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# Digital Document Management System

## Features

The features of Digital Document Management System (DDMS) are categorized as follows:

**Must-Have:**

These are the features which are absolutely mandatory in any document management system considering the requirements of ACIL. The features are listed below:

1. **Version Control** – DDMS should maintain both the major and minor version of all documents maintained in the system
2. **Document History** – DDMS should be able to restore previous versions of the document if so required
3. **Central Repository(File Based)** – the repository of documents should be maintained in a file system based repository
4. **User** **Management**- the DDMS should allow creating user-profiles and associate new users to these profiles.
5. **Document** **Locking** – The system should allow locking the documents for editing so that at the same time, two or more users do not edit the same document at the same time
6. **Security** **/ Access Control** – the DDMS should allow flexible security and access options for the document. Each user should have its own unique login and only authorized users should be able to access the document
7. **Search** **Documents** – The DDMS should allow searching for a document on flexible parameters
8. **Search** **Folders** – It should also allow searching for a folder
9. **Web**-**Based** – It should be a web-based application and not a desktop-based application
10. **Metadata** – DDMS should allow to pre-define multi-hierarchy metadata tags for a single document or a group of documents
11. **Rest /SOAP API** – DDMS should have a ready API to integrate with third-party applications
12. **Source Code Availability** – Complete source code of DDMS should be available for any customization in future
13. **Custom Reports** – The system should have the flexibility to create own reports as required
14. **Antivirus** – The system should integrate with other antivirus systems in order to scan documents that get added to DDMS
15. **Download Restrictions** – The system should have a provision to restrict downloads of any document if so required.

**Good to Have:**

These are the features in a DDMS which are not must, but it is good to have them in order to provide a better user experience. The core functionality of DDMS does not get affected due to their availability or lack of it.

1. **Subscriptions (For Notifications)** – The DDMS should preferably have a feature for subscribing to notifications for any change in the document.
2. **Mobile** **Interface** – The UI of DDMS should preferably be compliant to mobile devices
3. **Mobile** **App** – The DDMS should preferably have an Android and iOS app
4. **Templates** – The DDMS should preferably have a provision to create templates based on which documents could be created
5. **Saved** **Search** – The DDMS should preferably have a provision to save the frequent search conditions
6. **Drag** **&** **Drop** **Documents** – The system should preferably provide a user-friendly drag & drop feature to upload documents.
7. **Document** **Preview** – The system should preferably allow previewing the document within the application before opening them
8. **Microsoft Add-ins** – The DDMS should preferably have a plugin with Microsoft to track the changes done directly through DDMS
9. **Integrated HTML Editor** – The system should preferably have an in-built editor for HTML Content
10. **Integrated Text Editor** – It should also preferably have an in-built text editor
11. **Integrated Database Query Executor** – This feature is useful to administrators to directly query the database in case of any reported problems.
12. **Workflows** – The system should have an inbuilt workflow engine to define custom workflows for any document
13. **Document** **Sharing** – The users should preferably have a provision to share the documents with other users
14. **Document** **Conversion** – The system should preferably have provision to convert documents between multiple formats
15. **Personal** **Documents** – The DDMS should preferably have a provision for the user to store personal or work documents if any.
16. **Email** **Notification** – The system should preferably send automatic email notifications in case of any change in the document or folder
17. **LDAP** **& Active Directory** – It should preferably integrate with LDAP and Active Directory for authentication
18. **Thesaurus** – The system should preferably integrate with a third-party open-source thesaurus for content validation
19. **CMIS** – The system should preferably integrate with CMIS compliant systems
20. **Document** **Expiry** – It should preferably have a provision to specify the expiry date of the document
21. **Activity** **Log** – It should preferably store each and every activity of the user in the system

## DDMS Comparison

A comparison of available Document Management Systems was done based on the following criteria:

1. It should have a Community Edition with complete source code availability
2. It should Maximum Features out of the above-listed ones should be available

Following open source DDMS were verified. These DDMS were identified based on their ranking on various sites on the internet:

1. **LogicalDoc** Community Edition
2. **OpenKM** Community Edition
3. **OpenDocMan** Community Edition
4. **Alfresco** Community Edition

