



Università degli Studi
dell'Aquila

dipartimentoinformatica
Università degli Studi dell'Aquila

Introduzione ai risultati principali dopo il primo anno

University of L'Aquila
Computer Science Department
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Risultati principali di UniAQ dopo il primo anno (1/2)

- WP1: notazioni per la modellazione e sviluppo di d-ASAP
 - **Dually/ByADL**: basato su trasformazioni di modelli, che permette di relazionare le differenti notazioni di d-ASAP tra loro [**DuallyTSE**] + creazione notazione “ottimale” [**ICSE2010**]
 - Definizione di **un paradigma di sviluppo per d-ASAP ispirato dal ciclo di vita delle cellule**. Il paradigma è pensato per d-ASAP capaci di adattarsi a cambiamenti interni, dell’ambiente e dei requisiti. Consideriamo cambiamenti di tipo funzionale, non-funzionale e tecnologico che possono essere previsti, prevedibili e imprevedibili (WP5).
- WP2: verifica funzionale e non-funzionale di d-ASAP
 - un framework formale basato sul paradigma assume-guarantee che permette di definire sotto quali condizioni può essere eseguito un adattamento del sistema in modo da continuare a garantire i requisiti funzionali [**SEAMS2009**]
 - un framework basato su AGG per la verifica funzionale di sistemi self-repairing modellati tramite TGG [**FASE2010**], [**WICSA2009**]
 - un approccio per l’interpretazione dei risultati proveniente dalla verifica di performance e la successiva generazione di feedback da considerare per apportare modifiche all’architettura del sistema in modo da soddisfare il grado di performance desiderato [**SEAA2009**]

Risultati principali di UniAQ dopo il primo anno (2/2)

- WP3: tecniche e strumenti per la sintesi di d-ASAP [WICSA2009Ro], [ESECFSE2009Ro]
 - formalizzazione di due relazioni di matching e mapping tra protocolli di interazione eterogenei
 - esistenza e generazione di mediatori software
- WP4: tecniche e strumenti per il testing
 - StrawBerry [ESECFSE2009]: un approccio model-based per l'estrazione automatica, via analisi data-flow e testing, di protocolli di interazione dall'implementazione



