

NSRP Panel Project: (2019-483-012)

Automated Detail Planning and Instant Earned Value Control

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Program Technical Representative: Jamie Breakfield (HII-Ingalls)

NSRP Panel Project
(2019-483-012)
Business Technology & SDMT Joint Panel

Project Team



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Austal USA

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Fincantieri Marinette Marine

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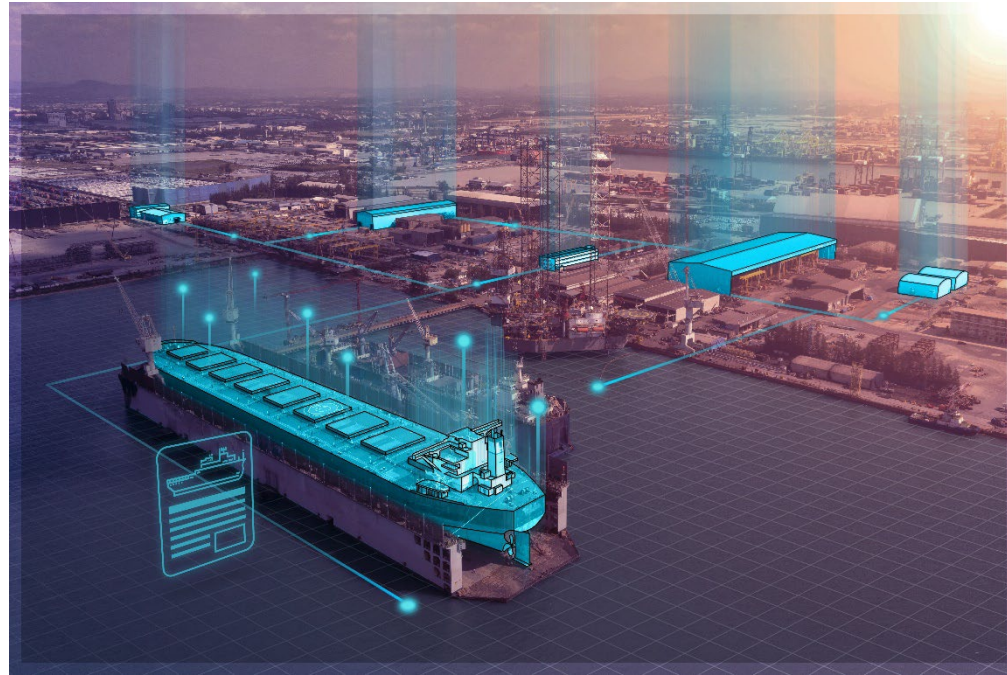
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Floorganise

Ronald de Vries, Managing Director

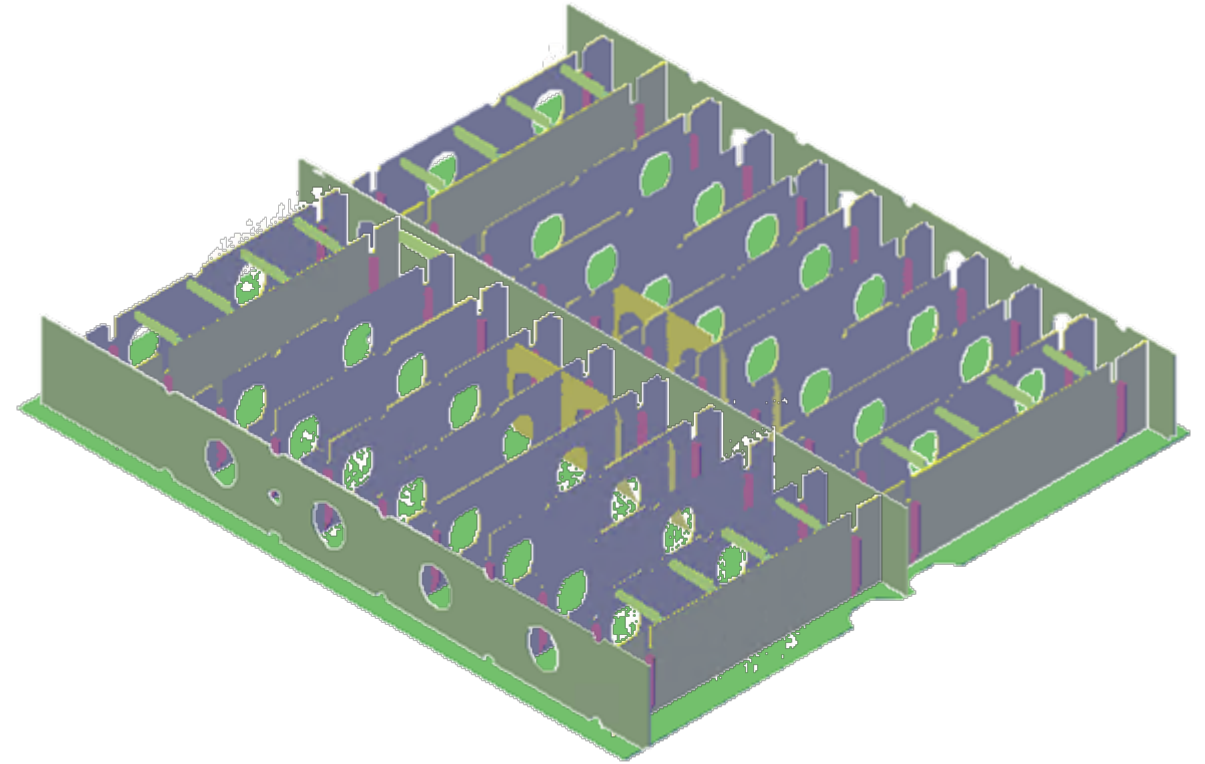
Automated Detail Planning and Instant Earned Value Control



Applying ShipConstructor part metadata to automate detail planning sequencing and budget setting (hours/duration) –to enhance project performance and EVMS control

Project Goals

- Automate the detail planning process coordinated with the project plan through a direct integration with engineering data
- Automated sequencing, budgeting (hours/duration), resource allocation, and Earned Value Management System (EVMS) control.
- Integrate the 3D engineering design model to allow metadata at the part level to drive the automated planning algorithm and interoperability with ERP, planning, EVMS and shop floor control.



Project Data Targeted

1. SSI and Floorganise conducted value stream mapping of information at each of the participating shipyards
2. Captured Business processes and Data requirements of each participant.
3. Targeted groups at the shipyards included:
Engineering, Production, IT, Planning and Project Control Processes

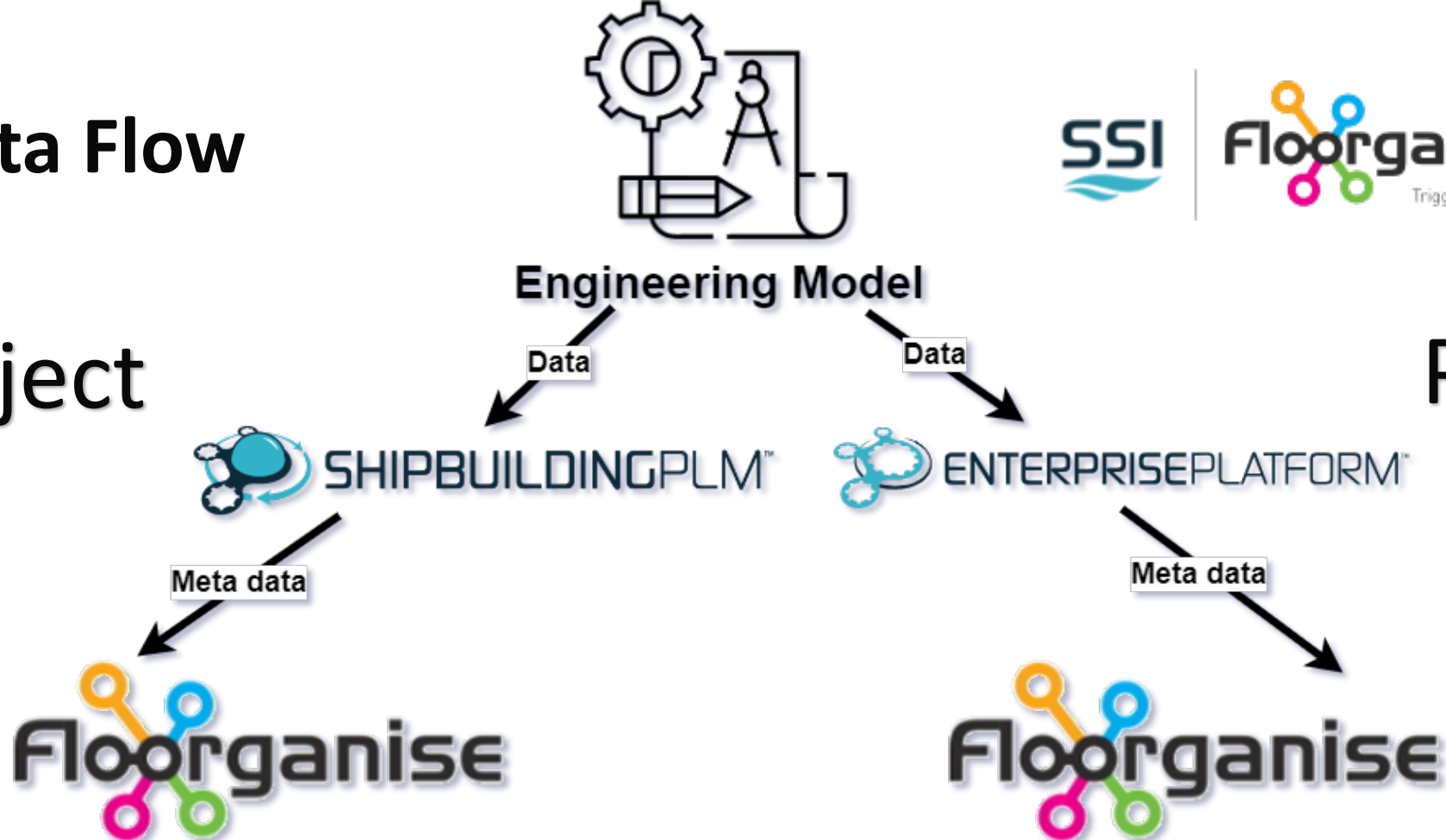
Floorganise and SSI defined what data is available to exported form Enterprise Platform to the Floor2Plan Tool.



