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TALAASH: Theaceae Approach in Learning based on Arsenal Access using SCORM's Handler

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***Abstract*— The most common issues over internet are congestion, request redundancy, denial of service and effective usage of network resources. However, internet has a serious issue such as power consumption, environment pollution and greater response time in ubiquitous computing environment. This paper proposes SCORM compliant approach for effective usage of network resource and energy saving based on arsenal information. A theaceae is a group of interrelated information. The theaceae comprises of Learning Management Systems (LMSs). LMS contains Learning Record Store (LRS). The LMS acts as arsenal - a gateway between the Client and the content repository. The TALAASH uses SCORM technique, which dynamically communicates with the client. It forms the response according to the content availability and delivers to the client.**

Keywords*— *Mobile Learning, Ubiquitous Learning, LMS, energy efficiency, SCORM, Tin can.

I. INTRODUCTION

The mLearning is sort of learning that happens when the learner is not at a fixed, predetermined location or learning that happens when the learner takes advantage of the learning opportunities offered by ubiquitous technologies.

Fig 1: Architecture of cluster system [18].

The mLearning can be implemented on e-learning [1]. The Figure 1 depicts the general architecture for mLearning using clustering approach. Since resources are available in each organization, it can best utilize to address the following issues:

(a) Huge network traffic,

(b) Increased response time,

(c) Environment pollution and

(d) Limited battery power for computing devices.

The available resource in organization, if configured to filter redundant request from the client, can reduce huge traffic on the internet. As the data is well organized on LAN, the response time is considerably less and the computing devices can be effectively used for learning. It has been analyzed that by involving more number of devices on network for communication, the pollution increases due to release of carbon. As the TALAASH system maintains data on LAN, the pollution can be minimized.

The proposed efforts investigate the feasibility of applying TALAASH protocol for effective learning. The aim of this work is to conserve energy of ubiquitous devices and minimize traffic on network to increase usage of the network [2]. The literature survey [3-23] on network topology, traffic and energy consumption in ubiquitous devices reveals that, by avoiding multiple request for indistinguishable resource, the network traffic can be minimized significantly.

The remaining paper is organized as follows: Section II discusses the design and architecture of the proposed system. In section III, we discuss the implementation details covering different components of the system being developed. In Section IV, we present the results and analyze the same for different test scenarios. In Section V we conclude.

II. DESIGN AND ARCHITECTURE

TALAASH System consists of TALAASH server and TALAASH cluster head. The server contains user data however, the cluster heads are connected to LAN. The TALAASH system requires one-time installation of the TALAASH server at machine and TALAASH Client at each node (ubiquitous device) in the network. Further, the client's ubiquitous node can perform the file access operation through network connection. The TALAASH cluster head has Wi-Fi and Bluetooth interface. It facilitates the client to access resources via Bluetooth interface and has access to server using Wi-Fi interface.

Fig. 2: Architecture Overview of TALAASH System

The Figure 2 depicts the architecture overview of the project approach for TALAASH system. The authors [18] discuss mLearning and cooperative clustering protocol. In this section, we focus on Learning Resource Management System (LRMS). The LRMS comprises of Learning Object Metadata (LOM), LOM creator/updater and Query

Processor. The SbADA is an infrastructure to access resources on internet. The users can also be connected over Wi-Fi or cluster head.

The role of LRMS is to observe the traffic on network and analyze the pattern. It acts as cache on the network. The LRMS receives resource request on LAN. It propagates the request to Query Processor. The Query Processor interprets and fetch the resource from LOM. If the requested resource is not found (fault occurance), the LRMS looks for the resource on internet and gives response to the client. In turn, the LRMS creates LOM and stores the data in LRS. The LOM is linked with timestamp as validity which is useful in updating the deprecated resource.

III. Implementation

A. *TALAASH Server*

A flowchart is shown in the Figure 3 for the Server of TALAASH System. It shows that the TALAASH server acts similar to traditional file server with an added feature of reading only text content from requested file.

