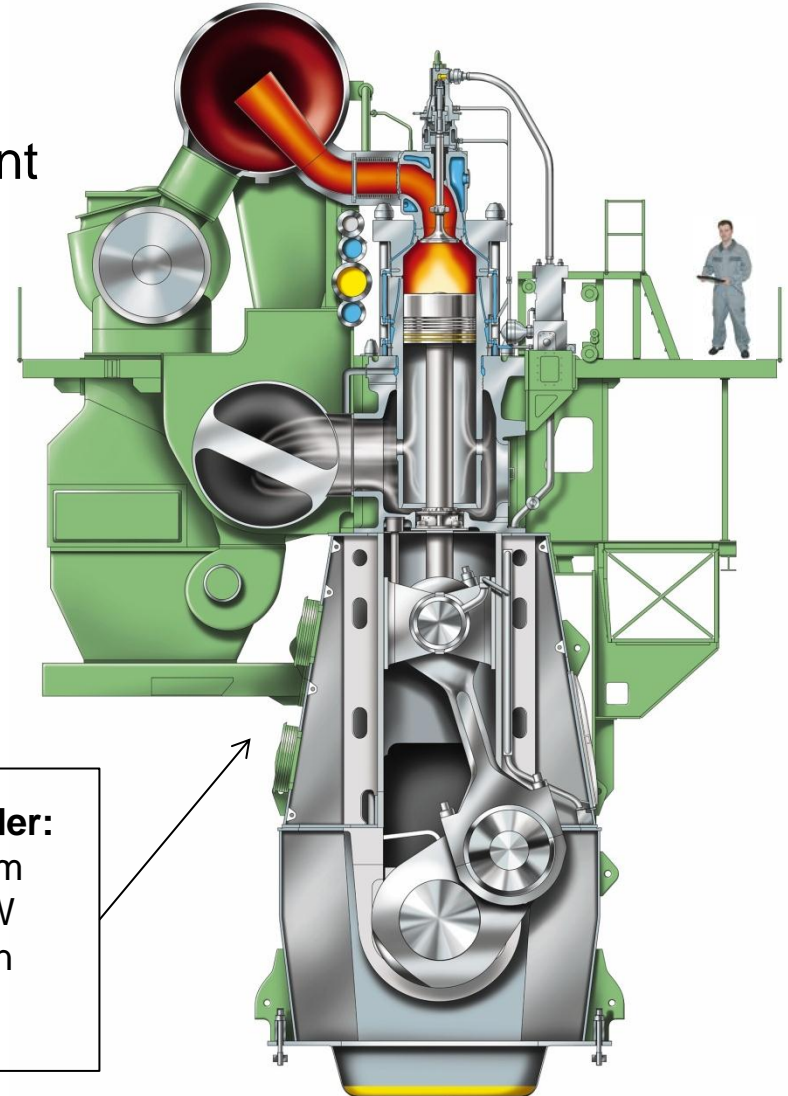


Overcoming PLM challenges to the Licensee business



Mr. Bjarne Rosford Nørgaard
Head of Engineering Process Development
MAN Diesel & Turbo.



14K98ME-C – worlds most powerful engine in order:

| | | | |
|---------|-------------|---------|-----------|
| Bore: | 980 mm | Stroke: | 2.660 mm |
| RPM: | 104 r/min | Power: | 84.280 kW |
| Fuel: | 346 ton/day | Weight: | 2.219 ton |
| Height: | 14,6 m | Length: | 29 m |

