System to Subsystem Transition add-on

System to Sub System transition add-on enables automated and iterative transition between system and subsystems.

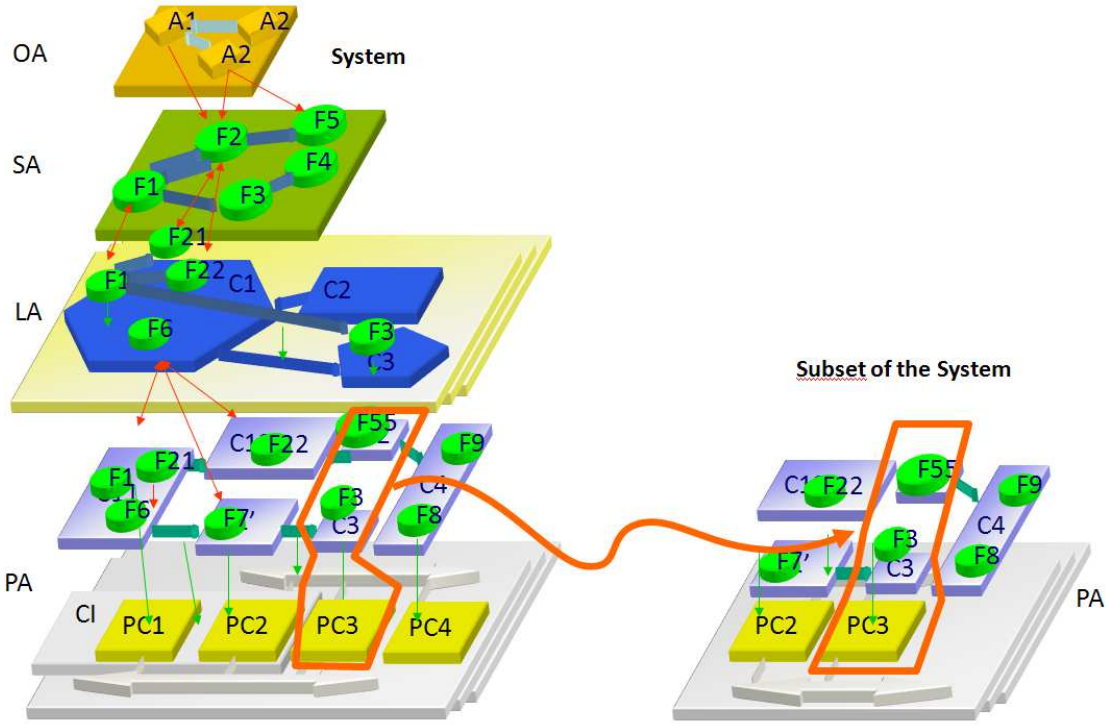
Three kinds of Transitions

System to Sub-System transitions are top-down and iterative: any change performed in the original System can be propagated at any moment to the Sub System.

Traceability between System and Sub System is ensured through a **mechanism based on system-wide ID's.**

Scoped Horizontal Extraction

The objective of this transition is to extract a subset of the Physical or Logical Architecture and populate a new model with this subset.