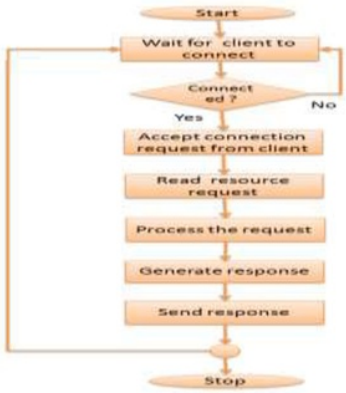

Fig 3: Flowchart for TALAASH server.

B. *TALAASH client*

The Figure 4 shows the flowchart for the Regular Node of TALAASH System. It depicts that the TALAASH regular node accepts input such as course selected and name of the file from user. On selecting course, it will request TALAASH cluster head for list of files and upon file selection, requests for file content to the TALAASH cluster head.

C. *TALAASH Description Builder*

The TALAASH cluster head acts as a Bluetooth server for TALAASH regular node and as client for TALAASH server. It accepts connection from TALAASH regular node reads request and forwards the same to TALAASH server. Also, accepts response from TALAASH server and delivers the same to respective client (TALAASH regular node).

The interaction between TALAASH regular node and cluster head also interaction between TALAASH cluster head and TALAASH server must be reliable. TALAASH regular node enables user to send request then tries to connect TALAASH cluster head if any within range. If TALAASH cluster head is not found within range, connects to TALAASH server and requests for the file or list of files.

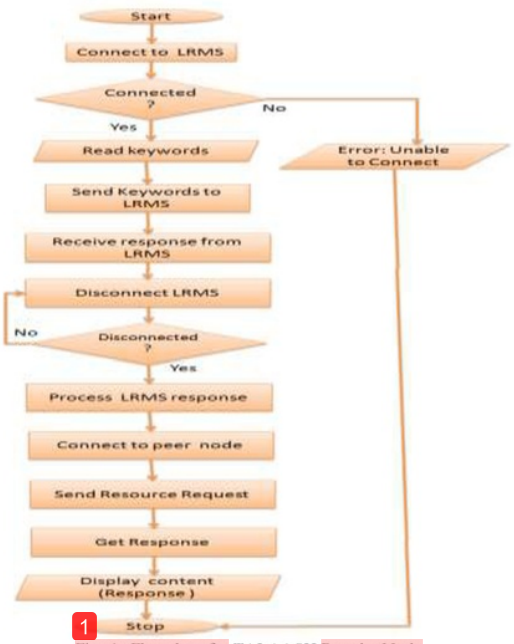

Fig. 4. Flowchart for TALAASH Regular Node.

IV. Result Analysis

This section discusses the results obtained from various observations. At the campus, the students are instructed to perform given assignment and the utilization of resource is observed. The authors observe the session and fetch the data at given instance of time to generate the graph. The figure 5 below depicts the percentage of resource (LRMS) utilization and the percentage of students involved in the session at given instance of time.

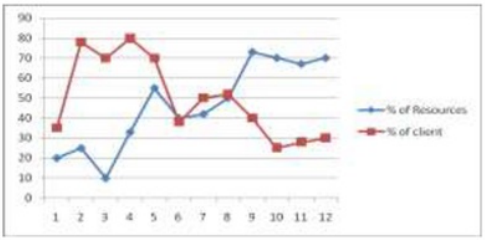

Fig 5: Ratio of Resource utilization and User involvement.

Conclusion

In this paper a system is proposed that enables learning using local resource through ubiquitous device. The system has been implemented using the Java and hence all the advantages of the Java Programming language accrue. As in the case with any ubiquitous learning system, one time installation of TALAASH system is to be done at one of the node in the network.

The system has been successfully tested for availability, traffic on network and efficiency on learning stuff from various sources on the college network and found to be very useful in reducing the access time of resources (already accessed). It has been proved that the deployment of TALAASH system results in 40%-50% reduction in traffic generated by educational organization. It is also proved that the battery consumption is reduced by 15% to 25% on any

mobile device in TALAASH system. This system can be very useful to organizations who wish to provide effective learning facility at a low cost of infrastructure for ubiquitous device that are equipped with limited power supply.

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