Data

NE

NE

Worlds Largest Container Ship

Majestic Mærsk



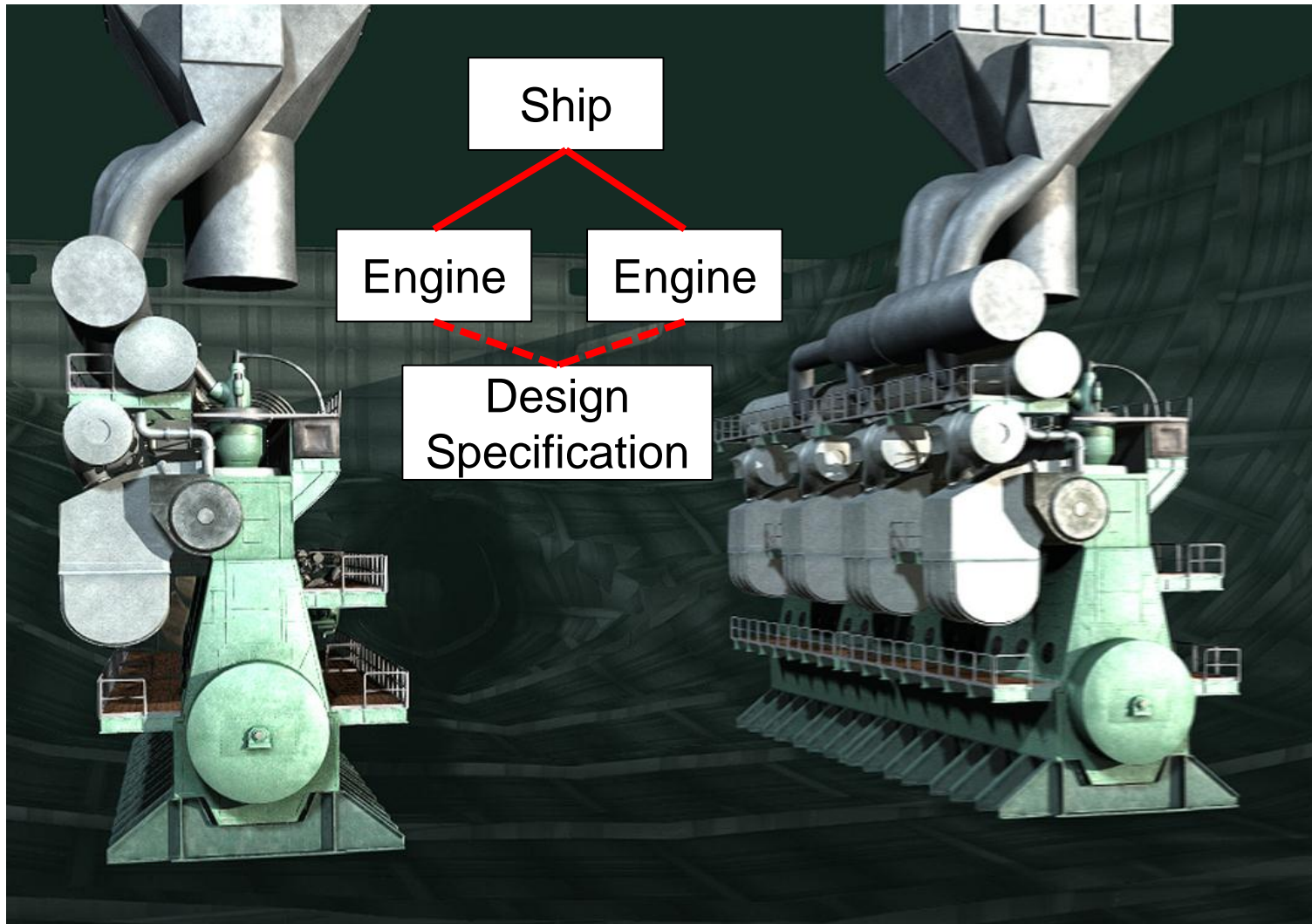
Worlds Largest Container Ship

Majestic Mærsk



Worlds Largest Container Ship

Majestic Mærsk



Overcoming PLM challenges to the Licensee business



Agenda

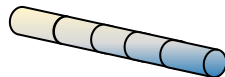
How to build a ship in 4 steps

Servicing 25.000 engines over 30 years/
"A regular day in the office"

