

Gets the content language.

getLocalAgentManager(). Static method in class com.ibm.jma.agent.AgentManager
Gets the local agent manager.
getLocalPostOffice(). Static method in class com.ibm.jma.mail.impl.PostOfficeRMI
getMail(). Method in class com.ibm.jma.mail.Mailbox
Gets (receives) a mail from this mailbox.
getMail(byte[]). Method in class com.ibm.jma.mail.Mailbox
Gets (receives) a mail with the specified correlation id from this mailbox.
getMail(byte[], long). Method in class com.ibm.jma.mail.Mailbox
Gets (receives) a mail with the specified correlation id from this mailbox, waiting if the mail arrives within the specified wait time.
getMail(long). Method in class com.ibm.jma.mail.Mailbox
Gets (receives) a mail from this mailbox, waiting if the mail arrives within the specified wait time.
getMail(String). Method in class com.ibm.jma.mail.Mailbox
Gets (receives) a mail with the specified content type from this mailbox.
getMail(String, long). Method in class com.ibm.jma.mail.Mailbox
Gets (receives) a mail with the specified content type from this mailbox, waiting if the mail arrives within the specified wait time.
getMailId(). Method in class com.ibm.jma.mail.Mail
Returns the mail id of this mail.
GetManager(). Method in class com.ibm.jma.agent.Agent
Gets the (current) agent manager of this agent.
getMessageId(). Method in class com.ibm.jma.message.RequestMessage
Gets the message id.
getMessageTypes(). Method in class com.ibm.jma.agent.Agent
Gets the message types which can be handled by this agent.
getMessageTypes(). Method in class com.ibm.jma.agent.AgentManager
Gets the message types which can be handled by this agent manager.
getMessageTypes(). Method in class com.ibm.jma.message.handler.ATRequestMessageHandler
Gets the message types which can be handled by this message handler.
getMessageTypes(). Method in class com.ibm.jma.message.handler.ATResponseMessageHandler
Gets the message types which can be handled by this message handler.
getMessageTypes(). Method in class com.ibm.jma.message.handler.KQLMessageHandler
Gets the message types which can be handled by this message handler.
getMessageTypes(). Method in interface com.ibm.jma.message.handler.MessageHandler
Gets the message types which can be handled by this message handler.
getMessageTypes(). Method in class com.ibm.jma.message.handler.RequestMessageHandler
Gets the message types which can be handled by this message handler.

getMessageTypes(). Method in class com.ibm.jma.message.handler.ResponseMessageHandler
Gets the message types which can be handled by this message handler.
getName(). Method in class com.ibm.jma.agent.AgentManager
Gets the name of this agent manager.
getName(). Method in class com.ibm.jma.mail.Mailbox
Returns the name of this mailbox.
getName(). Method in interface com.ibm.jma.mail.Queue
Returns the name of this mail queue.
getName(). Method in class com.ibm.jma.mail.impl.MemMailQueue
getName(). Method in interface com.ibm.jma.mail.impl.PostOfficeRemoteRMI
getName(). Method in class com.ibm.jma.mail.impl.PostOfficeRMI
getName(). Method in class com.ibm.jma.mail.impl.SQLMailQueue
getName(). Method in class com.ibm.jma.mail.URL
getOntology(). Method in class com.ibm.jma.message.KQMLMessage
Gets the content ontology.
getOperation(). Method in class com.ibm.jma.message.RequestMessage
Gets the operation to be performed by the receiver of this message.
getParameters(). Method in class com.ibm.jma.message.ATResponseMessage
Gets the parameters of the result.
getParameters(). Method in class com.ibm.jma.message.RequestMessage
Gets the parameters of the operation.
getPerformative(). Method in class com.ibm.jma.message.KQMLMessage
Gets the performative.
getPort(). Method in class com.ibm.jma.mail.URL
getPriority(). Method in class com.ibm.jma.mail.Mail
Returns the priority of this mail.
getProtocol(). Method in class com.ibm.jma.mail.URL
getReceiver(). Method in class com.ibm.jma.message.Message
Gets the receiver of this message.
getReceiverMB(). in class com.ibm.jma.message.Message
Gets the receiver mailbox of this message.
getRef(). Method in class com.ibm.jma.mail.URL
getResponseDestination(). Method in class com.ibm.jma.mail.Mail
Returns the response destination of this mail.
getResult(). Method in class com.ibm.jma.message.RequestMessage
Gets the result.
getResult(). Method in class com.ibm.jma.message.ResponseMessage
Gets the result that this message contains.
getResult(long). Method in class com.ibm.jma.message.RequestMessage
Gets the result if it arrives within the specified wait time.
getSender(). Method in class com.ibm.jma.message.Message
Gets the sender of this message.

