REVIEW OF LITERATURE:

Christof Weinhard et al. [2009], The first contribution of this paper is thus a detailed discussion about the different characteristics of Grid Computing and Cloud Computing. This technical classification allows for a well-founded discussion of the business opportunities of the Cloud Computing paradigm. To this end, this paper first presents a business model framework for Clouds. It subsequently reviews and classifies current Cloud offerings in the light of this framework.

Vincenzo D. Cunsolo et al. [2009], In this paper we present the Cloud@Home paradigm, describing its contribution to the actual state of the art on the topic of distributed and Cloud computing. We thus detail the functional architecture and the core structure implementing such a new paradigm, demonstrating how it is really possible to build up a Cloud@Home infrastructure.

Alexandros et al. [2009], Cloud Computing is rising fast, with its data centres growing at an unprecedented rate. However, this has come with concerns over privacy, efficiency at the expense of resilience, and environmental sustainability, because of the dependence on Cloud vendors such as Google, Amazon and Microsoft. Our response is an alternative model for the Cloud conceptualisation, providing a paradigm for Clouds in the community, utilising networked personal computers for liberation from the centralised vendor model. Community Cloud Computing (C3) offers an alternative architecture, created by combing the Cloud with paradigms from Grid Computing, principles from Digital Ecosystems, and sustainability from Green Computing, while remaining true to the original vision of the Internet.

Qi Zhang et al. [2010], Cloud computing 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 IT industry, the development of cloud computing technology is currently at its infancy, with many
issues still to be addressed. In this paper, we present a survey of cloud computing, highlighting its key concepts, architectural principles, state-of-the-art implementation as well as research challenges. The aim of this paper is to provide a better understanding of the design challenges of cloud computing and identify important research directions in this increasingly important area.

C. N. Höfer and G. Karagiannis [2011], This paper examines the available cloud computing services and identifies and explains their main characteristics. Next, this paper organizes these characteristics and proposes a tree-structured taxonomy. This taxonomy allows quick classifications of the different cloud computing services and makes it easier to compare them. Based on existing taxonomies, this taxonomy provides more detailed characteristics and hierarchies. Additionally, the taxonomy offers a common terminology and baseline information for easy communication. Finally, the taxonomy is explained and verified using existing cloud services as examples.

Gordon Blair et al. [2011], Cloud computing is currently one of the major topics in distributed systems, with large numbers of papers being written on the topic, with major players in the industry releasing a range of software platforms offering novel Internet-based services and, most importantly, evidence of real impact on end user communities in terms of approaches to provisioning software services. Cloud computing though is at a formative stage, with a lot of hype surrounding the area, and this makes it difficult to see the true contribution and impact of the topic.

Zaheer Khan et al. [2012], A key to understanding the nature of integrated environmental management systems is the identification of the need for horizontal integration of information across sectoral inter-agency boundaries at the local level, and the need for vertical coordination between levels of governance. This paper offers a user-oriented approach to the specification of requirements for the effective management of urban areas and the potential contributions that can be supported by cloud computing.

David W Chadwick et al. [2013], We describe the research undertaken in the six month JISC/EPSRC funded My Private Cloud project, in which we built a
demonstration cloud file storage service that allows users to login to it, by using their existing credentials from a configured trusted identity provider. Once authenticated, users are shown a set of accounts that they are the owners of, based on their identity attributes. Once users open one of their accounts, they can upload and download files to it. Not only that, but they can then grant access to their file resources to anyone else in the federated system, regardless of whether their chosen delegate has used the cloud service before or not. The system uses standard identity management protocols, attribute based access controls, and a delegation service.

Sanjeev Kumar Pippal and Dharmender Singh Kushwaha [2013], Data management and sharing is the challenge being faced by all the IT majors today. Adds over it, is the challenge faced by the cloud service providers in terms of multi-tenancy of data and its efficient retrieval. It becomes more complex in a heterogeneous computing environment to provide cloud services. A simple, robust, query efficient, scalable and space saving multi-tenant database architecture is proposed along with an ad hoc cloud architecture where organizations can collaborate to create a cloud, that doesn’t harm their existence or profitability. An ad hoc cloud fits very well to the scenario where one wants to venture into remote areas for providing education services using a cloud.

