

A Model for retrofit projects



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- Focus on Model Based (Systems) Engineering
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Some definitions

Retrofit:

- to modify equipment (in airplanes, automobiles, a factory, etc.) that is already in service using parts developed or made available after the time of original manufacture.
- (of new or modified parts, equipment, etc.) to fit into or onto existing equipment.
- to replace existing parts, equipment, etc., with updated parts or systems.

Source: Internet

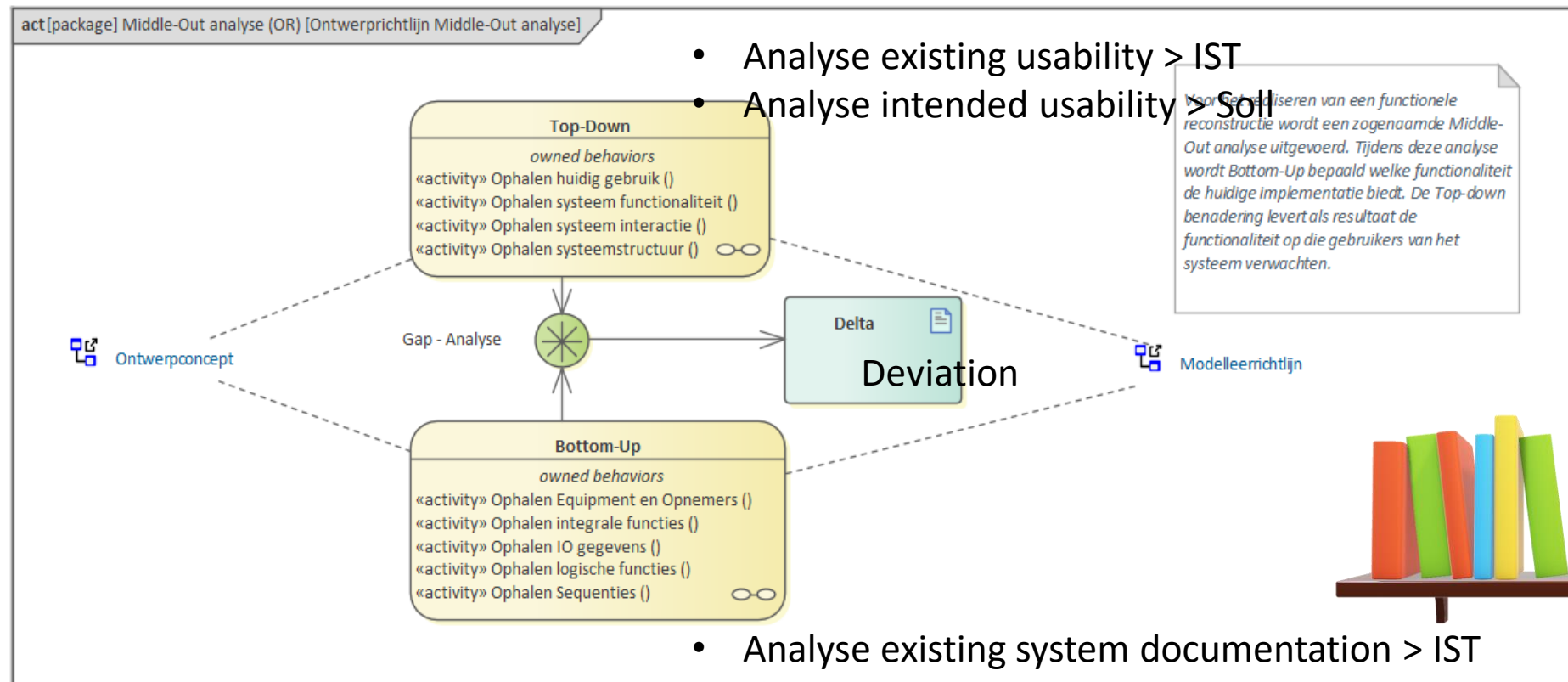
Issues

- Systems (or parts of it) are end of life
- People with knowledge of the processes/systems are retiring
- Documentation is outdated/incomplete
- Performance requirements



- “Goals” of the model:
 - The Model act as a “single source of thruth” for
 - Engineering
 - Maintenance
 - Testers
 - Asset management
 - Etc.
 - The Model act as a knowledge base for:
 - Maintenance
 - Asset management
 - Engineering
 - Testers
 - Operators
 - Project management
 - Etc.

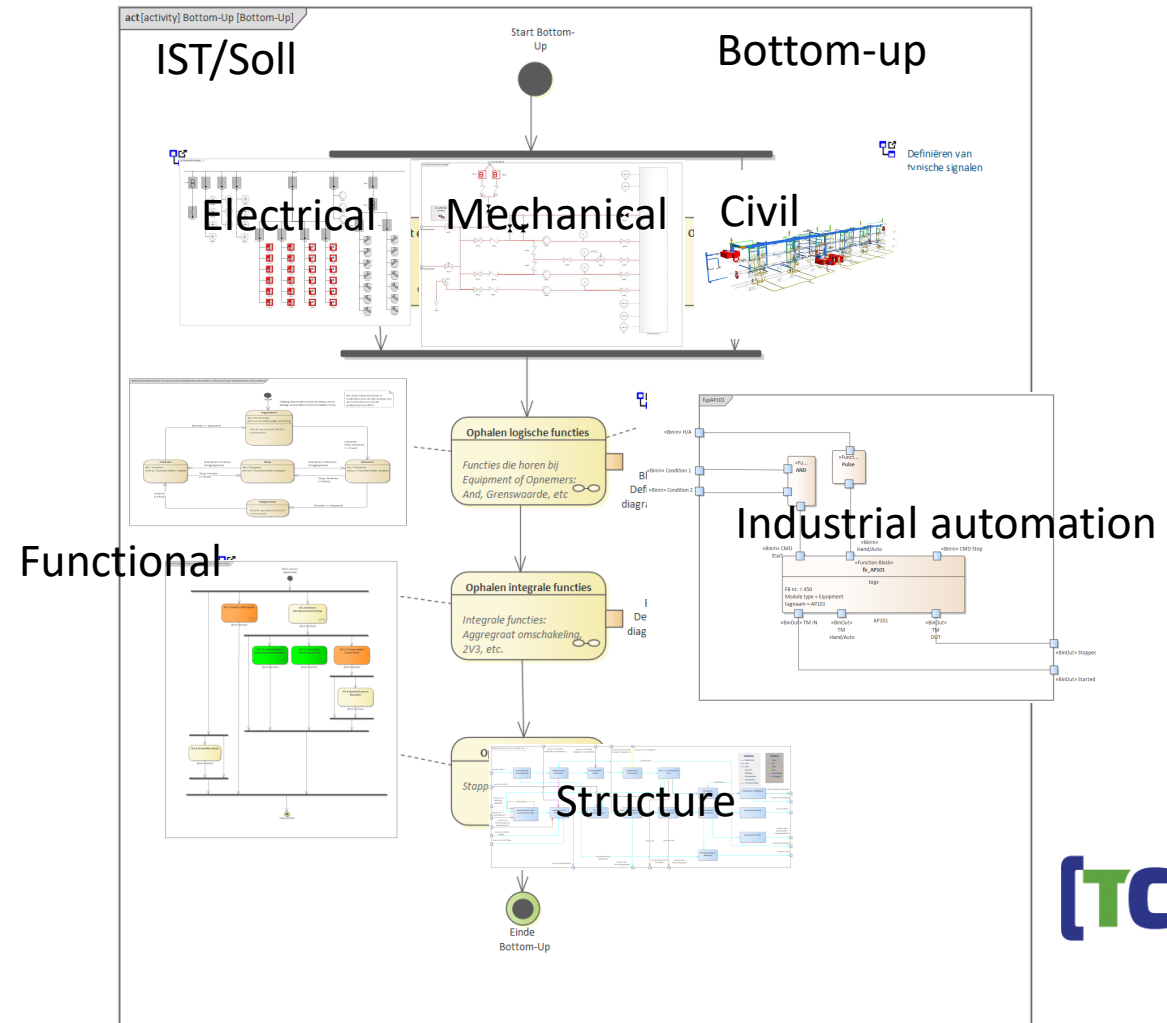
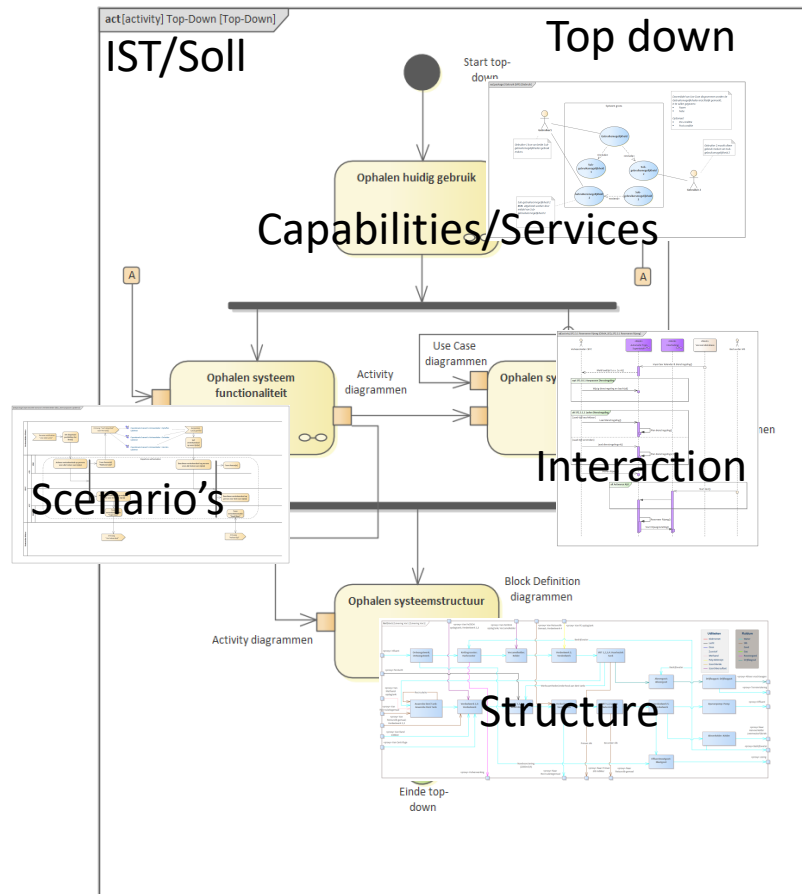
Middle-Out analyse > “Ist/Soll”



