A Prototype for a Grid based

Indian Rural Health Care System

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Abstract - *The paper focuses on the software system developed for the proposed architecture of the grid meant for Indian rural health care system. The application developed would display various activities and functionalities. The application will consolidate the Infant and women health data at various grid levels i.e. at the village, mandal, city and district. The application helps a rural doctor to get the advice by a specialist doctor in the city for preventive health care.*

Key Words: Grid, Spring Framework.

1. INTRODUCTION

In our grid based software application we can find actors at various levels of grid accessing the system. It is very important that grid share their information between them and grid information system is maintained properly. The health care system can immensely benefit from such software systems embedded with a database which holds huge records. The health care grid system application enables the patients at each level of grid to get the required facility. In case at any grid level there is a scarcity of resources then it can be shared from other grid level. Also it enables to transfer those unsolved cases present in a one grid level to another grid level.

The health care grid based application takes care of huge data related to villages, mandals, cities etc. This paper explains various screen shots taken from the developed grid based software application. The respective screen shows the different aspects and functionalities covered. The health care is an important factor for the entire society and it becomes equally important for the government to make sure that people from rural to urban make use of the health care services. The current grid system supports various kinds of activities including resource sharing etc. The current software system can be considered as a simulator which exhibits a systematic functionality.

There are various health issues at mandal, village, district etc and patients with numerous diseases can be found. But there are again complaints related to less number of doctors at each level and to overcome such issues we need to use the grid system to share the resources in terms of doctors. In the grid level software simulator all the data are recorded in a database and hence a permanent database is maintained. The users can visualize the data any time with respect to their permissions given. Before the simulator was developed architecture was proposed for the grid system which is taken into consideration while developing the software. The architecture is layered based and it is shown in Figure 1 below.
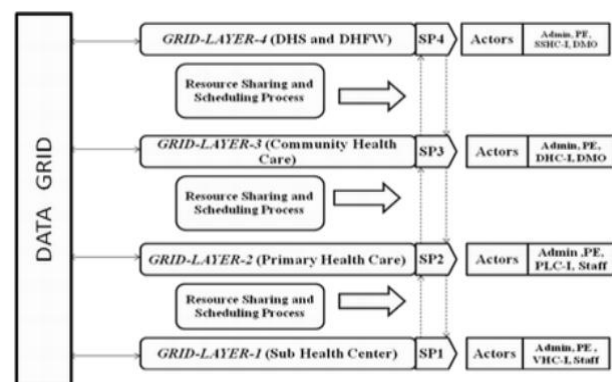

Fig -1: Proposed Health Care Grid Architecture

In the above grid architecture related to health care system [3], we can visualize the 4 layers which are at different levels and all are commonly connected with Data Grid. At each grid level there are set of actors who have to do specific task. In the above Figure 1 grid-layer-1 refers

to sub health center, grid-layer-2 refers to primary health center, grid-layer-3 refers to community health center and grid-layer-4 refers to directorate of health center.

2. SPRING FRAMEWORK

The current application [1][2] is developed using "Springs" framework and MySql database. It is well known fact that J2EE and other java web applications are widely used. Generally it is noted that "Springs" provides a good service but it is less intrusive than EJBs.
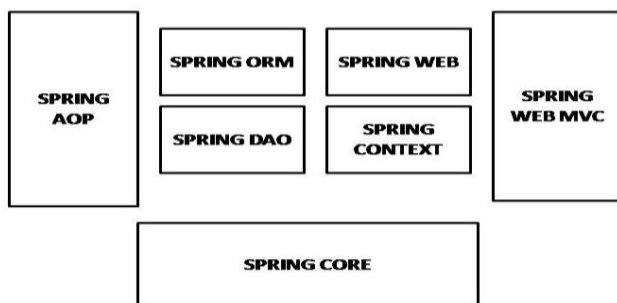

