The Software Prototype of Civil Court Case Management in Thailand

1Pornpen Rungruangpattana and 2Tiranee Achalakul, Ph.D.

1Faculty of Engineering
Department of Computer Engineering
King Mongkut’s University of Technology Thonburi, Thailand
2Faculty of Engineering Department of Computer Engineering King Mongkut’s University of Technology Thonburi, Thailand
1meiwentika@yahoo.com, 2tiranee@cpe.kmutt.ac.th

Abstract

This research work proposes an idea on the design framework of the IT support for the judiciary system in Thailand. We have performed an in-depth study of the court workflow at the Central Intellectual Property and International Trade Court (CIPITC). Case Management System (CMS) and Web services concepts were applied. We also considered the practicality of system deployment at the civil courts in Thailand. The court authorities were requested to participate in the usability evaluation of the design framework and the software prototype. The evaluation was conducted in three domains: effectiveness, efficiency, and satisfaction. The analysis and discussion were then presented as a part of our results.

Keywords: Civil Court Case Management, Civil Court, Software Prototype

1. Introduction

Nowadays the court of justice in Thailand faces a problem with a lot of backlog case pending. In 2007, there were about 1,182,537 cases in the court [1]. The delay in the court process has an effect on the country’s macro economics. With the increasing number of cases each year, it is necessary to re-engineer the court workflow and to introduce the use of IT in case management. However, the entire business process cannot be practically converted to the electronic-based system. Thus, an extensive study of a judiciary process is needed during software design.

In our work, we have selected the Central Intellectual Property and International Trade Court or CIPITC, where most evidences are in the form of documents, as the pilot court. In addition, we also studied the best practices from Australia, Singapore, Italy, and United Kingdom in applying IT to the Judiciary workflow.

Australia: Australian judiciary has accomplished using IT supports for the court called e-court. The systems have two interesting modules, which are Electronic Courtrooms and Electronic Filing. The Electronic Courtrooms provide electronic process and data including transcript, e-mail and access to pleadings and documents in real-time during trials [2]. The Intranet facility is provided to enable dial-in access for all parties. The court also provides the addition of audio evidence in digital format. The e-filing integrates the Case Management System to enhance the efficiency of the administration in justice. The court resource allocation is simplified. The module also manages judges’ workloads, time-booking and case list.

Singapore: The main technology adopted in Singapore’s judiciary is case management. Case management involves the monitoring and managing of cases in the
court docket. The main service of case management is Electronic Filing Service. The service converts paper documents into an electronic form. This service allows lawyers to file all documents electronically via the web-based front-end system. The courts also have the service to support the law firms or litigants-in-person who do not own computers [3].

_Italy:_ The IT system for the Italian court was established by Authority for Information Technology in the Public Administration (AIPA) [4]. There are two interesting projects as follows:

The XML and the structure of judicial documents project provides the current standard for structuring and exchanging of documents between a drafting system and an information retrieval system.

The electronic transmission of judicial documents project is concerned with the requests of information, exchange of messages and documents between the court and the parties in the transmission of digitally signed e-mail. The tasks also include collecting the court fee through credit cards [5].

_United Kingdom:_ IT supports for a judicial system is founded by Woolf [6] offering major benefits to the civil justice system. A private-initiative software development resulted in the computer-based transcription service. The day to day administrative tasks in the courts can be managed using IT court services. Document file management and data tracking are conducted effectively under the judicial case management system [5].

After the extensive survey of the best practice cases around the world, we have designed the software framework for the judiciary system in Thailand. The major features of the framework are case tracking and document management. The design, development, and evaluation efforts are described in the following sections.

2. The Civil Procedure at CIPITC

In order to design a software framework that is practical and usable, we have to study the civil case workflow at the CIPITC court. Figure 1 explains the simplified court proceedings from when the case institutes by the plaintiff to the verdict delivery by the judge. The workflow illustrates the involvement of people of different roles.

