Ptolemy Miniconference

Supélec

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Integration of a Flat Heterogeneous Domain in Ptolemy II

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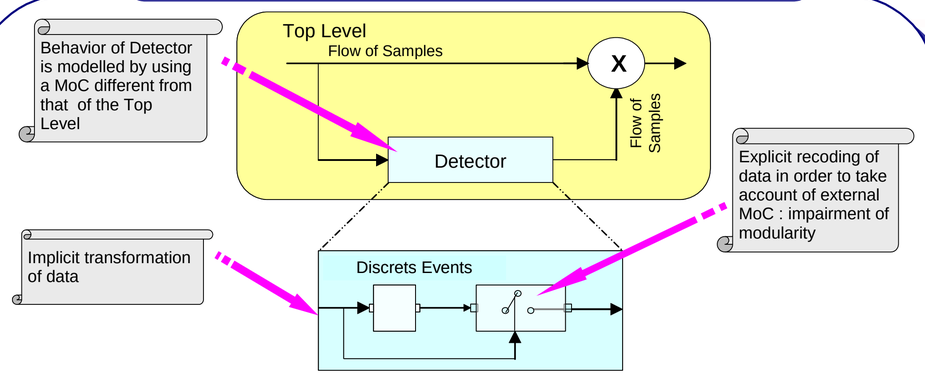
ISSUES



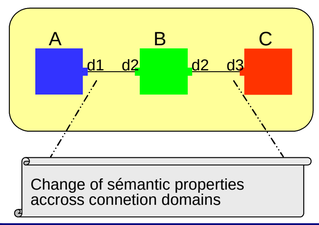
Consequences

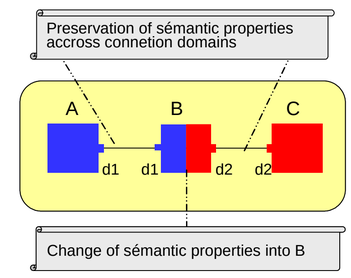
- Ad hoc constructions arise at the boundary between two MoCs;
- Components that have inputs or outputs that obey dierent MoCs cannot be used;
- What happens when data crosses the boundary between two domains depends on the modeling tools

GOAL

To mix different MoCs on the same hierarchical level

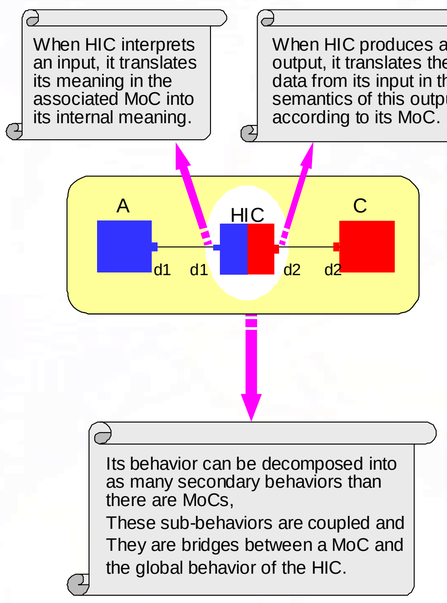
- Components obey only one MoC but we can make connections between terminals across domains
- Only terminals that belong to the same domain can be connected, but a component may obey several MoCs.





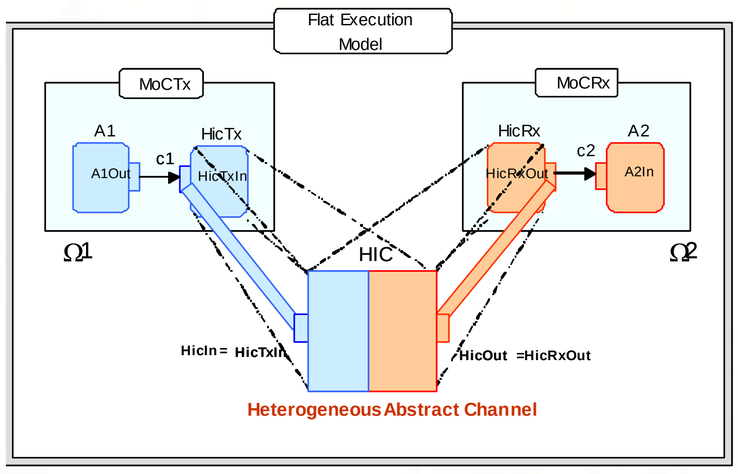
SOLUTION

Heterogeneous Interface Component (HIC)



