Enterprise Design Process Automation with Vault

Aravindan Subramanian

Head - IT / ERP & Systems

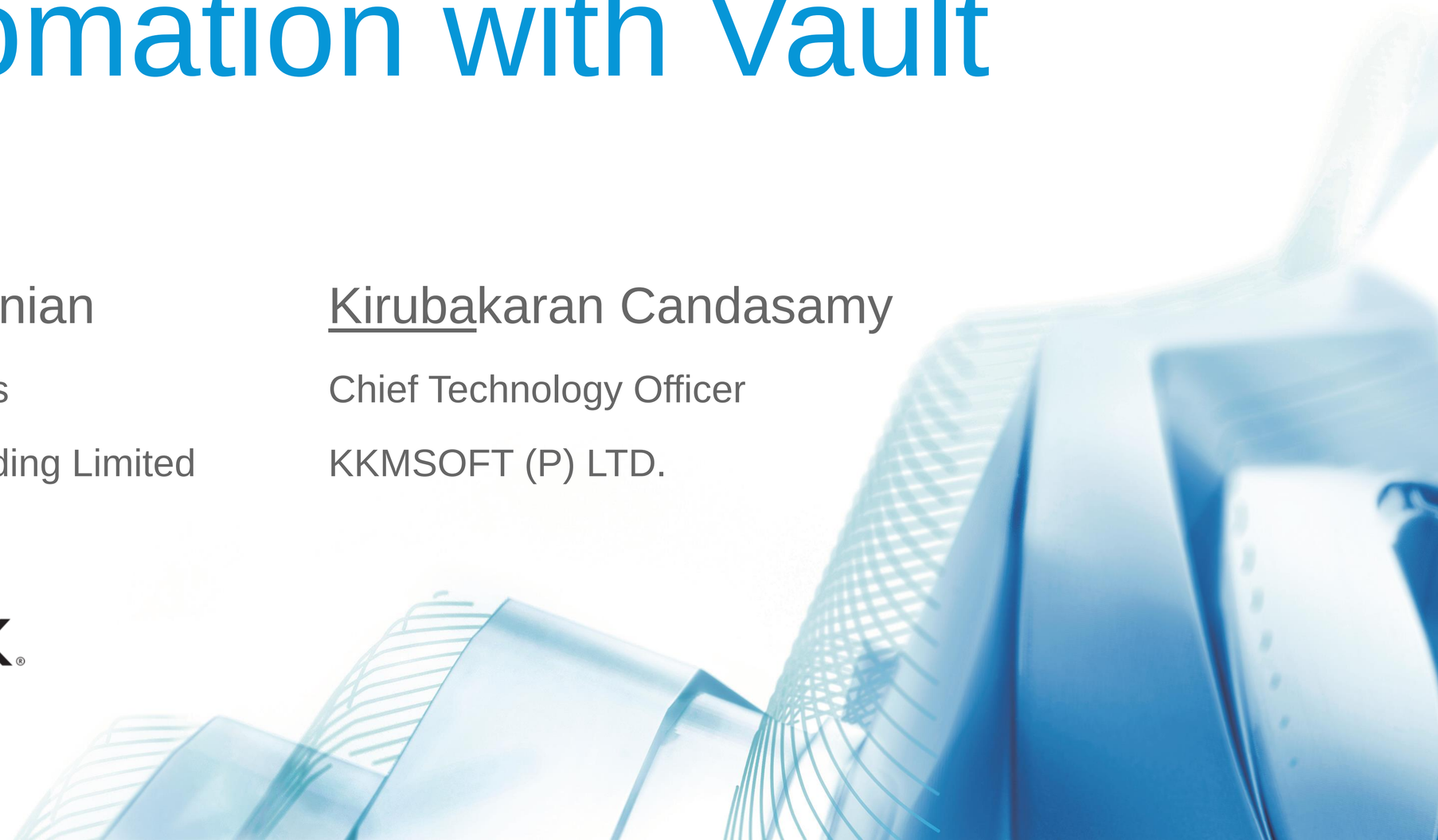
Larsen & Toubro Ship Building Limited

Kirubakaran Candasamy

Chief Technology Officer

KKMSOFT (P) LTD.

AUTODESK. UNIVERSITY



Agenda

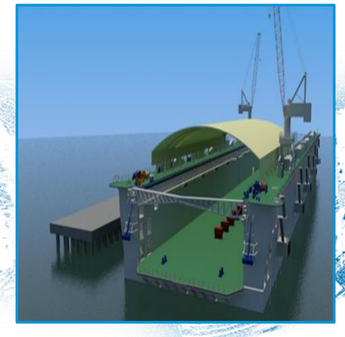
KNOW THE SPEAKERS

BUSINESS STORY

- About L&T
- About the Industry – Ship building
- Why PDM
- Why Vault
- Workflow
- Tools Developed <Videos>

TECHNICAL MAGIC

- Advantage Vault
- Captive Features
- Extended Feature
- Custom Features
- External Links
- Future / Work in progress



Aravindan Subramanian

Head of ERP /IT / Systems, L&T SB

- Head of ERP /IT / Systems and responsible for deployment of all Digital initiatives across L&T Shipbuilding.
- 25 years of experience in various industry sectors and Domain expertise in Automobile, Mfg., IT Software & Service organizations.
- Holds a Master’s degree in Business Administration after Bachelor’s degree in Engineering (Gold Medalist).
- Holds certifications in PMP, PMI – ACP, ITIL- Expert and Master Black Belt in Six Sigma in addition to other lead certifications in IT / Quality and Lean Manufacturing.
- Was head of Global delivery in his earlier stint in IT Sector.

L&T Shipbuilding

https://www.lntshipbuilding.com/

Kiruba karan Candasamy

Chief Technology Officer, KKM SOFT

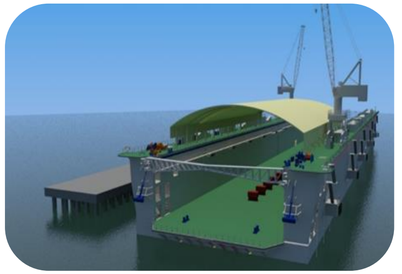
- Technology head of KKM SOFT, an Autodesk Gold and Consulting Services partner
- 24 years of experience in CAD/CAM/CAE, BIM, Industry 4.0 and Software Development in the roles of Sales, Technical, Technology integrator and research.
- Heads a team of developers and solution experts who integrate technologies across multiple domains to provide business transformation solutions to Building, Manufacturing, Construction, Transportation, Government and enterprises.
- Holds patents in industrial safety products and cloud based healthcare and services.
- Currently exploring integration of AI/ML, IoT, VR / AR / MR into design platforms for Machine based problem solving and innovation.

KKMSoft

http://kkmsoft.com/

Larsen & Toubro

India’s largest E&C company with interests in Projects, Defence, Shipbuilding, Infrastructure Development, Manufacturing, IT & Financial Services



Reserves & Surplus: INR 64,000 Cr (US$ 9.0 Bn)

