ISO TC184/SC4/WG10 workshop
Application Modularization
November 18-20, 1998

Ship Common Model

Jochen Haenisch

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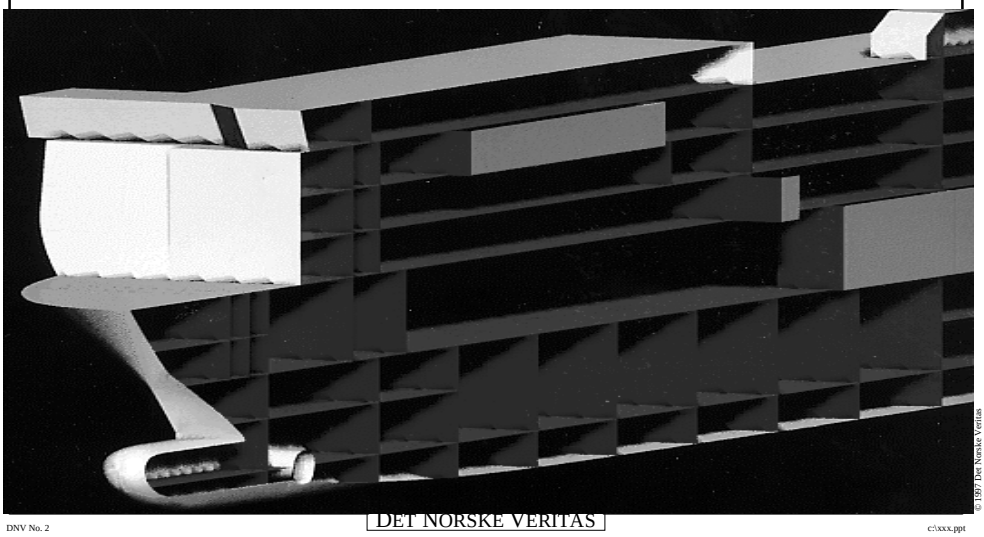
What we want to model:



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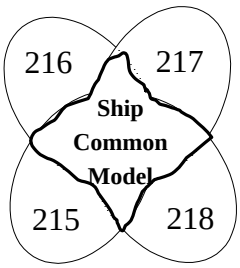
The Ship Product Model

- 216: Ship Moulded Forms
- 215: Ship Arrangements
- 218: Ship Structures
- 217: Ship Piping
- 226: Ship Mechanical Systems
- 234: Ship Operational Logs
- yyy: Ship Hydromechanics
- ...



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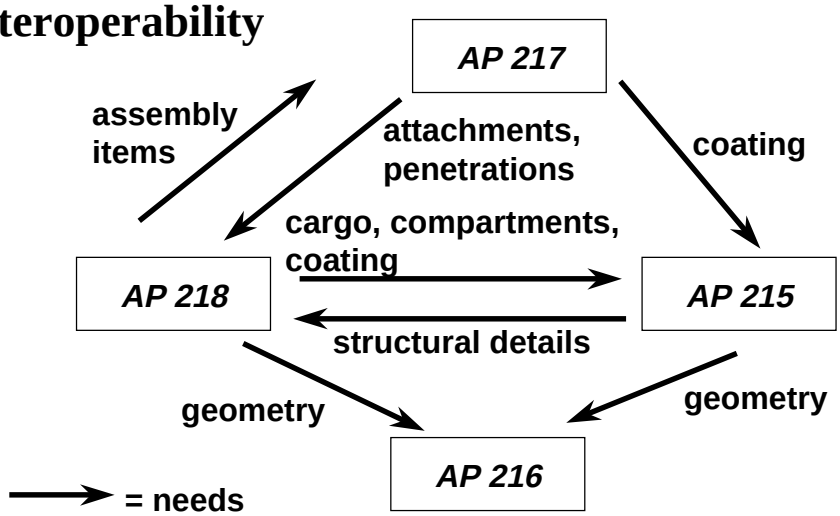
Challenge: Interoperability