The outcome of the verification of each DDMS and their comparison are listed below:

| **S No** | **Category** | **Feature** | **LogicalDoc CE** | **OpenKM CE** | **OpenDocMan CE** | **Alfresco CE** |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | Must-Have | Version Control | Yes | Yes | Yes | Yes |
| 2 | Must-Have | Document History | Yes | Yes | Yes | Yes |
| 3 | Must-Have | Central Repository - File Based | Yes | Yes | Yes | Yes |
| 4 | Must-Have | User Management | Yes | Yes | Yes | Yes |
| 5 | Must-Have | Document Locking | No | Yes | Yes | Yes |
| 6 | Must-Have | Security / Access Control | Yes | Yes | Yes | Yes |
| 7 | Must-Have | Search Documents | Yes | Yes | Yes | Yes |
| 8 | Must-Have | Search Folders | No | Yes | No | Yes |
| 9 | Must-Have | Web-Based | Yes | Yes | Yes | Yes |
| 10 | Must-Have | Metadata | Yes | Yes, XML Based | Yes | Yes |
| 11 | Must-Have | Rest /SOAP API | Yes | Yes | No | Yes |
| 12 | Must-Have | Source Code Availability | Yes | Yes | Yes | No |
| 13 | Must-Have | Custom Reports | Yes | Yes, Tabular, Programmable | No | ? |
| 14 | Must-Have | Antivirus | Third-party Integration | Third-party Integration | No | ? |
| 15 | Must-Have | Download Restriction | Yes | Yes | Yes | ? |
| 16 | Good to Have | Subscriptions (For Notifications) | No | Yes | No | ? |
| 17 | Good to Have | Mobile Interface | No | Basic UI Compatibility | No | Yes |
| 18 | Good to Have | Mobile App | No | No | No | Yes |
| 19 | Good to Have | Templates | Yes | Yes | No | ? |
| 20 | Good to Have | Saved Search | No | Yes | No | No |
| 21 | Good to Have | Drag & Drop Documents | No | No | No | Yes |
| 22 | Good to Have | Document Preview | Yes | Basic (Only Text, image, PDF, OpenOffice) | Yes | Yes |
| 23 | Good to Have | Microsoft Addins | No | Yes (Keep track of documents opened with MS Office) | No | Yes |
| 24 | Good to Have | Integrated HTML Editor | No | No | No | No |
| 25 | Good to Have | Integrated Text Editor | No | No | No | No |
| 26 | Good to Have | Integrated Database Query Executor | No | Yes | No | No |
| 27 | Good to Have | Workflows | No | Yes, XML Based | Yes | Yes |
| 28 | Good to Have | Document Sharing | No | No | No | Yes |
| 29 | Good to Have | Document Conversion | No | PDF, HTML through TPP | No | PDF |
| 30 | Good to Have | Personal Documents | No | Yes | No | Yes |
| 31 | Good to Have | Email Notification | Yes | Yes | No | ? |
| 32 | Good to Have | LDAP & Active Directory | No | Yes | No | No |
| 33 | Good to Have | Thesaurus | No | Add new, Not in-built | No | No |
| 34 | Good to Have | CMIS | Yes | Yes | No | Yes |
| 35 | Good to Have | Document Expiry | No | No | Yes | ? |
| 36 | Good to Have | Activity Log | Yes | Admin Level | Yes | ? |
| 37 | Others | Technology Stack | Spring, Hibernate and AJAX | Java, Spring, Hibernate, Jasper reports | PHP | Java |
| 38 | Others | Databases Supported | MySQL, Postgre SQL, Oracle | HSQL, H2, Postgres SQL, MySQL | MySQL | PostgreSQL |

Summary

Based on the above comparison, **OpenKM CE** is found to be most suitable DDMS.

## Standard Folder Structure

Based on the understanding for Projects and departments of ACIL, following folder structure for a central repository is proposed. This is only an indicative list. It would be prudent to take inputs from various departments for their respective folder structure.

