



**Department of Computer Science,
Electrical and Space Engineering**

**Network Programming and
Distributed Applications**

Lab 3 - Agents: The innocent childhood

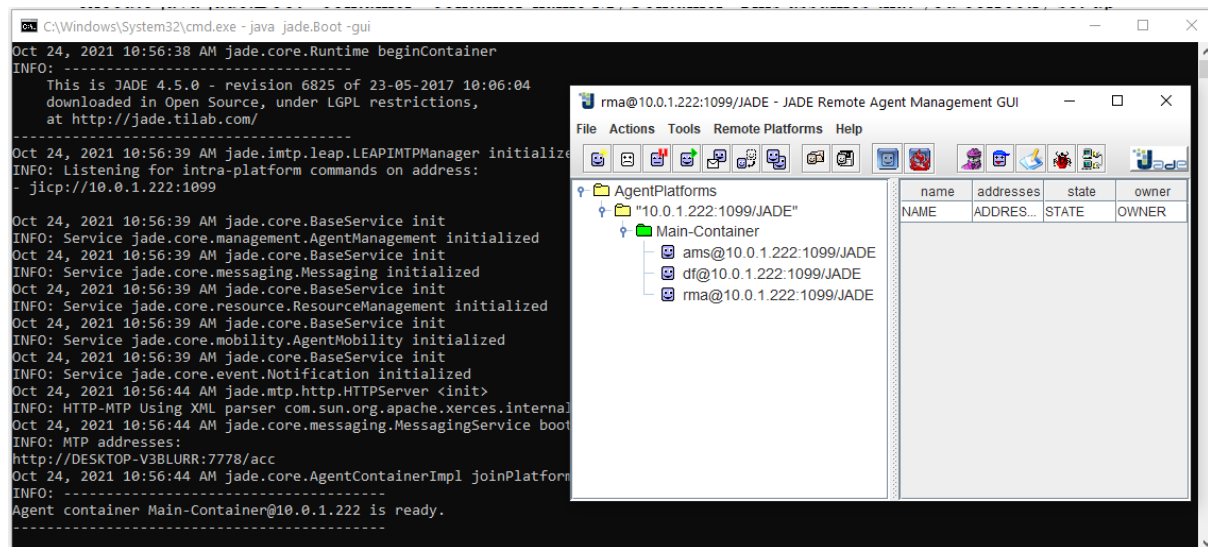
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25th September 2021

