Appendix A

Software Development Life Cycle Used in Cognitive KMS Deployment

Cognitive KMS Deployment Process Overview		
Project Owner	**Process Area:**	Scope
Anukul Tamprasirt, Project Manager	Deployment	Specifically to KMS

Process Objective: 1. To define Process for KMS Development
2. To define different types of task within project.
3. To provide common instructions for all task within projects.

Process No	Process Name	Process Description
DEV000	Overview of Processes for KMS Deployment for Cognitive Cluster Knowledge Management System.	Defines the KMS deployment overview of processes for the entire project tasks and common instructions necessary for the project team member.
DEV001	Preliminary Planning	To explain the guidelines and steps to prepare the schedule for the following processes: • Requirements Specification. • High Level Design.
DEV002	Requirements Specification	This process defines the requirement according to KMS IEEE Standard.
DEV003	Gap Analysis	This process explains various steps to do an analysis function needed within IEEE Standard and Modification necessary for Cynefin Framework
DEV004	High Level Design	This process explains various steps to do a system level design, to identify the architecture of the product.
DEV005	Detailed Analysis & Design	This process explains various steps to do detailed analysis and design.
DEV006	Set-up	This process explains various steps to setup the deployment environment as specified in the Software Project Management Plan (SPMP).
DEV007	Deployment	This process explains various steps to write compilation deployment conforming to specifications and standards.
DEV008	Test Plans	This process explains various steps

Process No	Process Name	Process Description
		to develop Unit and Integration Test Plans.
DEV009	Unit Testing & QC	This process explains various steps to carry out unit testing and to identify problems in individual modules.
DEV010	Integration & Integration Testing	This process explains various steps involved in integrating separate modules into the integrated system.
DEV011	Delivery / User Acceptance Test	This process explains various steps involved in releasing the trail to the CDA communities.
DEV012	Change Management	This process explains various steps involved in change management, fixing problems and incorporating user feedback.
TEC001	Hardware & Software Installation	This process explains the steps for the technical installation work.

Types of KMS Deployment Project

Software projects are classified into 'Standard' or 'Customization' depending on the effort involved to implementing the projects. Processes to be followed for these two types of projects are shown in section 3.0 of this document. However, if the estimated effort for the project is less than 6 person weeks and the output is used as a standard, the Project Lead is may define the process required to be followed for that project depending on the nature of the project.

1. 'Standard' Software projects

Standard Software projects are those projects for which the estimated effort for implementation of the project including the delivery phase is more than 6 person months or more than 3 calendar months.

2. 'Customization' development projects

Customization software projects are those projects for which the estimated effort for implementation of the project including the delivery phase is less than 6 person months and also less than 3 calendar months and/or specific requirement deviated from standard processes required.

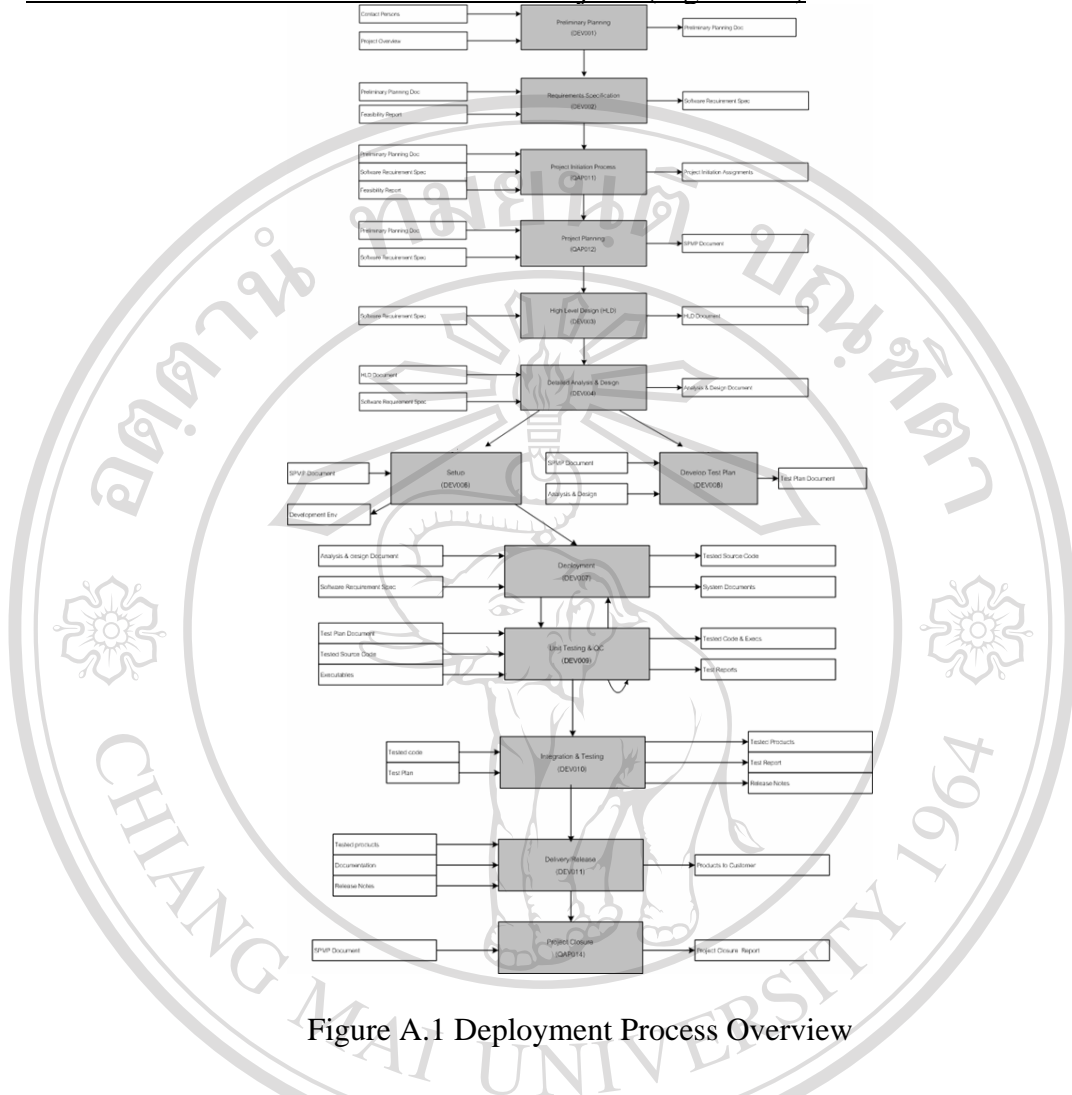Process Overview for "Customization" Projects (Figure A.1)