From the activity diagram with swim lanes in the Figures, there are eight roles involved: Party, Competent Officer, Finance Officer, Filling Clerk, Authority, Judge, Case-List Officer and Archivist. The process starts when a lawsuit is filed by a lawyer on behalf of a plaintiff or a party. The party then prepares the documents and the evidences for prosecution. A competent officer classifies and considers a case then issues an undecided case number. After that he/she inspects a plaint, the information is sent to a finance officer for a court fee calculation. When the inspection and the classification procedure are completed, the lawsuit will be handled on a case by case basis as follows:

- Rejected, a case is issued the decided case number and the document files are kept.
- Returned, a filing clerk informs a party to amend a plaint and re-send the documents.
- Accepted, the authority prepares the documents for a judge who owns the case. The judge then examines the witness and the documentary evidences.

When each phase finishes, every procedure in the court has to be recorded and kept in a file by a case-list officer and an archivist respectively. There are two case recording lists: If a lawsuit has been issued a decided case number, it is recorded in the Judgment-List. Otherwise it is put in the Case-List.
Figure 1. Plaint Receipt Workflow of General Civil Case at CIPITC
3. Framework Design

Our work aims at improving the efficiency of a case management process in terms of the correctness and the accuracy of data as well as time. We focus on the design in both the software structure and the system architecture domains. The following sections describe IT design framework and the adapted court workflow.

3.1. System Use Cases

In order to design a practical software system, we explore several use case scenarios. The actors can be categorized into two groups: court personnel and outside users. The court personal includes the management and the administrative users as well as the judges and court officers. The outside users include the general public who request the court service and the Supreme Court personnel. Figure 2 describes the use cases of the system. The court personnel manage the flow of the civil suit procedures via the document management module. They check and verify information of each lawsuit. They can also track cases and view public information the same way as outside users. There are six main actors in the system as briefly described below.

**Administrator:** Administrator monitors the entire system. One of the main tasks is to create and manage access groups. Sensitive information can then be protected. Only the authorized personnel are allowed to view the data. The other important task is a routine backup of case data.

**Authority:** This officer works with a judge and uses the system to view and prepare the case files. The main task is to process the lawsuit reports for a judge.

**Competent officer:** After a party filed a plaint, all documents have to be inspected by a competent officer. In addition, he/she has the duty to charge a court fee.

**Filing Clerk:** This officer is in charge of the announcement, commercial, writ issuance and case summon.

**Finance Officer:** Everything about financial records related to trials and cases is administered by a finance officer.

**Judge:** The judicial officer presides over a case filed to a court. He/she has to read and consider the plaint, request or appeal. Then examines a witness or documentary evidence and sums up a case. Other duties include the distribution of an owner file and reviewing of officer reports.

3.2. Software Structure

We design our software structure based on the Case Management System (CMS) concept [7, 8]. The software framework will be used to integrate isolated division, and enhance inter-office and customer services. The design goal is to facilitate the allocation of resources, manage judges’ workloads and time-tabling, list cases, and allocate courtrooms. Some parts of the software should be built based on the Web Service concept allowing other systems to request the services, such as checking case statuses and estimating case timeframes. The law firm should also be able to submit plaints and evidences on-line, which can save both time and money spending on traveling. In the court department, progress tracking and case allocation should be performed more efficiently with case data in hands. The software structure consists of five major modules, which is Database, Case Tracking, Electronic Search, Electronic Filing, and Document Management System. The structure is shown in Figure 3 and the brief descriptions of the modules can be presented as follows:
Figure 2. Use Cases Diagram of the system

Figure 3. CMS Structure

3.2.1. Database: Database is the most important module in the system. Every data and document from each law suit including the alteration of the data or process will be updated and kept in the database. The database is divided into two main parts: system user and lawsuit information. In order to access any service, end users have to register to the system. The user’s profile including permission is kept in the system user tables. The lawsuit tables keep the tracking number, plaintiff, defendant, and witness details.

3.2.2. Case Tracking: This module gives the court personnel an ability to review basic information about each legal matter, track legal fees, identify critical events and dates, and keep a running chronology of case status and progress. The module has a sophisticated security scheme to control all users’ privileges within the application. Figure 4 shows a UML sequence diagram of the main function in this module.
From the Figure, a party sends a username and a password through a web user interface. The information is verified by the authentication module. If the request is accepted, a party’s passport will be sent back. The passport along with an undecided case number can then be used to search for a case index. Next, the index number is sent to the information permission module and the user’s permission is verified. If the user is allowed to access the information, the module will send a request to the information retrieving component. The basic information of the case is then fetched from the system database. The data will be formatted into a report form before displaying. Moreover, while the party accesses the case information, the audit record is saved to the database for future reference. In other words, the system will create an audit trail in log files.

