

CSS497 Summer 2005

Redesigning and Enhancing the UWAgent Execution Engine

Status Report: Fri 06/24/2005

Summary

Dates: Mon 06/20/2005 – Fri 06/24/2005

This work period: Summarized RMI usage in current UWAgent, and looked into options for using TCP/IP with Java

Next work period: Work on a proof of concept using Java TCP/IP

Detail

RMI

RMI is used in the following places in UWAgent:

- UWPlace_Skel, UWPlace_Stub, UWAgentMailbox_Stub, and UWAgentMailbox_Skel classes
 - These are generated by rmic (the Java RMI compiler) to allow method invocations on remote objects. **We will need a TCP/IP equivalent for remote method invocation.**
- UWAgent class: RMI is used to **bind UWAgentMailboxes and look up recipient UWAgents using the RMI Registry.**
 - activateMailbox() – Activate the UWAgentMailbox so that messages can be sent and received
 - Naming.rebind("rmi://" + localAddress.getHostName() + ":" + UWAgentMailbox.portnumber + "/" + bindName, mailbox);
 - deactivateMailbox() – Deactivate the UWAgentMailbox to hop to a new location
 - Naming.unbind("rmi://localhost:" + UWAgentMailbox.portnumber + "/" + bindName);
 - hop() – move to a new location
 - In order to find where the recipient UWAgent is located, parse the RMI registry list() to find all agentIds that are bound to the local registry.
 - String [] regList = Naming.list("//localhost:" + UWPlace.portnumber);
 - // Loop through regList
- UWAgentMailbox class: RMI is used to **look up remote mailbox locations**
 - extends UnicastRemoteObject
 - throws RemoteException

- public InetAddress locateAgentIp() // Lookup the remote mailbox destination where the message will be sent.
 - // Lookup the remote mailbox destination where the message will be sent.
 - Naming.lookup("rmi://" + fwdAddr.getHostName() + ":" + getPortNumber() + "/" + bindName);
- notifyTerminationRequest() // Notify the agent that the parent has requested that it terminate itself and its descendants
 - // Lookup the remote mailbox destination where the message will be sent.
 - Naming.lookup("rmi://" + ti.getHostName() + ":" + getPortNumber() + "/" + bindName);
- notifyAgentLocation() // Notifies a UWAgent where ts = agentId of the new location of UWAgent (fs = agentId).
 - // Lookup the remote mailbox destination where the message will be sent.
 - Naming.lookup("rmi://" + ti.getHostName() + ":" + getPortNumber() + "/" + bindName);
- sendMessage() // Send the specified UWMessage to the UWAgentMailbox specified within the UWMessage.
 - // Lookup the remote mailbox destination where the message will be sent.
 - Naming.lookup("rmi://" + receivingIpAddr.getHostName() + ":" + getPortNumber() + "/" + bindName);
- UWInject class
 - throws RemoteException
- UWMessagingSystem class
 - extends Remote
 - throws RemoteException
- UWPlace class: RMI is used to **look up remote UWAgent locations**
 - extends UnicastRemoteObject
 - throws RemoteException
 - verifyAgentLocation() // Use the UWTransitSystem to lookup the last known location of the corresponding UWAgent at the specified remote host machine
 - Naming.lookup("rmi://" + verifyAddr.getHostName() + ":" + getPortNumber() + "/" + getPlaceName());
 - sendAgent() // Send the specified UWAgent to the UWPlace that resides on the specified host
 - // Lookup the remote destination where the agent will be sent.
 - Naming.lookup("rmi://" + hostName + ":" + getPortNumber() + "/" + getPlaceName());
 - retrieveAgent()
 - // Lookup the remote destination where the agent will be sent.
 - Naming.lookup("rmi://" + hostName + ":" + getPortNumber() + "/" + getPlaceName());
 - main()
 - // initialize rmi registry
 - String[] regList = Naming.list("//localhost:" + uwplace.portnumber);

- Naming.unbind("rmi:" + regList[i]); // loop
- Naming.rebind("rmi://localhost:" + portnumber + "/" + uwplace.getPlaceName(), uwplace);
- UWTransitSystem class
 - extends Remote
 - throws RemoteException

TCP/IP

- Uses the following classes
 - URL
 - URLConnection
 - Socket
 - ServerSocket

Questions

- What will take the place of the registry with the TCP/IP solution?
 - Idea: develop a UWRegistry class that listens on a particular port, and provides methods to store and retrieve locations of UWAgentMailboxes and UWAgents
- What will take the place of remote method invocation with the TCP/IP solution?
 - Idea: Use sockets to send TCP messages in a defined format indicating that particular methods should be called.