Figure A.1 Deployment Process Overview

1. DEV001-Preliminary Planning

Microsoft Project was used to create the preliminary project plan for KMS deployment. The total project was estimated to take around 6 man months. The overview detail project is in the following figure (figure A.2)
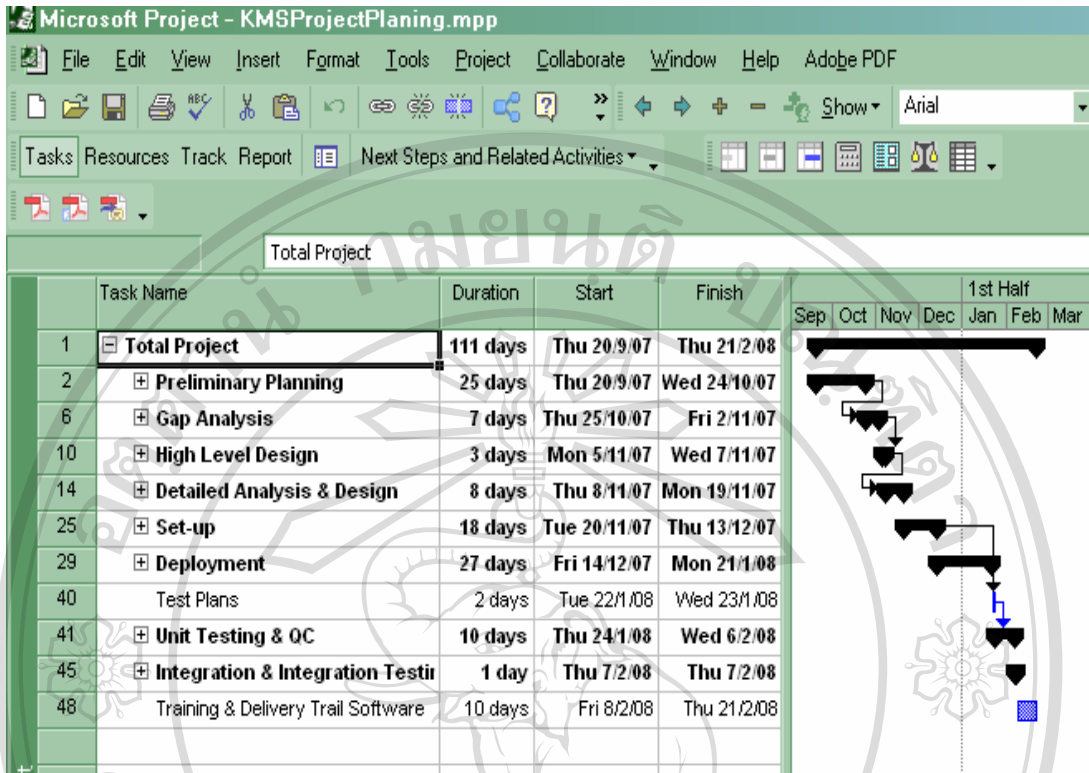
Figure A.2 Project Overview

1.1 Detail Project Plans (Table A.1)

Table A.1: Detail Tasks

Tasks	Day
Preliminary Planning	25
Requirements Specification	3
Content Identification Process	20
High Level Design Overview	2
Gap Analysis	7
IEEE KMS Analysis	1
Cognitive Knowledge Model	5
KMS Deployment Overview	1
High Level Design	3
Cynefine Databank	1
Cognitive Cluster System	1
Cluster Knowledge Databank	1
Detailed Analysis & Design	8
Cynefin Databank	1
Cynefin Framework	1
Cognitive Cluster Navigation	1
Cognitive Cluster System	6
Government Subsystem	3
Firm Subsystem	3
Cluster Knowledge Databank	1

| Tasks	Day
Theoretical Models	1
Implementation Models	1
Knowledge Management In Used	1
Set-up	18
Hardware-System Software	10
KMS Configuration and Add-On	5
User Security	3
Deployment	27
Cynefin Databank	2
Cynefin Framework	2
Cognitive Cluster Navigation	2
Cognitive Cluster System	14
Government Subsystem	7
Firm Subsystem	7
Cluster Knowledge Databank	11
Theoretical Models	3
Implementation Models	3
Knowledge Management In Used	5
Test Plans	2
Unit Testing & QC	10
Cynefin Databank	2
Cognitive Cluster System	5
Cluster Knowledge Databank	3
Integration & Integration Testing	1
Cognitive Cluster Navigation	1
Cognitive Cluster System Flow	1
Training & Delivery Trail Software	10

2. DEV002-Requirements Specification

The following is the requirement specification needed to implement Cognitive Cluster System