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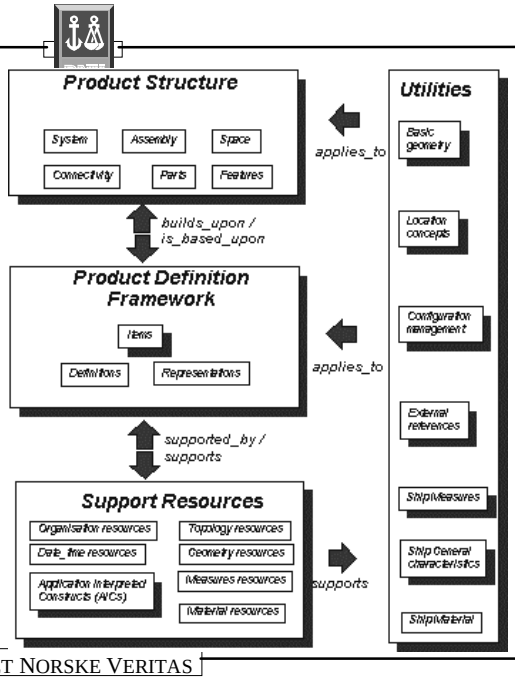
Contents of the Ship Common Model

- ✔ modelling framework
- ✔ common utilities
- ✔ reusable domain models



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Modelling approach

- Use the Building Block concept
- To develop a suite of ship related APs.
- These are ARM modules
  - for a comprehensive ship product model
  - and controlled reuse of its concepts
- in Express
  - for AP development
  - and implementation.
- Currently 130 BBs.

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The Building Block approach

- **Requirements that they fulfil:**
  - **integrated model approach, re-use of sub-models**
  - **concurrent model development**
  - **ISO compatibility**
  - **suited for early implementation**

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SCM domains

- **modelling framework (Item-Definition-Representation)**
- **Parts**
- **Features**
- **Product structures (by space, system, assembly)**
- **General characteristics**
- **Configuration management**
- **Location**
- **Moulded form**
- **Ships**
- **Ship materials**
- **Externally defined references**