getSenderMB(). Method in class com.ibm.jma.message.Message	K
Gets the sender mailbox of this message.	KQMLMessage(). Constructor for class com.ibm.jma.message.KQMLMessage
getType(). Method in class com.ibm.jma.mail.Mail	Constructs a KQML message.
Returns the content type of this mail.	KQMLMessageHandler(). Constructor for class com.ibm.jma.message.handler.KQMLMessageHandler
getURL(). Method in class com.ibm.jma.agent.AgentManager	KSQLMessageHandler(). Constructor for class com.ibm.jma.message.handler.KSQLMessageHandler
Gets the url of this agent manager.	M
H	Mail(). Constructor for class com.ibm.jma.mail.Mail
handleMessage(Message). Method in class com.ibm.jma.agent.Agent	Mail(Mail). Constructor for class com.ibm.jma.mail.Mail
Handles the specified message.	Mail(String, Object). Constructor for class com.ibm.jma.mail.Mail
handleMessage(Message). Method in class com.ibm.jma.agent.AgentManager	Constructs a mail with the specified content type and content
Handles the specified message.	Mailbox(String). Constructor for class com.ibm.jma.mail.Mailbox
handleMessage (Message). Method in class com.ibm.jma.message.handler.ATRequestMessageHandler	Constructs (opens) a mailbox with the specified name.
Handles the specified message.	mailId. Variable in class com.ibm.jma.message.Message
handleMessage(Message). Method in class com.ibm.jma.message.handler.ATResponseMessageHandler	main(String[]). Static method in class com.ibm.jma.mail.impl.POServer
Handles the specified message.	MemMailQuene(). Constructor for class com.ibm.jma.mail.impl.MemMailQueue
handleMessage(Message). Method in class com.ibm.jma.message.handler.KQMLMessageHandler	Message(). Constructor for class com.ibm.jma.message.Message
Handles the specified message.	minimumSize(). Method in class com.ibm.jma.mail.impl.POServer
handle(Message). Method in class com.ibm.jma.message.handler.KSQLMessageHandler	N
Handles the specified message.	NoSuchMailException(). Constructor for class com.ibm.jma.mail.impl.NoSuchMailException
handleMessage(Message). Method in interface com.ibm.jma.message.handler.MessageHandler	NoSuchMailException(byte[]). Constructor for class com.ibm.jma.mail.impl.NoSuchMailException
Handles the specified message.	NotImplementedException(). Constructor for class com.ibm.jma.mail.impl.NotImplementedException
handleMessage(Message). Method in class com.ibm.jma.message.handler.RequestMessageHandler	NotImplementedException(Object). Constructor for class com.ibm.jma.mail.impl.NotImplementedException
Handles the specified message.	O
handle(Message). Method in class com.ibm.jma.message.handler.ResponseMessageHandler	open(). Method in interface com.ibm.jma.mail.MailQueue
Handles the specified message.	Opens this mail queue for processing of mail.
hashCode(). Method in class com.ibm.jma.agent.AgentID	open(). Method in class com.ibm.jma.mail.impl.MemMailQueue
Returns the hash code for this agent identifier.	open(). Method in class com.ibm.jma.mail.impl.SQLMailQueue
I	P
init(AgentManager, AgentID), Object). Method in class com.ibm.jma.agent.Agent	POServer(String). Constructor for class com.ibm.jma.mail.impl.POServer
isClone(). Method in class com.ibm.jma.message.RequestMessage	preferredSize(). Method in class com.ibm.jma.impl.POserver
Tests if this message is a clone.	putMail(Mail). Method in class com.ibm.jma.mail.Mailbox
isEmpty(). Method in interface com.ibm.jma.mail.MailQueue	Puts a mail in this mailbox (ie., sends a mail to this mailbox).
Tests if this mail queue has no mail.	R
isEmpty(). Method in class com.ibm.jma.mail.impl.MemoryMailQueue	receiveMail(String). Method in interface com.ibm.jma.mail.PostOffice
Tests if this mail queue has no mail.	This method receives mail from a mailbox with name "mbName"
isEmpty(). Method in class com.ibm.jma.mail.impl.SQLMailQueue	receiveMail(String). Method in class com.ibm.jma.mail.impl.PostOfficeRMI
Tests if this mail queue has no mail.	receiveMail(String, byte[]). Method in interface com.ibm.jma.mail.PostOffice
isOneWay(). Method in class com.ibm.jma.message.RequestMessage	This method receives mail that has a correlation id "corrId" from the mail box of name "mbName"
Tests if the messaging mode is one-way.	
isRead(). Method in class com.ibm.jma.message.RequestMessage	
Tests if the result has been read.	
isSent(). Method in class com.ibm.jma.message.RequestMessage	
Tests if this message has been sent.	
itemStateChanged(ItemEvent). Method in class com.ibm.jma.mail.impl.POServer	

