NSRP Panel Project: (2019-483-012)

Automated Detail Planning and Instant Earned Value Control

ATI Project Manager: Nick Laney
Program Technical Representative: Jamie Breakfield (HII-Ingalls)

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

Project Team

Lead:

ShipConstructor Software USA

Patrick Roberts, VP of Sales & Operations
Rob Parker, Professional Services Manager
Darren Guillory, Technical Solutions Specialist
Lee Nicholas, Technical Program Manager

Austal USA

Shawn Wilber, Advanced Ship Building Manager

Fincantieri Marinette Marine

John Krueger, Director of Production

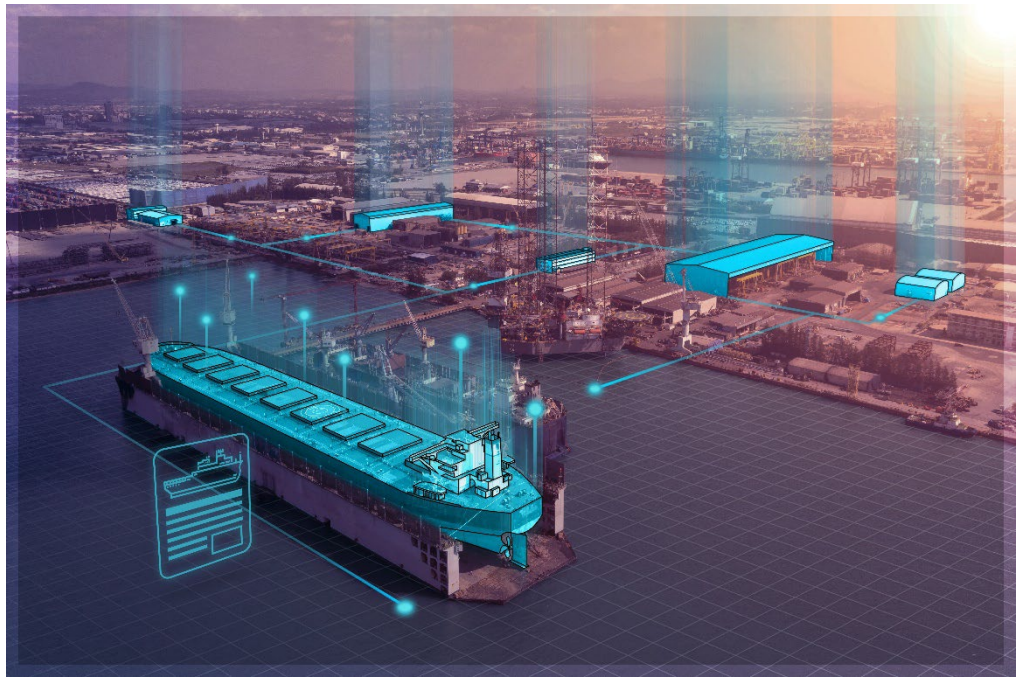
Philly Shipyard

Michel Boeckx, CTO

Floorganise

Ronald de Vries, Managing Director

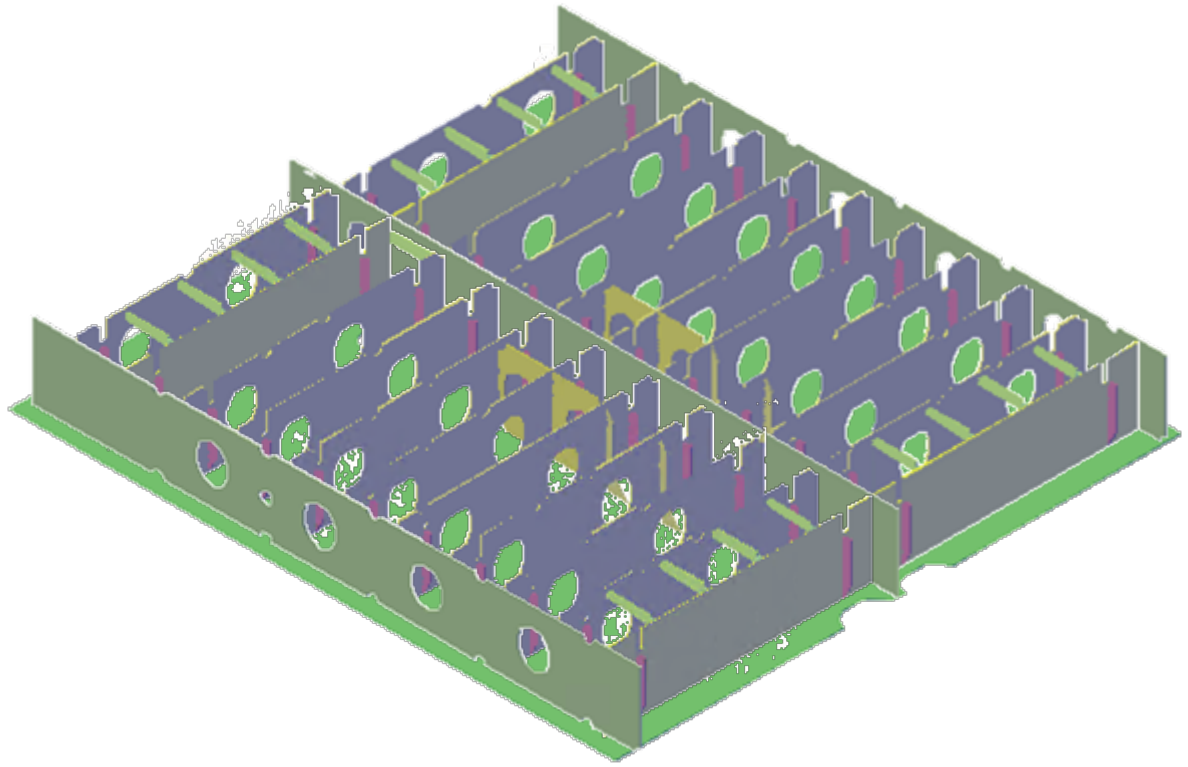
Automated Detail Planning and Instant Earned Value Control



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

Engineering Model

Data

Data

RA-Project

PP-Project

SHIPBUILDINGPLM

ENTERPRISEPLATFORM

Meta data

Meta data

Floorganise

Floorganise

What happens in Floor2Plan

The Goal: Generate automated detail planning

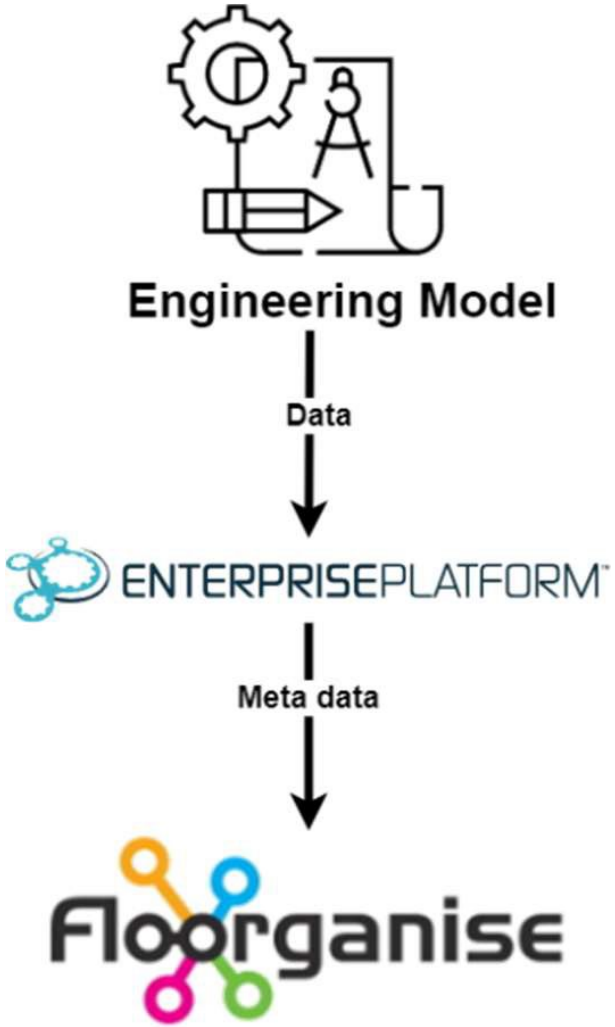
- Metadata utilized to create Jobs/tasks with
  - Budgets
  - Timeslots
- The automation creates more granular planning
- Enables better progress reporting
- Methods for better shop floor control