1. IEEE Standard Requirements for Knowledge Management System
   1.1 Knowledge Map
   1.2 Knowledge Map Instruction and Help
   1.3 Document Management System
   1.4 Forum Discussion System
   1.5 Capability Management System [Know-Who-Know-What]
   1.6 Lesson Learned Knowledge Base System
   1.7 Content Management System for Photo, Video and/or Multimedia

2. Cognitive Knowledge Model

The following Figures (Figures A.3) is the Cynefin Framework color definition to be used as for the Cognitive Knowledge Navigation System implemented by KMS.
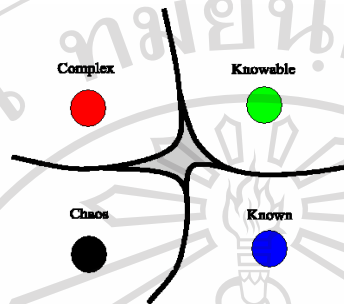
Figures A.3 Color Code Definition

2.1 KMS Deployment Function
      2.1.1 IEEE Standard Requirements
      2.1.2 Cognitive Knowledge Navigation System
      2.1.3 Cynefin Databank
      2.1.4 Cognitive Cluster System
      2.1.5 Cluster Knowledge Databank

3. DEV003-Gap Analysis

System analysis method to verify the necessary implementation needs to satisfy the requirement specifications.

3.1 Requirements
      3.1.1 IEEE Standard Requirements
      3.1.2 Cognitive Knowledge Navigation System
      3.1.3 Cynefin Databank
      3.1.4 Cognitive Cluster System
      3.1.5 Cluster Knowledge Databank

3.2 The Analysis (Table A.2)

Tab A2: Analysis of Requirements

Requirements	Implementation
IEEE Standard Requirements	Content Management Software Selection
Cognitive Knowledge Navigation System	Design Navigating System
Cynefin Databank	Deploy CMS Subsystems
Cognitive Cluster System	Deploy CMS Subsystems
Cluster Knowledge Databank	Deploy CMS Subsystems

4. DEV004-High Level Design

An overview of high level design for KMS using Cynefin Framework with Cognitive Knowledge Navigation System

4.1 High Level Design

4.1.1 Cognitive Knowledge Navigation System
The dynamic navigation to ontology page with the following guidelines (Figure A.4)
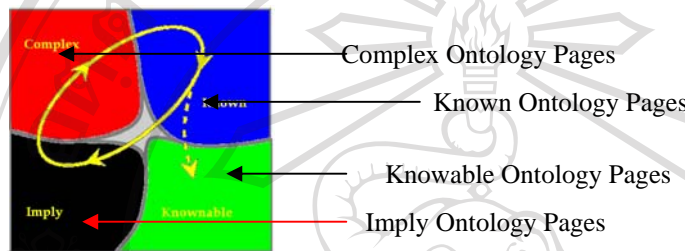

Figure A.4: Navigation Color Code System

4.1.2 Knowledge Map Design using dynamic navigation system (Figure A.5)
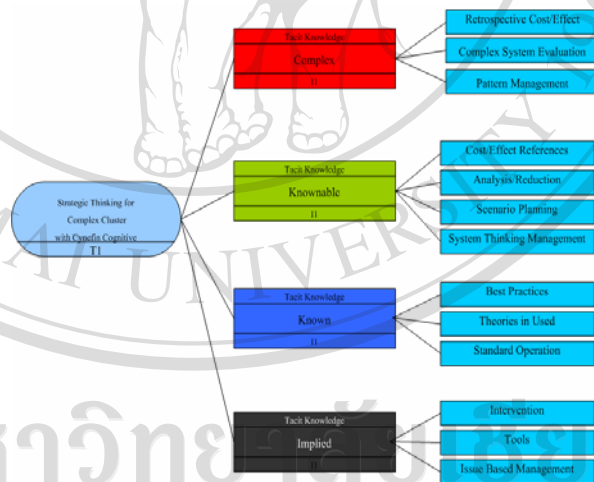

Figure A.5: Color Code Knowledge Map

4.1.3 KMS System Design Consists of
4.1.3.1 Cynefin Databank (Cynefin Knowledge Center and Legend of Navigation System)
4.1.3.2 Cognitive Cluster System (Dynamic Cluster System)
4.1.3.3 Cluster Knowledge Databank (Cluster Knowledge Center)

5. DEV005-Detailed Analysis & Design

The detailed Analysis & Design Process focuses on the design system architecture using compliance content management system available.

5.1 Cynefin Databank contains various information, knowledge and various media collected
    5.1.1 Cynefin Framework
    5.1.2 Cognitive Cluster Navigation

5.2 Cognitive Cluster System is the main system for KMS consists of 12 subsystems. Each subsystem classified by the color code which can be dynamically access via the knowledge map from each subsystem. The contain in each subsystem based upon its, classification ranges from complex to imply (Figure A.6)