Linquan Zhang et al. [2013], Cloud computing, rapidly emerging as a new computation paradigm, provides agile and scalable resource access in a utility-like fashion, especially for the processing of big data. An important open issue here is to efficiently move the data, from different geographical locations over time, into a cloud for effective processing. The de facto approach of hard drive shipping is not flexible or secure. This work studies timely, cost-minimizing upload of massive, dynamically-generated, geo-dispersed data into the cloud, for processing using a Map-Reduce-like framework. Targeting at a cloud encompassing disparate data centers, we model a cost-minimizing data migration problem, and propose two online algorithms: an online lazy migration (OLM) algorithm and a randomized fixed horizon control (RFHC) algorithm, for optimizing at any given
time the choice of the data center for data aggregation and processing, as well as the routes for transmitting data there.

**Mohammad Hajjat [2013]**, Deploying interactive applications in the cloud is a challenge due to the high variability in performance of cloud services. In this paper, we present Dealer - a system that helps geo-distributed, interactive and multi-tier applications meet their stringent requirements on response time despite such variability. Our approach is motivated by the fact that, at any time, only a small number of application components of large multi-tier applications experience poor performance. Dealer continually monitors the performance of individual components and communication latencies between them to build a global view of the application. In serving any given request, Dealer seeks to minimize user response times by picking the best combination of replicas (potentially located across different data centers). While Dealer requires modifications to application code, we show the changes required are modest.

**Edward G. Amoroso [2014]**, The most common solution for enterprise organizations seeking to mitigate cloud security threats currently involves building a virtual infrastructure inside an existing corporate firewall. With this approach, enterprise perimeter-protected datacenters host cloud services and/or are used to virtualize applications. These services and applications are accessible only to users who have been properly authenticated and securely admitted to the corporate intranet.

**Rajiv Ranjan [2014]**, Today, we live in a digital universe in which information and technology are not only around us but also play important roles in dictating the quality of our lives. As we delve deeper into this digital universe, we're witnessing explosive growth in the variety, velocity, and volume of data being transmitted over the Internet. A zetabyte of data passed through the Internet in the past year; IDC predicts that this digital universe will explode to an unimaginable eight Zbytes by 2015. These data are and will be generated mainly from Internet search, social media, mobile devices, the Internet of Things, business transactions, next-generation radio astronomy telescopes, high-energy physics synchrotron, and
content distribution. Government and business organizations are now overflowing with data, easily aggregating to terabytes or even petabytes of information.

**Ibrahim K Musa et al. [2014]**, Cloud based scientific data management - storage, transfer, analysis, and inference extraction - is attracting interest. In this paper, we propose a next generation cloud deployment model suitable for data intensive applications. Our model is a flexible and self-service container-based infrastructure that delivers network, computing, and storage resources together with the logic to dynamically manage the components in a holistic manner. We demonstrate the strength of our model with a bioinformatics application. Dynamic algorithms for resource provisioning and job allocation suitable for the chosen dataset are packaged and delivered in a privileged virtual machine as part of the container. We tested the model on our private internal experimental cloud that is built on low-cost commodity hardware. We demonstrate the capability of our model to create the required network and computing resources and allocate submitted jobs.

**Joonsang Baek et al. [2015]**, In this paper, we propose a secure cloud computing based framework for big data information management in smart grids, which we call “Smart-Frame.” The main idea of our framework is to build a hierarchical structure of cloud computing centers to provide different types of computing services for information management and big data analysis. In addition to this structural framework, we present a security solution based on identity-based encryption, signature and proxy re-encryption to address critical security issues of the proposed framework.

**Zahir Tari et al. [2015]**, Cloud computing offers cost-effective solutions via a variety of flexible services. However, security concerns related to managing data, applications, and interactions hamper the rapid deployment of cloud-based services on a large scale. Although many solutions exist, efficiency, scalability, and provable security still have issues that need to be properly addressed. This article explores the various challenges, existing solutions, and limitations of cloud security, with a focus on data utilization management aspects, including data storage, data analytics, and access control. The article concludes with a discussion
on future research directions that might lead to more trustworthy cloud security and privacy.

