

Mapping QoS Requirements

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ArtistDesign Workshop on Real-Time System Models for Schedulability Analysis

Outline

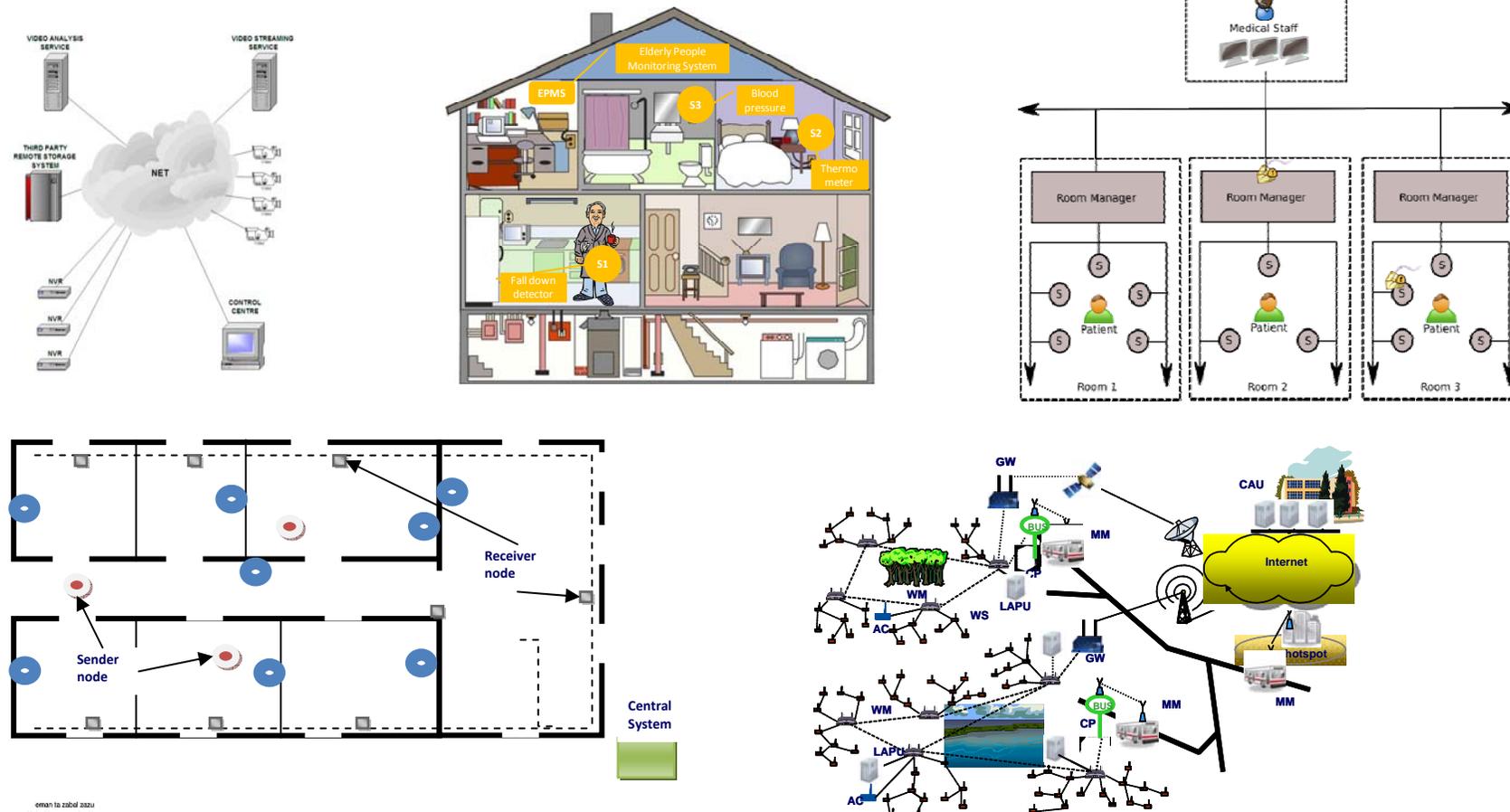


- Introduction
- Modeling Approach
 - Infrastructure View
 - Specification View
- Open Issues: Mapping QoS Requirements



