



Fraunhofer
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Kommunikationssysteme

UML Profile for CORBA Components

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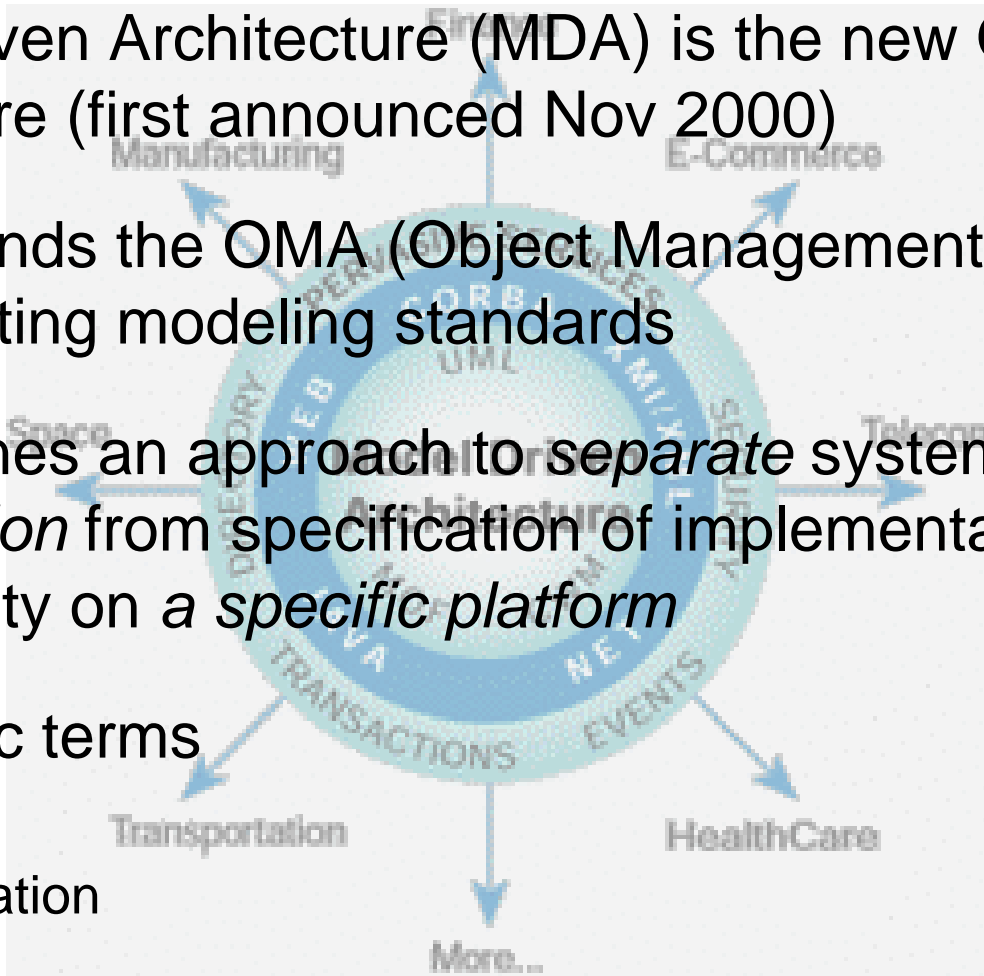
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What's it about?

- It's about Model Driven Architecture...
- It's about the UML Profile for EDOC ...
- It's about the CORBA Components ...
- It's about the UML Profile for the CORBA Components ...
- It's about the application of the UML Profile for the CORBA Components ...
- At the end...

It's about Model Driven Architecture...