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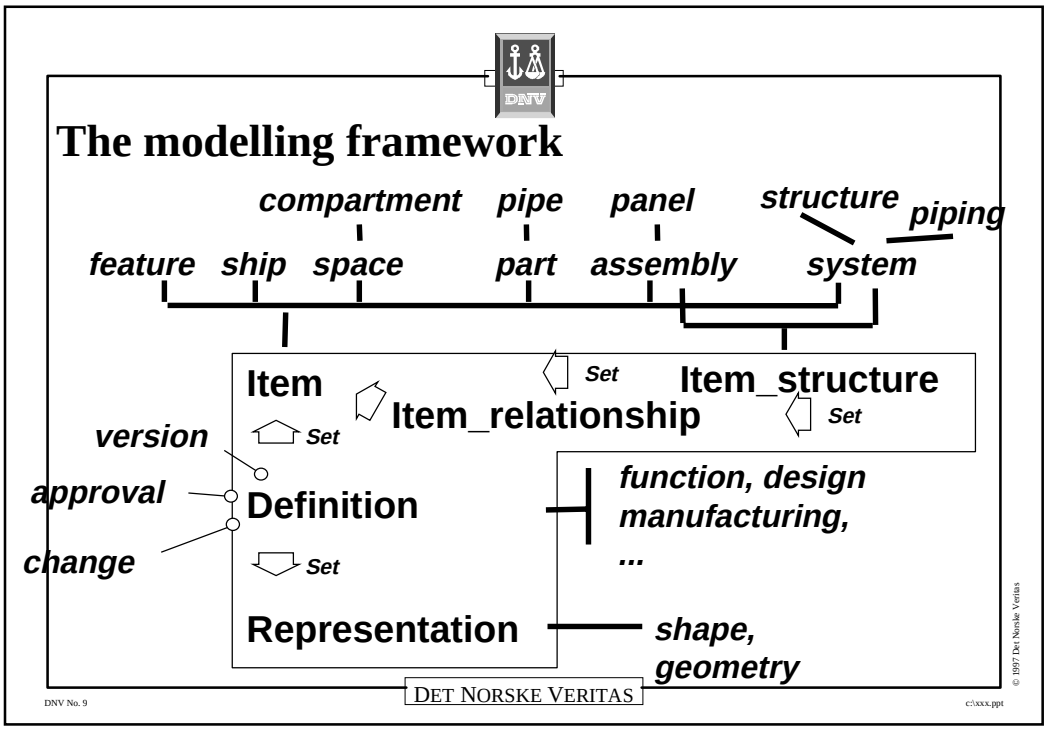
The modelling framework
compartment
pipe
panel
structure
piping
feature
ship
space
part
assembly
system
Item
Set
Item_structure
Item_relationship
Set
version
Set
approval
Definition
change
Set
function, design
manufacturing,
...
Representation
shape,
geometry
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DNV No. 9
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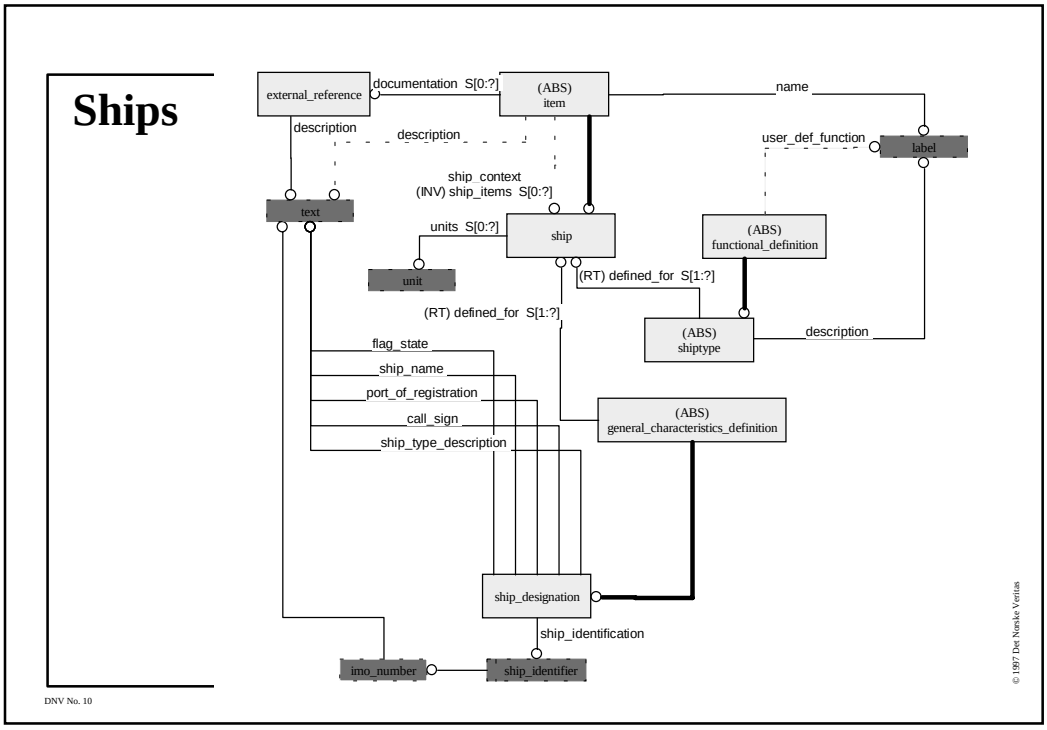
Ships
external_reference
documentation S[0:?]
(ABS)
item
name
description
description
user_def_function
label
ship_context
(INV) ship_items S[0:?]
text
units S[0:?]
ship
(ABS)
functional_definition
unit
(RT) defined_for S[1:?]
(RT) defined_for S[1:?]
(ABS)
shiptype
description
flag_state
ship_name
port_of_registration
call_sign
ship_type_description
(ABS)
general_characteristics_definition
ship_designation
ship_identification
imo_number
ship_identifier
DNV No. 10
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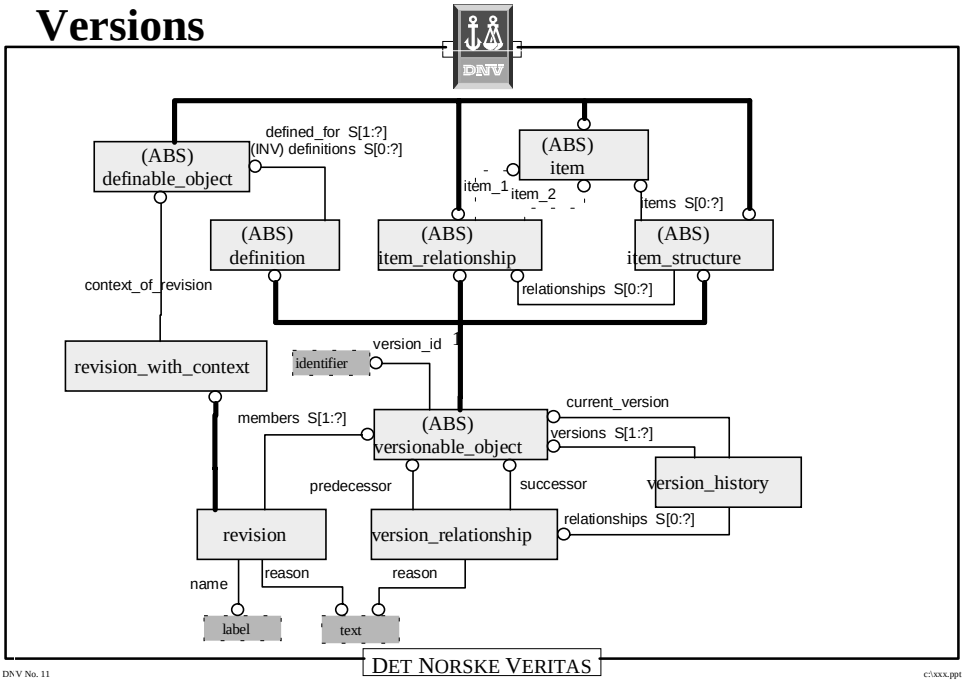
Versions



