

On the Interplay of Crosscutting and MAS-Specific Styles



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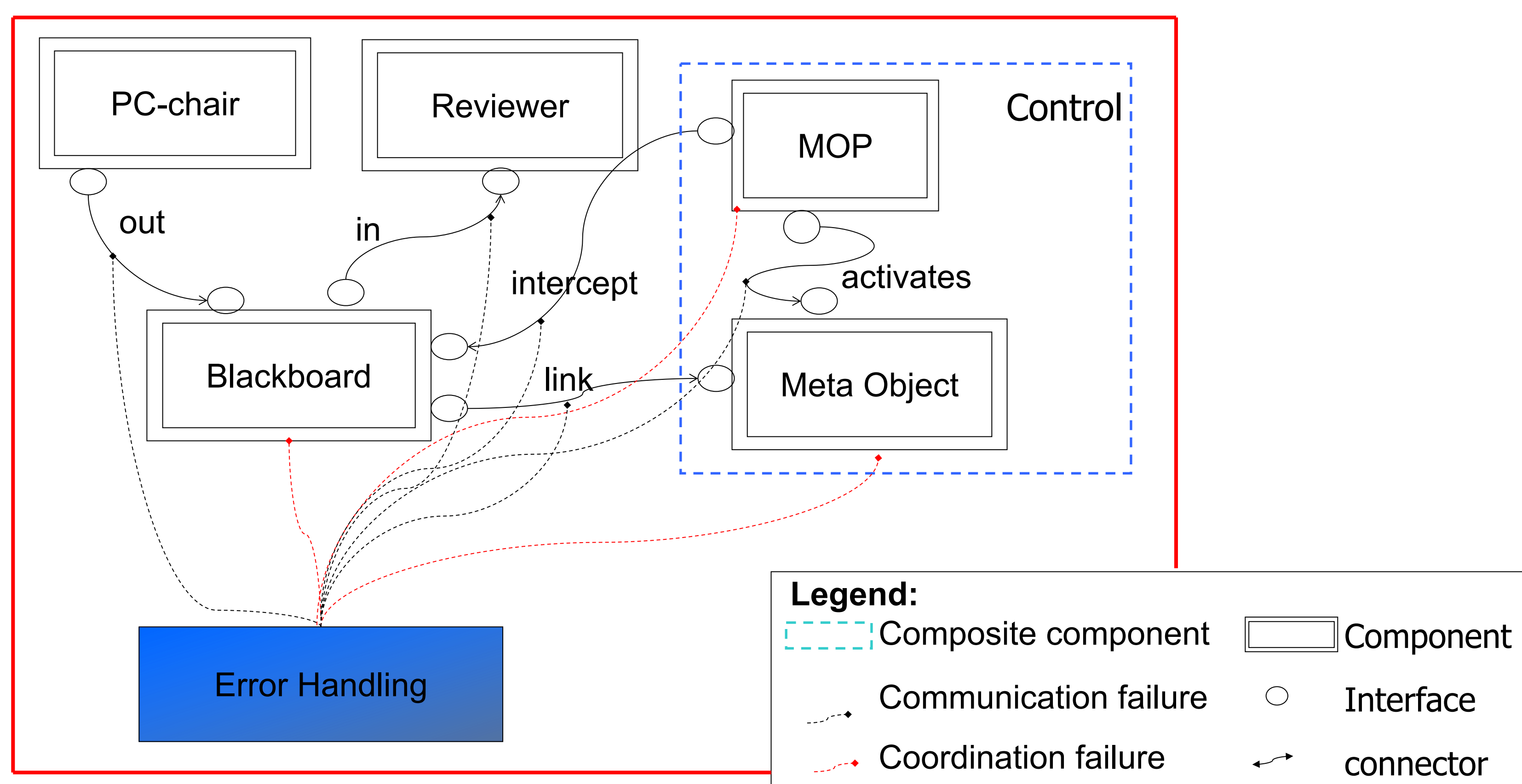
Architectural Crosscutting and MAS Styles

- Our research encompasses a *case study* to observe the influence of *domain-specific architectural styles* for multi-agent systems (MAS) on the nature of certain crosscutting concern