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

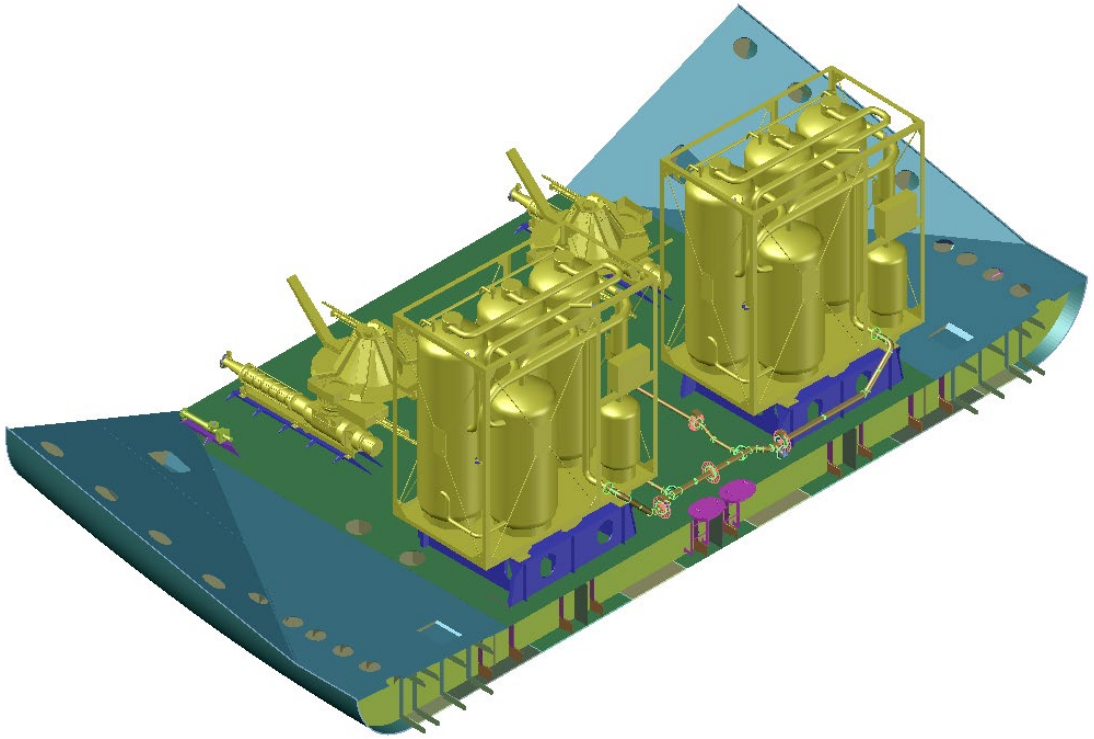
What happens in Floor2Plan
The Goal: More robust earned value management • Metadata utilized to generate earned value reports • The automation creates more granular report data • Allowing for instant up to date Earned Value reports

The Data Flow

Using EnterprisePlatform to accesses 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.

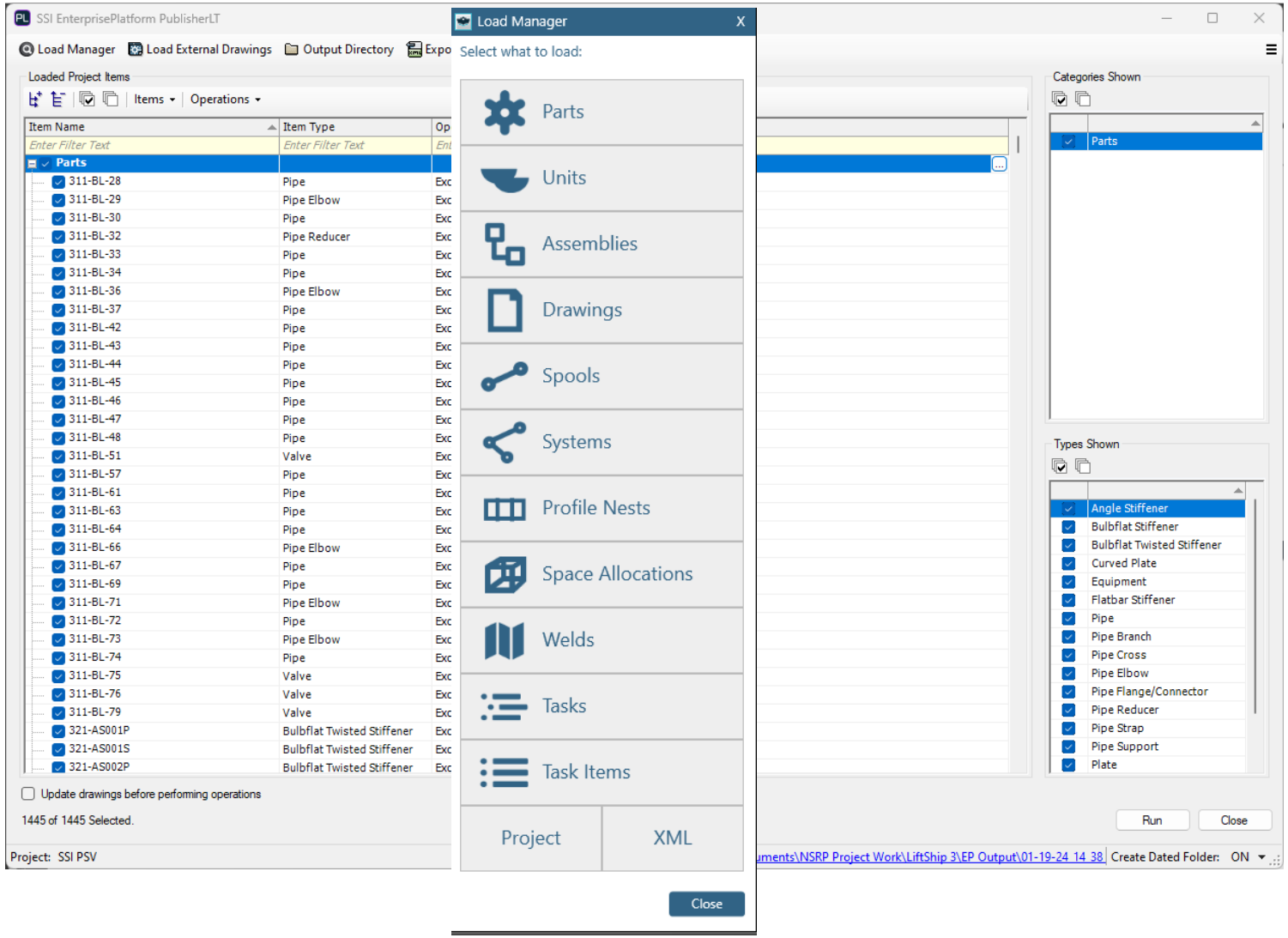
The Data Flow



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



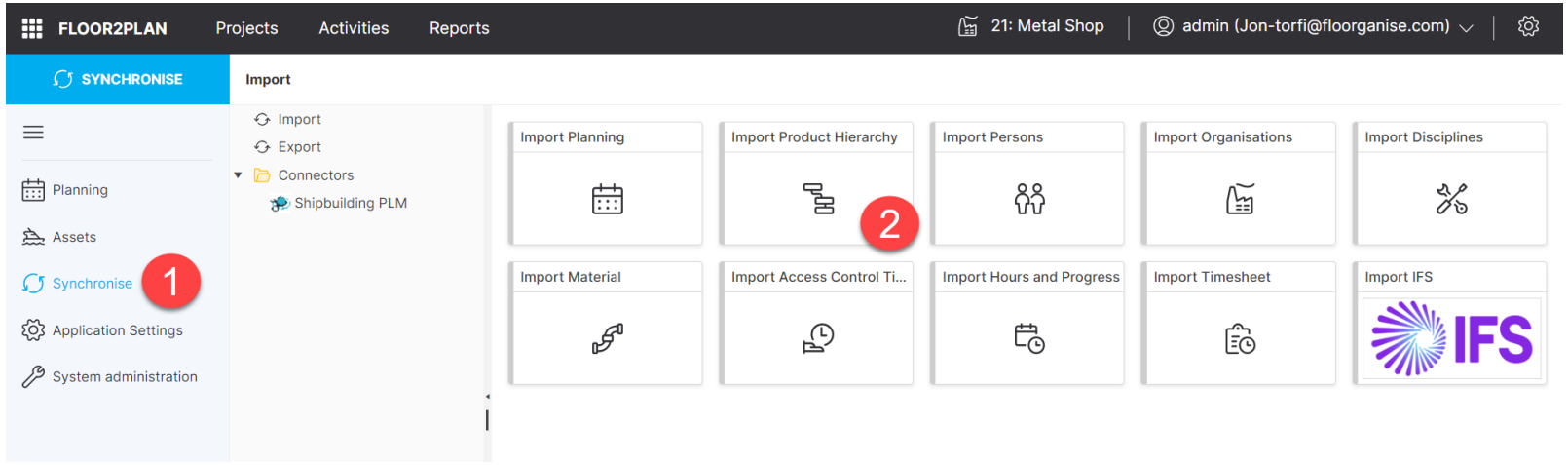
We load the targeted information into EnterprisePlatform PublisherLT and run the extraction report to produce a zip file that is saved to a relevant file location to be accessed for import to the Floorganise tool.