L&T Defence – Business Segments

Warship Building

Submarines & Underwater Platforms

Guns, Missiles & Armoured Systems

Military Communication

Weapon & Engineering Systems

WARSHIP BUILDING – FOCUS AREAS

Warships, Auxiliary Vessels & Special Platforms

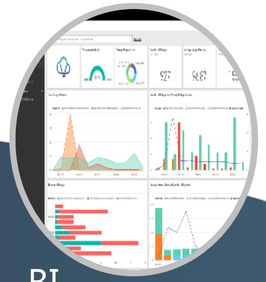
Refits, Life Extension & Upgrades

Digital Initiatives @ LTSB

Mobile App

Manpower tracking in shop-floor

Digital drawings display on shop floor



BI

AS 11/115, Daily P/L report & Capex

Cable Tracking through Bar-coding

Connected Assets/ Machines

Asset Codification

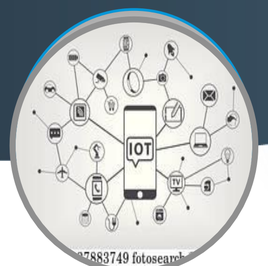
Robotic Process Automation

Vendor Portal Integration

ConstZon

Material Management System tracking

IoT Welding Station

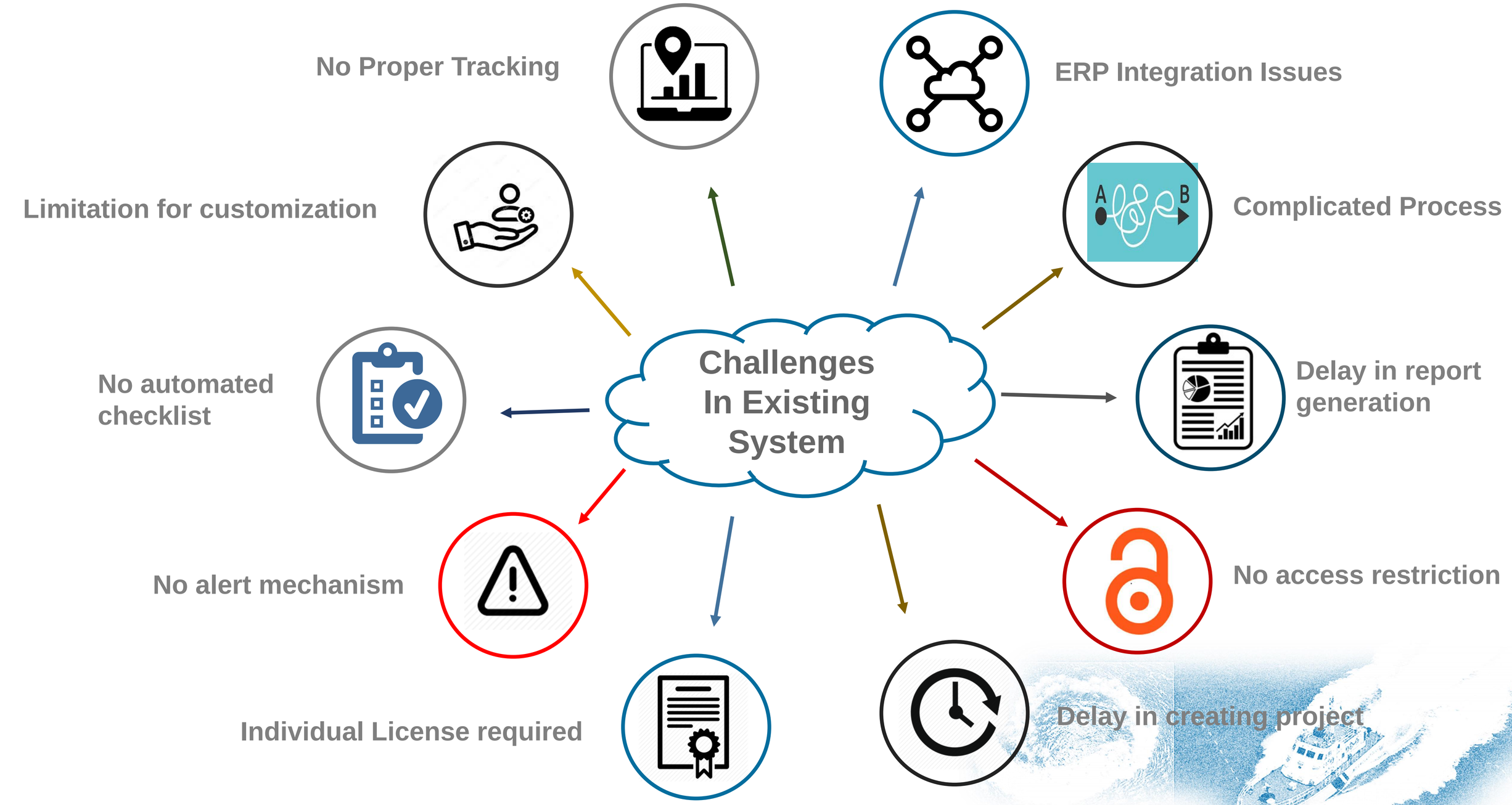


Smart Glass

Metal Bar-coding

Digital Demands of Ship building industry

- A Ship is a floating Plant! It’s a system of systems that integrates every field of engineering technology
- Warships have multiple specifications, compliances, classifications, certifications and approvals before, during and after construction
- The design and documentation involves multiple departments, domains, formats and external agencies
- Requires maximum security with on-premise setup as a compliance requirement
- Tight integration to project plan, construction plan and procurement plan across enterprise applications a necessity


Challenges In Existing System
No Proper Tracking
ERP Integration Issues
Limitation for customization
Complicated Process
A
B
No automated checklist
Delay in report generation
No alert mechanism
No access restriction
Individual License required
Delay in creating project

Challenges - highlights

LIMITATION IN THE CUSTOMIZATION:

There are some limitations in the existing system to accommodate the Business process which leads to involvement of Human interface and time delay in the process.

UNAVAILABILITY OF STATUS TRACKING:

Proper tracking system is not available regarding the overall drawing planned vs released status.

DRAWING RELEASE CHECKLIST:

Each type of drawings having different sets of check list and no provision in the existing system for system based checklist. Design maintained the check lists in hard copy.

TRANSPARENCY:

No alert mechanism to the users on the release of documents.

User based license: Need of procurement of license to all the users.

Why PDM…

Platform Complexity Metrics	Frigate	Collins Class Submarine
Weight (tonnes)	3,600	3,000
Length (metres)	118	78
Number of systems	60	108
Number of parts to assemble	170,000+	500,000+
Construction time (months)	22	60
Drawings & Design document (Nos)	**10000+**	**33000+**

To handle such high volume documents and complicate Business Process, Product Data Management “PDM” alone is not enough

Need an Automation over PDM which can simplify the business process, eliminate human efforts and reduces the time line…

Data Flow

CADMATIC

AutoCAD

Vault

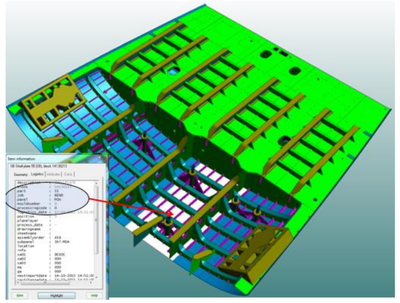
Maker & Checker

Checklist

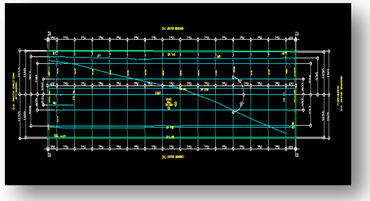
Share Folder

infor

3D Model (with attributes)



2D Drawing



CSV

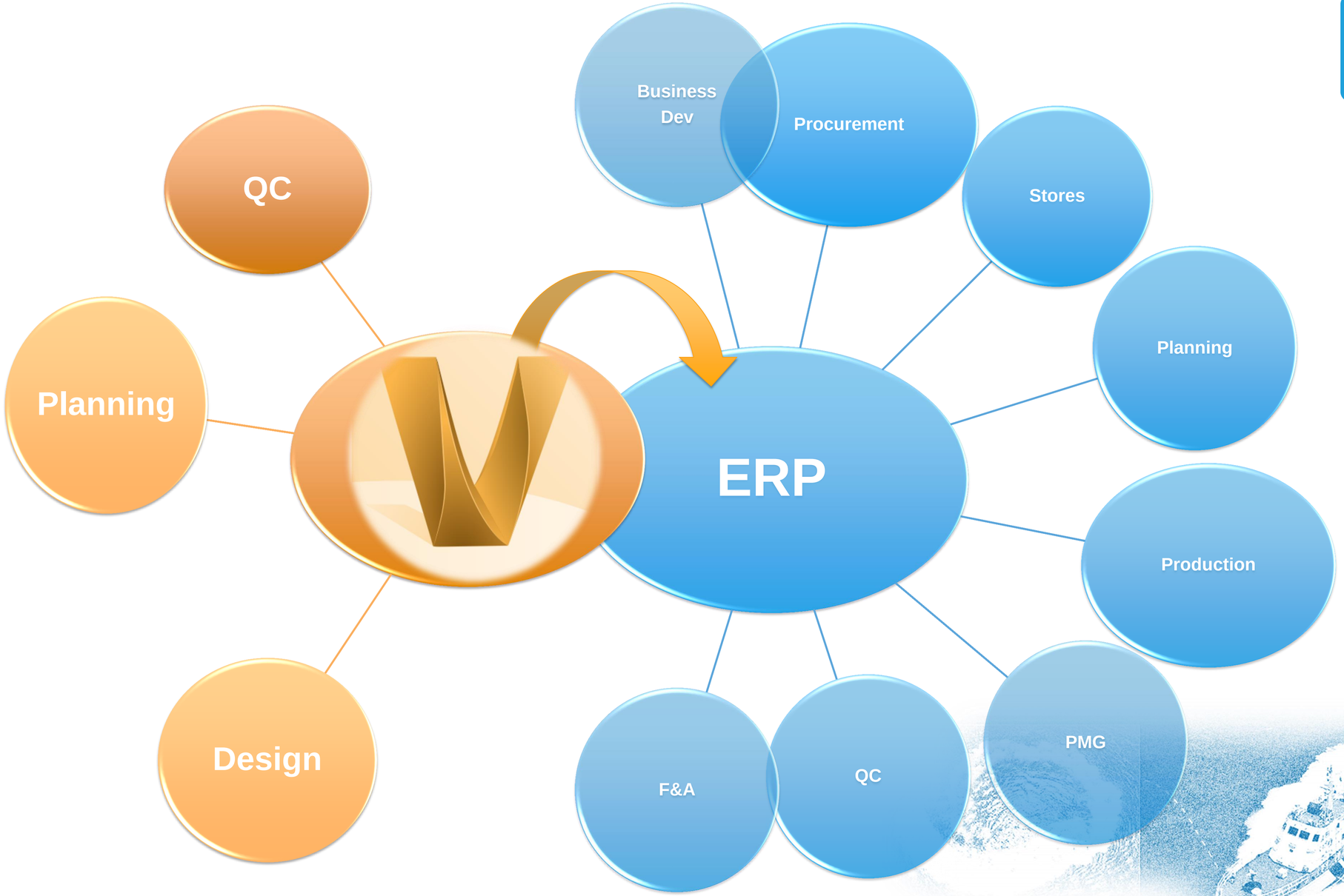
Share Folder

Design data uploaded in ERP

DATA MANAGEMENT

PDM

- Basic design drawings
- Class Approved drawings
- Production drawings
- Item code generation
- Document schedule tracking
- Surveyor comments
- Contract specification status completion



ERP

- Drawing release status
- BOM to withdraw from stores
- Drawing On-Hold
- Work Authorization
- Parent child for GRN
- Class drawing for QC

AUTOMATION OF BUSINESS PROCESS THROUGH VAULT

Auto Generation of Material Request

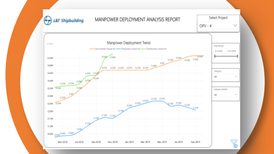
Auto Update of Item Code

Auto Generation of Purchase Request

Material Check

MIS Update

Manpower Deployment Analysis Report



Work Order Generation

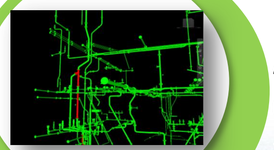
Work Authorization

BoM Comparison

infor

Navisworks

Auto Update of Work Completion Status in 3D Model



PRO

Technical Wizardry

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What advantages do we get with Vault?