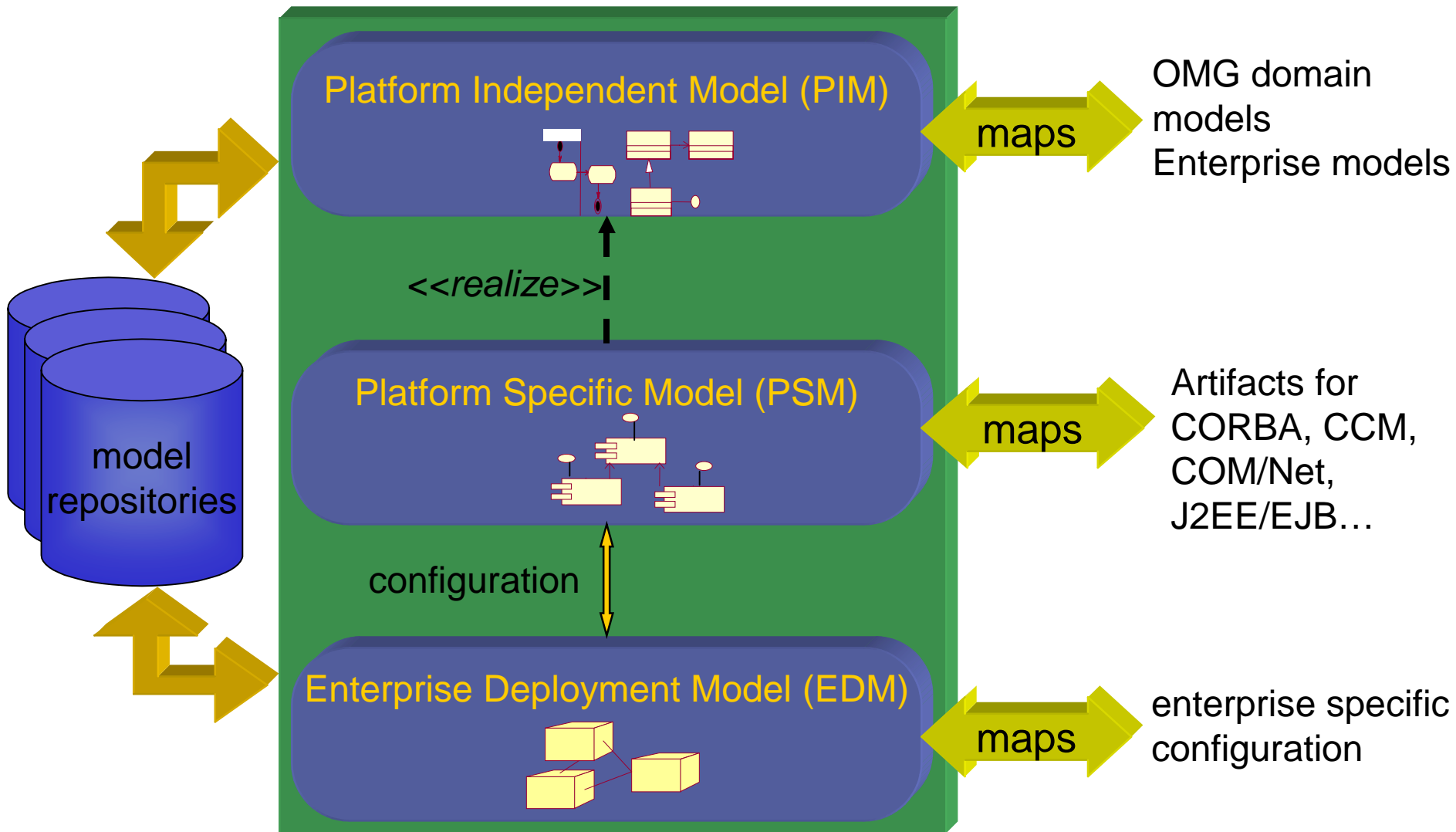
- Model Driven Architecture (MDA) is the new OMG basic architecture (first announced Nov 2000)
- MDA extends the OMA (Object Management Architecture) by integrating modeling standards
- MDA defines an approach to *separate system functionality specification* from specification of implementation of that functionality on *a specific platform*
- MDA basic terms
 - Model
 - Specification
 - Platform



