

AMETAS

Good Migrations.

AMETAS White Paper Series

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Glossary

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Agent

An AMETAS agent is a Place User that can be mobile. It communicates with other Place Users using asynchronous messages and can access system resources by communicating with services.

Agenthood

The concept of agenthood defines the common properties of software agents.

Agent Relaying

Relaying is a process which takes place if the target place of a migrating AMETAS agent is not active. In this case the agent is sent to the target place's relay place instead and must wait until the actual target place is activated again. This is useful for disconnected computing.

Agent Type

An agent's type is given by a description of its abilities and its behaviour. This description is the basis for the mediation of agents, or Place Users in general. A matching algorithm is applied to find out if two type descriptions are compatible with each other. In AMETAS we use *conceptual graphs* for describing types. However, the basic mediation system installed by default relies on simple string-based descriptions.

AMETAS core

The AMETAS system provides some basic functionalities for Place Users which can not be altered by agent programmers or Place Users. The part of a place is called the *core*.

AMETAS Messages

An AMETAS message is an asynchronous message used for Place User communication in AMETAS. It consists of a header and a body. The header contains information about the sender, the receiver, and the type of the message while the body consists of application data.

Asynchronous Messages

In general, such messages are deposited by an entity inside some kind of mailbox and actively retrieved by another entity. By using asynchronous messages for communication, entities can be easily decoupled. In AMETAS, agent autonomy is ensured by restricting Place Users to this communication scheme.

Autonomy

Autonomy is one of the basic properties of agenthood. An agent is said to be autonomous if it does not require a direct intervention by its user while fulfilling its tasks. The agent is usually given directions at startup and is able to do its job without the need to contact its user.

Conceptual Graph

Conceptual graphs are a formalism for describing knowledge. In such a graph, *concepts* are connected to one another by *relations*. For example the concepts 'car' and 'vehicle' may be connected by the 'is a'-relation ('car' → 'is a' → 'vehicle') to express a subtype relation. Two conceptual graphs may match partially, i.e. certain parts contain the same concepts and relations while other parts are incompatible to each other.

Disconnected Computing

Disconnected computing (or operation) takes place if a user initiates an application to do a task and goes off-line while the task is executed. AMETAS agents are ideal to do this kind of computation.

Events

An event is fired by the AMETAS core system if a certain situation arises. Events may be received by Place Users to react to them.

Event Handler

An Event Handler a part of a Place User which uses the extended event mechanism of AMETAS. The Handler defines some methods for event processing. Every Place User may have several separate Event Handlers.

Event Manager

The Event Manager allows the AMETAS core to fire events when certain situations occur inside the core and forwards these events to registered Place Users.

Groups

Privileges may also be seen as groups which Place Users can join to get certain permissions. Therefore, privileges are sometimes called groups.

Intelligence

An agent's ability to evaluate information, to accumulate knowledge, to learn, to draw conclusions and to derive proper strategies for fulfilling its task, is often called *intelligence*. In some cases agent intelligence explicitly involves *artificial intelligence* techniques like inference engines or neural networks. In other cases cleverly designed algorithms may exhibit intelligence.

Knowledge

Knowledge is essentially well-structured information. The structure of this information can be used to draw conclusions and derive new information. There are several possibilities for structuring information. See the entry on *conceptual graphs*, for example.

Mediation

When, for example, a client needs a specific service without having a-priori knowledge about the services name, address, or interface, the client may request a mediation. In general, during a mediation the mediator tries to find an object whose description matches the description given in the mediation request. It depends on the description mechanism if the match has to be exact (e.g. when comparing two strings) or if partial matches are possible (see the entry on *conceptual graphs*).

Mediator

A mediator is an entity responsible for mediation.

Migration

The process of traveling from one place to another is termed migration.

Mobility

The ability to move from one location to another is termed *mobility*. In the area of software agents mobility means that agents are able to migrate from one host to another to process data locally.

Permissions

Permissions enable Place Users to do certain things which otherwise would be prohibited. Most predefined permissions allow access to specific system resources like the file system or network connections. Permissions are grouped within privileges which may be given to a Place User.

Place User

An entity that resides on and uses an AMETAS Place. Place Users may be agents, services or user adapters and communicate using asynchronous messages.

Place User ID

The Place User ID is the unique identifier of a Place User. In the context of this White Paper Series the Place User ID is sometimes called the Place User's *name*.

Post Office

The Post Office is an AMETAS core service that allows Place Users to deposit and retrieve messages.

Privileges

Privileges are used as containers for a set of permissions. A privilege can be seen as a *permission profile*, Place Users may possess a privilege to do certain things according to the permissions contained in the privilege.

Relay Place

A relay place is a permanent place that is specified to receive the agents targeted for a temporary place if the temporary place is not active.

SCC

SCC is an acronym for *Signed Class Container*. A SCC contains arbitrary classes that are dynamically loadable by Place Users. The SCC also contains signatures for every class in the container to ensure authenticity.

Service

A service is a non-mobile Place User that grants agents access to system resources. Services are used to extend an AMETAS place in an application-specific way.

SPU

SPU is an acronym for *Signed Place User*. A SPU contains all the classes along with the signatures and the type of a Place User. Agents migrate by requesting the transmission of their SPU container.

Strong Migration

When the execution state of an agent is transmitted during its migration to another place we talk about *strong* migration. This enables the place to continue agent execution exactly at the point where the agent was interrupted by the migration.

Temporary Place

Temporary places are AMETAS places which may go on-line and off-line as desired by their user. They are normally used to start the user's agent applications and may disconnect while the user's agents fulfill their tasks. When the user goes on-line again, the agents can return to its place, wherever it is started. The temporary place concept is an important prerequisite for disconnected computing.

User Adapter

A user adapter is a non-mobile Place User mainly used for providing an interface to an agent application for the user. It may also serve as an application interface that allows external applications to control an AMETAS application. In most cases a user adapter will display a graphical user interface to the user that allows him to communicate with other application components.

Weak Migration

Migration is *weak* if agents are not transmitted together with their current execution state. Such agents have to be restarted at the receiving place and cannot be continued where they left off.