Part I: Trying is the best way of learning

1. Starting up Jade

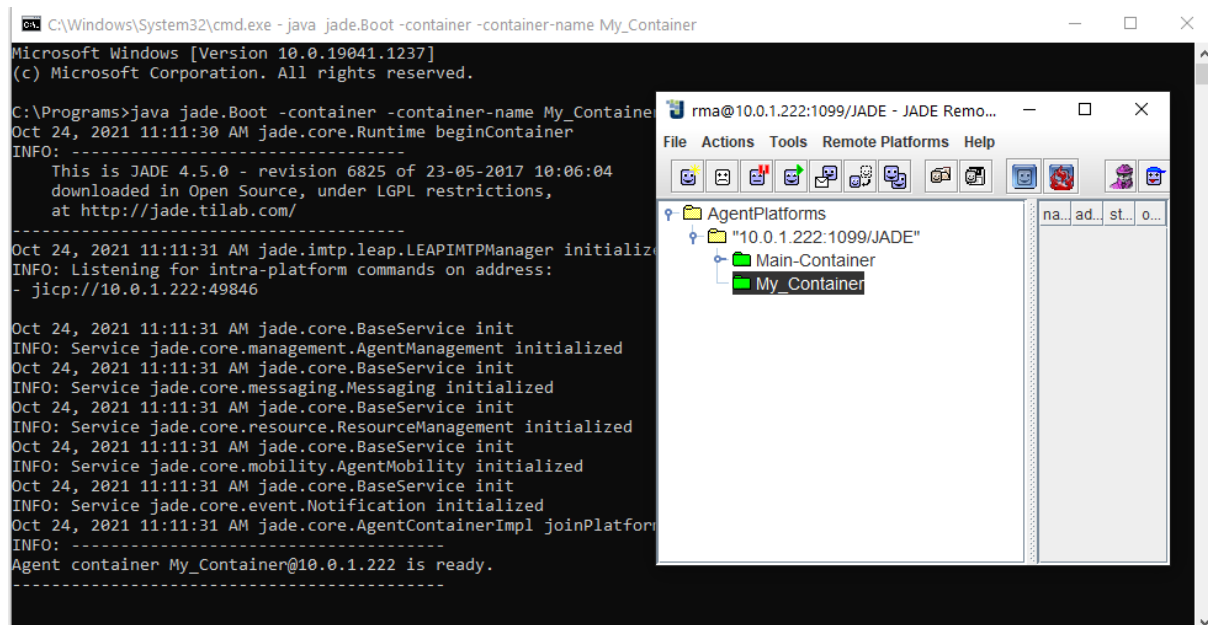
java jade.Boot -gui



2. Creating Containers (default, User Defined Name)

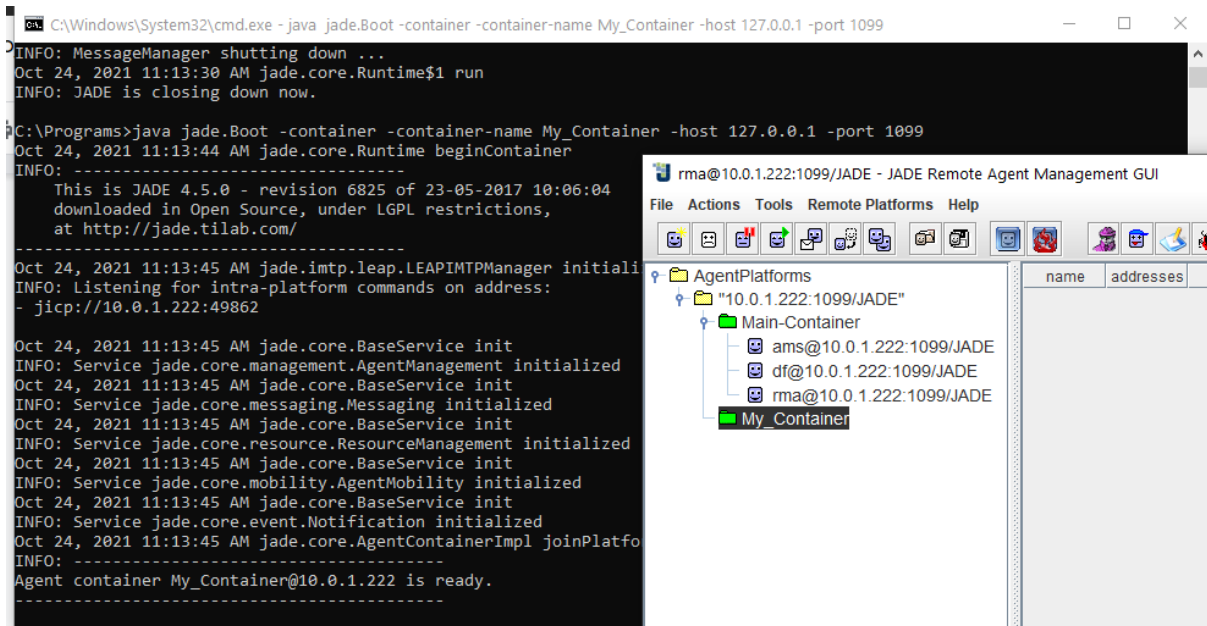
java jade.Boot -container

java jade.Boot -container -container-name My_Container



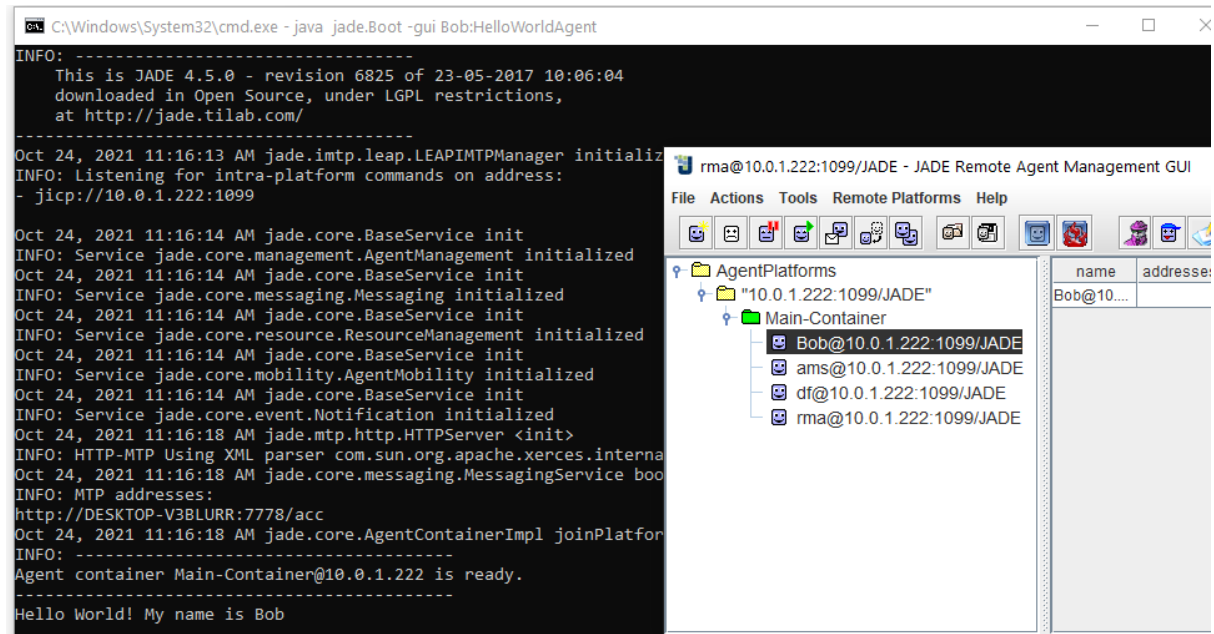
3. Creating Container in Different Machine

java jade.Boot -container -container-name My_Container -host [IP/Computer Name] -port 1099