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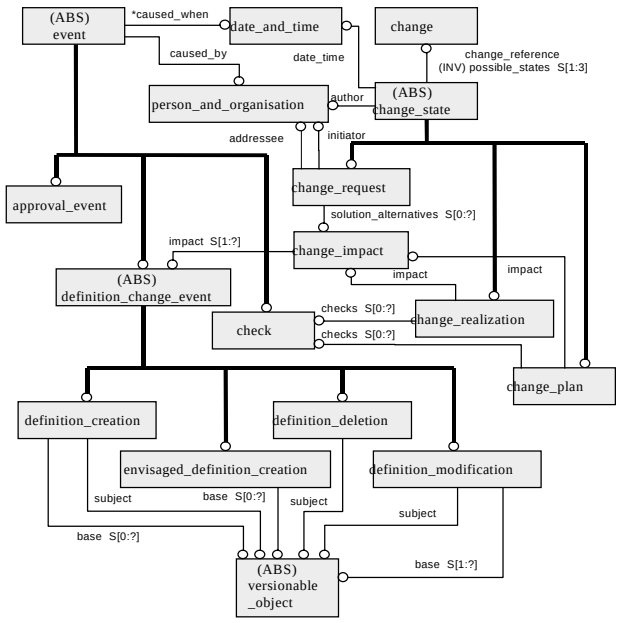
Change