MDA Ingredients

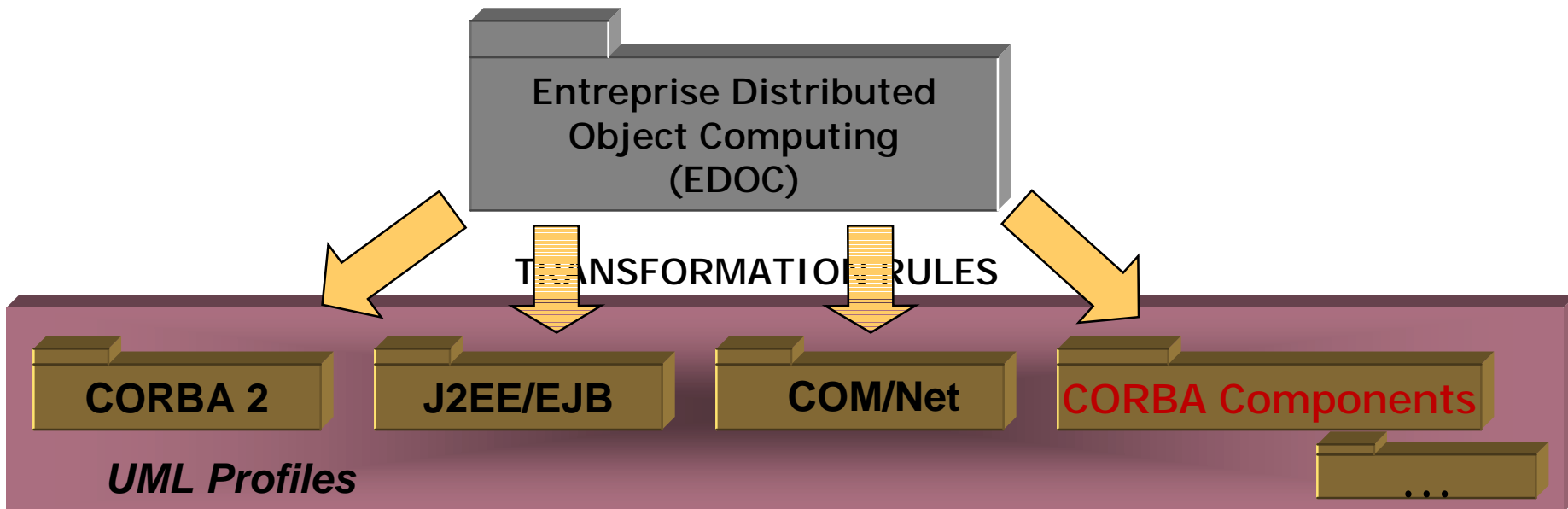
- Meta Object Facility
 - Foundation for OMG Metadata and Modeling architecture
- XML Metadata Interchange (XMI)
 - Use W3C Extensible Markup Language (XML) for the transfer syntax and interchange format for models
- Unified Modeling Language
 - The UML is a graphical language for specifying, visualizing, constructing, documenting the artifacts of software systems
- Platforms and Mappings
 - CORBA, CORBA Component Model, .NET, J2EE

Models, Platforms, Mappings and Repositories



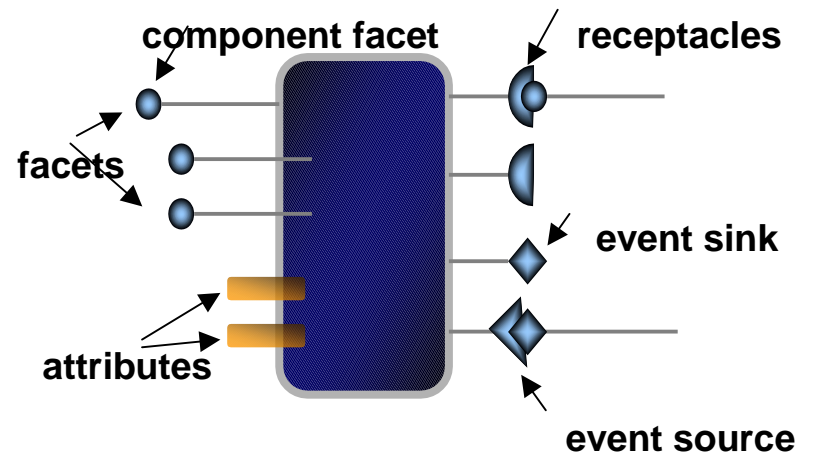
It's about the UML Profile for EDOC ...

- EDOC - Enterprise Distributed Object Computing
- A modeling framework for the development of component based systems
- Standard in the context of a MDA and based on UML 1.4
- Mappable to different platforms (UML Profiles)



It's about the CORBA Components ...

- CORBA Components or CORBA Component Model (CCM) is the component infrastructure based on CORBA 2x
- CCM extends CORBA IDL modeling concepts
 - Component IDL (extended concepts for component modeling)
 - Component Implementation Framework (concepts for modeling a component implementation)



- Packaging & Deployment
- CCM comes with programming model
 - Container architecture

It's about the UML Profile for the CORBA Components ...

