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An Over Review of Faces and Paybacks of Cloud Computing and Motivation on Environment Security for Hybrid Encryption

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ABSTRACT:
Cloud computing is a method that uses the remote services of another company to access resources, such as servers, software, and storage, over the Internet in exchange for a charge. In contrast to local hard drives or servers, this enables an organization to store and view data or programs virtually, that is, in a cloud. The origins of cloud computing can be traced to the 1950s, when mainframe computers were widely used in new businesses and educational institutions that were attempting to automate manual labor and create new tools using pre-existing languages as well as developing new, more human-friendly, higher-level languages. Due to a severe lack of skilled workers who could complete this task effectively during these periods, mainframe computers were extremely popular in the market. Everyone can now submit programs from dumb terminals, and the mainframe will process them according to priority and queue, eliminating the need for waiting. Because mainframe computers made CPU processing power and storage suddenly available, it was a better investment with many returns. In-depth discussions of cloud computing's various service and deployment models have been covered in the sections above. There is also a thorough discussion of the security problems and other important issues related to the cloud computing environment and its components. Setting a few goals for (A) It is suggested that new methods be researched and developed to improve end-user authentication security for end user in cross cloud environment. (B) Developing a method to automate the security check in recently installed cloud platforms is suggested. (C) By putting a new algorithm in IDS, it is suggested that the present attack detection and prevention mechanism in a multi-tenant environment be developed and critically examined. (D) According to this study, a framework is a set of guidelines for protecting the cloud computing environment from different types of outside threats. (E) Evaluation and comparison of previous software implementations of the aforementioned mechanism's speed/cost tradeoff.

Keywords: Cloud Computing, environment security, hybrid encryption

INTRODUCTION

Over the past five years, cloud computing (CC) has only lately begun to take shape in its mature form. Numerous writers, scholars, and institutions have attempted to provide their own definitions of cloud computing. Here are a few of the well-known and modified definitions that have been compiled and are still relevant today. form in table 1. In their own definition, Wang et al. [82] stated that cloud computing

is a collection of network-enabled services that also offer scalability and Quality of Service guarantees. When compared to typical computing resources, the service is relatively cheap and is referred to as tailored based on the needs of the client. The reasons it differs from other technologies, such as its user-centric interface design, scalability, adaptability, etc., were also highlighted in this study. A number of technologies, including virtualization, service-oriented architecture (SOA), Web 2.0, and service level orchestration and workflow, were also covered as factors in the better adoption of cloud computing.

Source	Definition
Gartner [84]	Cloud computing is a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service using internet technologies.
IDC [85]	An emerging IT development, deployment and delivery model, enabling real-time delivery of products, services and solutions over the Internet.
IBM [86]	Cloud computing is on-demand access, via the internet, to computing resources—applications, servers (physical servers and virtual servers), data storage, development tools, networking capabilities, and more—hosted at a remote data centre managed by a cloud services provider (or CSP).
NIST [87]	Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models
AWS [88]	Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing. Instead of buying, owning, and maintaining physical data centres and servers, you can access technology services, such as computing power, storage, and databases, on an as-needed basis from a cloud provider like Amazon Web Services (AWS).
TechTarget [89]	Cloud computing is a general term for anything that involves delivering hosted services over the internet.

Table 1. Cloud Computing definitions by selected technological firms

Features and benefits of Cloud Computing:

On-demand self-service

Any digital resource offered by the cloud provider can be automatically made available to customers at any time upon request. It's similar to a buffet at a party or mall where a range of goods are available for purchase.

Agile service network base

This CC environment is basically an agile service network where any service architecture can develop and generate a new service at its own whim. Services can be accessed and subscribed to automatically without any human interaction or paperwork. When a company is intending to introduce a new product and has a tight schedule, this property is actually quite necessary.

Broad network access

End users can access cloud computing services via a variety of devices, including laptops, PCs, martphones, tablets, and IoT (Internet of Things) devices like smartwatches, smart TVs, smart ars, and smart homes. Since the technology used to create the device, operating system, and API (Application Programming Interface) calls varies from one another, these are all referred to as eterogeneous access

points. Still, this ongoing technology is what makes it beautiful.

Internet Centric

Using the internet alone is the foundation of CC. This is advantageous in that any service, including financial transactions, video conferencing, and audio/video streaming, can be facilitated by the internet. At the moment, all teaching activities are conducted entirely online owing to COVID-19. All of this is possible because of CC. It does have several drawbacks, such as the inability of customers to use its subscribed services or any other online resources that are accessed through CC without internet connectivity. Because of this significant drawback, many businesses are increasingly moving toward quasi-connection-based applications, which can transmit and receive data when there is an internet connection and provide offline or cached data within the program itself when there isn't. If an end user wishes to send data or information, it will be saved in the program itself as an outgoing message when there is no internet, and it will subsequently be delivered via the cloud once connectivity is restored. Examples include WhatsApp, an iOS software that was solely an internet-based tool before 2018 but now enables message sending even when connectivity is absent. Similar to this, OTT (Over the Top) streaming services are now using the user's local storage as a cache to store files, movies, and audio, if there is room.

Virtualization and Multi-Tenancy

By pooling computing resources, it is ensured that more than one individual can use them. The software needs to be set up to stand out from the competition and offer scalable services to numerous unrelated tenants. This idea is not new; it was referred to as time sharing in mainframe environments in the 1960s and 1970s and was somewhat covered in the thesis before. This unique feature, known as a hypervisor, enables the installation of several virtual systems on a single computer. A more thorough discussion of the hypervisor will be covered later in this thesis. Figure 1 illustrates basic virtualization, in which many virtual machines (VMs) operate simultaneously across a shared infrastructure, creating the appearance of multiple machines running on a single piece of hardware.