5.2.1 Cognitive Knowledge Navigation System

Design Detail of Cognitive Knowledge Management with dynamic navigation system (Figure A.6)
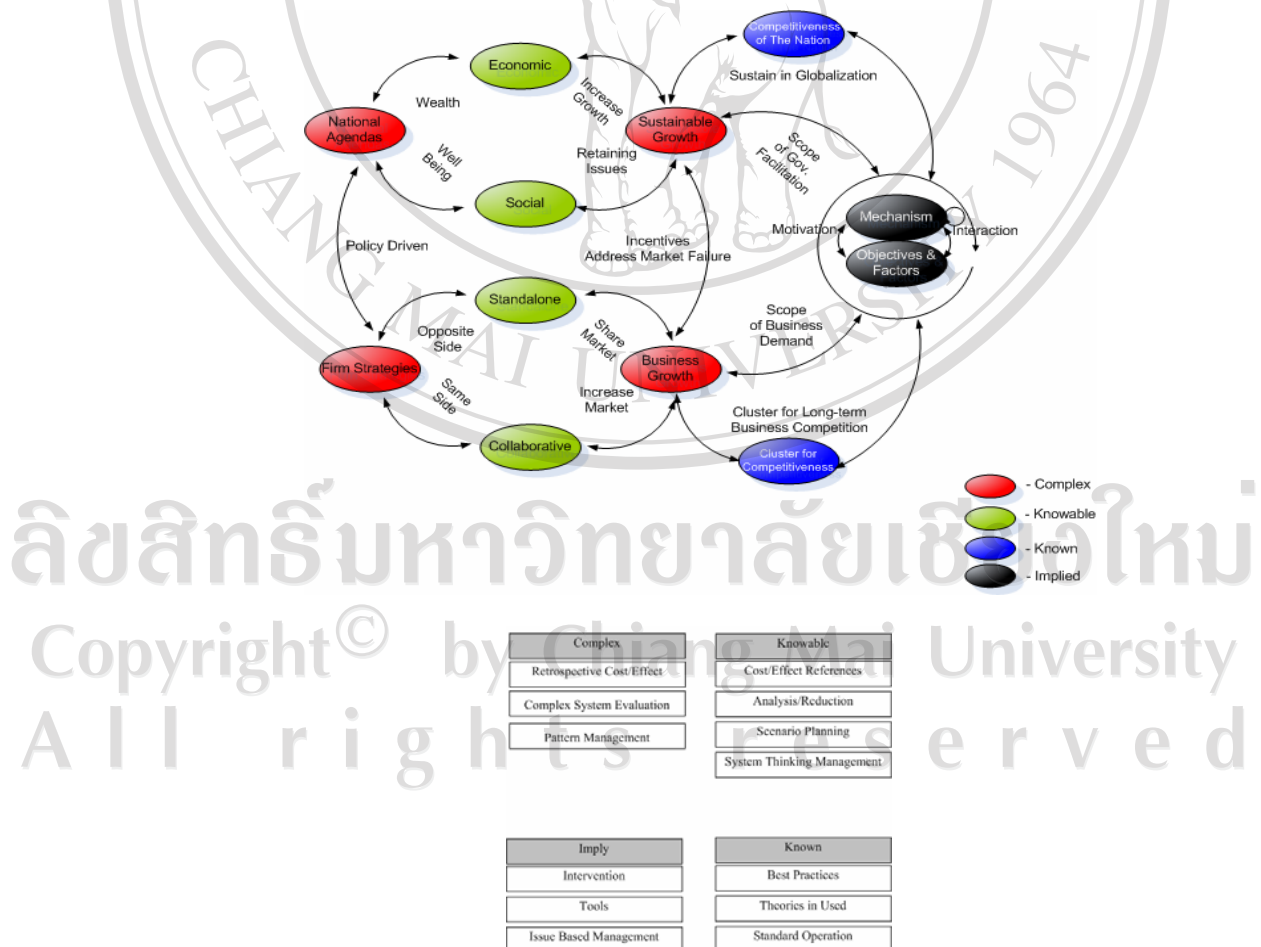

Figure A.6: Dynamic Cognitive Knowledge Map

5.2.2 Subsystem Functions
5.2.2.1 Government Subsystem
5.2.2.2 Firm Subsystem

5.3 Cluster Knowledge Databank contains various knowledge, information and media collected.
5.3.1 Theoretical Models
5.3.2 Implementation Models
5.3.3 Knowledge Management In Used

5.4 KMS Design

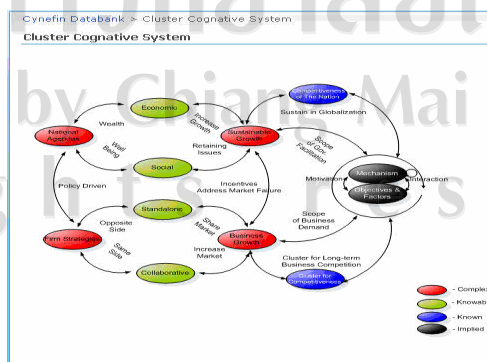5.4.1 Top Menu Frame (Figures A.7)

Figures A.7 KMS Top Menu Frame

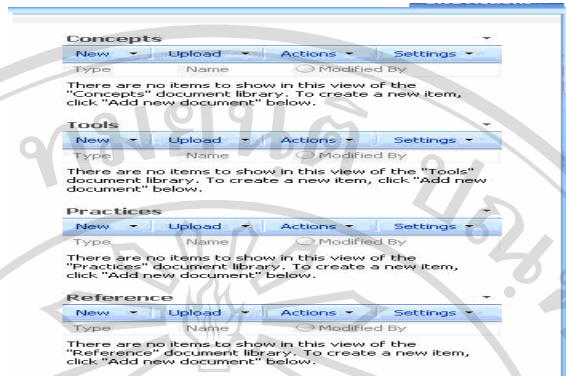5.4.2 Left Menu Frame (Figures A.8) in each subsystem

Figures A.8 KMS Left Menu Frame

5.4.3 Top Zone (Figures A.9) is the main idea in each page, for examples, the knowledge map of cluster cognitive system in the 2nd subsystem.
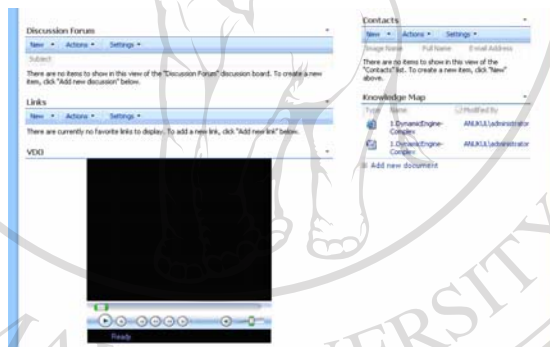

Figures A.9 KMS Top Zone

    5.4.4 Middle Left/Right Zone (Figures A.10) consists of the necessary knowledge and information related in each page of the system.