Dealing with the need of multiple modeling notations

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WP1 – Modeling Notations

“The main goal of WP1 is to develop suitable formal modeling notations that

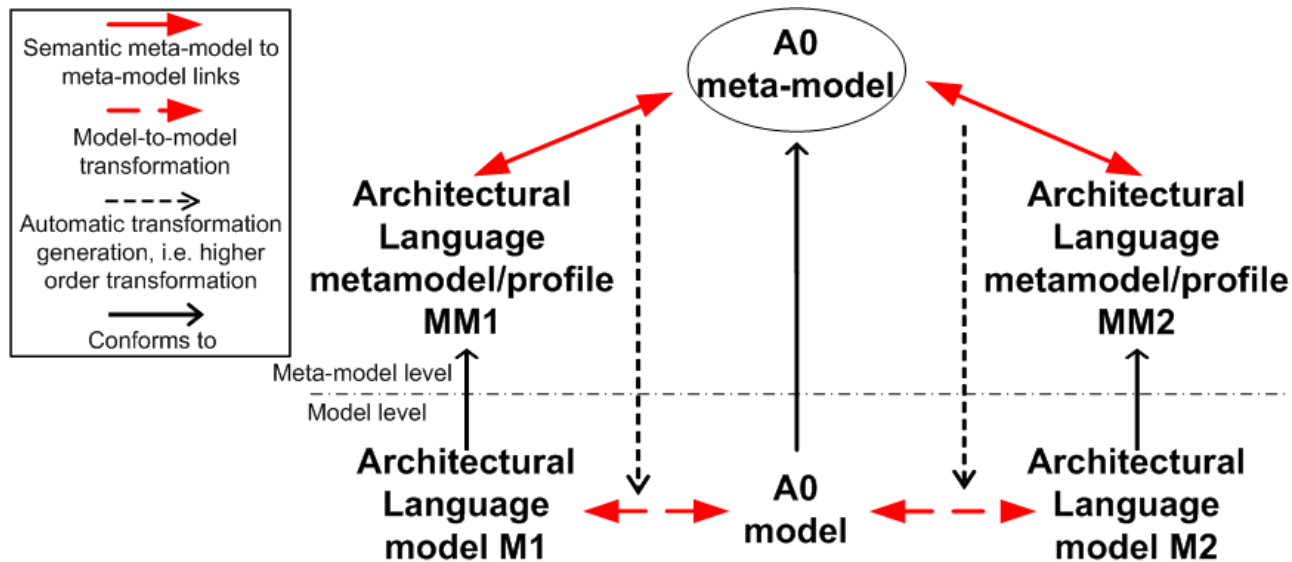
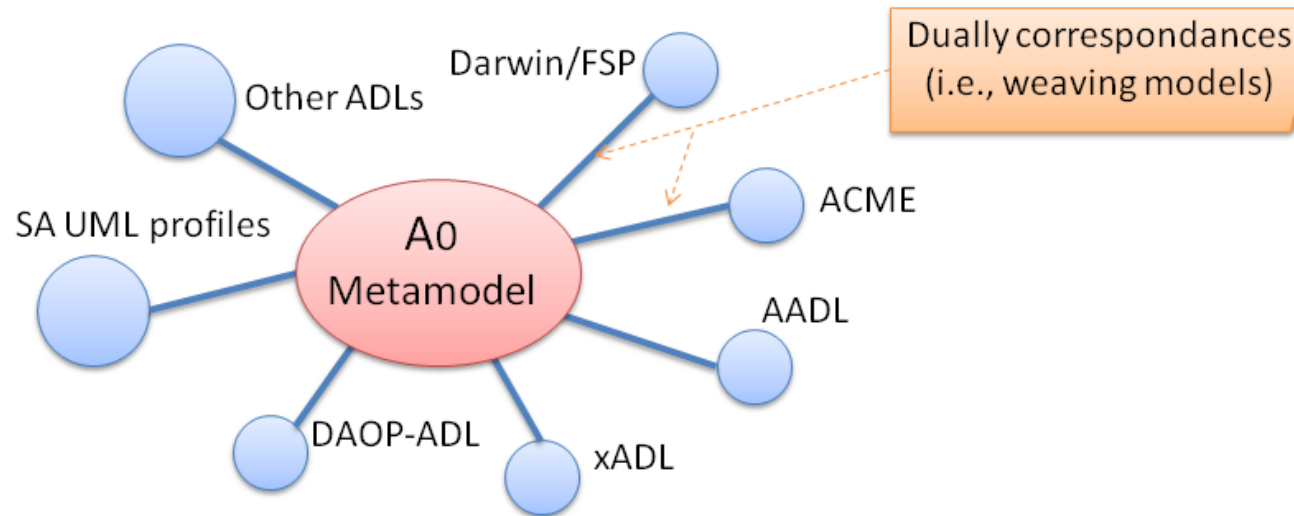
a) are capable of capturing the requirements (both functional and non-functional) that are characteristic for pervasive and adaptable applications, and

b) support dependability of adaptable applications all along the development process.”