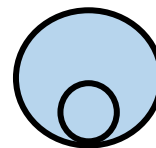
How we will handle the challenges



The Funnel



The Pipe



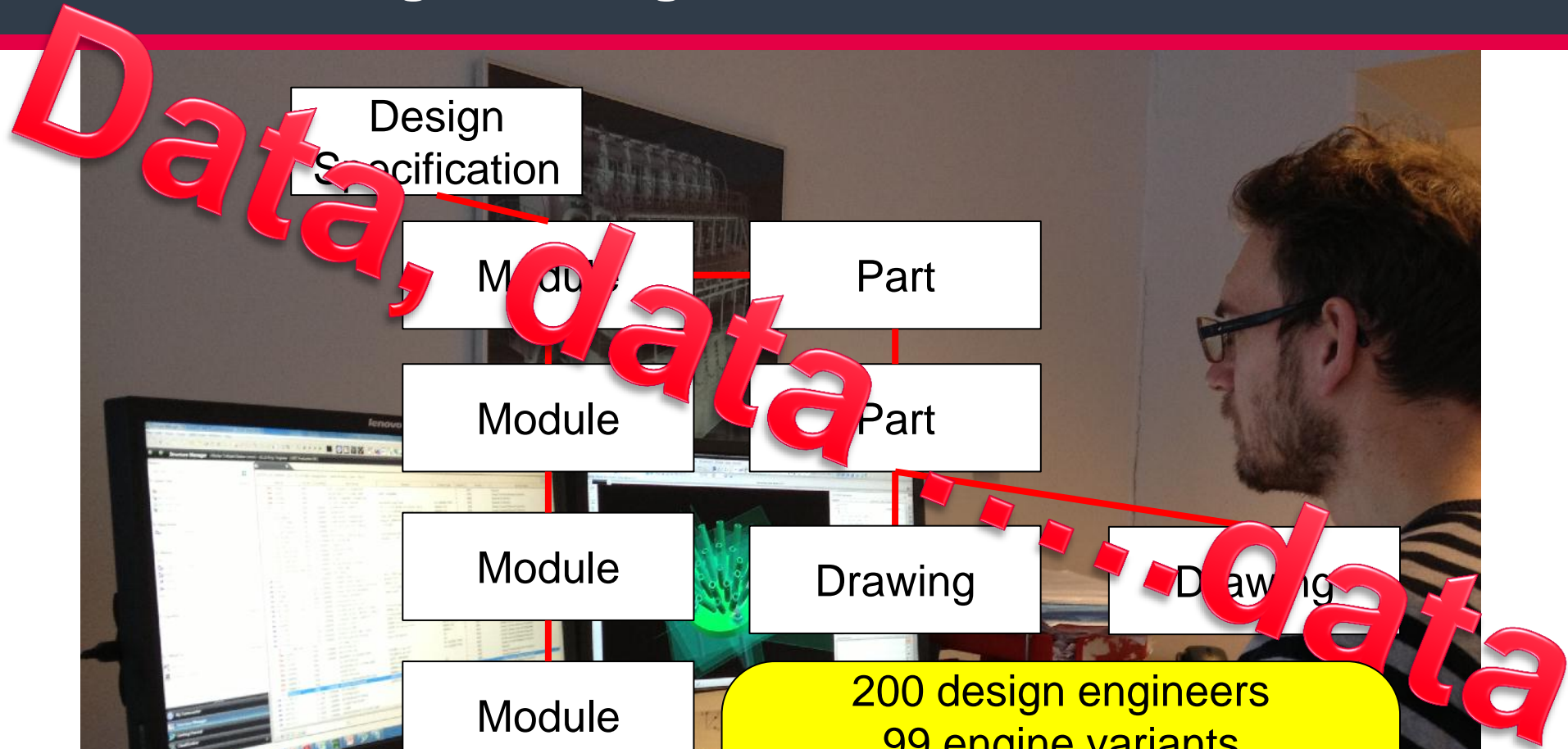
The Extension

How to build a ship in 4 steps

... from the perspective of an engine

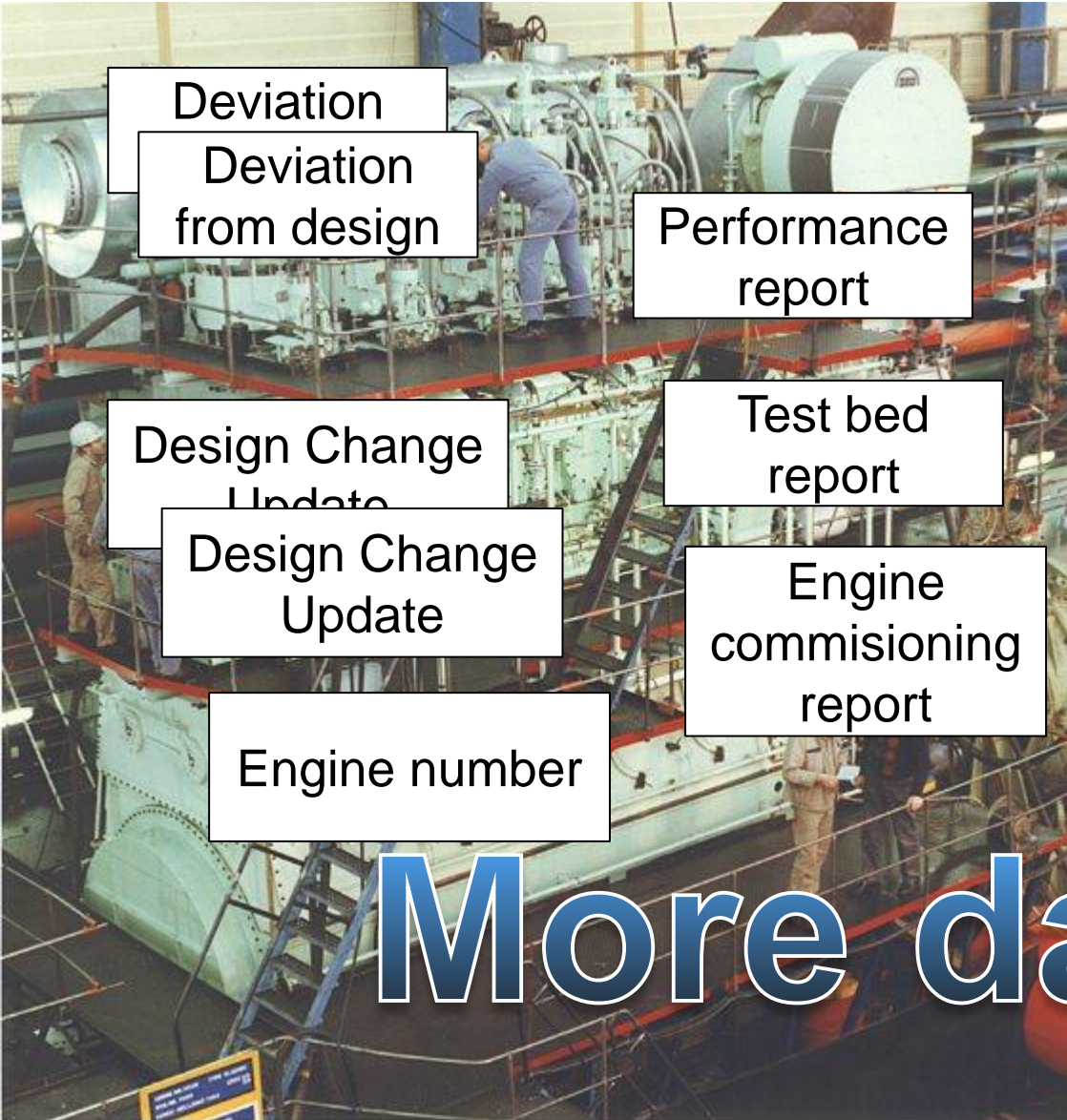


STEP 1: Engine Design



200 design engineers
99 engine variants
1,6 mio. parts in total
60.000 new parts created/year
~8.000 files/day delivered
331 design specs in 2013

STEP 2: Engine building



Deviation
Deviation
from design

Performance
report

Design Change
Update

Test bed
report

Design Change
Update

Engine
commisioning
report

Engine number

More data....