**Joonsang Baek et al. [2015]**, The main challenges of smart grids, however, are how to manage different types of front-end intelligent devices such as power assets and smart meters efficiently; and how to process a huge amount of data received from these devices. Cloud computing, a technology that provides computational resources on demands, is a good candidate to address these challenges since it has several good properties such as energy saving, cost saving, agility, scalability, and flexibility. In this paper, we propose a secure cloud computing based framework for big data information management in smart grids, which we call “Smart-Frame”.

**Zheng Yan et al. [2016]**, Cloud computing plays an important role in supporting data storage, processing, and management in the Internet of Things (IoT). To preserve cloud data confidentiality and user privacy, cloud data are often stored in an encrypted form. However, duplicated data that are encrypted under different encryption schemes could be stored in the cloud, which greatly decreases the utilization rate of storage resources, especially for big data. Several data de-duplication schemes have recently been proposed. However, most of them suffer from security weakness and lack of flexibility to support secure data access control. Therefore, few can be deployed in practice. This article proposes a scheme based on attribute-based encryption (ABE) to de-duplicate encrypted data stored in the cloud while also supporting secure data access control.

**Uthpala Premarathne and Alsharif Abuadbba [2016]**, Cloud-based electronic health record (EHR) systems are next-generation big data systems for facilitating efficient and scalable storage and fostering collaborative care, clinical research, and development. Mobility and the use of multiple mobile devices in collaborative healthcare increases the need for robust privacy preservation. Thus, large-scale EHR systems require secure access to privacy-sensitive data, data storage, and management. The authors provide a comprehensive solution with a cryptographic role-based technique to distribute session keys to establish communications and information retrieval using the Kerberos protocol; location- and biometrics-based
authentication to authorize users; and a wavelet-based steganographic technique to embed EHR data securely using electrocardiography (ECG) signals as the host in a trusted cloud storage. A comprehensive security analysis demonstrates that the model is scalable, secure, and reliable for accessing and managing EHR data.

**Johnu George et al. [2016]**, As mobile devices are more susceptible to unauthorized access, when compared to traditional servers, security is also a concern for sensitive data. Hence, it is paramount to consider reliability, energy efficiency and security for such applications. The MDFS (Mobile Distributed File System) [1] addresses these issues for big data processing in mobile clouds. We have developed the Hadoop Map Reduce framework over MDFS and have studied its performance by varying input workloads in a real heterogeneous mobile cluster. Our evaluation shows that the implementation addresses all constraints in processing large amounts of data in mobile clouds. Thus, our system is a viable solution to meet the growing demands of data processing in a mobile environment.

**Yuanxiong Guo et al. [2017]**, Co-location data centers are an important type of data centers that have some unique challenges in managing their energy consumption. Tenants in a co-location data center usually manage their servers independently without coordination, leading to inefficiency. To address this issue, we propose a formulation of coordinated energy management for co-location data centers. Considering the randomness of workload arrival and electricity cost function, we formulate it as a stochastic optimization problem, and then develop an online algorithm to solve it efficiently. Our algorithm is based on Lyapunov optimization, which only needs to track the instantaneous values of the underlying random factors without requiring any knowledge of the statistics or future information. Moreover, alternating direction method of multipliers (ADMM) is utilized to implement our algorithm in a decentralized way, making it easy to be implemented in practice.

**Muhammad Baqer Mollah et al. [2017]**, Over the last few years, smart devices are able to communicate with each other and with Internet/cloud from short to long range. As a consequence, a new paradigm is introduced called Internet of
Things (IoT). However, by utilizing cloud computing, resource limited IoT smart devices can get various benefits like offload data storage and processing burden at cloud. To support latency sensitive, real-time data processing, mobility and high data rate IoT applications, working at the edge of the network offers more benefits than cloud. In this paper, we propose an efficient data sharing scheme that allows smart devices to securely share data with others at the edge of cloud-assisted IoT. In addition, we also propose a secure searching scheme to search desired data within own/shared data on storage.