools drag down the impact of the state's charter sector. Our findings reveal some important considerations for Ohio policy makers as they consider the future place of online learning within K-12 education. They also highlight key questions and challenges that policy makers, advocates, and educators ought to bear in mind, and properly address, as the adoption of technology in education increases in the coming years.

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