- Robust Database integration, scalable and replicable.
- Multisite, Multi-server, floating user environment for an ideal client server / on premises requirement
- Simple desktop client interface and Web client support on any browser
- Extensively customizable
  - Web-service driven / GUI independent
  - Support for Add-ins, APIs, integrations
- Revision and Version for File, folder, BOM and custom objects.
- Any file capability – CAD / Office / PDF / ZIP. Native support for large number of file formats that the Design team can throw at us – without license!

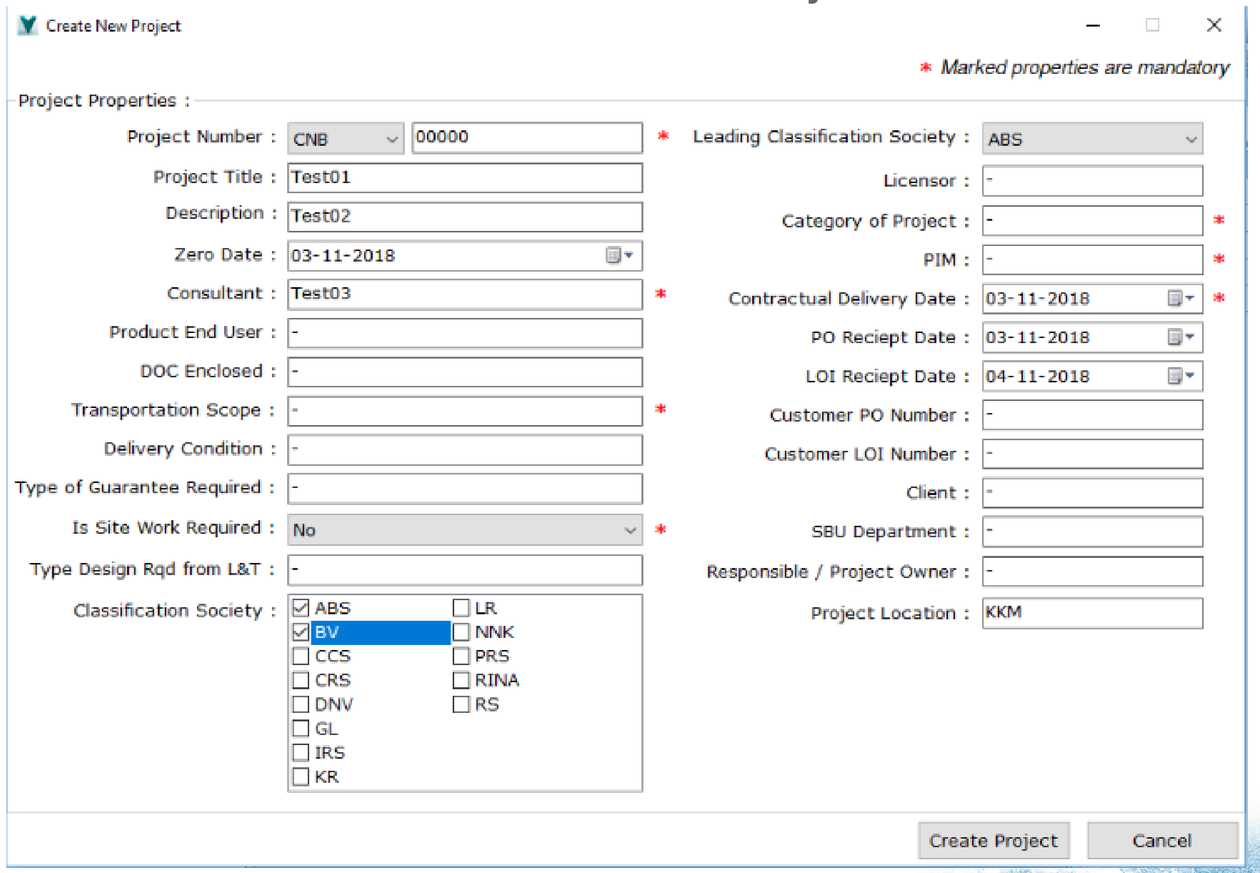
Key Vault features that go a long way

- Custom object definition
- Meta-data Validation
- File, folder, Vault, user, role and custom access definitions
- Job server / process automation
- Data standardisation – customizable
- Reports – customizable
- File preview of multiple formats
- MS Office and Outlook integration
- Flat file export