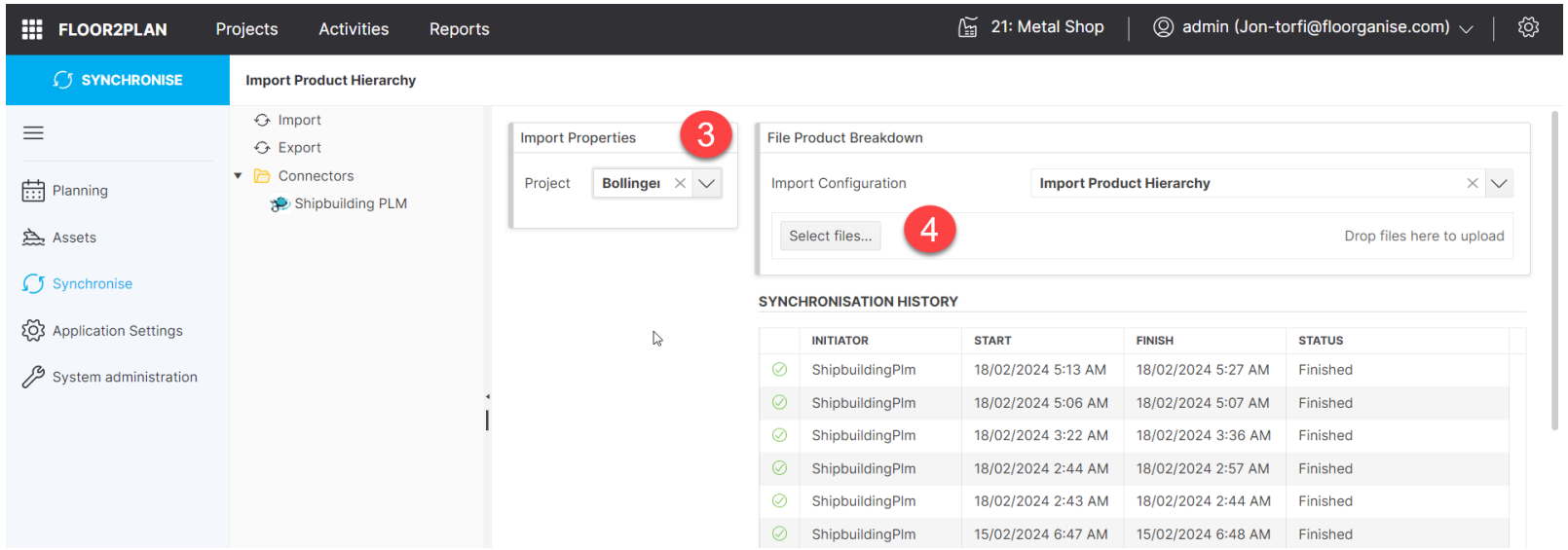
EnterprisePlatform Import routine

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





What is Floor2Plan

NSRP RA-PROJECT

RA & PP PROJECT

SHIPCONSTRUCTOR PLM

PROJECT PLAN/WP'S

RESOURCES/DEPTS

DATA EXCHANGE

FLOOR2PLAN SHIPYARD-MES

TIME & ATTENDANCE

HOURS ON JOBS, HRS. ON SITE, HOLIDAYS, QUALS, PERSONAL SHIFTS

RA & PP PROJECT

PRODUCTION PLANNING AND SCHEDULING

MAKE-READY AND LAST PLANNER METHODS

RA & PP PROJECT

SHOP FLOOR CONTROL

CHANGE-, QUALITY-, TECHNICAL DIRECTION- MATERIAL ORDER MANAGEMENT

RA & PP PROJECT

PROJECT CONTROL

ADVANCED PLANNING AND SCHEDULING, QC REPORTING, CALCULATION/ESTIM.

MISCELLANEOUS

ASSET MAN, PREVENTIVE MAINTENANCE, EVMS, CPI/SPI, 3D KITTING ETC

The Data Flow

Engineering Model

Data

Data

RA-Project

SHIPBUILDINGPLM

Meta data

Floorganise

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

ENTERPRISEPLATFORM

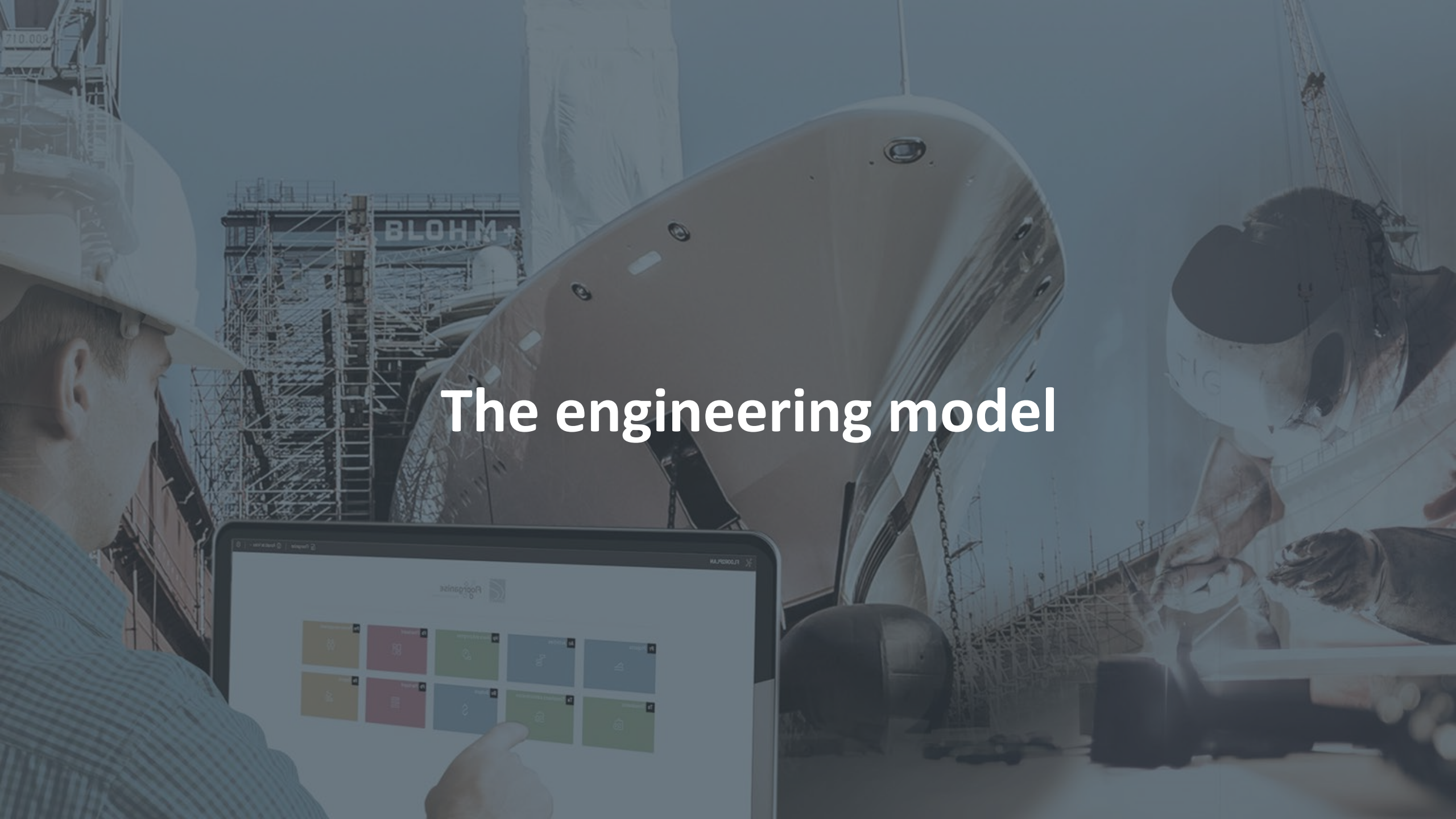
Meta data

Floorganise

What happens in Floor2Plan

The Goal: More robust earned value management

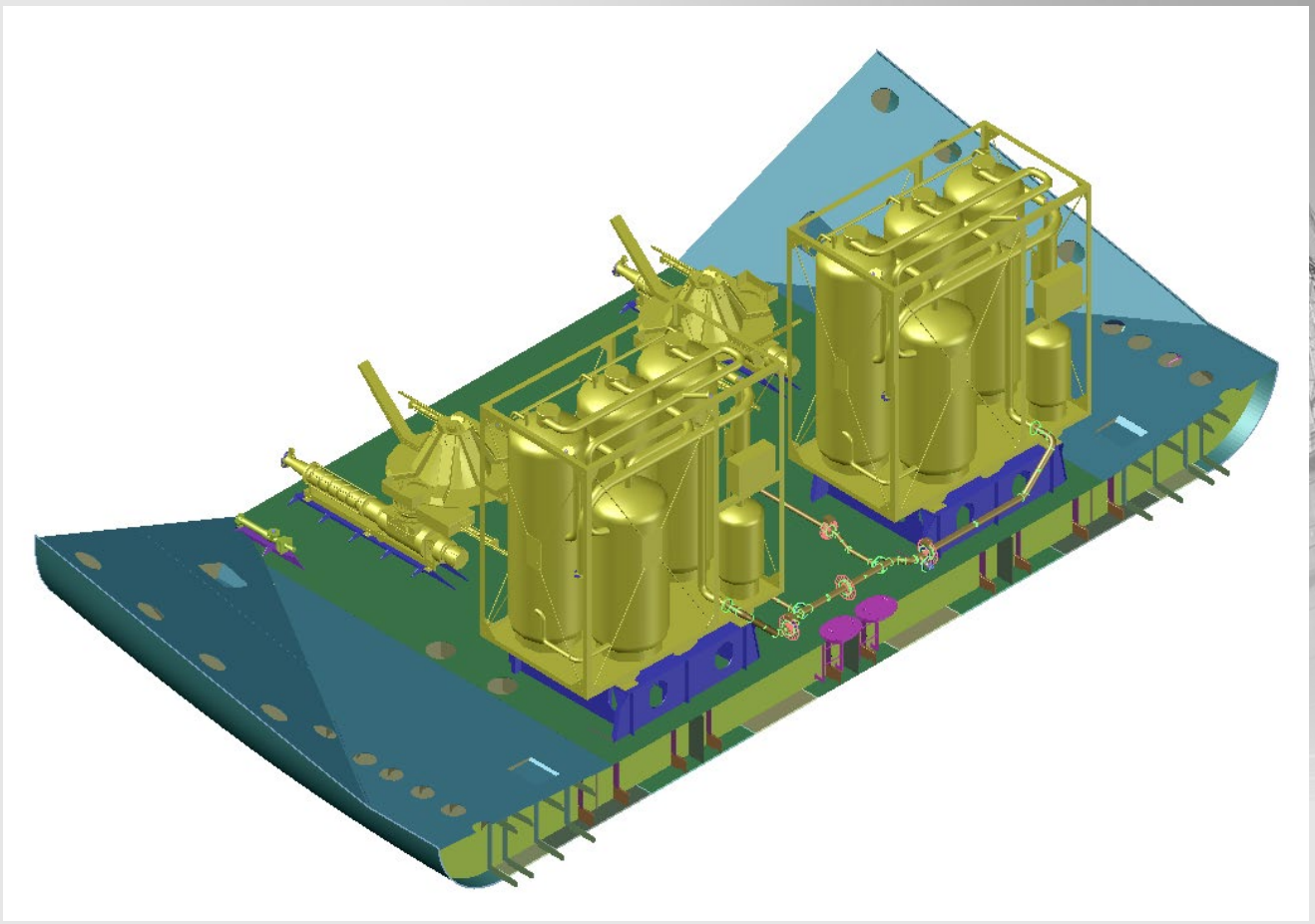
- Metadata utilized to generate earned value reports
- The automation creates more granular report data
- Allowing for instant up to date Earned Value reports



