

# Designing an Online Employee Work Process Scheduling System for National Water Supply and Drainage Board in Sri Lanka

RMDS Rathnayake<sup>#</sup> and A Ariyaratne

Department of Information Technology, Faculty of Computing, General Sir John Kotelawala Defence University, Ratmalana, Sri Lanka

<sup>#</sup>r.m.d.sewwandi@gmail.com

**Abstract**— *Managing employee work scheduling process is a vital task. Most organizations use manual systems for scheduling the employee work. But it is very time consuming and need a lot of effort to use those systems. The project is an approach for “Employee Work Process scheduling system” for National water supply and drainage board, the system, which was developed now, makes this process of scheduling much easier and computerized. By this system the general manager or top level designated employee can fix the schedule of any employee working under him, can even check whether the employee is free in the particular time or in other times. Thus the top level management can easily fix the process of scheduling, and even can change the appointment which is reflected immediately to the related employee avoiding direct contact of the employee resulting in saving lot of time and work overhead. The system even has the option for only viewing employee’s activities or appointments. This feature avoids direct contact to the respective employee’s database and activities. There is an option where only the supervisor (the top-level manager) can have direct access to the employee’s activities, can change the appointments of employees working under him. No other employee of the same designation or same level of hierarchy can do so. The proposed system is a software designed to assist in the process of scheduling the employees. Also this intended system will reduce human errors in handling employee details with regards to daily work process schedules. This research has used agile waterfall development methodology in order to develop design of the system. A survey has been conducted to identify drawbacks and address them successfully during development of the system. Proposed designing solution is accomplished by using web technologies with ASP.net and C# to run on Windows operating system.*

**Keywords**— *Employee Work Process Scheduling System*

## I. INTRODUCTION (PROLEGOMENA)

Software solution have introduced of new way of building real world platforms. Software provides cost effective,

accurate, user-friendly and reliable solution for almost all application, among other software technologies programming, web and multimedia have been widely used for the development of application software. Now a day numerous tools available for software development .This thesis present our project to develop a software solution for the domain of employee work process schedules. In doing so this chapter outlines objectives, background and motivation for the project. This project is named as EW PSS. This paper includes Hypothesis, proposed solution objectives, proposed solution, problems in brief, resource requirement and overview of structure of the rest of thesis.

### A. Objectives

With the aim of develop a computer based employee work process scheduling system, this project has identified the following objectives,

- 1) To critically study the current practices and issues in employee work process scheduling system.
- 2) To critically study the existing solutions for employee work process schedules.
- 3) To conduct a detailed study on the phases of software engineering life cycle.
- 4) To do a detailed study on database, web and mobile technologies.
- 5) Design and develop computer based employee work process scheduling system.
- 6) Evaluate the new employee work process scheduling system.

### B. Background and motivation

There is a growing interest in employee work process schedules especially in the IT project field. If the employee work process schedules are neglected then the whole working process of all the projects will be badly influenced.

### C. Problem in brief

Constraints are restrictions or conditions that the system should comply with during development and execution. The system must be developed within the boundaries defined by constraints. All constraints must be followed

during development of the system. Following are the constraints of the system

- An active internet connection is required to access system.
- Participants have to be employees of the organization.
- Participants need to have a valid email address.
- Organization's employee database is required for the list of participants.
- Organization's infrastructure (meeting rooms and equipment) database is required for scheduling the meeting.
- Participants and the other employees who are in the latter part of the hierarchy shall not be allowed to modify activities, or change the data.
- Cannot immediately convey the message of postponing, cancellations as well as necessary amendments in the employee work process schedules
- Difficulty in handling more paper work which leads to misplace and loss of files.
- More time consuming with the system activities
- , Less security and unauthorized access to the system.

#### D. Hypothesis

One of the severe and rising potential problems in most large organizations are they do not have Proper Employee work process scheduling system. Although there are some struggles to reduce and recover the problems in manual Employee scheduling systems, these are still the most common method for waste the time in organizational environment. Inappropriate methods may have lots of problems like employee work load is high, monetary and natural impacts. Therefore, it should be selected sensibly by considering both regulations and constraints on organizational rules. In this reading, candidate sites for an appropriate Employee work process scheduling systems determined by using the integration of web based employee work process scheduling system for national water board in Ratmalana. Comparison of the maps produced by these two different methods (manual systems and computerized web based systems) shows that both methods yield conformable results.

