Centralized School Management System for Government Schools in Ethiopia using Distributed Database

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Abstract

School Management System is developed to reduce the burden of teachers, educational data integration, control all the activities in school and parent's tension. But the main focus of this system is giving transformation to digitalization in government school sectors in Ethiopia. Till schools are not computerized, papers and documented sheets only using for to record data, data integrations and processing. Also there is no digitally centralized data center for student's record from the beginning of their studies. So it is not possible to access the student's information from outside the school campus. This proposed system will overcome these issues by keeping the data in centralized. It will help to monitor the educational progress of each and every school under the government easily so government can bring new schemes in schools to bring quality education. Also this system helps to the parents to monitor their children's education progress and attendance. This will lead to the quality education.

Keywords– *School Management System, Distributed database, School Management, School Administration*

I. INTRODUCTION

Education is the most necessarily important and key scheme to develop a country. Now Ethiopian government gives great attention to develop good ICT and quality of education. Education is important in the development of country. However, most schools are not technologically well organized to provide a quality service. This system will help the schools in all aspects and it will help the parents and education department of country.

A. Database System

A Database is systematically organized of indexed informationthat allows easy retrieval, updating, analysis, and output of data. Each database mayinvolve different database management systems and different architectures thatdistribute the execution of transactions [1].

1) Centralized Database Management System

Centralized database management systems were implemented to meet the structuredinformation needs. Structured information is usually presented as regularly issued formal reports in a standard format. Such information, generated by procedural programming languages, is created by specialists in response to preciselychanneled requests. Thus, structured information needs are well served by centralized systems.The use of a centralized database required that corporate data be stored in a single central site, usually a mainframecomputer [2].

In Fig 1: In centralized database system is a system that keeps the data in one single database at one single location. It is called as database server. Multiple clients can work simultaneously on a database server by using client/server configuration or intranet configuration. The main disadvantage of the centralized database management system is single point failure. If database server fail then it will affect overall work.

Disadvantages

- Bottleneck can occur as a result of high traffic.
- Limited access by more than one person to the same set of data as there is only one copy of it
- It is maintained in a single location. This can lead to major decreases in the general efficiency of the system.
- If there is no fault-tolerant setup and hardware failure occurs, all the data within the database will be lost.
- Since there is minimal to no data redundancy, if a set of data is unexpectedly lost it is very hard to retrieve it back, in most cases it would have to be done manually.

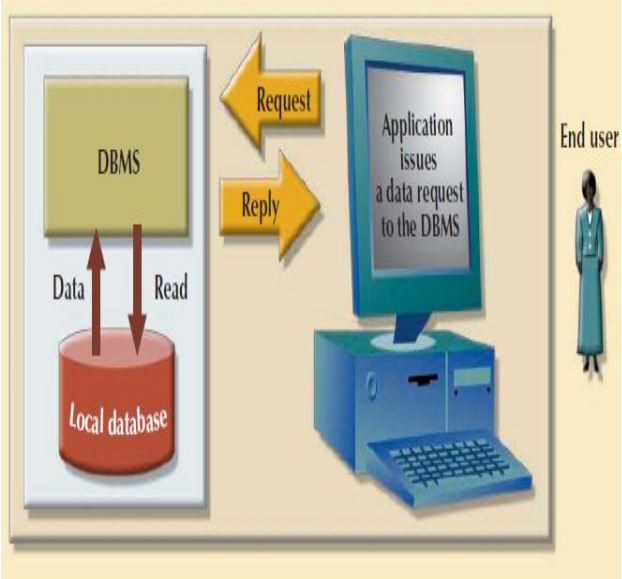

Fig 1: Centralized DB management system

2) Distributed Database Management System

Distributed Database technology resulted from a merger of two technologies: database technologyand network and data communication technology. Computer networks allow distributed processing of data [3]. Distributed database (DDB) as a collection of multiple logicallyinterrelated databases distributed over a computer network, and a distributed databasemanagement system (DDBMS) as a software system that manages a distributeddatabase while making the distribution transparent to the user.

In Fig 2: In distributed database system data can be replicated in different five sites and connected by data communication technology.