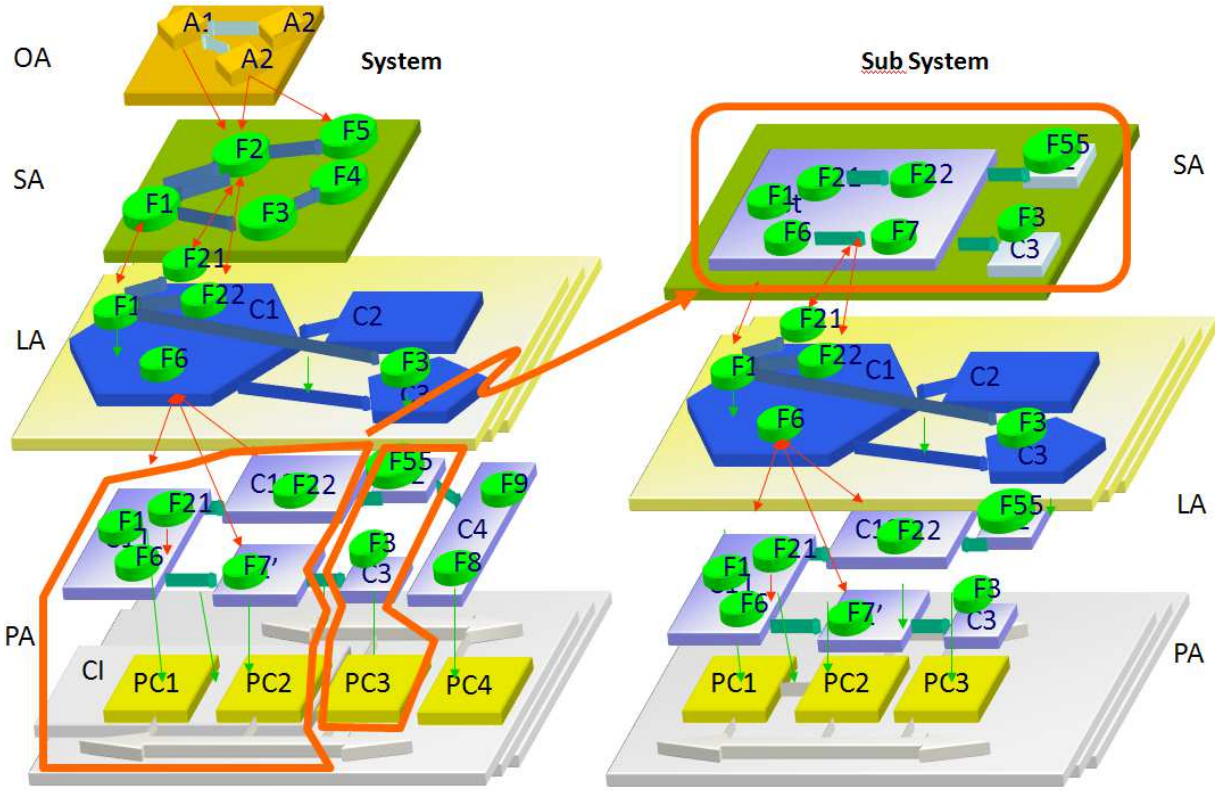


The transformation algorithm performs the following steps:

1. Computation of the transitive closure of elements to be extracted starting from one or several Physical / Logical Components
2. Comparison with previous extraction
3. Merge

Vertical Transition (SA)

The objective of this transition is to re-apply the methodology starting from one or several given Configuration Item(s).



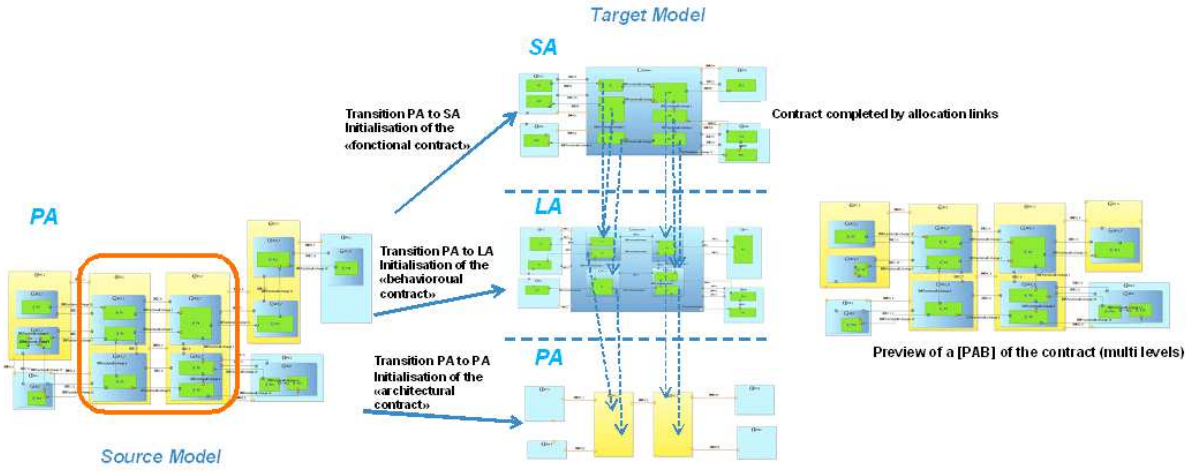
The transformation algorithm performs the following steps:

1. Computation of the transitive closure of elements to be transformed or copied starting from one or several Configuration Items
2. Transformation of elements (for example, a sibling Physical Component will become a System Actor
3. Comparison with previous transition
4. Merge

Vertical Transition (SA-LA-PA)

The principle of the transition is to select one or more Node Physical Component from a source model and generate (or update) a target model whose system of interest will be the selection.

The transition will automatically create the target model and fill its three phases (System Analysis, Logical Architecture and Physical Architecture) with new Capella objects linked to the objects of the source model:



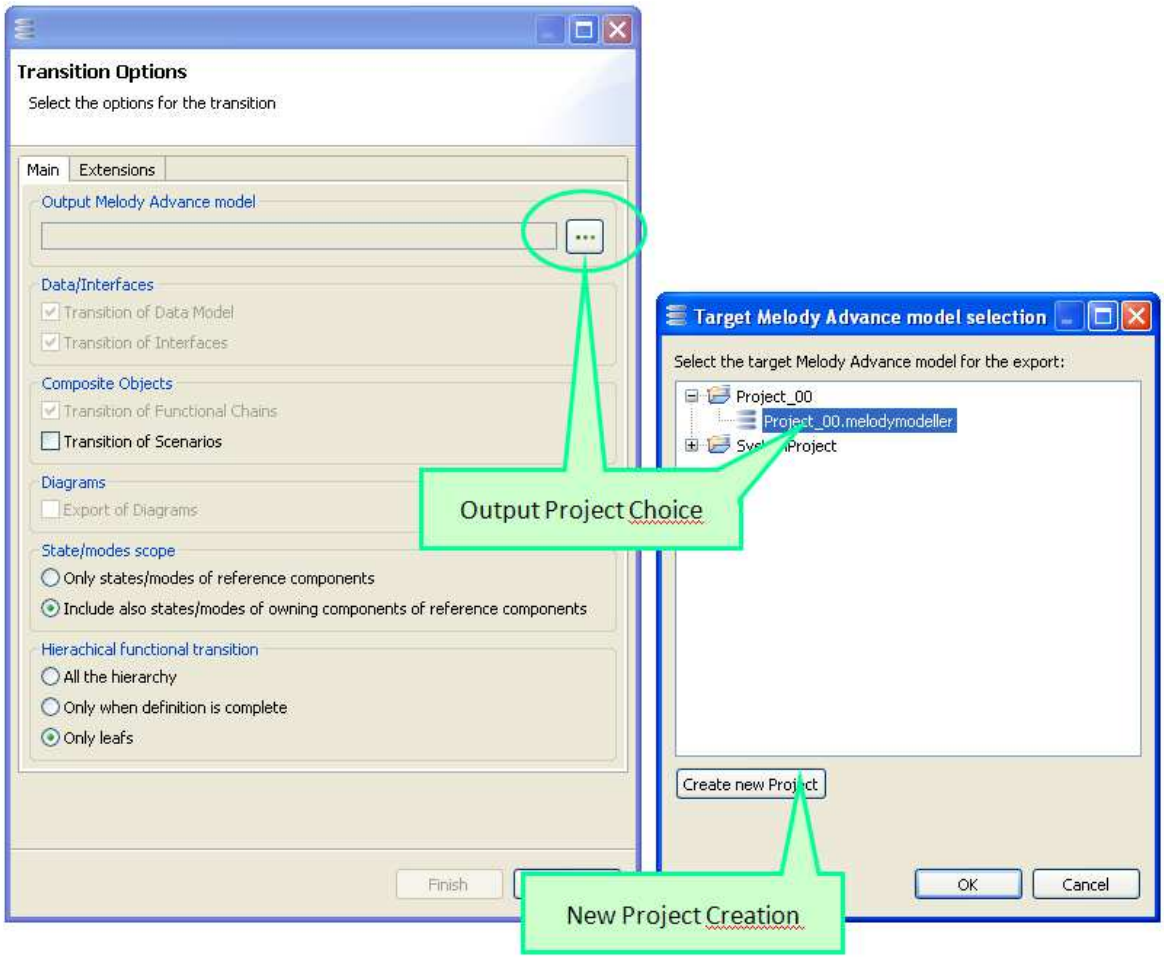
Transformation Command

