

CORBA QoS Management with CIM/WBEM

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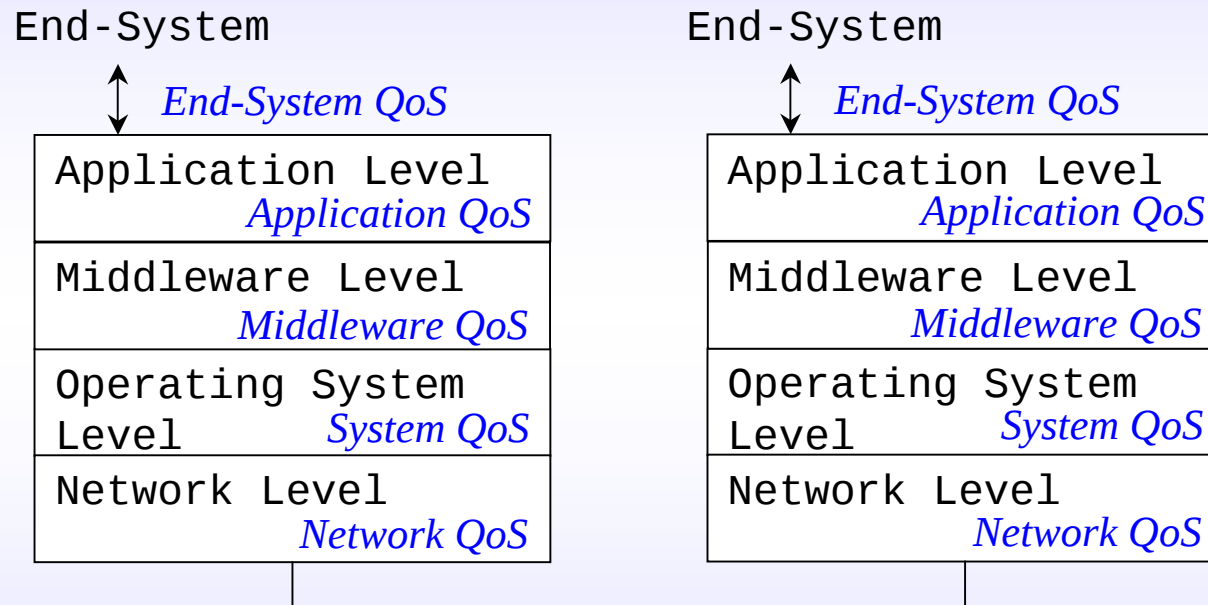
With the collaboration of Alcatel CIT – Toulouse – FRANCE

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- + CORBA QoS Specification
- + CIM CORBA QoS Modeling
- + Management Architecture
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End-System QoS issues

- The distributed environment of the heterogeneous resources



- QoS parameterization has to be specified at each level

➡ **Focus on Middleware QoS and its dependency relationships**



RELATED WORKS

- **Abstract points of view at Application Objects level**

- ✗MAQS - Management for Adaptive QoS-enabled Services

- (<http://citeseer.nj.nec.com/becker97maqs.html>)

- ✗QuO - Quality Objects

- <http://www.dist-systems.bbn.com/tech/QuO/>

- ✗QOS Manager : a generic QoS management framework for distributed environments.