The Data Flow

RA-Project

PP-Project



What happens in Floor2Plan

The Goal: Generate automated detail planning

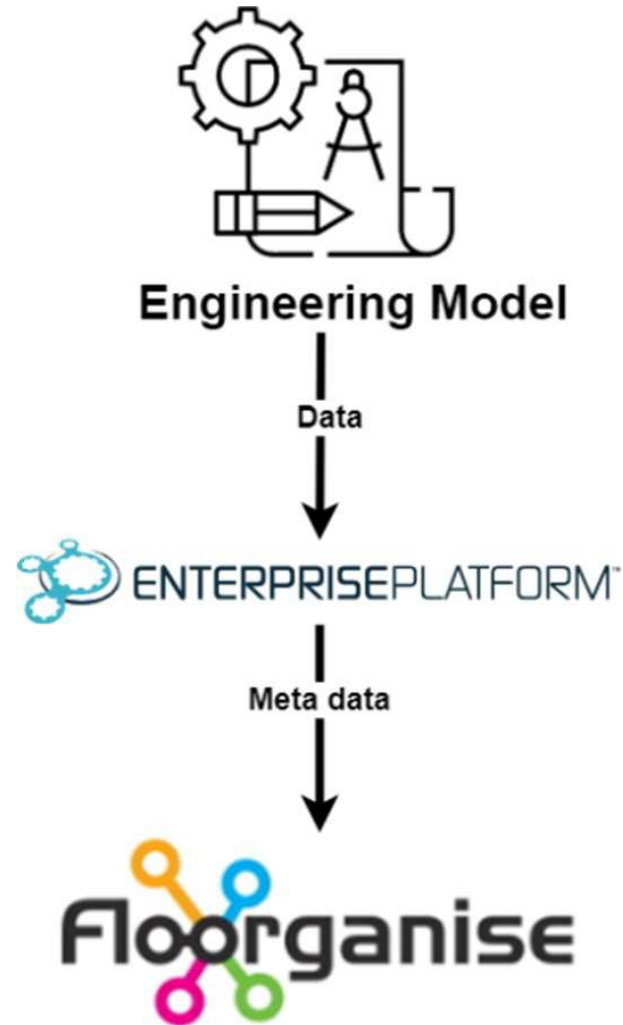
- Metadata utilized to create Jobs/tasks with
 - Budgets
 - Timeslots
- The automation creates more granular planning
- Enables better progress reporting
- Methods for better shop floor control

What happens in Floor2Plan

The Goal: More robust earned value management

- Metadata utilized to generate earned value reports
- The automation creates more granular report data
- Allowing for instant up to date Earned Value reports

The Data Flow



PP-Project

What happens in Floor2Plan

The Goal: More robust earned value management

- Metadata utilized to generate earned value reports
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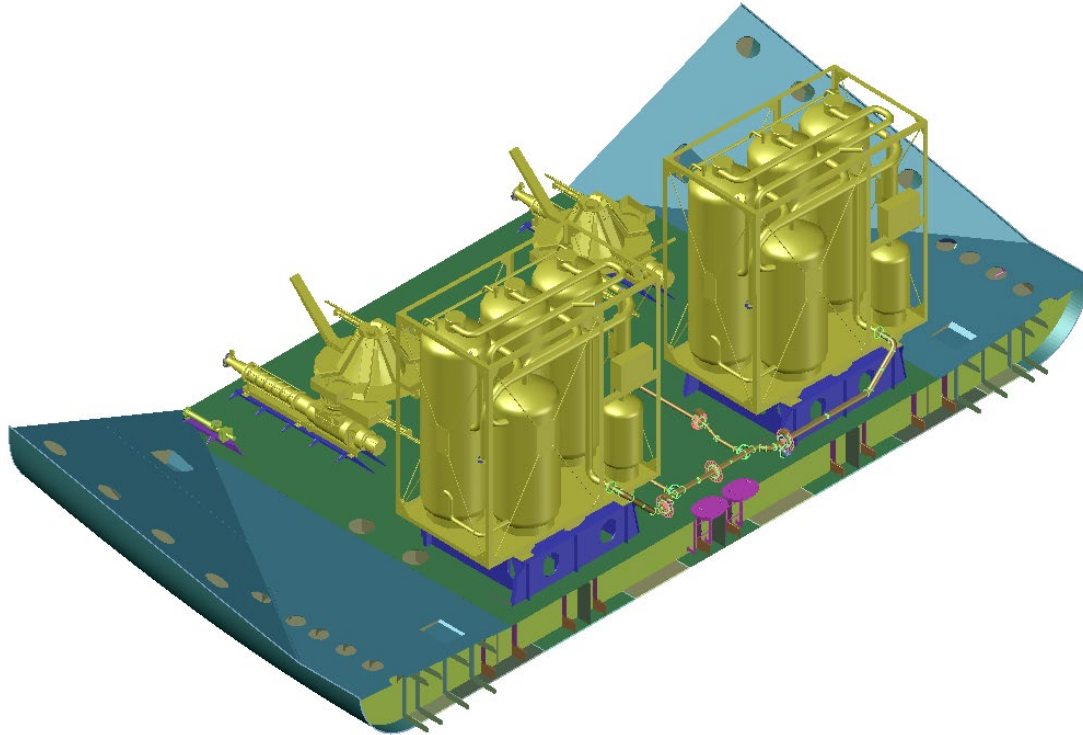
The Data Flow



Using EnterprisePlatform to access the same engineering model as ShipbuildingPLM.

- The only difference is that it's file-based
- PublisherLT is the user interface of EnterprisePlatform
- PublisherLT generates and provides a zip file
- The zip file is then imported into Floor2Plan
- Zip file contains relevant metadata, drawings and figures of the parts.

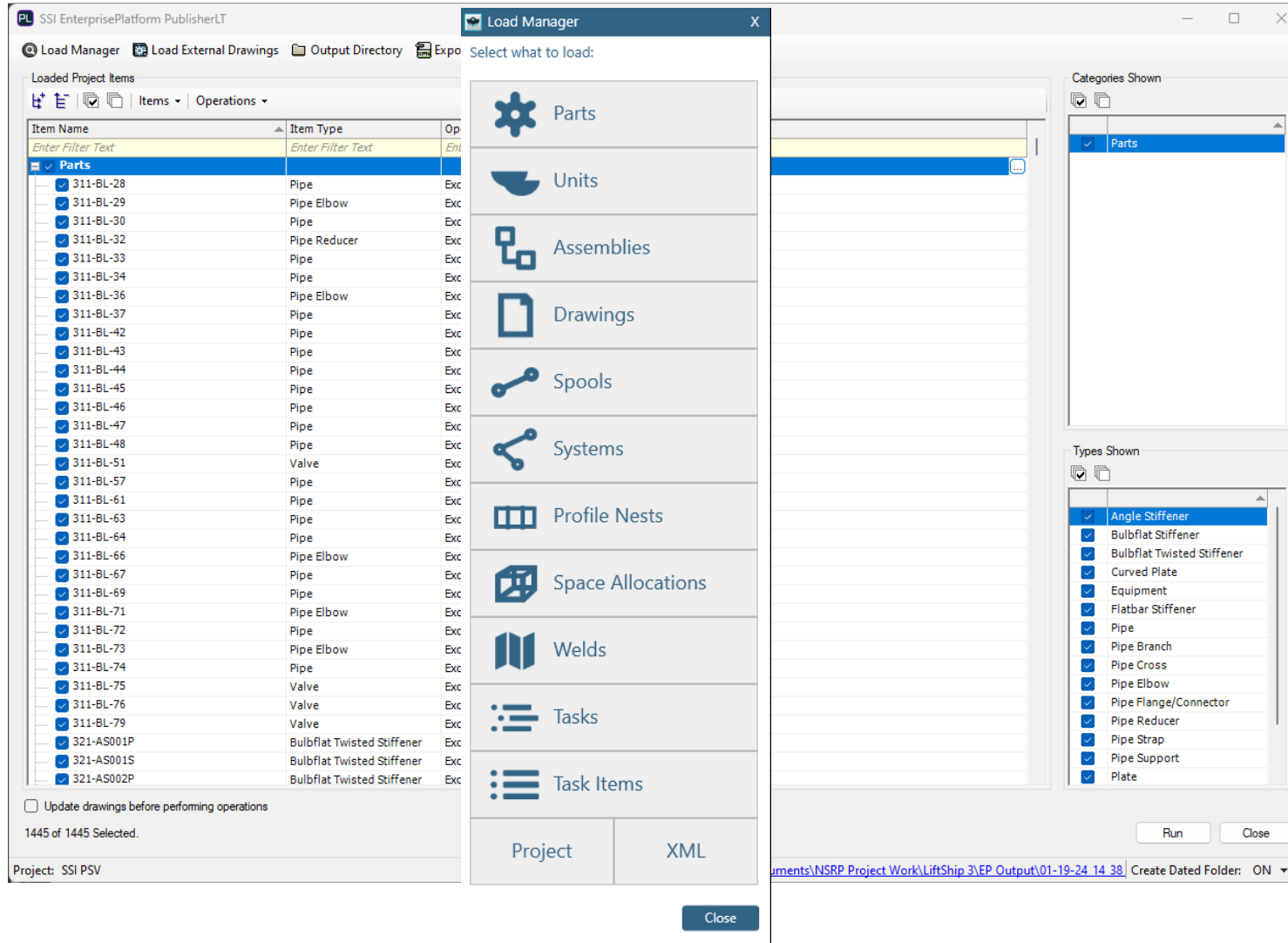
The Data Flow



Within ShipConstructor we targeted an assembly or block that we want to export information for planning. In this case the workshop used “321” Block of the ShipConstructor provided PSV Project.