Transitions are possible from one or several logical, physical components or one Configuration Item. The Multiphase Transition is only available from one or more selected node physical components.

1. Open the source Capella project model
2. Select one or several components (in the Project Explorer or in a diagram).
3. From the contextual menu (right click), select “System To SubSystem Transition” and then, the kind of Transition to be performed..

Configuration of the transition

A configuration dialog opens and allows, among others, to choose the target model.



Gap analysis with previous iteration of the transition

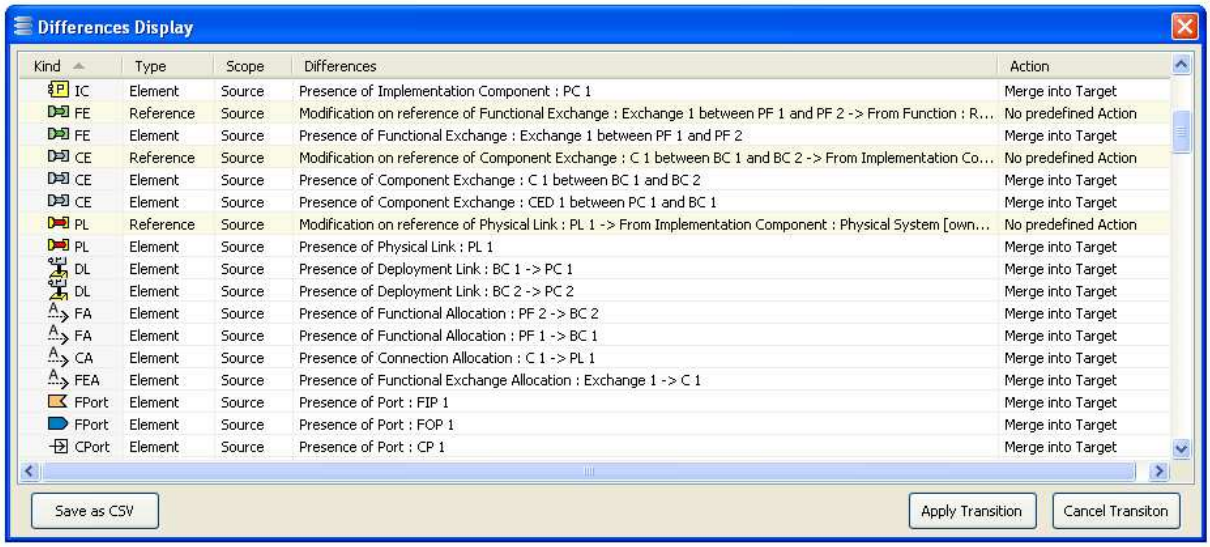
Once the target project selected, a dialog displaying the differences and the actions planned by the transition is displayed.