- J. Daniel's thesis

- **Management points of view**

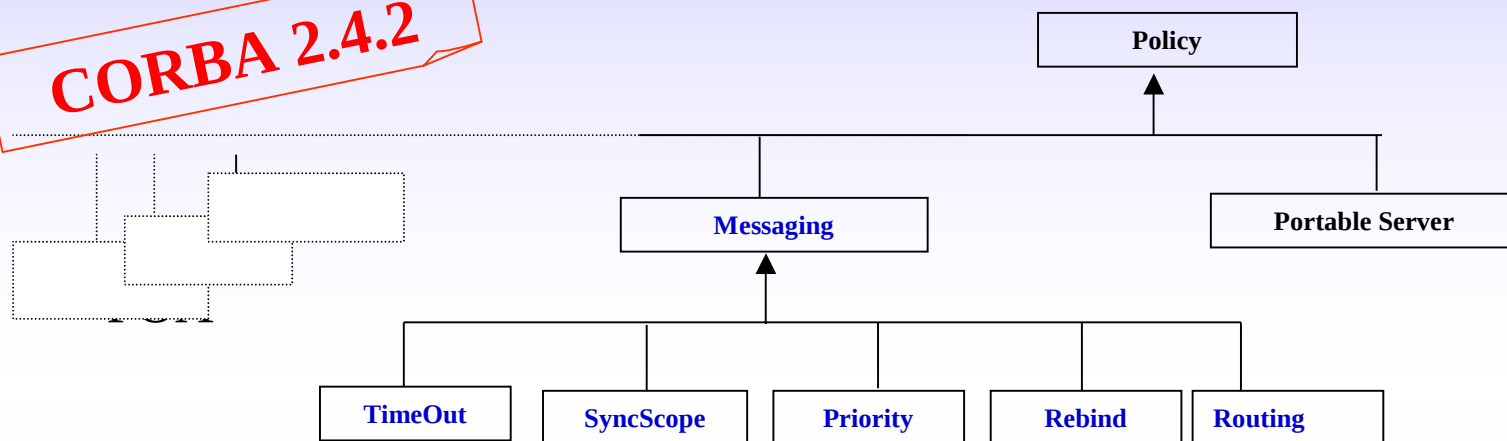
- ✗MAScOTTE Project - MAnagement Services for Object oriented disTributed sysTEms (<http://www.esrin.esa.it/MAScOTTE>)

- ✗SUMO – Supervision and Mastery for Functioning of Space Operations

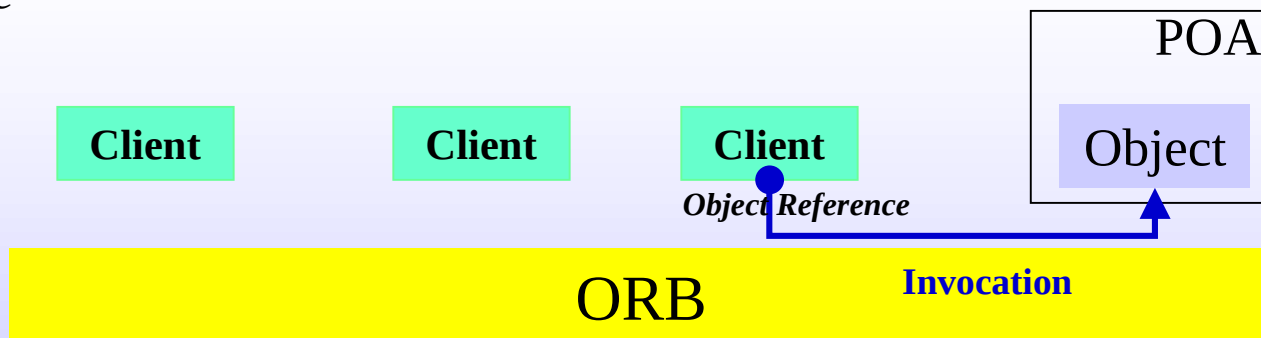
- A WBEM-based open management platform (<http://www.irit.fr/SUMO>)

CORBA QOS Specification : CORE elements

CORBA 2.4.2



CORBA core



CORBA QOS Specification : Messaging

		Server-Side Orb	Client-side	
			Object Reference	Orb Application
Messaging Policy	Rebind Support			X
	Synchronization Scope			X
	Request and Reply Priority	X	X	X
	Request and Reply Timeout			X
	Routing Type	X	X	X
	Maximum Hops			X
	Queue Ordering	X	X	X



CIM CORBA QoS Modeling (1/7)

WHY CIM MODELING ?