Fig -2: Springs Framework Architecture

In the above Figure 2 we can visualize springs framework architecture. In the above architecture there are seven components which include "Spring AOP", "Spring ORM", "Spring DAO", "Spring Web", "Spring Context", "Spring Web MVC" and "Spring Core". Spring is a framework which is free and open source and has numerous functionalities. It also helps to make the java applications customize effectively and efficiently.
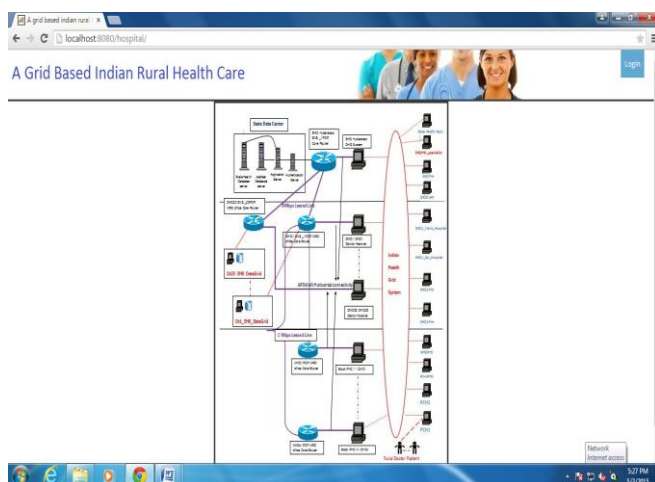
3. MODULE SCREEN SHOTS

Fig -3: Login Screen

The above Figure 3 shows the login page of the grid based rural health care. There are different users who can login into the page they will differ in terms of permissions.
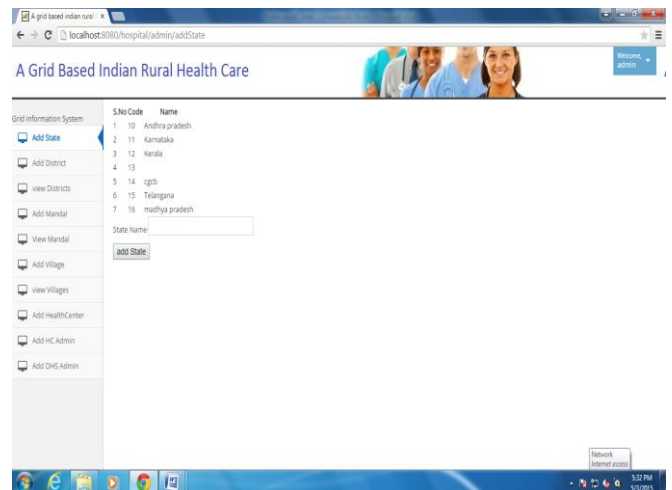

Fig -4: Add State Details

The above Figure 4 shows the page when the user logged in as "admin". The "admin" can add new state as visible above in the page. After adding the details the user has to click on "add state" button. The details are added and they are visible on the screen. Similarly other options of the grid information system are present on the left hand side.
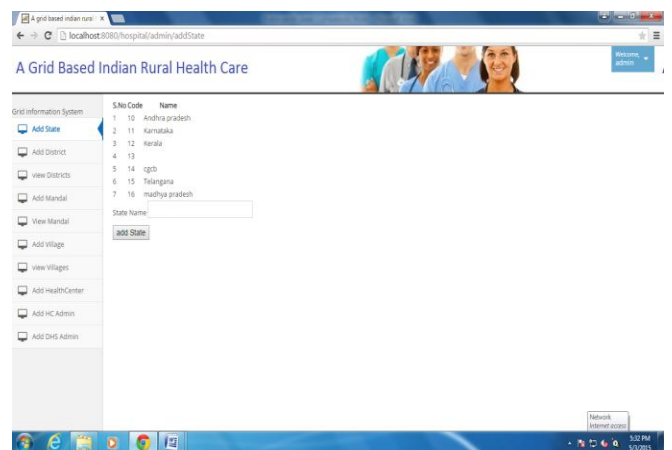