3.2.3. Electronic Search: This module is intended to provide services to general public as well as court personnel. Electronic search can be performed in several ways, such as searching for case or petition, person’s name, verdicts, and specific documents. This feature is accessible to all users. A keyword can be submitted to the E-Search system. The specified query is then performed and the data is returned from the database if found. The document management module can also be searched to find duplicate words in various documents. Thus, the searching results can come from either the database or the document management system. Our design uses a sequential method for searching that shown in Figure 5.

3.2.4. Electronic Filing: Electronic Filing is a process of filing court documents in an electronic format. We adopt the legal XML (eXtensive Markup Language) standards in designing the E-Filing system. The module can be integrated with various court case management components. With the XML standard, the attorney office can access all required form, submit the forms and additional documents through any standard web browser. The module can accept documents in various formats, including Microsoft Word, WordPerfect, PDF, and TIFF. Inside the module, each case’s documents can be forwarded directly to the appropriate judicial authority over secure channels. After the case is accepted, the case’s documents can enter the Document Management System.
The workflow of our Electronic Filing system is shown in a sequence diagram in Figure 6. When a party files a plaint, the documents are saved in the database. Next, a competent officer views and proofs the documents. He or she then classifies the case and calculates the fee. A finance officer checks the fee information via the Case Tracking module, updates the payment status of the party, and issues a receipt. Then, the plaint/documents are forwarded to a judge again via the Case Tracking module. After an initial reviewing of the case, a judge decides to reject, return or accept the plaint (actions described in section 2). Case data will be updated by several people along the workflow until the judge assigns the date for a trial. The verdict can also be recorded in the Filing system.

The Filing and the Case Tracking system work together, in order to achieve the electronic workflow.

3.2.5. Document Management System: This module involves managing the documents, which includes abilities to search, create, edit, delete, and retrieve documents electronically with appropriate access rights. Furthermore, the module can distribute the documents from one person to another along the document flow. A paper-based document should also be scanned, tagged, and stored in the main database as well. Authentication of the documents will also be considered. We design DMS to be able to classify and organize documents more easily, as well as to manage the complete lifecycle of the document. End users can access the system anywhere at anytime. Permission setting can be done in a user level, a group level, and a document level.

3.3. System Architecture

This section presents the design on system architecture. Since this system is intended to serve both court’s personnel and general public, several technologies including Web Service are investigated. We also have to consider the fact that the system will have to work in collaboration with other court’s information system, for example, the Court of Appeal and the Supreme Court. The case’s documents should be forwarded if requested in the case of lawsuit appealing. Several communication and security protocols are included in the design to provide a secured framework.

Figure 7 shows our overall system. The system users can be divided into 4 parts as annotated in the diagram, which are the officers of CIPITC (number 1), general public (number 2 and 3), the Court of First Instance’s personnel (number4) and high court’s personnel (number 5 and 6).
Server B could serve the main engine of the system. The court’s personnel can then access the data and all the software features through the Windows application installed on their authorized client machines. The service-oriented components that are meant for the users outside of the organization can be deployed in a separate server (server A in this case). Server A will take care of all the Internet traffics. RSS (Really Simple Syndication) [9] feeds can be made available at Server A also. Web traffics will go through HTTPS which is the secured standard protocol. Data are transmitted through Secure Sockets Layer (SSL) [10].

Figure 6. A Sequence Diagram for E-Filing
Web services can be invoked by different people. The user case examples are an attorney uploads the documents, and a citizen look for case status information. The personnel from the high courts can also access the case data through another set of services. Data will be transferred using an XML format. These services are provided through a standard web browser.