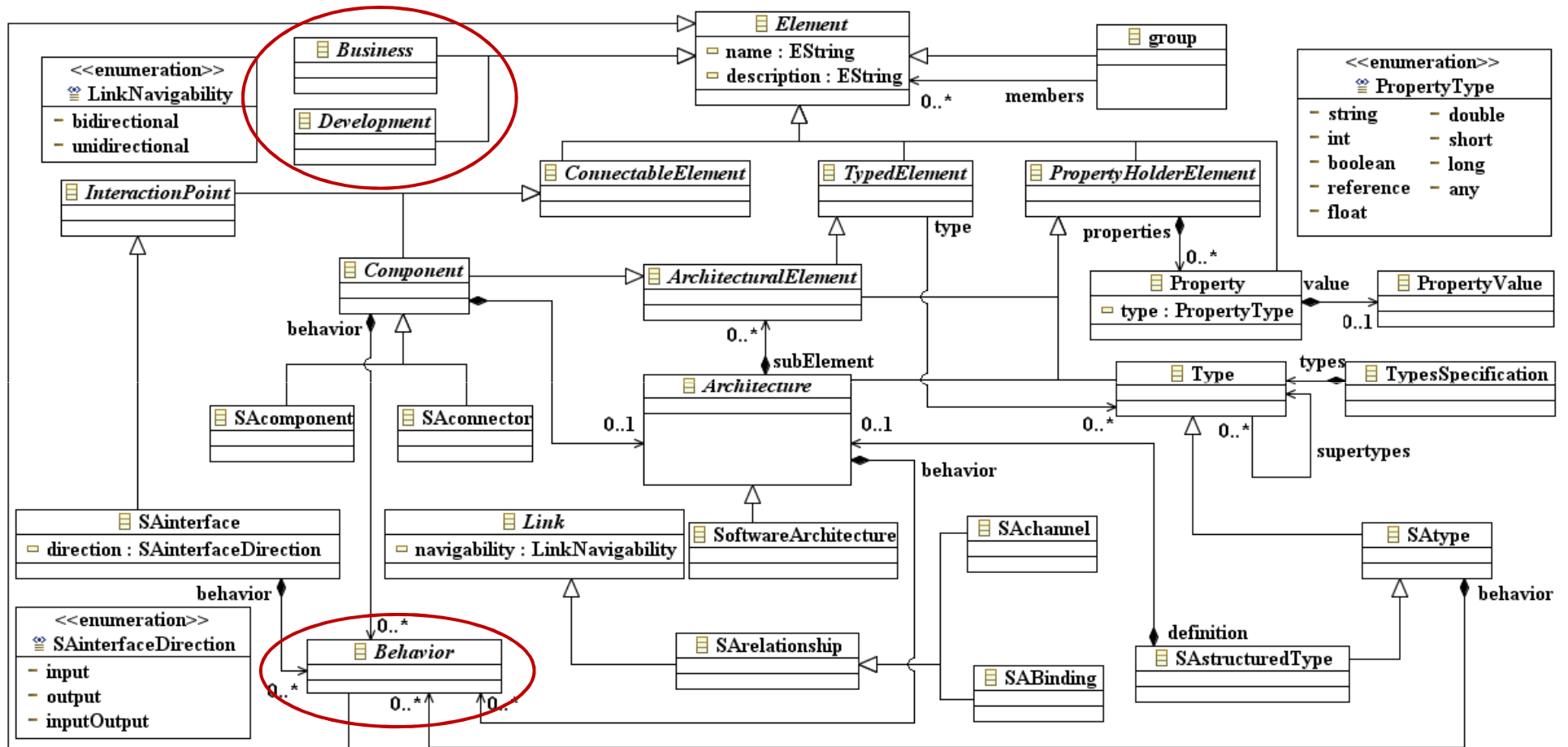
Two objectives:

- Developing a common semantic framework binding these notations together in a coherent way
- Building the “optimal” modeling notation