Licensee

Plan production, produce parts, assemble and tests the engine.

STEP 3: Ship building



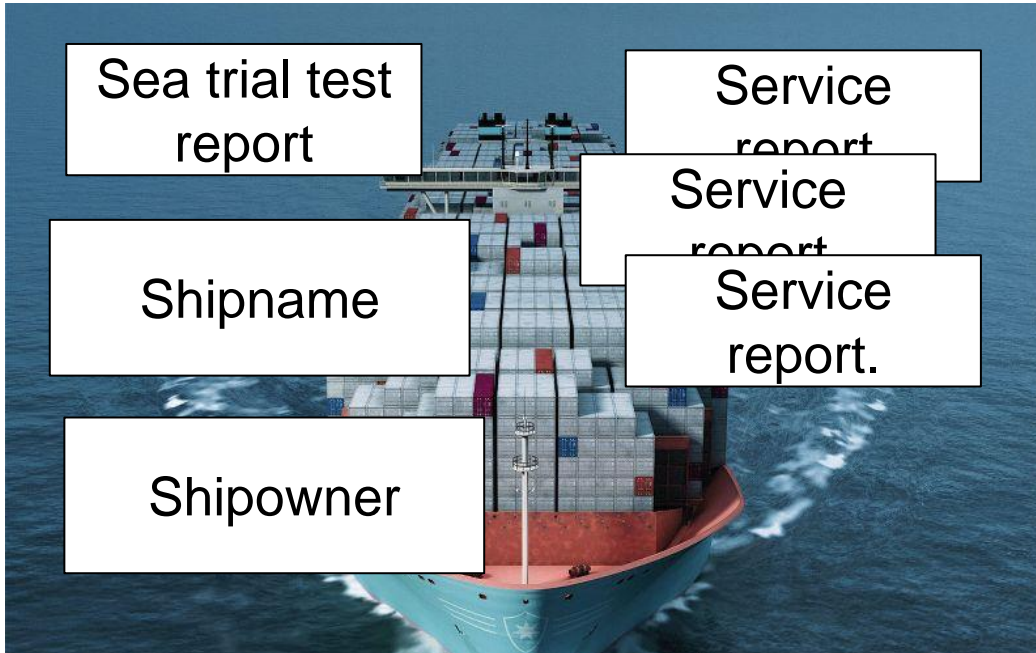
Build the (rest of the) ship around the engine

IMO number

Hull number.

Shipyard

STEP 4: Ship in operation



When in sea start the engines!
Perform Sea trial test.

Handover to shipowner.



Shipowner

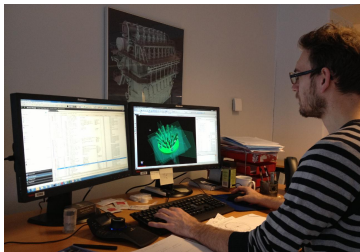
Engine Qualities

- Long duration: minimum 30 years, operational 24/7/365.
- Reliable: Minimal service breaks