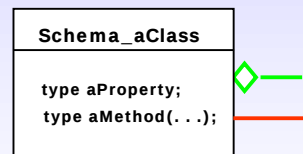
- CIM is an implementation neutral schema for describing overall management information
 - CIM facilitates the common understanding of management data across different management systems
 - CIM facilitates the integration of management information from different sources
 - CIM is a data model not an implementation
 - CIM provides models for both instrumentation and management

CIM CORBA QoS Modeling (3 / 7)

CIM OVERVIEW

Concepts of CIM models

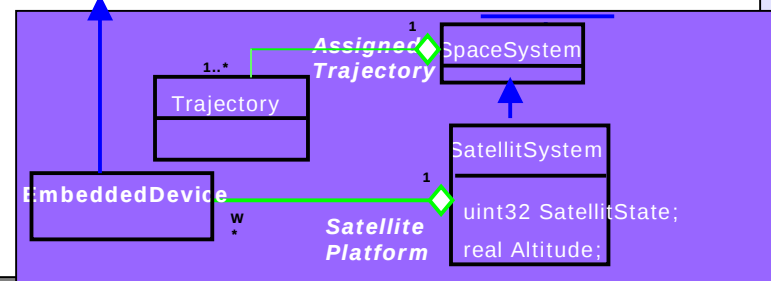
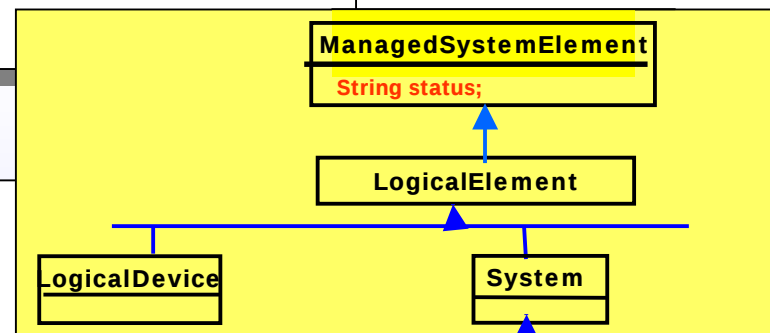
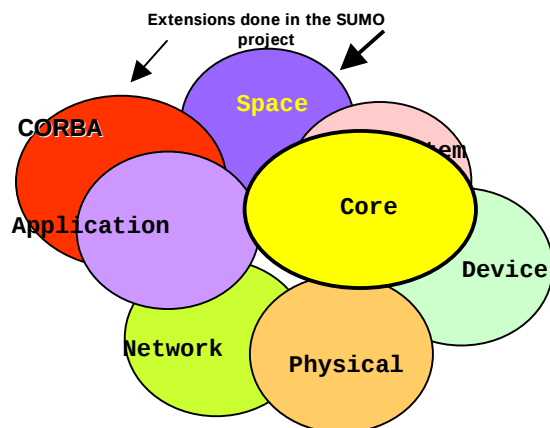
- Object-Oriented**
- Schema, Class, Property and Method,
 - Association (sub-type of Class)
 - Reference (sub-type of Property)
-
- Management**
- Qualifier
 - Indication and Trigger



```

[Abstract]
class CIM_Service
{
    ...
    [Counter, MaxValue(100)]
    uint32 TotalRestart;
    ...;
}
    
```

Modelling and Representation





CIM CORBA QoS Modeling (4/7)

CORBA modeling approach

- CORBA CIM extension schema
(called SUMOOMG_CorbaCore Model)
- CORBA Security and fault tolerance
(SUMOOMG_Security & SUMOOMG_Redundancy Models)