Figures A.10: KMS Middle Left/Right Zone

    5.4.5 Bottom Zone (Figures A.11) is another part of knowledge and information used in each page this part of the page may also include the multimedia and video content related.

Figures A.11 KMS Bottom Zone

6. DEV006-Set-up

   This process including preparation, selecting Hardware-Software (TEC001), installation and configuration of various environment to support KMS deployment.

6.1 Hardware & System Software Setup

6.1.1 Server Specification

1. PC Base Server using Intel Pentium4 3.0 GHz as the main processor
2. Memory Capacity of 2048 MB
3. Storage Capacity of 40 GB
4. Read/Writable CD Rom
5. Network Interface Capacity of 100 MBPS
6. 15 Monitor
7. Keyboard, Mouse and Peripherals
8. UPS

6.1.2 Client Device Specification
      1. PC Desktops or Notebooks Clients using at least Intel Pentium 700 MHz as the main processor

      2. Memory Capacity of 256 MB

      3. Internet or Local area Network Access

      4. Keyboard, Mouse and Peripherals

6.1.3 Software Specification

6.1.3.1 Server Software Specification
      1. Microsoft Windows Server^{TM} 2003 Standard, Enterprise, Datacenter or Web Edition equipped with Service Pack latest upgrade (This service packs is essential for SharePoint Portal Server 2003

      2. Windows Server 2003 Web Edition Requires to install Microsoft SQL Server^{TM} 2000 on a different server.

      3. Microsoft Internet Information Services (IIS) 6.0

6.1.3.2 Microsoft Office SharePoint Portal Server 2003 Requirements
      1. SharePoint Portal Server 2003 including Microsoft SQL Server 2000 Desktop Engine (MSDE 2000). Microsoft SQL Server 2000 Standard Edition or Enterprise Edition with most up-to-date Service Pack is required for better through put and performance (with SharePoint Portal Server 2003 on Domain Controller Server this must be used with SQL Server 2000 Standard Edition or Enterprise Edition with the most up-to-date Service Pack)

      2. SharePoint Portal Server 2003 must be a member of the Domain in Microsoft Windows NT® 4.0, Windows® 2000 or Windows Server 2003

6.1.3.3 Microsoft SQL Server 2000 Enterprise Edition Requirements
      1. Microsoft Windows NT® Server 4.0 operating system with Service Pack 5 or higher, Windows NT Server 4.0 Enterprise Edition with Service Pack 5 or higher, Windows 2000 Server, Windows 2000 Advanced Server or Windows 2000 Datacenter Server

      2. Microsoft Internet Explorer 5.0 or higher

6.1.4 Client Specification
      1. In order to use KMS, Microsoft Internet Explorer 5.01/5.5/6.0 with the most up-to-date Service Pack must be installed on the clients

      2. Microsoft Office Visio 2003 (Optional)

      3. Microsoft Office 2003 Edition (Optional)

6.2 Setup Function

6.2.1 Administrative Functions

6.2.1.1 Manage User: Knowledge workers and Community of Practice Management
      1. Contributor role for managers and experts

      2. Content Manager role for knowledge engineer

      3. Reader role for knowledge workers

4. Administrator role to manage Community of Practice Areas, User and Security

6.2.1.2 Manage Area: Access Control

1. User Community Access Right: Multilevel Rights for the different categories of users in each community of practices

6.2.2 Community Functions
6.2.2.1 Topics in each Community of Practice

1. Areas
Each Community of Practice Home
1.1 Top Frame
1.2 Middle Left Frame
1.3 Middle Right Frame
1.4 Bottom Frame

2. List of Knowledge Based
1. knowledge map (Cynefin Framework Representation)
2. Reference documents (Repository)
3. General Discussion forum
4. Contacts for capability management system
5. lesson learned knowledge, Best Practice, Story Telling
6. Portal Link
7. Picture and Multimedia Electronic Document Library for Case Study, Image knowledge
8. Knowledge Map Instruction and Help for Knowledge Worker

3. List of Decision Support Collaboration
1. Web Part Feature for Knowledge Map
2. Tasks involved in Community of Practice Activities
3. Problem Issues
4. General Discussion for decision support system (Bi-direction)

4. List of Communication within a Community of Practice
1. Events Feature for meeting, training, seminar, ceremony, appointment
2. Announcement related to the Community of Practice
3. News

6.2.3 Knowledge Worker Public Service Function
6.2.3.1 Public Feature
1. User Profile for knowledge workers
2. Shared Workspace for decision support and collaboration for knowledge workers
3. Shared Documents for community of practice useful documents
4. Shared Link for useful links which related to Community of Practice

Knowledge Worker Private Desktop Function

6.2.3.2 Private Feature
1. My Calendar Feature
2. News
3. My Links Summary for private useful links
4. Links for my Portal
5. My Alerts Summary Feature
6. Private Documents for private useful documents
7. Shared Documents for corporate useful documents
8. My Picture Feature for private pictures

6.2.4 Search Function

Search Communities of Practices, Task, Inference, Knowledge Base by Name or Code

6.2.4.1 Advanced Search by Combination Keywords
1. Search by Type (Area Items, Area, Document Library, Documents, Lists, People, Picture Library and Pictures)
2. Search by Properties (Description, Title, URL)
3. Search by Date (Modified in Last Hour(s))

6.2.4.2 Meta Data Search (WebDAV)
Web Distributed Authoring and Versioning allows user to transparently publish and manage resources on the World Wide Web.