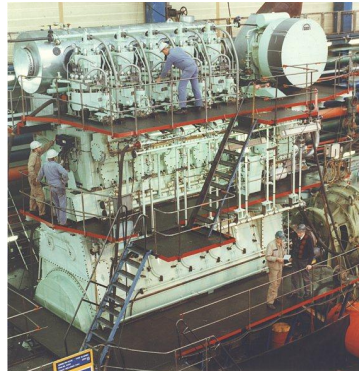
Lifecycle of an engine



MAN Diesel & Turbo



Engine Design



Licensee



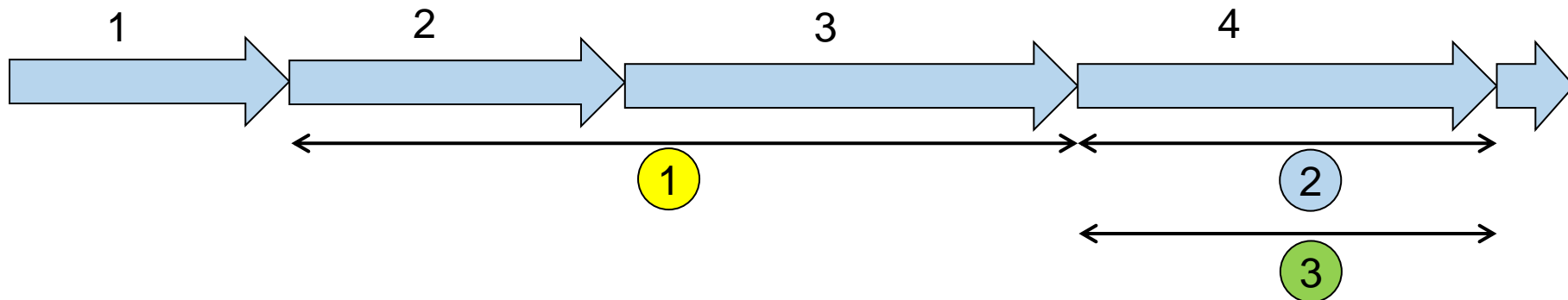
Shipyard



Shipowner



Scrap



1 Production support

2 MAN warranty on design

3 After sales services

A regular day in the office



Teamcenter

A stack of seven white rectangular documents with black outlines, arranged in a descending staircase pattern from top-left to bottom-right. The top document is the most visible and contains the text "Design Specification".