| **Level 1** | **Level 2** | **Level 3** | **Level 4** | **Level 5** | **Level 6** | **Level 7** | **Level 8** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 01. Projects |  |  |  |  |  |  |  |
|  | 001. <Project 1> |  |  |  |  |  |  |
|  |  | 01. Tender Documents |  |  |  |  |  |
|  |  |  | 01. Work Order |  |  |  |  |
|  |  |  | 02. BOQ |  |  |  |  |
|  |  | 02. Drawings |  |  |  |  |  |
|  |  |  | 01. Concept Drawings |  |  |  |  |
|  |  |  |  | 01. Civil |  |  |  |
|  |  |  |  |  | *<Campus Building Structure wise>* |  |  |
|  |  |  |  | 02. Structural |  |  |  |
|  |  |  |  | 03. Interior |  |  |  |
|  |  |  |  | 04. Exterior |  |  |  |
|  |  |  |  | 05. Services |  |  |  |
|  |  |  |  |  | 01. Electrical High Voltage |  |  |
|  |  |  |  |  | 02. Electrical Low Voltage |  |  |
|  |  |  |  |  | 03. Lifts |  |  |
|  |  |  |  |  | 04. Plumbing |  |  |
|  |  |  |  |  | 05. HVAC |  |  |
|  |  |  |  |  | 06. Horticulture |  |  |
|  |  |  |  |  | 07. IT |  |  |
|  |  |  |  |  | 08. <Service n> |  |  |
|  |  |  | 02. Soft Drawings |  |  |  |  |
|  |  |  |  | 01. Civil |  |  |  |
|  |  |  |  |  | *<Campus Building Structure wise>* |  |  |
|  |  |  |  | 02. Structural |  |  |  |
|  |  |  |  | 03. Interior |  |  |  |
|  |  |  |  | 04. Exterior |  |  |  |
|  |  |  |  | 05. Services |  |  |  |
|  |  |  |  |  | 01. Electrical High Voltage |  |  |
|  |  |  |  |  | 02. Electrical Low Voltage |  |  |
|  |  |  |  |  | 03. Lifts |  |  |
|  |  |  |  |  | 04. Plumbing |  |  |
|  |  |  |  |  | 05. HVAC |  |  |
|  |  |  |  |  | 06. Horticulture |  |  |
|  |  |  |  |  | 07. IT |  |  |
|  |  |  |  |  | 08. <Service n> |  |  |
|  |  |  |  | 06. Coordinated |  |  |  |
|  |  |  | 03. As-Built Drawings |  |  |  |  |
|  |  |  |  | 01. Civil |  |  |  |
|  |  |  |  |  | *<Campus Building Structure wise>* |  |  |
|  |  |  |  | 02. Structural |  |  |  |
|  |  |  |  | 03. Interior |  |  |  |
|  |  |  |  | 04. Exterior |  |  |  |
|  |  |  |  | 05. Services |  |  |  |
|  |  |  |  |  | 01. Electrical High Voltage |  |  |
|  |  |  |  |  | 02. Electrical Low Voltage |  |  |
|  |  |  |  |  | 03. Lifts |  |  |
|  |  |  |  |  | 04. Plumbing |  |  |
|  |  |  |  |  | 05. HVAC |  |  |
|  |  |  |  |  | 06. Horticulture |  |  |
|  |  |  |  |  | 07. IT |  |  |
|  |  |  |  |  | 08. <Service n> |  |  |
|  |  |  |  | 06. Coordinated |  |  |  |
|  |  | 03. Time Management |  |  |  |  |  |
|  |  |  | 01. Plan |  |  |  |  |
|  |  |  |  | 1. Master Plan |  |  |  |
|  |  |  |  | 2. Monthly Plan |  |  |  |
|  |  |  |  |  | 2018 |  |  |
|  |  |  |  |  |  | 01. Jan 2018 |  |
|  |  |  |  |  |  |  | 01. Work Plan |
|  |  |  |  |  |  |  | 02. Resource Plan |
|  |  |  | 02. Track |  |  |  |  |
|  |  |  |  | 2. Monthly Tracker |  |  |  |
|  |  |  |  |  | 2018 |  |  |
|  |  |  |  |  |  | 01. Jan 2018 |  |
|  |  | 04. Material Management |  |  |  |  |  |
|  |  |  | 01. Indents |  |  |  |  |
|  |  |  |  | 2018 |  |  |  |
|  |  |  |  |  | 01. Jan 2018 |  |  |
|  |  |  |  |  |  | 01. <Indent No> |  |
|  |  |  | 02. Purchase Orders |  |  |  |  |
|  |  |  |  | 2018 |  |  |  |
|  |  |  |  |  | 01. Jan 2018 |  |  |
|  |  |  |  |  |  | 01. <PO No> |  |
|  |  |  | 03. Material Receipt Notes |  |  |  |  |
|  |  |  |  | 2018 |  |  |  |