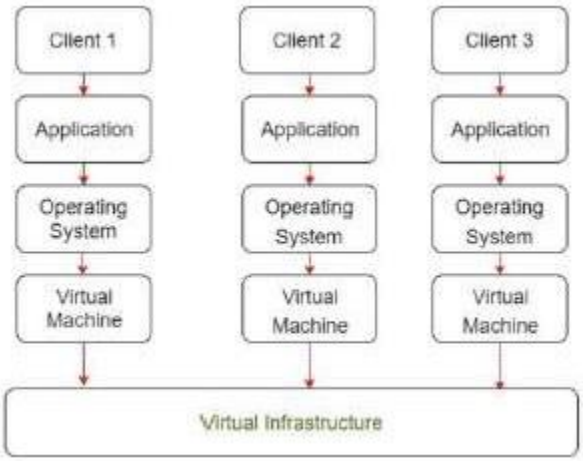

Figure 1. Virtualization

Shift of IT focus to innovation

Because resources are now more readily available and more quickly, academics and researchers can focus solely on innovation rather than drafting proposals, obtaining funding, and carefully allocating it to support

and validate their own hypotheses. Resources are no longer scarce, are offered at very competitive prices, and—most importantly—do not need to be purchased thanks to the development of technology. They are currently offered on a pay-as-you-go basis.

A comparative on Cloud Computing Service Models

Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and other common services and/or models that cloud service providers worldwide typically offer through their platforms include comparative shown in Fig : 2

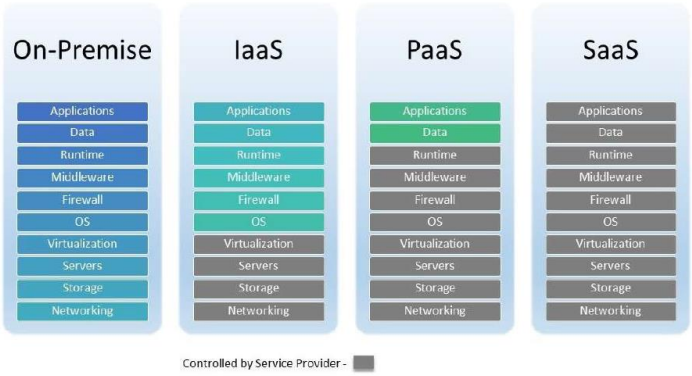

Figure 2 Categorization of Cloud based on Service Provided and their respective controls

Cloud Computing Deployment Models

Clouds are branded in four types, based on their deployment such as , Public Cloud, Public Cloud, Hybrid Cloud, Community Cloud.

Key Security features in Cloud Computing

The ITU-T Security Architecture offers a methodical way to assess security requirements and select different security solutions and policies for the organization's technical infrastructure. The Security Architecture's specified security services. The ITU-T Security Architecture offers a methodical way to assess security requirements and select different security solutions and policies for the organization's technical infrastructure. To evaluate the primary security needs in cloud computing, the security services outlined in the OSI Security Architecture can be effectively expanded.

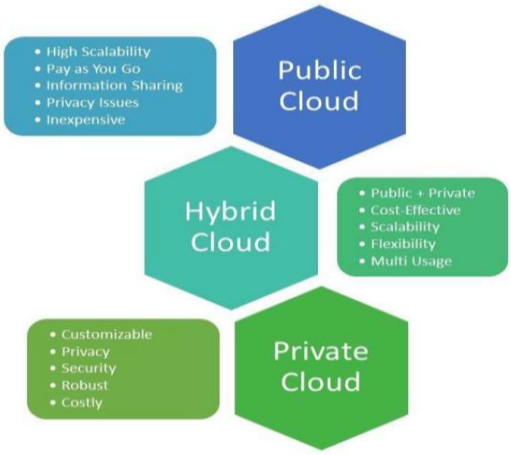

Figure 3 Types of Cloud based on Deployment Model

Motivation and Background

When cloud computing technology was included in the 2008 Gartner hype cycle, it grabbed headlines for the first time. This hype cycle is one type of tool used to show where a certain technology stands at the moment. Over 90% of the services are currently backed by cloud computing technologies. Cloud computing has proven to be a beneficial catalyst for advancing science and research in a variety of fields, including the medical field, defense, tourism, and space exploration. These factors led to the start of this study, which aims to improve the platform's overall security posture while conducting a complete review of cloud computing's present security and privacy. Any technology that meets user expectations and is cost-effective and secure will be the icing on the cake. Technology is considered relevant enough when it meets these standards. With this perspective in mind, this study attempted to improve intrusion detection techniques.

Additionally, because cloud computing is a dynamic platform, auditing it is challenging. A new automated framework called CloudAudit is made to work across platforms, such as Microsoft-based Azure services, Google-based GCP, and Amazon-based AWS. In a similar vein, a simple forensic framework is also suggested so that inquiry can be carried out with ease using the pre-established procedure and procedures anytime examination of this massive and dynamic platform is required.

Concluded with Research Objectives

In-depth discussions of cloud computing's various service and deployment models have been covered in the sections above. There is also a thorough discussion of the security problems and other important issues related to the cloud computing environment and its components. Consequently, it is suggested that this study project focus on the goals listed below:

[1] Researching and developing novel approaches to improve end-user authentication security in a cross-cloud setting is suggested.[2]. The creation of an automated security check for recently deployed cloud platforms is suggested.[3]. By adopting a novel algorithm in IDS, it is suggested that the current attack detection and prevention mechanism in a multi-tenant environment be developed and critically analyzed.[4]. According to this study, a framework is a set of guidelines for protecting the cloud computing environment from different kinds of outside threats. [5]. Analysis and comparison of previous software implementations of the aforementioned mechanism's speed/cost tradeoff

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