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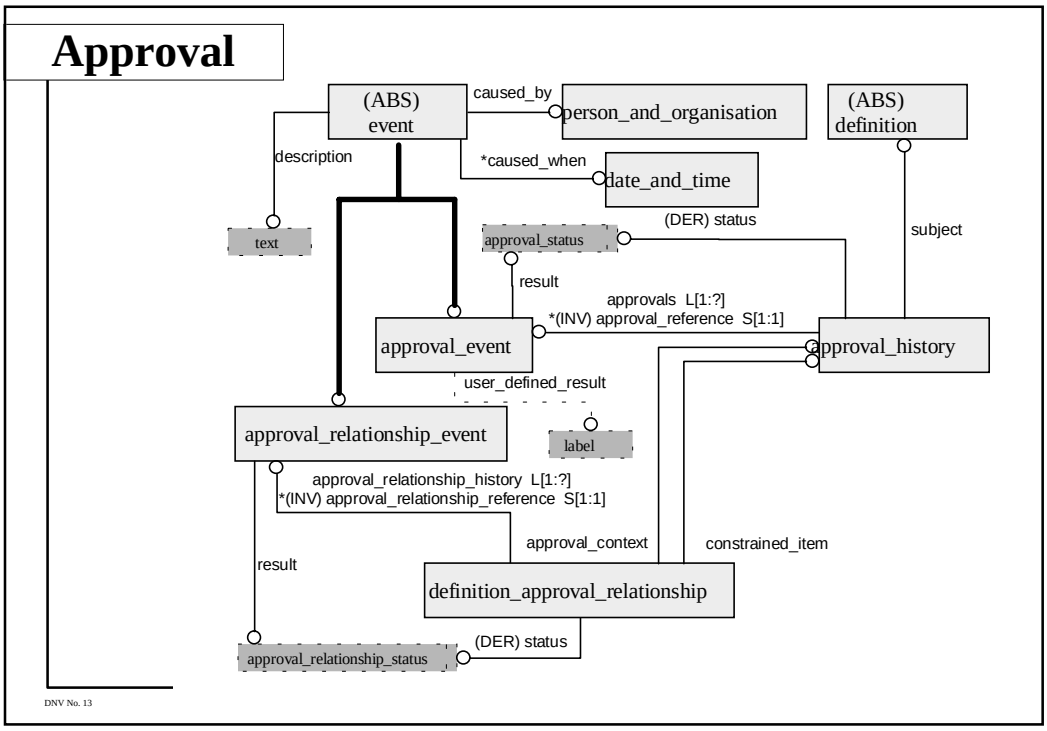
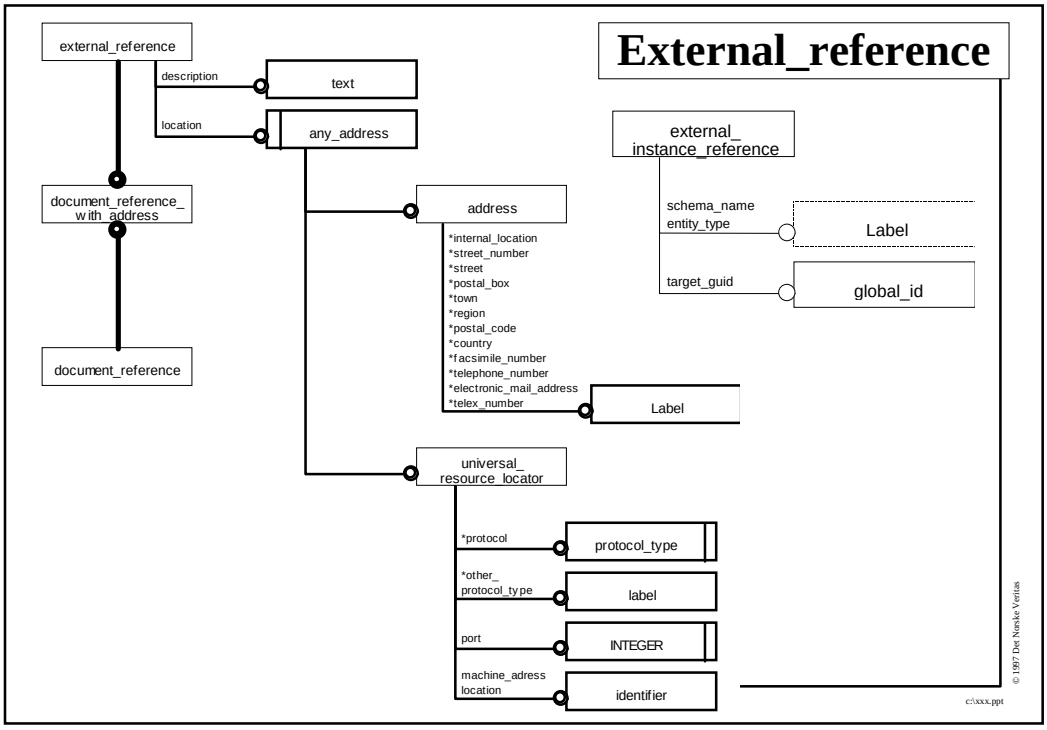

Approval
(ABS) event
caused_by
person_and_organisation
(ABS) definition
description
*caused_when
date_and_time
text
approval_status
(DER) status
subject
result
approvals L[1:?]
*(INV) approval_reference S[1:1]
approval_event
approval_history
user_defined_result
approval_relationship_event
label
approval_relationship_history L[1:?]
*(INV) approval_relationship_reference S[1:1]
approval_context
constrained_item
result
definition_approval_relationship
(DER) status
approval_relationship_status
DNV No. 13