Interpretation of flat model in hierarchical approach is done by a Flat Execution Model :

1. Partitioning the system into homogeneous subsystems
2. Delegation of the computation of the behavior of the subsystems to their respective regular MoCs
3. Static Scheduling of the subsystems
4. Management of HICs and coordination of the communications between subsystems
5. Execution of subsystems



System Partitionning

- Topological sort
- For each actor A
- If exist a subsystem S using the MoC of A then
  - Put A in S only if there is no path between A and any actor of S througth a HIC
  - Else, create a new subsystem and put A
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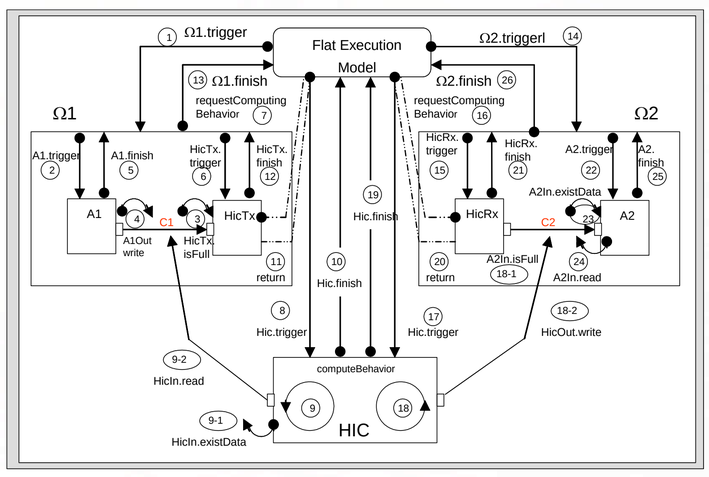
Scheduling of subsystems

- Based on the precedence induced by the HICs
- Building of a skeleton of the partitioned system that contains only the projections of the HICs and their dependencies
- This skeleton is then used to determine the precedence relation on subsystems
- Any order which is compatible with this relation of precedence yields a possible scheduling of the subsystems