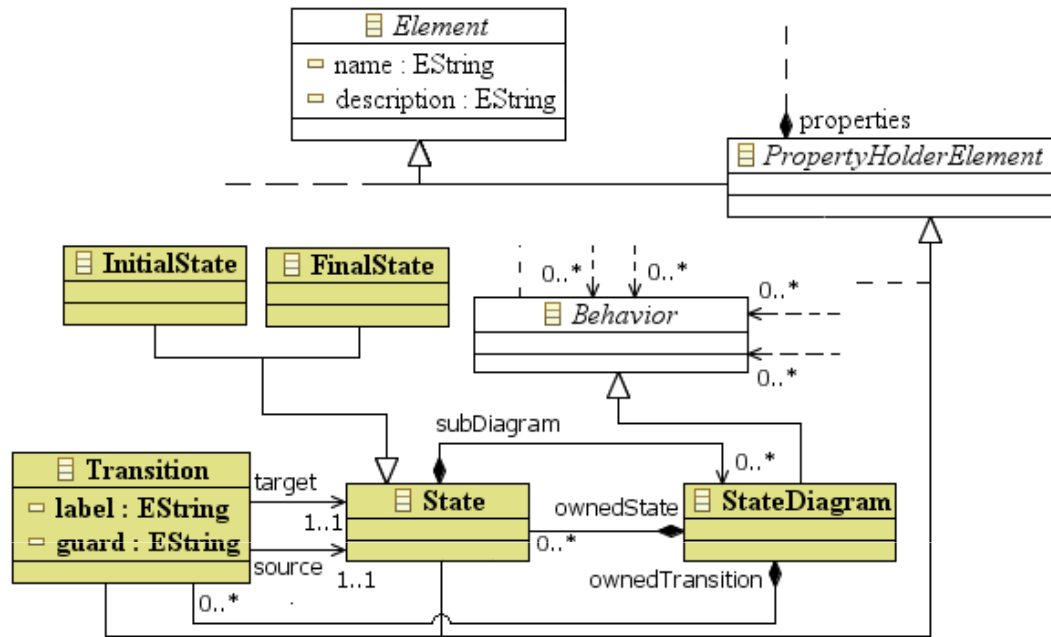
First Objective: DUALLy [DuallyTSE]



