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A dynamic platform for workflow management system: a ward management perspective

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University of Wollongong

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A thesis submitted in (partial) fulfilment of the requirements for the award of the degree

Doctor of Philosophy

from

UNIVERSITY OF WOLLONGONG

by

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School of Information System and Technology
Faculty of Informatics
2010
I, Nantika Prinyapol, declare that this thesis, submitted in partial fulfilment of the requirement for the award of Doctor of Philosophy, in the School of Information Systems and Technology, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Nantika Prinyapol
31 March 2010
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LIST OF ABBREVIATIONS

AJAX  Asynchronous JavaScript and XML
AfC   Agenda for Change
ANA   American Nurses Association
ANMC  Australian Nursing and Midwifery Council
ASP   Active Server Pages
BPD   Business Process Discovery
BPM   Business Process Management
BPMN  Business Process Modelling Notation
DPWF M Dynamic Platform for Workflow Management
EN    Enrolled Nurse
FAS   Function Allocation Service
FS    Function Service
IPD   In-Patient Department
LAN   Local Area Network
LPN   Licensed Practical Nurse
NHS   National Health Service
NMC   Nursing and Midwifery Council (UK)
NMRA  Nursing and Midwifery Regulatory Authorities (AUS)
NP    Nurse Practitioner
NSW   New South Wales
OS    Operation System
PDA   Personal Digital Assistant
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHP</td>
<td>PHP: Hypertext Preprocessor</td>
</tr>
<tr>
<td>RN</td>
<td>Registered Nurse</td>
</tr>
<tr>
<td>RS</td>
<td>Recompilation Service</td>
</tr>
<tr>
<td>SOA</td>
<td>Service-Oriented Architecture</td>
</tr>
<tr>
<td>SOAP</td>
<td>Service-Oriented Architecture Protocol</td>
</tr>
<tr>
<td>TAFE</td>
<td>Technical And Further Education</td>
</tr>
<tr>
<td>UDDI</td>
<td>Universal Description, Discovery and Integration</td>
</tr>
<tr>
<td>UML</td>
<td>Unified Modelling Language</td>
</tr>
<tr>
<td>W3C</td>
<td>World Wide Web Consortium</td>
</tr>
<tr>
<td>WFM</td>
<td>Workflow Management</td>
</tr>
<tr>
<td>WPS</td>
<td>Work Profile Service</td>
</tr>
<tr>
<td>WSDL</td>
<td>Web Service Definition Language</td>
</tr>
<tr>
<td>XML</td>
<td>eXtensible Markup Language</td>
</tr>
<tr>
<td>YAWL</td>
<td>Yet Another Workflow Language</td>
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ABSTRACT

This research proposes a dynamic recompilation platform for a workflow management system to manage a hospital ward. Literature review has shown that ward management in hospitals and nursing care processes are complicated and it is not easy to design and develop a ward management system that is easy to use and one that suits requirements of any ward due to the complex nature of the hospital environment. A workflow management system that can be customised and recompiled is desired due to the dynamic nature of the nursing care process. This research investigates the feasibility of using web service technology to develop a workflow management system that enables a nursing supervisor to customise their work requirements using a dynamic recompilation technique. The two main features of the proposed system are customisation and dynamic recompilation. Customisation allows users to modify functions within the web service repository to suit individual tasks based on their work profile and situations, whereas dynamic recompilation allows multiple web service repositories to be recompiled and arranged into a new set of dynamic functional services when task assignment changes. This research proposes a framework of ward workflow management system using web services technology. We called the proposed system the dynamic platform for workflow management system (DPWFM) consisting of four web service repositories that include work profile service (WPS), function service (FS), function allocation service (FAS) and recompilation service (RS). There are three perspectives to the DPWFM: organisational, functional and procedural. The organisational aspect of the WPS defines the organisational roles of individual nurses in the hospital, the functional aspect of the FS describes tasks, activities and services to be performed and the procedural aspect of the FAS describes the allocation and assignment of tasks. The recompilation aspect of the
DPWFM is the RS that dynamically recompiles the function services using inputs from the WPS, FS and FAS to create an agenda workflow in the form of scheduled tasks to help nurses in organising and performing the assigned tasks. We will present a scenario to show how the dynamic recompilation of the DPWFM can be applied in a ward. The architecture of the proposed system consisting of three architectural layers of presentation, business logic and data layers will also be presented. The contribution of this research is the development of an innovative approach of using web services technology to manage workflow in the hospital ward.
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