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IDENTITY AND ACCESS MANAGEMENT IN RESPONSIVE OPEN LEARNING ENVIRONMENT

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ABSTRACT

Information and Communication Technology(ICT) team up with Cloud Computing make fabulous changes in the field of Education. Innovative and Interactive methods of teaching changes the teacher-centric method into learner-centric method. This paper represents the Responsive Open Learning Environment. This paper also describes about Identity and Access Management in the Personal Learning Environment. Finally, this paper concludes with the importance of Authentication, Authorization and Access Control (AAA) in the Responsive Open Learning Environment.

Keywords: Cloud Computing, Identity and Access Management, Information and Communication Technology, Responsive Open Learning Environment.

I INTRODUCTION

1.1 Cloud Computing

In the Digital Era, information and knowledge sharing is possible through Cloud Computing. With the use of Internet, one can easily access computing resources like system, services, servers and networks in the Cloud environment. Cloud Computing is very much suitable for small and medium organisation. Cloud Computing increases the resource utilization with minimum effort efficiently.

Cloud Computing has five characteristics (On-demand Self-service, Broad Network access, Resource pooling, Rapid elasticity and Measured Service). Cloud Computing has three service models (Software as a Service, Platform as a Service and Infrastructure as a Service) and four deployment models (Public Cloud, Private Cloud, Hybrid Cloud and Community Cloud). Due to mobility and heterogeneity Cloud Computing has to face many challenges like privacy, confidentiality and security.

Communication involves sender, receiver, message and channel. The message is passed through the channel from sender to receiver. The NIST[1] Cloud Computing reference architecture defines a set of actors (Cloud Provider, Cloud Consumer, Cloud Broker, Cloud Auditor and Cloud Carrier). Cloud Provider (Sever) offers services to the Consumers (Client/ End User). Cloud Broker transforms the service in between Cloud Provider

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and Cloud Consumer. Cloud Auditor conduct continuous assessment of the Cloud Services, Operations, Performance and the Security. Cloud Carrier acts as a communication medium in the Cloud Environment.

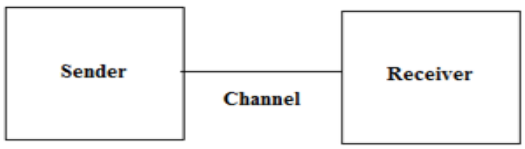

Fig 1: Communication

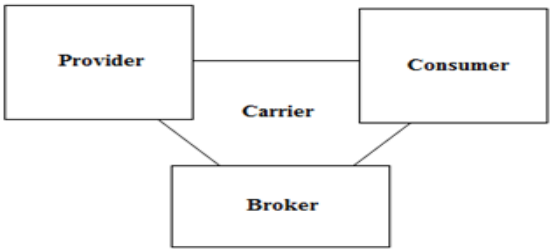

Fig 2: Cloud Conceptual Model

1.2 Personal Learning Environment (PLE)

Cloud Computing transforms global and rich content of education to every one using Information and Communication Technology (ICT)[2]. Personal Learning Environment (PLE) is the combination of tools, people, and services that make up personalized resources and approach to learning. It is centered around the individual's efforts to learn.

A personalised learning environment increases the student's need and creates a learning site where they can limit their own learning at their own pace. It lets the students to dynamically design their own learning strategies. It enables better contact between student/teacher, and the education is less teacher-centered. The younger generation of today learns by being interactive. This involves interactive classrooms with personalized ICT solutions.

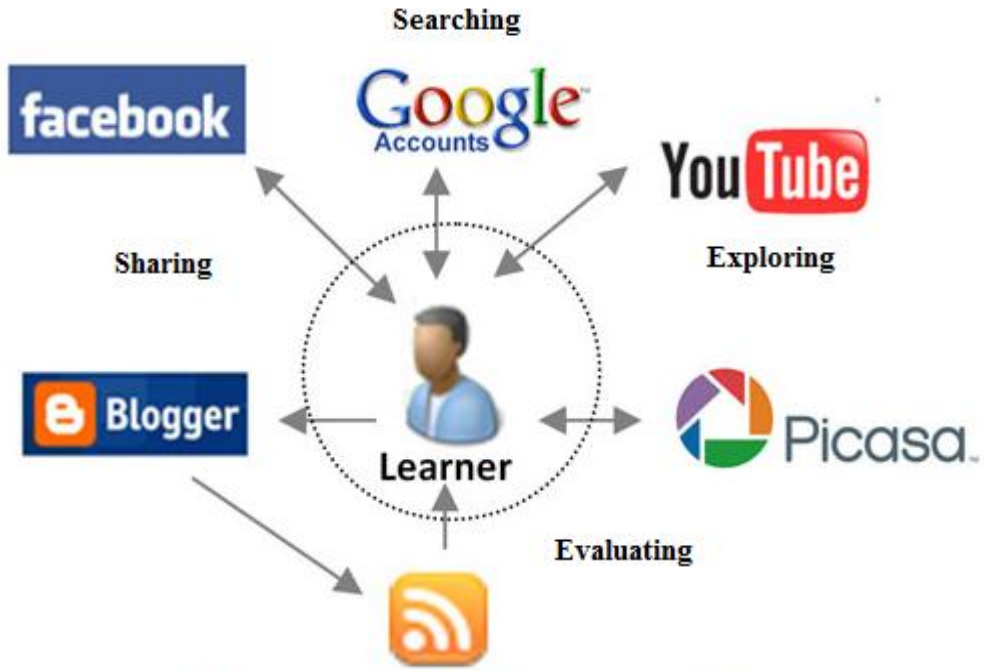

Fig 3: Personal Learning Environment (PLE)