4. Creating first Jade Agent (HelloWorldAgent.java), compiling Jade Agent.

5. Running HelloWorldAgent



C:\Windows\System32\cmd.exe - java jade.Boot -gui Bob:HelloWorldAgent;Alice:HelloWorldAgent;John:HelloWorldAgent

downloaded in Open Source, under LGPL restrictions,
at <http://jade.tilab.com/>

Oct 24, 2021 11:17:14 AM jade.imtp.leap.LEAPIMTPManager initialize
INFO: Listening for intra-platform commands on address:
- jicp://10.0.1.222:1099

Oct 24, 2021 11:17:14 AM jade.core.BaseService in
INFO: Service jade.core.management.AgentManagement
Oct 24, 2021 11:17:14 AM jade.core.BaseService in
INFO: Service jade.core.messaging.Messaging initia
Oct 24, 2021 11:17:14 AM jade.core.BaseService in
INFO: Service jade.core.resource.ResourceManagemen
Oct 24, 2021 11:17:14 AM jade.core.BaseService in
INFO: Service jade.core.mobility.AgentMobility in
Oct 24, 2021 11:17:14 AM jade.core.BaseService in
INFO: Service jade.core.event.Notification initia
Oct 24, 2021 11:17:19 AM jade.mtp.http.HTTPServer
INFO: HTTP-MTP Using XML parser com.sun.org.apache
Oct 24, 2021 11:17:19 AM jade.core.messaging.Messa
INFO: MTP addresses:
http://DESKTOP-V3BLURR:7778/acc
Oct 24, 2021 11:17:19 AM jade.core.AgentContainer
INFO: -----
Agent container Main-Container@10.0.1.222 is ready

Hello World! My name is Alice
Hello World! My name is John
Hello World! My name is Bob

rma@10.0.1.222:1099/JADE - JADE Remote Agent Management GUI

File Actions Tools Remote Platforms Help

AgentPlatforms

"10.0.1.222:1099/JADE"

Main-Container

- Alice@10.0.1.222:1099/JADE
- Bob@10.0.1.222:1099/JADE
- John@10.0.1.222:1099/JADE
- ams@10.0.1.222:1099/JADE
- df@10.0.1.222:1099/JADE
- rma@10.0.1.222:1099/JADE

name	address
NAME	ADDRESS

C:\Windows\System32\cmd.exe - java jade.Boot -container -container-name MyContainer Bob:HelloWorldAgent;Alice:HelloWorldAgent

The filename, directory name, or volume label syntax is incorrect.

C:\Programs>java jade.Boot -container -container-name MyContainer Bob:HelloWorldAgent;Alice:HelloWorldAgent

Oct 24, 2021 11:52:39 AM jade.core.Runtime beginContainer
INFO: -----
This is JADE 4.5.0 - revision 6825 of 23-05-2021
downloaded in Open Source, under LGPL restrictions,
at <http://jade.tilab.com/>

Oct 24, 2021 11:52:40 AM jade.imtp.leap.LEAPIMTPManager initialize
INFO: Listening for intra-platform commands on address:
- jicp://10.0.1.222:50025

Oct 24, 2021 11:52:40 AM jade.core.BaseService in
INFO: Service jade.core.management.AgentManagement
Oct 24, 2021 11:52:40 AM jade.core.BaseService in
INFO: Service jade.core.messaging.Messaging initia
Oct 24, 2021 11:52:40 AM jade.core.BaseService in
INFO: Service jade.core.resource.ResourceManagement
Oct 24, 2021 11:52:40 AM jade.core.BaseService in
INFO: Service jade.core.mobility.AgentMobility in
Oct 24, 2021 11:52:40 AM jade.core.BaseService in
INFO: Service jade.core.event.Notification initia
Oct 24, 2021 11:52:40 AM jade.core.AgentContainer
INFO: -----
Agent container MyContainer@10.0.1.222 is ready.