The engineering model

The example engineering data we used was block “321”

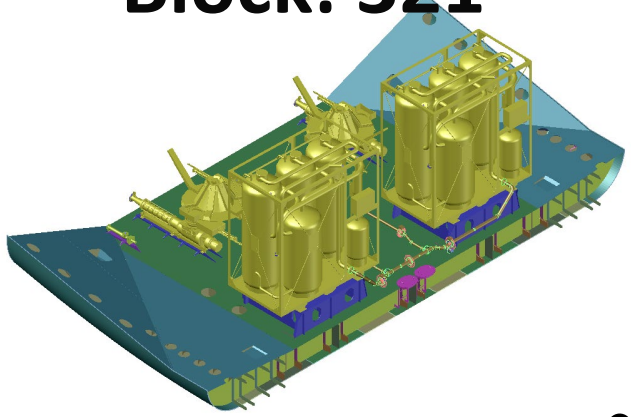
- Midsection section block of a ship
- The engineering data had a hierarchy
- The drawings were grouped into:
  - Structures
  - Equipment
  - Pipes

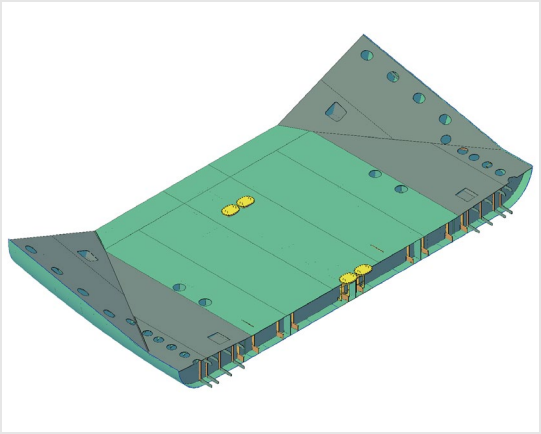


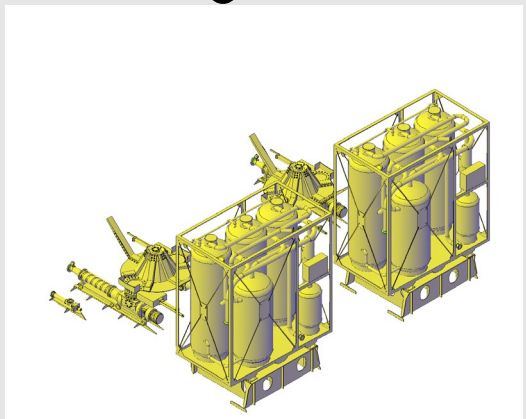
NSRP Work Shop

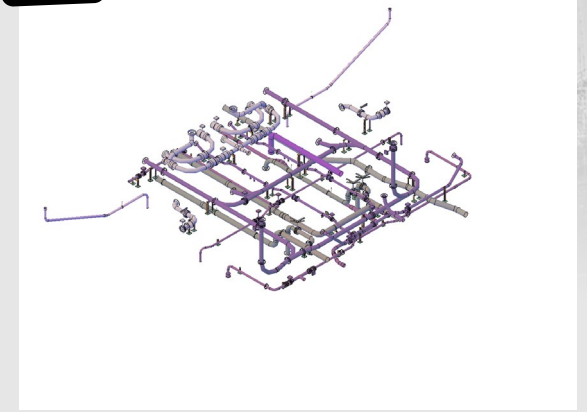
The engineering model

Block: 321









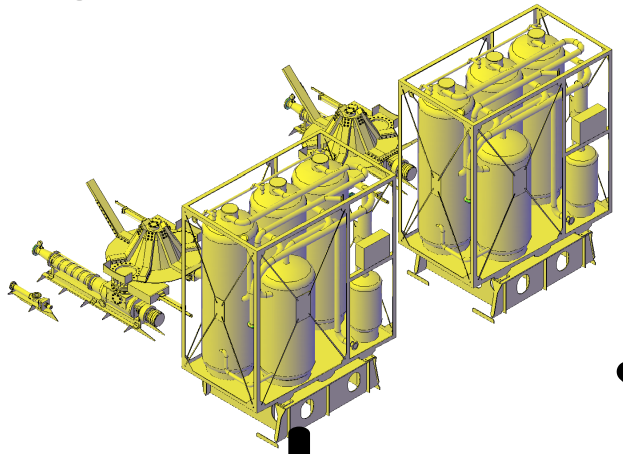
Structure Assembly

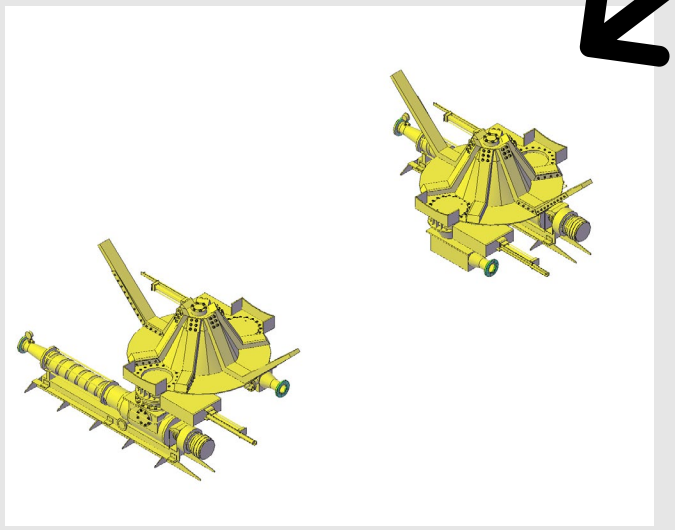
Equipment Assembly

Pipe Assembly

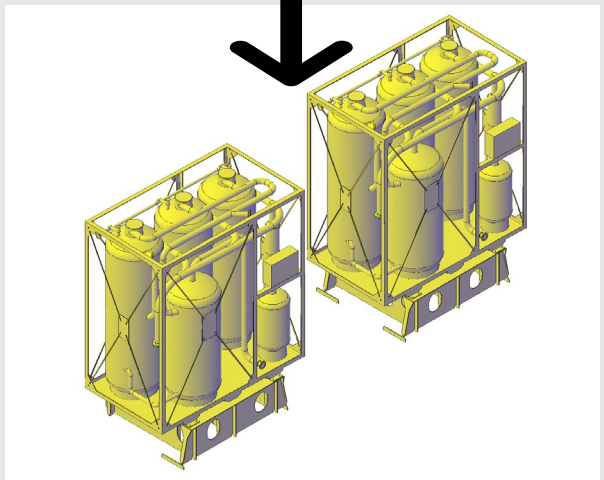
Drill down