3.4. A New Plaint Receipt Process

After an IT support is put in place, our workflow of the court can be simplified without introducing a massive effect to the court process and people involved. We found that most evidences files in civil cases are in the form of documents. The time consuming paper processing and redundant process can thus be reduced along the judiciary workflow by converting paper documents into electronic forms at the beginning of the flow. From our design framework presented in the previous sections, the document management system can be employed in place of the Cast-List and the Archivist officers. The new workflow is presented in Figure 8. Information will be entered to the software system only once and automatically recorded to the database and distributed to all people involved. Access right and authentication modules can be utilized to protect the information.

Furthermore, we can remove the process of issuing the decided and undecided case number as these numbers can be generated automatically within system.

4. Prototype Implementation

Our implementation emphasizes the use of open source technology. MySQL was selected as our DBMS. With the presence of the service-oriented traffics over the Internet, NuSOAP toolkit was employed. NuSOAP handled SOAP [11] message creations and consumptions. System connection between the courts can be done through web services with XML and HTTPS. The user interfaces were implemented on PHP platform.

We chose DMZ (Demilitarized Zone) as a firewall in our system. Network consists of three parts: trusted internal network, DMZ network and the Internet network. Trusted
internal network is separated from the Internet network and services are only available for internal requests. DMZ network allows requests from both internal network and the Internet, but the requests are only accepted through specific rules. All data in the network is transmitted through Secure Sockets Layer (SSL). Trusted internal network and DMZ network are shown in server B and A respectively in Figure 8.

An RSS feed is one of the features provided in our system. This service is particularly suitable for users with limited resource. We used open source software to develop this feature. This service allows end users to check for new updates without having to access the web site every time. End users can subscribe to use this service from a web browser; RSS Readers can then checks for new content and downloads it if there is update. Furthermore, end users can separate desired information from undesired information, and also schedule to check for new content sporadically.

5. Software Usability Evaluation

Our software prototype has not been implemented at CIPITC for actual trail use yet. However, we have deployed the software on a test server and requested people from different background to use it. The usability results are presented in this section.

5.1. Evaluation Methodology

Quota sampling [12] was a technique we used in the usability evaluation process. A questionnaire was created and then used to evaluate the prototype system. The participants in our survey were divided into three groups. Group I is judges and officers (18 people). Group II is lawyer and legal counselors (15 people). Group III is IT personnel (17 people).

The survey method started with explanations about our ideas on software design. Then, the participants join in a system demonstration session and were asked to fill a questionnaire. Problems and suggestions were noted. Our evaluation questionnaire
consisted of 26 questions, which assessed three factors: efficiency, effectiveness, and satisfaction.

Saving time, cost, and resources are illustrations of the efficient system. We expected our system to be effective. In other words, the system should work accurately, reliably and securely. Satisfaction, although subjective can also reflect the users opinion of the system.

5.2. Discussion and Analysis

Table 1 displays the results of the average scores and the standard deviation. The score of the efficiency factor ranged from 3.4 to 3.7. Group III gave the highest score. The familiarity of the technology may be the reason why they believed in the use of the IT support system.

Group II was not directly concerned with the case management procedure so it was more difficult for the group to envision the usage. The efficiency score was thus lower. For group I, the objectives of the IT implementation were clear as they knew the existing problems and disadvantages of the current system. Thus, they gave a higher score for the efficiency factor than group II.

Table 1. The Average of Scores in each Group

<table>
<thead>
<tr>
<th>Target Group</th>
<th>Factor</th>
<th>Score Averages</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judge, Officer and Attorney</td>
<td>Efficiency</td>
<td>3.57</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>Effectiveness</td>
<td>3.67</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>Satisfaction</td>
<td>3.88</td>
<td>0.76</td>
</tr>
<tr>
<td>Lawyer and Legal Counselor</td>
<td>Efficiency</td>
<td>3.42</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>Effectiveness</td>
<td>3.82</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>Satisfaction</td>
<td>3.76</td>
<td>0.60</td>
</tr>
<tr>
<td>IT Personnel</td>
<td>Efficiency</td>
<td>3.63</td>
<td>0.82</td>
</tr>
<tr>
<td></td>
<td>Effectiveness</td>
<td>3.96</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>Satisfaction</td>
<td>3.83</td>
<td>0.69</td>
</tr>
</tbody>
</table>

Figure 9. The Average Scores of the Three Factors for all Participants
As for the system effectiveness score all groups gave a high score where the highest being group III (score 3.96). We may conclude that both indirect and direct users had positive opinions.