Introduction

o The concept of *model* in iLAND

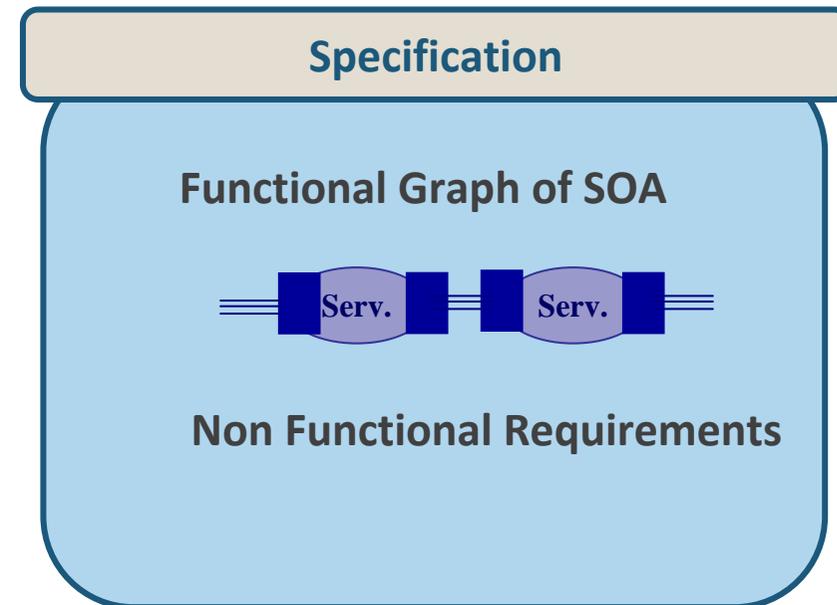
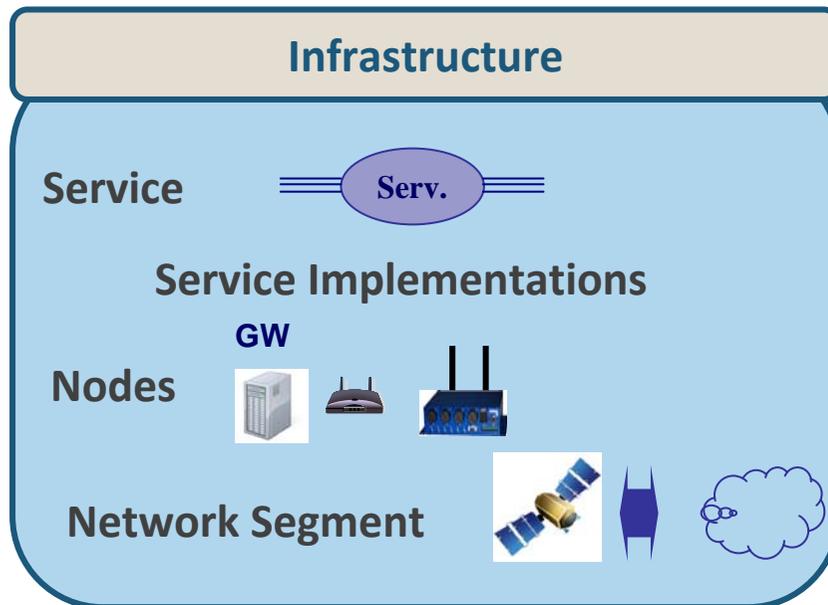


