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iButton Unified Management System

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Abstract – *The synergistic relationship between our requirements and technology is been from the dawn of the mankind, has led to the invention of simple tools and continues into modern technologies. In this modern era, our life is captured between various access control technologies where we have to carry various passwords or essentials of that system. It is necessary to come up with a centralised system which will be able to manage different tasks with a single access control technology. Besides the credibility and performance, cost of the system is also one of the most important factor. iButton can be considered as the most suitable option for such kind of systems due to its low cost, durability and small size. This iButton can be easily and cheaply interfaced to help uniquely identify the owner as each iButton has its own unique 64-bit key. Such systems can be used in colleges, hotels, MNC's, offices to centralize the different services.*

Keywords-*iButton, control access.*

I. INTRODUCTION

iButton [1] unified management system is a centralized task management system with which users can have access to different services using a single iButton. For a college, we are going to implement the system on two levels. The first part is for students which will manage canteen, stationary, library transactions and attendance of the students. Student can get access to all these services with single iButton. The second part is door lock system where security personnel will be able to access all the classrooms of particular floor with a single iButton. There will be website to inform students about their services i.e. transactions and attendance. The same system can be implemented using different technologies like low frequency or high frequency RFID or swipe card but iButton is superior over it due to its low cost and long durability.

II. LITERATURE SURVEY

With over 175 million iButton devices currently in circulation, this technology is growing rapidly accounting many applications. Unlike bar codes and magnetic stripe cards, most of the iButton devices can be read and be written too. In addition, the communication rate and product breadth of iButton devices go well beyond the simple memory products typically available with RFID. As for durability, the thin plastic of smart cards is no match for the strength of the stainless steel-called iButton device.

It uses the 1-Wire interface and has two communication speeds: standard mode at 16kbps, and overdrive mode at 142kbps.Each iButton device has a unique and unalterable address laser etched onto its chip inside the can. The iButton device is ideal for any application where information needs to travel with a person or object.

MySQL is probably the most popular open source database management system. MySQL scales very well with large databases without adding much latency to the query responses.

Django [2] is open-source web framework, written in Python, which greatly helps in development of web apps / websites. The framework is itself comes with a webserver to check the working of the current project locally before deploying it using an industry grade webserver like Apache or Nginx. Some famous sites that use this framework are Mozilla, Instagram, Open Stack and National Geographic. [2]

Apache is open source webserver software which handles the request and response with the clients. It acts as an interface between the service and the client. It provides user with the appropriate response to the client request.

III. SYSTEM ARCHITECTURE

The above system can be divided into two subsystems which work as client and server to get the expected output. The first part of the system is the server system which maintains the database and acts as the brains behind most of the operation.

Various services can be implemented with the main server responding to all the requests. Like the general Server-Client model used on the internet, the iButton systems would act like a client sending requests to the server. Each iButton system can ask for its own service as per the requirements. Thanks to the Django framework, new services or as Django calls it 'apps' could be developed and integrated with the existing architecture. Thus, the service system can be easily scaled to handle variety of requests types. The Apache Server can easily handle large requests with ease. The MySQL database scales very well to large databases with very efficient speed. The iButton system/devices will generate Http Requests to the server which would be worked upon and the appropriate responses will be generated.

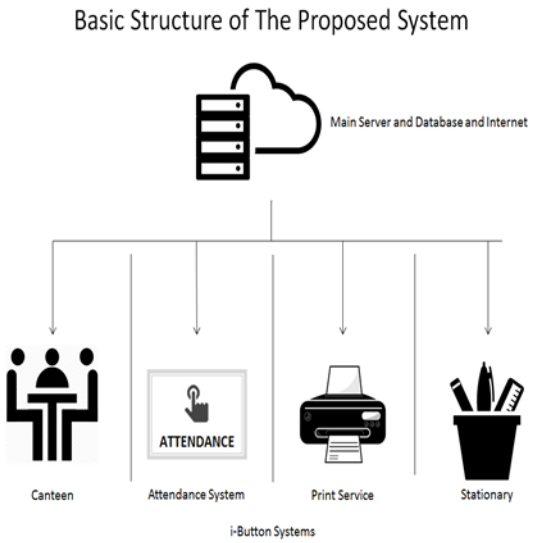

Figure 1: Basic Architecture

3.1. Server System

The server system is designed using the LAMP [3] stack which is an acronym for Linux, Apache, MySQL, Perl/Python/PHP. Most of the components in LAMP stack are free. **Figure 2** shows the flow in LAMP stack.