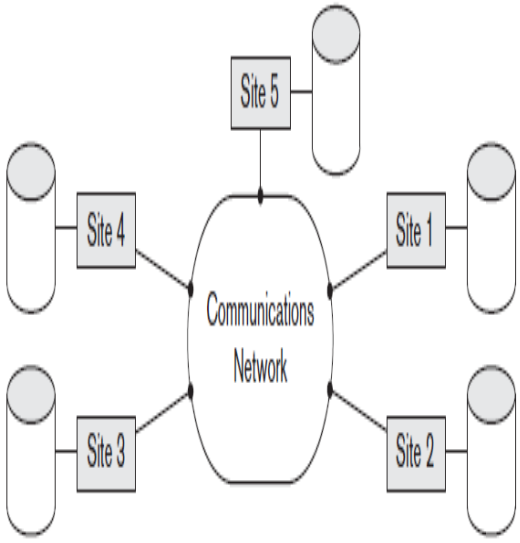

Fig 2: Distributed Database Architecture

Advantages of DDBMS: [5]

- Sharing a database across multiple nodes can obtain a storage space extension and also can benefit from multiple processing resources.
- Increased reliability and availability.
- Faster response
- Modular growth (resilient)
- The system is continued to work in case of failures.
- Improved performance and parallelism in executing transactions can be achieved

II. PROPOSED SYSTEM

Proposed system, focused on four phases mainly. It providing the access to parents to check their children status also system will send the SMS to the parent's mobile. Second one is system using the distributed database system to overcome the problems in centralized database management system. Third one is to help the management to manage the schools activities by digital. Fourth one is to help the education department of country.

A. Use Case Diagram:

Use case diagrams are usually referred to as behavior diagrams used to describe a set of actions (use cases) that some system or systems (subject) should or can perform in collaboration with one or more external users of the system (actors). Its main purpose is to visualize the functional requirements of a system, including the relationship of "actors" (human beings who will interact with the system) to essential processes, as well as the relationships among different use cases [4].

Simply can tell as use case diagram is a diagram to sow the activities of actor and how they interact with the system.in this system. In Fig 3: In this proposed system seven actors are available. Those actors are:

- Main admin
- School admin
- Supervisor
- Teacher
- Student
- Record officer
- Parent

1. Main Admin

MainAdministrator is responsible for managing the system at the top level. He is responsible for managing the lower administrator (school admin), and view all school report. He is controlling and maintaining entire system.

2. School Admin

School administrator is responsible for managing the activities that they performed by system mainly in the each school. School admin is managing the account of the school actor like teacher, student, supervisor, and record officer. Also he is managing the classes, school information and school report. He can update the latest information to the system.

3. Supervisor

He is the one who control the employee status in the school. He receive the report from teachers and he will approve the repot and send it to the main admin by semester wise. He can see the feedback from main admin and teacher and can give the comment.

4. Teacher:

He is responsible for his subject. He can add the student result and attendance to the system. He can send the comments to the parents and students through the system. He can send SMS to the parents from the system regarding the attendance and daily activities. He can prepare report card for his subject.

5. Student

Students can register for the new academic year. He can see his result and daily status from the system. He can see the comments from the teacher and can send the feedback also. He can see the school and teacher information.

6. Parent

Parentcanview the daily activities of their children through the system and can also receive SMS message from class teacher about the child daily activity. Parent can give feedback or comment through the system to the class teacher. Parent can view their children report card as well as the transcript.

7. Record Officer

can make transfer of student from one school to other school and send all the detail of student information to the student new school through this system. He can print out the student transcript and make validation by the school supervisor.

B. Class Diagram:

The static structures of a computer application or a database station are shown in a class diagram. It also shows how the different entities (people, things, and data) relate to each other. It can be used to display logical classes, and implementation classes. It is the main building block of object oriented modeling. It is a type of static structure diagram in UML that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among the classes [4].

The database we used in this system is to store the information that we recorded by using this system. Here different number of tables used:

The main admin table also store the profile detail of the top-level admin like username, password, mailed, comments etc.

The school administrator table store the detail information of the school administrator profile like username, password, mailed, mobile.

The information table store the information that the admin post through the system.

Teacher table, record officer table, student table, parent table, supervisor table all this table store the profile of the corresponding person.

The mark table store the student result that submitted by the teacher.

Transcript table can also the student transcript that is automatically prepared by the system when the teacher submit the student result.

The other table is transfer table. This table store the student information when they make transfer from one school to other school.

