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
  o 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.**
  o activateMailbox() – Activate the UWAgentMailbox so that messages can be sent and received
    ▪  Naming.rebind("rmi://" + localAddress.getHostName() + ":" + UWAgentMailbox.portnumber + "/" + bindName, mailbox);
  o deactivateMailbox() – Deactivate the UWAgentMailbox to hop to a new location
    ▪  Naming.unbind("rmi://localhost:" + UWAgentMailbox.portnumber + "/" + bindName);
  o 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**
  o extends UnicastRemoteObject
  o throws RemoteException
public InetAddress locateAgentIp() // 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
   Naming.lookup("rmi://" + ti.getHostName() + ":" +
   getPortNumber() + "/" + bindName);

notifyAgentLocation() // Notifies a UWAgent where ts = agentId of the new location of UWAgent (fs = agentId).
   Naming.lookup("rmi://" + ti.getHostName() + ":" +
   getPortNumber() + "/" + bindName);

sendMessage() // Send the specified UWMessage to the UWAgentMailbox specified within the UWMessage.
   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
   Naming.lookup("rmi://" + hostName + ":" + getPortNumber() + "/" +
   getPlaceName());

retrieveAgent()
   Naming.lookup("rmi://" + hostName + ":" + getPortNumber() + "/" +
   getPlaceName());

main()
   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.