#### E. Software solution for employee work process schedules Technology adapted databases & web technologies

II. Current Work process of the Employee work process scheduling system [Review of Others' work - Literature Review (Review of others work)]

(Existing issues in line with the Employee work process scheduling systems, Current Work process of the Employee work process scheduling systems)

III. Technology adapted databases & web technologies

#### A. Software Requirements

- 1) Operating System : Windows 2007
- 2) Browser : IE
- 3) Database Server : Oracle 8I or SQL Server
- 4) Database Connectivity : C#DBC , Microsoft ODBC Driver for Oracle
- 5) Other Tools & Technologies : C#, AWT tool kit(This is new tool kit)

IV. Approach - (Web application for employee work process scheduling system)

This includes an approach to employee work process scheduling system by using web technologies.

This system is primarily targeted for administrative level employees, general level employees, and other organizational parties. (They have different access levels such as the administrative level employees can edit ,view as well as update all the schedules, the general level users can view and update their profile states like "seen" and other employees only can view the schedules with the respective employees )

Employee personal details such as their

- 1) User type (supervisor, labor , others)
- 2) User name
- 3) Login Password,
- 4) Employee ID
- 5) dept-name
- 6) dept-no
- 7) Dates and times

By using these details we can decide that we can use state of art of the deductive research approach and agile development methodology in order to find the issues exist within the present situation and to design an automated system.

#### A. Outputs

Employee work schedules with respect to the date and time.

C. Discuss what happens in the Process (Explain the details of the system with the relevant technology used for conversion of input to the output. Expansion on the process can be seen as the conduct of the project)

The system, which is going to develop, makes this process of scheduling much easier and computerized. In this system at the beginning the users can enter their user name and password and he can be either administrative level employee, the general level users. After that he can enter the employee ID, Department name and No after that they can enter the By this system the manager or

top level designated employee can fix the schedule of any employee working under him, he even can check whether the employee is free in the particular time or in other times..

The system even has the option for only viewing the employee’s activities or appointments. This feature avoids direct contact to the respective employee’s database and activities. There is an option where only the supervisor (the top-level manager) can have direct access to the employee’s activities, he can change the appointments of the employees working under him. No other employee of the same designation or same level of hierarchy can do this.

### V. THE DESIGN OF EMPLOYEE WORK PROCESS SCHEDULING SYSTEM

Employee work process scheduling system is primarily an employee work process scheduling web based system with multiple user access through various tools. In order to develop the proposed solution we use agile development methodology which includes the steps shown in the diagram below.

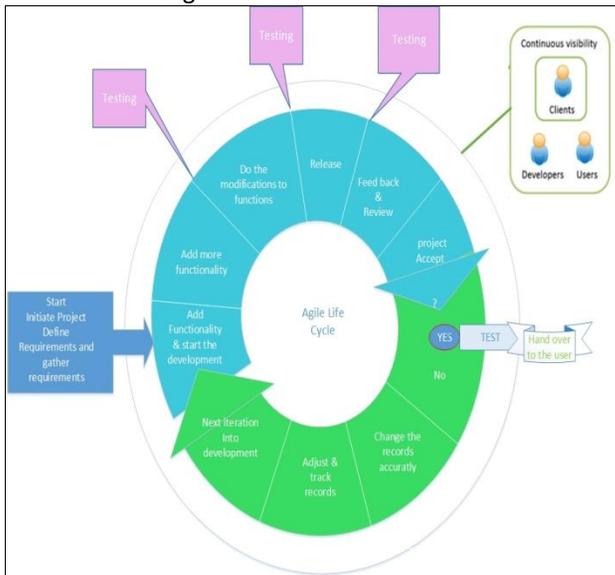


Figure 1: Steps in agile development life cycle

System design is a solution a “how to” approach to the creation of the new system. This provides the understanding and procedural details necessary for implementing the system recommended in the feasibility study emphasis is on translating performance requirements into design specifications.