|  |  |  |  |  | 01. Jan 2018 |  |  |
|  |  |  |  |  |  | 01. <MRN No> |  |
|  |  | 05. Equipment Maintenance |  |  |  |  |  |
|  |  |  | 01. Equipment Inspection |  |  |  |  |
|  |  |  |  | 01. Plan |  |  |  |
|  |  |  |  |  | 2018 |  |  |
|  |  |  |  |  |  | 01. Jan 2018 |  |
|  |  |  |  | 02. Report |  |  |  |
|  |  |  |  |  | 2018 |  |  |
|  |  |  |  |  |  | 01. Jan 2018 |  |
|  |  | 06. Vendor Management |  |  |  |  |  |
|  |  |  | 01. <Vendor 1> |  |  |  |  |
|  |  |  |  | 01. Vendor Contracts |  |  |  |
|  |  |  |  | 02. Work Plan |  |  |  |
|  |  |  |  | 03. Work Tracker |  |  |  |
|  |  |  |  | 04. Billing |  |  |  |
|  |  |  |  | 05. Handover |  |  |  |
|  |  |  |  | 06. Correspondences |  |  |  |
|  |  |  |  | 07. Meeting Minutes |  |  |  |
|  |  | 07. Quality Control |  |  |  |  |  |
|  |  |  | 01. Internal Audits |  |  |  |  |
|  |  |  |  | 01. Checklist |  |  |  |
|  |  |  |  | 02. Presentations |  |  |  |
|  |  |  |  | 03. Meeting Minutes |  |  |  |
|  |  |  |  | 04. Correspondences |  |  |  |
|  |  |  |  | 05. Reports |  |  |  |
|  |  |  | 02. Internal Reviews |  |  |  |  |
|  |  |  |  | 01. Checklist |  |  |  |
|  |  |  |  | 02. Presentations |  |  |  |
|  |  |  |  | 03. Meeting Minutes |  |  |  |
|  |  |  |  | 04. Correspondences |  |  |  |
|  |  |  |  | 05. Reports |  |  |  |
|  |  |  | 03. Third-Party Audits |  |  |  |  |
|  |  |  |  | 01. Checklist |  |  |  |
|  |  |  |  | 02. Presentations |  |  |  |
|  |  |  |  | 03. Meeting Minutes |  |  |  |
|  |  |  |  | 04. Correspondences |  |  |  |
|  |  |  |  | 05. Reports |  |  |  |
|  |  |  | 04. Client Inspections |  |  |  |  |
|  |  |  |  | 01. Civil |  |  |  |
|  |  |  |  |  | 01. Checklist |  |  |
|  |  |  |  |  | 02. Presentations |  |  |
|  |  |  |  |  | 03. Meeting Minutes |  |  |
|  |  |  |  |  | 04. Correspondences |  |  |
|  |  |  |  |  | 05. Reports |  |  |
|  |  |  |  | 01. Structural |  |  |  |
|  |  |  |  |  | 01. Checklist |  |  |
|  |  |  |  |  | 02. Presentations |  |  |
|  |  |  |  |  | 03. Meeting Minutes |  |  |
|  |  |  |  |  | 04. Correspondences |  |  |
|  |  |  |  |  | 05. Reports |  |  |
|  |  |  |  | 01. Electrical |  |  |  |
|  |  |  |  |  | 01. Checklist |  |  |
|  |  |  |  |  | 02. Presentations |  |  |
|  |  |  |  |  | 03. Meeting Minutes |  |  |
|  |  |  |  |  | 04. Correspondences |  |  |
|  |  |  |  |  | 05. Reports |  |  |
|  |  |  |  | 01. HVAC |  |  |  |
|  |  |  |  |  | 01. Checklist |  |  |
|  |  |  |  |  | 02. Presentations |  |  |
|  |  |  |  |  | 03. Meeting Minutes |  |  |
|  |  |  |  |  | 04. Correspondences |  |  |
|  |  |  |  |  | 05. Reports |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  | 05. Statutory Certifications |  |  |  |  |
|  |  |  |  | 01. <Certification Name> |  |  |  |
|  |  |  |  |  | 01. Checklist |  |  |
|  |  |  |  |  | 02. Presentations |  |  |
|  |  |  |  |  | 03. Meeting Minutes |  |  |
|  |  |  |  |  | 04. Correspondences |  |  |
|  |  |  |  |  | 05. Reports |  |  |
|  |  | 08. Financials |  |  |  |  |  |
|  |  |  | Client Billing |  |  |  |  |
|  |  |  |  | 01. RA 1 |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  | Budget |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  | Cash Flow |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  | 09. Correspondences |  |  |  |  |  |