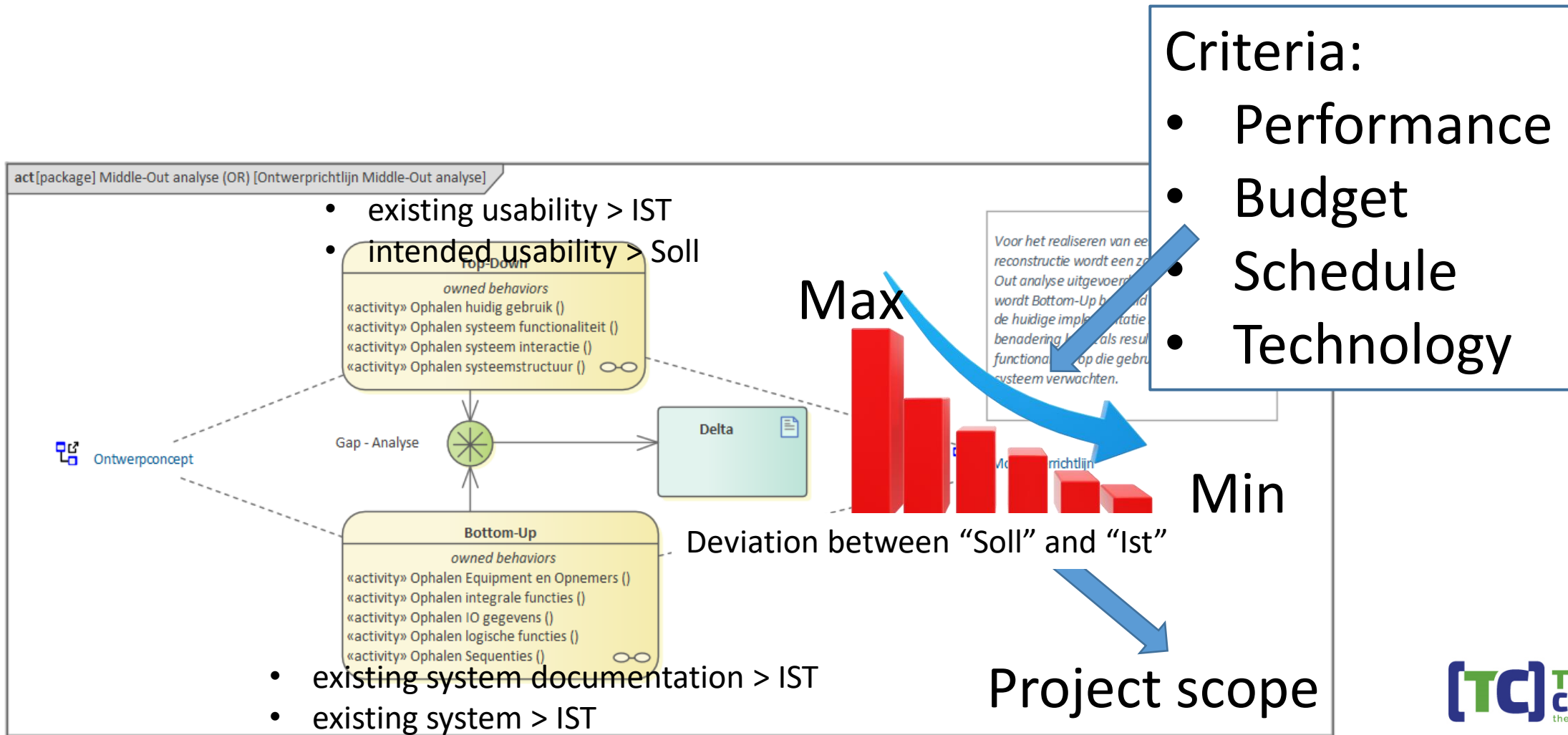
- Analyse existing system documentation > IST
- Analyse existing system > IST



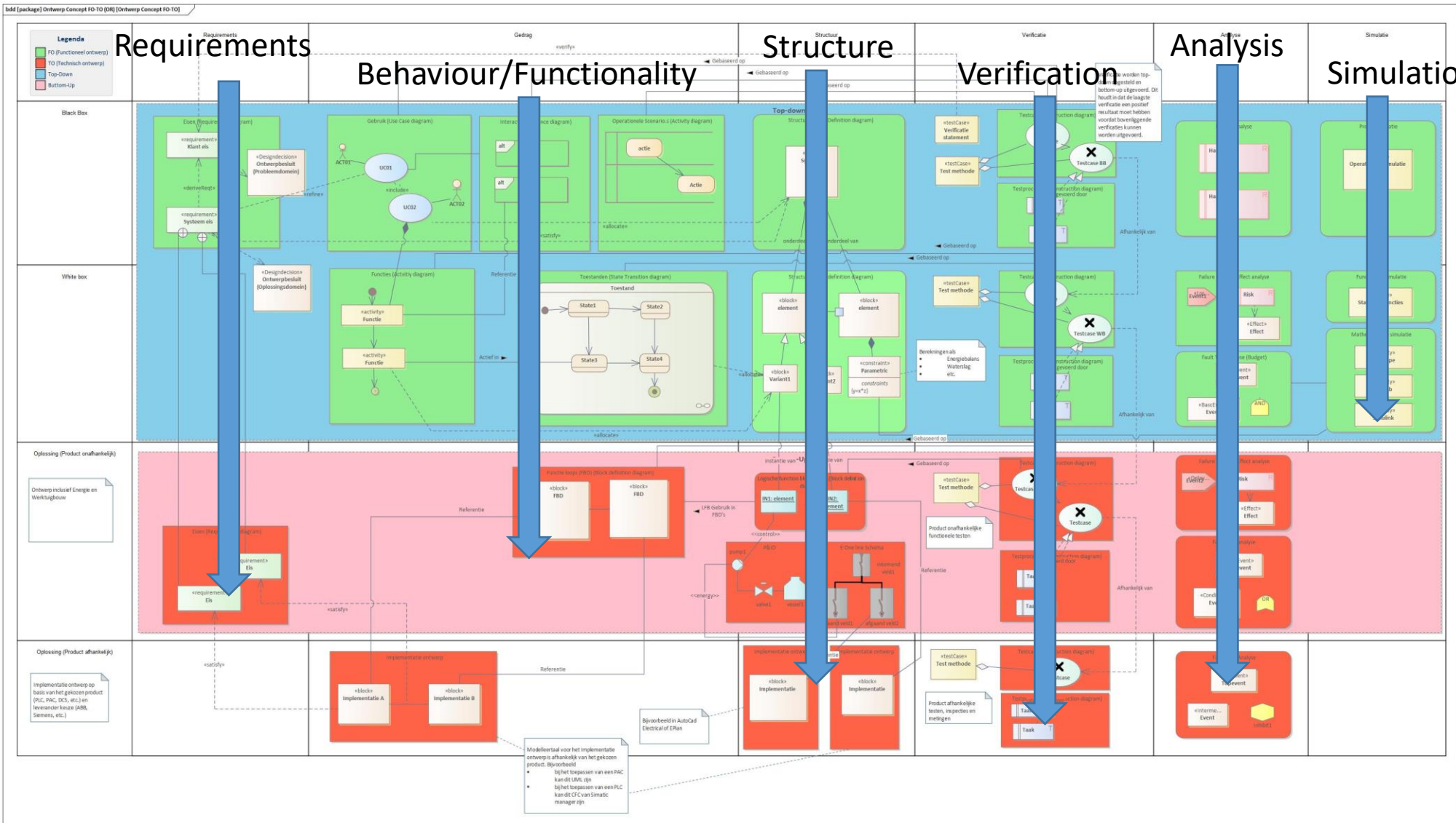
Middle-out analysis: Process



Middle-Out analyse: Project scope



Analysis/Design concept



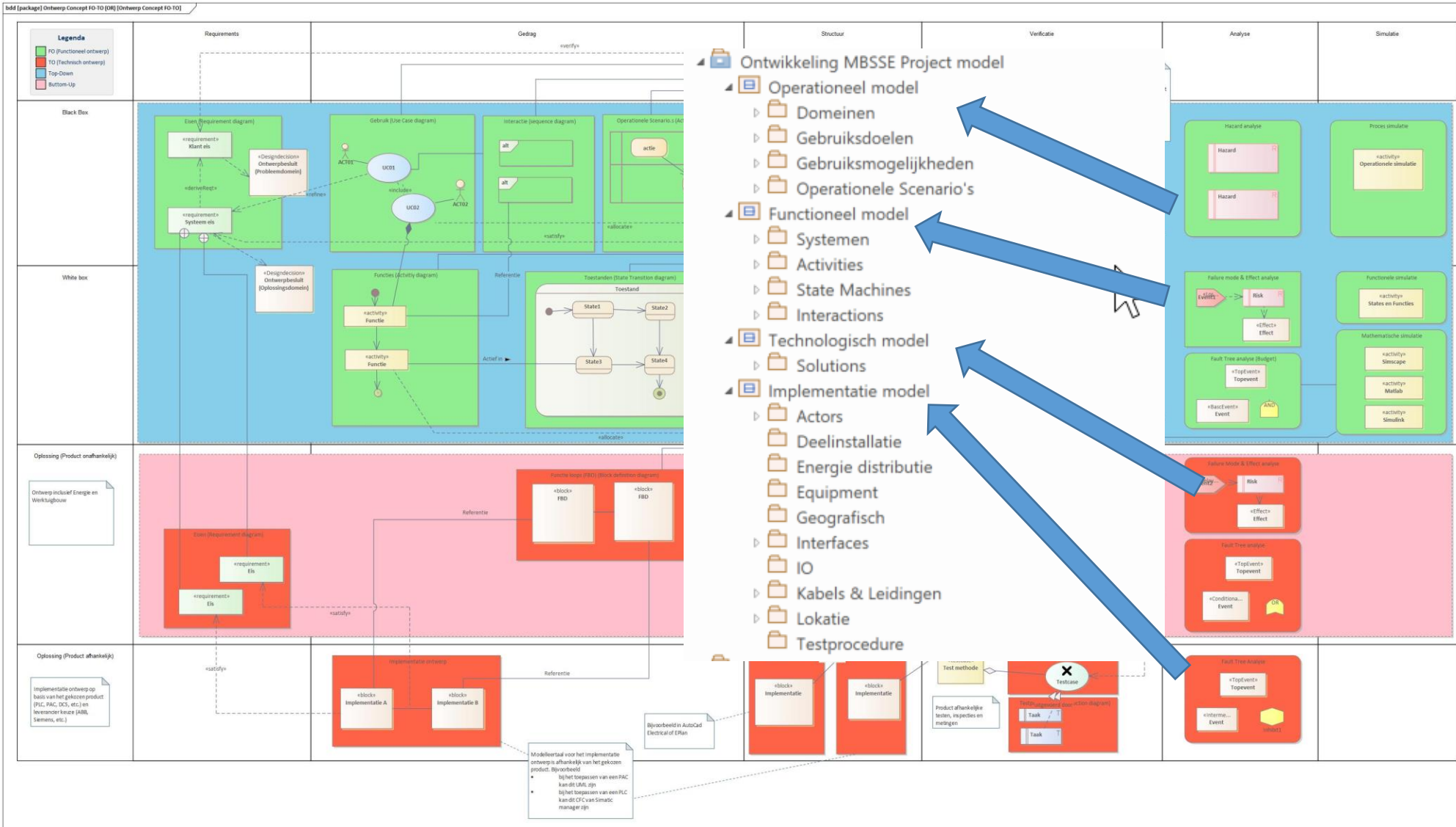
Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