6.2.4.3 Content Search and External Content Search

7. DEV007-Deployment

Deployment KMS with Microsoft Sharepoint Content Management System (CMS), the Cognitive Knowledge Management System consists of the following subsystems:

7.1 Cognitive Cluster Complex System (Main)
7.1.1 Government Subsystem
1. Gov-EconomicGoverningFactors
2. Gov-NationalAgendas
3. Gov-SocialImplicationFactors
4. Gov-SustainableGrowth
5. CompetitivenessofTheNation
7.1.2 Firm Subsystem
1. Firm-BusinessGrowth
2. Firm-Collaborative
3. Firm-StandAlone
4. FirmStrategies
5. ClusterForCompetitiveness

7.1.3 Cluster Core
1. ClusterMechanism
2. ClusterMotivation
3. ClusterObjectivesAndFactors

7.1 Knowledge Drawer

Knowledge Drawer Approaches will be used for the easy access. Knowledge Map and dynamic navigation of Cognitive Cluster System will be deployed by linkage and design template features of CMS. The following is a sample of deployment process using Sharepoint (Figure A.12)
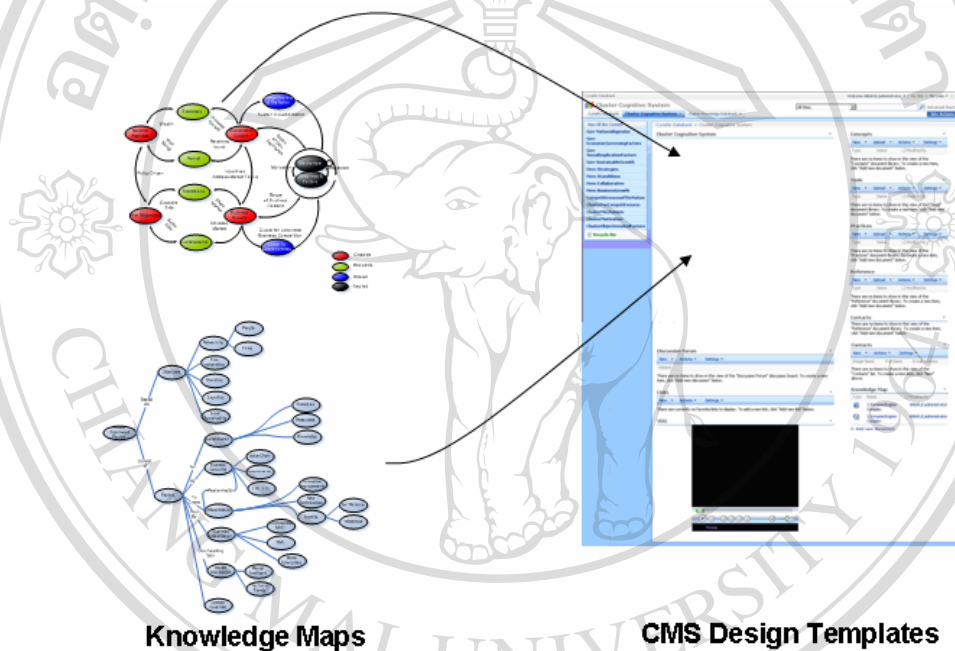
Knowledge Maps   **CMS Design Templates**

Figure A.12 Deployment Process

8. DEV008-Test Plans

8.1 Test Planning

Test Plan consists of Cognitive Cluster System
1. Requirement Specification
2. Detail Design
3. Test Case (Data Planning and Acquisition)
4. Validation Check List
    4.1 Validation Requirement
    4.2 Validation of Data
    4.3 Validation of Function
    4.4 Ease of Used
    4.5 Further Recommendations

Reference Information
1. Dev02 (Requirement Specification)
2. Dev05 (Detail Design)

8.2 Test Cases
1. Chiang Mai Northern Clusters information, media and reference best practices
2. Makhong Clusters information, media and reference best practices
3. Seminars and Events from various meeting within the test cases
4. External Information and Web Links

8.3 Validation Check Lists

Duty Test (Role Base Validation) Table A.3

Table A.3: Duty Test Check List

DT-1 Management Role (Contributer)
Conduct Task
Create Cluster Senario
Conduct Decision
DT-2 Expert Role (Contributor)
Suggestion (CoP/Task/Inference Level)
Knowledge Base Contribution
Response to Task, Senarios, Forum, Alert, Help Me, Asking
Community Contribution
DT-3 Knowledge Engineer Role (Content Manager)
Content Management (Create List, Screen Layout)
Knowledge Base Maintenance/Contribution
Community Management
DT-4 Knowledge Worker Role (Reader)
Help Me (Support Empowerment)
Teach Me /Learning

Function Specification Test (Function Base Validation) Table A.4

Table A.4: Function Base Validation

FS-1 Administrative Function
FS-1.1 Manage User
- Application Administrator
- Contributor Role
- Content Manager
- Reader
FS-1.2 Manage Area
- CoP Based Security
FS-2 Community Function

FS-2.1 Topics of CoP
FS-2.2 Areas
- Top Frame
- Middle Left Frame
- Middle Right Frame
- Bottom Frame
FS-2.3 List of Knowledge Base
Document Library for Knowledge Map
Document Library for Document Management System (Repository)
View Page Web Part for Document Management System in each Cynefin Classification
View Page Web Part for Document Management System in each Cynefin Classification
General Discussion Forum
Contacts