Mapping QoS Requirements



Introduction

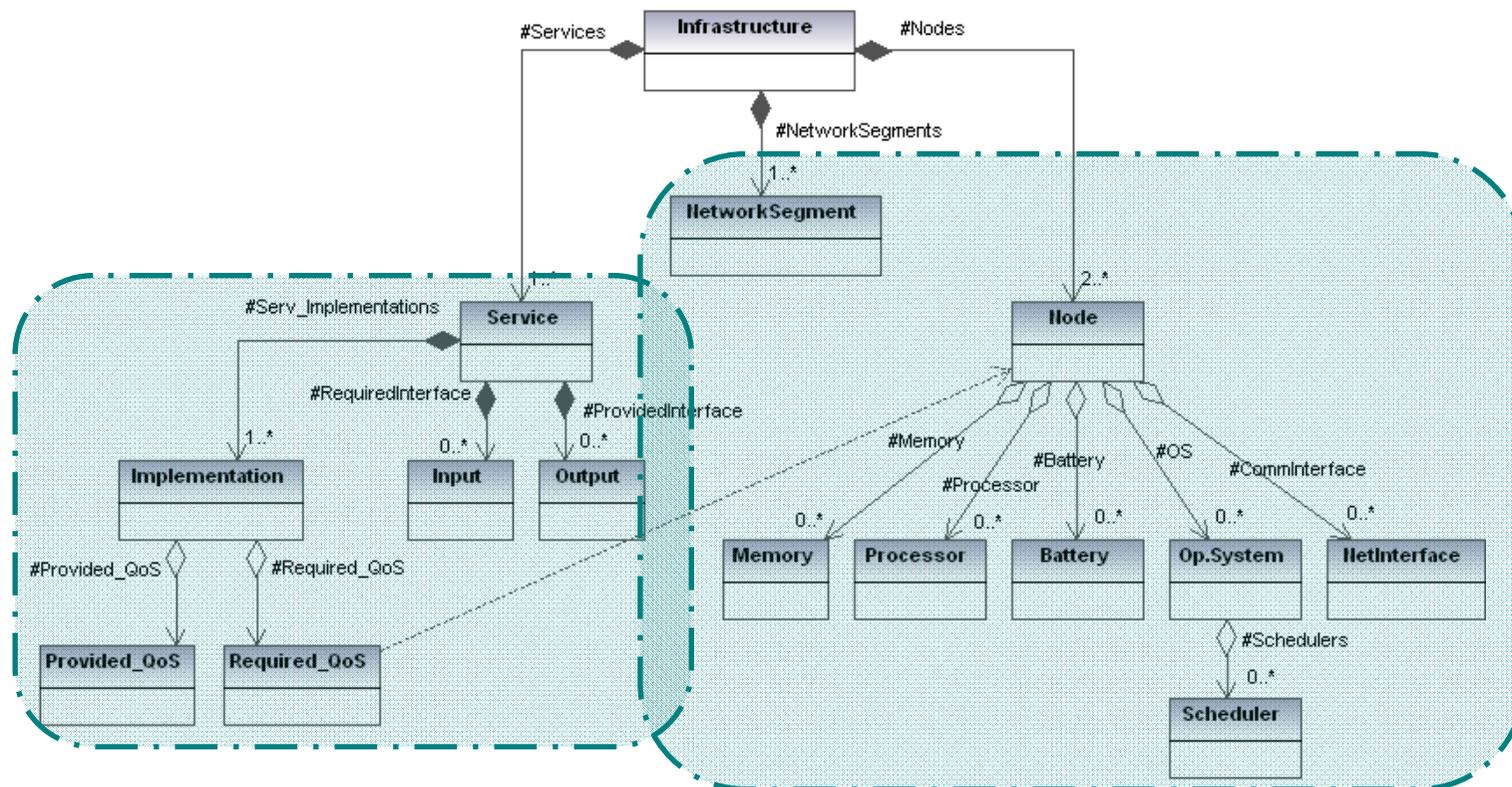
- Identification of Domain Specific Models