Equipment Assembly

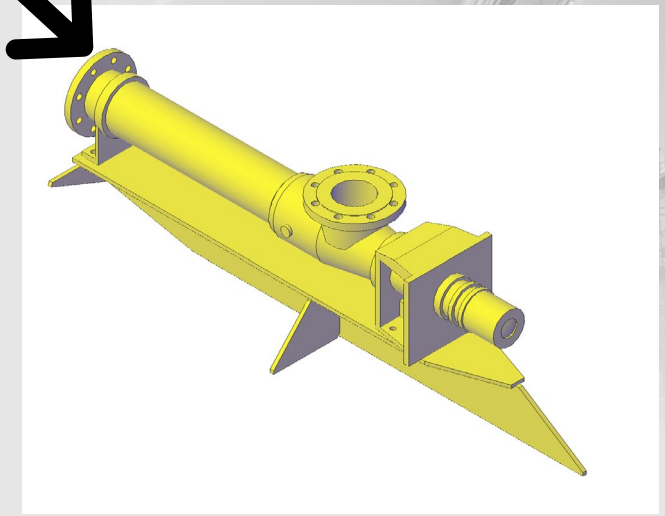




Drill feeder



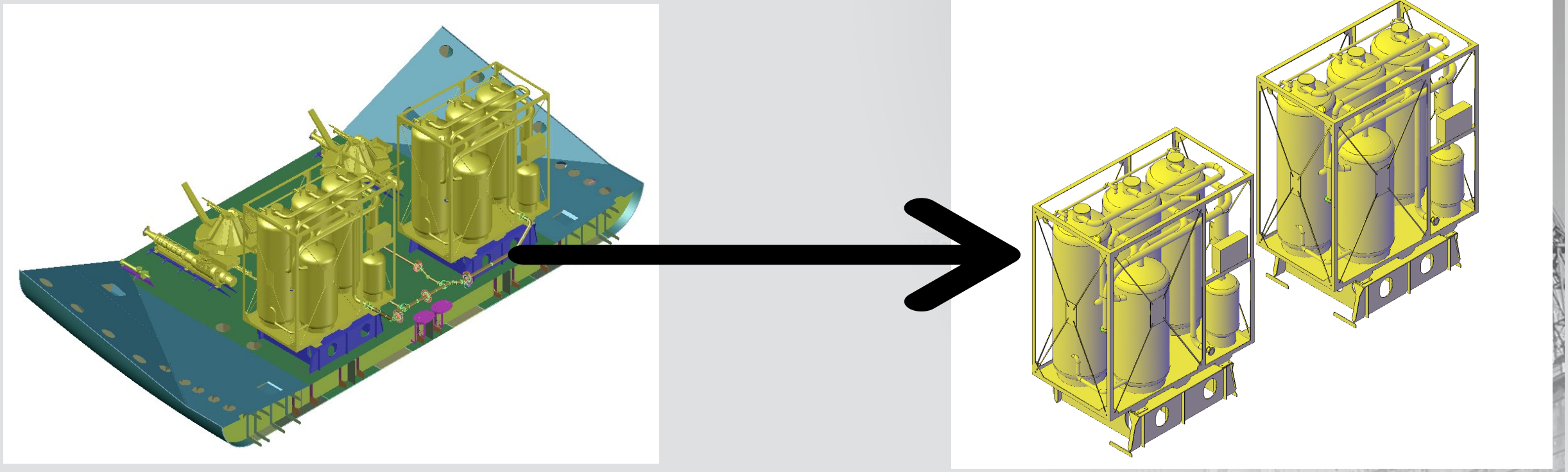
Dry Bulk Discharge



Stripping Pump

DELIVERING OPERATIONAL EXCELLENCE

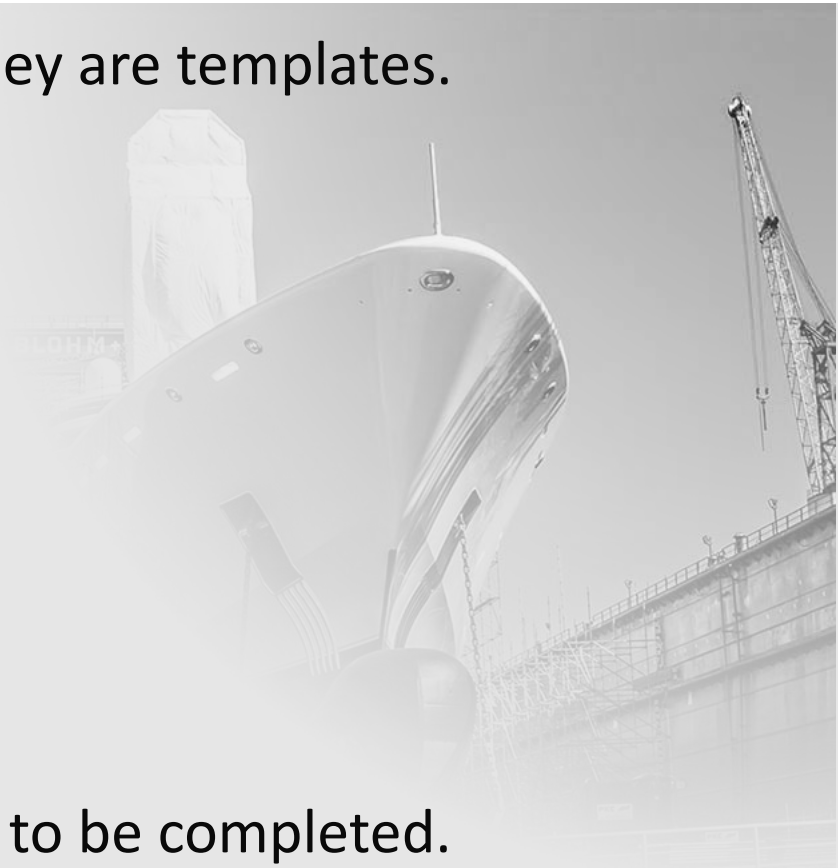
Topics



- 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

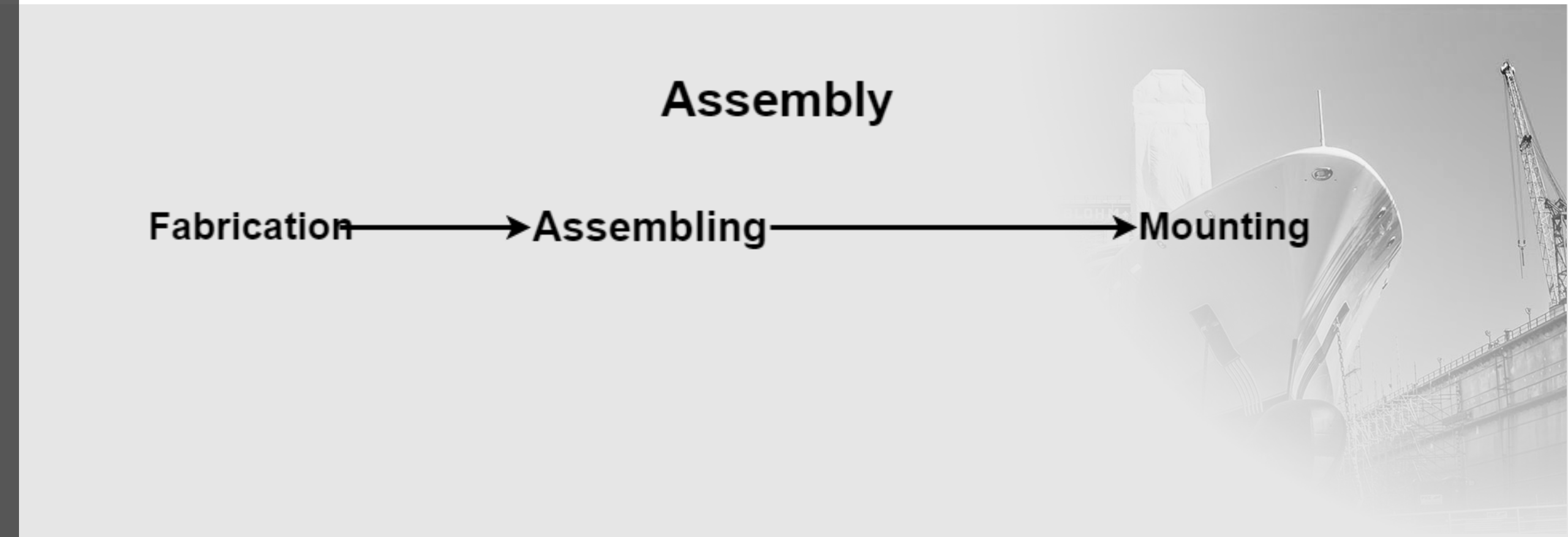
What are templates



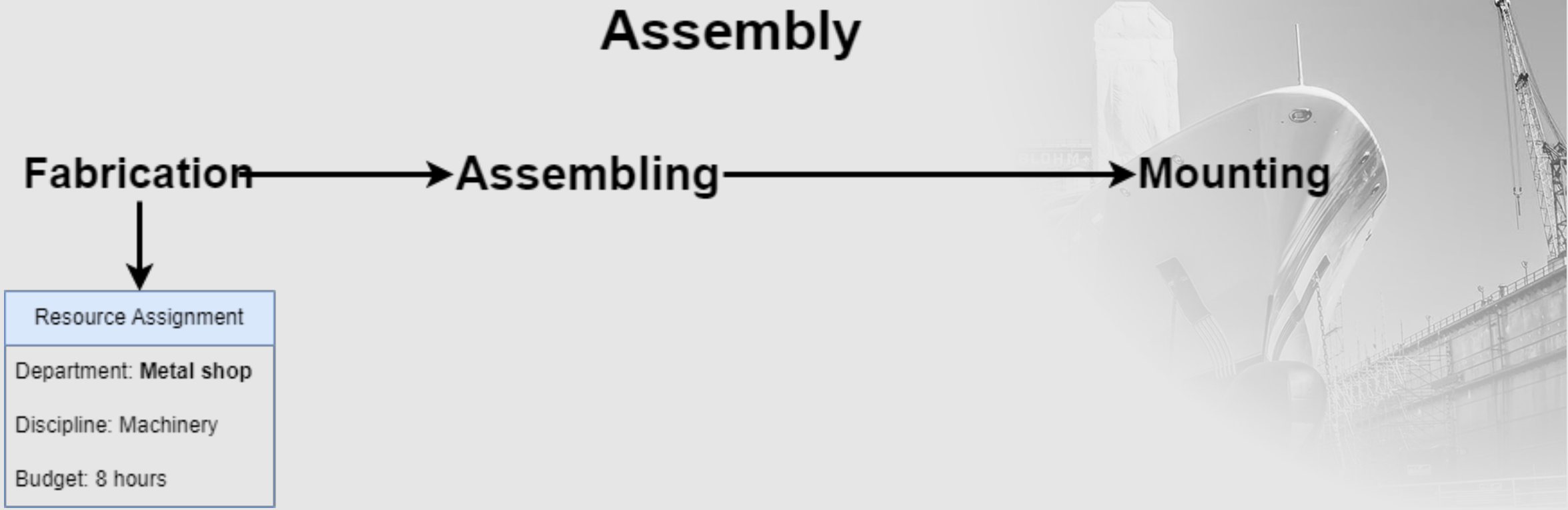
- Floor2Plan templates are exactly what the name implies: they are templates.
- They consist of a standard value stream need to build:
  - Units
  - Blocks
  - Assemblies
  - Systems
  - Plates
  - Spools
  - Etc.