8.4 Validation Guidelines
1. Proper
2. Fair
3. Poor
4. Others (Comments)

9. DEV009-Unit Testing & QC

Upon the test plan and test configuration the following is the result from Test records collected

9.1 Duty Test (Table A.5)

Table A.5: Duty Test Records

Issue	Proper	Fair	Poor	Comment
DT-1 Management Role (Contributer)				
Conduct Task		X		Share Point Features
Create Cluster Senario		X		Share Point Features
Conduct Decision		X		Share Point Features
DT-2 Expert Role (Contributor)				
Suggestion (CoP/Task/Inference Level)	X			
Knowledge Base Contribution	X			
Response to Task, Senarios, Forum, Alert, Help Me, Asking		X		
Community Contribution		X		Need further Improvement for more

Issue	Proper	Fair	Poor	Comment
				complex situations
DT-3 Knowledge Engineer Role (Content Manager)				
Content Management (Create List, Screen Layout)		X		Share Point Features
Knowledge Base Maintenance/Contribution		X		Share Point Features
Community Management		X		Share Point Features
DT-4 Knowledge Worker Role (Reader)				
Help Me (Support Empowerment)		X		
Teach Me /Learning		X		

Function Specification Test (Table A.6)

Table A.6: Function Specification Test Records

Issue	Proper	Fair	Poor	Comment
FS-1 Administrative Function				
FS-1.1 Manage User - Application Administrator - Contributor Role - Content Manager - Reader		X		
FS-1.2 Manage Area - CoP Based Security		X		
FS-2 Community Function				
FS-2.1 Topics of CoP	X			
FS-2.2 Areas - Top Frame - Middle Left Frame - Middle Right Frame - Bottom Frame		X		
FS-2.3 List of Knowledge Base				
Document Library for Knowledge Map		X		
Document Library for Document Management System (Repository)		X		
View Page Web Part for Document Management System in each Cynefin Classification	X			Associated with Color Code Coordination Schemes
View Page Web Part for Document Management System in each Cynefin Classification	X			Associated with Color Code

Issue	Proper	Fair	Poor	Comment
				Coordination Schemes
General Discussion Forum		X		
Contacts		X		

Notes:

Test results on both DT and FS illustrated fair adequate ease of use and functional requirement. This system can be further enhanced to support more complex community practice in which advanced programming may be required i.e. online ontology update with automatic synchronization update CMS.

10. DEV010-Integration & Integration Testing

Integration & Testing for Cognitive KMS deployment consists of the following
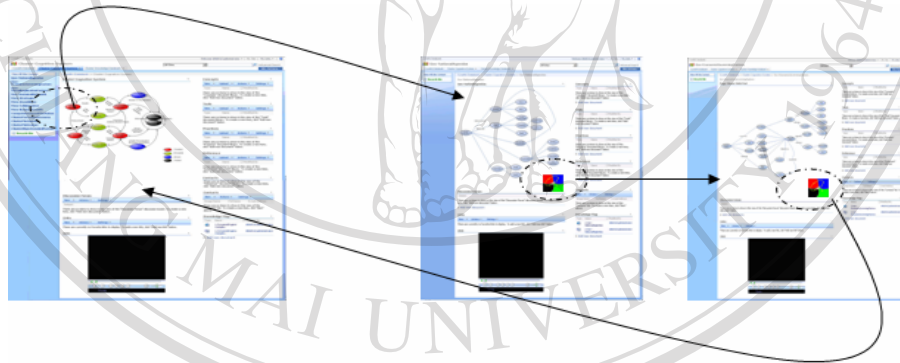
    1. Navigation Flow (Figure A.13)

Figure A.13: Navigation Loop Test

    2. Referencing Data Bank to either (Figure A.14):
      2.1 Cynefin Data Bank
      2.2 Competiveness Data Bank
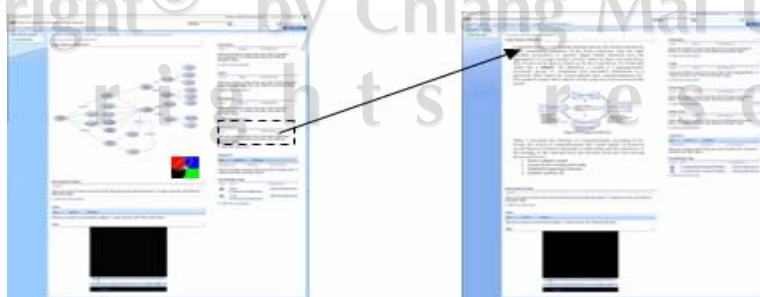

Figure A.14: Referencing Test

Notes:

Integration test result is adequate for ease of use and navigation. This system can be further enhanced to support more complex dynamism when investing more details in messaging and discussion functional requirements by which out of the scope for this deployment.

11. DEV011-Delivery / User Acceptance Test

Cognitive KMS deployment is a output of the dynamic knowledge modeling research. It is intended to apply the best software engineering practice for this deployment to create the working prototype within a limited timeframe. This prototype is not considered as a direct path to permanent product development and some software engineering tasks will need to be reevaluated otherwise. As the conclusion, "CognitiveClusterSystem" delivered here is a trial software version V0.1

Delivery and User Acceptance Test (UAT) can be separated into the following
1. Training
   1.1 CMS Administrative
        1.1.1 CMS configuration
        1.1.3 CMS content management
                1.1.3.1 Template Management
                1.1.3.2 Text
                1.1.3.3 Multimedia
   1.2 CMS Usage
2. Transfer the ownership from development team to project owner
3. Cut Over and Maintenance (when necessary and within limited time frame)

