

Chapter 71

Biometric Authentication for the Cloud Computing

Sumit Jaiswal
IIT (BHU), India

Santosh Kumar
IIT (BHU), India

Subhash Chandra Patel
IIT (BHU), India

R. S. Singh
IIT (BHU), India

S. K. Singh
IIT (BHU), India

ABSTRACT

As the data being stored to a distant server away from direct control of user cloud presents various security risks and threat issues associated with the user authentication and access control mechanisms, it is of utmost importance to ensure the security of confidential business data in the cloud storage along with making sure that only properly authenticated and authorized personnel can access the data and applications in the cloud. An important step in this regard is to execute biometric security mechanisms, which increases the competence level of security and only permits authenticated individuals by verifying different biometric parameters of human biometric characteristics (traits): patterns like fingerprints, retina, iris, voice, face, ear, palm, signature, and DNA recognition. Implementation of biometric authentication mechanism will take security of data and access control in cloud to higher level. This chapter discusses how a proposed biometrics system with respect to other recognition systems so far is more advantageous and result-oriented because it does not work on presumptions: it is unique and provides fast and contact-less authentication.

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1. INTRODUCTION

Cloud Computing can be considered a new perspective way of services based utility computing where a business enterprise needs to pay only for the services needed, apart from putting effort into technical details of setting up an entire infrastructure or requiring licensing for an entire business software. Cloud computing has changed the way people's perception about services and computing. Cloud computing has the provision of allocating the computing power, storage resources, network resources to multiple clients in a real time scenario.

In October 2009 paper representation "Effectively and Securely using the Cloud Computing Paradigm" by Peter Mell and Tim Grance of United States National Institute of Standards and Technologies (NIST) has given the definition of cloud computing: "Cloud computing is a model for enabling ubiquitous, convenient, on demand network access to shared pool of configurable computing resources(e.g., networks, servers, storage, applications, and services) and applications as services that can be rapidly provisioned and released with minimal management effort or service provider interaction" (Mell & Grance, 2009). As compared to traditional model of computing where setting up an entire infrastructure for start-up companies is a tedious task of its own, apart from being costly and requirement of technical expertise. Cloud computing takes care of these issues by transforming all the resources to a distant data centre of shared pool of computing resources. It elevates the customers from the problems of purchasing and maintaining the entire IT infrastructure and let them to focus primarily on their business issues.

Cloud computing reduces the cost of any business organization by providing scalable, configuring devices (randomly provisioned as per the changing needs of demand by business). Cloud computing uses the concept of utility computing, providing services (storage, software, platform) as per the requirements thereby leveraging them from bothering about other unnecessary technical issues.

NIST defined the standard definition of cloud computing consisting of following essential characteristics:

- 3 service models i.e. Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS);
- 4 deployment models i.e. private cloud, community cloud, public cloud and hybrid cloud;
- 5 essential features include virtualized computing resource pool, broad network access, rapid elasticity, on-demand self-service, measured service.

IaaS provides the storage services, distant secure storage services Eg. Amazon S3. PaaS deploys the operations over the platform suitable for creation of applications Eg. Google App Engine. SaaS is based on rental model of pay as you use mechanism. It includes propriety software usage, thereby solving the licensing trouble for the organisations. Eg. Microsoft Office 365.

Cloud Computing comprises the shared pool of configurable computing resources enabling ubiquitous, on-demand deploying applications and storage services which is cheap and less complex than on-premises IT infrastructure deployment of computing resources. The services involve PaaS, IaaS, SaaS.

Figure 1 depicts the model of cloud computing as the stack of these essential features.

Cloud Computing enables a 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 to the businesses and released with minimal management effort or service provider interaction (Mell & Grance, 2009), which in turn makes the overall overhead much smaller than the traditional computing.

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