Model structure



Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll



BPMN

Operational analysis
Ist/soll

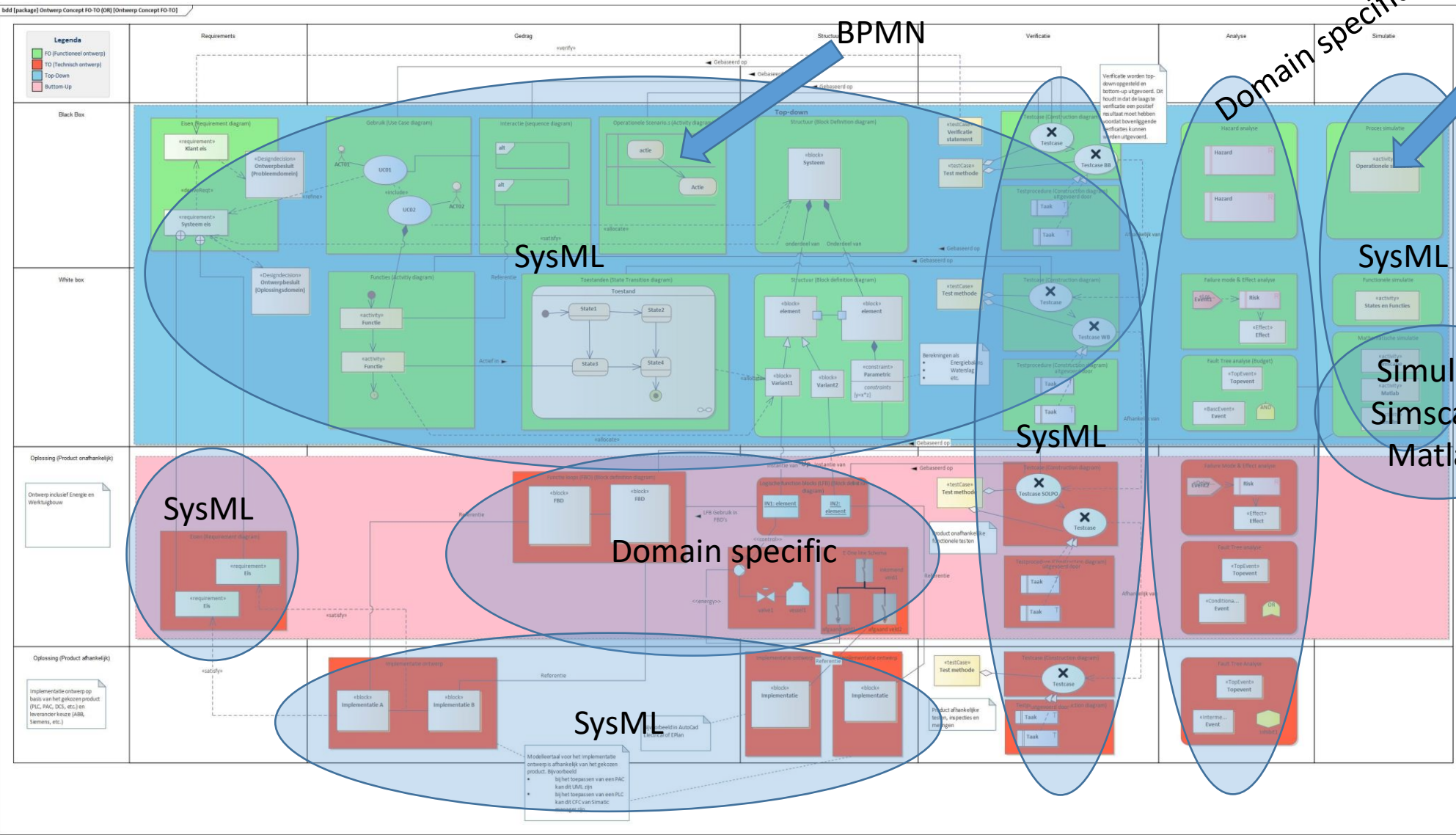
Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll



Modeling languages



Domain specific

Domain specific

SysML

SysML

SysML

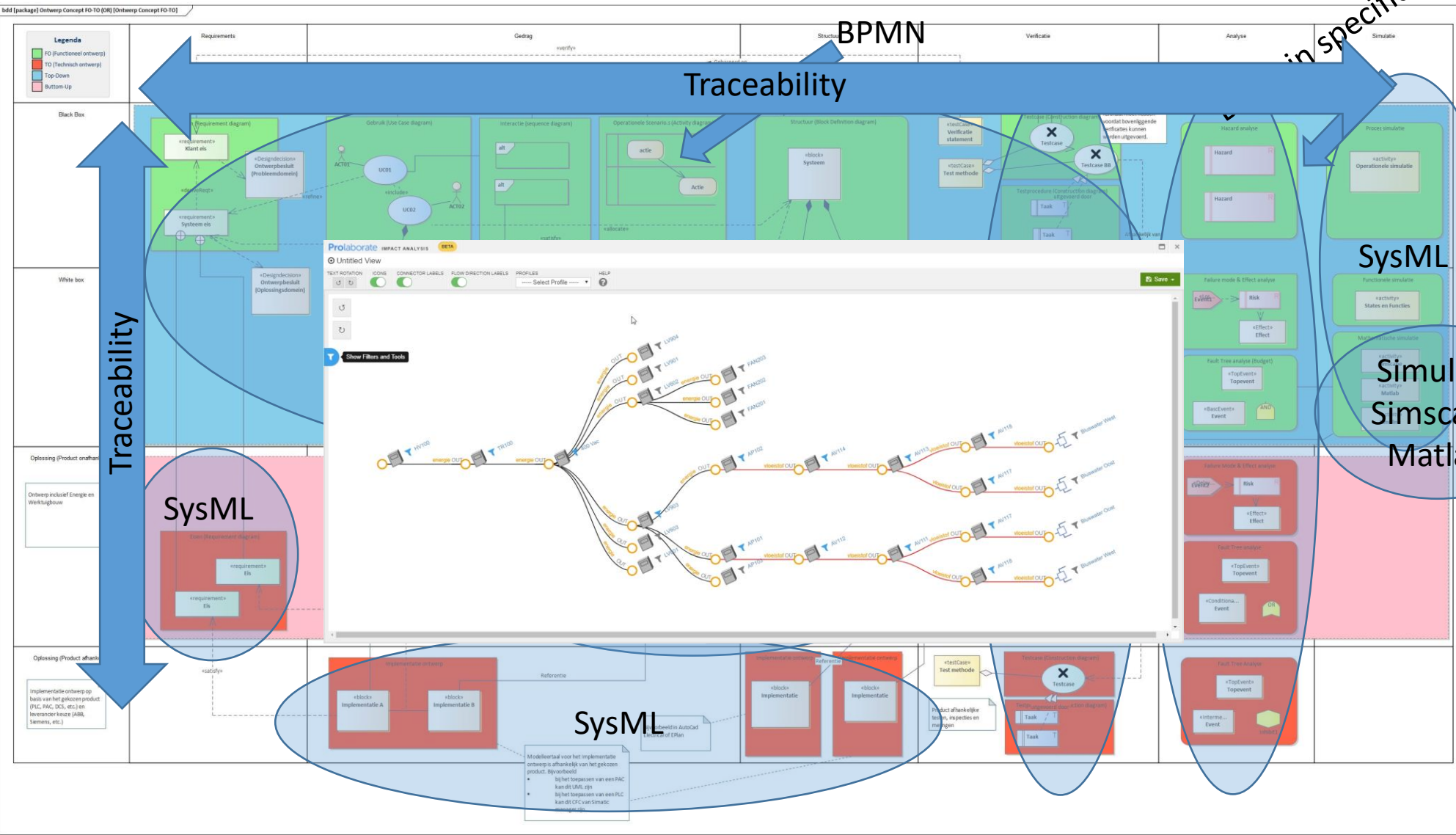
Simulink
Simscape
Matlab

SysML



BPMN

Traceability



in specific

Operational analysis
Ist/soll

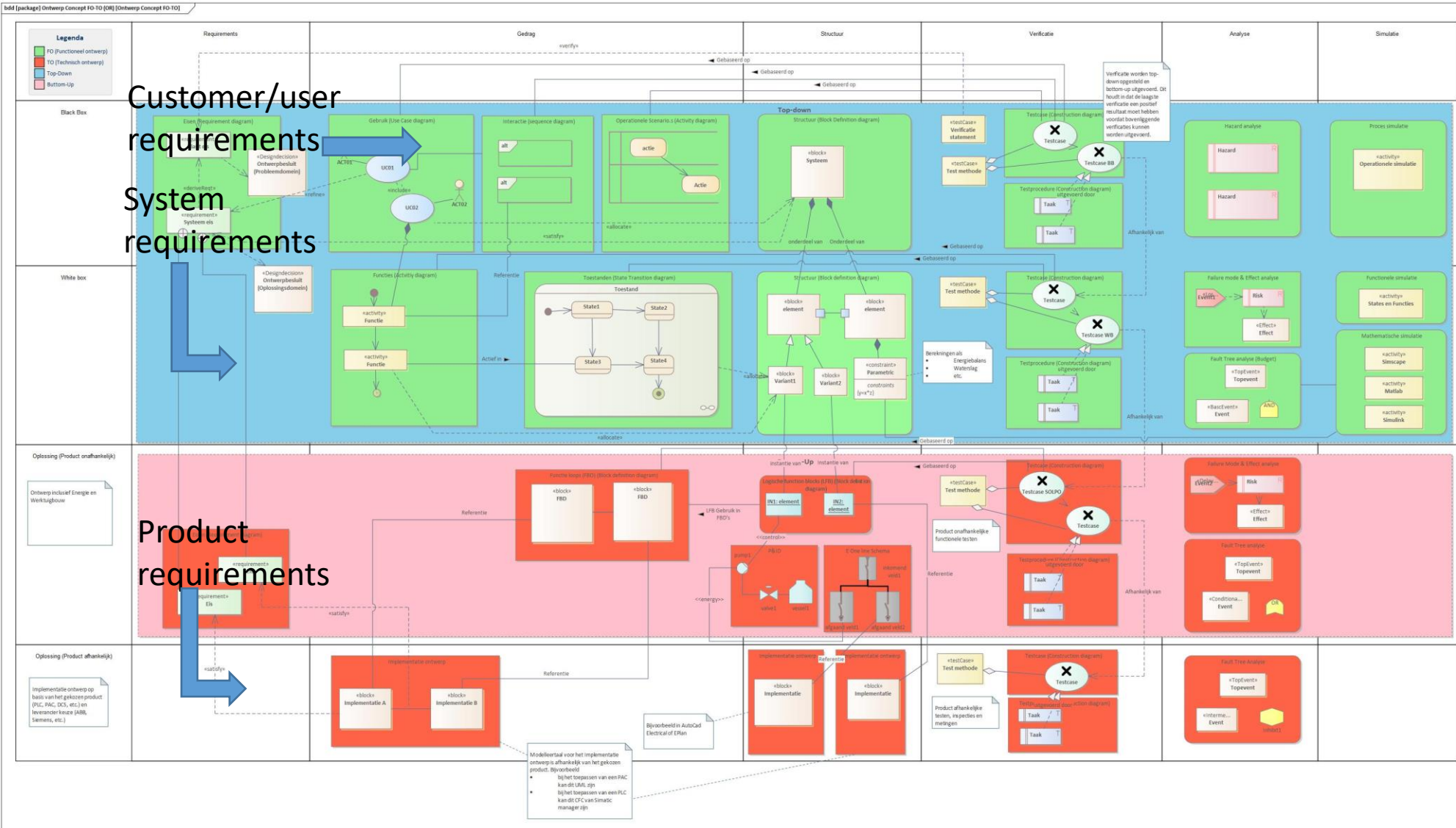
SysML
Simulink
Simscape
Matlab

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

Requirements



Customer/user requirements

System requirements

Product requirements

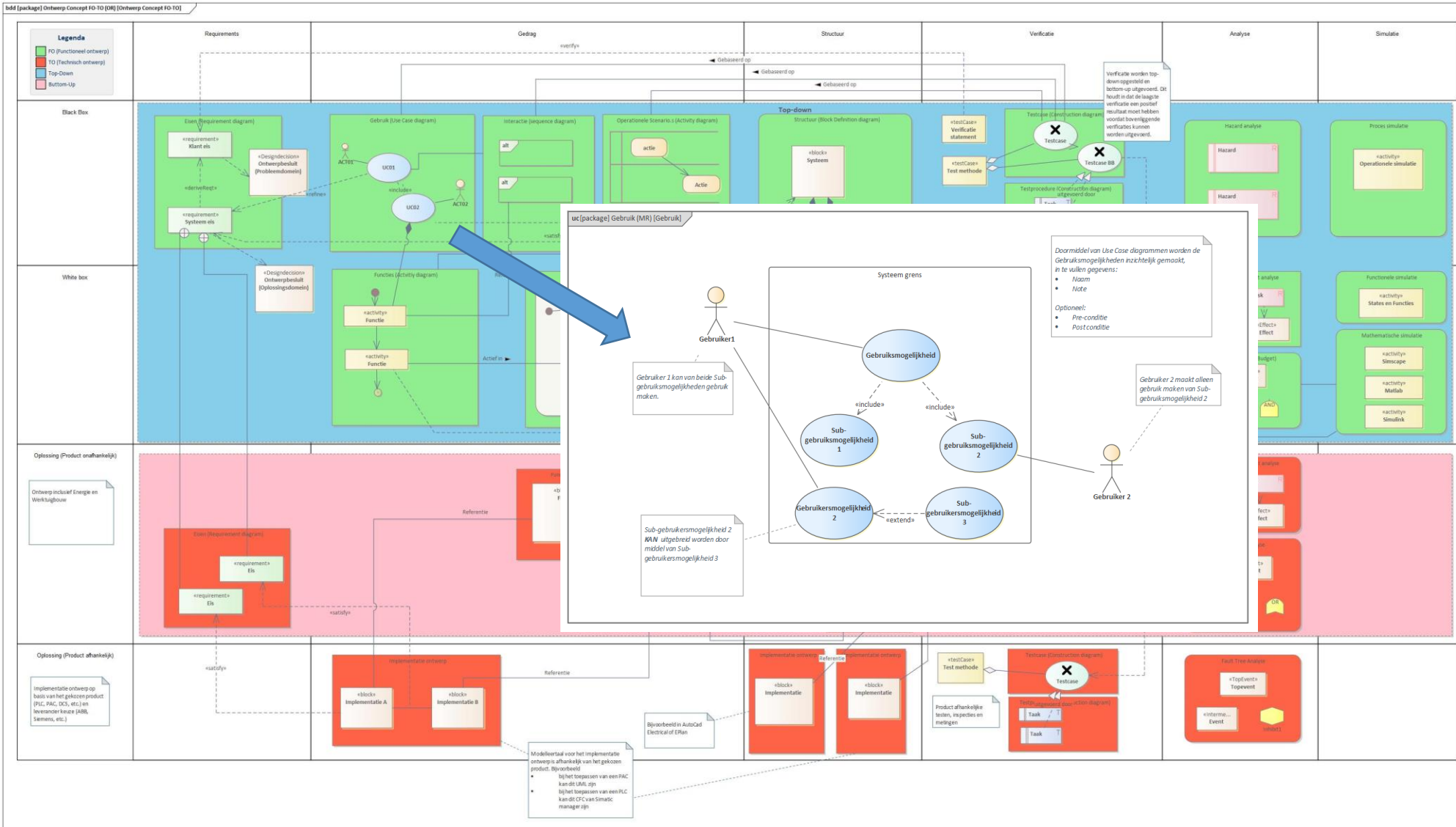
Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

Capabilities/Services



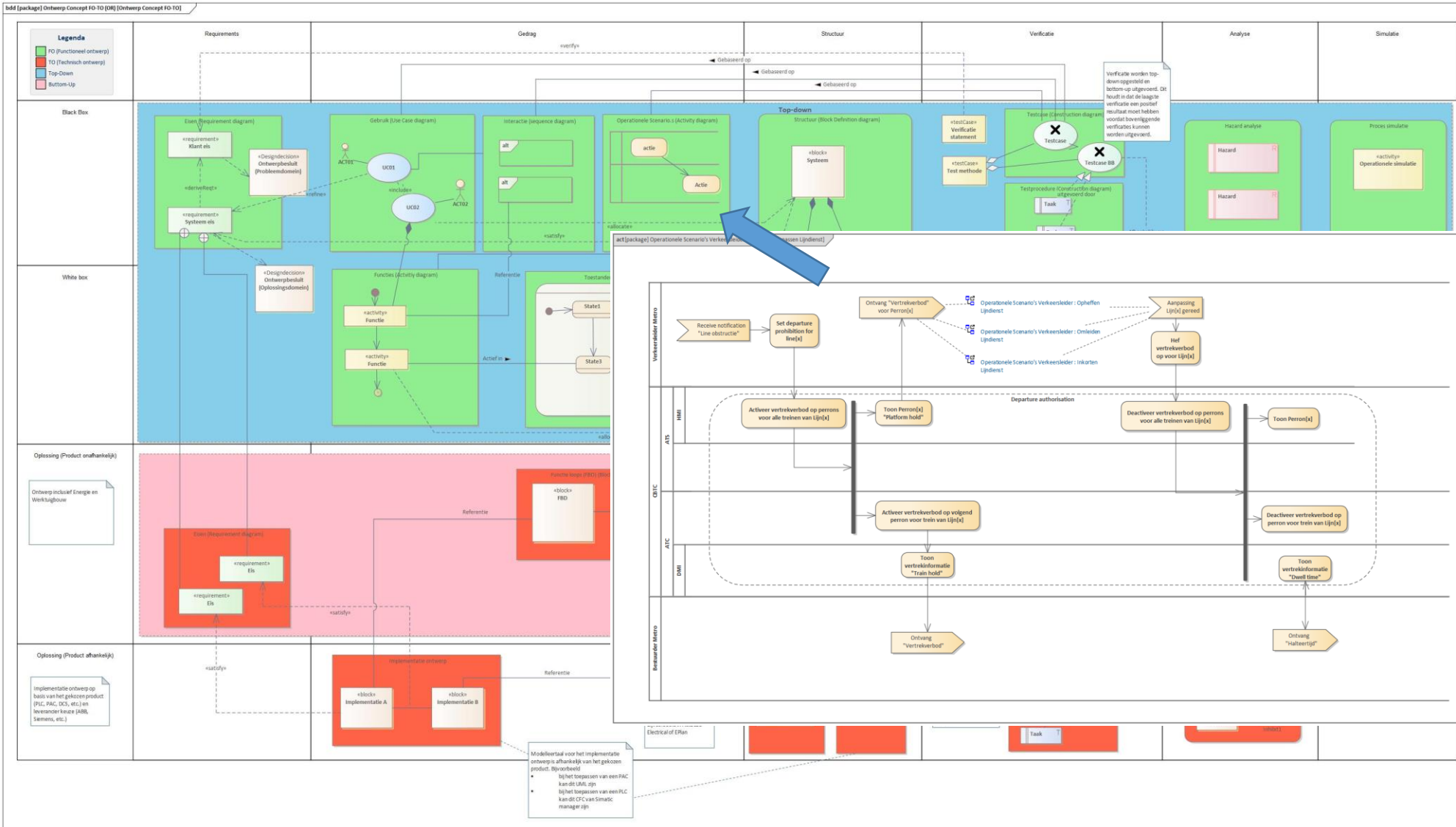
Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

Operational scenario's



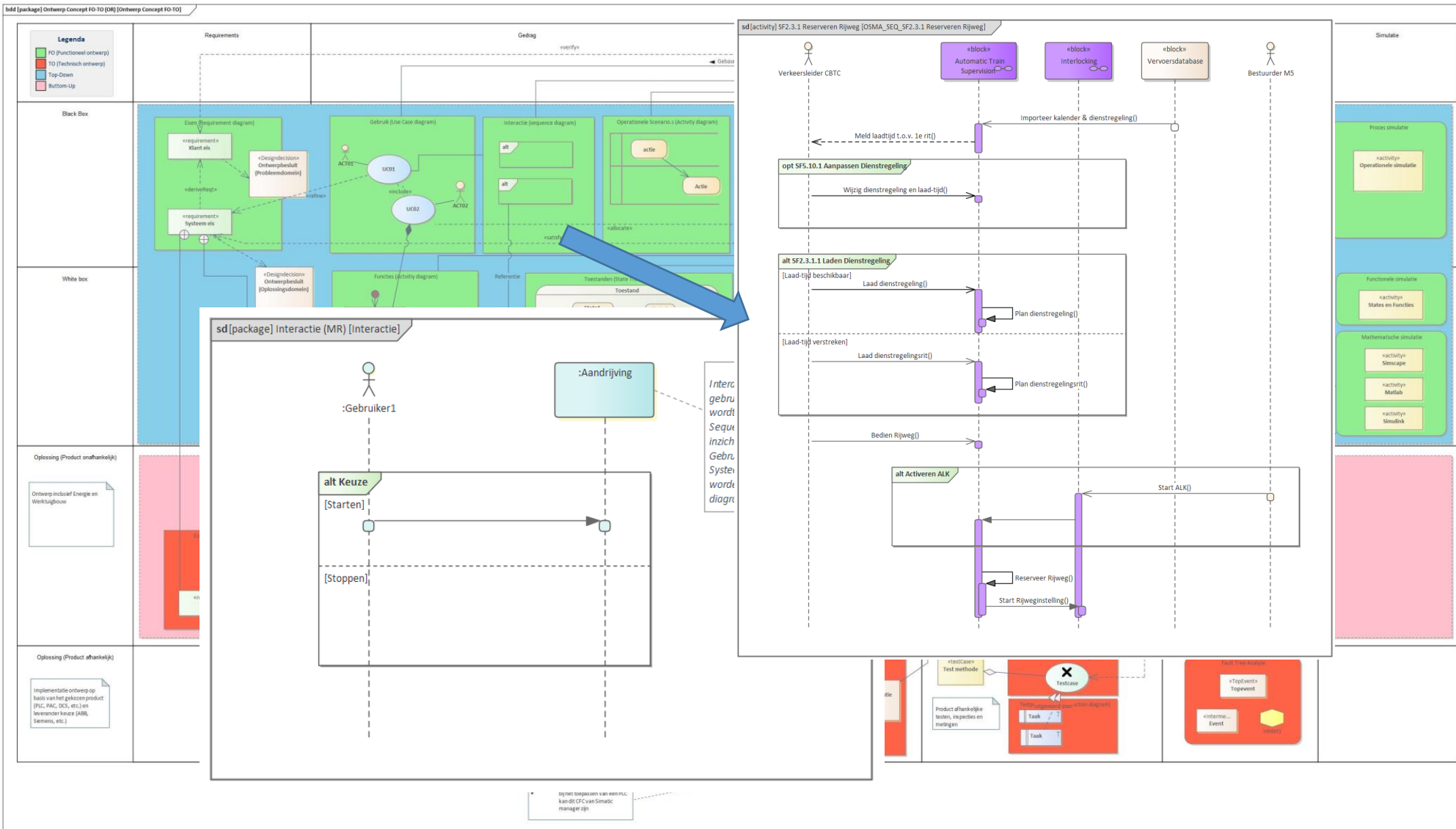
Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