- Graphical modeling support for the existing CCM metamodel concepts using UML Extension mechanisms:
 - Stereotypes: Sub-classifications of an existing UML element
 - Tagged Values: new kinds of properties that may be attached to model elements
 - Constrains: Conditions and restrictions, that apply to model elements
- MDA development environments can target different up-to-date component platforms.
- The UML profile for CORBA is extended to allow the modeling of additional concepts of IDL 3.0 and Component IDL (CIDL)
- Interoperability between various analysis and design tools is ensured

UML Profile for CORBA Components: Stereotypes (1)

Stereotype	UML Construct	Description
<<CORBAComponent>>	Class	Indicates the class represents a CORBA component.
<<CORBAInterface>>	Class	Indicates the class represents a CORBA Interface that can be provided or used from CORBA components.
<<CORBAEvent>>	Class	Indicates the class represents a CORBA Event that can be published or emitted to components, or consumed from components.
<<CORBAStream>>	Class	Indicates the class represents a CORBA Stream Type.
<<CORBAHome>>	Class	Indicates the class represents a component Home, meta-type that acts as a manager for instances of a specified component type.
<<CORBAEmits>>	Association	Indicates the association represents a CORBA event-emitting side of an event connection relationship.

UML Profile for CORBA Components: Stereotypes (2)

Stereotype	UML Construct	Description
<<CORBAPublishes>>	Association	Indicates the association represents a CORBA event-publishing side of an event connection relationship.
<<CORBAConsumes>>	Association	Indicates the association represents a CORBA event-consuming side of an event connection relationship.
<<CORBAProvides>>	Association	Indicates the association represents a CORBA interface-providing side of a connection between an interface and component.
<<CORBAUses>>	Association	Indicates the association represents a CORBA interface-using side of a connection between an interface and component.

UML Profile for CORBA Components: Stereotypes (3)

Stereotype	UML Construct	Description
<<CORBASink>>	Association	Indicates the association represents a CORBA stream-sinking side of a stream-based connection between components.
<<CORBASource>>	Association	Indicates the association represents a CORBA stream-sourcing side of a stream-based connection between components.
<<CORBASinkSource>>	Association	Indicates the association represents a CORBA sinking-sourcing side of a stream-based connection between components.
<<CORBAFinder>>	Operation	Indicates the operation represents a CORBA finder operation for obtaining homes for particular component types, of particularly home types, or homes that are bound to specific names in a naming service.

UML Profile for CORBA Components: Stereotypes (4)

Stereotype	UML Construct	Description
<<CORBAFactory>>	Operation	Indicates the operation represents a CORBA factory operation for creating and destroying a component instance.
<<CORBAComposition>>	Package	Indicates the package represents a CORBA Composition what is a unit of a CORBA component implementation.
<<CORBAHomeExecuter>>	Class	Indicates the class represents a CORBA Home Implementation.
<<CORBAImplements>>	Association	Indicates the association represents a CORBA relationship between the executer and the component, or home executer and component home.

UML Profile for CORBA Components: Stereotypes (5)

Stereotype	UML Construct	Description
<<CORBAManages>>	Association	Indicates the association represents a CORBA relationship between the home and the home executor, or component and component home.
<<CORBAExecutor>>	Class	Indicates the class represents a CORBA component executor.
<<CORBASegment>>	Class	Indicates the class represents a CORBA segmented implementation structure for a component implementation.
<<CORBAArtifact>>	Class	Indicates the class represents a CORBA Artifact that can be used for modeling abstractions from programming language constructs like classes.

UML Profile for CORBA Components: Stereotypes (6)

Stereotype	UML Construct	Description
<<CORBAEnum>>	Class	Indicates that the class represents a CORBA Enumeration Type.
<<CORBAException>>	Class	Indicates that the class represents a CORBA Exception.
<<CORBAModule>>	Subsystem	Indicates a package is a CORBA Module, as opposed to a logical abstraction.