- All template activities are sequenced with a set duration.
- Each activity will consist 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

NSRP Work Shop

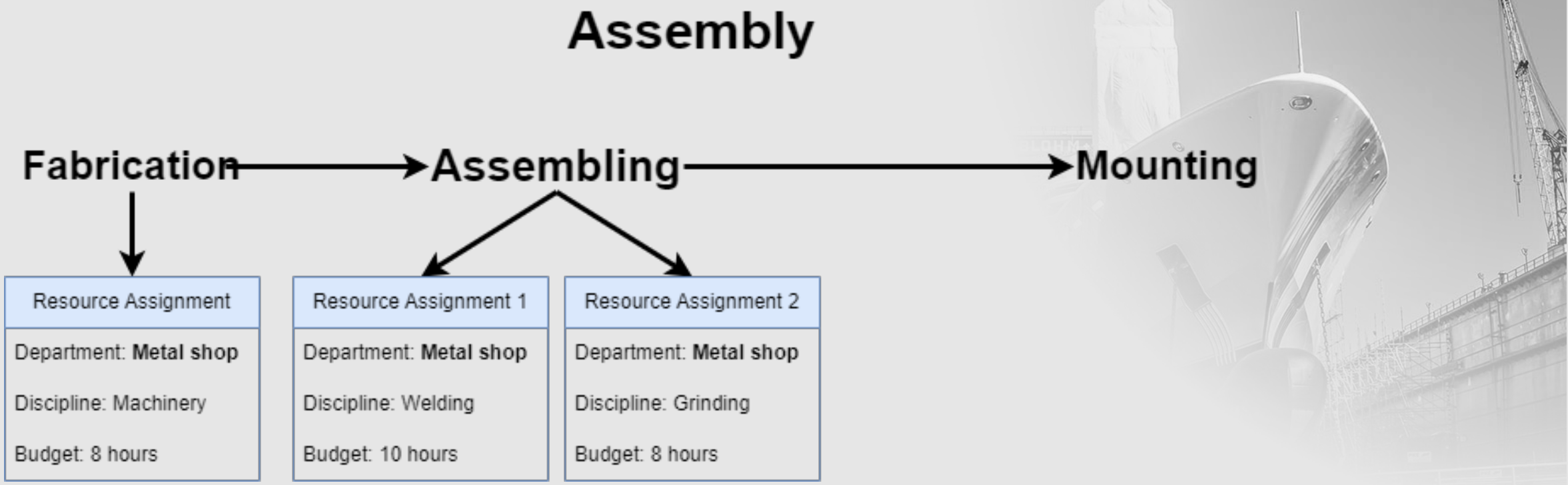
The activities of an Assembly template



Assignments for the fabrication activity

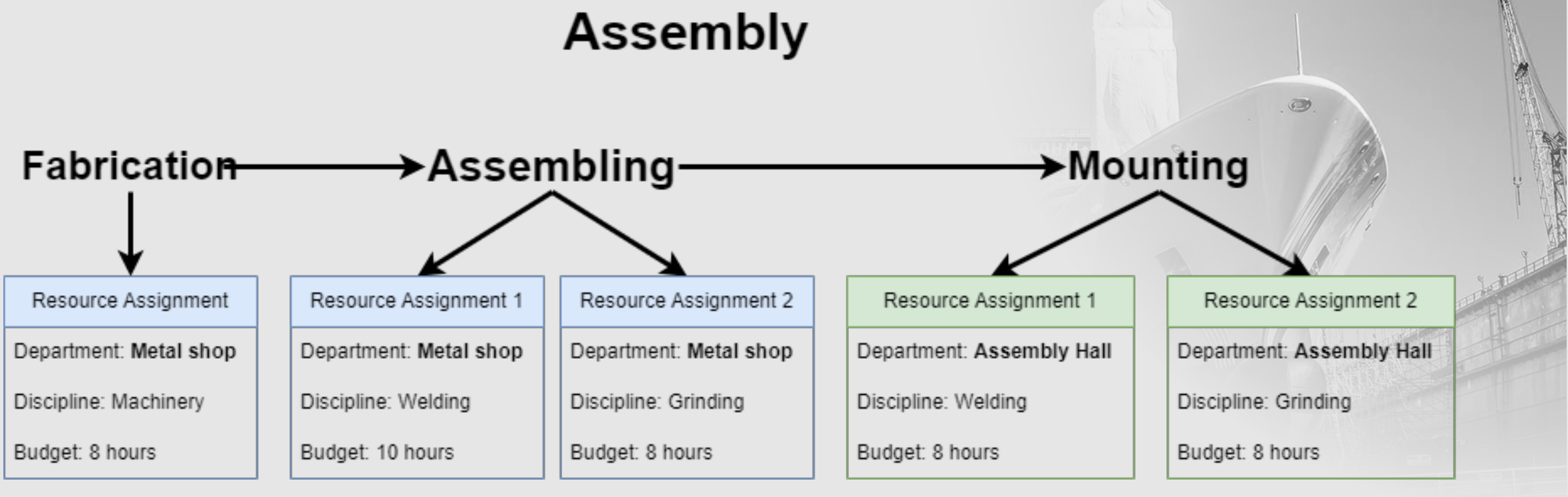


Assembly assignments



NSRP Work Shop

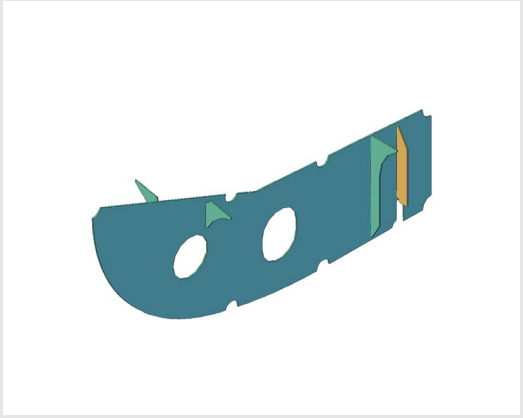
Mounting assingments



NSRP Work Shop

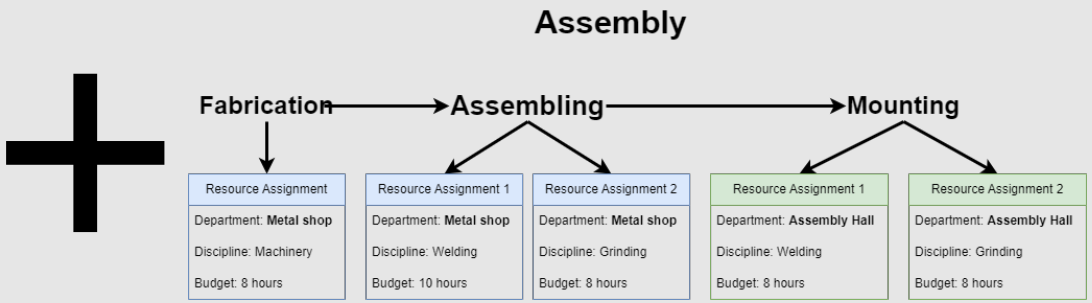
Drawings + Templates = Detail planning

Engineering model



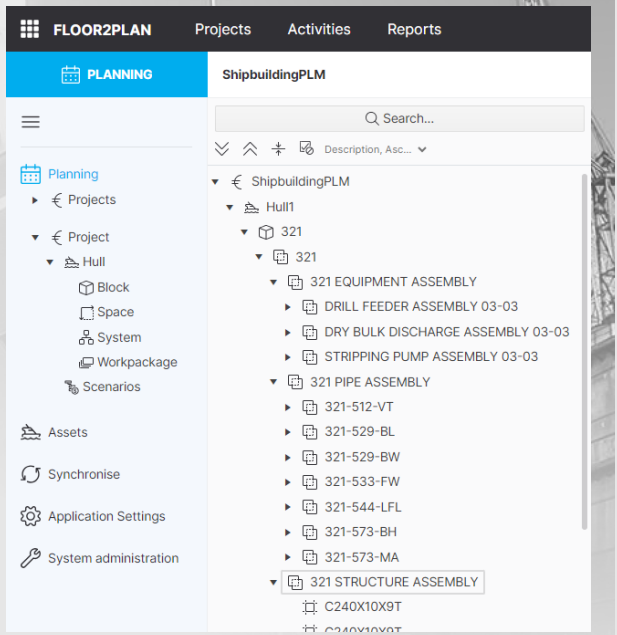
We use the metadata from the drawings as input into the templates.