System interactions



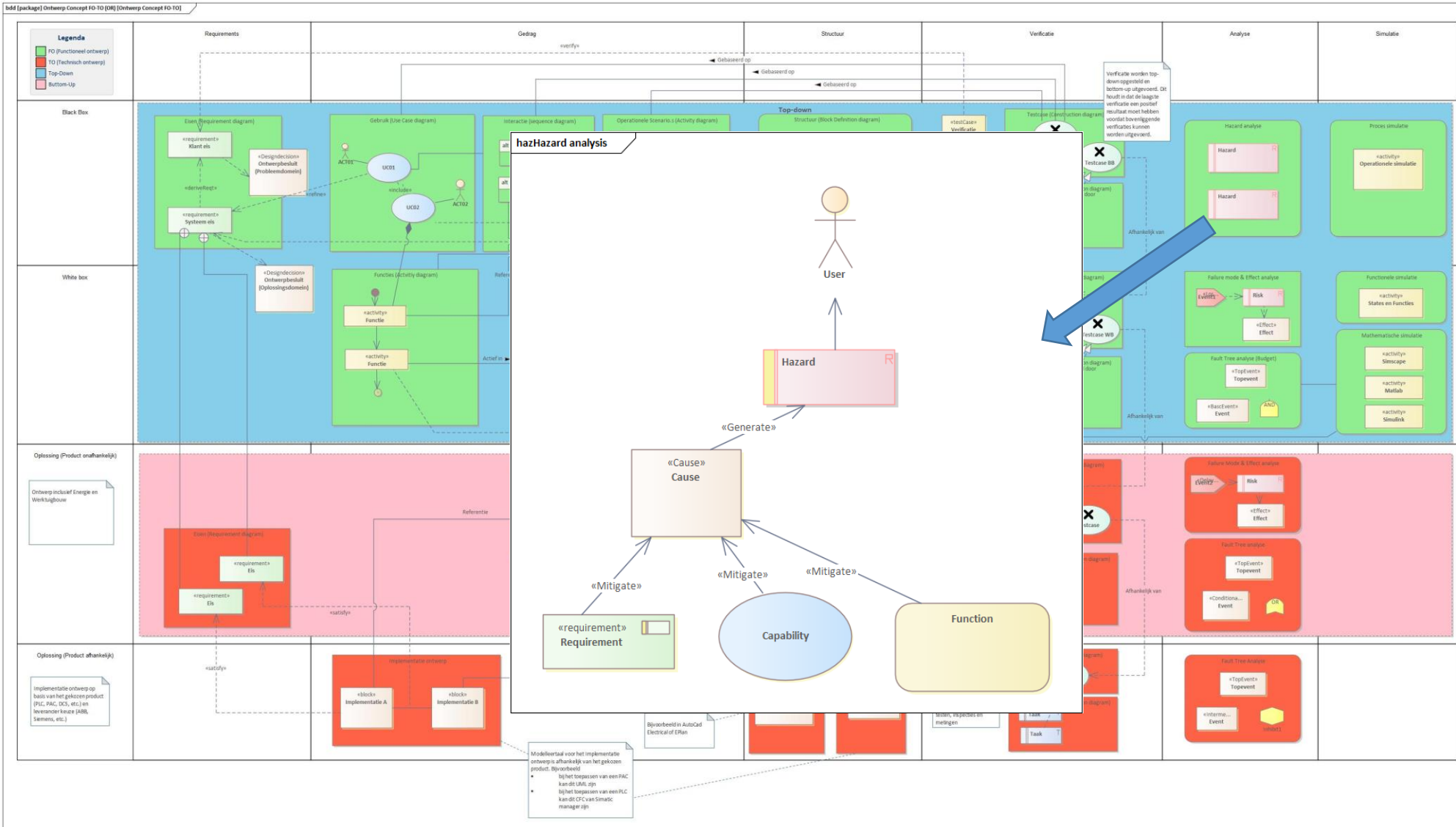
Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

Hazard analysis



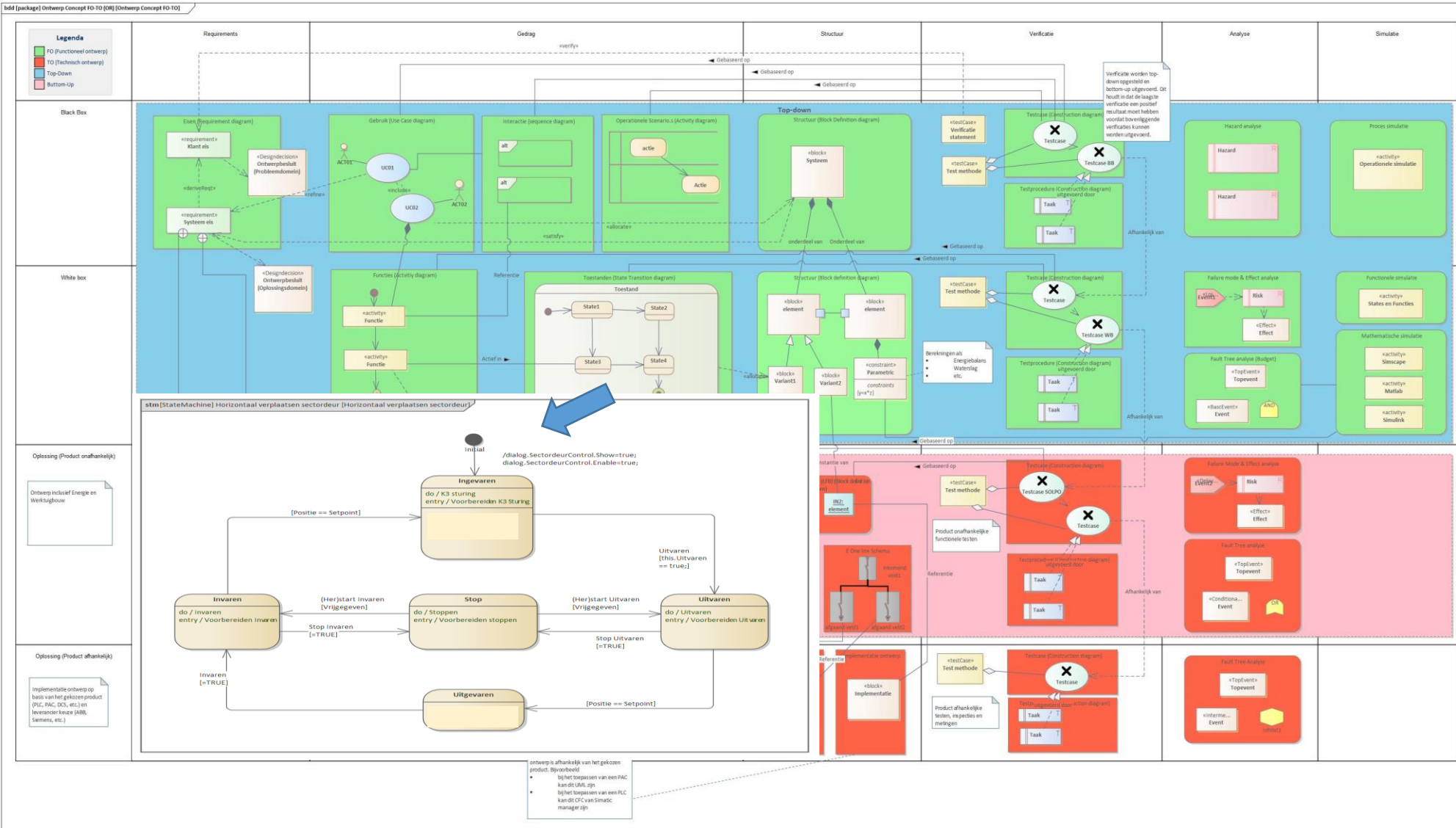
Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

System States



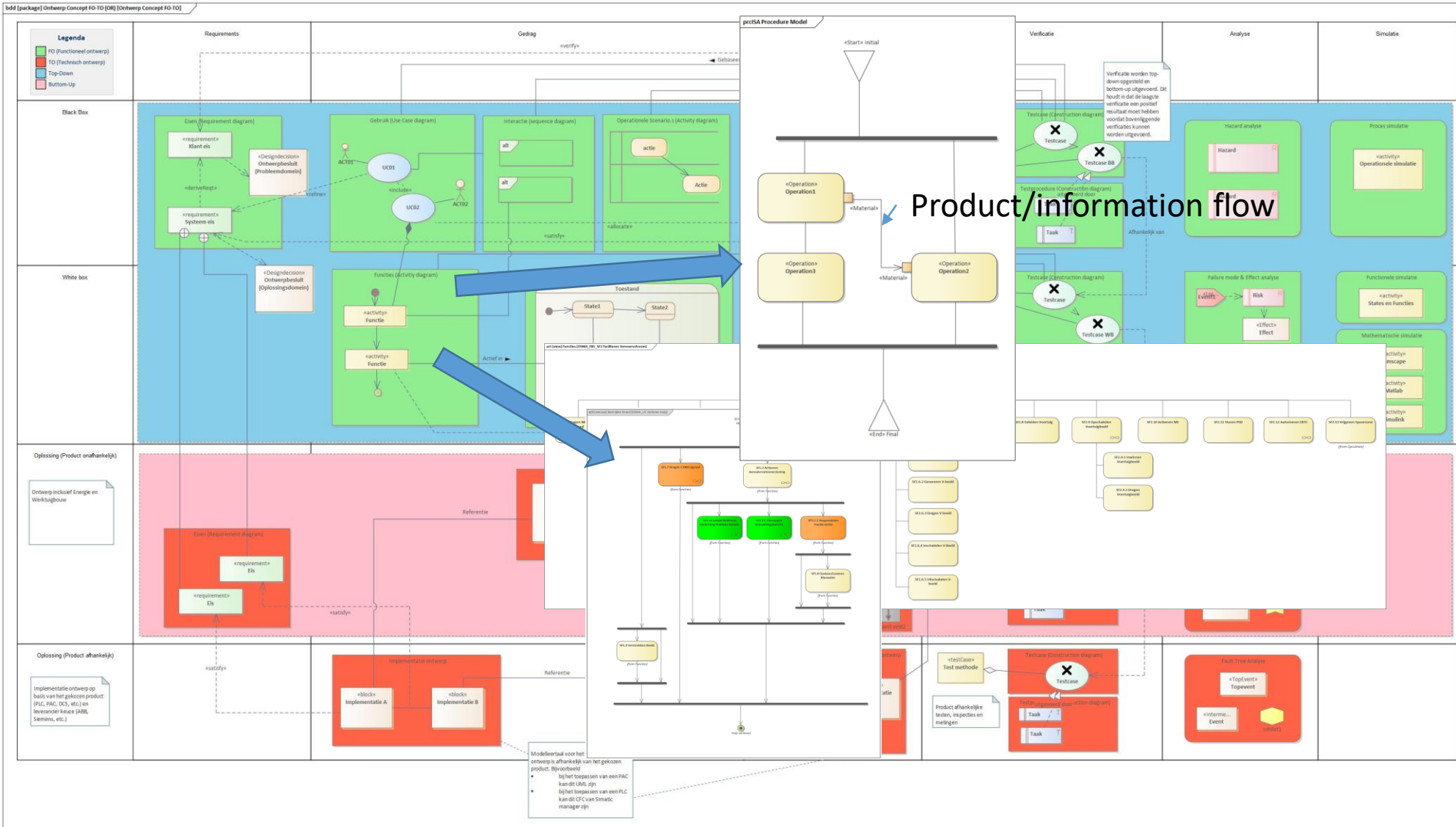
Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