DUALy core set: A₀

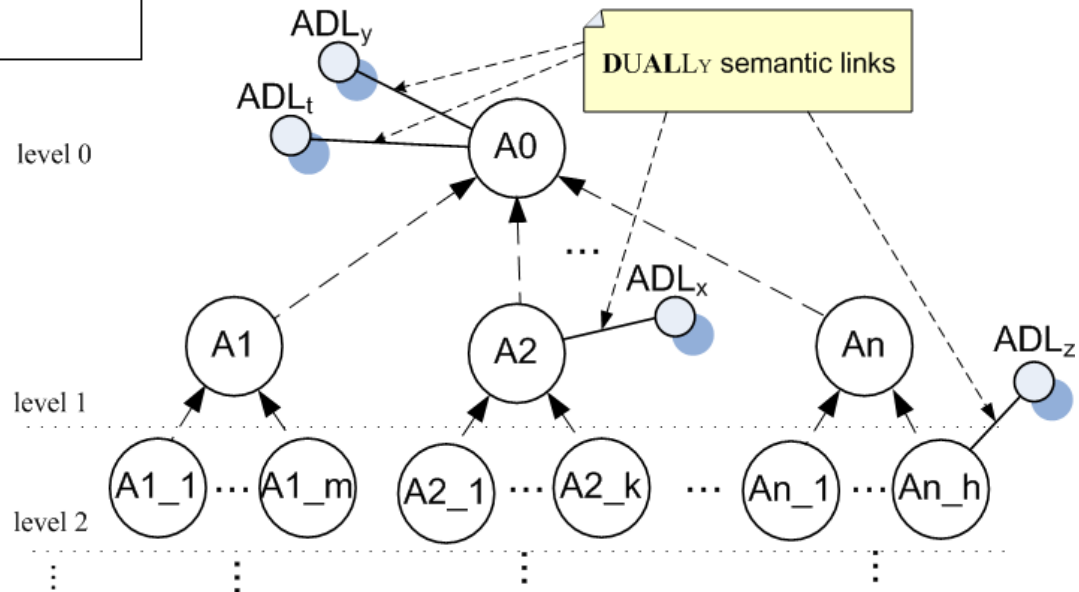


Extensibility mechanisms of A0

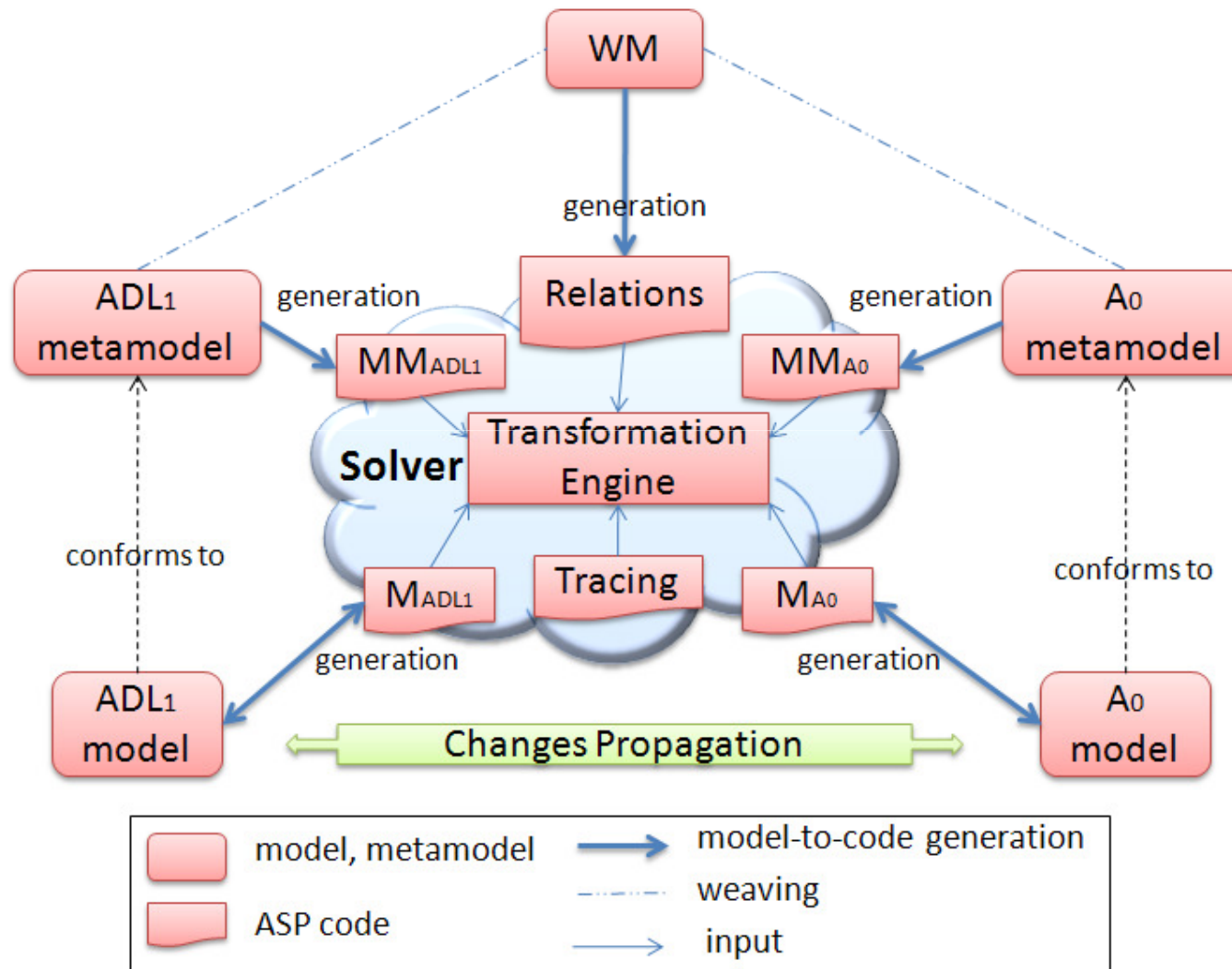


Extension of A0
with behavior

Hierarchy of domain
specific extensions of A0



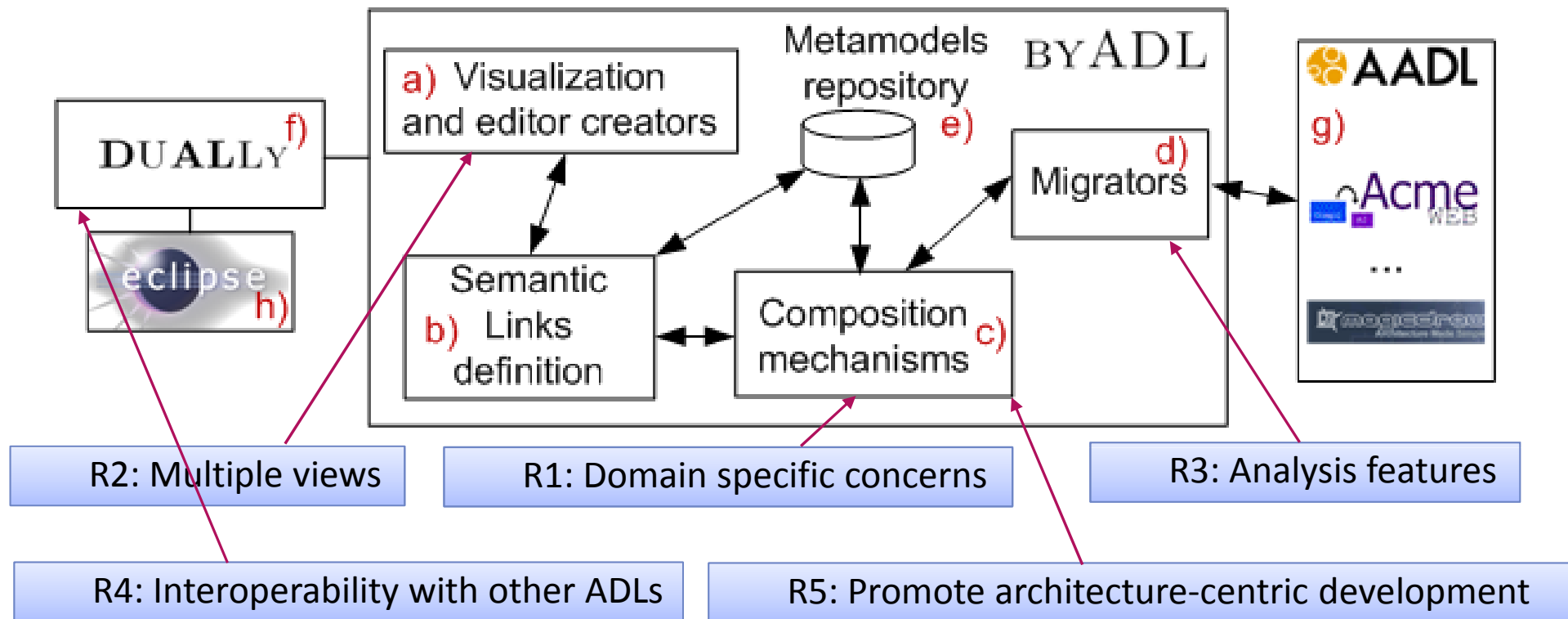
Ongoing works: improving the change propagation features



Second Objective: Building the “optimal” modeling notation

- Current ADLs
 - Support well the concept of Software Architecture as a set of constituting elements (such as components & connectors)
 - but they fail to capture **multiple stakeholders concerns** and their **design decisions** (it represent a broader view of SA being accepted today)
- Emergent requirements
 - R1: Domain specific concerns
 - R2: Multiple views
 - R3: Analysis features
 - R4: Interoperability with other ADLs
 - R5: Promote architecture-centric development

byADL: a framework for building next generation ADLs [ICSE2010]



byADL exploits model-driven techniques and allows a software architect to define its own new generation ADL by starting from an existing ADL, and

- adding **domain** specificities, new architectural **views**, or analysis aspects,
- integrating the ADL with development **processes** and **methodologies**, and
- customizing the ADL by **fine tuning** it