Custom Tools develop over Vault features

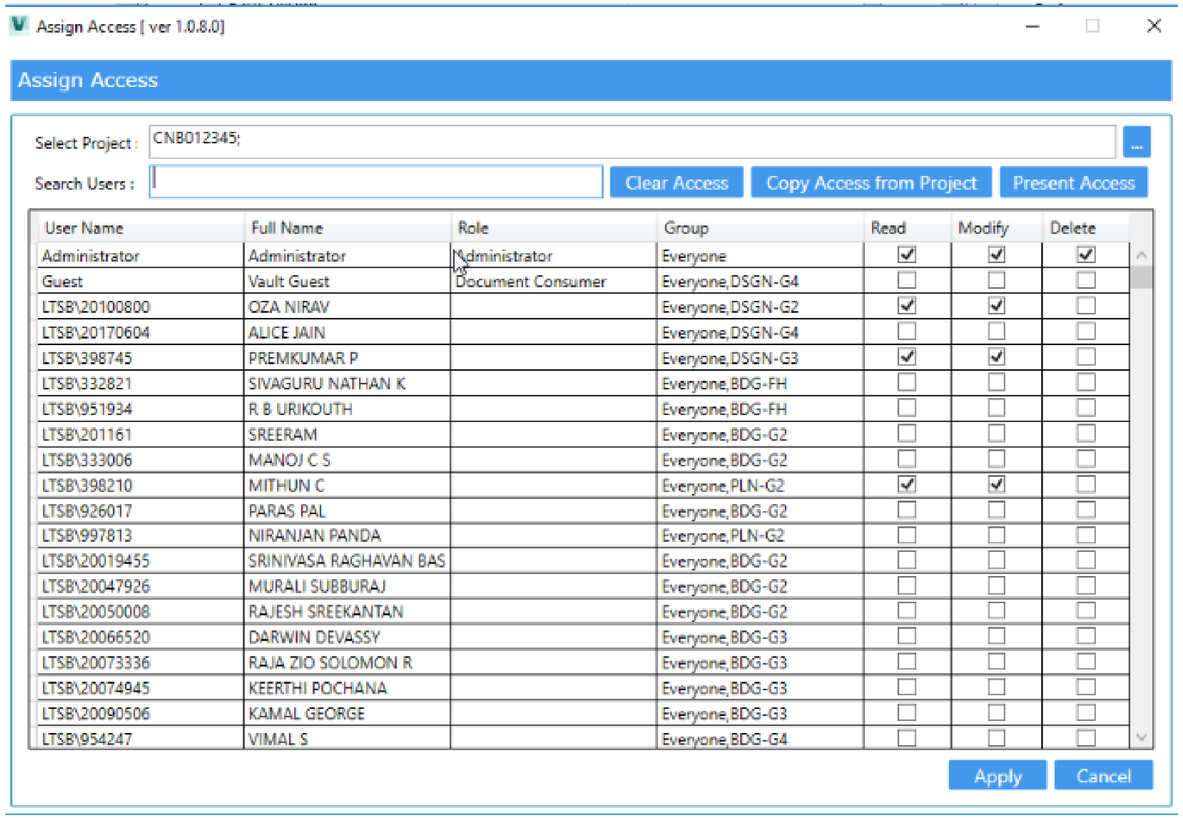
Project Creation Tool

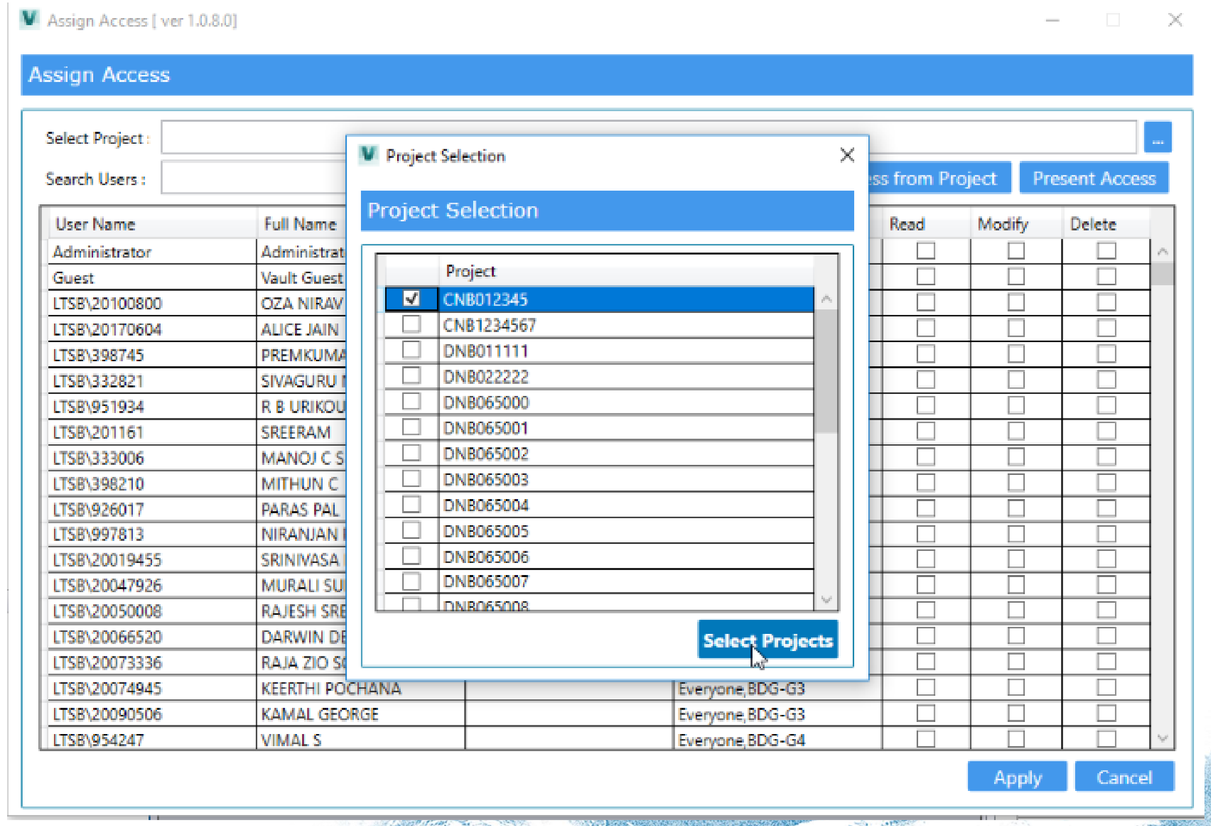
- Automate all tasks related to creation of New Projects from scratch or from a template



Assign Access Tool

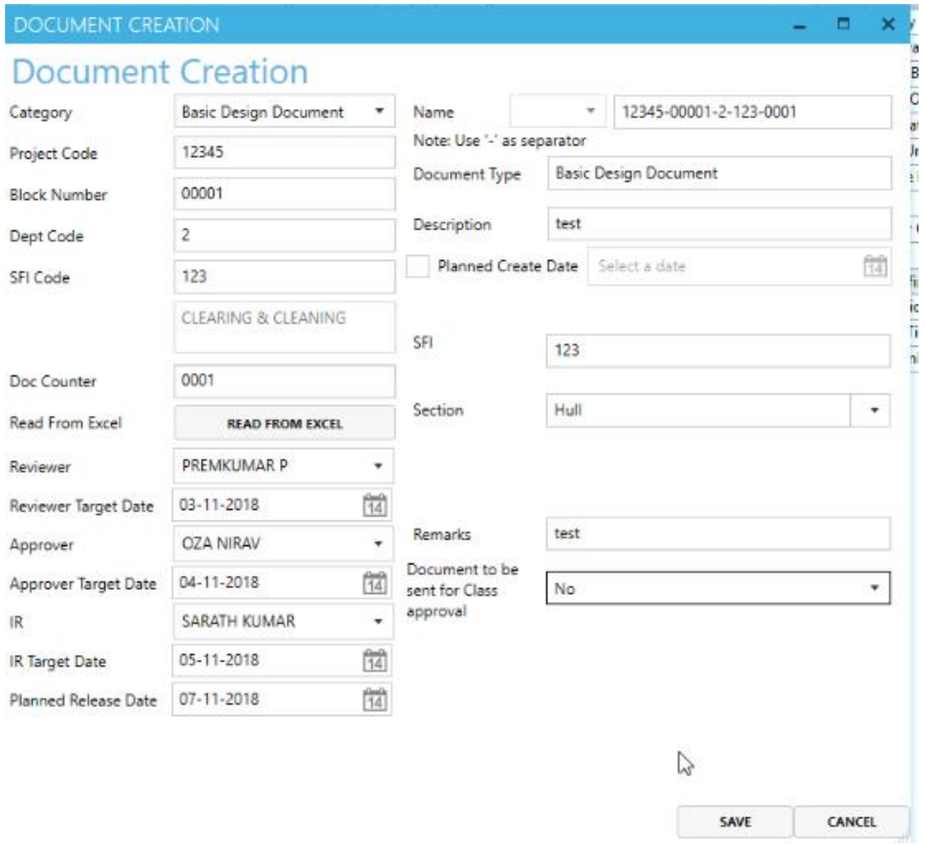
- Assign access to the users in specific project without changing any settings in the configuration

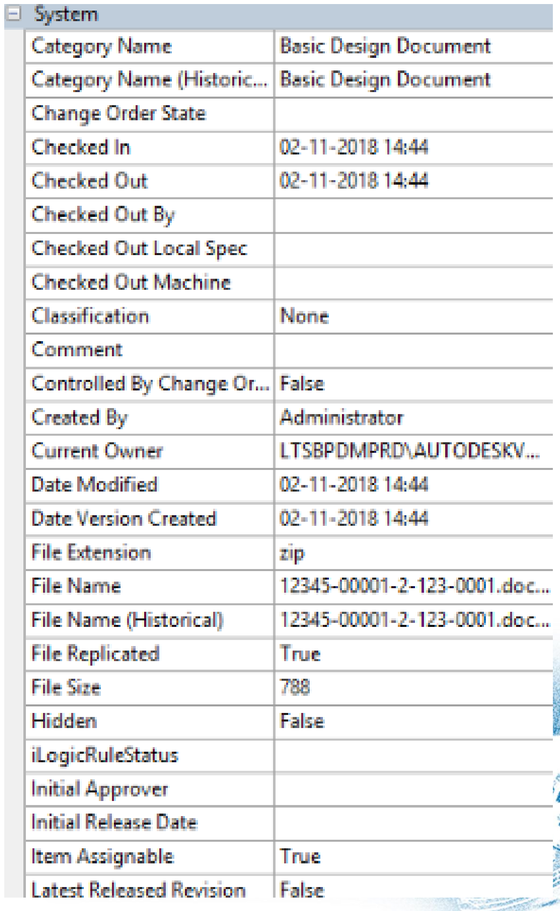




Document creation tool

- Creating document with required properties which will eliminate the manual error and save time