System functions



Operational analysis
Ist/soll

Functional analysis
Ist/soll

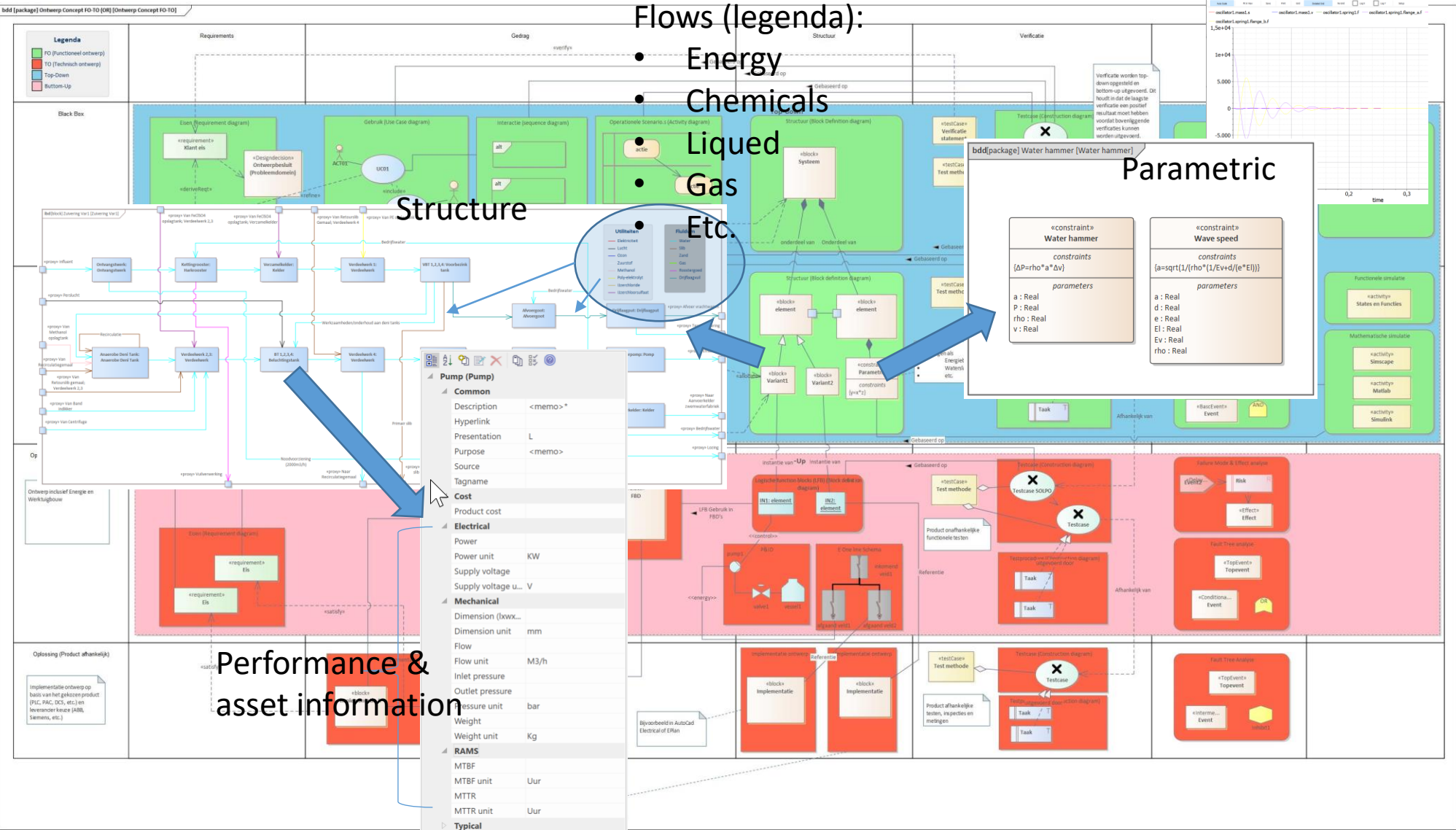
Technology analysis
Ist/soll

Configuration analysis
Ist/soll

System structure

Flows (legenda):

- Energy
- Chemicals
- Liquefied Gas Etc.



Performance & asset information

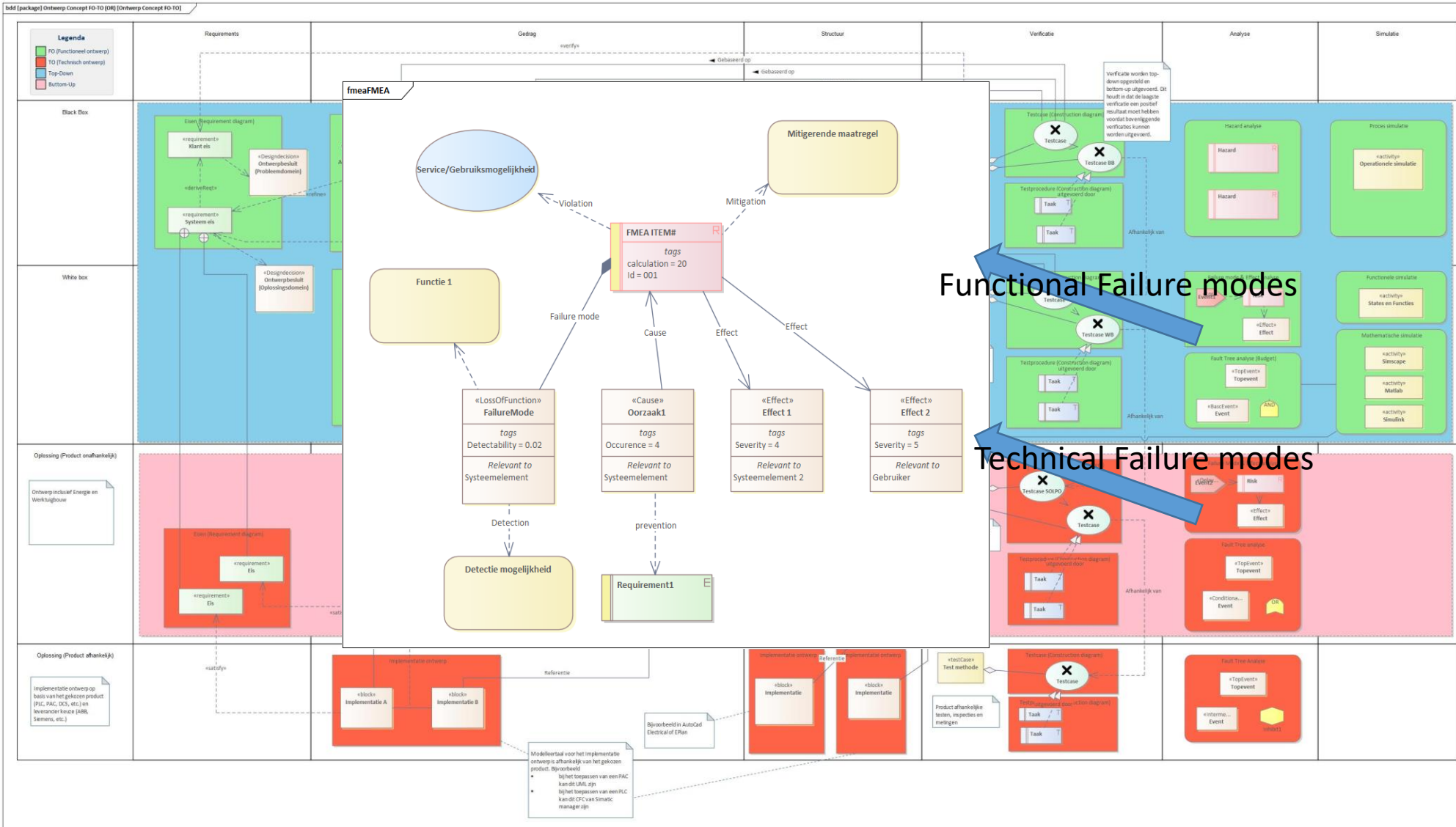
Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

Failure mode analysis



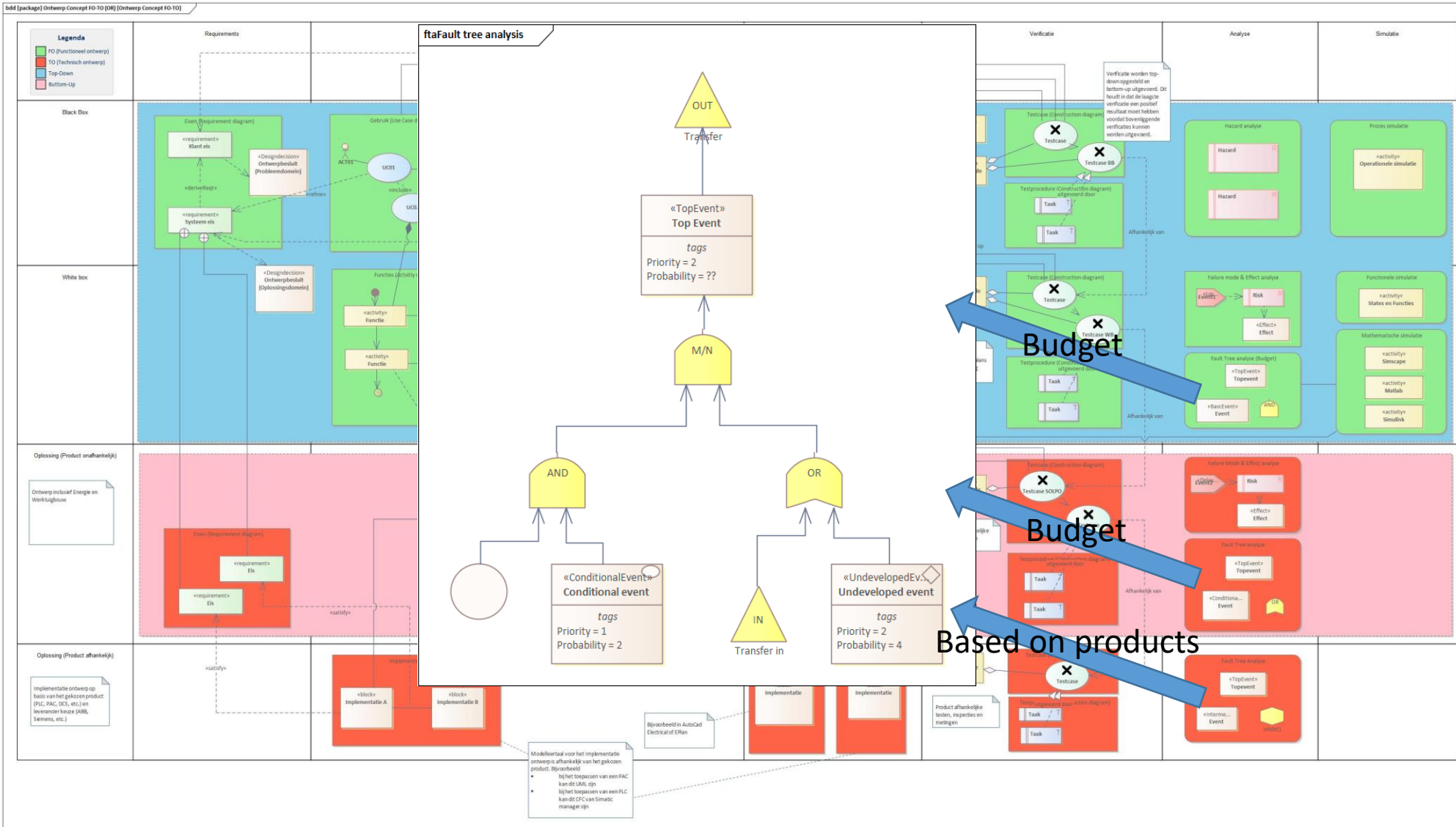
Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