External_reference
external_reference
description
text
location
any_address
external_ instance_reference
document_reference_ with_address
address
schema_name
entity_type
Label
target_guid
global_id
*internal_location
*street_number
*street
*postal_box
*town
*region
*postal_code
*country
*facsimile_number
*telephone_number
*electronic_mail_address
*telex_number
Label
document_reference
universal_ resource_locator
*protocol
protocol_type
*other_ protocol_type
label
port
INTEGER
machine_adress location
identifier
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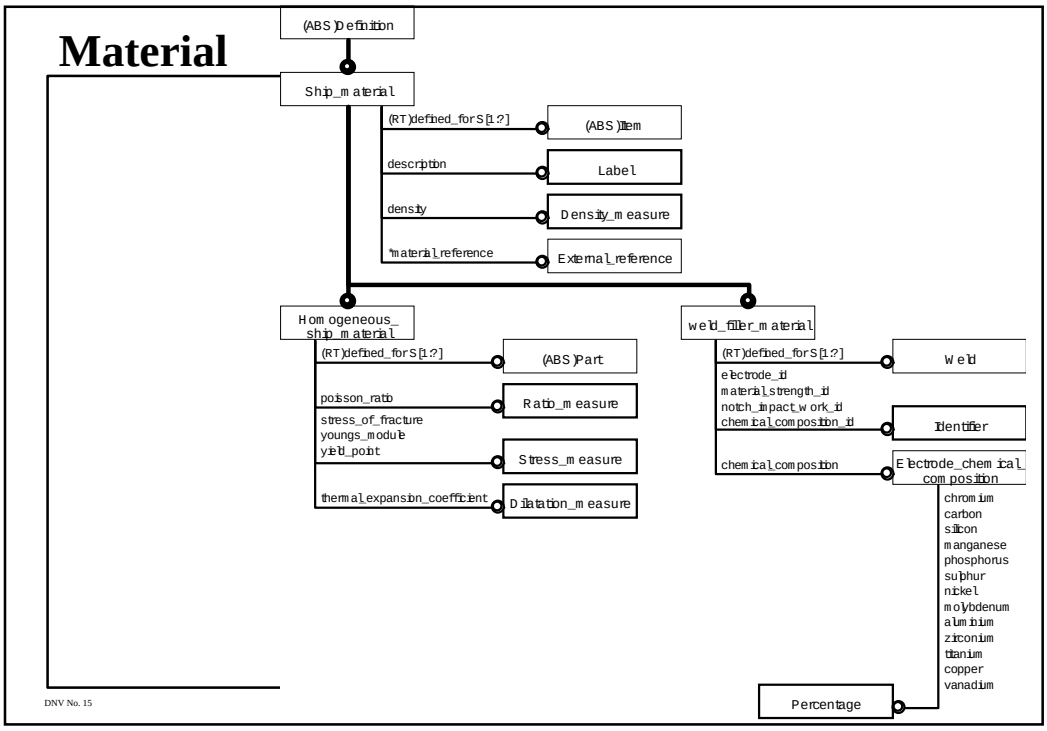
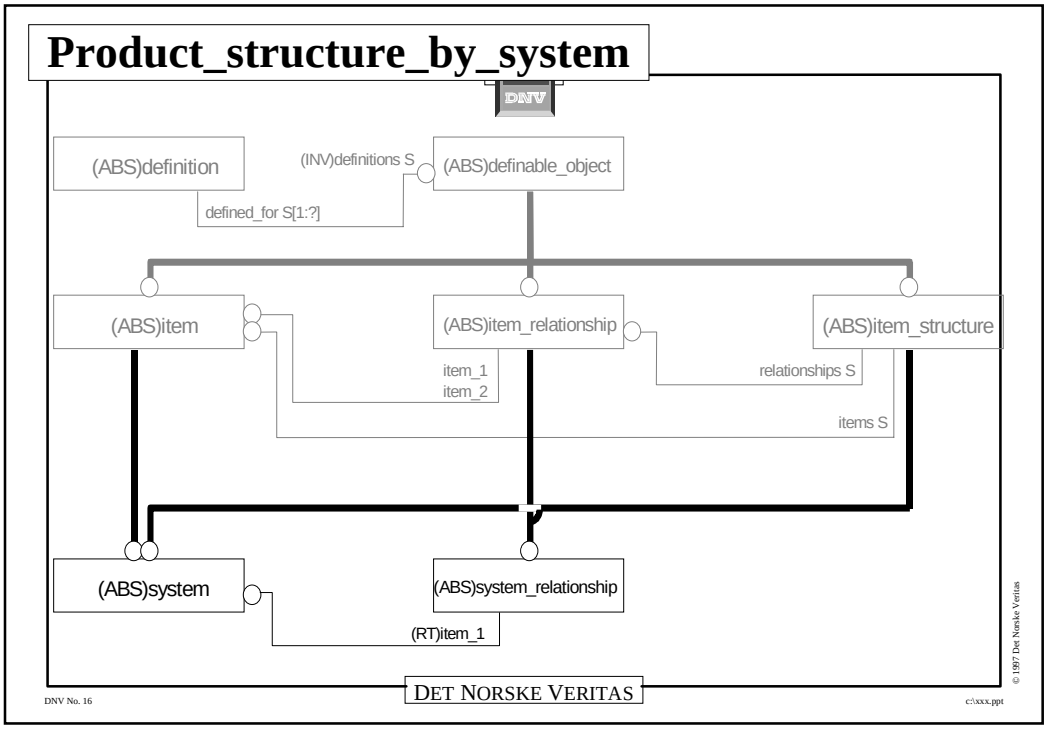