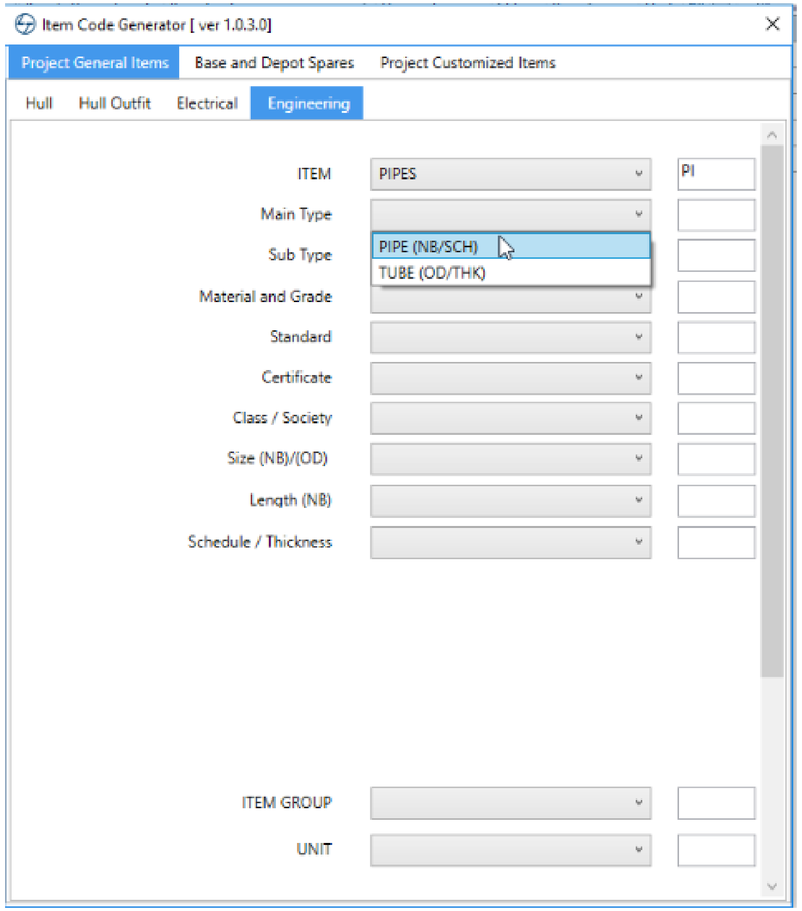


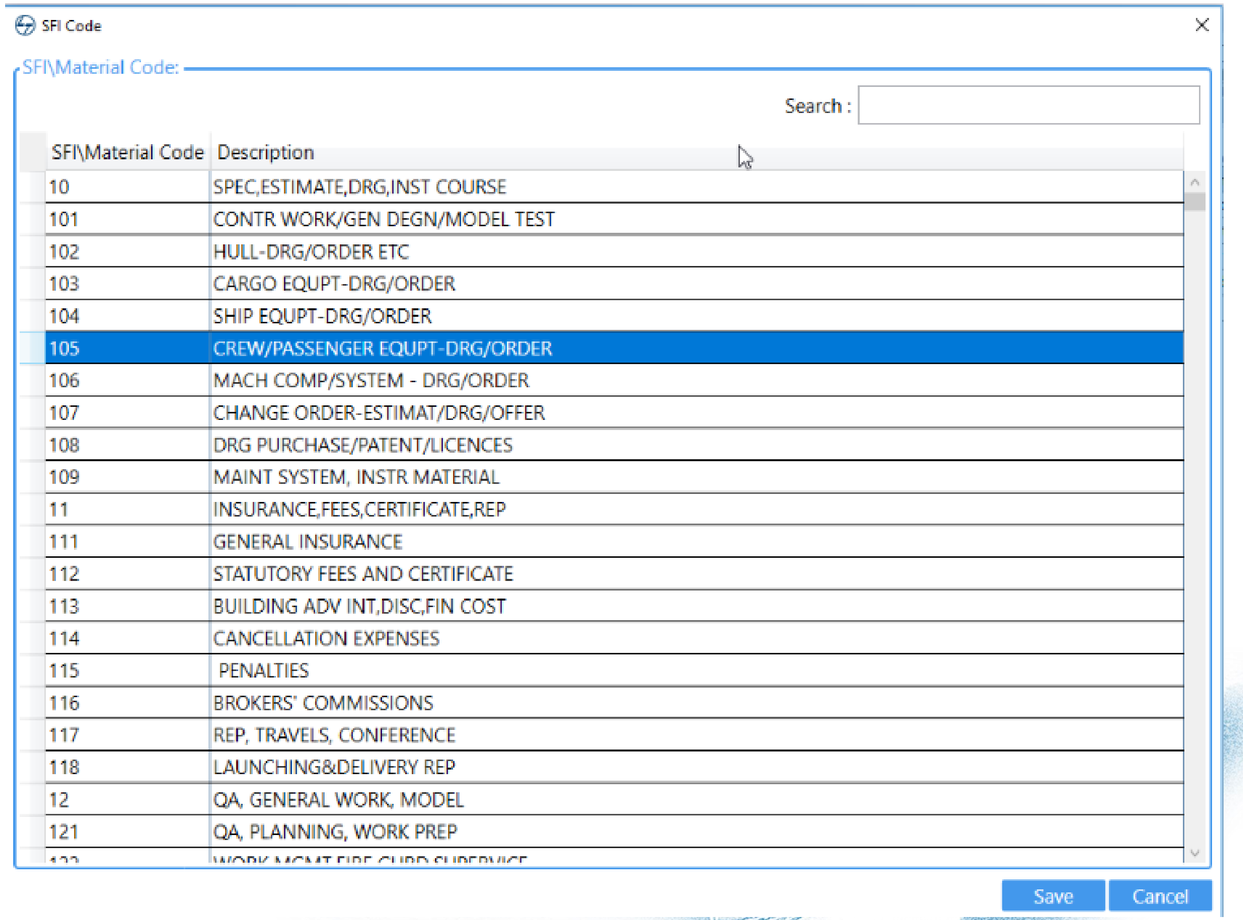


System	
Category Name	Basic Design Document
Category Name (Historic...	Basic Design Document
Change Order State	
Checked In	02-11-2018 14:44
Checked Out	02-11-2018 14:44
Checked Out By	
Checked Out Local Spec	
Checked Out Machine	
Classification	None
Comment	
Controlled By Change Or...	False
Created By	Administrator
Current Owner	LTSBPDMPRD\AUTODESKV...
Date Modified	02-11-2018 14:44
Date Version Created	02-11-2018 14:44
File Extension	zip
File Name	12345-00001-2-123-0001.doc...
File Name (Historical)	12345-00001-2-123-0001.doc...
File Replicated	True
File Size	788
Hidden	False
iLogicRuleStatus	
Initial Approver	
Initial Release Date	
Item Assignable	True
Latest Released Revision	False

Item Code Generator

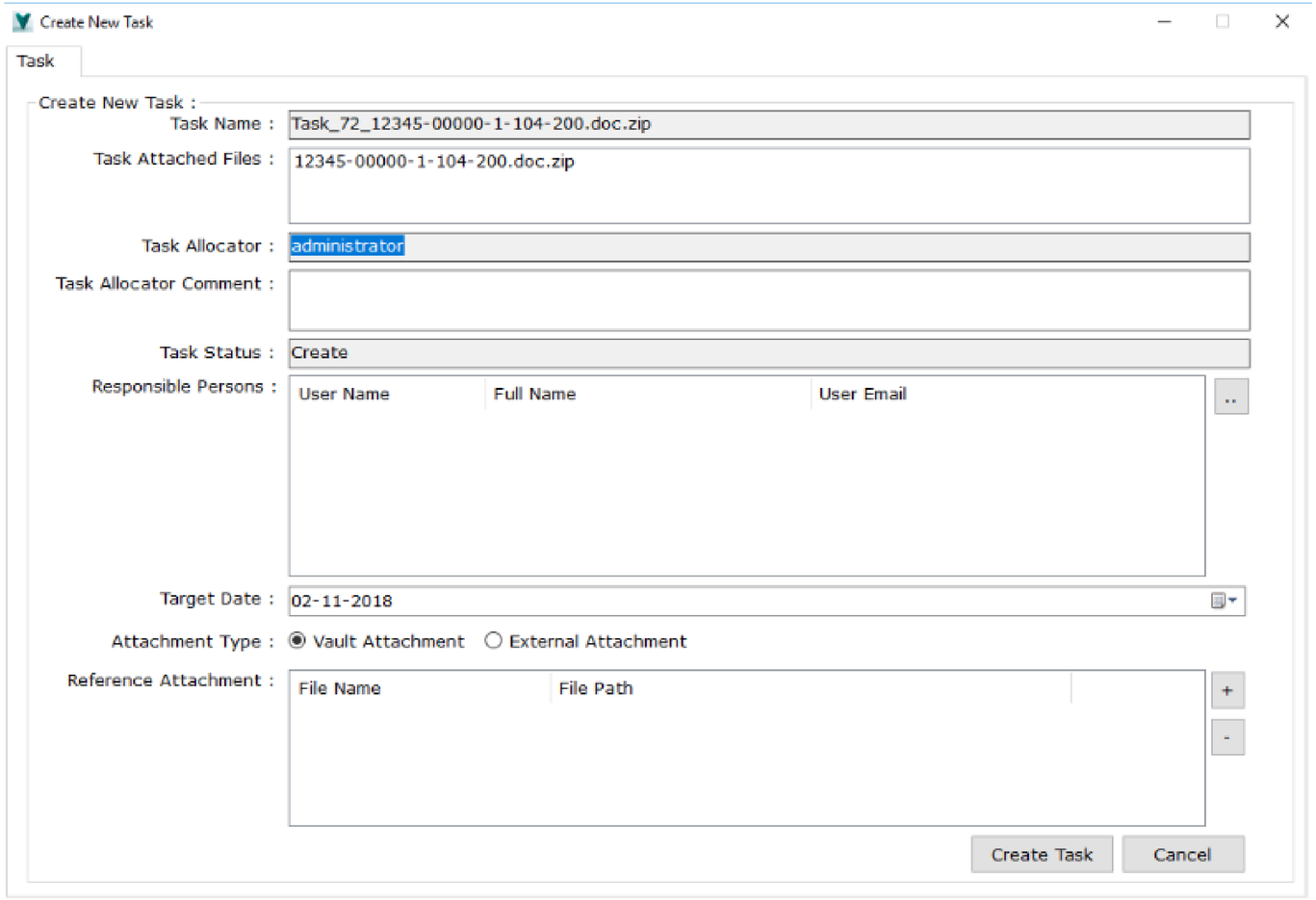
- Generate Item Codes / Material Codes and other ERP centric activities within Vault to link to CAD / BOM