Templates



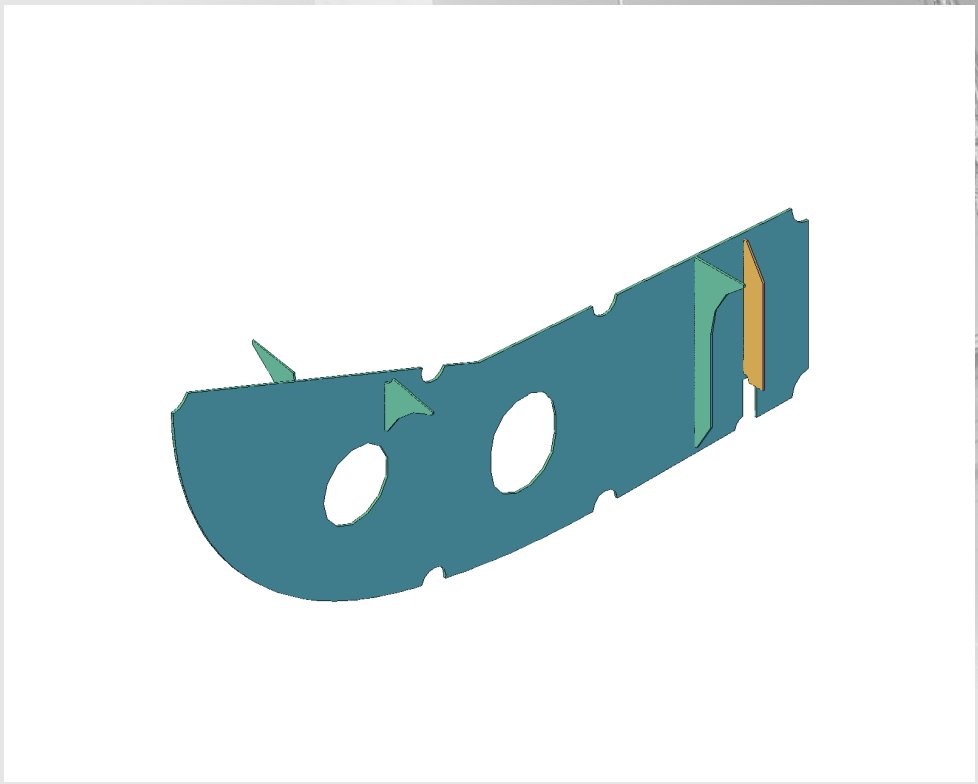
The system then turns the engineering model metadata into a detailed project plan.

Detail planning



More detailed project plans increase reporting capabilities and other functions

- 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.

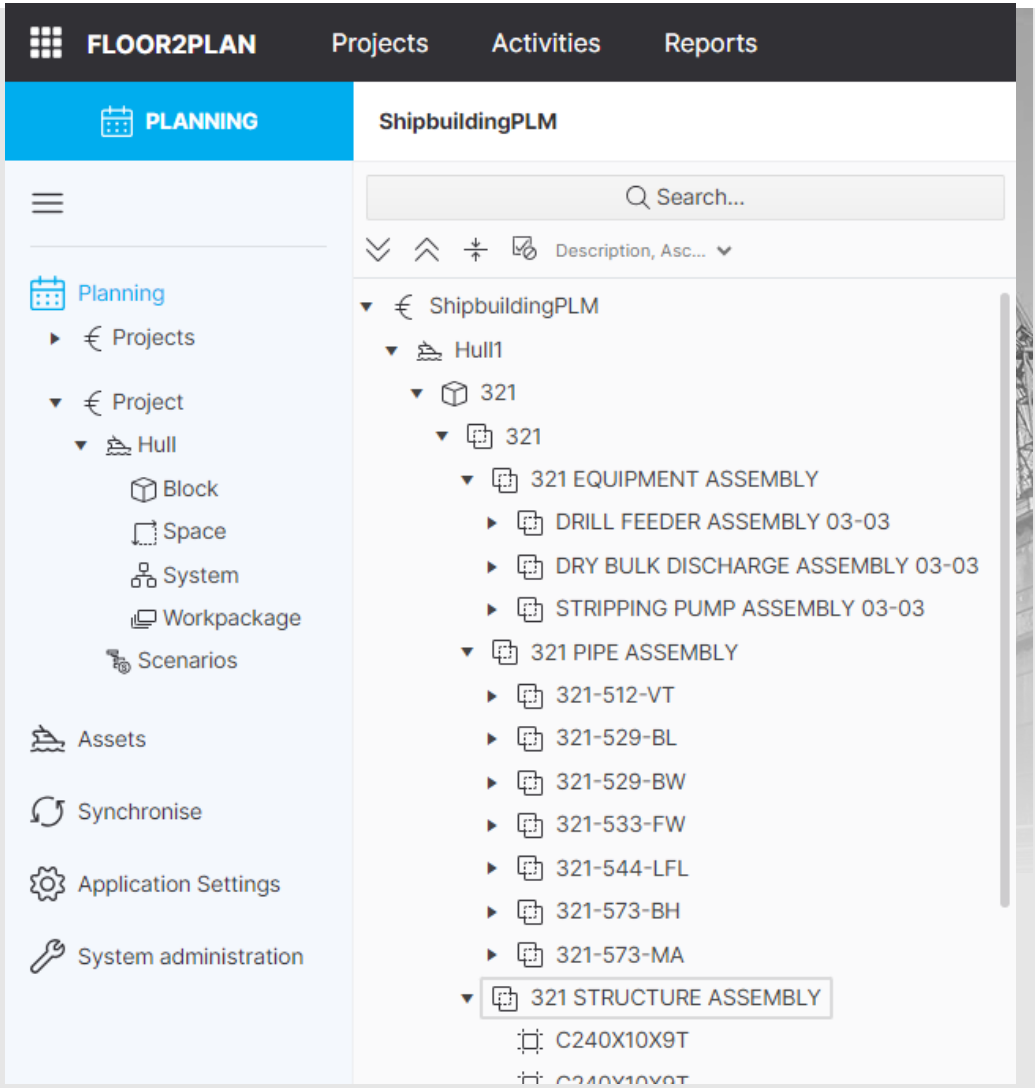


NSRP Work Shop

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



EnterprisePlatform
Data import

DELIVERING OPERATIONAL EXCELLENCE

EnterprisePlatform Import routine

SSI | Floorganise Triggering Smart Shipbuilding

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.

