

The RASCALLI Platform

For a Flexible and Distributed Development of Virtual Systems Augmented with Cognition

Brigitte Kenn, Christian Schollum

Abstract

The RASCALLI platform is a modular and flexible development and runtime environment for artificial systems augmented with aspects of cognition. The platform supports a distributed development style and the integration of components from different areas of research realized in a variety of programming languages. It supports multi-agent architectures and multi-agent instances, as well as multiple versions of the same components to run in parallel on a single platform instance. Individual agents are created in a Lego-like manner via assembly of components deployed in the platform.

Motivation

Research projects like RASCALLI pose a number of technical challenges, such as

- integrating components implemented in various technologies, developed by different project partners,
- re-using components for different approaches to a given problem and
- comparing, evaluating and experimenting with multiple approaches.

The RASCALLI Platform aims at providing a development and runtime environment that alleviates these problems.

Requirements

System integration

The cost of integration of external and legacy components should be kept to a minimum. This can be achieved by providing a single runtime environment which is used by all project members, as well as a service-oriented software architecture.

Re-usability

In order to maximize re-usability, the platform as well as applications built on top of the platform should be implemented in a component-based fashion.

Distributed development

Allow project partners in different geographical locations to contribute and integrate platform and application components.

Multi-agent / Multi-architecture

Support the concurrent execution of multiple agents, even if they implement different agent architectures.

Multi-version

Allow for multiple versions of a each component to co-exist within a single platform instance.

Realization

Infrastructure Layer

This layer consists of basic technologies and development tools, such as OSGi and Maven, as well as custom-made utilities for agent development. OSGi (www.osgi.org) has been chosen as the basic framework for the RASCALLI Platform because it allows us to implement a service-oriented, component-based architecture, supporting multiple versions of components and services.

Framework Layer

This layer contains general platform services and utilities employed by the RASCALLI agents. This includes technical support (e.g. for networking or RDF handling) as well as common infrastructure services, such as user and agent management.

Agent Layer	Agent architectures, components, definitions and instances
Framework Layer	Technical services and utilities (e.g. networking support, RDF support, logging support)
Infrastructure Layer	Basic tools and components (e.g. Java, OSGi, Maven)

Agent Layer

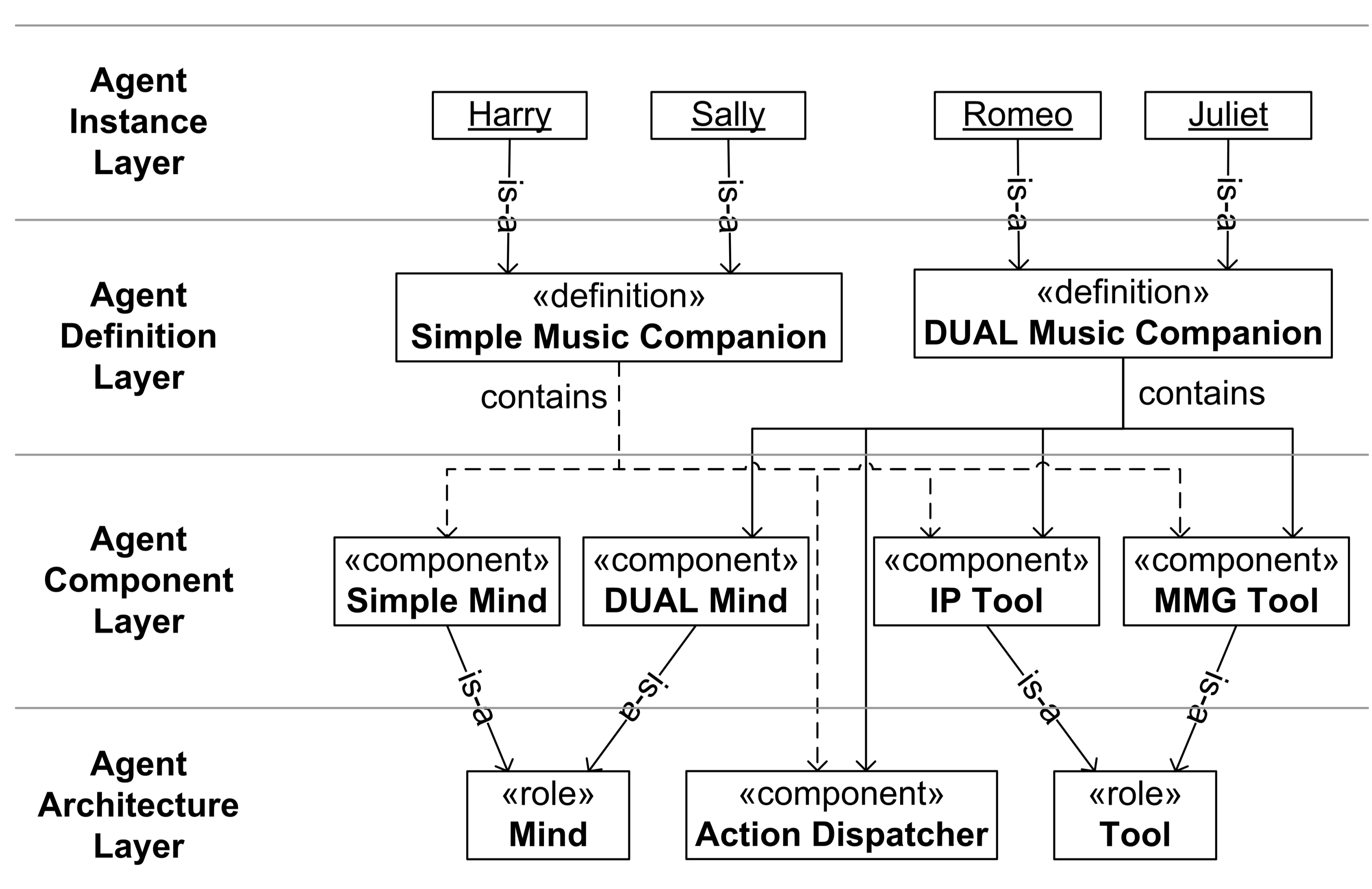
The Agent Layer is the application layer of the RASCALLI platform and consists of four sub-layers. Each layer contains a specific kind of artifacts:

An **Agent Architecture** is a blueprint for a particular type of agent, defining the basic roles and components of an agent.

An **Agent Component** is an implementation of a role defined on the agent architecture layer. Multiple implementations of a given role may exist.

An **Agent Definition** is an assembly of specific agent components of a given agent architecture.

An **Agent Instance** is an actual agent running in the platform.



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