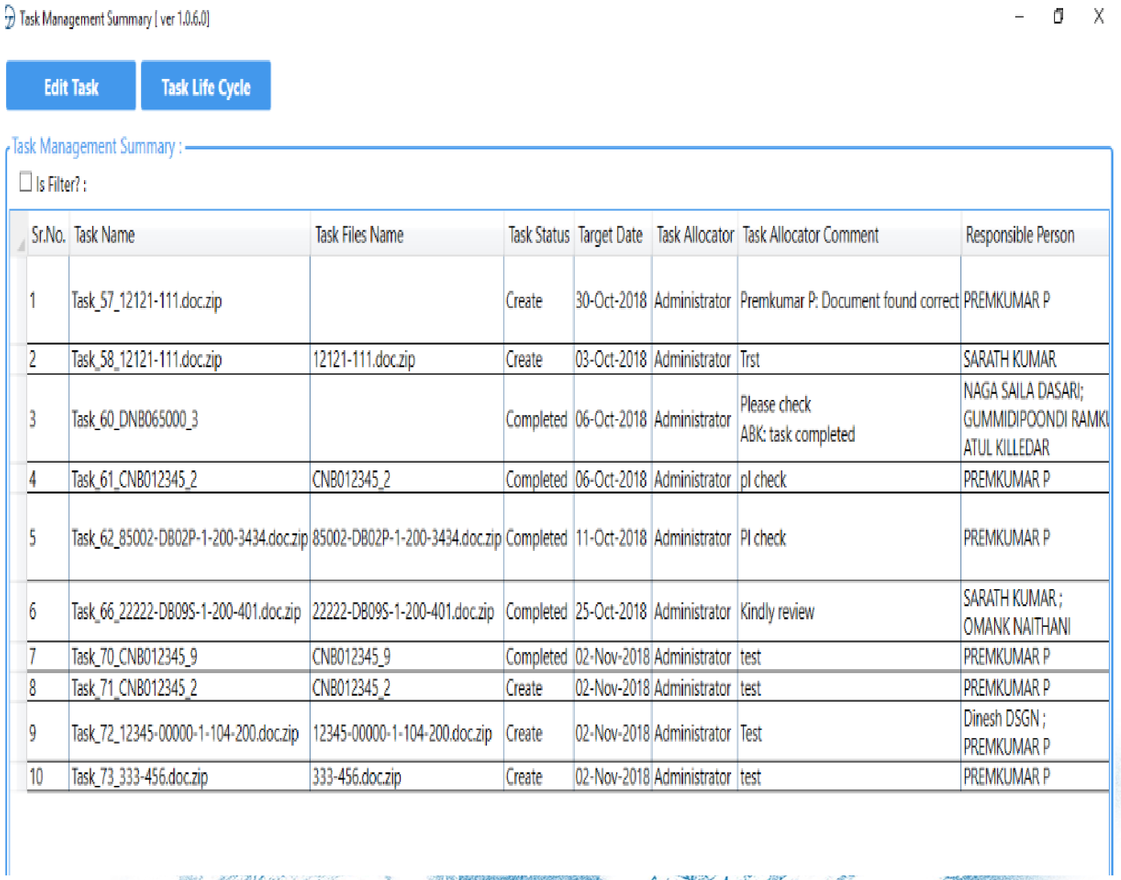




Task Assignment

- Assign Tasks, documents and activities based on workflow

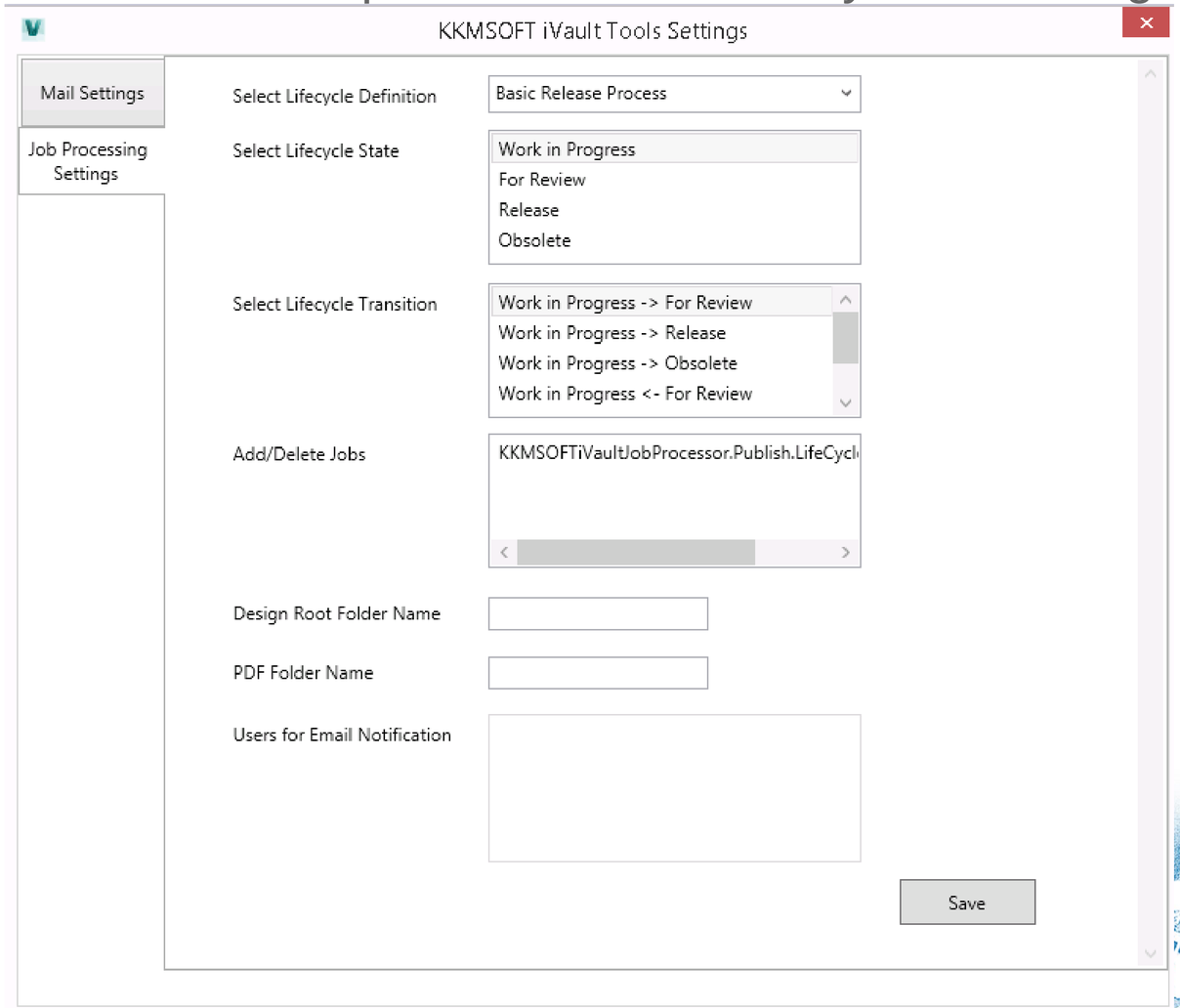




Sr.No.	Task Name	Task Files Name	Task Status	Target Date	Task Allocator	Task Allocator Comment	Responsible Person
1	Task_57_12121-111.doc.zip		Create	30-Oct-2018	Administrator	Premkumar P: Document found correct	PREMKUMAR P
2	Task_58_12121-111.doc.zip	12121-111.doc.zip	Create	03-Oct-2018	Administrator	Trst	SARATH KUMAR
3	Task_60_DNB065000_3		Completed	06-Oct-2018	Administrator	Please check ABK: task completed	NAGA SAILA DASARI; GUMMIDIPOONDI RAMKI ATUL KILLEDAR
4	Task_61_CNB012345_2	CNB012345_2	Completed	06-Oct-2018	Administrator	pl check	PREMKUMAR P
5	Task_62_85002-DB02P-1-200-3434.doc.zip	85002-DB02P-1-200-3434.doc.zip	Completed	11-Oct-2018	Administrator	PI check	PREMKUMAR P
6	Task_66_22222-DB09S-1-200-401.doc.zip	22222-DB09S-1-200-401.doc.zip	Completed	25-Oct-2018	Administrator	Kindly review	SARATH KUMAR ; OMANK NAITHANI
7	Task_70_CNB012345_9	CNB012345_9	Completed	02-Nov-2018	Administrator	test	PREMKUMAR P
8	Task_71_CNB012345_2	CNB012345_2	Create	02-Nov-2018	Administrator	test	PREMKUMAR P
9	Task_72_12345-00000-1-104-200.doc.zip	12345-00000-1-104-200.doc.zip	Create	02-Nov-2018	Administrator	Test	Dinesh DSGN ; PREMKUMAR P
10	Task_73_333-456.doc.zip	333-456.doc.zip	Create	02-Nov-2018	Administrator	test	PREMKUMAR P