Fault tree analysis



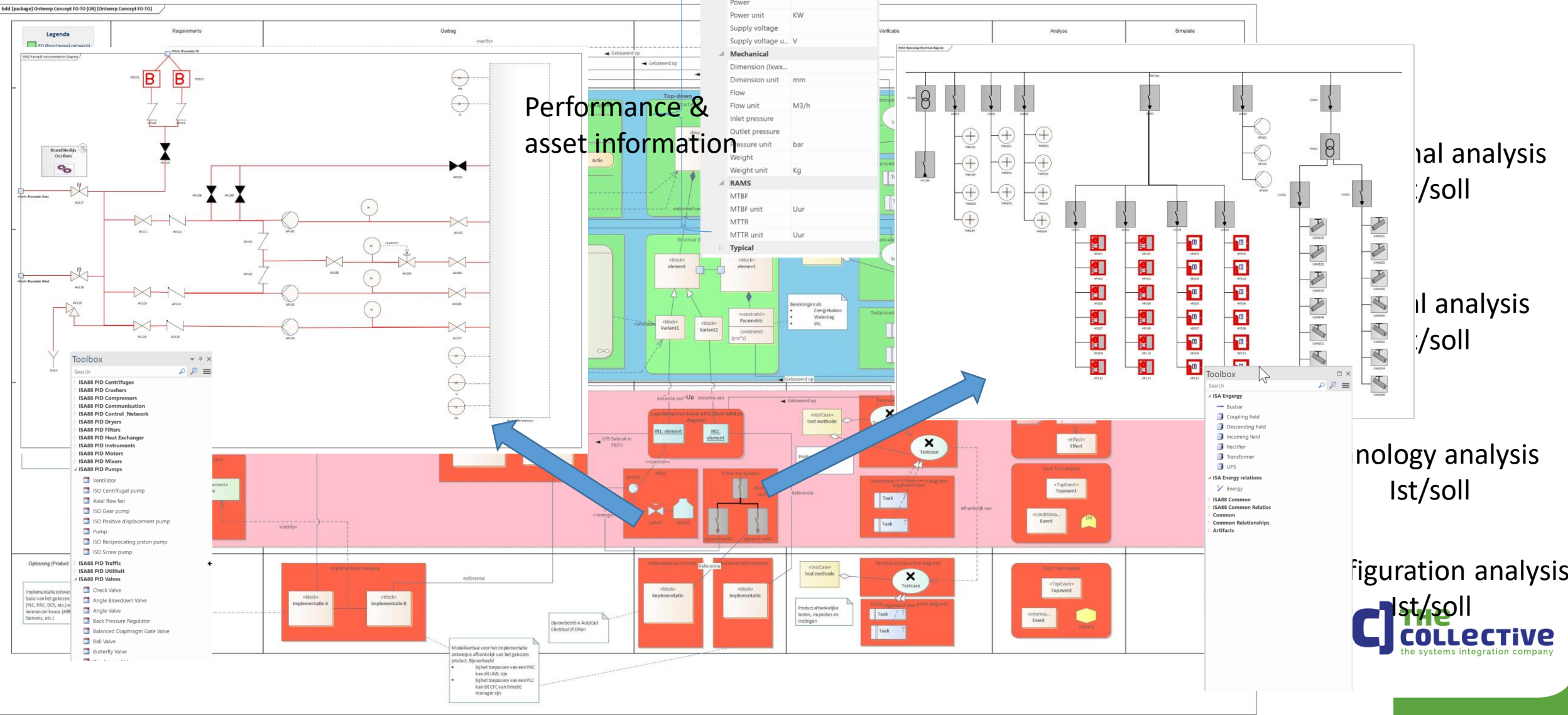
Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

Technology: E & M



Performance & asset information

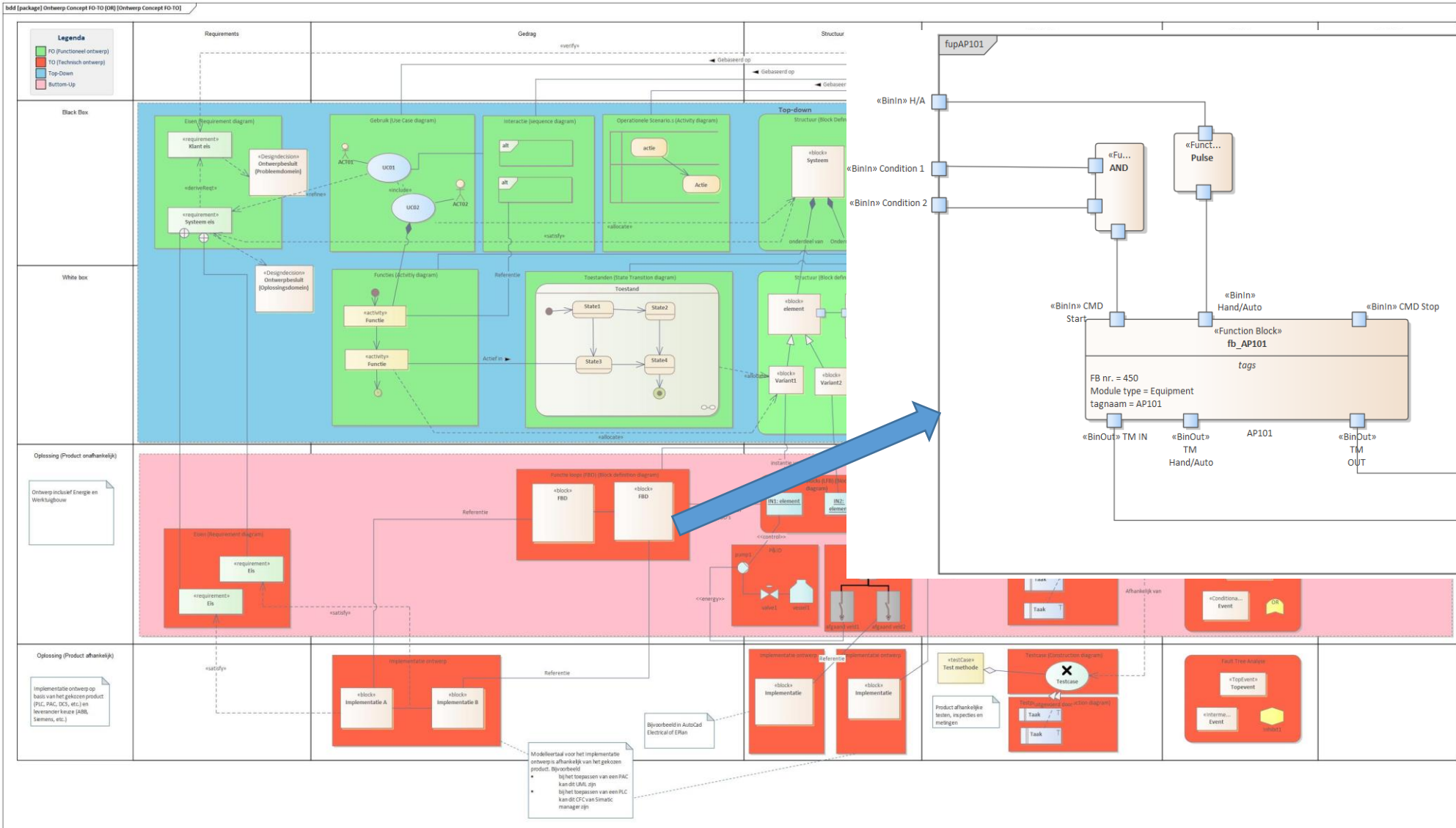
nal analysis
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il analysis
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nology analysis
Ist/soll

figuration analysis
Ist/soll

Industrial automation



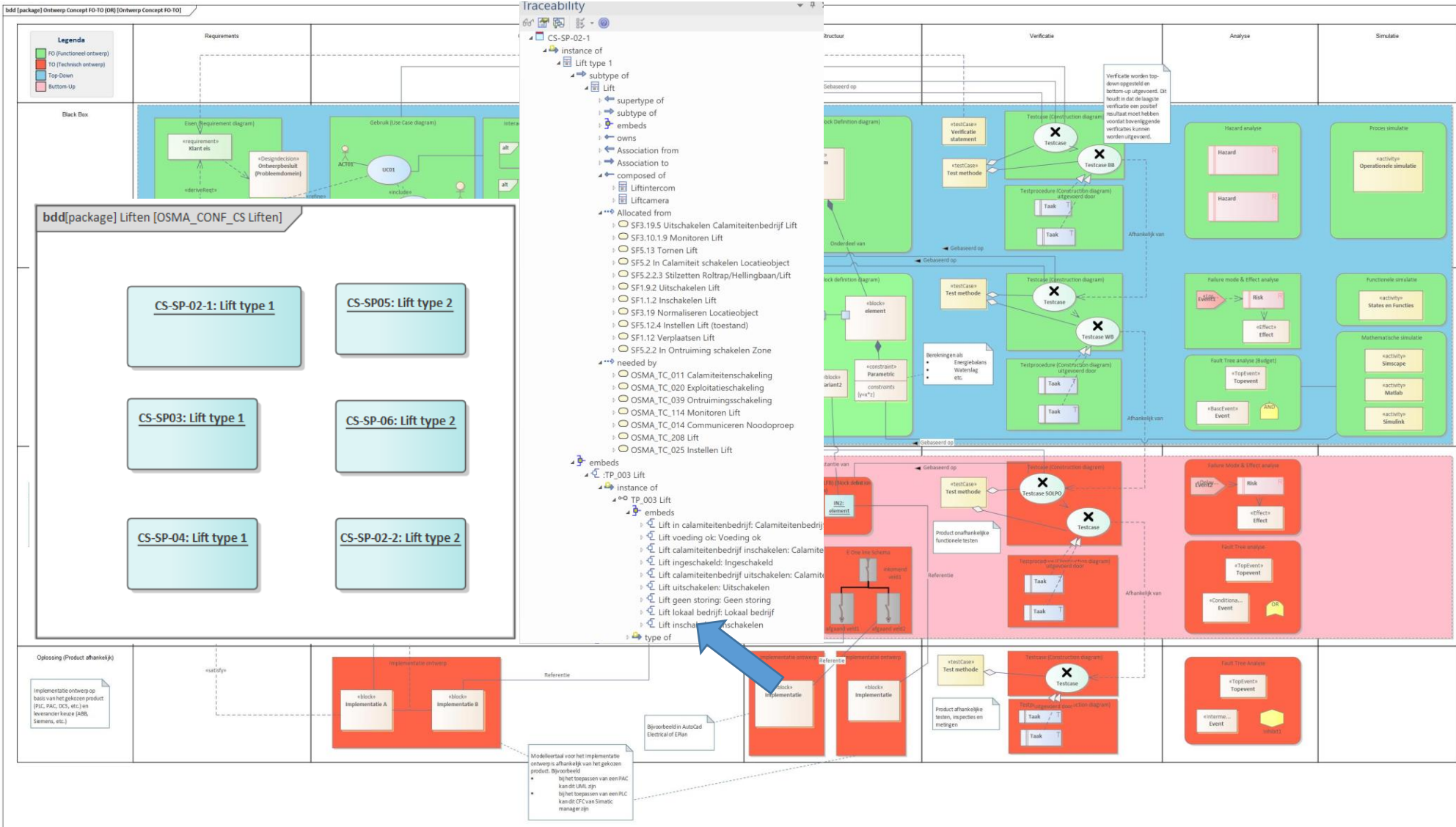
Functional analysis
Ist/soll

Behavioral analysis
Ist/soll

Configuration analysis
Ist/soll

Configuration analysis

Configuration



Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

3D BIM integration

Definition: wall, floor, room, etc.