UML Profile for CORBA Components: Tagged Values (1)

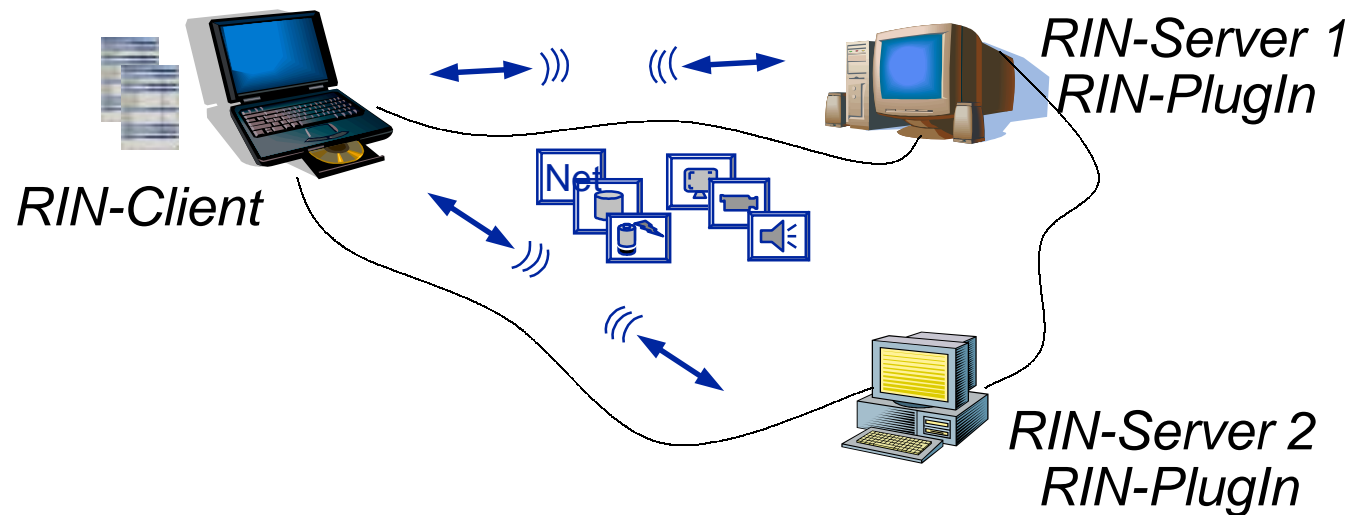
Applies to:	Property Definition	Value Definition
Class: <<CORBAComponent>>	ContainerType	“Transient”, “Persistent”
	ContainerImplType	“Stateless“, “Conversational“, “Durable“
	ServantLifetimePolicy	“Method”, “Transaction”, “Component”, “Container“
	TransactionPolicy	“NOT_SUPPORTED”, “REQUIRED”, “SUPPORTS”, “REQUIRES_NEW”, “MANDATORY”, “NEVER”
	SecurityPolicy	User specific
	EventPolicy	“Normal”, “Default”, “Transaction”
	PersistenceMechanism	“CORBA”, “User”

UML Profile for CORBA Components: Tagged Values (2)