Lastly, we found that every group was satisfied with the system design, especially group I. This implied that the people who were directly involved with the court procedure were ready for a change and thought that the IT system would be beneficial.

Figure 9 displays the average results from all participants, which is presented in the form of a radar chart. The average values of efficiency, effectiveness, satisfaction were displayed in four angles. From the Figure 8, the survey results were favorable with the overall average value of 3.73. All participant groups had good attitudes toward the new system.

In addition, we used the Analysis of Variance (ANOVA) technique to analyze the three factors mentioned above. We used a 0.05 level of significance to determine the possibility of our hypothesis that there is no significant difference in the opinion among different group of participants. We analyze the result from ANOVA table with P value, if the score is less than P value at a significant level, the hypothesis will be rejected.

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS(x)</th>
<th>df</th>
<th>Mean Square</th>
<th>F₀</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>1.78</td>
<td>2</td>
<td>0.89</td>
<td>1.13</td>
<td>0.37</td>
</tr>
<tr>
<td>Error</td>
<td>34.89</td>
<td>47</td>
<td>0.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>669.75</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>1.86</td>
<td>2</td>
<td>0.93</td>
<td>1.58</td>
<td>0.28</td>
</tr>
<tr>
<td>Error</td>
<td>29.08</td>
<td>47</td>
<td>0.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>762.38</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction</td>
<td>2.25</td>
<td>2</td>
<td>1.13</td>
<td>2.11</td>
<td>0.26</td>
</tr>
<tr>
<td>Error</td>
<td>23.88</td>
<td>47</td>
<td>0.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>763.20</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows that the p-value of the efficiency, effectiveness and satisfaction were more than 0.05. We can thus say that there is no significant difference in the efficiency, effectiveness, and satisfaction of the system between groups. This implied that participants in each group do not have strong differences in opinions about the usability of the system. Most participants support the implementation of the system and we can thus conclude that the new system has high efficiency, effectiveness and satisfaction.

6. Conclusion

The objective in this research is to improve the court process by decreasing the time delay and expenses in case management. The initial framework focuses on supporting the work flow of the Central Intellectual Property and International Trade Court. The design framework emphasized the case management system. System security was also considered; the basic security (such as user permission) and DMZ were adapted. Software and system architectures were presented. After the detail design was concluded, a part of the framework was developed as a prototype. The usability study was then performed. Three factors, which are efficiency effectiveness and satisfaction, were evaluated. Although, the system was still a prototype, the evaluation results were favorable. The results also showed that our design was effective and would benefit several groups of people ranging from the court personnel to the general publics.
References

Venezuela, Norway, Netherlands and Italy”, Information Technology & Law Series, 
T.M.C.ASSER PRESS, pp. 20-27.
Langbroek (Eds.)”, The Challenge of Change of Judicial Systems, Developing a Public 
Administration Perspective, Amsterdam, IOS Press.
pp. 28-31.
[7] Case Management Software [Online], Available: 
[2008, February 14].
[2008, April 12].
[10] Halabi, N., Yurovitsky, B. and Karidi, L., SSL (Secure Sockets Layer) [Online], Available: 
http://www.w3schools.com/soap/default.asp [2007, February 25].
[2008, February 14].
Authors

Tiranee Achalakul received her B.S. degree in computer engineering from King Mongkut’s Institute of Technology Ladkrabang, Thailand, in 1994 and completed her Ph.D. in computer engineering from Syracuse University, New York, in 2000. After finishing her Ph.D., she joined the Johnson and Johnson Vision Care, Inc., USA, as a system developer. She is currently an associate professor and holding a department chair position at the Department of Computer Engineering, King Mongkut’s University of Technology Thonburi, Thailand. Her research interests include parallel and distributed computing, software engineering, grid technology, image processing and fusion, and data mining applications.

Pornpen Rungruangpattna received her B.S. degree and M.S. degree in computer engineering from King Mongkut’s University of Technology Thonburi, Thailand, in 2004 and 2008 respectively. Her research area includes software engineering and computer networks.