|  |  |  | 01. Client |  |  |  |  |
|  |  |  |  | 2018 |  |  |  |
|  |  |  |  |  | 01. Jan-2018 |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  | 02. Consultant |  |  |  |  |
|  |  |  |  | 2018 |  |  |  |
|  |  |  |  |  | 01. Jan-2018 |  |  |
|  |  |  | 03. Architect |  |  |  |  |
|  |  |  |  | 2018 |  |  |  |
|  |  |  |  |  | 01. Jan-2018 |  |  |
|  |  |  | 03. Others |  |  |  |  |
|  |  |  |  | 2018 |  |  |  |
|  |  |  |  |  | 01. Jan-2018 |  |  |
|  |  | 10. MIS Reports |  |  |  |  |  |
|  |  |  | 2018 |  |  |  |  |
|  |  |  |  | 01.Jan-2018 |  |  |  |
|  |  |  |  | 02. Feb-2018 |  |  |  |
|  |  | 11. Handover |  |  |  |  |  |
|  |  |  | 01. Services |  |  |  |  |
|  |  |  |  | 01. Electrical High Voltage |  |  |  |
|  |  |  |  | 02. Electrical Low Voltage |  |  |  |
|  |  |  |  | 03. Lifts |  |  |  |
|  |  |  |  | 04. Plumbing |  |  |  |
|  |  |  |  | 05. HVAC |  |  |  |
|  |  |  |  | 06. Horticulture |  |  |  |
|  |  |  |  | 07. IT |  |  |  |
|  |  |  |  | 08. <Service n> |  |  |  |
|  |  | 12. Time Office |  |  |  |  |  |
|  |  |  | 01. Attendance reports |  |  |  |  |
|  |  |  |  | 2018 |  |  |  |
|  |  |  |  |  | 01. Jan-2018 |  |  |
|  |  | 13. Safety |  |  |  |  |  |
|  |  |  | 01. Safety Training |  |  |  |  |
|  |  |  |  | 2018 |  |  |  |
|  |  |  |  |  | 01. Jan-2018 |  |  |
|  |  |  | 02. Safety Inspections |  |  |  |  |
|  |  |  |  | 01. Plan |  |  |  |
|  |  |  |  | 02. Report |  |  |  |
|  |  |  | 03. Safety Incidences |  |  |  |  |
| 02. Departments |  |  |  |  |  |  |  |
|  | Head Office |  |  |  |  |  |  |
|  |  | 01. Purchase |  |  |  |  |  |
|  |  | 02. HR |  |  |  |  |  |
|  |  | 03. Admin |  |  |  |  |  |
|  |  | 04. Accounts |  |  |  |  |  |
|  |  | 05. Quality |  |  |  |  |  |
|  |  | 06. Safety |  |  |  |  |  |
|  |  | 07. Maintenance |  |  |  |  |  |
|  |  | 08. *<Department n>* |  |  |  |  |  |
|  | Kolkata RO |  |  |  |  |  |  |
|  |  | 01. Purchase |  |  |  |  |  |
|  |  | 02. HR |  |  |  |  |  |
|  |  | 03. Admin |  |  |  |  |  |
|  |  | 04. Accounts |  |  |  |  |  |
|  |  | 05. Quality |  |  |  |  |  |
|  |  | 06. Safety |  |  |  |  |  |
|  |  | 07. Maintenance |  |  |  |  |  |
|  |  | 08. *<Department n>* |  |  |  |  |  |
| 03. Shared |  |  |  |  |  |  |  |
|  | 01. HR-Admin |  |  |  |  |  |  |
|  |  | 01. From HR |  |  |  |  |  |
|  |  | 02. From Admin |  |  |  |  |  |
|  | 02. Purchase - Stores |  |  |  |  |  |  |
|  |  | 01. From Purchase |  |  |  |  |  |
|  |  | 02. From Stores |  |  |  |  |  |

*\*The ones which are marked in red colour require further elaboration after inputs from respective departments*

*\*\* The folder structure is best viewed and understood through the attached Ms-Excel worksheet*

## Next Steps

Following are the immediate next steps that are suggested to be taken up:

1. Take Feedback on the folder structure and incorporate inputs from respective departments.
2. Setup & configure OpenKM CE on a staging server
3. Basic UI changes like logo etc. in openKM CE
4. Trial run for one project and department of ACIL, for 2 months.
5. Simultaneously hire qualified resources for customization and maintenance of openKM CE
6. Integration with existing ACIL applications