Topic: Cloud Computing

Synthesising information from different sources

The following excerpts contain information on the topic of Cloud Computing. Read them carefully and:

- **Using information from all excerpts, write a paragraph of 140 words (not less than 110 and not more than 160) discussing the most important features of Cloud Computing.**

You must:

- **Use information from all sources.**
- **Cite your sources appropriately.**
- **Paraphrase and summarise appropriately! You must not plagiarise!**

Excerpt 1

Cloud computing brings important conveniences but also comes with new security advantages and risks. Cloud computing benefits from better availability. Its deployment can be performed in different zones, and virtual machines running on bad nodes can be automatically migrated. An added benefit is that the virtualization also reduces the collocation of different software on the same servers, reducing security issues. This deployment model often facilitates updates and fixes. Yet new security risks are also created; a common architecture is susceptible to attacks and may compromise all the services running on the connected cloud. As such, an attacker can target many elements of the cloud platform: the cloud web interface and Application Programming Interfaces (API), the authentication system, the segregation of users and data (virtualization layers, storage systems, networks).
[1] M. Michel, O. Serres, A. Anbar, E. J. Golden, and T. El-Ghazawi, "Open Source Private Cloud Platforms for Big Data," in *Big Data Analytics for Sensor-Network Collected* Intelligence, H-H. Hsu, C-Y. Chang and C-H. Hsu, Eds. Oxford: Elsevier, pp. 63-80.

Excerpt 2

Reliability and QoS are the two main issues that Cloud Computing came to address in Grid Computing. Grid Computing resources are tightly coupled; a failure in one node may result in the failure of a series of nodes that depends on it. In Cloud Computing, resources are loosely coupled, which allows dynamic failover, or restarting nodes and applying different configurations for different applications at run time. This can help in creating portable as well as available applications. On the other hand, it is difficult to guarantee quality of service (QoS) in Grid Computing. This is because traditional Grid Computing does not provide centralized management for job scheduling and performance measurement. An individual user or virtual organization (VO) activity can impact the performance of other users using the same platform; this will result in variable throughput and response time. Conversely, Cloud Computing guarantees the bandwidth and response time of services through centralized management and measured services; this makes Cloud Computing more suitable for mission critical systems.
[2] M. Hamdaqa and L. Tahvildari, "Cloud Computing Uncovered: A Research Landscape", *Advances in Computers*, vol. 86, pp. 41-85, 2012.

Excerpt 3

Cloud computing (CC) has recently emerged as a new paradigm for hosting and delivering services over the Internet. Cloud computing is attractive to business owners as it eliminates the requirement for users to plan ahead for provisioning, and allows enterprises to start from the small and increase resources only when there is a rise in service demand. However, despite the fact that cloud computing offers huge opportunities to the Information Technology (IT) industry, the development of cloud computing technology is currently at its infancy, with many issues still to be addressed. In this chapter, we adopt a networked control systems (NCS) viewpoint to present a survey of cloud computing, highlighting its key concepts, architectural principles, state-of-the-art implementation, as well as research challenges. The fundamental aim of this chapter is to establish a better understanding of the

design challenges of cloud computing and identify important research directions in this increasingly important area.
[3] M. S. Mahmoud and Y. Xia, *Networked Control Systems: Cloud Control and Secure Control*. Oxford: Butterworth-Heinemann, 2019.