IJARSE
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1.3. Responsive Open Learning Environment (ROLE)

An important feature of Web 2.0 services[3] (e.g. wikis, blogs and social networks) is that they experience an exponential growth of both users and content, leading to potentially viral social networking, collaboration, communication and knowledge sharing opportunities.

ROLE[3] aims to exploit web-based tools and technologies to empower learners to construct their own personal learning environments. The overall goal is to create flexible, web-based open technologies for the federation and mash-up of learning services on a personal level. The vision of ROLE is to empower the learner to build their own responsive learning environment. Responsiveness is defined as the ability to react to the learner needs and reflect upon her own learning process[3]. PLE takes a more natural and learner-centric approach and is characterised by the use of a set of services and tools that are controlled and carefully chosen by individual learners.

II LITERATURE SURVEY

In recent years, research on mash-up technologies for learning environments have gained interest. The overall goal is to enrich traditional learning management systems (LMS) with mash-ups of widgets and services that can be easily combined and configured to fit the learner needs. The ROLE interoperability framework provides a common technical infrastructure to assemble widgets and services in Personal Learning Environments[3].

PLE is a single user's e-learning system that offers access to a variety of learning resources, and that may bring access to learners and teachers who use other PLE[4]. Engaging students in participatory design of learning analytics and their platforms is a key potential of learning analytics for learners (LAL)[5]. As cloud computing technology binds the resources into a single domain, this technology can be a prominent key for solving the educational problems[6].

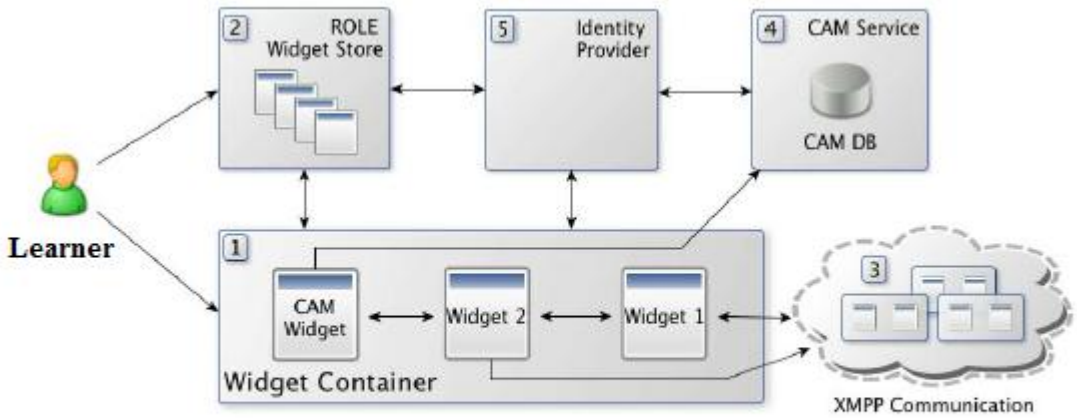

Fig 4: ROLE Infrastructure

III IDENTITY AND ACCESS MANAGEMENT (IAM)

Due to the reduced cost and less operational and maintenance overhead, more and more organizations are moving their applications to Cloud Environment, which increases the security issues. With the help of

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infrastructure provided by Cloud Computing provider, Cloud Service providers provide their services to their Customers/Consumers/End Users. While using these services, consumers register their personal identity such as Voter ID, Name, Credit card number, Date of birth, Mobile number etc. Handling these sensitive data to Cloud service provider is a serious concern. Identity and Access Management is the primary key concern to the Cloud security and privacy.

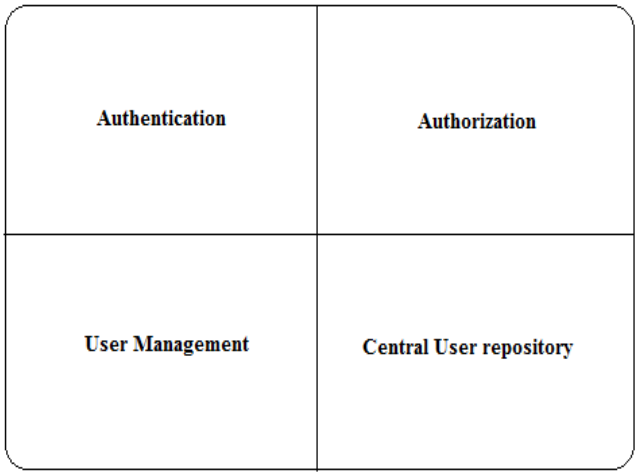

Fig 5: Identity and Access Management (IAM)

3.1 Authentication

Authentication is the process of verifying the identity of the user. In the multi-tenant, Cloud Environment users are required to prove their identity to access the web resources. Authentication factors are usually grouped into these three categories: 1) what you know (e.g., password), 2) what you have (e.g., token), and 3) who you are (e.g., biometric).