- The engineering data had a hierarchy
- The drawings were grouped into:
 - Structures
 - Equipment
 - Pipes

The Data Flow



We load the targeted information into EnterprisePlatform PublisherLT and run the extraction report to produce a zip file that is saved to a relevant file location to be accessed for import to the Floorganise tool.

EnterprisePlatform Import routine



Data Flow into Flooranise

After gathering the Zip file

1. Navigate to synchronize page
2. Click on Import Product Hierarchy
3. Select project
4. Select zip file

The screenshot displays the FLOOR2PLAN web application interface. The top navigation bar includes 'FLOOR2PLAN', 'Projects', 'Activities', and 'Reports'. The user is logged in as 'admin (Jon-torfi@floororganise.com)'.

The left sidebar shows the 'SYNCHRONISE' menu with options: Planning, Assets, Synchronise (highlighted with a red circle 1), Application Settings, and System administration.

The main content area shows the 'Import' section with a list of connectors: Import, Export, Connectors, and Shipbuilding PLM. The 'Import Product Hierarchy' connector is selected, and the 'Import Planning' button is highlighted with a red circle 2.

The 'Import Properties' dialog box is open, showing the 'Project' dropdown set to 'Bollinger' (highlighted with a red circle 3).

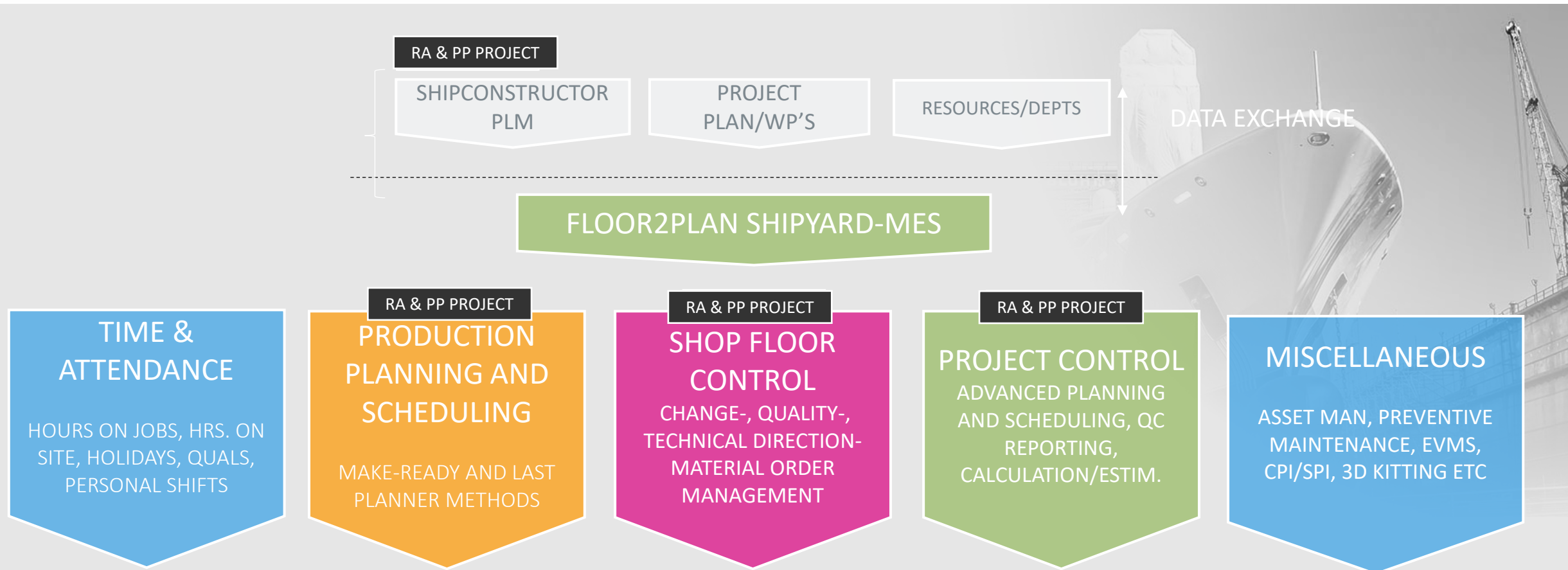
The 'File Product Breakdown' dialog box is open, showing the 'Import Configuration' dropdown set to 'Import Product Hierarchy' and a 'Select files...' button (highlighted with a red circle 4).

The 'SYNCHRONISATION HISTORY' table shows the following data:

	INITIATOR	START	FINISH	STATUS
✓	ShipbuildingPlm	18/02/2024 5:13 AM	18/02/2024 5:27 AM	Finished
✓	ShipbuildingPlm	18/02/2024 5:06 AM	18/02/2024 5:07 AM	Finished
✓	ShipbuildingPlm	18/02/2024 3:22 AM	18/02/2024 3:36 AM	Finished
✓	ShipbuildingPlm	18/02/2024 2:44 AM	18/02/2024 2:57 AM	Finished
✓	ShipbuildingPlm	18/02/2024 2:43 AM	18/02/2024 2:44 AM	Finished
✓	ShipbuildingPlm	15/02/2024 6:47 AM	15/02/2024 6:48 AM	Finished

What is Floor2Plan

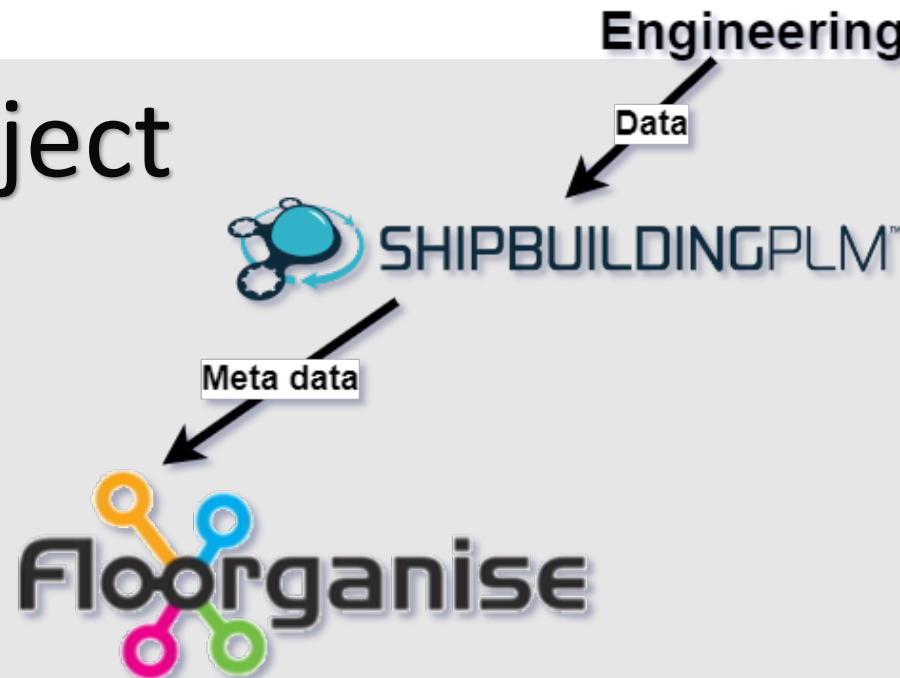
NSRP RA-PROJECT



The Data Flow



RA-Project

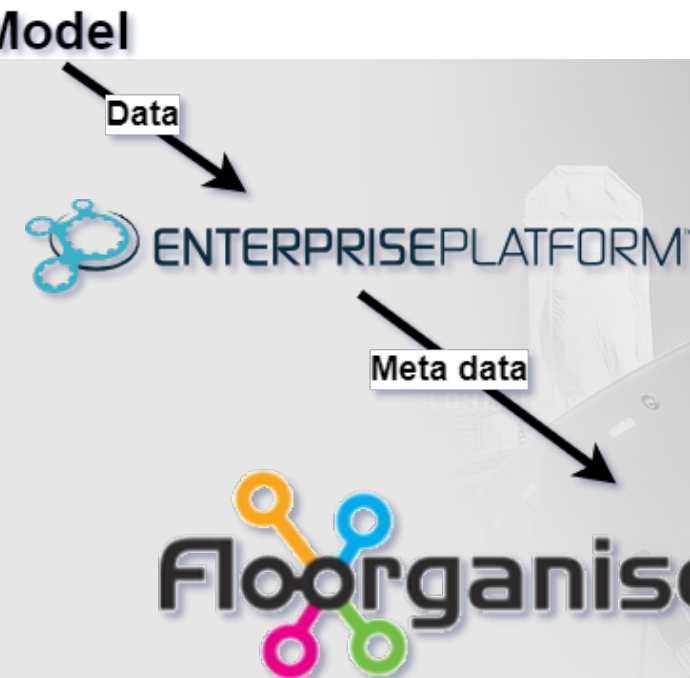


What happens in Floor2Plan

The Goal: Generate automated detail planning

- Metadata utilized to create Jobs/tasks with
 - Budgets
 - Timeslots
- The automation creates more granular planning
- Enables better progress reporting
- Methods for better shop floor control