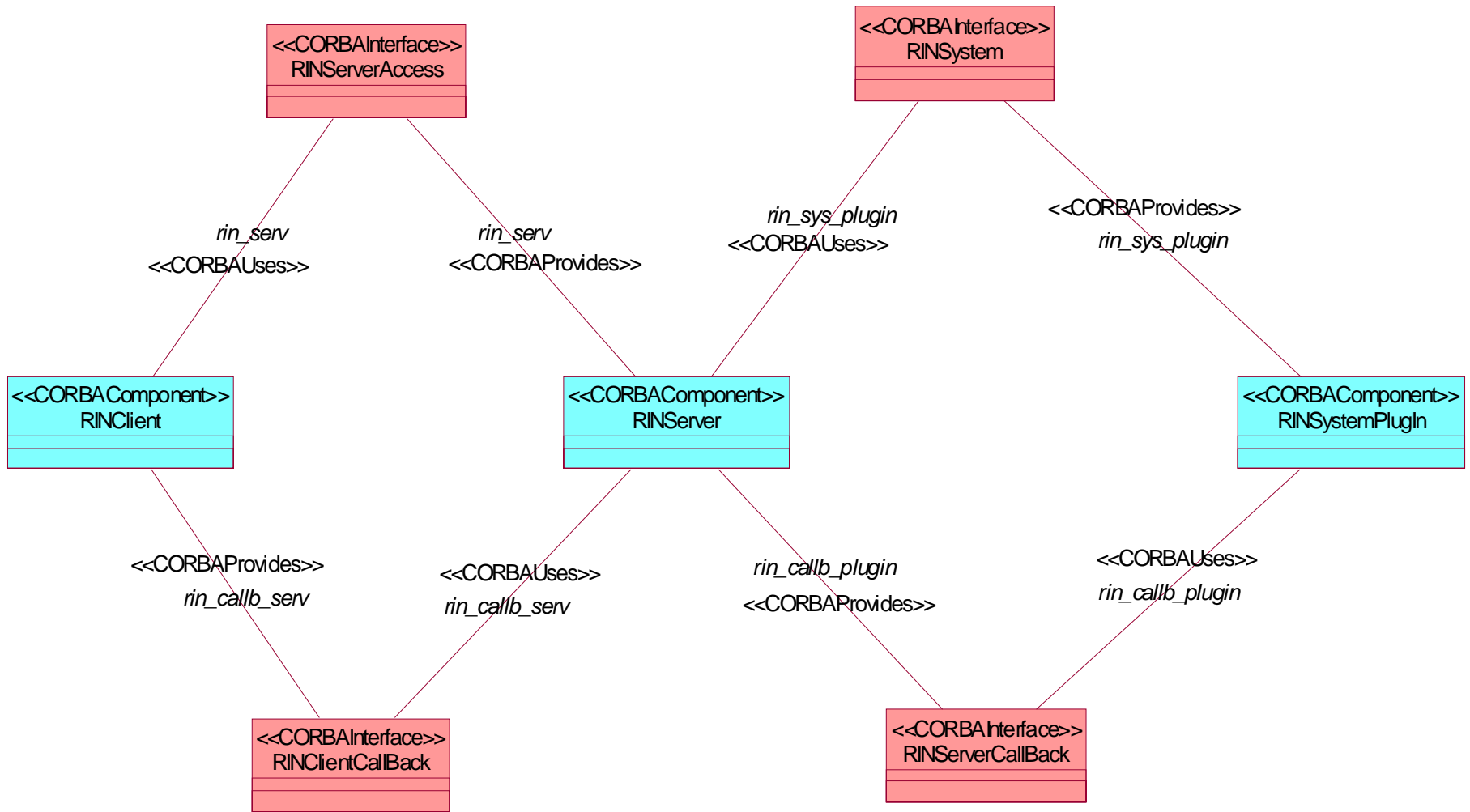
Applies to:	Property Definition	Value Definition
Package <<CORBAComposition>>	Category	“entity” •persistent state •identity.
		“process” •persistent state •persistent identity •behavior
		“service” •no state •no identity •behavior.
		“session” •transient state •identity which is not persistent •behavior.

It's about the application of the UML Profile for the CORBA Components ...

- RIN System – Resource Information Network System
 - is supposed to answer demands for an increased resource-awareness of today's applications, e.g. in the deployment process of CORBA-Components
 - consists of RIN-Client, RIN-Server and RIN-PlugIn
 - XML strings as a system interchange format between RIN-Client, RIN-Server and RIN-PlugIn

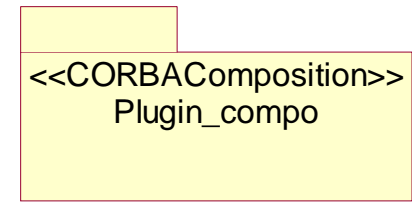
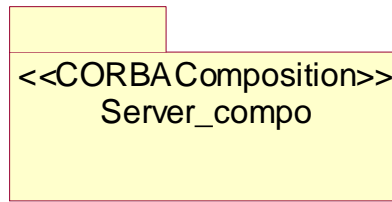
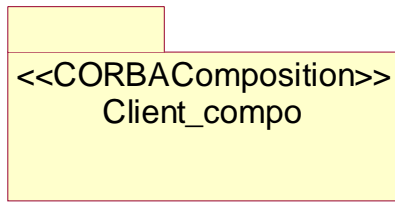