The design of this software product constitutes three distinct types of activities – external design, architectural design and detailed design. Architectural and detailed designs are collectively referred to as internal design.

External design of this software involves conceiving and specifying the externally observable characteristics of a software product, which includes user, displays functional characteristics and performance requirements of the product. External design begins during the analysis phase and continues into the design phase. Internal design involves conceiving and specifying the internal structure and processing details of the software product.

Architectural design is concerned with refining the conceptual view of the system identifying internal processing functions decomposing them into sub-functions and establishing interconnections among them. Structured design is a method to design a system. It is a data-flow based methodology that identifies inputs and outputs and describes the functional aspects of the system. It partitions a program into a hierarchy of modules organized in top-down manner with the details at the bottom. Structured design tools includes structured charts, HIPO charts etc.

Top level architecture of the employee work process scheduling system is shown in the below picture

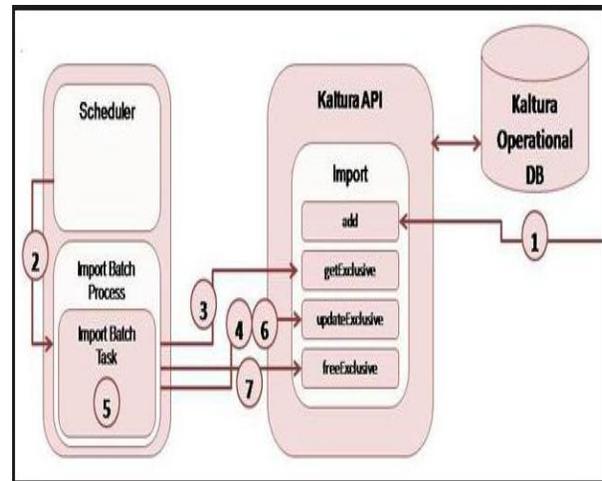


Figure 2: basic process of the system

Next we briefly describe the role of each module and the connection.

#### A. User interfaces

User interface give the access to employees to enter to the systems .User interface also allows to high level managers to the maintenance and up grate. In this design ordinary employees always go through the server to access the database. In contrast the system administrators or the higher level manger can directly access the database without going through the server. The other employees can access the database through

the server. Authorized employees can have some or else given some extended access to the system regarding certain tasks. The user interface enables the user inputs such as employee no, name, section, and job types. The following figures show some interfaces of the proposed solution.