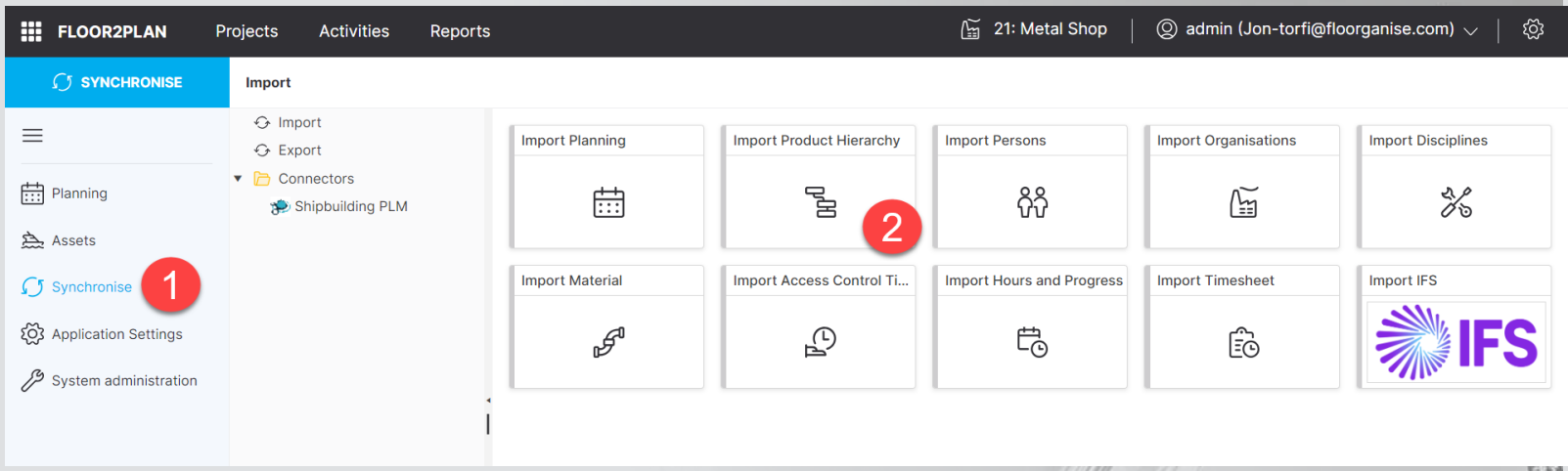
DELIVERING OPERATIONAL EXCELLENCE

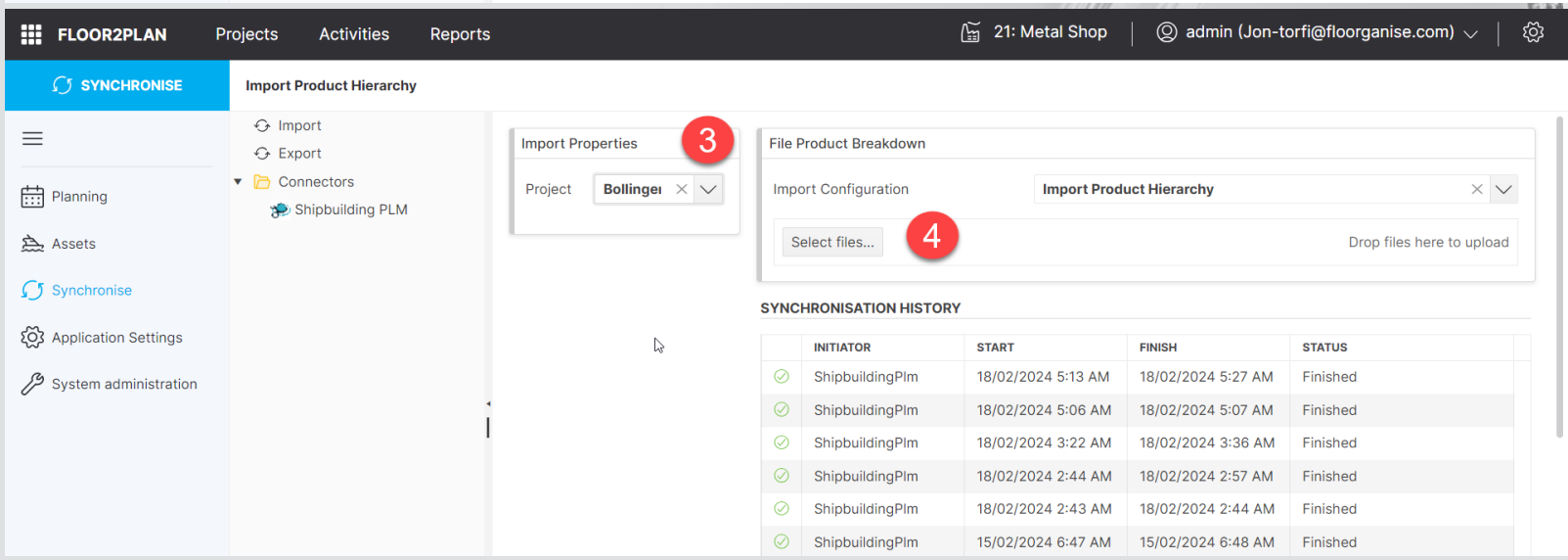
EnterprisePlatform Import routine

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

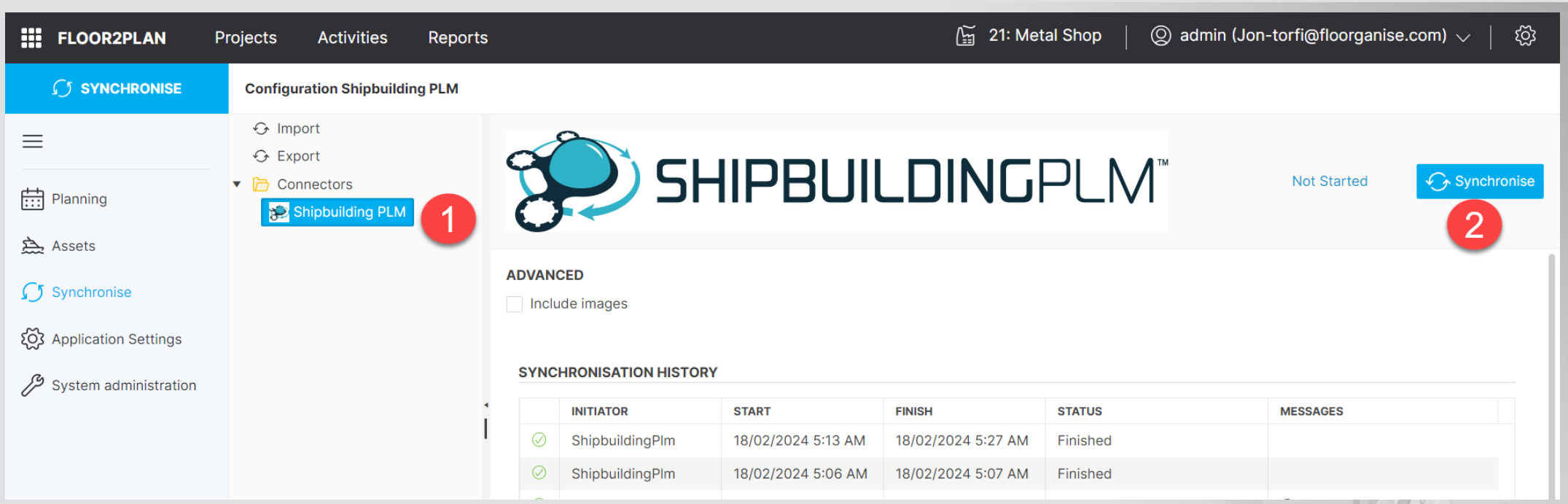




ShipbuildingPLM
Data import

DELIVERING OPERATIONAL EXCELLENCE

Importing data



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

SSI | Floorganise — Triggering Smart Shipbuilding

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

FLOOR2PLAN | Projects | Activities | Reports

PLANNING | ShipbuildingPLM

Search...

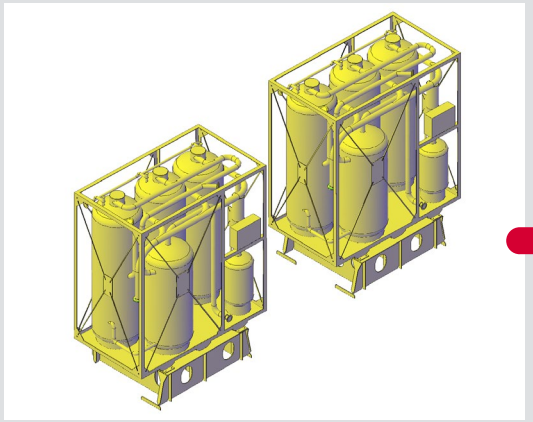
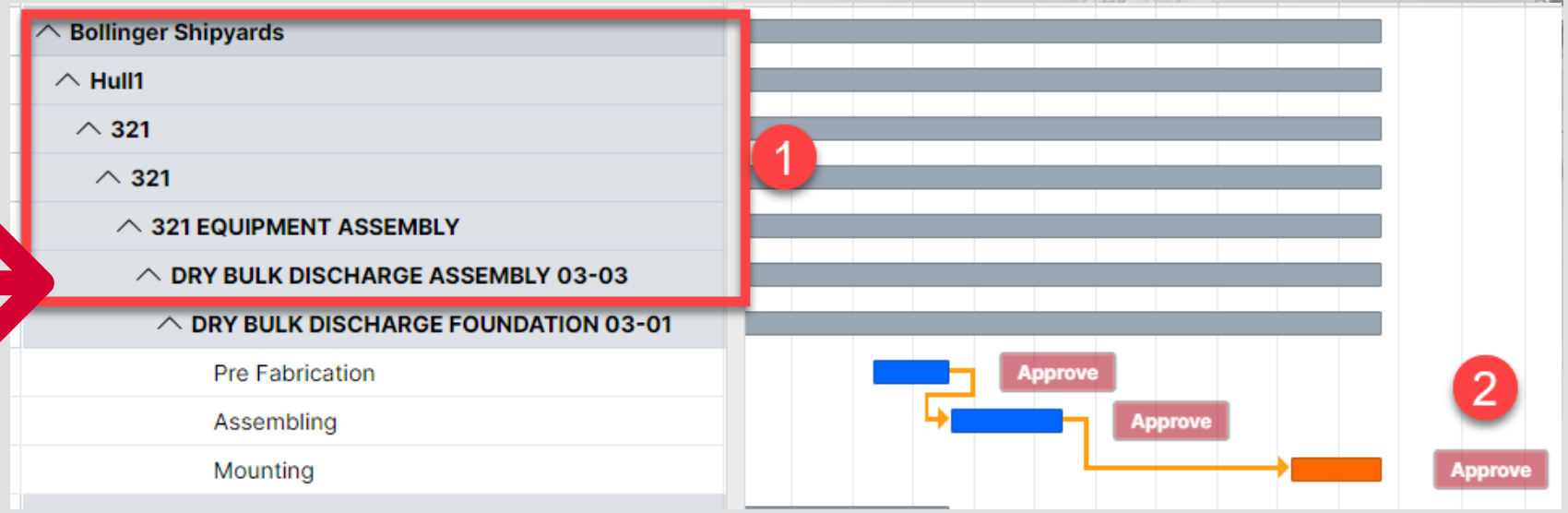
Description, Asc...

Planning
- Projects
- Project
  - Hull
    - Block
    - Space
    - System
    - Workpackage
    - Scenarios
- Assets
- Synchronise
- Application Settings
- System administration

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

DELIVERING OPERATIONAL EXCELLENCE

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