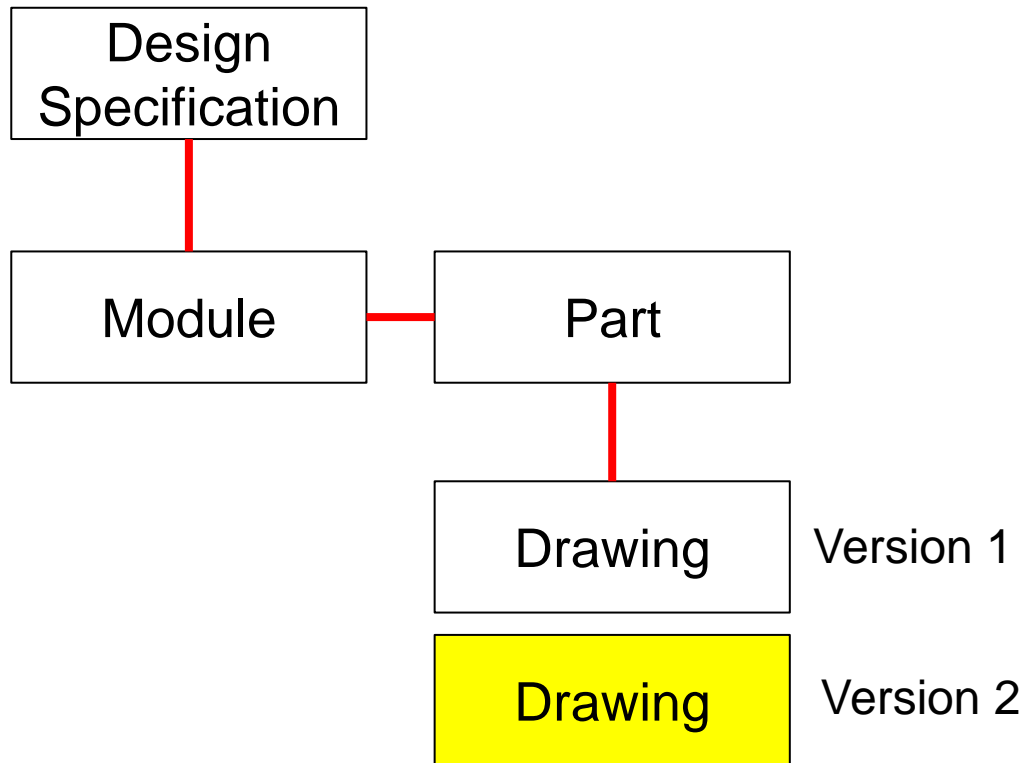
Design
Specification

Example case 1: MS Blue Oyster



MS Blue Oyster

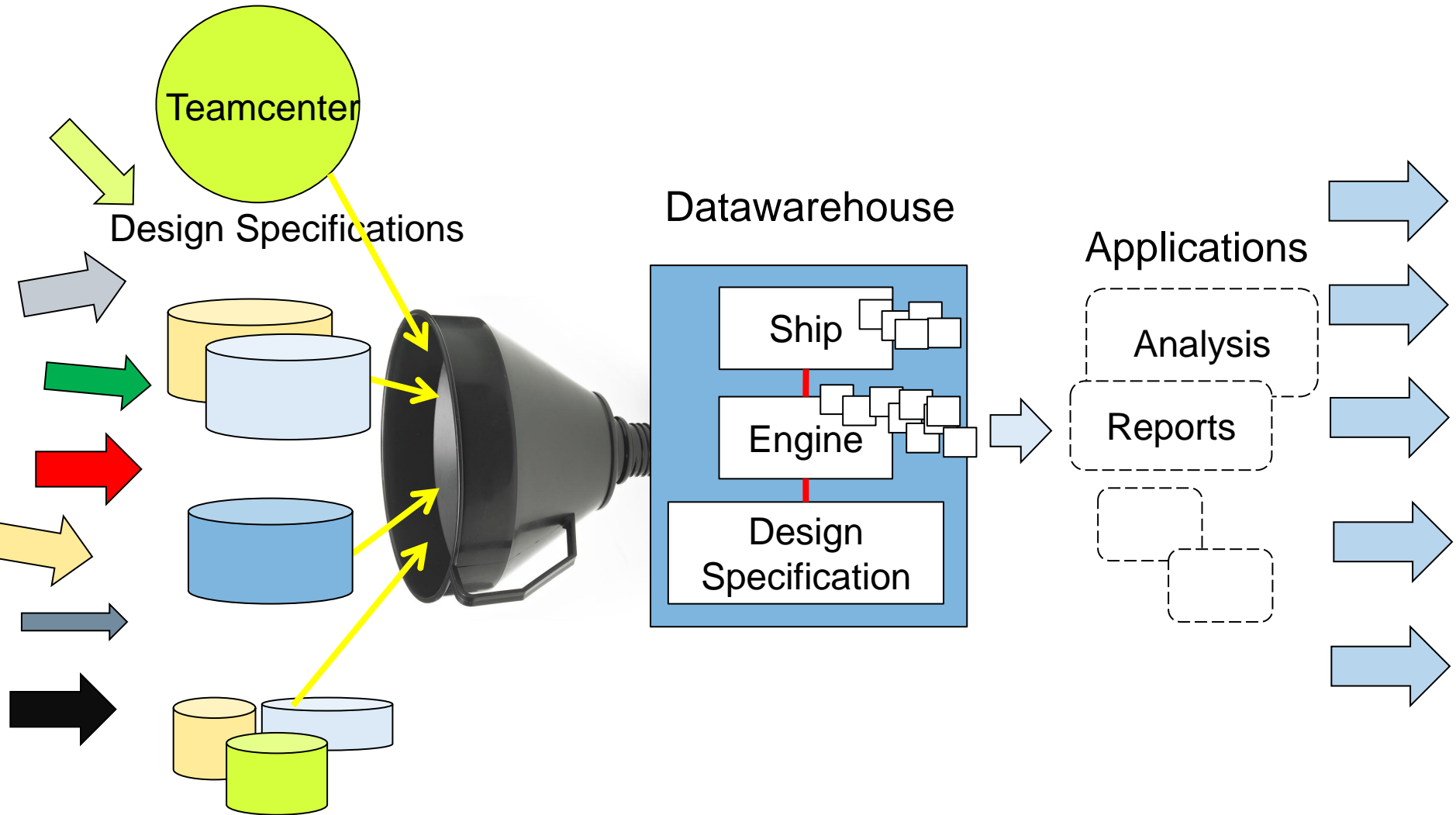
Example case 2: Problem with designed part