Material
(ABS)Definition
Ship_material
(RT)defined_for S[1:?]
(ABS)Item
description
Label
density
Density_measure
*material_reference
External_reference
Homogeneous_ship_material
(RT)defined_for S[1:?]
(ABS)Part
poisson_ratio
Ratio_measure
stress_of_fracture
youngs_module
yield_point
Stress_measure
thermal_expansion_coefficient
Dilatation_measure
weld_filler_material
(RT)defined_for S[1:?]
Weld
electrode_id
material_strength_id
notch_impact_work_id
chemical_composition_id
Identifier
chemical_composition
Electrode_chemical_composition
chromium
carbon
silicon
manganese
phosphorus
sulphur
nickel
molybdenum
aluminium
zirconium
titanium
copper
vanadium
Percentage
DNV No. 15


Product_structure_by_system
DNV
(ABS)definition
(INV)definitions S
(ABS)definable_object
defined_for S[1:?]
(ABS)item
(ABS)item_relationship
(ABS)item_structure
item_1
item_2
relationships S
items S
(ABS)system
(ABS)system_relationship
(RT)item_1
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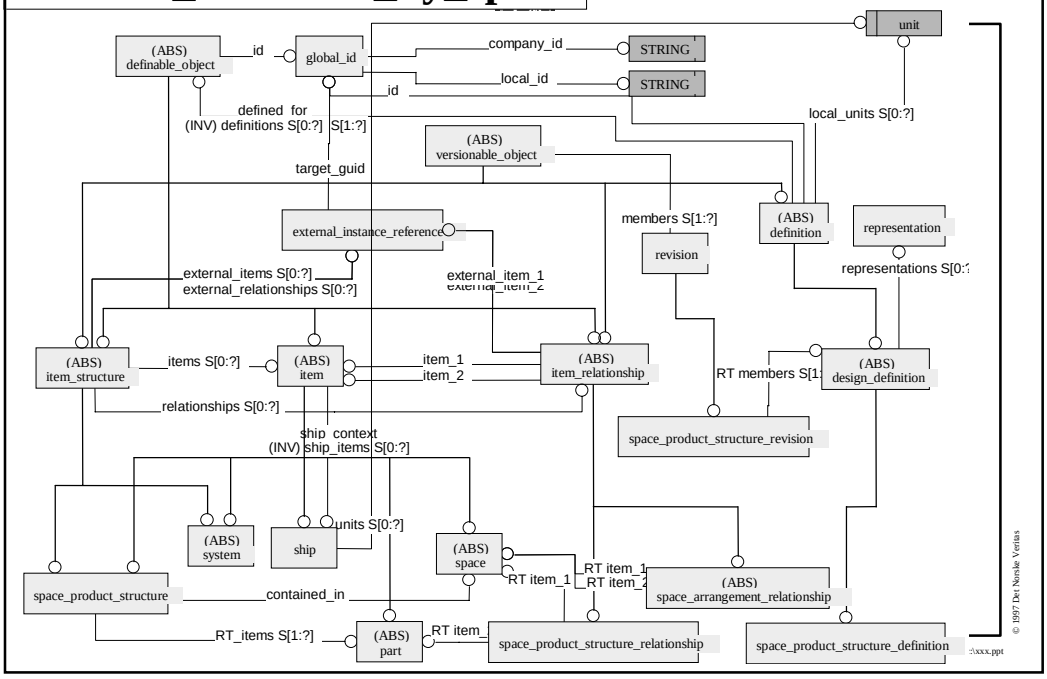
Product_structure_by_space