Fig -5: Add Village Details

The above Figure 5 shows the "Add Village" page when user logged in as "Admin". This page has two different areas that include "Add New Village" and "Health Center Details". In the "Add New Village" area many options are present that are to be filled like "Village Name", "Select

District", "Select Mandal" etc. When it comes to "Health Center Details" the option include "Health center name" etc.
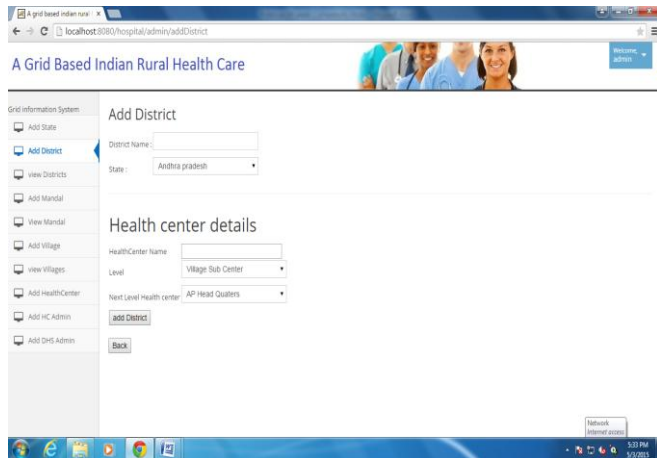

Fig -6: Add District Details

The above Figure 6 describes about "Add District" which include "Add District" and "Health center details". In "Add District" we have details like "District Name" and "State". When it comes to "health center details" we have "Health center name", "level" etc. After filling all the details the user has to press the "add district" button.

Fig -7: Role of a Doctor

The above Figure 7 shows role of a doctor when logged into the health care system application. On left hand side we can visualize the options like PIS (Patient information system), MIS, and TNG (Transfer to next grid). Also within PIS the options present are "No patients selected" and "All patients". The doctor can view all the necessary records and can also delete the patient record.
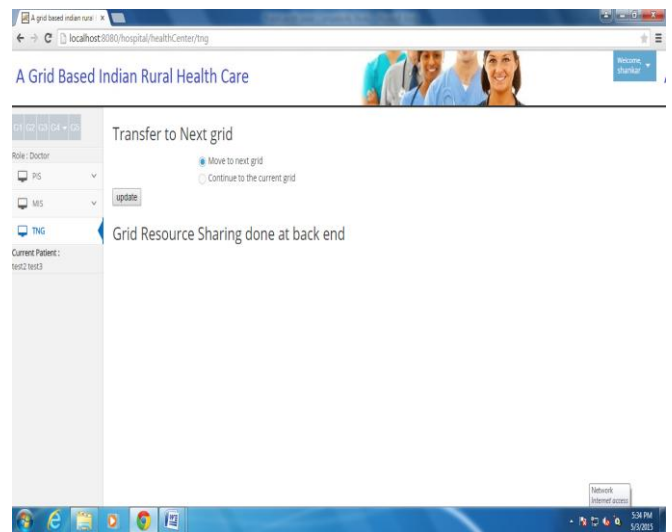