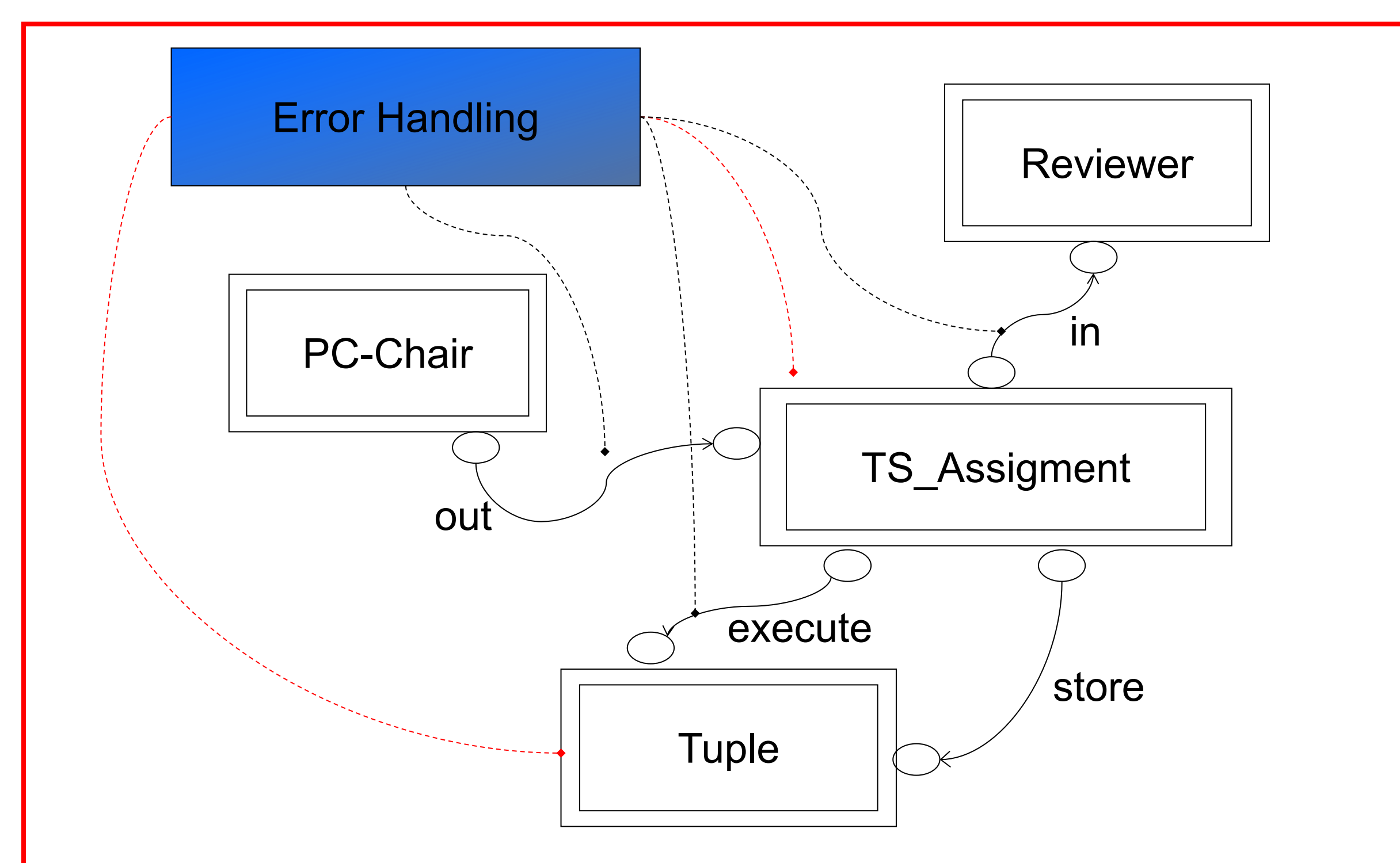
Conference Management System

- The *Conference Management System* (CMS) [1] application supports the management of paper submissions to conferences
 - The agents enrolled in this system represent the people involved
- Architectural concerns* in the CMS design:
 - Coordination* regulates the interaction-intensive activities
 - Error handling* provides measures to enhance system robustness