In the window, elements are sorted out by types

- The column "Type" indicates whether the difference concerns the presence of an element “Element” or the modification of a reference on an element "Reference".
- The column "Scope" indicates whether the difference was found on the “Source” or “Target” model
- The column "Differences" indicates the title of the difference.
- The column "Action" indicates the type of action planned by the transition:
    - "Merge into target": application of the merge of the difference in the output model

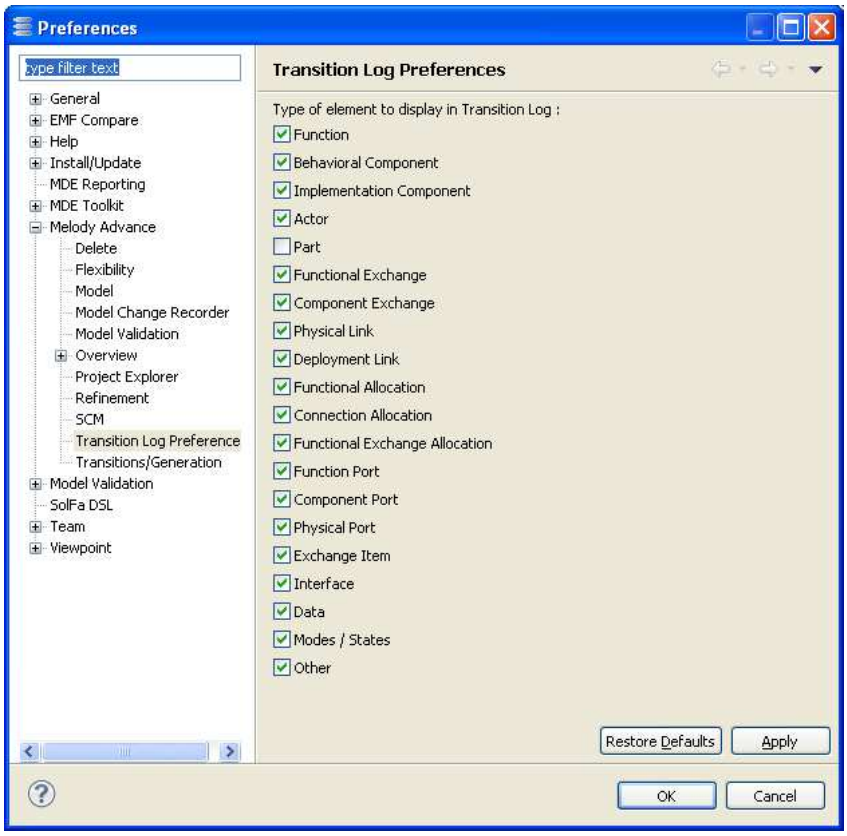
- "No predefined Action": the difference is not taken into account

- The column "Detail" gives the complete detail of the difference to investigative purposes very thin.

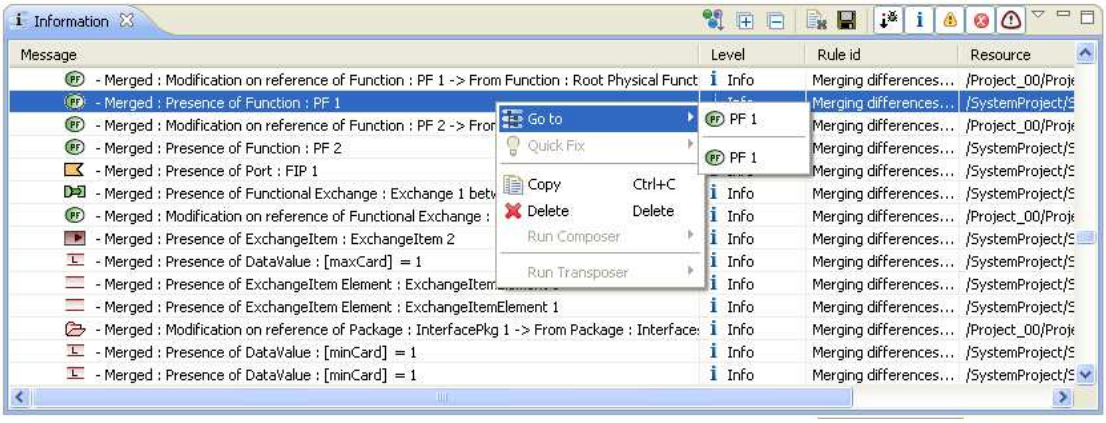


The effective application of the transition is performed by clicking on the button "Apply Transition ". The "Save as CSV" button allows to export the differences in a CSV file for a further analysis of the deviations.