Fig -8: TNG screen

The above Figure 8 shows the TNG option. The option "TNG" will have again two sub-options "Move to next grid" and "Continue to the current grid". The user has to press the update button after selecting the required option. The grid resource sharing is done at the back end.
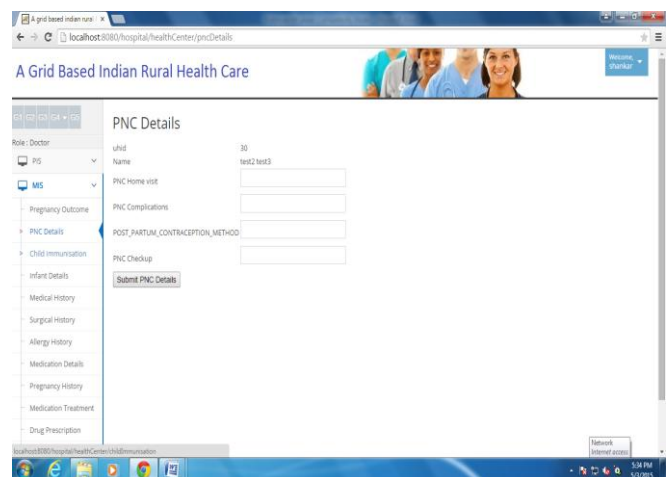

Fig -9: MIS and Doctor Role

The above Figure 9 shows the details and sub-options of MIS. The MIS has various sub-options like pregnancy outcome, PNC details, child immunization, infant details, medical history, medication details, pregnancy history, medication treatment, drug prescription, disease information and TNG. When we click on pregnancy history a form appears which the user has to fill. After filling the form the user has to click on pregnancy history button.
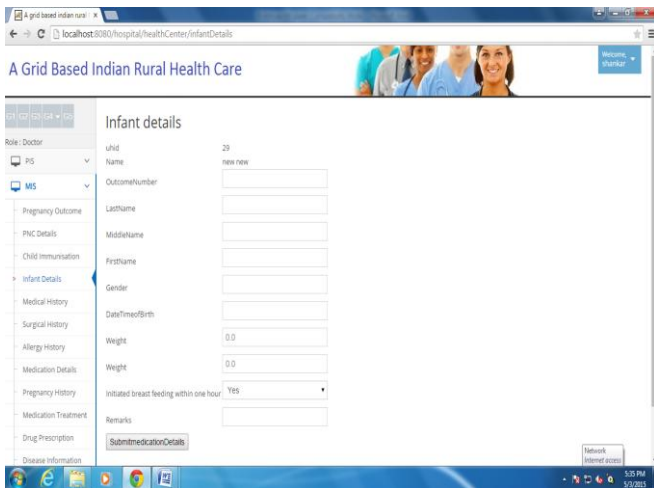
Fig -10: Infant Details

The above Figure 10 shows MIS sub-option infant details. When the user clicks on infant details a form appears and when that form is filled then the user has to click "Submit" button.
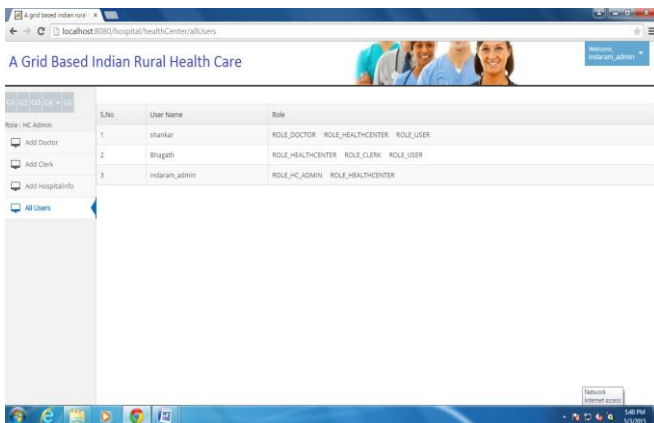

Fig -11: All Users page

The above Figure 11 taken from the health care system simulator describes and shows the user names and their respective roles which they perform. In the above screen we can see there are three users with names "indaram_admin", "Bhagat" and "Shankar". Below the column with name "Role" the roles are mentioned.

4. CONCLUSIONS

The overall software application was developed using Java-Springs technology. The application runs overall fine and it works as a good prototype model. It is a well customized user application. The application covers all the major aspects needed for grid based health care system. The data mining aspects related to the grid system are mentioned in our other related paper works.

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