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receiveMail(String, byte[]). Method in class com.ibm.jma.mail.impl.PostOffice
 receiveMail(String, byte[], long). Method in interface com.ibm.jma.mail.PostOffice
 This method receives mail with correlation id "corrId" 5 with timed wait of "waitTime" milliseconds from mailbox "mbName" when it times out a null mail object is returned
 receiveMail(String, byte[], long). Method in class com.ibm.jma.mail.impl.PostOfficeRMI 10
 receiveMail(String, long). Method in interface com.ibm.jma.mail.PostOffice
 This method receives mail with timed wait of "waitTime" milliseconds from a mailbox "mbName". 15
 receiveMail(String, long). Method in class com.ibm.jma.mail.impl.PostOfficeRMI
 receiveMail(String, String). Method in interface com.ibm.jma.mail.PostOffice
 This method receives mail of type "type" from a 20 mailbox with name "mbName"
 receiveMail(String, String). Method in class com.ibm.jma.mail.impl.PostOfficeRMI
 receiveMail(String, String, long). Method in interface com.ibm.jma.mail.PostOffice 25
 This method receives mail of type "type" with timed wait of "waitTime" milliseconds from mailbox "mbName" when it times out a null mail object is returned
 receiveMail(String, String, long). Method in class com.ibm.jma.mail.impl.PostOffice 30
 RequestMessage. Constructor for class com.ibm.jma.message.RequestMessage
 Constructs a request message. 35
 RequestMessageHandler(). Constructor for class com.ibm.jma.message.handler.RequestMessageHandler
 ResponseMessage(Object). Constructor for class com.ibm.jma.message.ResponseMessage
 Constructs a response message with the specified 40 result.
 ResponseMessageHandler(). Constructor for class com.ibm.jma.message.handler.ResponseMessageHandler
 retrieveAgent(AgentID). Method in class com.ibm.jma.agent.AgentManager 45
 Retrieves the agent with the specified agent identifier.
 retrieveMail(String, byte[], long). Method in interface com.ibm.jma.mail.impl.PostOfficeRemoteRMI 50
 retrieveMail(String, byte[], long). Method in class com.ibm.jma.mail.impl.PostOfficeRMI
 retrieveMail(String, long). Method in interface com.ibm.jma.mail.impl.PostOfficeRemoteRMI
 retrieveMail(String, long). Method in class com.ibm.jma.mail.impl.PostOfficeRMI 55
 S
 send(). Method in class com.ibm.jma.message.Message
 Sends this message to the receiver.
 send(). Method in class com.ibm.jma.message.Request- 60 Message
 Sends this message.