Funnel



#1: Consolidate and share data



More benefits



Supply chain forecasting

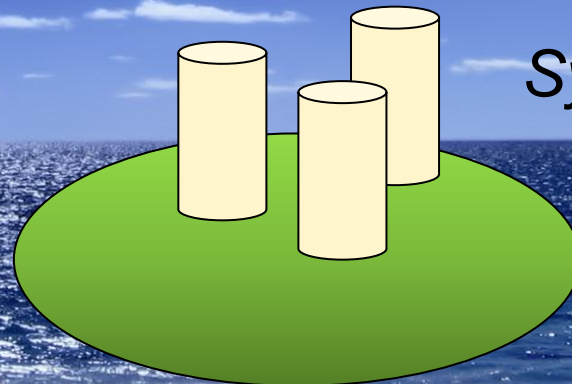
Impact Analysis

Identification of potential retrofit customers

Support for fact based decisions



Example case 3: System islands

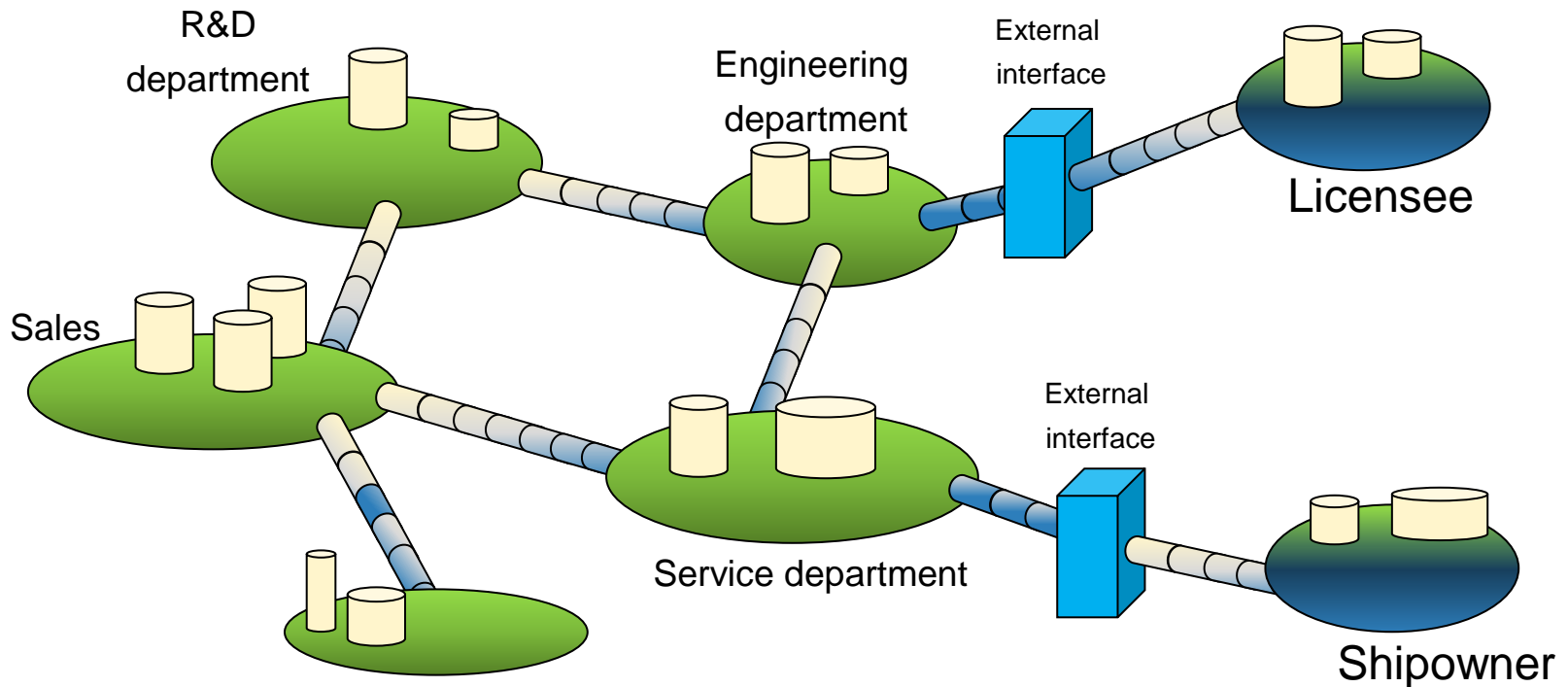


System Island

Pipeline

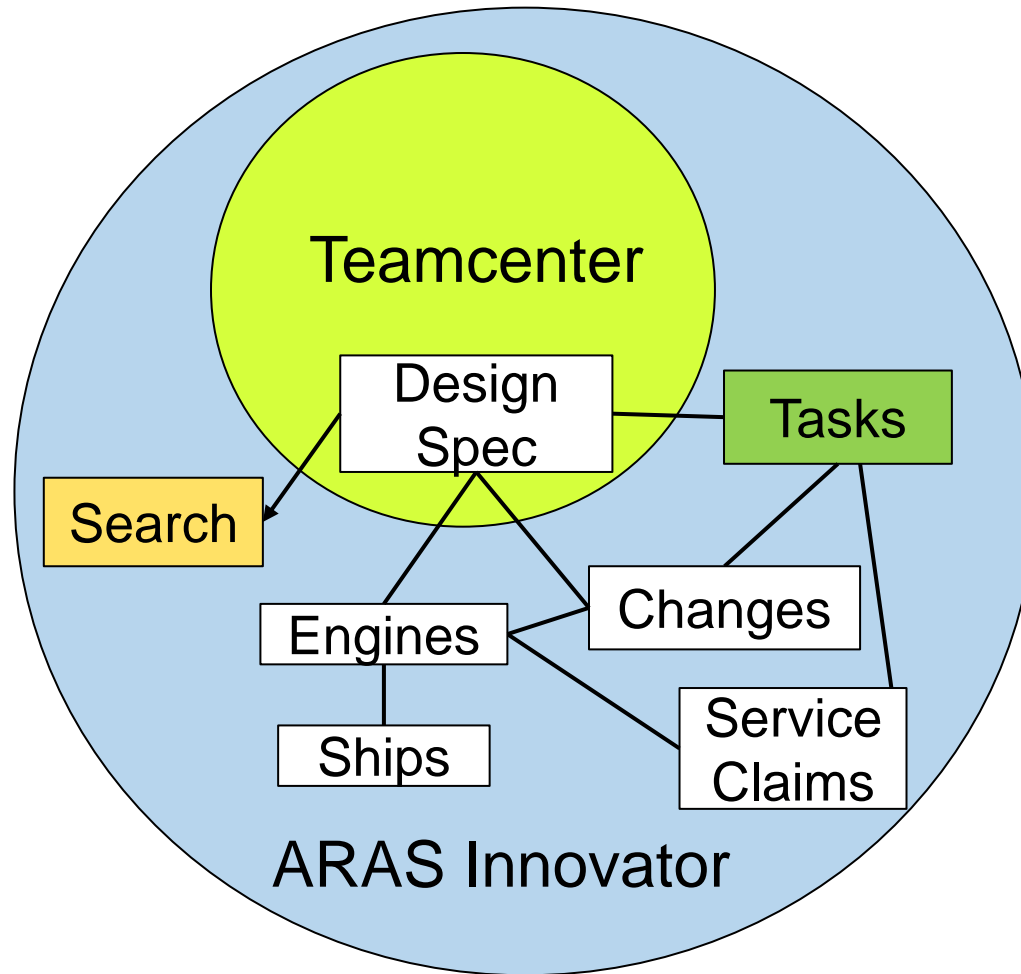


#2: Interconnected systems



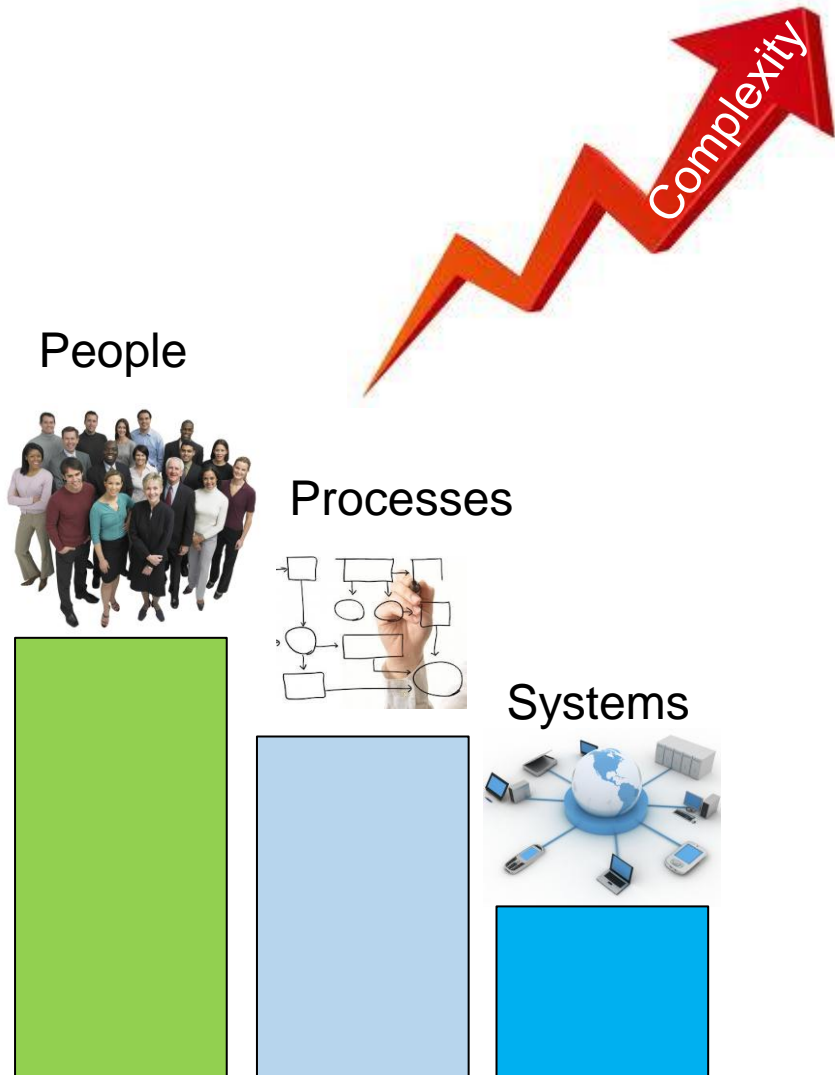
- Better synchronisation
- More efficient exchange of data
- Systems support "We working as one unit"

Our PLM system

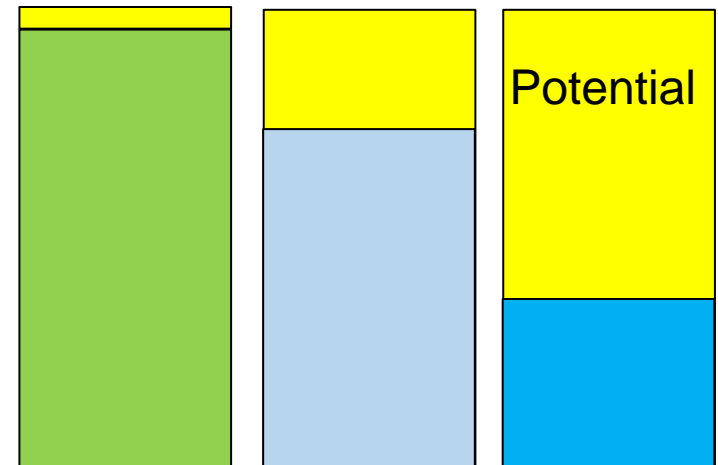


Hope: Agile system landscape, which we can gradually build

Our Challenge



- Offer even better service
- Improve our engine design even more
- Maintain high product quality
- Agility



Our Vision

Engineering Proces Development, Low Speed BU

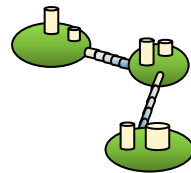


Our vision is that in 2017 our business unit will have customers, employees, processes and systems working together as efficient as a Diesel engine.

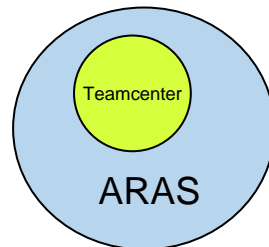
We will achieve this by:



Consolidate and share data



Interconnect systems



Extending our PLM platform
with ARAS

We will implement this stepwise over time....

Thank you, Questions?

Bjarne Rosford Nørgaard
Engineering Proces Development
MAN Diesel & Turbo,
Marine Low Speed
bjarne.noergaard@man.eu

Disclaimer



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