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A Report on Cloud Computing

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Introduction

Cloud computing is a concept for providing on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that may be swiftly supplied and released with no administration effort or service provider contact. Cloud computing, like utility-based systems like electricity, water, and sewage, provides a centralised pool of configurable computing resources and computer outsourcing methods that enable diverse computing services to different persons. Cloud computing can be defined as on-demand self-service, broad network access, resource pooling, quick elasticity or expansion, and measured service, among other things.

Cloud computing is also defined as a dynamic and frequently extensible platform that provides users with transparent virtualized resources over the Internet. Software as a service (SaaS), Platform as a service (PaaS), and Infrastructure as a Service (IaaS) are the three tiers of cloud computing architecture. Clouds enable cost savings, outsourcing, resource sharing, access from anywhere at any time, on-demand scalability, and service flexibility. By hiding technical aspects like software upgrades, licences, and maintenance from clients, cloud computing reduces the need for user interaction. Clouds may also provide more security benefits than individual server deployments. Because cloud providers pool resources, they may hire professional security personnel, whereas traditional businesses may be confined to a network administrator who is not well versed in cyber security issues. Similarly, due to the availability of resources and the elasticity of the architecture, clouds are more resistant to Distributed Denial of Service (DDoS) attacks [1-3].

Description

Architecture of cloud computing

The architecture for cloud businesses and researchers into two parts have defined computing: the core stack and the management. There are three layers in the core stack: There are three types of resources: (1) resource, (2) platform, and (3) application. The infrastructure layer, which consists of physical and virtualized computing, storage, and networking resources, is known as the resource layer. The platform layer is the most complicated portion, and it can be broken down into several sublayers. A computing framework, for example, is responsible for transaction dispatching and/or job scheduling. A storage sub-layer allows for infinite storage and caching. The application server and other components offer the same fundamental application logic as before, but with on-demand capabilities or flexible management, ensuring that no one component becomes the system's bottleneck.

CLOUD, SOC and GRID

Computing in the cloud and service-oriented computing: SOC's encapsulation, componentization, decentralisation, and integration capabilities are significant: they provide architectural concepts as well as software standards for connecting computers and devices across the Internet via standardised protocols. In fact, the concept of cloud computing is largely founded on the evolution of SOC, particularly the SaaS service model. SOC advancements can help Cloud Computing in a number of ways: Service Discovery for Cloud Services, Service Composition for Cloud Services, Service Management for Cloud Services, Cloud for Web Service Development, and Cloud for Web Service Testing are all examples of cloud services [4,5].

Computing in the cloud and grid: Grid computing is a hardware and software architecture that was developed in response to real-world issues in advanced scientific research. The Grid, as far as we can tell, is distributed computing 'middle ware' that enables 'organised cross-organizational resource sharing' for high-end computational applications like science and engineering [2]. The similarities between Cloud Computing and Grid Computing are obvious. For starters, they are both aiming for resource virtualization.

Cloud computing and supercomputing: High-performance computing (HPC) tries to address sophisticated (scientific) computation issues by utilising supercomputers and computer clusters. The initial goal of Cloud computing and HPC are clearly distinct, resulting in distinct computing paradigms and applications. While high-performance computing (HPC) has been widely employed for scientific workloads, cloud computing was created to serve business applications. HPC attempts to improve the performance of a scientific application by pooling resources from many organisations.

Security issues, categories, and dependencies in the cloud

Issues and categories: The following five categories are used to categorise cloud computing security concerns: (1) The Security Standards category is concerned with regulatory and regulating entities that define cloud security regulations in order to maintain a secure working environment in the cloud. Service level agreements, auditing, and other agreements between users, service providers, and other stakeholders are all part of it. (2) The Network category refers to the means by which users connect to cloud infrastructure in order to do the calculations they desire. Browsers, network connections, and information exchange via registration are all part of it. (3) The Access Control category is a user-focused area that encompasses concerns such as identification, authentication, and authorisation. (4) The Cloud Infrastructure category includes security vulnerabilities in SaaS, PaaS, and IaaS, as well as virtualization-related issues. (5) Data integrity is included under the Data category [6].

Dependencies between cloud security issues and categories: We have found relationships between these categories and the security issues they cover, in addition to identifying cloud security challenges and dividing them into numerous categories. If one of the categories is vulnerable to particular assaults, other categories may be vulnerable as well. Under this category, security-related concerns could be entry points for additional dangers to infiltrate the cloud. Taking appropriate management and security safeguards in category (1) can significantly reduce or even eliminate security risks in the other categories [2,3].

Conclusion

Firewall misconfigurations, hostile insiders, modified binaries, multi-tenancy, side channels, weak browser security, and mobility are among the 28-cloud security vulnerabilities we discovered. After that, we divide these

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concerns into five categories: security standards, network, access, cloud infrastructure, and data. We also define nine cloud-based attack classes and give varying incidences of each, including phishing, fate sharing, botnets, and malware injection.

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Conflict of Interest

The authors reported no potential conflict of interest.

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