Infrastructure View

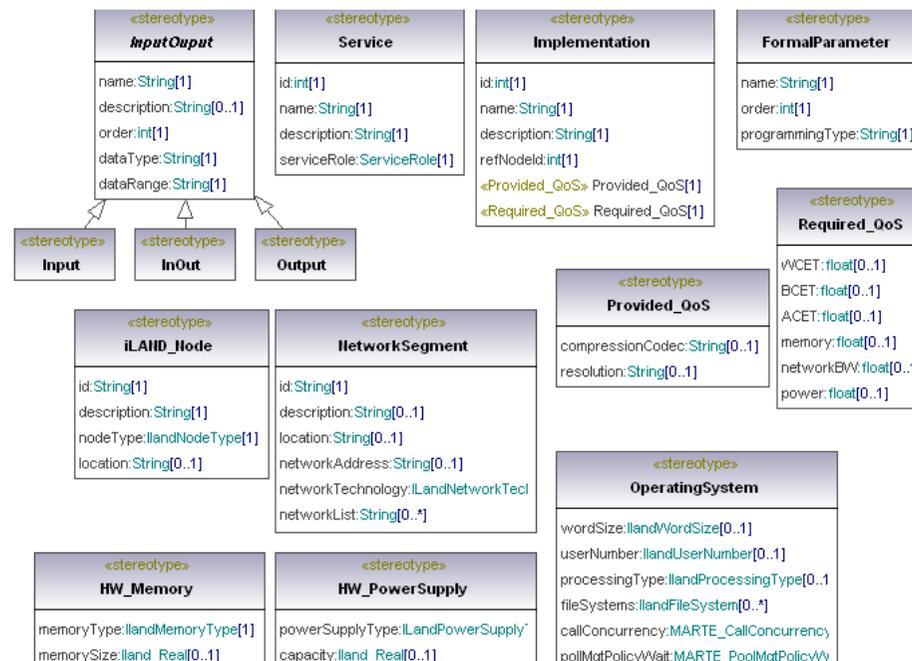
- o Meta-model





Infrastructure View

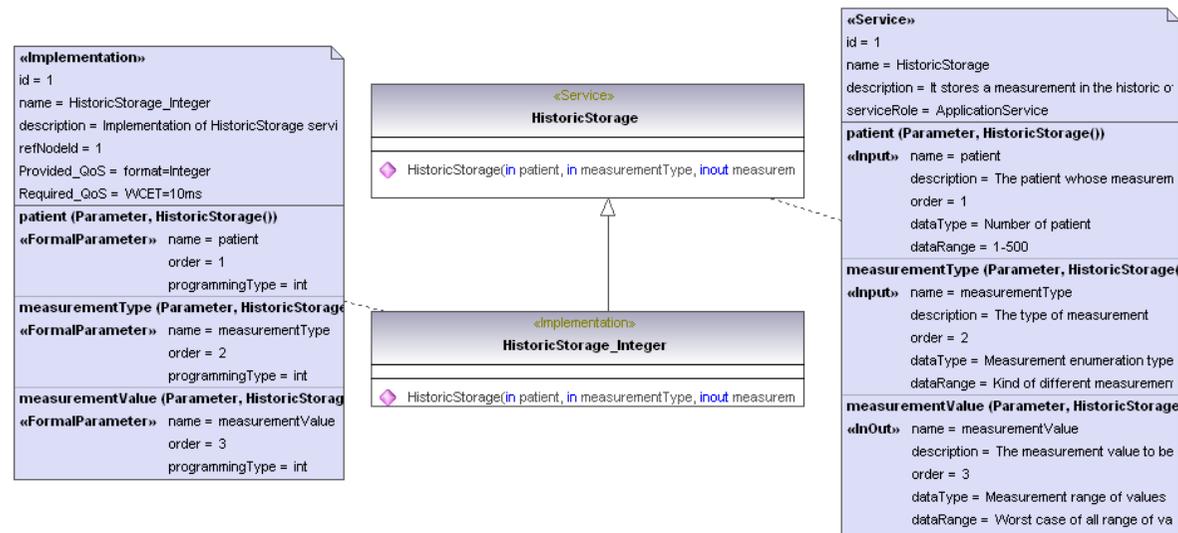
- UML profile
 - Set of stereotypes and tagged values
 - Applied to the identified UML elements
- UML diagrams and UML elements





Infrastructure View

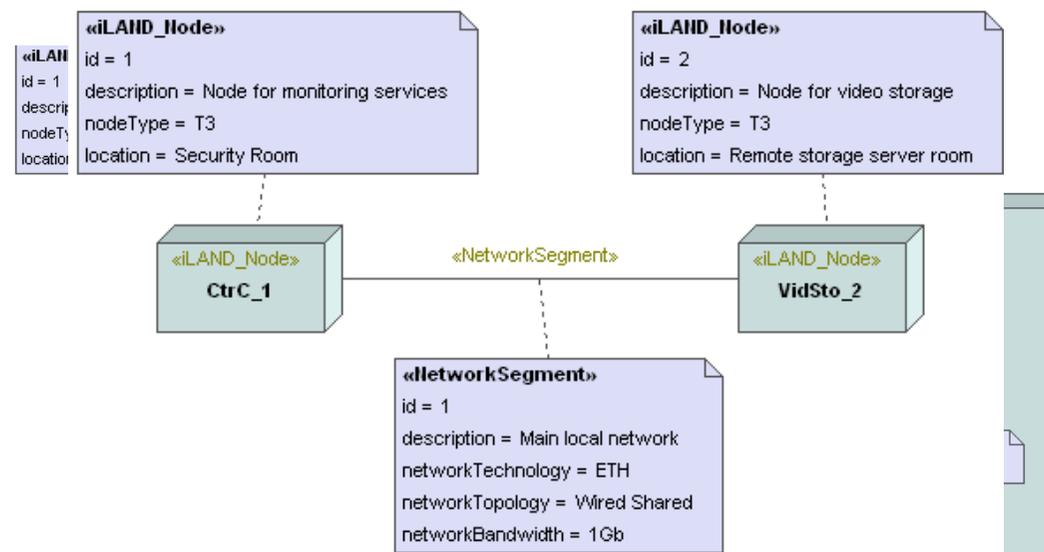
- Services and Service Implementations
 - Diagrams:
 - Class diagram
 - Elements
 - Class





Infrastructure View

- Network Segments, Nodes and their resources
 - Diagrams:
 - Deployment diagram
 - Elements
 - Communication path / association, Node, device (memory, processor, battery and network interface), execution environment, artefact





Specification View

- Service Oriented Application (SOA)