Hello World! My name is Alice
Hello World! My name is Bob

rma@10.0.1.222:1099/JADE - JADE Remote Agent Management GUI

File Actions Tools Remote Platforms Help

AgentPlatforms

"10.0.1.222:1099/JADE"

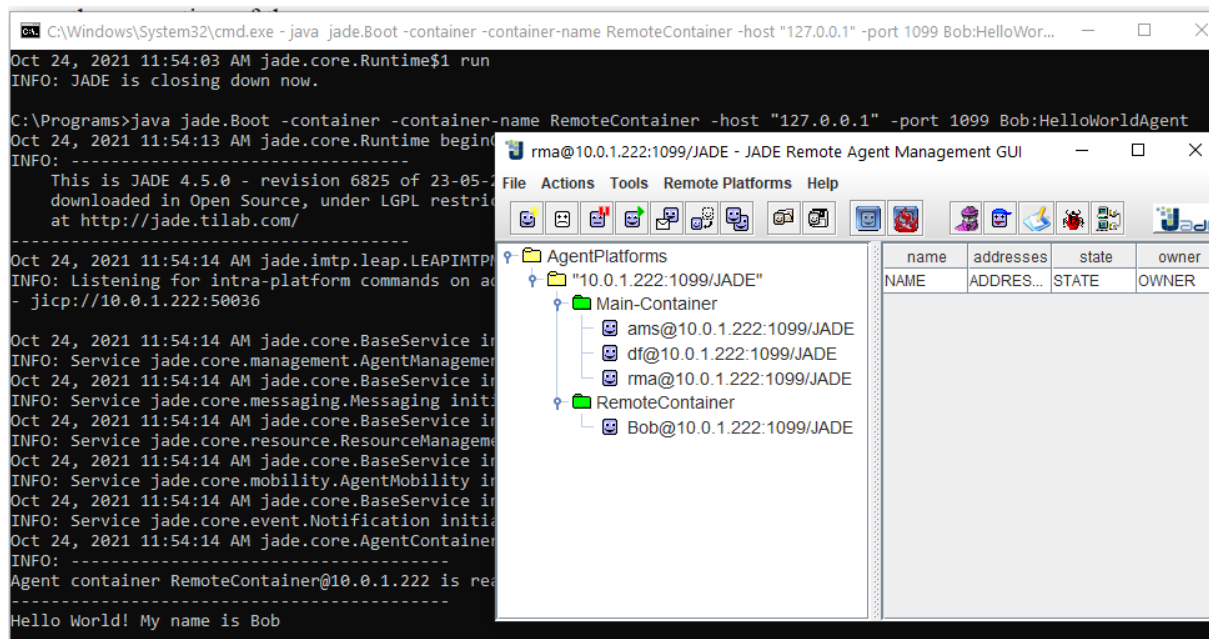
Main-Container

- ams@10.0.1.222:1099/JADE
- df@10.0.1.222:1099/JADE
- rma@10.0.1.222:1099/JADE

MyContainer

- Alice@10.0.1.222:1099/JADE
- Bob@10.0.1.222:1099/JADE

name	addresses	state	owner
NAME	ADDRESS...	STATE	OWNER



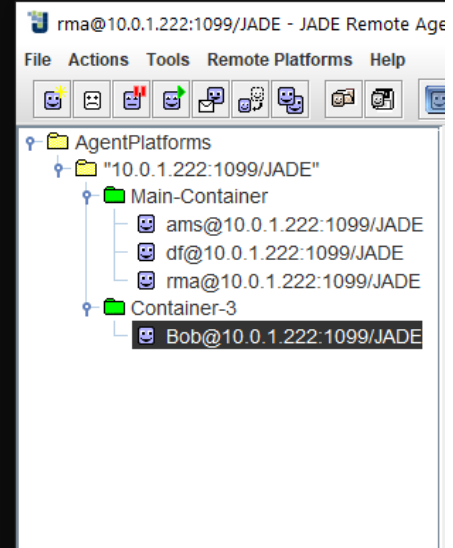
6. Get and display full Agent Identification Info.

```
Oct 24, 2021 12:06:20 PM jade.core.BaseService init
INFO: Service jade.core.management.AgentManagement initialized
Oct 24, 2021 12:06:20 PM jade.core.BaseService init
INFO: Service jade.core.messaging.Messaging initialized
Oct 24, 2021 12:06:20 PM jade.core.BaseService init
INFO: Service jade.core.resource.ResourceManagement initialized
Oct 24, 2021 12:06:20 PM jade.core.BaseService init
INFO: Service jade.core.mobility.AgentMobility initialized
Oct 24, 2021 12:06:20 PM jade.core.BaseService init
INFO: Service jade.core.event.Notification initialized
Oct 24, 2021 12:06:20 PM jade.core.AgentContainerImpl joinPlatform
INFO: -----
Agent container MyContainer@10.0.1.222 is ready.
-----
Hello World! My name is Bob
Hello World. I'm an agent!
My local-name is Bob
My GUID is Bob@10.0.1.222:1099/JADE
My addresses are:
- http://DESKTOP-V3BLURR:7778/acc
```