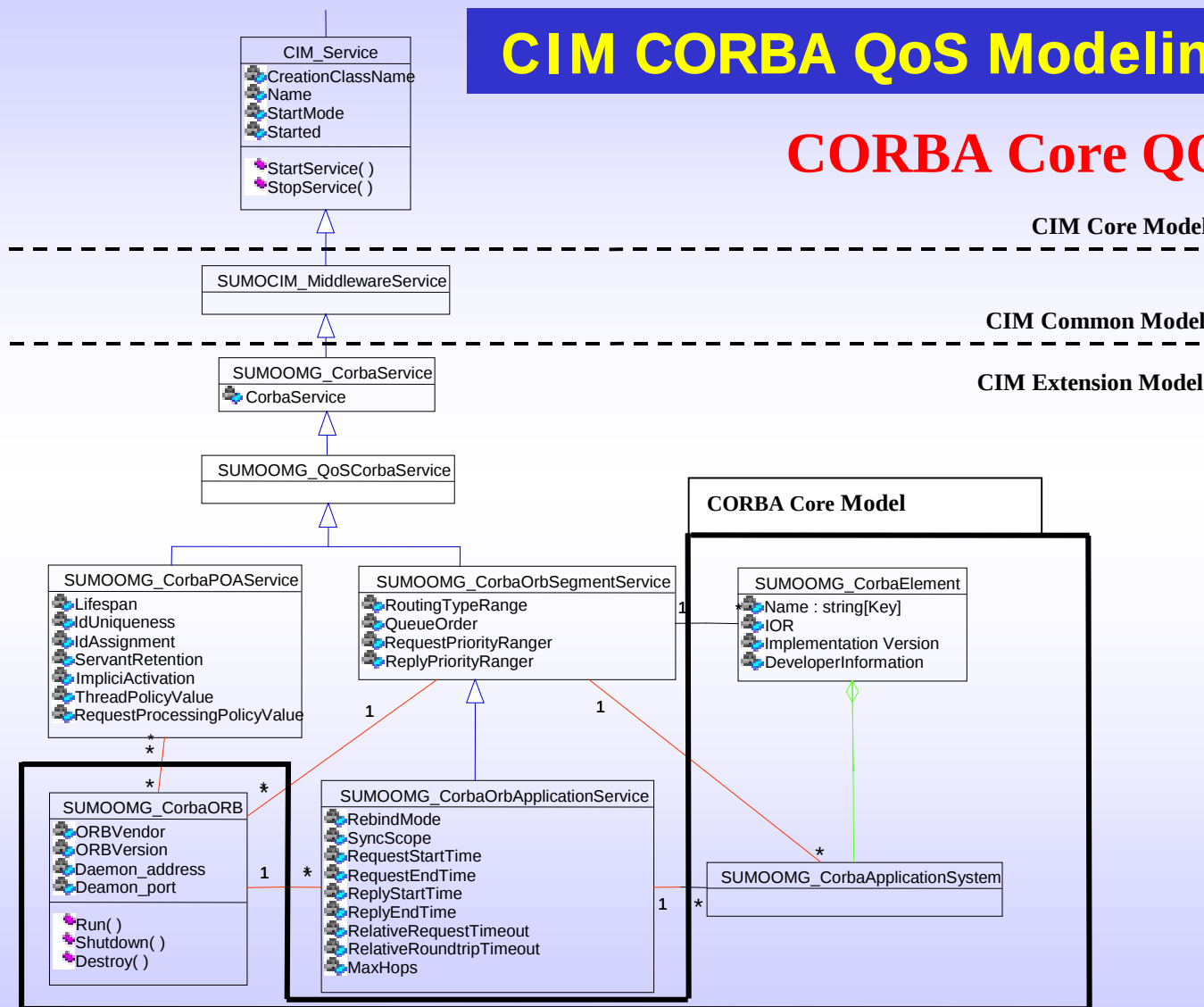
SUMO 1.0

-
- CORBA Core QoS Model - which presents the information of the QoS defined for the server-side and the client-side;
 - Configuration QoS Model - which presents the values that can be used with each parameter of each policy;
 - QoS Dynamic Model - ORB monitoring during the processing time.