- Service in



- Port

- Connector

- Timeout

- Event

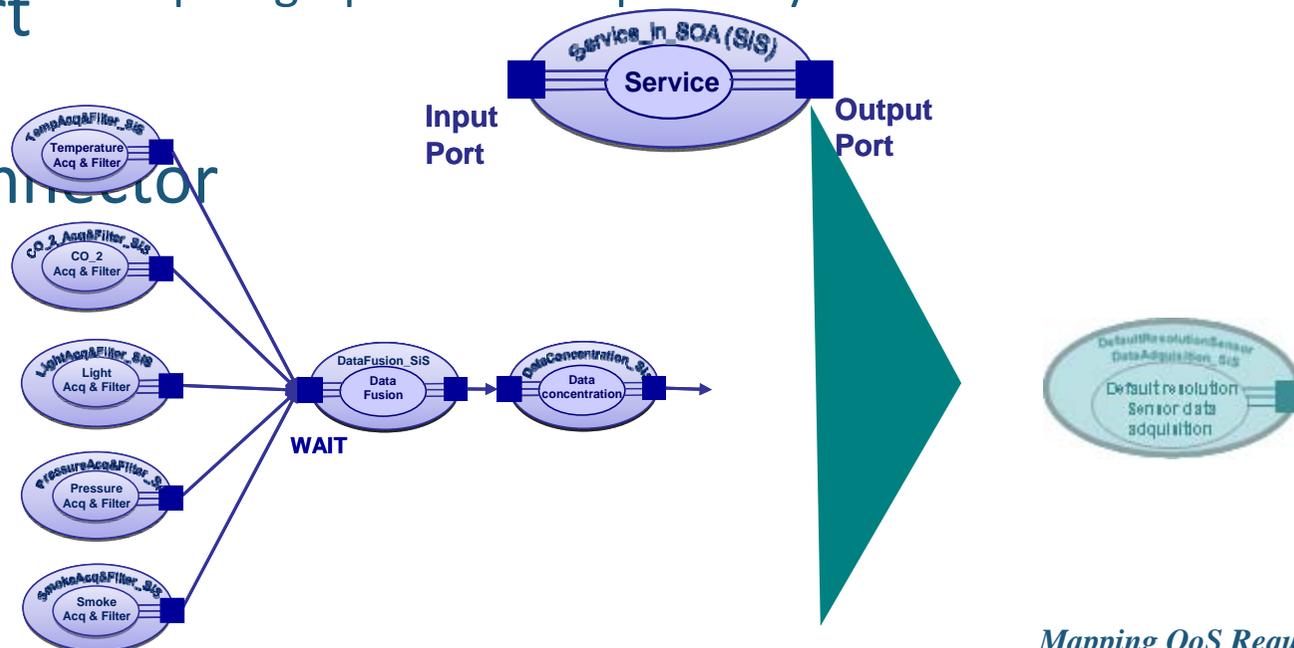




Specification View

- Service Oriented Application (SOA)
- ~~Service in SOA (SiS) / Macro_SiS~~
 - Encapsulates SiS during modeling phase
 - Encapsulates services defined at Infrastructure view
 - Complex graphs in a compact way
- Port

○ Connector



Mapping QoS Requirements





Specification View

- Service Oriented Application (SOA)
 - Service In SOA (SiS) / Macro_SiS
 - Reception of input parameters
 - Input logic:
 - WAIT (Default): *waits for all its predecessors*
 - NO-WAIT: *input parameters may come from different sources*
 - Output logic:
 - AND (Default): *sends to all its successors*
 - Generic: *custom logic described by an activity diagram*
 - Port
 - Input Port
 - Output Port
 - Connector
 - Output Port
 - Timeout
 - Sending of output parameters
 - Event





Specification View

- Service Oriented Application (SOA)
- Service in SOA (SiS) / Managed_SiS
 - Collect information exchanged among SiS
 - From output ports → associated to output parameters
- Port
 - To input ports → used by input parameters

8 Timeouts Connector

- Maximum duration of a situation
- Timeout operations:
 - Activation
- Event
 - Reset
 - Get current value