7. Agent with Argument

```
C:\Programs>java jade.Boot -container Bob:AgentArg("arg1","arg2","arg3")
Oct 24, 2021 12:11:46 PM jade.core.Runtime beginContainer
INFO: -----
This is JADE 4.5.0 - revision 6825 of 23-05-2017 10:06:04
downloaded in Open Source, under LGPL restrictions,
at http://jade.tilab.com/
-----
Oct 24, 2021 12:11:46 PM jade.imtp.leap.LEAPIMTPManager initialize
INFO: Listening for intra-platform commands on address:
- jicp://10.0.1.222:64156

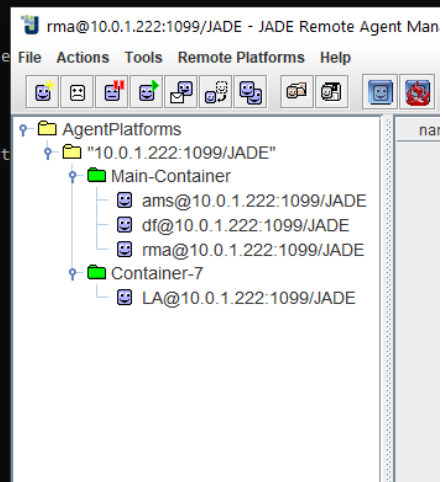
Oct 24, 2021 12:11:46 PM jade.core.BaseService init
INFO: Service jade.core.management.AgentManagement initialized
Oct 24, 2021 12:11:46 PM jade.core.BaseService init
INFO: Service jade.core.messaging.Messaging initialized
Oct 24, 2021 12:11:46 PM jade.core.BaseService init
INFO: Service jade.core.resource.ResourceManagement initialized
Oct 24, 2021 12:11:46 PM jade.core.BaseService init
INFO: Service jade.core.mobility.AgentMobility initialized
Oct 24, 2021 12:11:47 PM jade.core.BaseService init
INFO: Service jade.core.event.Notification initialized
Oct 24, 2021 12:11:47 PM jade.core.AgentContainerImpl joinPlatform
INFO: -----
Agent container Container-3@10.0.1.222 is ready.
-----
Hello World! My name is Bob
Hello World. Im an agent!
My local-name is Bob
My GUID is Bob@10.0.1.222:1099/JADE
My addresses are:
- http://DESKTOP-V3BLURR:7778/acc
My arguments are:
- arg1
- arg2
- arg3
My First Argument is not Hi Sorry Bye
```



9. SimpleBehaviour Class

```
C:\Programs\LooperAgent>java jade.Boot -container LA:LooperAgent
Oct 24, 2021 12:27:41 PM jade.core.Runtime beginContainer
INFO: -----
This is JADE 4.5.0 - revision 6825 of 23-05-2017 10:06:04
downloaded in Open Source, under LGPL restrictions,
at http://jade.tilab.com/
-----
Oct 24, 2021 12:27:42 PM jade.imtp.leap.LEAPIMTPManager initialize
INFO: Listening for intra-platform commands on address:
- jicp://10.0.1.222:55025

Oct 24, 2021 12:27:42 PM jade.core.BaseService init
INFO: Service jade.core.management.AgentManagement initialized
Oct 24, 2021 12:27:42 PM jade.core.BaseService init
INFO: Service jade.core.messaging.Messaging initialized
Oct 24, 2021 12:27:42 PM jade.core.BaseService init
INFO: Service jade.core.resource.ResourceManagement initialized
Oct 24, 2021 12:27:42 PM jade.core.BaseService init
INFO: Service jade.core.mobility.AgentMobility initialized
Oct 24, 2021 12:27:42 PM jade.core.BaseService init
INFO: Service jade.core.event.Notification initialized
Oct 24, 2021 12:27:42 PM jade.core.AgentContainerImpl joinPlatform
INFO: -----
Agent container Container-7@10.0.1.222 is ready.
-----
I am with:300 0: LA
I am with:500 0: LA
I am with:300 310: LA
I am with:500 510: LA
I am with:300 620: LA
I am with:300 930: LA
I am with:500 1010: LA
I am with:300 1240: LA
I am with:500 1520: LA
I am with:300 1560: LA
I am with:500 2040: LA
I am with:500 2540: LA
```



10. TickerBehaviour Class

The screenshot displays a terminal window on the left and a file explorer window on the right.

Terminal Window:

```

C:\Windows\System32\cmd.exe - java jade.Boot -container TickerBehav2
- jicp://10.0.1.222:64003

Oct 24, 2021 12:42:21 PM jade.core.BaseService init
INFO: Service jade.core.management.AgentManagement initialized
Oct 24, 2021 12:42:21 PM jade.core.BaseService init
INFO: Service jade.core.messaging.Messaging initialized
Oct 24, 2021 12:42:21 PM jade.core.BaseService init
INFO: Service jade.core.resource.ResourceManagement initialized
Oct 24, 2021 12:42:21 PM jade.core.BaseService init
INFO: Service jade.core.mobility.AgentMobility initialized
Oct 24, 2021 12:42:21 PM jade.core.BaseService init
INFO: Service jade.core.event.Notification initialized
Oct 24, 2021 12:42:21 PM jade.core.AgentContainerImpl
INFO: -----
Agent container Container-10@10.0.1.222 is ready.
-----
1057: Ticker
2060: Ticker
3062: Ticker
4068: Ticker
5074: Ticker
6083: Ticker
7094: Ticker
8099: Ticker
9109: Ticker
10122: Ticker
11132: Ticker
12136: Ticker
13145: Ticker
  