PP-Project

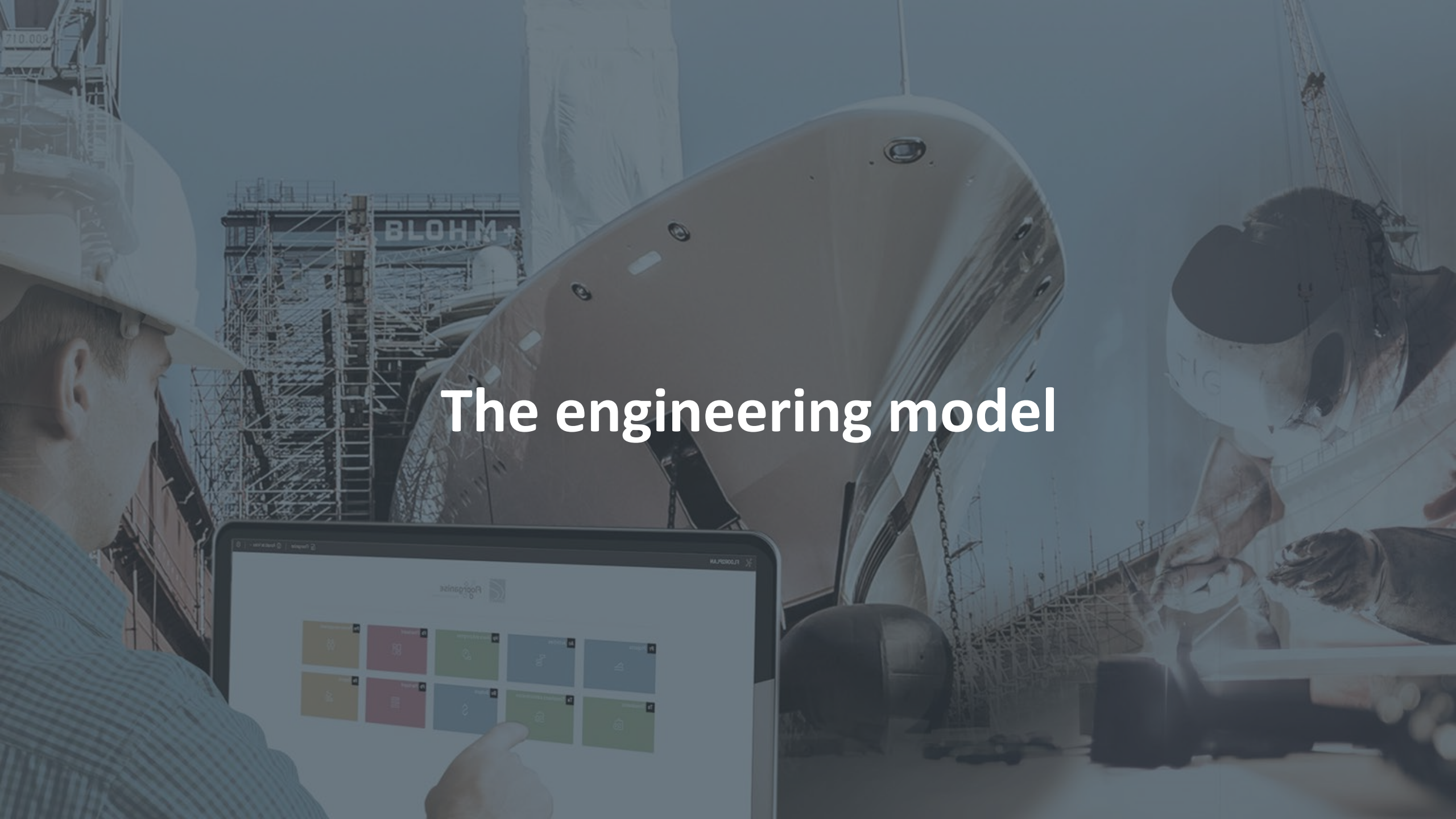


What happens in Floor2Plan

The Goal: More robust earned value management

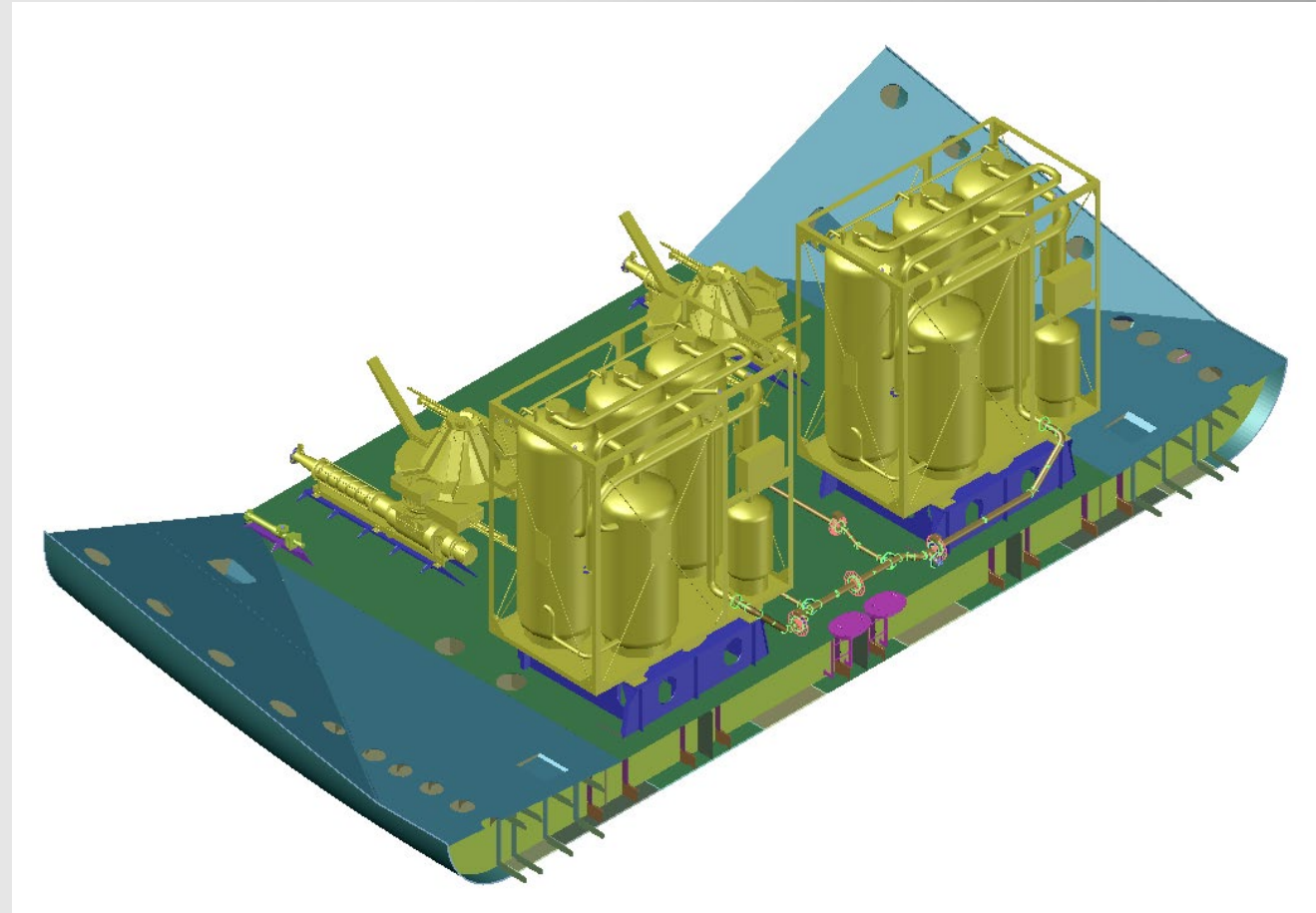
- Metadata utilized to generate earned value reports
- The automation creates more granular report data
- Allowing for instant up to date Earned Value reports

The engineering model



The example engineering data we used was block “321”

- Midsection section block of a ship
- The engineering data had a hierarchy
- The drawings were grouped into:
 - Structures
 - Equipment
 - Pipes