NEW

CIM CORBA QoS Modeling (5/7)

CORBA Core QOS Model



CIM CORBA QoS Modeling (6 / 7)

CORBA Configuration QOS Model

[Description (“The Setting class represent configuration-related and operational parameters for a POA”)]

Class SUMOOMG_CorbaPOASetting: **CIM_Setting** {

[Description (“Parameter of QoS which defines the lifeSpan for a POA. Values are: transient, persistent, unknown), **ValueMap**{ “transient”, “persistent”, “unknown”},

ModelCorrespondance (SUMOOMG_CorbaPOAService.LifeSpan)]

string, **LifeSpanValue**;

[Description (“Parameter of QoS which determines the Object Id. Values are: unique_id, multiple_id, unknown), **ValueMap**{ “unique_id”, “multiple_id”, “unknown”} ,

ModelCorrespondance (SUMOOMG_CorbaPOAService.IdUniqueness)]

string **IdUniquenessValue**;

[Description (“Parameter of QoS which defines the retention. Values are: retain, non_retain, unknown), **ValueMap**{ “retain”, “non_retain”, “unknown”} ,

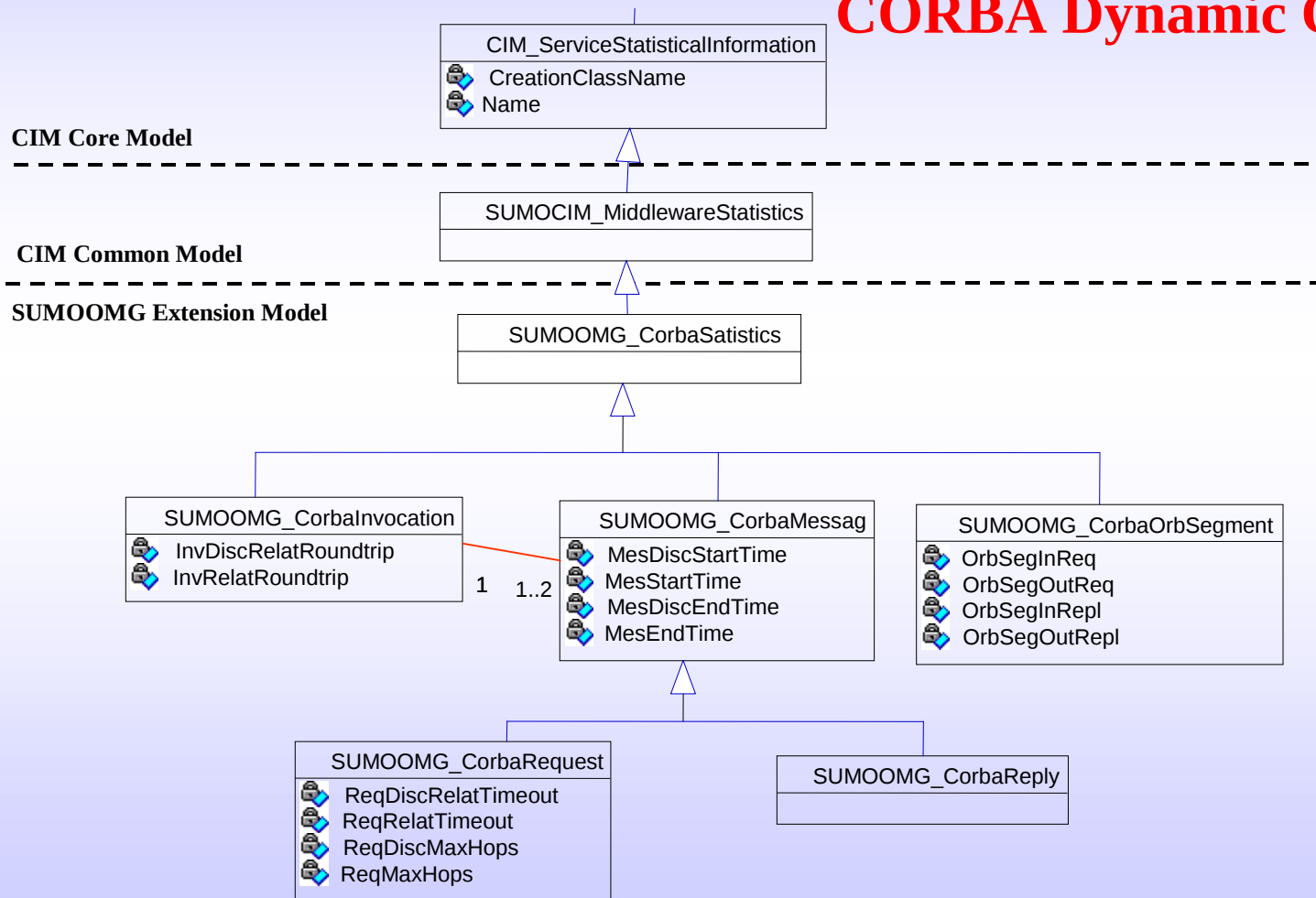
ModelCorrespondance (SUMOOMG_CorbaPOAService.ServantRetentionValue)]