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sendMail(String, Mail). Method in interface com.ibm.jma.mail.PostOffice
 This method sends a mail "mail" to a mailbox with name "mbName"
 sendMail(String, Mail). Method in class com.ibm.jma.mail.impl.PostOfficeRMI
 sendMessage(AgentID, Message). Method in class com.ibm.jma.agent.AgentManager
 Sends the specified message to the agent with the specified identifier.
 setClone(). Method in class com.ibm.jma.message.RequestMessage
 Indicates that this message is a clone.
 setContent(Object). Method in class com.ibm.jma.message.KQMLMessage
 Sets the content.
 setCorrelationId(byte[]). Method in class com.ibm.jma.mail.Mail
 Sets the correlation id for the mail that this mail corresponds to.
 setCorrelationId(byte[]). Method in class com.ibm.jma.message.ResponseMessage
 Sets the correlation id for the corresponding request message.
 setDestination(String). Method in class com.ibm.jma.mail.Mail
 Sets the destination of this mail
 setInReplyTo(String). Method in class com.ibm.jma.message.KQMLMessage
 Sets the identifier that this message is replying to.
 setLanguage(String) Method in class com.ibm.jma.message.KQMLMessage
 Sets the content language.
 getMailId(byte[]). Method in class com.ibm.jma.mail.Mail
 Sets the mail id of this mail.
 setMail(byte[]). Method in class com.ibm.jma.message.RequestMessage
 Sets the message id.
 setOneway(). Method in class com.ibm.jma.message.RequestMessage
 Sets the messaging mode to one-way.
 setOntology(String). Method in class com.ibm.jma.message.KQMLMessage
 Sets the content ontology.
 setOperation(String). Method in class com.ibm.jma.message.RequestMessage
 Sets the operation to be performed by the receiver of this message.
 setParameters(Hashtable). Method in class com.ibm.jma.message.ATResponseMessage
 Sets the parameters of the result.
 setParameters(Hashtable). Method in class com.ibm.jma.message.RequestMessage
 Sets the parameters of the operation.
 setPerformative(String). Method in class com.ibm.jma.message.KQMLMessage
 Sets the performative.
 setPriority(int). Method in class com.ibm.jma.mail.Mail
 Sets the priority of this mail.
 setReceiver(String). Method in class com.ibm.jma.message.Message
 Sets the receiver of this message.
 setRef(String). Method in class com.ibm.jma.mail.URL

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setReplyWith(String). Method in class com.ibm.jma.message.KQMLMessage
 Sets the identifier that this message is to be relied with.
 setResponseDestination(String). Method in class com.ibm.jma.mail.Mail
 Sets the response destination of this mail.
 setSender(String). Method in class com.ibm.jma.message.Message
 Sets the sender of this message.
 Size(). Method in interface com.ibm.jma.mail.MailQueue
 Returns the number of mail in this mail queue.
 size(). Method in class com.ibm.jma.mail.impl.MemoryMailQueue
 size(). Method in class com.ibm.jma.mail.impl.SQLMailQueue
 SQLMailQueue(String). Constructor for class com.ibm.jma.mail.impl.SQLMailQueue
 T
 toString(). Method in class com.ibm.jma.agent.AgentID
 Gets the string representation of this agent identifier.
 toString(). Method in class com.ibm.jma.mail.Mail
 Returns a string representing his mail.
 toString(). Method in class com.ibm.jma.mail.URL
 U
 URL(String). Constructor for class com.ibm.jma.mail.URL
 URL(String, String, int, String). Constructor for class com.ibm.jma.mail.URL
 We claim:
 1. A method of providing a communication infrastructure, for communication between independently executing autonomous agents, each of the agents being managed by an agent-hosting server, between the agents and agent-hosting servers, wherein each of the agent-hosting servers can manage one or more of the agents, and between the agent-hosting servers for a distributed computer system, said method comprising the steps of:
 communicating mail asynchronously between distributed objects by use of a mail facility layer, the mail facility layer providing a mail object comprising a mail type, a mail identifier, and a mail correlation identifier, the mail identifier uniquely identifying the mail, and the mail correlation identifier associating the mail with another mail;
 communicating a message between the distributed objects by use of a message facility layer providing asynchronous and synchronous communication of messages; and
 communicating between agents, between agents and agent-hosting servers, and between agent-hosting servers by use of an agent management facility communication layer which manages the agents by locating, dispatching, and retrieving the agents
 wherein:
 the agent management communication facility layer uses and depends upon the lower message facility layer and the lower mail facility layer;
 the message facility layer uses and depends upon the lower mail facility layer;
 the lower message facility layer and the lower mail facility layer may be used independently of the upper agent management communication facility layer; and
 the lower mail facility layer may be used independently of the upper message facility layer.