Specification View

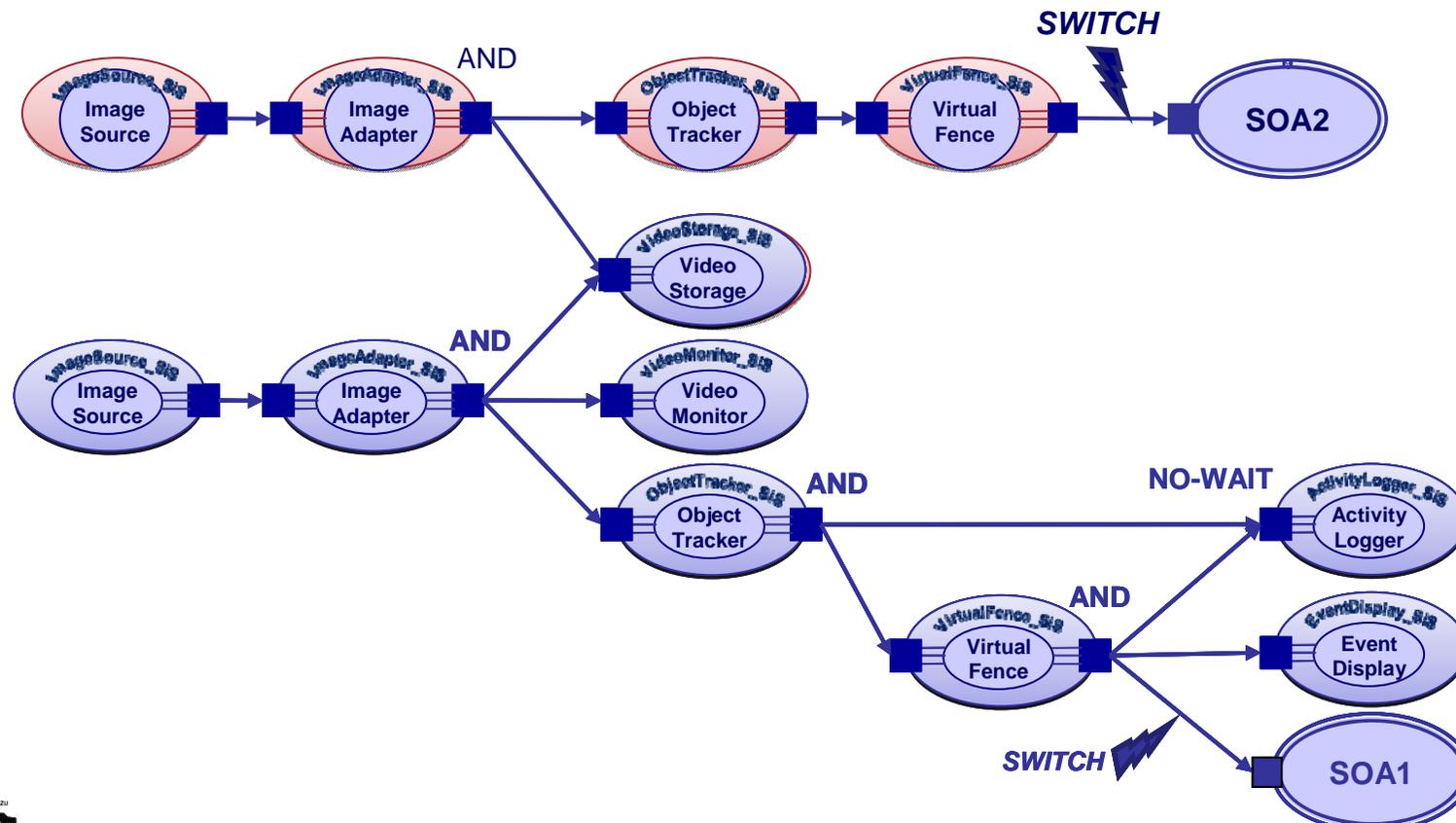
- Service Oriented Application (SOA)
 - Reconfiguration at application level
- Service in SOA (SIS) / Macro_SIS
 - create/destroy applications and allocate/de-allocate their corresponding resources at runtime
- Port
 - Event triggering logic associated to output ports → activity diagrams
- Connector
 - Types:
 - Create: *triggers a new SOA and the original SOA remains executing*
 - Replace: *triggers a new SOA and the original SOA is destroyed*
 - Switch: *two SOAs execute continuously and alternately*
 - Destroy: *triggers the stop of a running SOA*
- Event