RIN System: Components and their interfaces



RIN System: Components and their compositions

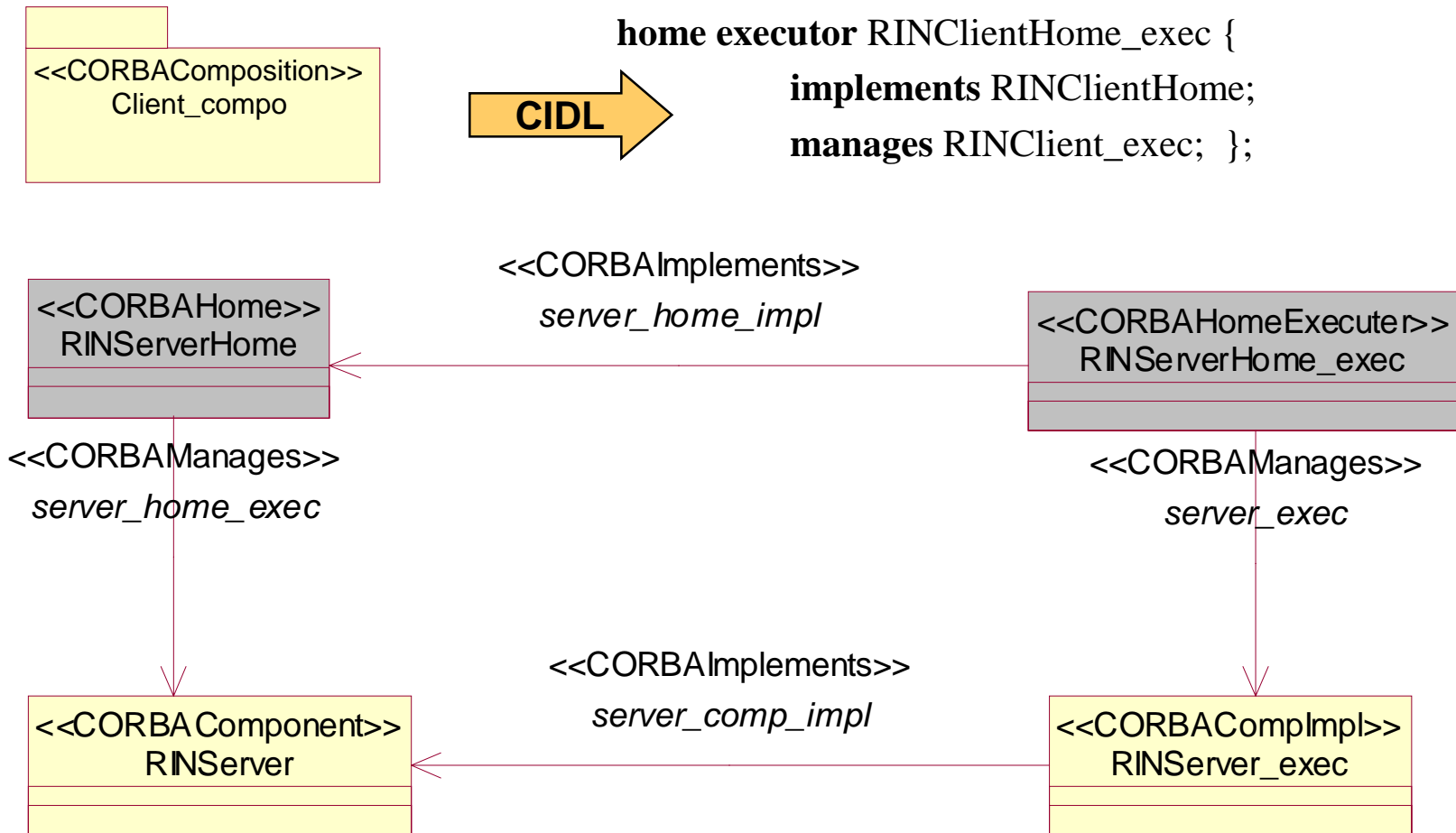
- Composition - unit of component implementation



- A composition definition specifies the following elements:
 - Component home
 - Home executer
 - Component executer
 - Component

RIN System: Composition description of Client_compo

- Composition - unit of component implementation



At the end ...

- Graphical support for CORBA Components in form of UML Profiles
- New component models could be designed with MDA and mapped to CCM
- Possibility to automatic generation of CIDL- and Deployment-XML Specifications for the Deployment process
- Transformation rules should be defined to declare how EDOC specifications can be transformed to CCM specifications