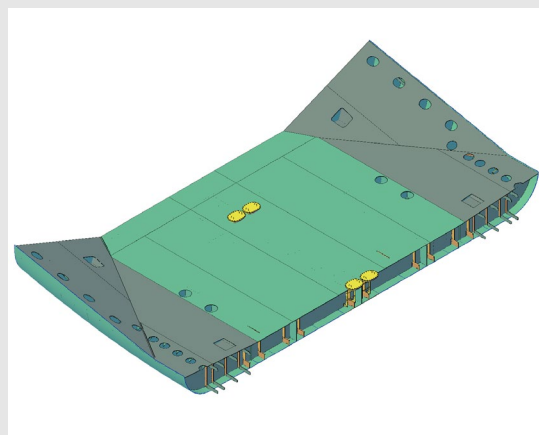
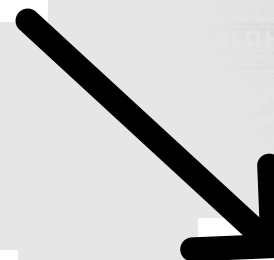
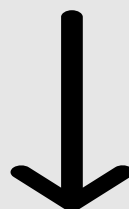
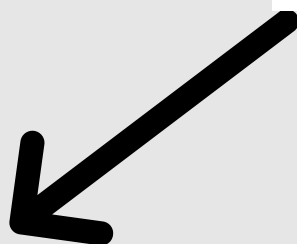
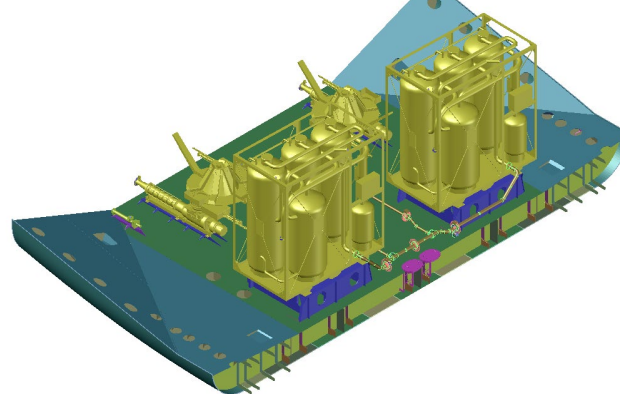


NSRP Work Shop

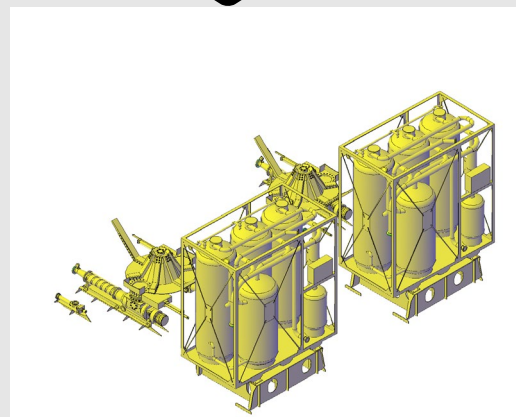
The engineering model



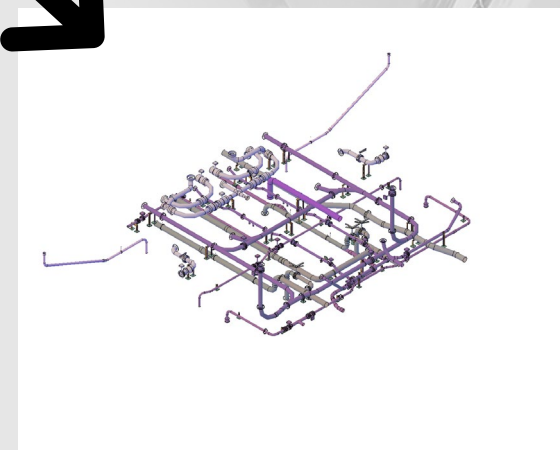
Block: 321



Structure Assembly

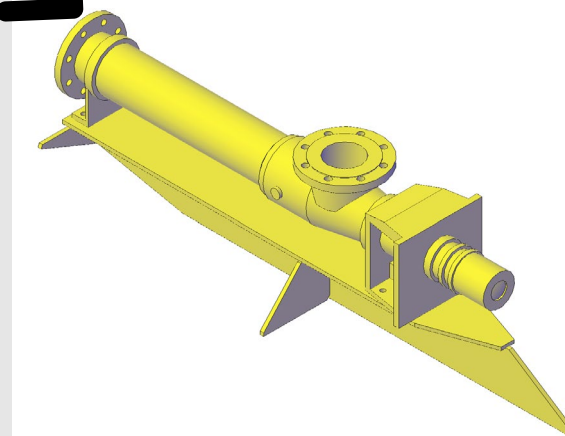
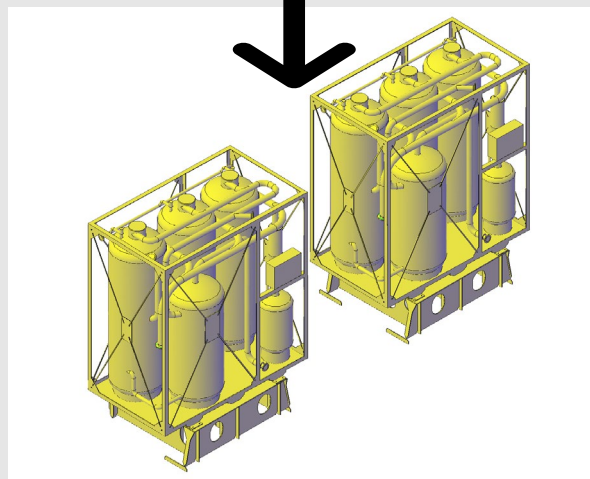
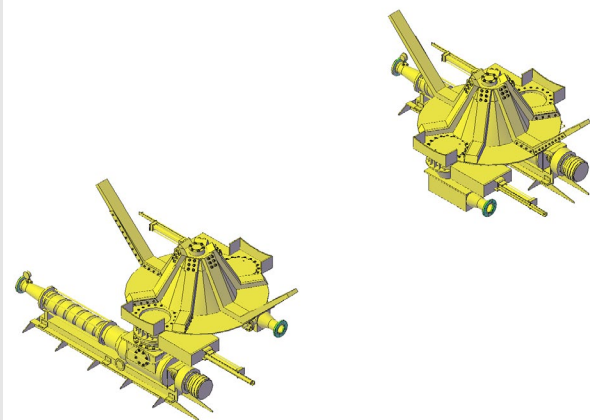
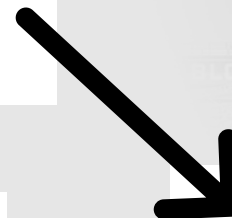
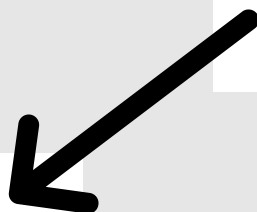
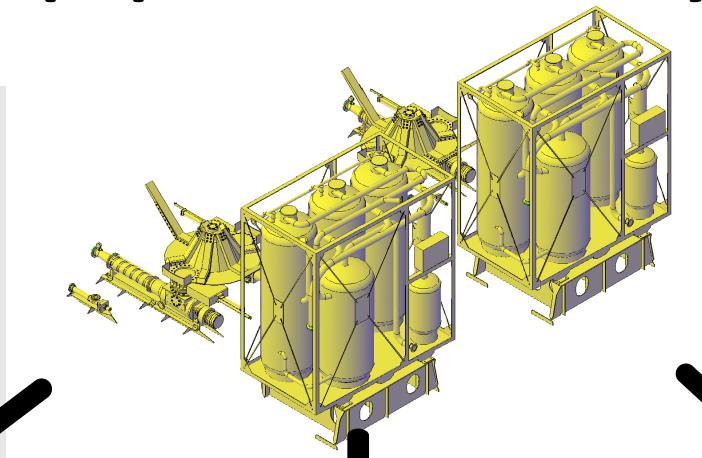