Specification View

o Event



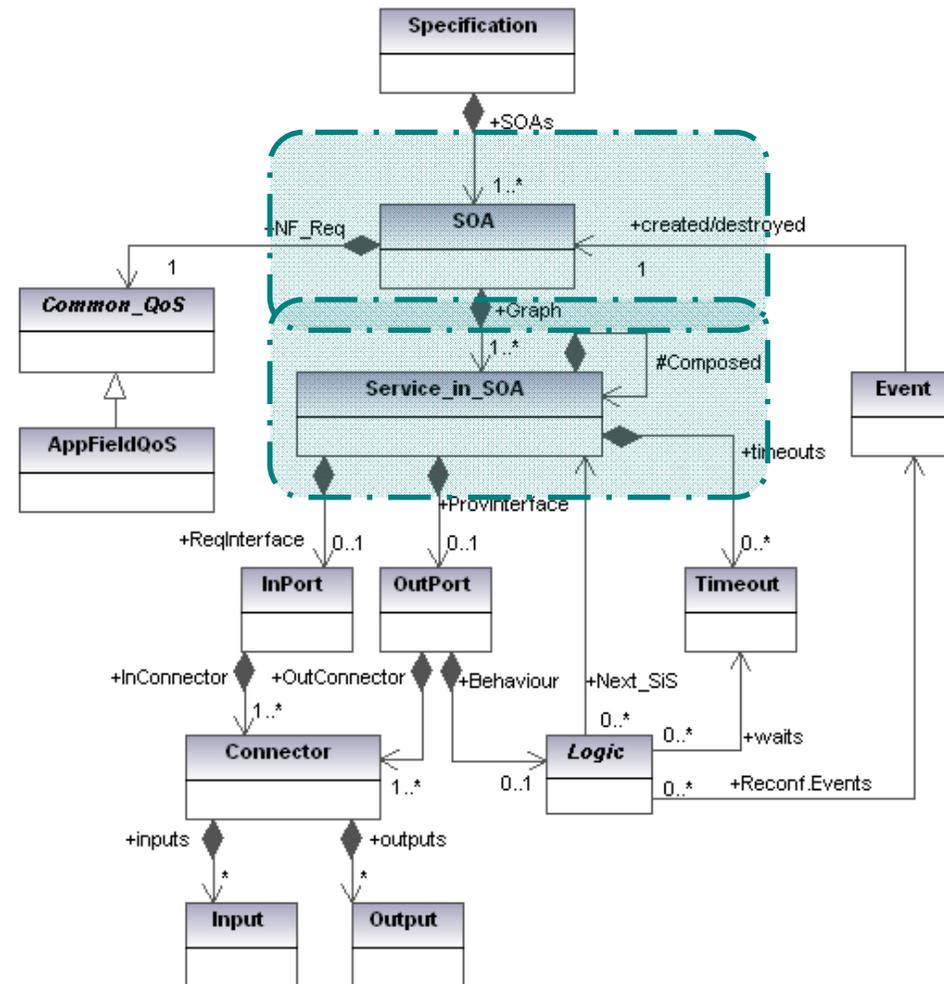
Mapping QoS Requirements





Specification View

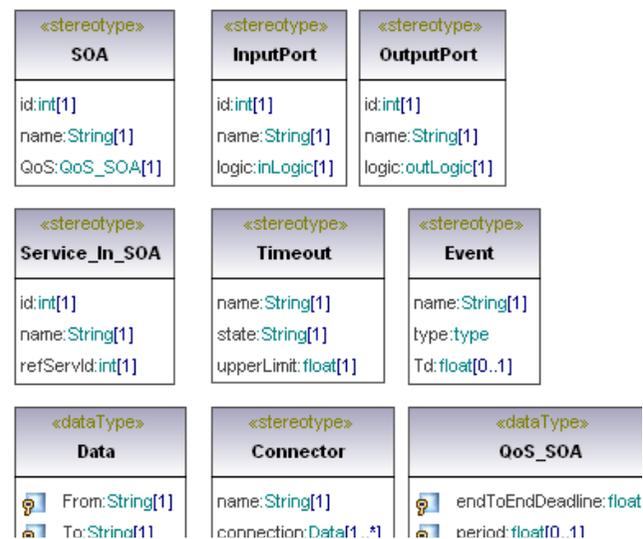
- o Meta-model





Specification View

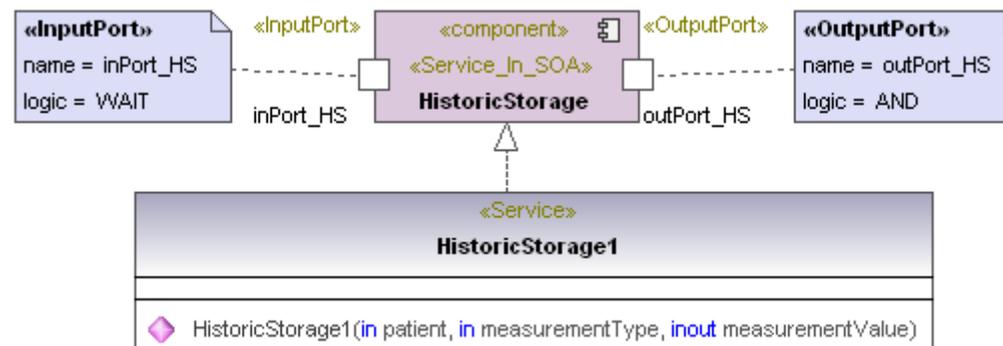
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Specification View

- Diagrams:
 - Service graph → component diagram
 - Output port logic → activity diagram
- Elements:
 - SiS → Component
 - Input port, output port → Port
 - Infrastructure Service association → Component realization