ProjectId	LatestRevisionId	RevisionNumber	Name	Schema
1703927	1441705	0	Test-Booth	Ifc4
1703928	1515201	0	Test-Booth	Ifc4
1768473	1572867	0	Test-MechanicsPiping	Ifc2x1c1
1312885	13176259	0	Test-Dismark	Ifc2x1c1
1307209	12103959	0	Test-Seminarhouse	Ifc4
1835009	1638403	0	Test-Season	Ifc2x1c1

Step 1: Select IFC project to import

Step 2: Select destination
IFC-Models

Step 3: Generate model in EA
Generate

Step 1: Select IFC project to import

Step 2: Select destination

Step 3: Generate model in EA

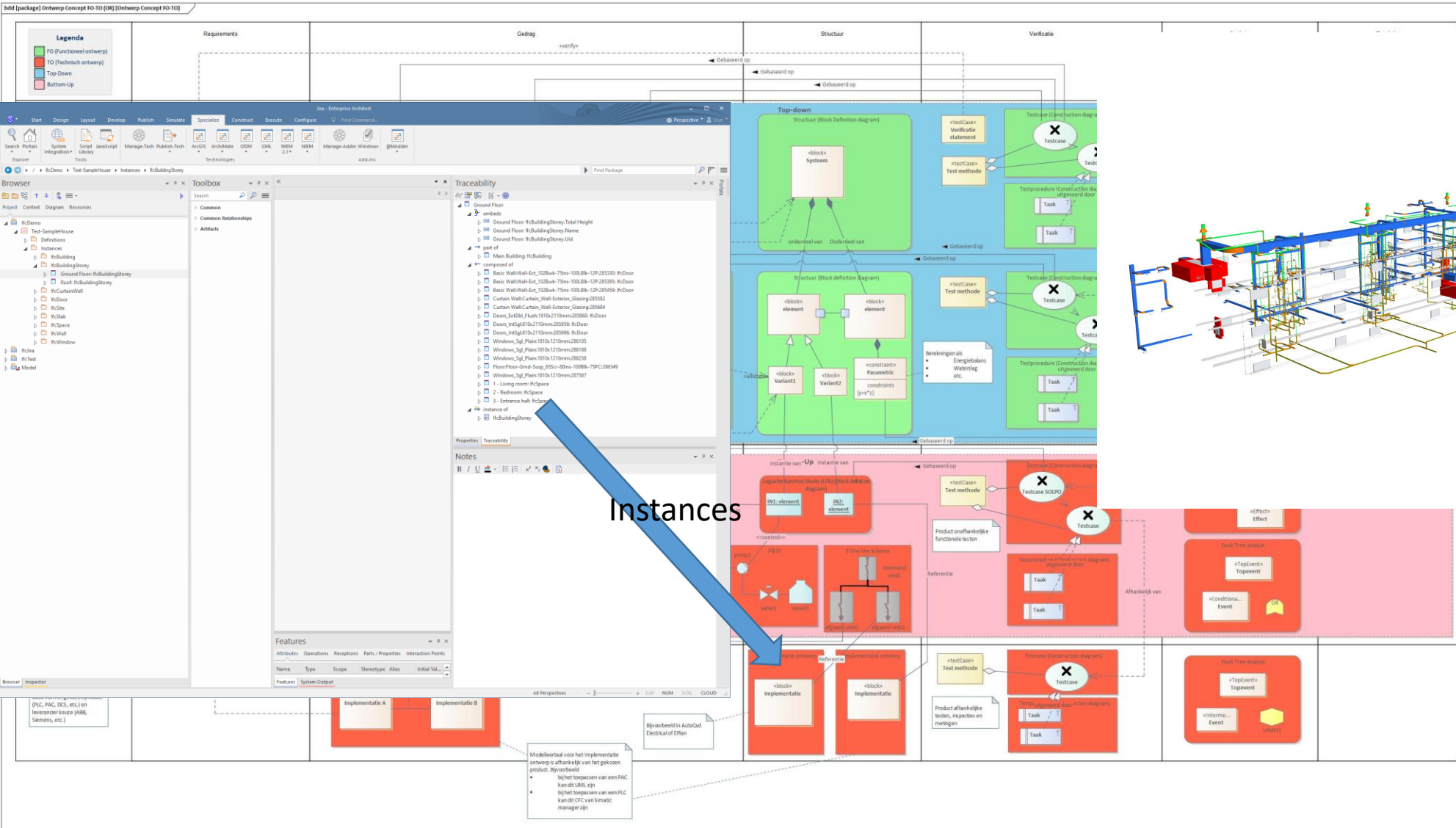
Definition: wall, floor, room, etc.

IST/SOII

Configuration analysis

TC THE COLLECTIVE
the systems integration company

3D BIM integration



ysis

'sis

Technology analysis
Ist/soll

Configuration analysis



3D BIM integration

The screenshot displays a software interface for 3D BIM integration. On the left, a 'Repository Browser' shows a hierarchical tree of elements like 'Model', 'B:Test', 'B:Kra', and 'Test-SampleHouse'. A central 3D model shows a building facade with a door and a window. A blue arrow labeled 'Navigation' points from the 3D model to a detailed diagram of a door mechanism. This diagram includes various components like 'vsh1', 'vsh2', 'vsh3', 'vsh4', 'vsh5', 'vsh6', 'vsh7', 'vsh8', 'vsh9', 'vsh10', 'vsh11', 'vsh12', 'vsh13', 'vsh14', 'vsh15', 'vsh16', 'vsh17', 'vsh18', 'vsh19', 'vsh20', 'vsh21', 'vsh22', 'vsh23', 'vsh24', 'vsh25', 'vsh26', 'vsh27', 'vsh28', 'vsh29', 'vsh30', 'vsh31', 'vsh32', 'vsh33', 'vsh34', 'vsh35', 'vsh36', 'vsh37', 'vsh38', 'vsh39', 'vsh40', 'vsh41', 'vsh42', 'vsh43', 'vsh44', 'vsh45', 'vsh46', 'vsh47', 'vsh48', 'vsh49', 'vsh50', 'vsh51', 'vsh52', 'vsh53', 'vsh54', 'vsh55', 'vsh56', 'vsh57', 'vsh58', 'vsh59', 'vsh60', 'vsh61', 'vsh62', 'vsh63', 'vsh64', 'vsh65', 'vsh66', 'vsh67', 'vsh68', 'vsh69', 'vsh70', 'vsh71', 'vsh72', 'vsh73', 'vsh74', 'vsh75', 'vsh76', 'vsh77', 'vsh78', 'vsh79', 'vsh80', 'vsh81', 'vsh82', 'vsh83', 'vsh84', 'vsh85', 'vsh86', 'vsh87', 'vsh88', 'vsh89', 'vsh90', 'vsh91', 'vsh92', 'vsh93', 'vsh94', 'vsh95', 'vsh96', 'vsh97', 'vsh98', 'vsh99', 'vsh100'. The diagram also includes a 'Task' table and a 'Task Tree Analysis' section.

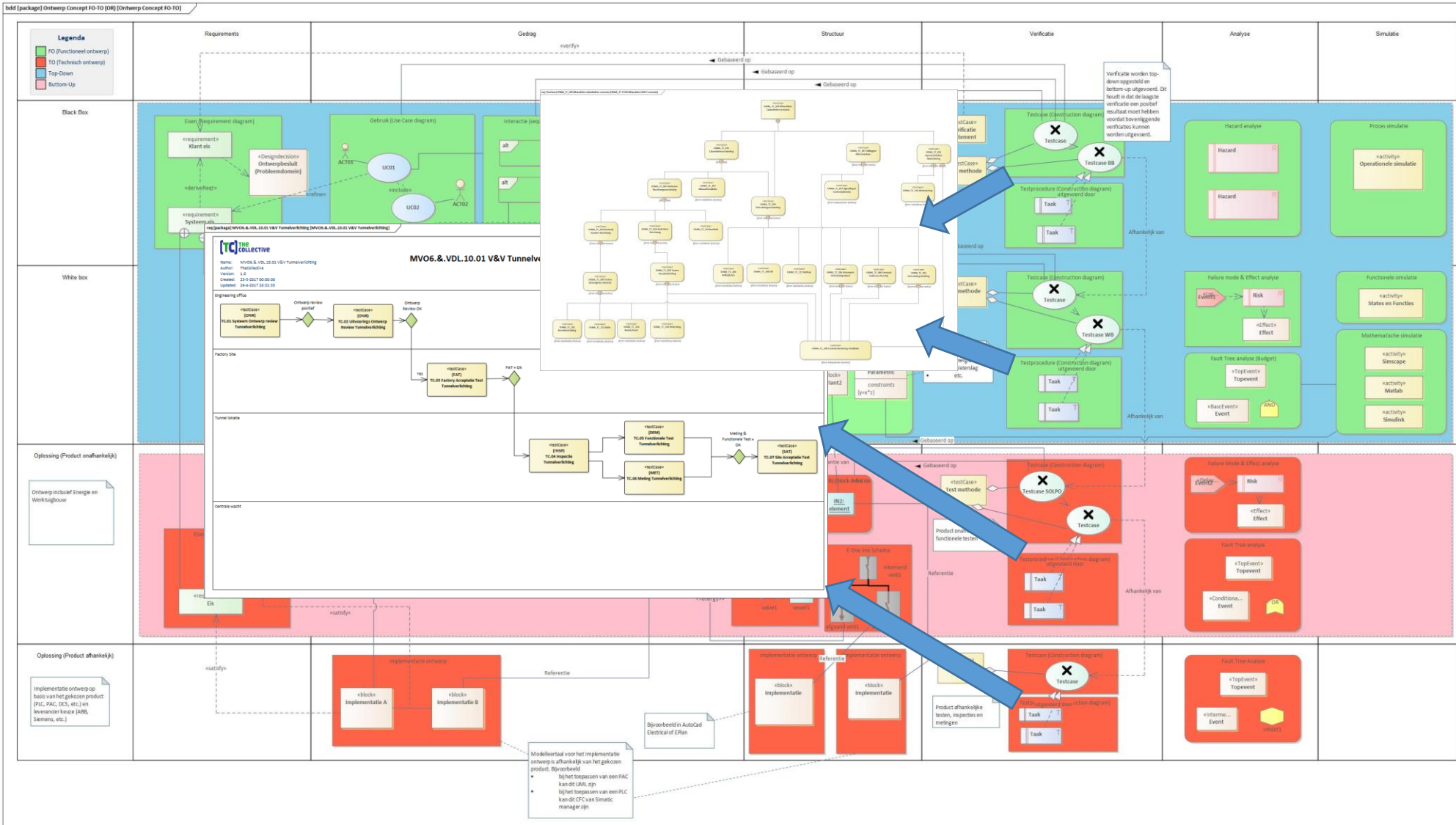
Operational analysis
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Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

Verification



Operational analysis
Ist/soll

Functional analysis
Ist/soll

Technology analysis
Ist/soll

Configuration analysis
Ist/soll

Management

The screenshot displays a comprehensive software development lifecycle management interface. On the left, a 'Toolbox' lists various artifacts and relationships, including 'ISAB8 Recipe', 'ISAB8 Common', and 'ISAB8 Common Relations'. The main workspace is divided into 'Requirements' and 'White box' sections, containing diagrams like 'Een (Requirement diagram)', 'Gebruik (Use Case diagram)', and 'Functies (Activity diagram)'. A central 'orgCommon' diagram shows a hierarchy of artifacts: 'Change' (yellow), 'issue' (orange), 'Risk' (red), and '«Designdecision» Design decision' (beige). Four blue arrows point from these central boxes to corresponding detail panels on the right. The 'Change : Change' panel shows properties like Name, Description, and Priority. The 'issue : Issue' panel shows properties like Name, Alternative, and Status. The 'Risk : Risk' panel shows properties like Name, Impact, and Likelihood. The 'Designdecision : Design decision' panel shows properties like Name, ApprovalDate, and Type. The bottom right corner features the logo for 'TC THE COLLECTIVE the systems integration company'.

Management

Dashboard

Management [\(Set as Default\)](#)

Management dashboard

Schedule & Progress

Roadmap Projectmanagement

Roadmap Techniek

Voortgang (%)

Product status

Overzicht procs

Project Risks

Risico verdeling

Risico dossier

Name	Type	Author	Created Date
Risico 1 Ziekte door Corona	Element	Peter Dubbelman	2020-03-26 10:08:39
Risico 2 Na GAP analyse blijkt er nog iets vergeten te zijn	Element	Jan de Liefde	2020-03-26 10:09:59
Risico 3 Het framework wordt niet of laat goedgekeurd	Element	Jan de Liefde	2020-03-26 10:10:56

Mijn reviews

- Review Verificatie & Validatie (33 Days left)
- Review Project Management Plan (Not Yet Started)

Project Deviations

Afwijkingen

Afwijking register

Name	Type	Author	Created Date	Modified Date
Afwijking 1	Element	Jan de Liefde	2020-03-26 16:08:26	2020-03-26 16:09:38
Afwijking 2	Element	Jan de Liefde	2020-03-26 16:09:23	2020-03-26 16:09:45
Afwijking 3	Element	Jan de Liefde	2020-03-26 16:09:51	2020-03-26 16:10:01
Afwijking 4	Element	Jan de Liefde	2020-03-26 16:10:09	2020-03-26 16:10:21

Changes

Wijzigingen

Implementatie

Testmethode