Equipment Assembly



Pipe Assembly

Equipment Assembly

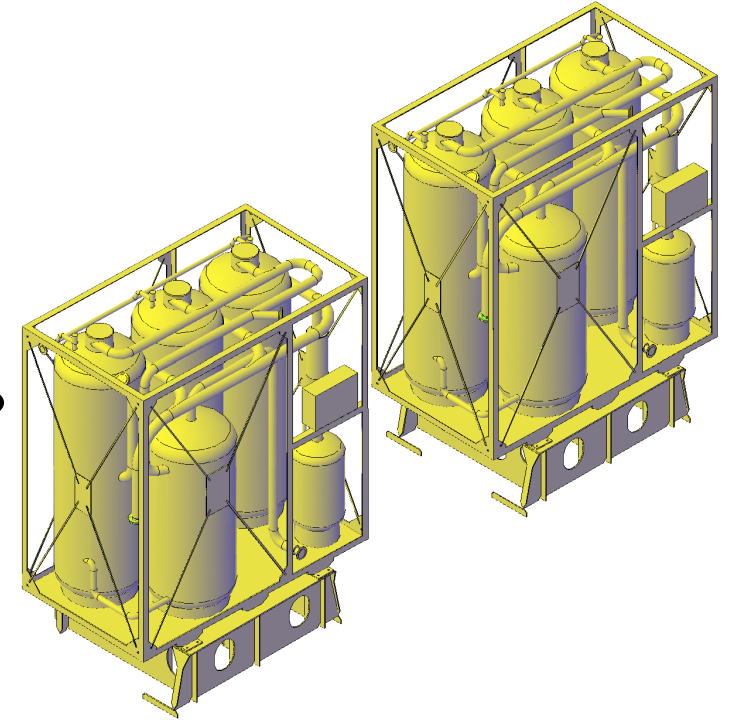
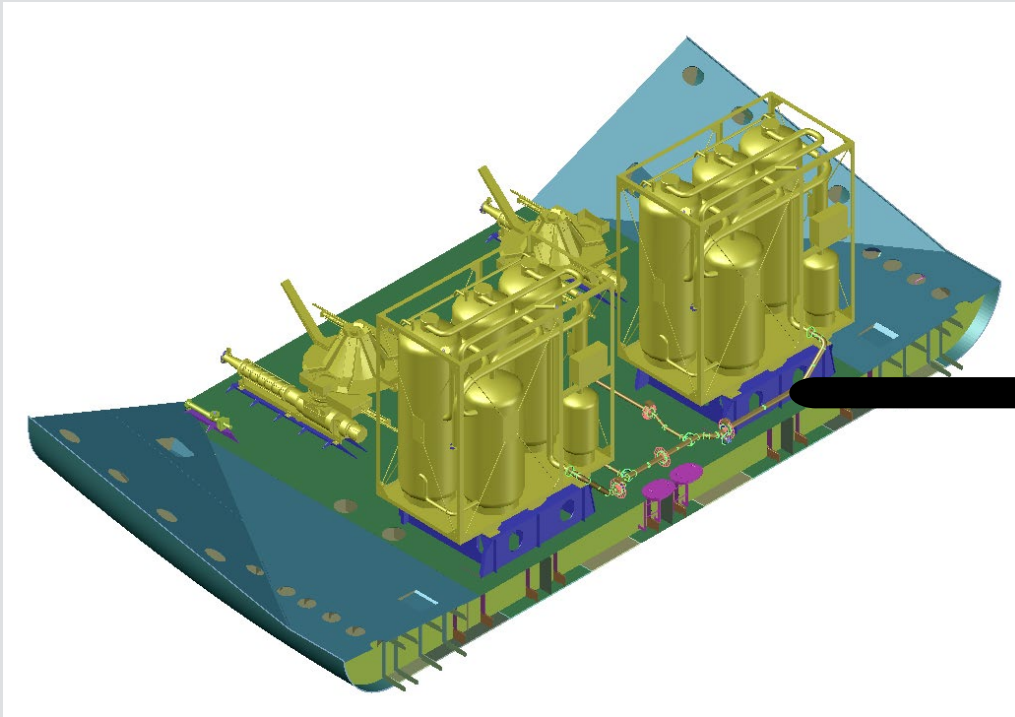


Drill feeder

Dry Bulk Discharge

Stripping Pump

Topics



- Creating detailed planning from the metadata of the engineering model
- Results in a project plan with many activities
- To simplify we are going to focus on the assembly for the “**Dry Bulk Discharge**”

Templates

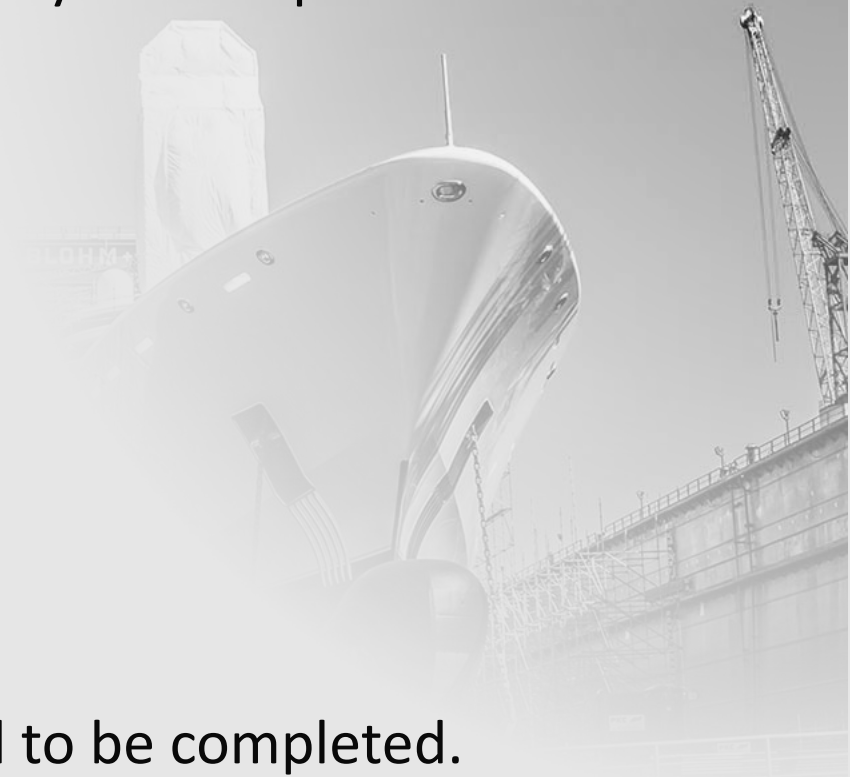
A construction worker wearing a white hard hat and safety glasses is looking at a tablet. The tablet screen shows a software interface with a grid of colorful tiles (yellow, red, green, blue) and icons. The background is a large ship hull under construction, with the word "BLOHM" visible on a structure. The image is overlaid with a semi-transparent dark blue filter.

NSRP Work Shop

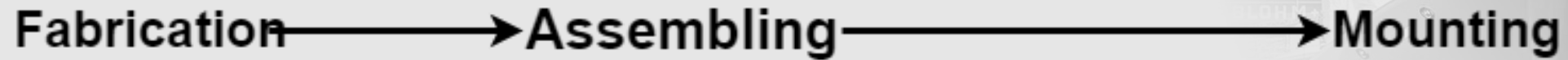
What are templates



- Floor2Plan templates are exactly what the name implies: they are templates.
- They consist of a standard value stream need to build:
 - Units
 - Blocks
 - Assemblies
 - Systems
 - Plates
 - Spools
 - Etc.
- All template activities are sequenced with a set duration.
- Each activity will consist of resource assignments that need to be completed.
- The resource assignments are assigned to departments to oversee and disciplines for execution.
- Templates also contain activity relationships, material requirements and more