Traditionally username and password is used for authentication in so many applications. Some other types of authentication methods are biometric authentication, one time password (OTP), smart card, USB tokens, Public Key Infrastructure (PKI) authentication, Multi factor authentication. Protocols like SSO (Single Sign On), SAML (Security Assertion Mark-up Language) Token, SSL (Secure Socket Layer), The Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP), The Extensible Authentication Protocol (EAP), Kerberos are used for authentication.

3.2 Authorization

Authorization is the process of granting or denying access (Access Policy) to the network resource. Authorization comprises mainly two processes - approving only certain users to access, process, or alter data and applying varying limitations on user's access or actions. In simple words, authentication defines who you are and authorization defines what you are allowed to do. Authentication process always proceeds to Authorization process.

IJARSE
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3.3 User Management

User Management describes the set of administrative functions such as identity creation and maintenance of user identity and privileges. One of its components is user life cycle management that enables an enterprise to manage the lifespan of a user account, from the initial stage of provisioning to the final stage of de-provisioning.

3.4 Central User repository

Central User Repository stores and delivers identity information to other services, and provides service to verify credentials submitted from clients.

3.5 Access Control

Access Control[7] is a security policy or procedure that allows, denies or restricts the access to a system. It also monitors and records all attempts made to the system. There are two types of access control - physical and logical. Physical access controls limits access to campus, buildings and rooms. Logical access controls limits connections to computer networks, system files and data. The four main categories of access control are - Mandatory access control, Discretionary access control, Role-based access control, Rule-based access control. Access control systems perform user identification, access approval, and accountability of entities through login credentials.

IV PROPOSED WORK

In the ROLE infrastructure identity provider is one of the significant part. In this study, the users are classified into groups like admin, faculty, research scholar, student and guest. User credentials like id/regno, date of birth,

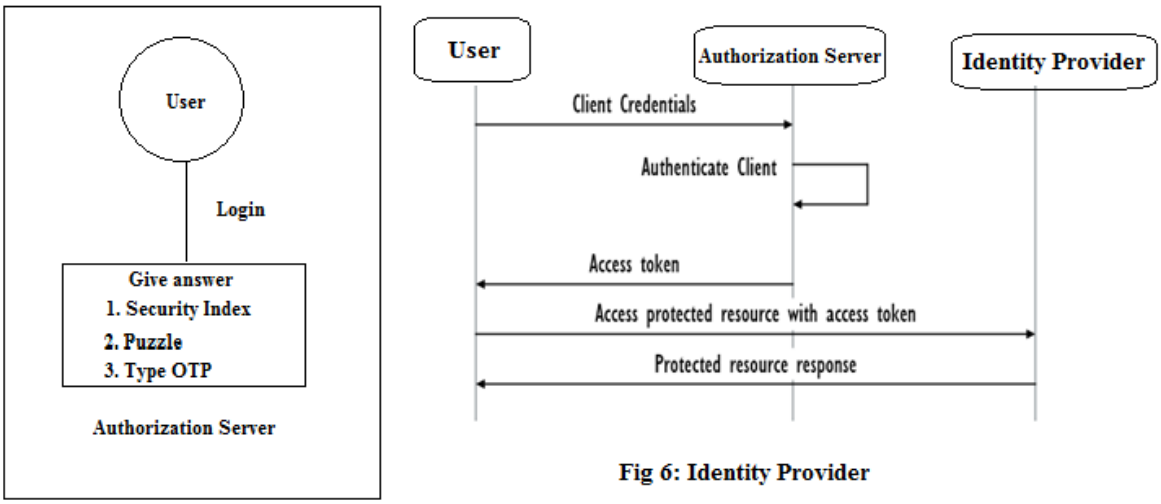

Fig 6: Identity Provider

driving licence number, voter id, Aadhar no, department, blood group, mobile number etc. are registered. By using these credentials security index is prepared. According to their role, an access control list is to be prepared.

IJARSE
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User can login with their id/regno. Every time randomized question is asked from the security index for the security. After answering this only, the user can get the access to the resource. Authorization server allows only after checking the answer for the security index question, puzzle and OTP. Carefully preparing the role and access control list provide better security.

V CONCLUSION

In the imminent world, teaching and learning moves to the new horizon which makes the education very interesting and efficient. Education is one of the applications of Cloud Computing; which collaborates with ICT also changes the environment into innovative manner. Taking into security as a concern, this paper describes on AAA (Authentication, Authorization, Access control). Identity and Access Management is the major concern in the Cloud Security.

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