```

File Explorer Window:

The window title is "rma@10.0.1.222:1099/JADE - JADE Remote Agent Management". The address bar shows "File Actions Tools Remote Platforms Help". The file structure is as follows:

- AgentPlatforms
 - "10.0.1.222:1099/JADE"
 - Main-Container
 - ams@10.0.1.222:1099/JADE
 - df@10.0.1.222:1099/JADE
 - rma@10.0.1.222:1099/JADE
 - Container-10
 - Ticker@10.0.1.222:1099/JADE

12. Agent Communication

[illegible]

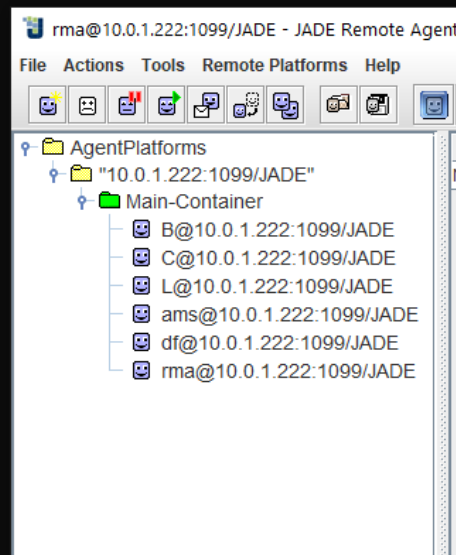
13. Multi-agent System Example I

```
C:\Windows\System32\cmd.exe - java jade.Boot -gui B:BankerAgent;C:CustomerAgent;L:LoanAgent

INFO: -----
Agent container Main-Container@10.0.1.222 is ready.
-----
Hello World! My name is L
Hello World! My name is B
Please Enter Your Name for Loan:
Hello World! My name is C
Otabek Sobirov
****I Sent Message to::> C ****
The Content of My Message is::>Otabek Sobirov
***I Received a Message***
The Sender Name is:B
The Content of the Message is::> Otabek Sobirov
::: And Performative is:: REQUEST
Line Content:::Arash Mousavi
Found Your Name:::Otabek Sobirov
Record Alread Exists
****I Replied to::> B***
****I Received a Message***
The Sender Name is::>C
The Content of the Message is::> EXIST
::: And Performative is::> INFORM

oooooooooooooooooooooooooooooooooooooooooooooooooooo
The Content of My Reply is:EXIST
oooooooooooooooooooooooooooooooooooooooooooooooooooo
You Are a Valid Customer and Eligible for Loan
A Message has Been Sent to LoanAgent
***I Received a Message***
The Sender Name is:B
The Content of the Message is::> Otabek Sobirov
::: And Performative is:: REQUEST
Line Content:::Arash Mousavi
Your file has been written
****I Replied to::> B***
****I Received a Message***
The Sender Name is::>L
The Content of the Message is::> Done
::: And Performative is::> INFORM

oooooooooooooooooooooooooooooooooooooooooooooooooooo
The Content of My Reply is:Done
oooooooooooooooooooooooooooooooooooooooooooooooooooo
Loan Recorded
```



AgentGui

Message Performative

REQUEST

Receiver

R1

Content

Hello How Are You?

Agent List

Send

Cancel

Sent Messages

Hello How Are You? -> R1
hi -> R1
Hello How Are You? -> R1
Hello How Are You? -> R1
Hello How Are You? -> R1

Received Messages

I am Fine Thank You :From: R1 :Performative: INFORM
I am Fine Thank You :From: R1 :Performative: INFORM

Agent List

ams@10.0.1.222:1099/JADE
gAgent@10.0.1.222:1099/JADE
R1@10.0.1.222:1099/JADE
df@10.0.1.222:1099/JADE
rma@10.0.1.222:1099/JADE

sniffer0@10.0.1.222:1099/JADE - Sniffer Agent

Actions

About

AgentPlatforms

ThisPlatform

Container-1

gAgent@10.0.1.222:1099/JADE

sniffer0-on-Container-1

Container-2

R1@10.0.1.222:1099/JADE

sniffer0-on-Container-2

Main-Container

Diagram

Other

gAgent

R1

0

1

2

3

INFORM-1

REQUEST-1

INFORM-1

No Message

14. Distributed Platform

The AgentGui window is divided into several sections:

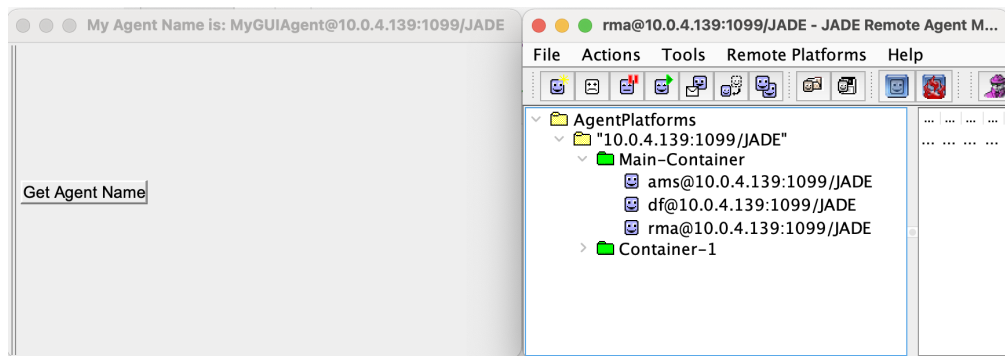
- Message Performative:** A dropdown menu currently set to "REQUEST".
- Receiver:** A text field containing "R1".
- Content:** A text field containing "Hi 2".
- Buttons:** "Send" and "Cancel" buttons are located below the content field.
- Sent Messages:** A list box showing "Hi -> R1" and "Hi 2 -> R1".
- Received Messages:** An empty list box.
- Agent List:** A list box on the right showing a list of agents: ams@192.168.43.247:1099/JADE, R1@192.168.43.247:1099/JADE, gAgent@192.168.43.247:1099/JADE, df@192.168.43.247:1099/JADE, and rma@192.168.43.247:1099/JADE. The first three agents are highlighted with an orange box.

```
INFO: Service jade.core.event.Notification initialized
Oct 23, 2021 11:22:33 AM jade.core.AgentContainerImpl joinPlatform
INFO: -----
Agent container S@192.168.43.170 is ready.
-----

Hello World! My name is S4
****I Sent Message to::> R1 ****
The Content of My Message is::>Hello How Are You?
****I Received a Message***
The Sender Name is::>R1@192.168.43.247:1099/JADE
The Content of the Message is::> I am Fine Thank You
::: And Performative is::> INFORM

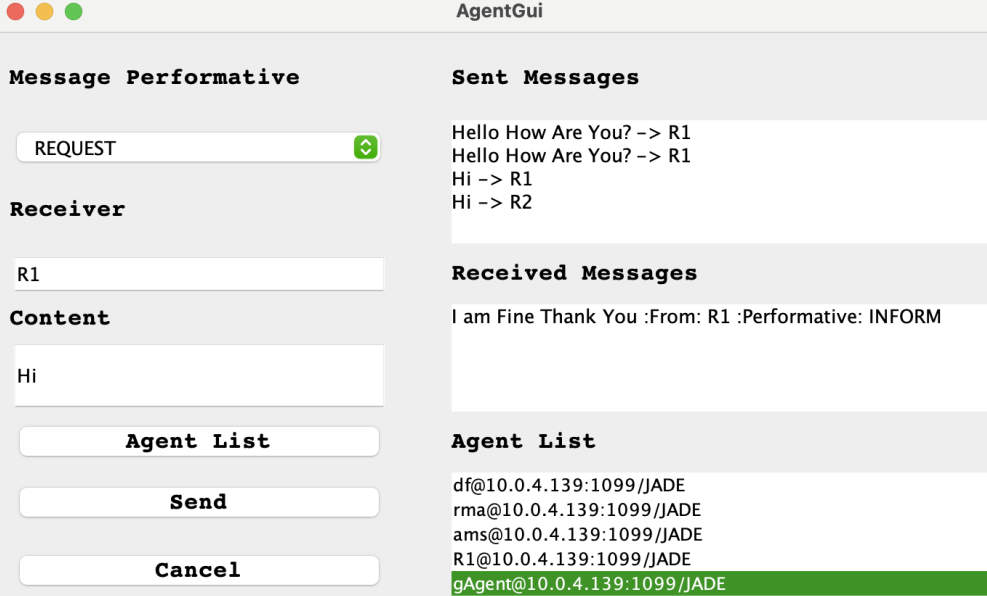
oooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo
```