Domains outside the SCM

- 215
  - cargo
  - compartment characteristics
  - ...
- 217
  - piping
  - ...
- 218
  - manufacturing of structures
  - welding
  - ...
- 226
  - mechanical products
  - ...
- 234
  - monitored data
  - activities and events
  - ...

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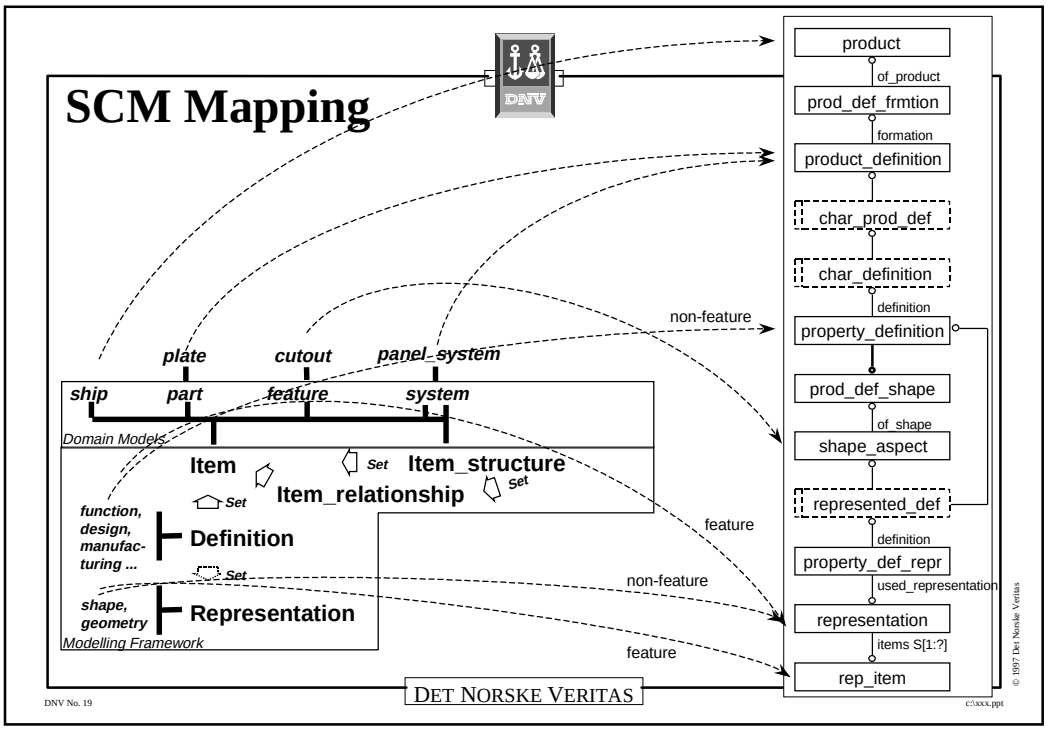

Challenges

- **Clean distinction between ship specific concepts and IR concepts**
- **Scoping of a BB:**
  - **not too large (entire BB shall be reused);**
  - **INVERSE**
- **How include supertype constraints?**
- **How scope select types?**
- **Link to AIM and ATS part of a concept?**
  - **Harmonisation on UoF level more/also useful?**
- **How recognise a BB in an AP?**
- **How make people accept and reuse existing concepts?**
- **How enforce discipline in development and usage?**

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