It is possible to choose the type of elements that should be displayed in the difference window. To do so, choose Window / Preferences and then Capella / Transition Log Preferences.



Transition Log



Validation Rules

The vertical transformation SA-LA-PA includes 4 validation rules that warn the user about inconsistent element allocations and deployments on target models. In general, these rules inspect the pre-allocation links generated by the multiphase transformation and crosscheck existing allocations and deployments against these pre-allocation links. A pre-allocation link is a kind of trace and thus filtered from the Capella Explorer by default. Each rule verifies a specific kind of allocation/deployment:

HW_01 - Logical Function Allocations

Checks if a Logical Function is allocated on the expected Logical Component.

HW_02 - Physical Component Deployment

Checks if a Behavioral Physical Component is deployed in the expected Node Physical Component.

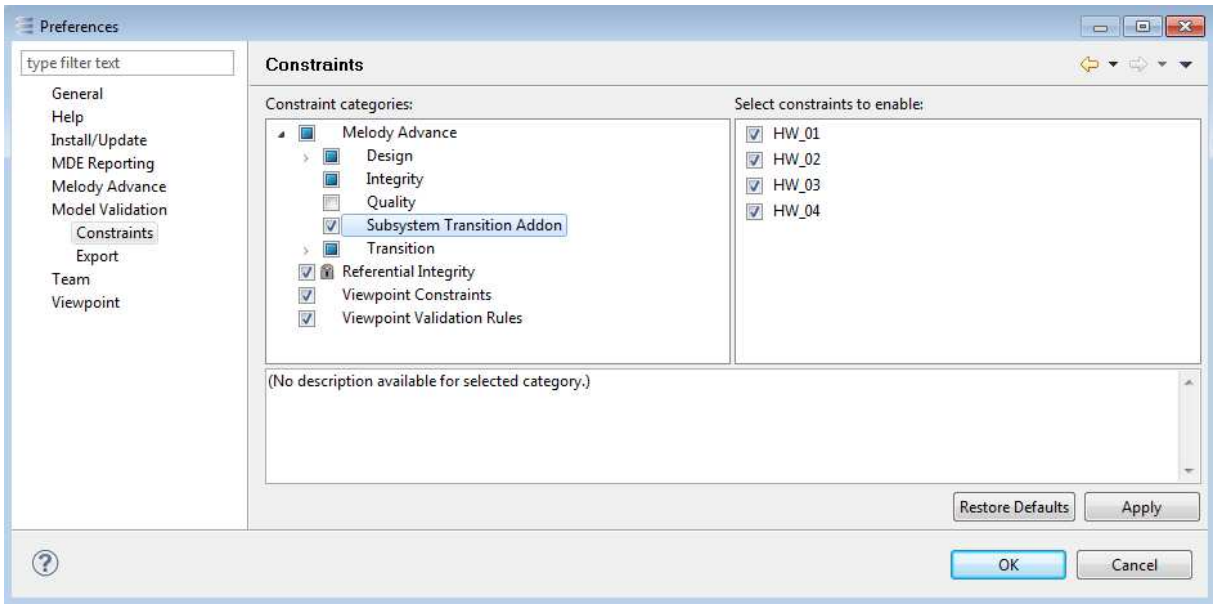
HW_03 - Logical Functional Exchange Allocations

Checks if a Logical Functional Exchange is allocated on the expected Component Exchange.

HW_04 - Physical Component Exchange Allocations

Checks if a Physical Component Exchange is allocated on the expected Physical Link.

The validation rules can be enabled/disabled selectively by selecting Window -> Preferences -> Model Validation -> Constraints. The multiphase transition rules can then be found under Capella -> Subsystem Transition Addon:



To launch a validation, select a suitable model element (e.g. SystemEngineering) and chose “Validate Model” from its context menu.