Generated Default Editors

- ◆ Bpmn Diagram IECS-MS
 - ◆ Darwin Specification IECS-MS_architecture
 - ◆ Component Declaration CTSMType
 - ◆ Component Declaration FTmanager
 - ◆ Normal Component CTSM
 - ◆ Exception Component CTSM
 - ◆ Connector Declaration NetworkType
 - ◆ Component Declaration IECS-MS
 - ◆ Component Declaration WorkstationType
 - ◆ Component Declaration ProxyType
 - ◆ Component Declaration DBType

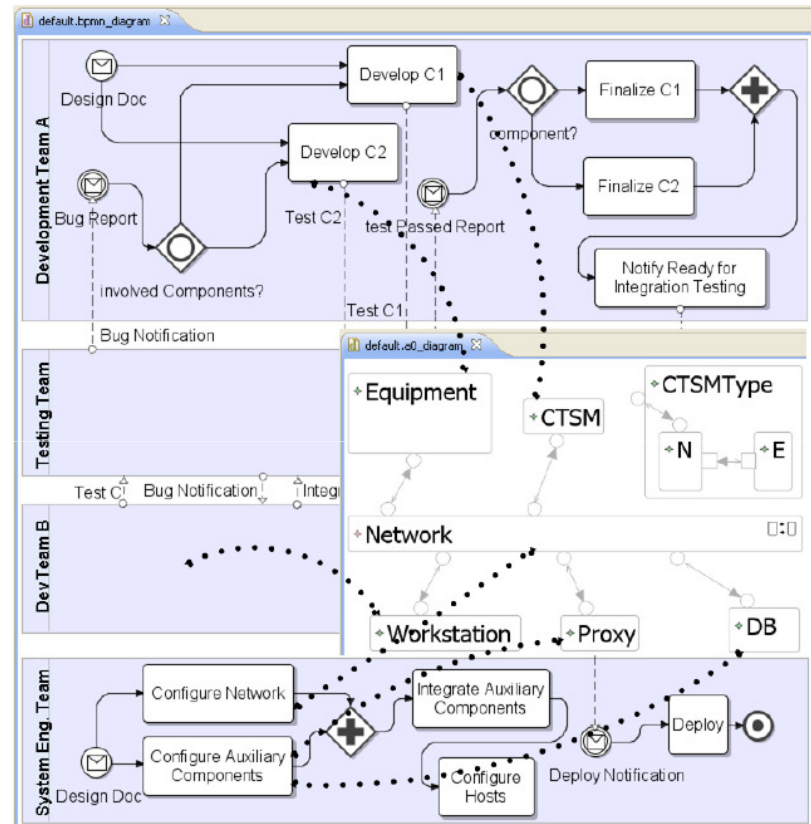
Property	Value
Artifacts Container	...
Documentation	...
Formal Parameters	...
Has Exception	true
ID	...
Name	CTSMType
Ncname	...

(a) Tree-based editor

```

DarwinSoftwareConnectorModel.hutn
DarwinSoftwareConnector {
  BpmnDiagram "bpmndiagram" {
    ...
  }
  DarwinSpecification "IECS-MS_architecture" {
    name : IECS-MS_architecture
    artifactsContainer : BpmnDiagram "bpmndiagram"
    componentDeclarations :
      ComponentDeclaration "CTSMType" {
        name : CTSMType
        componentDeclarations :
          ComponentDeclaration "FTManager" {
            name : FTManager
          }
        innerInstances :
          NormalComponent "CTSM" {
            name : CTSM
            declaration :
          },
          ComponentDeclaration "FTManager" {
          },
          ExceptionComponent "ExCTSM" {
            name : CTSM
            declaration : ComponentDeclaration "FTManager"
          }
        },
      ConnectorDeclaration "NetworkType" {
        name : LanType
        ...
      }
    }
  }
}
  
```

(b) Textual editor



(c) Graphical editor



Un paradigma di sviluppo per d-ASAP ispirato dal ciclo di vita delle cellule

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...vedere slides Antinisca

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