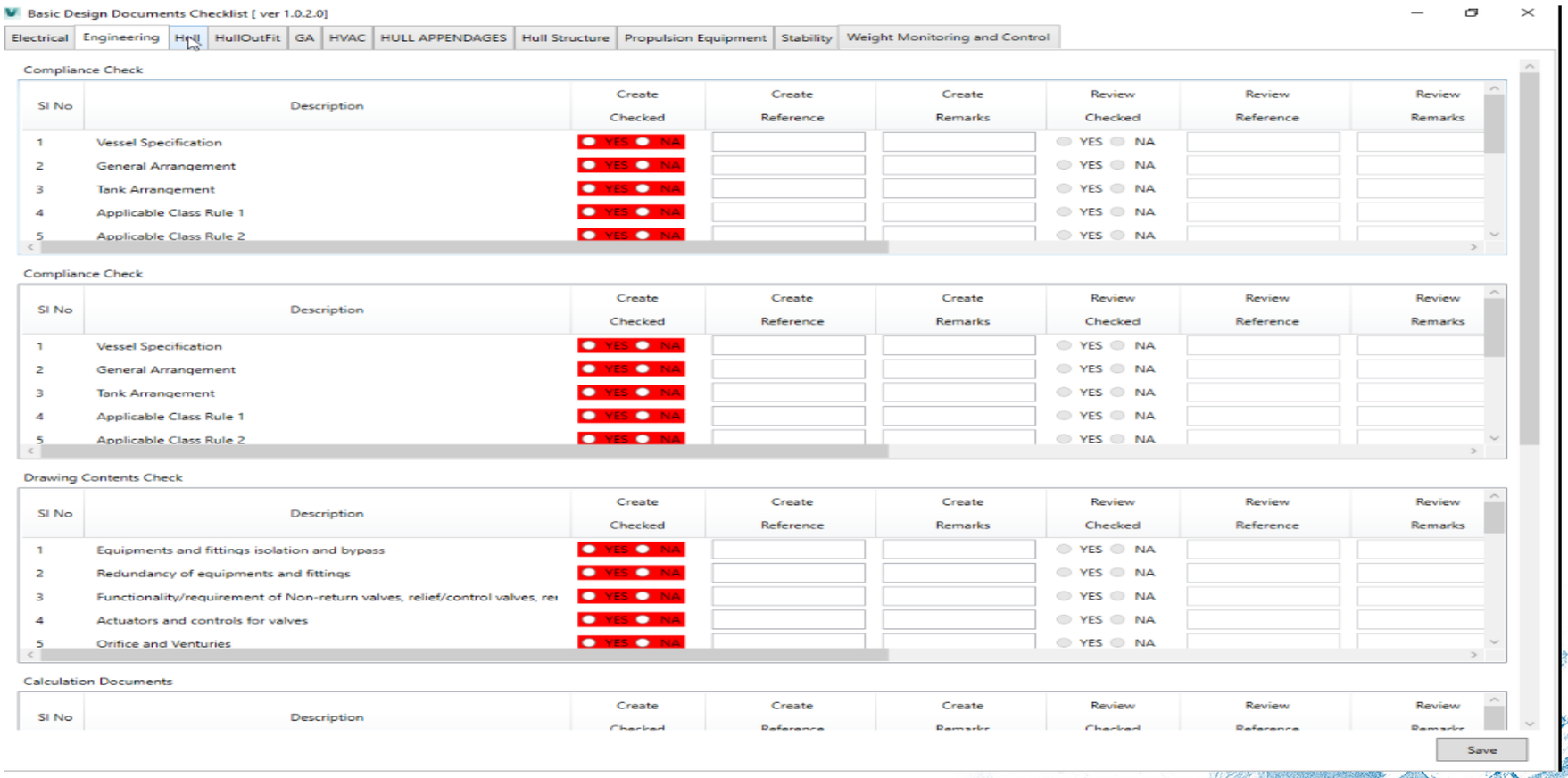
Email Notification Tool

- It automatically triggers notification to respective users in every state change



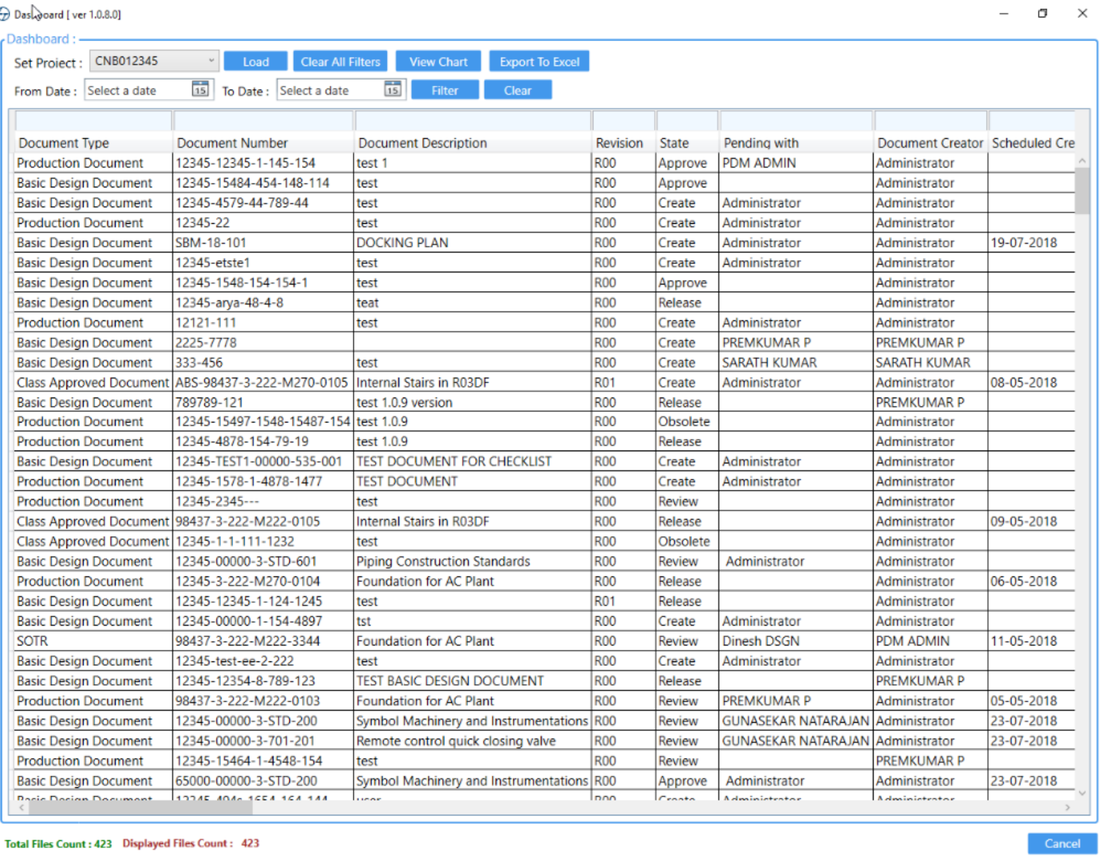
Checklist

- To fill the checklist for during every state change to ensure all the works has been done and also give the required information to the next level peoples.



Project Dashboard

View complete project status and KPIs on a dashboard in Top Management / Supervisor / User Perspective



Document Type	Document Number	Document Description	Revision	State	Pending with	Document Creator	Scheduled Cre
Production Document	12345-12345-1-145-154	test 1	R00	Approve	PDM ADMIN	Administrator	
Basic Design Document	12345-15484-454-148-114	test	R00	Approve		Administrator	
Basic Design Document	12345-4579-44-789-44	test	R00	Create	Administrator	Administrator	
Production Document	12345-22	test	R00	Create	Administrator	Administrator	
Basic Design Document	SBM-18-101	DOCKING PLAN	R00	Create	Administrator	Administrator	19-07-2018
Basic Design Document	12345-etste1	test	R00	Create	Administrator	Administrator	
Basic Design Document	12345-1548-154-154-1	test	R00	Approve		Administrator	
Basic Design Document	12345-arya-48-4-8	teat	R00	Release		Administrator	
Production Document	12121-111	test	R00	Create	Administrator	Administrator	
Basic Design Document	2225-7778		R00	Create	PREMKUMAR P	PREMKUMAR P	
Basic Design Document	333-456	test	R00	Create	SARATH KUMAR	SARATH KUMAR	
Class Approved Document	ABS-98437-3-222-M270-0105	Internal Stairs in R03DF	R01	Create	Administrator	Administrator	08-05-2018
Basic Design Document	789789-121	test 1.0.9 version	R00	Release		PREMKUMAR P	
Production Document	12345-15497-1548-15487-154	test 1.0.9	R00	Obsolete		Administrator	
Production Document	12345-4878-154-79-19	test 1.0.9	R00	Release		Administrator	
Basic Design Document	12345-TEST1-00000-535-001	TEST DOCUMENT FOR CHECKLIST	R00	Create	Administrator	Administrator	
Production Document	12345-1578-1-4878-1477	TEST DOCUMENT	R00	Create	Administrator	Administrator	
Production Document	12345-2345---	test	R00	Review		Administrator	
Class Approved Document	98437-3-222-M222-0105	Internal Stairs in R03DF	R00	Release		Administrator	09-05-2018
Class Approved Document	12345-1-1-111-1232	test	R00	Obsolete		Administrator	
Basic Design Document	12345-00000-3-STD-601	Piping Construction Standards	R00	Review	Administrator	Administrator	
Production Document	12345-3-222-M270-0104	Foundation for AC Plant	R00	Release		Administrator	06-05-2018
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Basic Design Document	12345-00000-1-154-4897	tst	R00	Create	Administrator	Administrator	
SOTR	98437-3-222-M222-3344	Foundation for AC Plant	R00	Review	Dinesh DSGN	PDM ADMIN	11-05-2018
Basic Design Document	12345-test-ee-2-222	test	R00	Create	Administrator	Administrator	
Basic Design Document	12345-12354-8-789-123	TEST BASIC DESIGN DOCUMENT	R00	Release		PREMKUMAR P	
Production Document	98437-3-222-M222-0103	Foundation for AC Plant	R00	Review	PREMKUMAR P	Administrator	05-05-2018
Basic Design Document	12345-00000-3-STD-200	Symbol Machinery and Instrumentations	R00	Review	GUNASEKAR NATARAJAN	Administrator	23-07-2018
Basic Design Document	12345-00000-3-701-201	Remote control quick closing valve	R00	Review	GUNASEKAR NATARAJAN	Administrator	23-07-2018
Production Document	12345-15464-1-4548-154	test	R00	Review		PREMKUMAR P	
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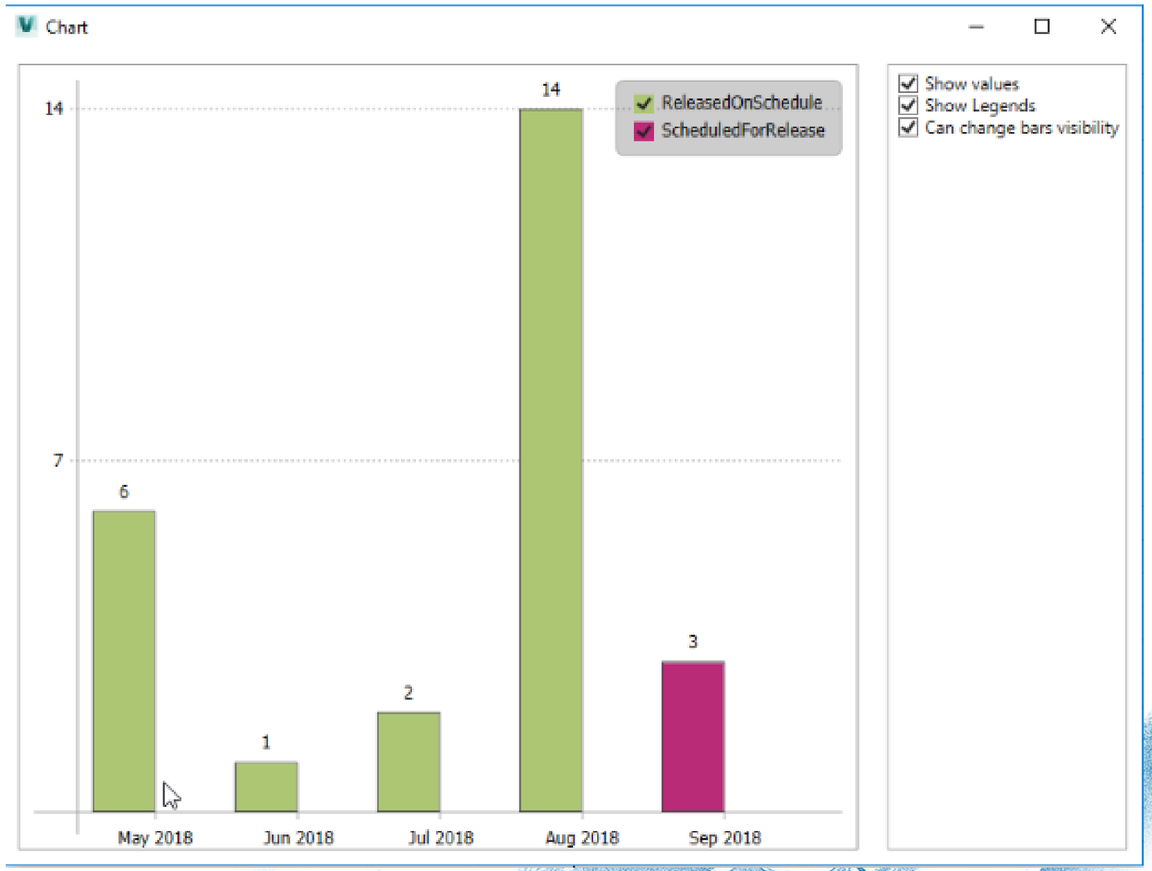
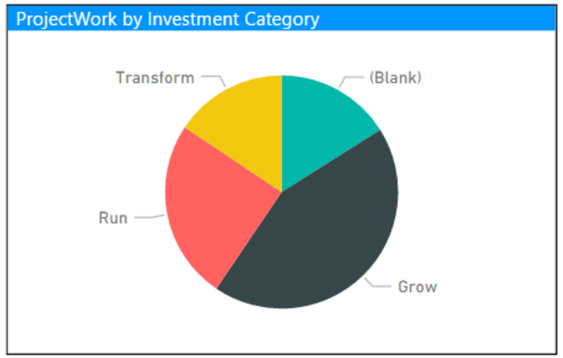