CMS in the Reflective Blackboard Pattern



CMS in the Stigmergic Coordination Pattern



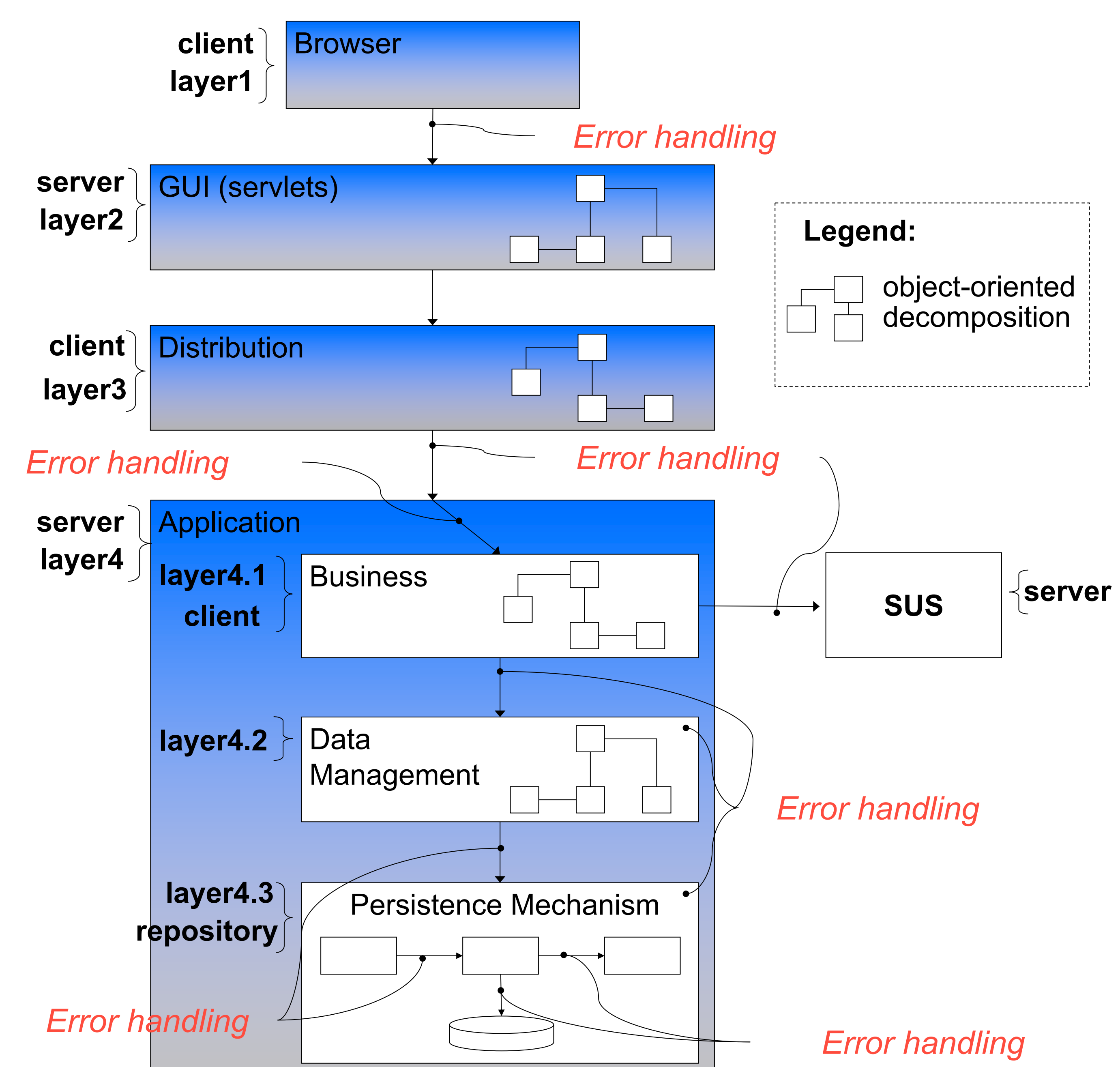
Crosscutting Concerns

- Coordination:**
 - is a crosscutting in the Stigmergic Coordination pattern[3]: coordination is *scattered* in all the agents
 - is not crosscutting in the Reflective Blackboard pattern[2]: coordination is modularized in specific meta-objects
- Error Handling :**
 - is crosscutting in the Stigmergic Coordination pattern: the behavior for managing errors is spread over all the agents
 - is crosscutting in the Reflective Blackboard pattern: both agents and control are involved in error treatments

Aspects in Specific Architectural Styles

- The kind of *decomposition* supported by styles favor the clean modularization of some concerns while others are not well modularized [4]
- Styles have directly interfered with the nature of the crosscutting concerns at the architectural description of the systems:
 - Determine the level of tangling or scattering of a concern
- Error handling is *recurrently crosscutting* independently of the architecture stylistic choice or style compositions
- We have also observed a crosscutting manifestation of exception handling in other architectural styles [5]
- We might need more expressive *join point models* (and *pointcut languages*) for aspect-oriented architecture design [5]
- The selection of *architecture styles determine the design space for the particular problem*; then the style semantics should provide a basis for architectural aspect description

Another Example: the Health Watcher



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