CURRICULUM VITAE

Name: MR. ANUKUL TAMPRASIRT

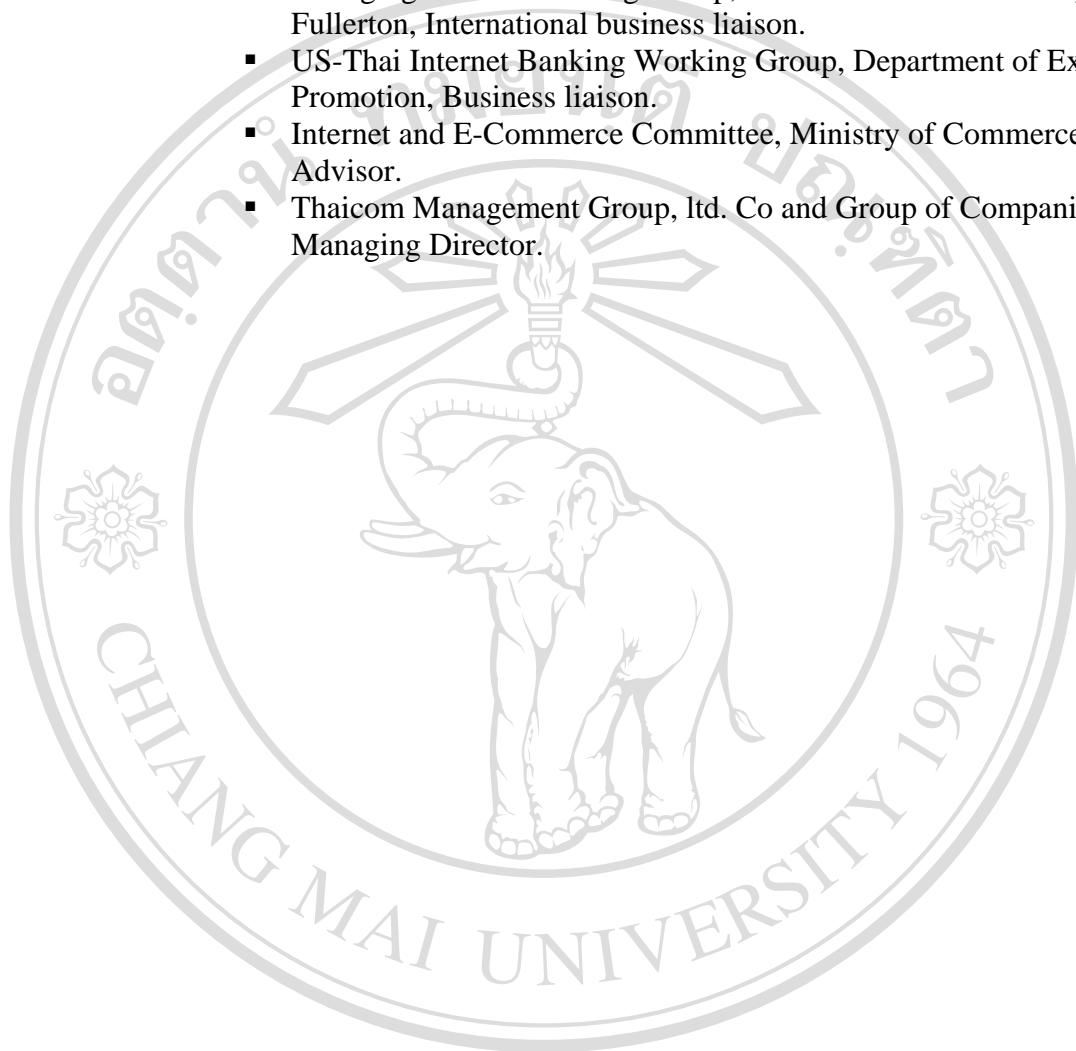**Birth:**   March, 31 1960

EDUCATION:

1982   BS, Horticulture, Kasetsart University
1984   MS, Computer Sciences, Memphis State University, USA

CARRIER ACHIEVEMENT (2000 – Present):

- The Federation of Thai Industries, Deputy General Secretary.
- The Institution of Software Promotion for Industries, Chairperson of the management board.
- Ministry of National Resources and Environment, Technical Advisory Team Member.
- Software Industry Club, The Federation of Thai Industries, Chairperson
- Regional Cluster Development, Fiscal Policy Office, Ministry of Finance, Project Director.
- Thailand Investor Services, Ministry of Finance, Director.
- International Trade Center, World Trade Organization, Resource Person.
- The Association of Thai Software Industry, Honorable President.
- The Association of Thai Software Industry, President.
- The Thai Federation of Information Technology, President.
- Foreign Investment Evaluation Subcommittee, Department of Business Development, Ministry of Commerce, Member of the Board.
- Software Engineering Subcommittee, Thailand Industrial Standards Institute, Ministry of Industry, Chair Person.
- Information Technology Subcommittee, Asset Capitalization Bureau, Member of the Board.
- Software Promotion Agency, Ministry of ICT, Member of the Board.
- GS1 Thailand, Federation of Thai Industries, Member of the Board.
- Information and Communication Technology Committee, Thai Chamber of Commerce, Member of the Board.
- E-Industry Advisory Board, Minister of ICT, Member of the Board.
- National Electronic and Computer Technology Center, Ministry of Science and Technology, Member of the Board.

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- Private Public Partnership Working Group, Ministry of ICT, Assistance to the Secretary.
- Emerging Market Working Group, California State University at Fullerton, International business liaison.
- US-Thai Internet Banking Working Group, Department of Export Promotion, Business liaison.
- Internet and E-Commerce Committee, Ministry of Commerce, Advisor.
- Thaicom Management Group, ltd. Co and Group of Companies, Managing Director.