Assembly

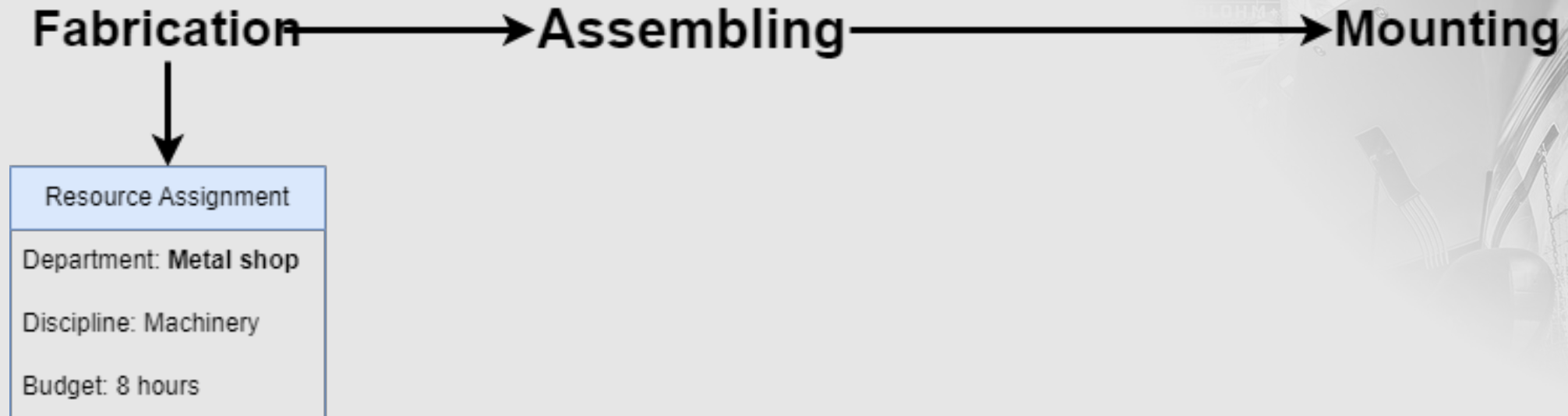


NSRP Work Shop

Assignments for the fabrication activity

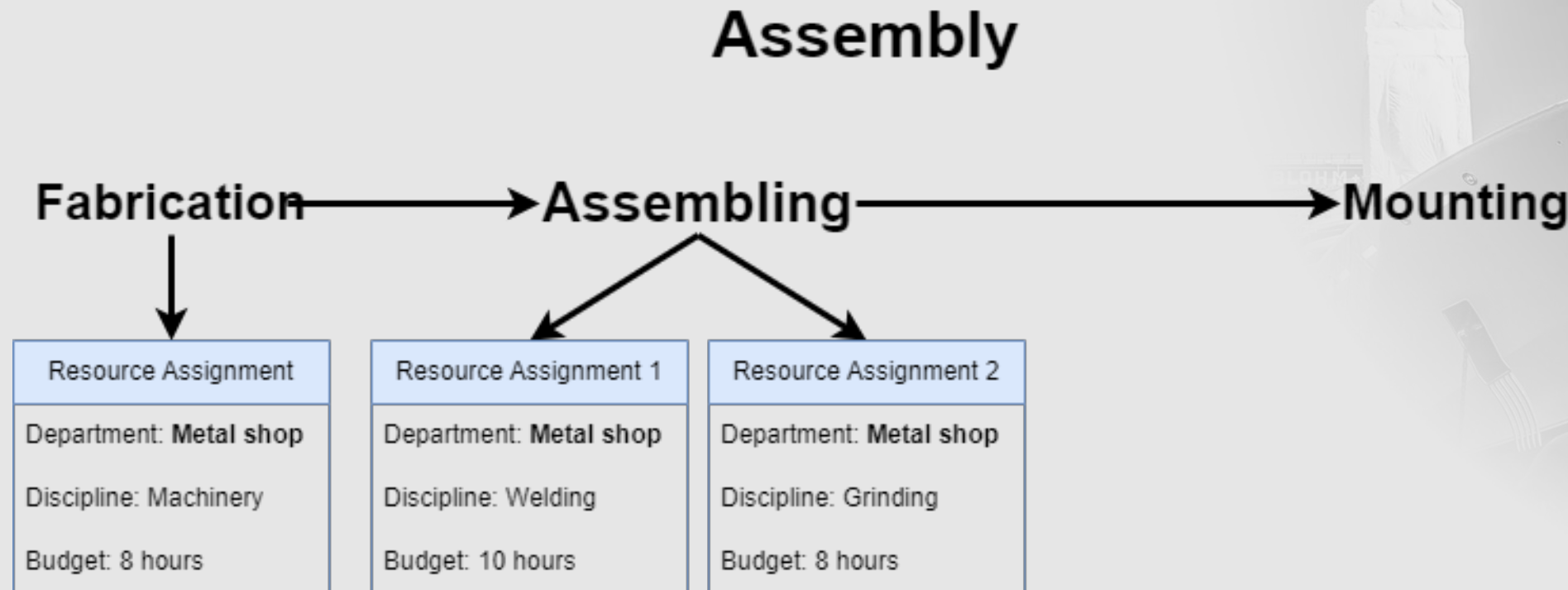


Assembly



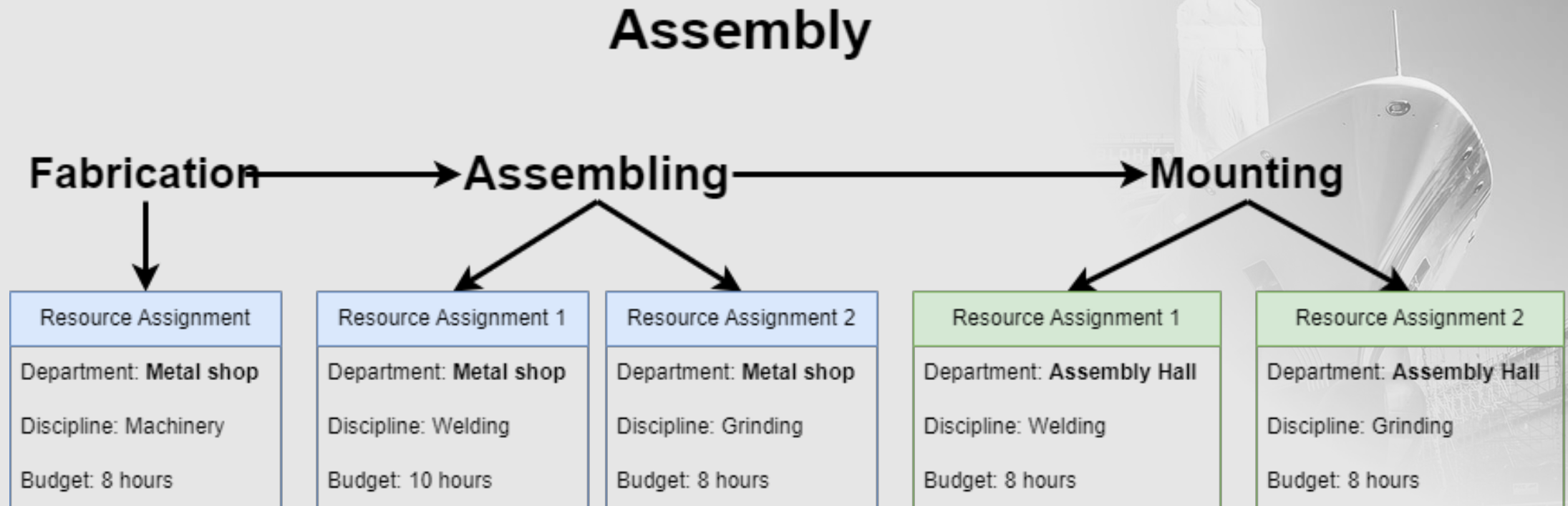
NSRP Work Shop

Assembly assignments



NSRP Work Shop

Mounting assignments

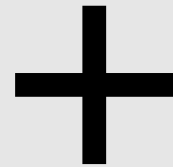
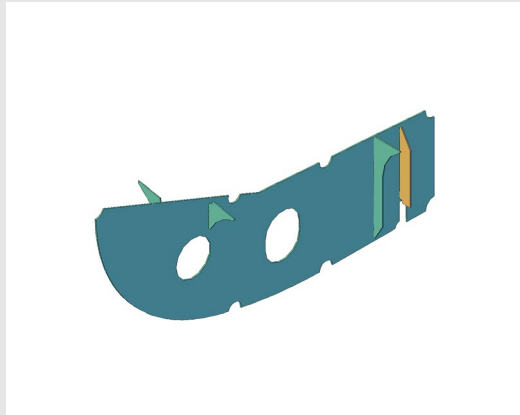


NSRP Work Shop

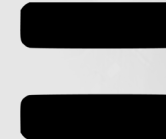
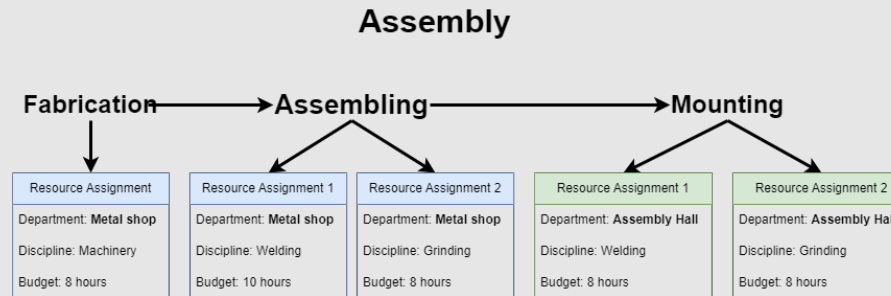
Drawings + Templates = Detail planning



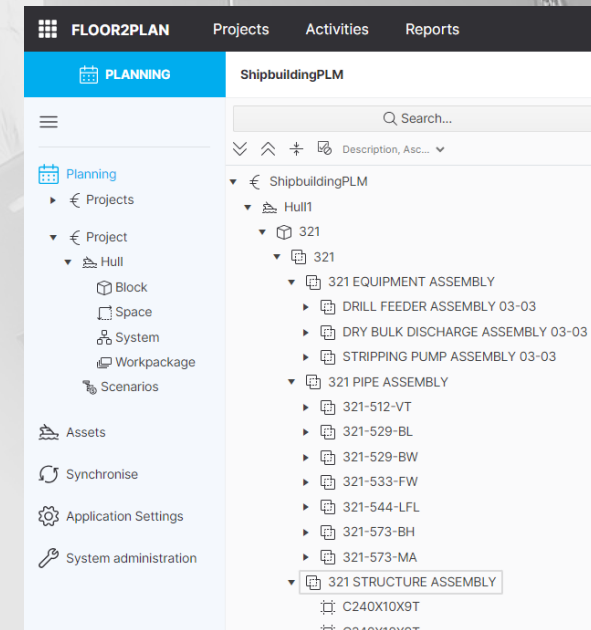
Engineering model



Templates



Detail planning



We use the metadata from the drawings as input into the templates.

The system then turns the engineering model metadata into a detailed project plan.

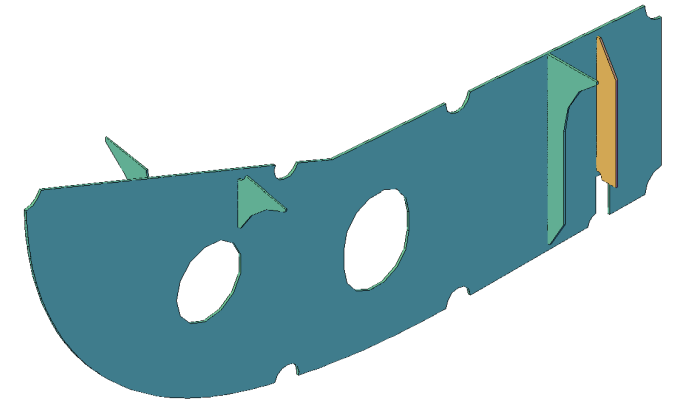
More detailed project plans increase reporting capabilities and other functions

NSRP Work Shop

Engineering model metadata



- From the metadata, we can use attributes like:
 - Weight
 - Surface Area
- Scale budgets and durations
- Making the detail planning less static and scale it based on the component's magnitude.



NSRP Work Shop

Benefits of a detailed project plan

Automating the creation of the project plans.