string **ServantRetentionValue**;

...};

CIM CORBA QoS Modeling (7/7)

CORBA Dynamic QOS Model

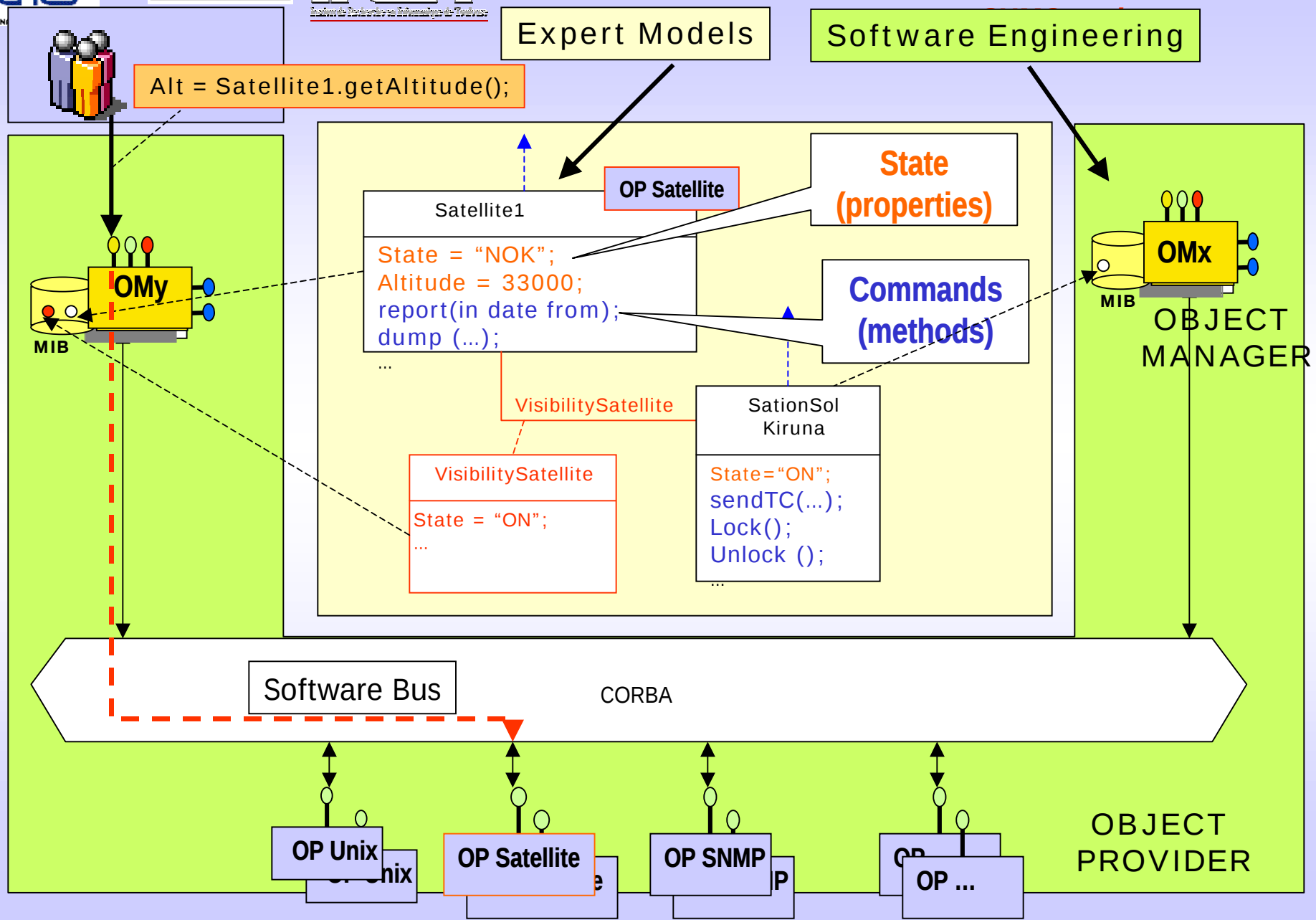




MANAGEMENT ARCHITECTURE (1/3)

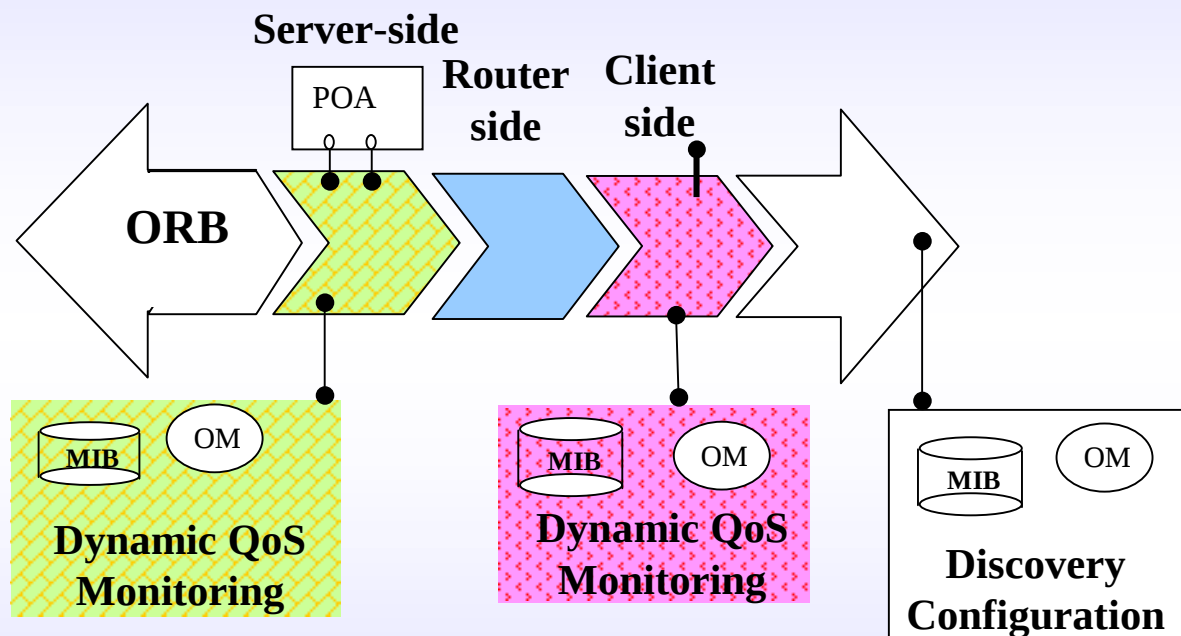
SUMO PROJECT

- ✚ Motivation: Satellite Constellations Management
- ✚ Actors
 - CNES
 - Alcatel
 - IRIT Laboratory (Paul Sabatier University)
- ✚ Used standards
 - CIM
 - WBEM
 - CORBA