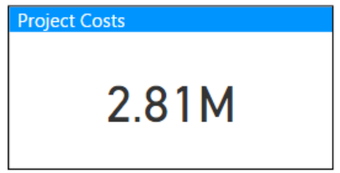
Gantt Chart

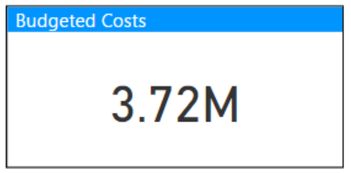
Dashboard
Feed
Tasks
Issues
Milestones
Calendar
Documents
Timesheet
Invoices & Expenses
Forums
Pages
Chat
Users
Reports & Charts
Reports view
Milestone Gantt
FIT
MAX
Add Task
Scroll to Unscheduled Tasks
TITLE
%
May '18
Jun '18
Insulation 37
Insulation- All tasks 37
Basement Tiles 40
Overhead Tank 70
Tank Material 60
Check leakages 0
Storage Capacity 0
Identify site 100
Draft and Fire stop 40
Caulk and Air seal 20
Avinash M
Eduardo Vargas
Charles Stone
Charles Stone, Avinash
Avinash M
Charles Stone
Charles Stone
Charles Stone

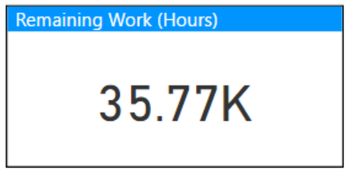
Project Dashboard

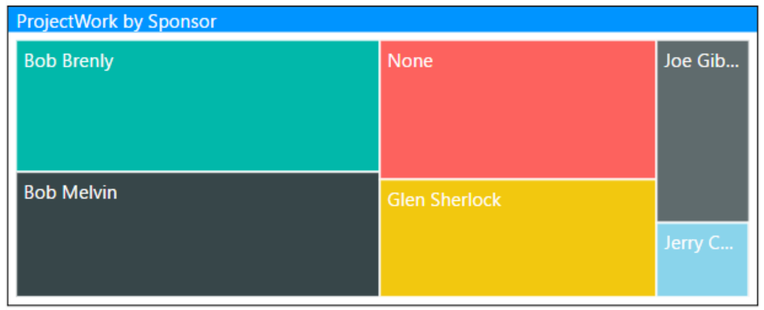
PROJECTS OVERVIEW

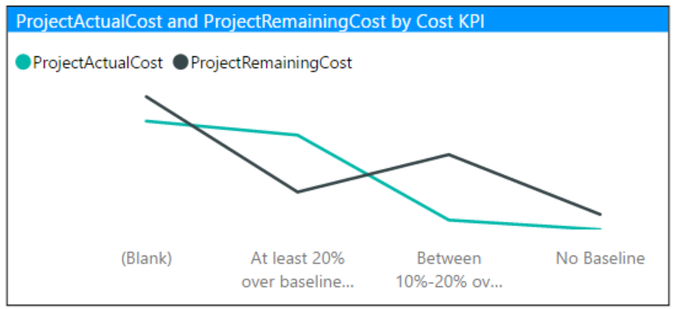


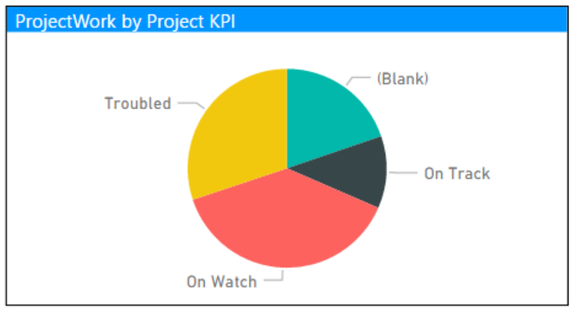




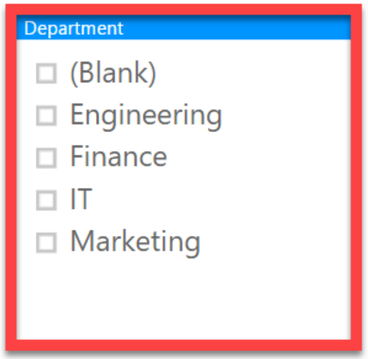








ProjectName	ProjectStartDate	ProjectWork	ProjectActualWork	ProjectRemainingWork	ProjectWorkVariance
BC Example	12/1/2016 12:00:00 AM	2,338.00	0.00	2,338.00	2,338.00
Big 4 Holiday Park Construction	10/25/2016 12:00:00 AM	2,338.00	0.00	2,338.00	2,338.00
Cairns demo 1	10/24/2016 12:00:00 AM	2,338.00	0.00	2,338.00	2,338.00
Great barrier bikeway	10/25/2016 12:00:00 AM	2,338.00	0.00	2,338.00	2,338.00
Software Development for Project Sites	10/26/2016 12:00:00 AM	2,338.00	0.00	2,338.00	2,338.00
Zurich Database Upgrade	1/11/2016 8:00:00 AM	2,296.00	0.00	2,296.00	2,296.00
Automated Sensor System	6/6/2016 8:00:00 AM	2,288.00	0.00	2,288.00	2,288.00
Diesel Engine Exhaust Converter	5/9/2016 8:00:00 AM	2,288.00	0.00	2,288.00	2,288.00
Dubrina Currency Exchange Upgrade	5/23/2016 8:00:00 AM	2,288.00	0.00	2,288.00	2,288.00
Total		**62,807.20**	**27,038.30**	**35,768.91**	**25,678.20**



Custom Built tools over Vault features

Project and Folder structure Creation in vault

- https://www.youtube.com/watch?v=fQ_v_6QfYaE

Assign Access

- https://youtu.be/g3r07Mpyzjs

Document Creation

- https://youtu.be/WMML12OXjhw

Mass Upload

- https://youtu.be/EQhvmwEQe5Y

Document Task creation

- https://youtu.be/RC7RvwPyxJI

Document Dash board

- https://youtu.be/IZ8tBMuMxio

DIN

- https://youtu.be/3WNl6QPURfc

Surveyor Comments

- https://youtu.be/60b1SU5VDfY

Customer Comments

- https://youtu.be/ISK46ak5IVM

Item Code Generator

- https://youtu.be/RXxSRnC2KHE

Future looks better!

LIVE CAD INTEGRATION

MIGRATION OF DATA
BETWEEN VARIOUS LIVE
PROJECTS

INTEGRATION WITH ERP
QUALITY SERVER

INTEGRATION TO QUALITY

INTEGRATION WITH PMS
SYSTEM

PROJECT MANAGEMENT

ON-HOLD STATUS
INTEGRATION WITH ERP

DIRECT TO ERP

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