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2. The method of claim 1 wherein the mail correlation identifier associates a request message and a response message to the request message by a message handler setting the correlation identifier of the response message to be the message identifier of the request message.
 3. The method of claim 1 further comprising the steps of: encapsulating a message format and message semantics through a message type of the message the message type indicating an allowed message passing mode of the message;
 associating a message handler with the message type; and processing the message by the associated message handler.
 4. The method of claim 1 wherein the agent management communication facility layer provides object oriented abstractions comprising:
 an agent;
 an agent identifier uniquely identifying the agent; and
 an agent manager for managing the agent, the management comprising:
 locating the agent;
 sending a message to the agent;
 dispatching the agent; and
 retrieving the agent.
 5. An article of manufacture for use in a distributed computer system for providing a communication infrastructure for communication between independently executing autonomous agents, each of the agents being managed by an agent-hosting server, between the agents and agent-hosting servers, wherein each of the agent-hosting servers can manage one or more of the agents, and between the agent-hosting servers, said article of manufacture comprising a computer-readable storage medium having a computer program embodied in said medium which may cause the distributed computer system to:
 communicate mail asynchronously between distributed objects by use of a mail facility layer, the mail facility layer providing a mail object comprising a mail type, a mail identifier, and a mail correlation identifier, the mail identifier uniquely identifying the mail, and the mail correlation identifier associating the mail with another mail;
 communicate a message between the distributed objects by use of a message facility layer providing asynchronous and synchronous communication of messages; and
 communicate between agents, between agents and agent-hosting servers, and between agent-hosting servers by use of an agent management communication facility layer which manages the agents by locating, dispatching, and retrieving the agents
 wherein:
 the agent management communication facility layer uses and depends upon the lower message facility layer and the lower mail facility layer;
 the message facility layer uses and depends upon the lower mail facility layer;
 the lower message facility layer and the lower mail facility layer may be used independently of the upper agent management communication facility layer; and
 the lower mail facility layer may be used independently of the upper message facility layer.

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6. The article of manufacture of claim 5 wherein the mail correlation identifier associates a request message and a response message to the request message by a message handler setting the correlation identifier of the response message to be the message identifier of the request message.

7. The article of manufacture of claim 5 wherein the computer program may further cause the distributed computer system to:

encapsulate a message format and message semantics through a message type of the message, the message type indicating an allowed message passing mode of the message;

associate a message handler with the message type; and process the message by the associated message handler.

8. The article of manufacture of claim 5 wherein the agent management communication facility layer provides object oriented abstractions comprising:

an agent;

an agent identifier uniquely identifying the agent; and

an agent manager for managing the agent, the management comprising:

- locating the agent;
- sending a message to the agent;
- dispatching the agent; and
- retrieving the agent.

9. A distributed computer system for providing a communication infrastructure for communication between independently executing autonomous agents, each of the agents being managed by an agent-hosting server, between the agents and agent-hosting servers, wherein each of the agent-hosting servers can manage one or more of the agents, and between the agent-hosting servers, said distributed computer system comprising:

a mail facility layer providing asynchronous communication of mail between distributed objects, the mail facility layer providing a mail object comprising a mail type a mail identifier, and a mail correlation identifier the mail identifier uniquely identifying the mail, and the mail correlation identifier associating the mail with another mail;

a message facility layer providing asynchronous and synchronous communication of messages between distributed objects; and

an agent management communication facility layer providing communication between agents, between agents

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and agent-hosting servers, and between agent-hosting servers which manages the agents by locating, dispatching, and retrieving the agents

wherein:

the agent management communication facility layer uses and depends upon the lower message facility layer and the lower mail facility layer; the message facility layer uses and depends upon the lower mail facility layer;

the lower message facility layer and the lower mail facility layer may be used independently of the upper agent management communication facility layer; and

the lower mail facility layer may be used independently of the upper message facility layer.

10. The distributed computer system of claim 9 wherein the mail correlation identifier associates a request message and a response message to the request message by a message handler setting the correlation identifier of the response message to be the message identifier of the request message.

11. The distributed computer system of claim 9 further comprising:

an encapsulation of a message format and message semantics through a message type of the message, the message type indicating an allowed message passing mode of the message;

an association of a message handler with the message type; and

a processing of the message by the associated message handler.

12. The distributed computer system of claim 9 wherein the agent management communication facility layer provides object oriented abstractions comprising:

an agent;

an agent identifier uniquely identifying the agent; and

an agent manager for managing the agent, the management comprising:

- locating the agent;
- sending a message to the agent;
- dispatching the agent; and
- retrieving the agent.

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