MANAGEMENT ARCHITECTURE (3/3)

CORBA QOS MANAGEMENT



Legend



"Management" Relationship



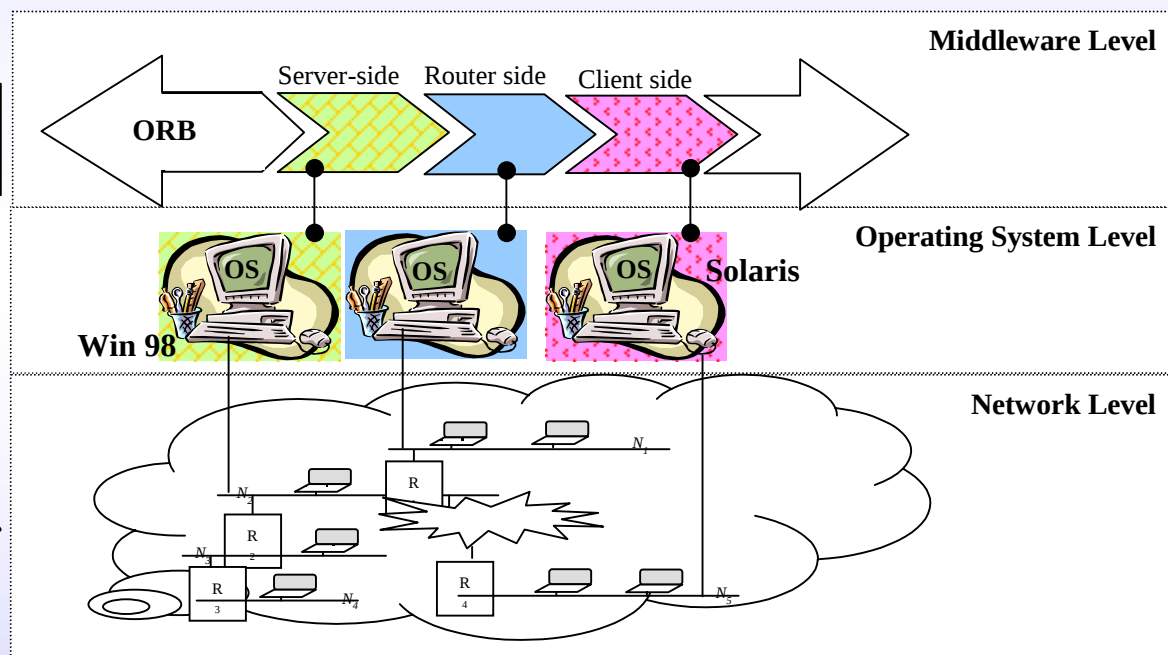
Server Object



Object reference (Client site)

RELATIONSHIP with OS and NETWORK (1/2)

**No direct relationship
with Operating System and the Network levels but ...**



The Messaging permits:

- Differentiated service
- No Resource Reservation

To manage
priority of
Process in order
to enhance
performance



CONCLUSION & PERSPECTIVES

- A new management approach of CORBA QOS
- CIM CORBA QOS models : Core QoS, QoS Configuration and QoS Dynamic Monitoring
- A management architecture of CORBA Core QoS is being implemented in SUMO project (WBEM/CORBA/Java platform).
- No direct relationship between the CORBA QoS and Operating System and the Network levels.

PERSPECTIVES

- To measure the influence of the heterogeneous environment in the test phase.
- A generic and dynamic configuration of the environment to enhance performance of the middleware level.
- To study other middleware environments.
- To reach a cooperation between heterogeneous management systems.