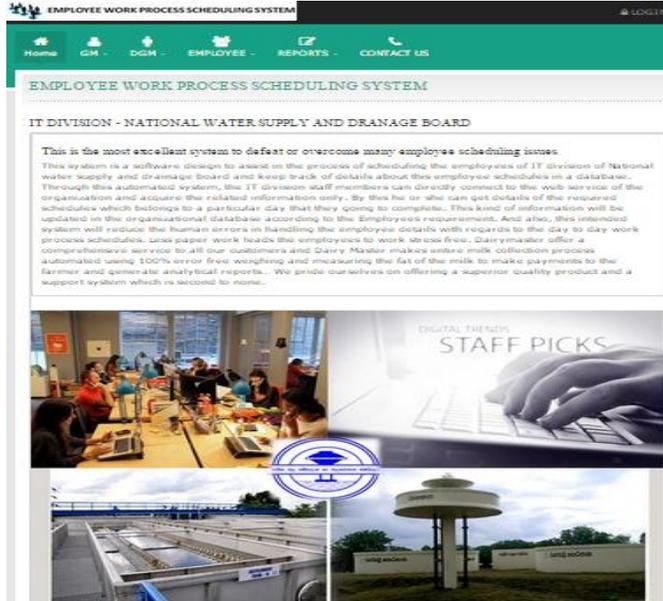


Figure 3: Home page of the system

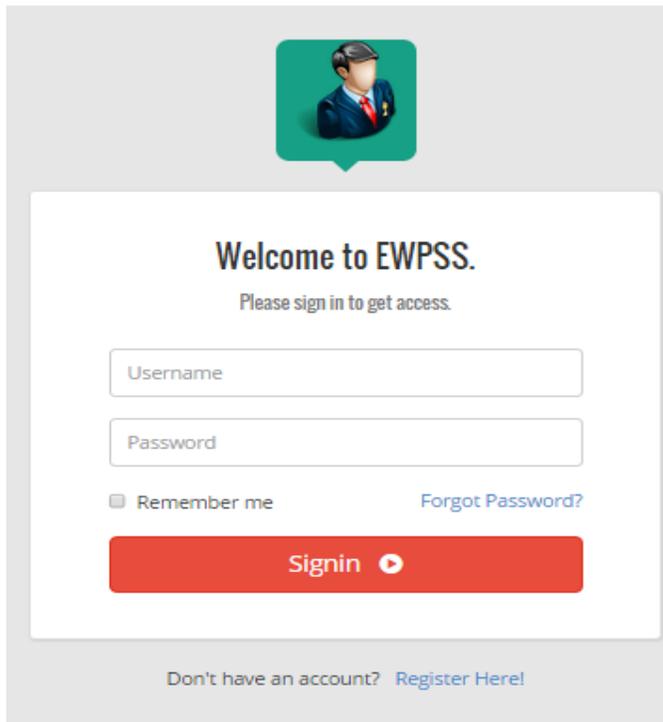


Figure 4: Login user interface of the system

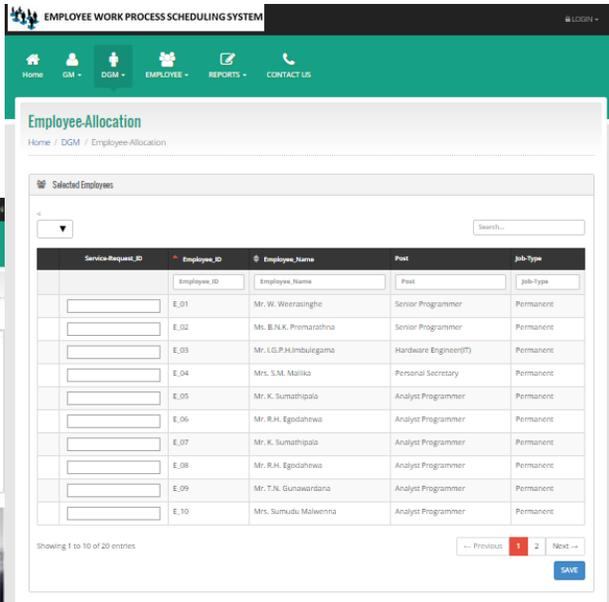


Figure 5: Employee Allocation interface of the system.

**B. Server**

Server provides direct access to all kind of users. The server also has a direct connection to the organizational database. This particular server has been design and handles more than thousand requests at the given time. It is also supplies with the backup service.

**C. Database design (Main tables in Employee work process scheduling system)**

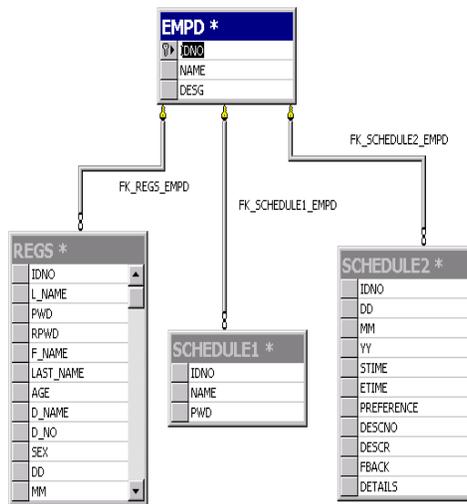


Figure 6- part of the Entity Relationship Diagram- (Database)

**VI. Testing of employee work process scheduling system**  
 Testing the newly developed or modified systems is one of the most important activities in the system development methodology the goal of testing is to verify the logical and physical operation of the design blocks to determine that they operate as intended.

During testing the program to be tested is executed with a set of test cases, and the output of the program for the test cases is evaluated to determine if the program is performing as it is expected to do so. There are a number of rules that can serve well as testing objectives. Testing is a process of executing a program with the intent of finding errors. Good test case is alone that has a high Probability of finding as yet undiscovered errors.