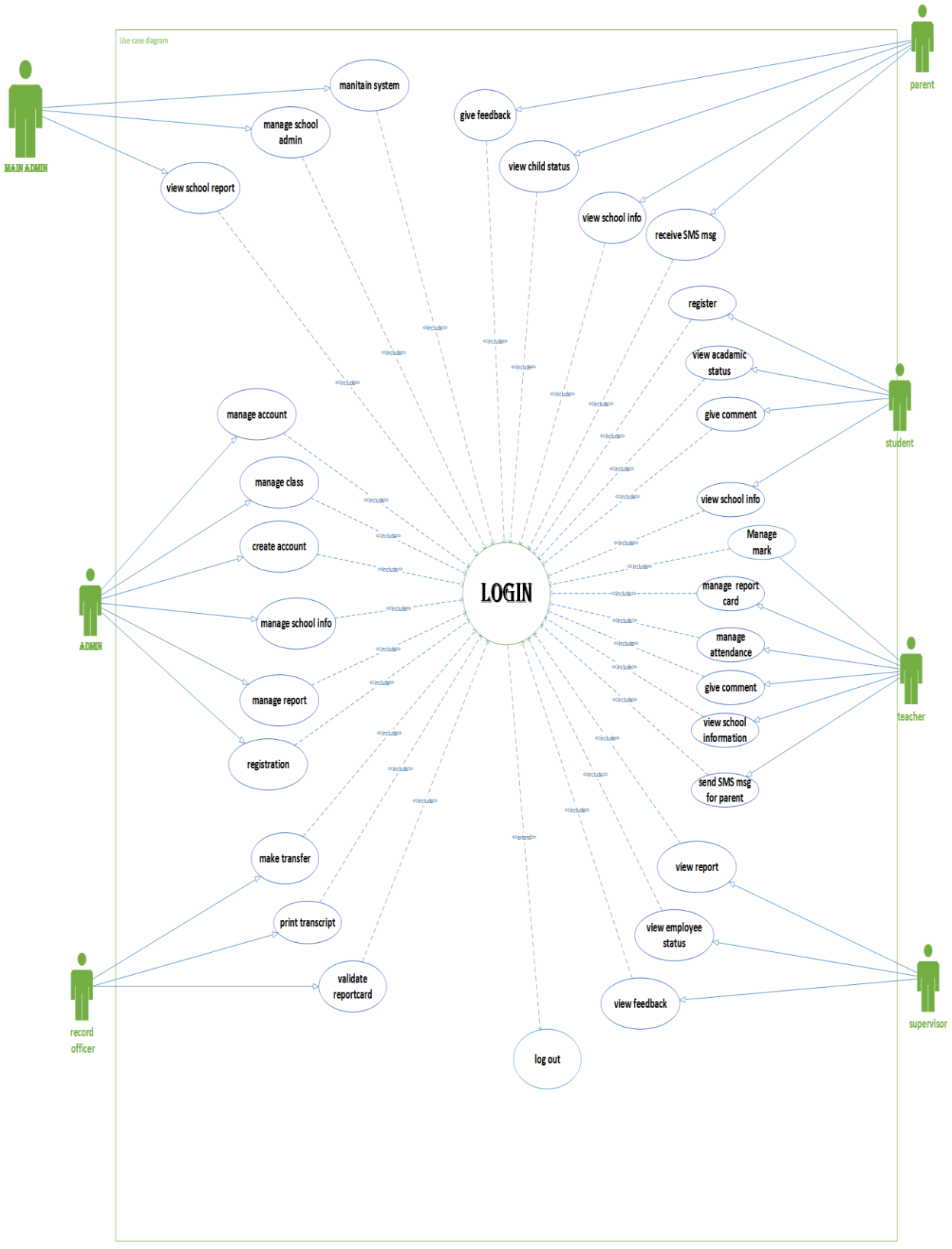

Fig 3: Use Case Diagram

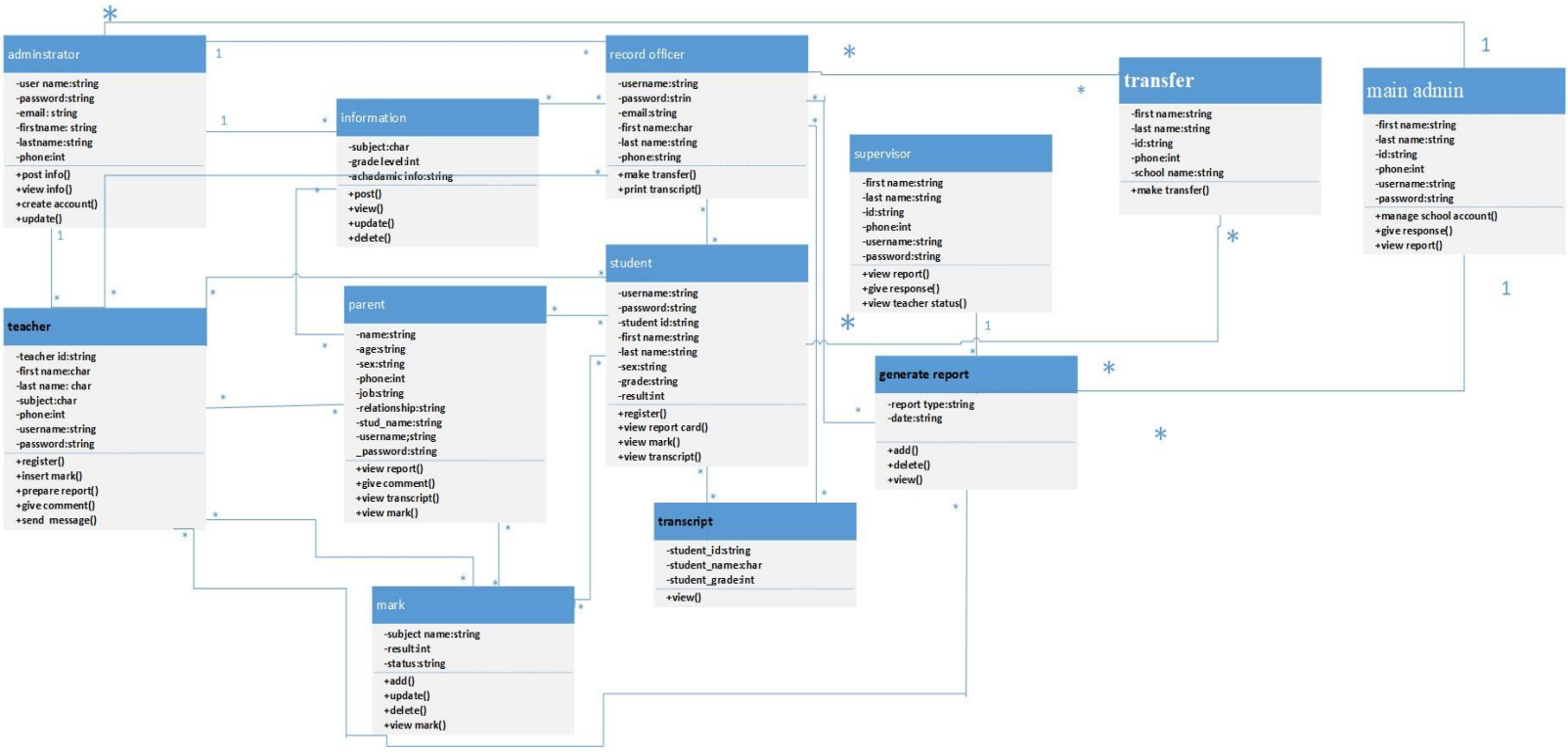

Fig 4: Class Diagram

C. CONCLUSION

This web based system will overcome the all complex activities related to the school management. It made the parents to involve in their children school activates. So it will help to active the quality education. Also it helps to achieve the country goal that quality education, digitalization and growth of ICT. This system will provide the entire county school information so government can take necessary measurements and action take easily. This system increasing the digitalization in the school activities. In addition that planned to add the e-learning and e-library to this system such that adding lecture and tutorial videos to the students for reference.

REFERENCES

[1] ParulTomar, Megha,An Overview of Distributed Database, International Journal of Information and Computation Technology. Volume 4, Number 2 (2014)

[2] Coronel, Morris, ROB, "Database Systems Design, Implementation and Management" Ninth Edition

[3] Elmasri, Navathe, "Fundamental of Database Systems" Sixth Edition

[4] Sunguk Lee "Unified Modeling Language (UML) for Database Systems and Computer Applications" International Journal of Database Theory and Applicationvol 5, No 1 2012

[5] Nicoleta, Mirela, "Centralized vs. Distributed Databases. Case Study" Academic Journal of Economic Studies Vol 1, No 4