MySQL is locally hosted on the server machine for security as well as ease of implementation. The schemas for database mostly revolve around the UID of the iButton. The schemas with least possible necessary fields to store the required data for the system were selected. The fields can be tweaked as per changes in services.

Fields used in the current version of the implementation of UserList Table (one of the most important table of the entire system) are UidKeyType, Name, Studroll, Cash, UID, Division, Year, Department for our college based system implementation.

Currently the entire frontend service is divided into user accessible section called UserInterface, order managing and tracking section called CanteenManager, section to manage UID database of the organization called UserManager. Sections are not linked with each other, thereby not affecting other sections working. Thus, each section can be developed and tested independently and a new feature can be added without changing the other system.

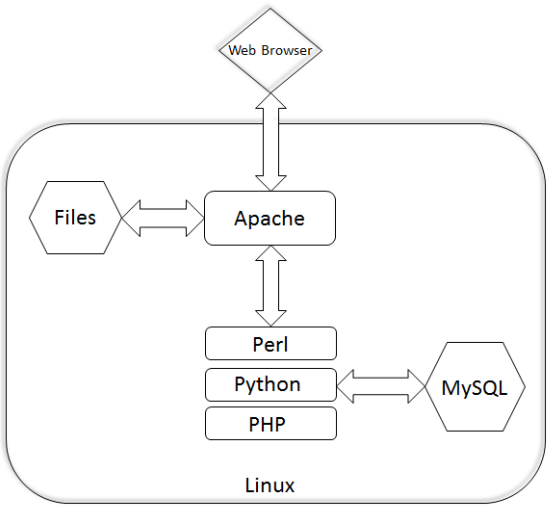

Figure 2: LAMP Stack

3.2. Hardware

The hardware part of the project is based on AT89S52 microcontroller from ATmel which is an 8051 core. The microcontroller features 8KB of internal flash memory, one full duplex UART serial port, three 16-bit timers along with other features of 8051.

The other parts used to implement the system are ESP8266 WiFi module and an iButton scanner which is just a piece wire.

The ESP8266 WiFi module is a low cost WiFi chip along with its own microcontroller. It is used to access the internet and send/receive data from the microcontroller to our server and database.

The iButton is a tiny device with unique 64bit address. It uses 1-wire protocol for communicating with the microcontroller and doesn't need special scanners for the purpose. A simple wire can work.

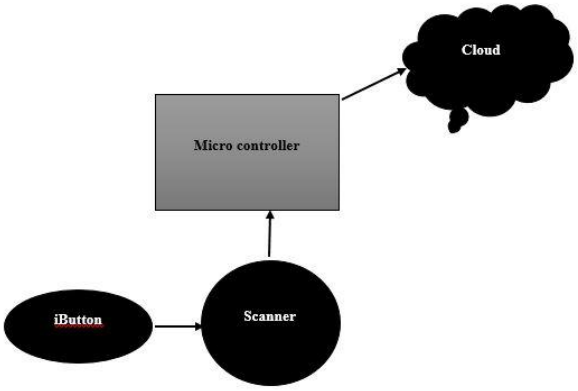

Figure 2: Hardware block diagram

IV. CONCLUSION

iButton unified management system can be considered as the best and acceptable replacement over RFID and barcode systems. 64bits unique address of iButton provides the product breadth so such systems can easily be implemented on a larger scale with lot of applications as per the requirement. The use of open source software bundle known as LAMP makes the system very cost effective and easy to implement. The system may face some technical glitches like iButton missing or delay in ESP data transfer to server.

REFERENCES

[1] "iButton" [Online]. Available: https://www.maximintegrated.com/en/app-notes/index.mvp/id/3808 [Accessed: 30- Aug- 2016].
[2] "Django overview | Django", Djangoproject.com, 2016. [Online]. Available: https://www.djangoproject.com/start/overview/. [Accessed: 31- Aug- 2016].
[3] "LAMP (software bundle)", Wikipedia, 2016. [Online]. Available: https://en.wikipedia.org/wiki/LAMP_(software_bundle)#/media/File:LAMP_software_bundle.svg. [Accessed: 31- Aug- 2016].