Specification View

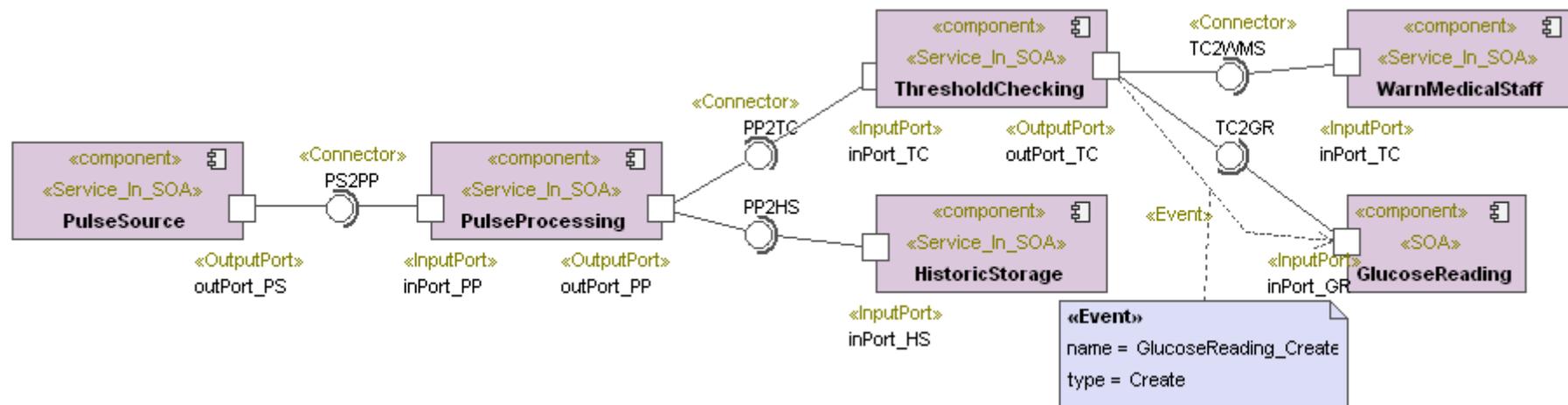
- Elements:
 - Connectors (Data Flow)
 - Outputs → Interface Realization
 - Inputs → Interface Usage



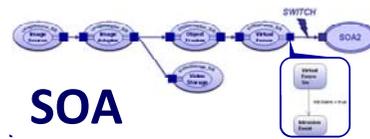
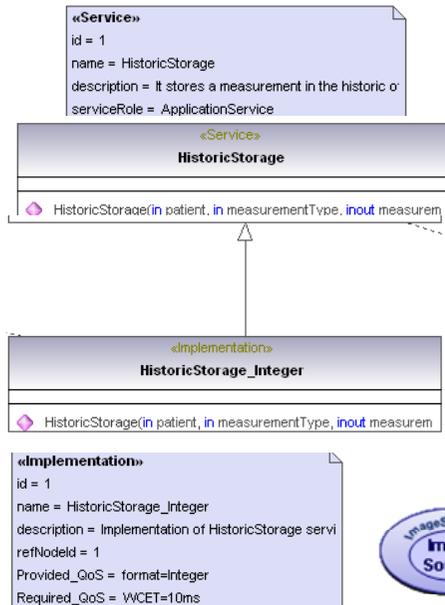


Specification View

- Elements:
 - SOA → Component
 - Reconfiguration event → Dependency



Open Issues: Mapping QoS Requirements

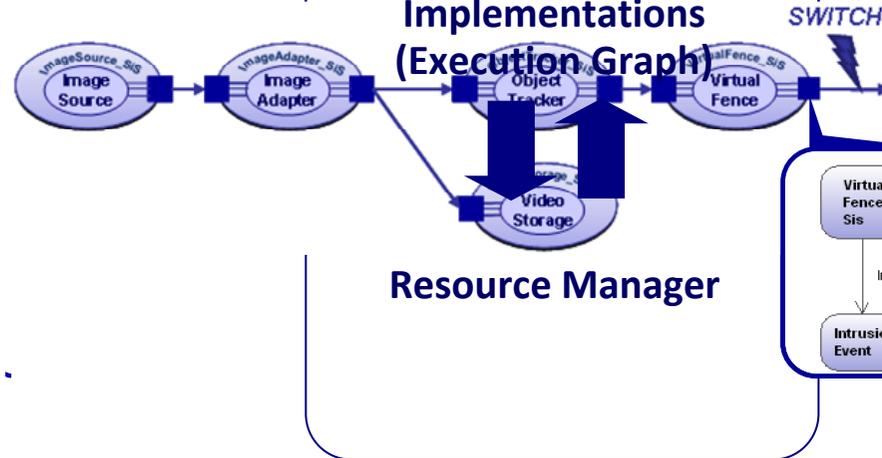


Application Modeling Tool

Composer

Selection of Service Implementations
(Execution Graph)

Resource Manager



- SOA QoS:
 - end to end latency, fps
- Reconfiguration QoS:
 - Maximum delay to video monitoring
 - maximum delay to video storage
- maximum latency of a SiS