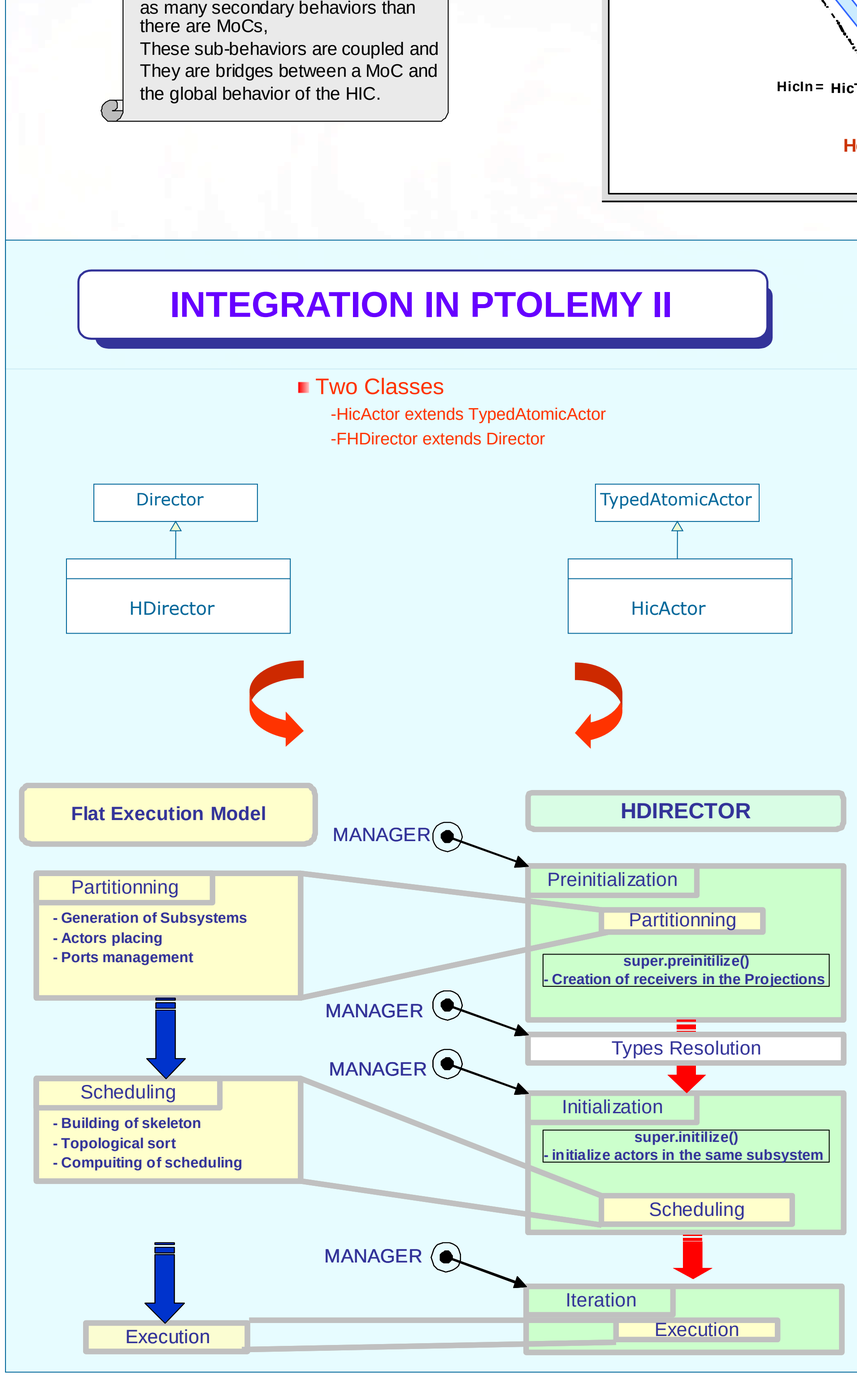
Execution



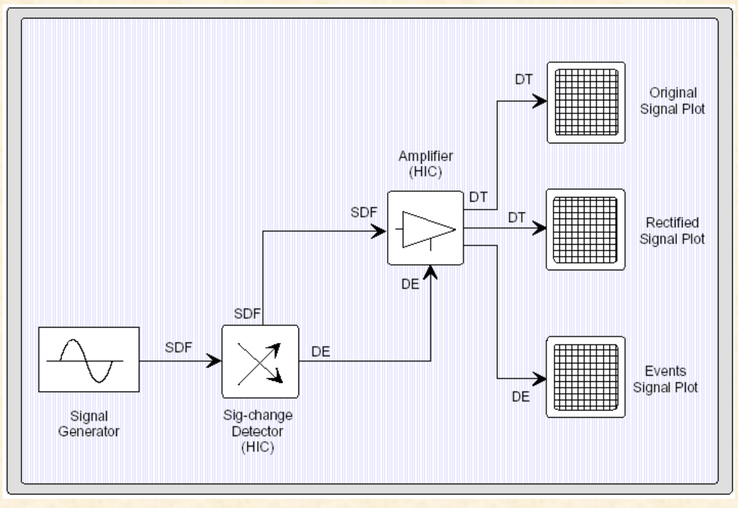
INTEGRATION IN PTOLEMY II

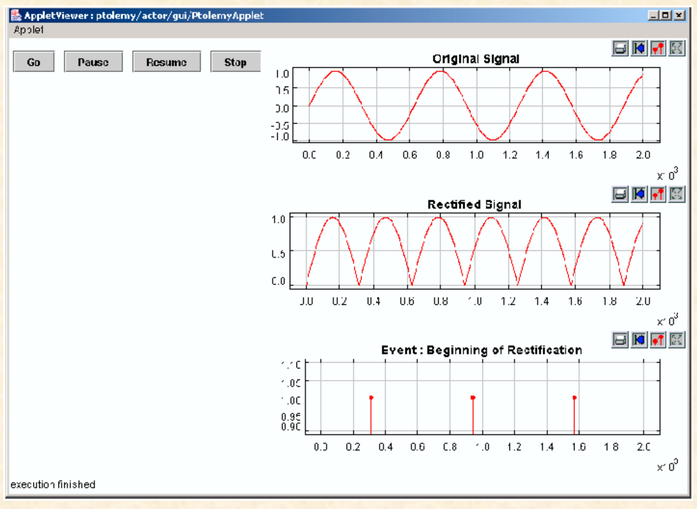
Two Classes

-HicActor extends TypedAtomicActor
-FHDirector extends Director



SIMULATION IN PTOLEMY II





CONCLUSION

This approach offers several advantages since :

- the use of components that have heterogeneous inputs or outputs allows the use of several heterogeneous components at the same level of the hierarchy,
- the explicit specification of the heterogeneous behavior in the HICs allows to specify what happens at the boundary between different MoCs.

KEY WORDS

Actors
Hierarchy
Heterogeneous
Software Engineering
Design
Components
Embedded Systems
Model of computation,
Modeling
Heterogeneity

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