A successful test is a one that uncovers as yet undiscovered errors. The basic levels are unit testing, integration testing and

#### *A. Acceptance testing.*

In here we carry out this testing within different levels, which attempts to detect different types of faults that lay with the system. We performed this with realistic data of the client to demonstrate that the software is working satisfactory. Testing here focus on external behaviour of the employee work process scheduling system.

#### *B. Unit testing*

During the implementation of the system each module of the system was tested separately to uncover errors with are its boundaries. Employee work process scheduling system's User inter-faces was used as a guide in this process.

#### *C. Integration testing*

The objective of integration testing is to take the unit tested modules and build a program structure that has been defined in the design. We have done a top down integration, which is an incremental approach, which is constructing and testing small segments where errors are easier to isolate and corrected. The Integration process was performed in three steps

- 1) The main control was used as test driver.
- 2) Tests were conducted as each module was integrated.
- 3) Use regression testing (Conducting all or some of the previous tests) to ensure that new errors have not been introduced in the solution.

#### *D. System Testing*

Here the entire proposed software system is tested. The references document for this process is the requirements document and the goal is to see if the system meets its requirements.

#### *E. Boundary Conditions test*

Boundary conditions as in case of generating sequences were tested to ensure that the module operates properly at boundaries established to limit or restrict processing.

#### VII. Implementation of employee work process scheduling system.

For this purpose we discussed requirement of software, hardware, algorithms, flow charts, pseudocode related to each module in the design. The employee work process scheduling system has been primarily implemented as a client server based system which predominantly works as a c# based system that runs on windows operating system. Next we briefly describe the implementation of each module.

##### *A. Implementation of GUI module*

The GUI has been implemented with .Net framework and c#. The interface executes the algorithm to attend to user request and generate a response.

- 1) Verifying the user
- 2) Ask to enter the request
- 3) Accept the request
- 4) Query with the database.
- 5) If the request can be made then accept it.
- 6) Else ask for new request.

##### *B. Implementation of server*

Server for the Employee work process scheduling system has been implemented with open source MySQL database server. The choice of MySQL has been influenced by various reason including it is open source, widely used, runs on any OS.

#### VII. EVALUATION

We presented the implementation of automated Employee work process scheduling system. This chapter describes the evaluation of our approach. For this purpose, we present the result from our informal evaluation of the solution. Then we proceed to describe how we have formally evaluated our approach to check for meeting the objectives of the project.

##### *A. Informal evaluation*

During the implementation process the modules in the system have been incrementally tested. The integrated solution has also been tested by running the system in the actual work setting. In these informal testing senior managers, IT engineers, Analysis, Clarks have been involved. Accordingly improvements were done, and also identified training requirements for the setting.

##### *B. Formal evaluation*

In order to test the achievements of the objectives of the project the experiments is carried out as follows.

Note that achievements of problem and technology related objectives are evident of the materials in chapter

2. This chapter has critically reviewed 150 research papers to formulate the problem.

The solution related objectives are concerned with a realizing the features of the solution stated in the chapter 4. These features together with the input and output are as follows.

User friendliness, Speed and Accessibility

This experimental has one control group without using the system. And one experimental groups the uses system for testing purpose. Both groups were given the same task and collected their feedback as per above features to be tested. The list was to register

#### VIII. CONCLUSION

In this paper we explained our approach to automated solution for employee work process scheduling system by describing its inputs, outputs, features, processes, users. We also highlighted the uniqueness of our solution with respect to the output. As with any computerized database the reporting capabilities are endless and provide many departments with better tools to manage their staff. This is more applicable for departments with a large number of employees. Employees using the PC based data entry option have the flexibility to enter their own time. Time clocks are the simplest and most accurate method for many employees to enter their time worked and are seen as technologically advanced and easy to use. The system can document an employee's negative behaviours when they are absent or tardy by using the scheduling system in conjunction with the time clocks. The system screens are easy to understand and use as they mimic a Microsoft Outlook design. A new supervisor module is now available that has more customizable screen using a dashboard design.

#### ACKNOWLEDGMENT

This design is designed to meet the needs of "Employee work process schedules". We are pleased to place this design in the hands of our dear readers. Our thanks to DGM of IT section of NWSDB, Sri Lanka and Mrs. JHGDP

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