- Enables foreman progress in more detail
- Drawing names can become checklists
- More detailed material call-offs

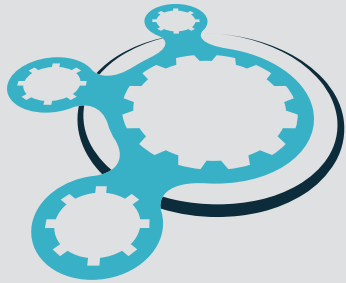


The screenshot displays the FLOOR2PLAN software interface. The top navigation bar includes 'FLOOR2PLAN', 'Projects', 'Activities', and 'Reports'. A blue 'PLANNING' tab is active. The left sidebar contains a menu with 'Planning' (selected), 'Assets', 'Synchronise', 'Application Settings', and 'System administration'. Under 'Planning', there are sub-items: '€ Projects', '€ Project', and 'Hull'. The 'Hull' item is expanded, showing 'Block', 'Space', 'System', 'Workpackage', and 'Scenarios'. The main content area is titled 'ShipbuildingPLM' and features a search bar and a list of project items. The list is organized hierarchically: 'ShipbuildingPLM' (expanded) contains 'Hull1' (expanded), which contains '321' (expanded), which contains '321 EQUIPMENT ASSEMBLY' (expanded), '321 PIPE ASSEMBLY' (expanded), and '321 STRUCTURE ASSEMBLY' (expanded). The '321 EQUIPMENT ASSEMBLY' list includes 'DRILL FEEDER ASSEMBLY 03-03', 'DRY BULK DISCHARGE ASSEMBLY 03-03', and 'STRIPPING PUMP ASSEMBLY 03-03'. The '321 PIPE ASSEMBLY' list includes '321-512-VT', '321-529-BL', '321-529-BW', '321-533-FW', '321-544-LFL', '321-573-BH', and '321-573-MA'. The '321 STRUCTURE ASSEMBLY' list includes 'C240X10X9T'.

A construction worker wearing a white hard hat and a blue and white checkered shirt is looking at a tablet. The tablet screen shows a software interface with a grid of colorful tiles (yellow, red, green, blue) and icons. In the background, a large white ship hull is being lifted by a crane. The word "BLOHM" is visible on a structure in the background. The scene is set in a construction yard with scaffolding and other industrial equipment.

EnterprisePlatform Data import

EnterprisePlatform Import routine



ENTERPRISEPLATFORM™

The Enterprise Platform import routine accesses the same engineering model as ShipbuildingPLM.

- The only difference is that it's file-based
- EnterprisePlatform provides a zip file
- The zip file is then imported into Floor2Plan
- Zip file contains metadata, drawings and figures of the parts.

EnterprisePlatform

Import routine



How to import the data

After gathering the Zip file

1. Navigate to synchronise page
2. Click on Import Product Hierarchy
3. Select project
4. Select zip file

The screenshot displays the FLOOR2PLAN EnterprisePlatform interface. The top navigation bar includes 'FLOOR2PLAN', 'Projects', 'Activities', and 'Reports'. The user is logged in as 'admin (Jon-torfi@floorganise.com)'.

The left sidebar shows the 'SYNCHRONISE' menu with options: Planning, Assets, Synchronise (highlighted with a red circle 1), Application Settings, and System administration.

The main content area shows the 'Import' section with a list of connectors: Import, Export, Connectors, and Shipbuilding PLM. The 'Import Product Hierarchy' option is highlighted with a red circle 2.

The 'Import Product Hierarchy' window is open, showing the 'Import Properties' section with a dropdown menu for 'Project' set to 'Bollinger' (highlighted with a red circle 3). The 'File Product Breakdown' section shows the 'Import Configuration' dropdown set to 'Import Product Hierarchy' and a 'Select files...' button (highlighted with a red circle 4).

The 'SYNCHRONISATION HISTORY' table is visible at the bottom right, showing a list of completed imports.

	INITIATOR	START	FINISH	STATUS
✓	ShipbuildingPlm	18/02/2024 5:13 AM	18/02/2024 5:27 AM	Finished
✓	ShipbuildingPlm	18/02/2024 5:06 AM	18/02/2024 5:07 AM	Finished
✓	ShipbuildingPlm	18/02/2024 3:22 AM	18/02/2024 3:36 AM	Finished
✓	ShipbuildingPlm	18/02/2024 2:44 AM	18/02/2024 2:57 AM	Finished
✓	ShipbuildingPlm	18/02/2024 2:43 AM	18/02/2024 2:44 AM	Finished
✓	ShipbuildingPlm	15/02/2024 6:47 AM	15/02/2024 6:48 AM	Finished

A background image showing a shipbuilding yard with large ship hulls under construction. One hull has the name 'BLOHM' visible. In the foreground, a person wearing a white hard hat and a blue checkered shirt is looking at a laptop. The laptop screen displays a software interface with a grid of colorful tiles (yellow, red, green, blue) and icons, representing a PLM system. The text 'ShipbuildingPLM Data import' is overlaid in white on the right side of the image.

ShipbuildingPLM Data import

Importing data

The screenshot shows the FLOOR2PLAN web application interface. The top navigation bar includes 'FLOOR2PLAN', 'Projects', 'Activities', and 'Reports'. The user is logged in as 'admin (Jon-torfi@floorganise.com)'. The left sidebar contains a menu with 'Planning', 'Assets', 'Synchronise', 'Application Settings', and 'System administration'. The main content area is titled 'Configuration Shipbuilding PLM' and includes a 'SYNCHRONISE' button. Below this, there are options for 'Import', 'Export', and 'Connectors'. The 'Connectors' section is expanded, showing 'Shipbuilding PLM' with a red circle '1' next to it. To the right of the 'SHIPBUILDINGPLM' logo, there is a 'Not Started' status and a 'Synchronise' button with a red circle '2' next to it. Below the logo, there is an 'ADVANCED' section with a checkbox for 'Include images'. At the bottom, there is a 'SYNCHRONISATION HISTORY' table.

	INITIATOR	START	FINISH	STATUS	MESSAGES
✓	ShipbuildingPlm	18/02/2024 5:13 AM	18/02/2024 5:27 AM	Finished	
✓	ShipbuildingPlm	18/02/2024 5:06 AM	18/02/2024 5:07 AM	Finished	

We created a direct data exchange to import the engineering model from ShipbuildingPLM

1. The connector has a dedicated page in our system where users can view the results of import.
2. The Synchronise button starts the import procedure and builds up the detailed planning of the project.

Example of the detail planning



DELIVERING
OPERATIONAL
EXCELLENCE

The Automatic detail planning



Model Drawings Production Drawings BOM BOM Structure Changes			
3			
Part Name ↑	Type	Revision	Generat...
[-] 321 EQUIPMENT ASSEMBLY	Assembly	A	1
[-] DRILL FEEDER ASSEMBLY 03-03	Assembly	A	1
[-] DRY BULK DISCHARGE ASSEMBLY ...	Assembly	A	1
[-] STRIPPING PUMP ASSEMBLY 03-03	Assembly	A	1
[-] 321 PIPE ASSEMBLY	Assembly	A	1
[-] 321-512-VT	Assembly	A	1
[-] 321-529-BL	Assembly	A	1
[-] 321-529-BW	Assembly	A	1
[-] 321-533-FW	Assembly	A	1
[-] 321-544-LFL	Assembly	A	1
[-] 321-573-BH	Assembly	A	1
[-] 321-573-MA	Assembly	A	1
[-] 321 STRUCTURE ASSEMBLY	Assembly	A	1
[-] C240X10X9T	Plate	A	1
[-] C240X10X9T	Plate	A	1
[-] C240X10X9T	Plate	A	1

The drawing
hierarchy from
ShipbuildingPLM
results in an
automated detail
plan in Floor2Plan

ProjectsActivitiesReports

PLANNING

Planning

- € Projects
- € Project
 - Hull
 - Block
 - Space
 - System
 - Workpackage
 - Scenarios

Assets

Synchronise

Application Settings

System administration

ShipbuildingPLM

Description, Asc... ▾

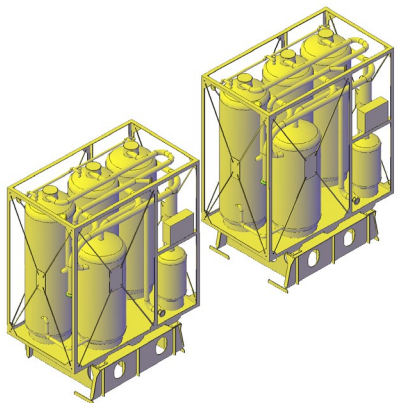
€ ShipbuildingPLM

- Hull1
 - 321
 - 321
 - 321 EQUIPMENT ASSEMBLY
 - DRILL FEEDER ASSEMBLY 03-03
 - DRY BULK DISCHARGE ASSEMBLY 03-03
 - STRIPPING PUMP ASSEMBLY 03-03
 - 321 PIPE ASSEMBLY
 - 321-512-VT
 - 321-529-BL
 - 321-529-BW
 - 321-533-FW
 - 321-544-LFL
 - 321-573-BH
 - 321-573-MA
 - 321 STRUCTURE ASSEMBLY
 - C240X10X9T
 - C240X10X9T

Foundation planning

The plan for the dry bulk discharge assembly can be seen in the figure below.

1. The hierarchy gathered from the engineering model
2. Activities for building the foundation for the dry bulk discharge



^ Bollinger Shipyards
^ Hull1
^ 321
^ 321
^ 321 EQUIPMENT ASSEMBLY
^ DRY BULK DISCHARGE ASSEMBLY 03-03
^ DRY BULK DISCHARGE FOUNDATION 03-01
Pre Fabrication
Assembling
Mounting