15. Agent with GUI



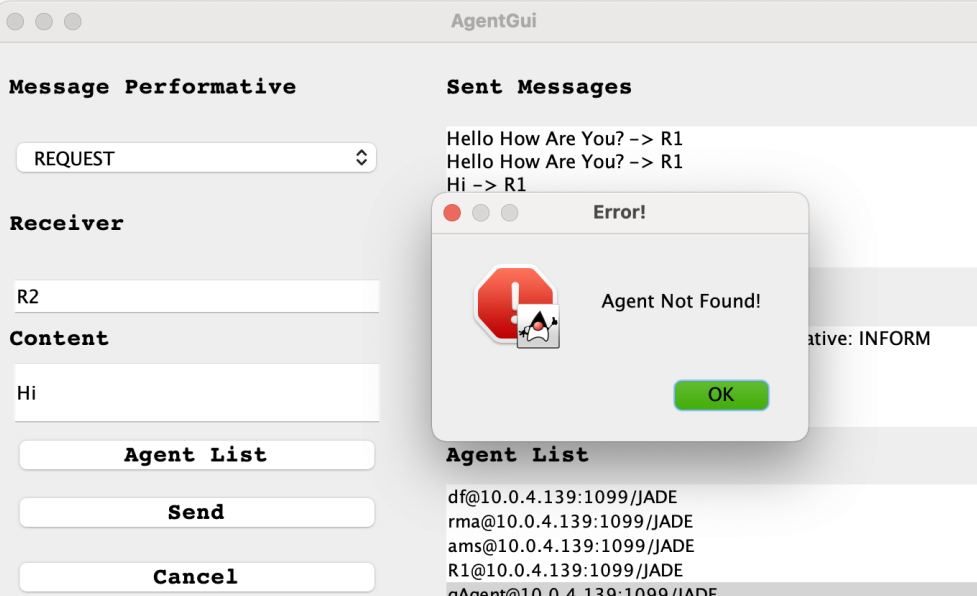
Part II: Write your own agents

In this assignment, you have to write your own GUI Agent, which will communicate with another agent. An example of the interface is as shown below. You will get half of the lab points (and pass the lab) when you implement only the functionality as shown in the illustration above. Open your mind and implement extra features: For a nicer interface, you will get an additional 25%, for more advanced management of information (for example retrieve the recipients from a drop-down list, a possibility to retrieve agents from a different platform, etc) you get another 25%.



The AgentGui window displays the following components:

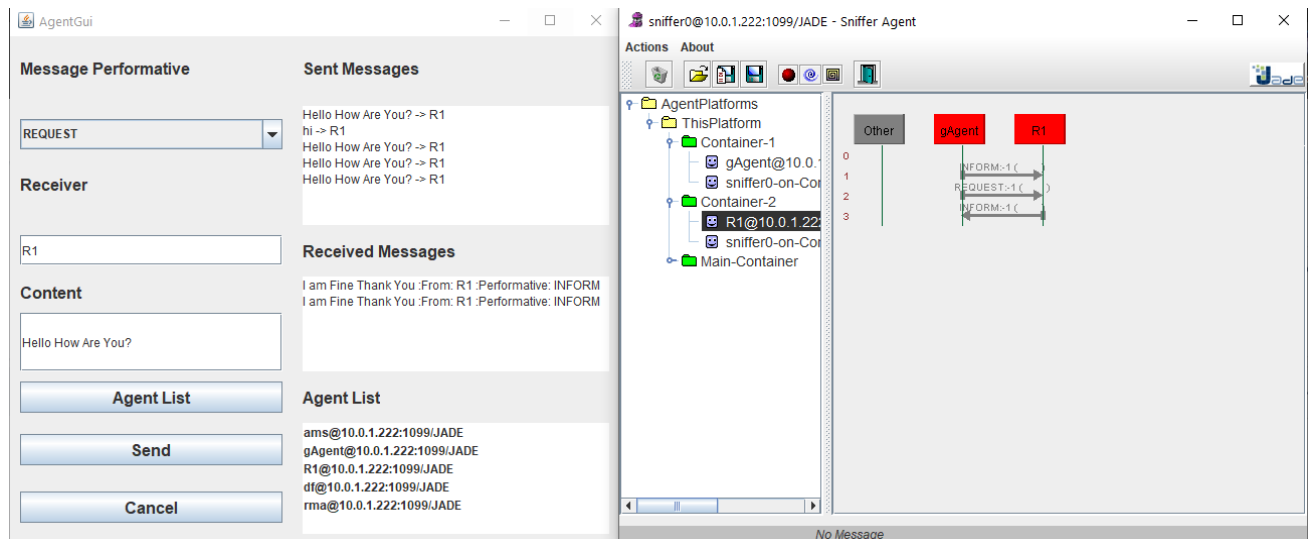
- Message Performative:** A dropdown menu set to "REQUEST".
- Receiver:** A text field containing "R1".
- Content:** A text field containing "Hi".
- Buttons:** "Agent List", "Send", and "Cancel".
- Sent Messages:** A list showing three messages: "Hello How Are You? -> R1", "Hello How Are You? -> R1", and "Hi -> R1".
- Received Messages:** A list showing one message: "I am Fine Thank You :From: R1 :Performative: INFORM".
- Agent List:** A list of agents: "df@10.0.4.139:1099/JADE", "rma@10.0.4.139:1099/JADE", "ams@10.0.4.139:1099/JADE", "R1@10.0.4.139:1099/JADE", and "gAgent@10.0.4.139:1099/JADE" (highlighted in green).



The AgentGui window displays the following components:

- Message Performative:** A dropdown menu set to "REQUEST".
- Receiver:** A text field containing "R2".
- Content:** A text field containing "Hi".
- Buttons:** "Agent List", "Send", and "Cancel".
- Sent Messages:** A list showing three messages: "Hello How Are You? -> R1", "Hello How Are You? -> R1", and "Hi -> R1".
- Received Messages:** A list showing one message: "I am Fine Thank You :From: R1 :Performative: INFORM".
- Agent List:** A list of agents: "df@10.0.4.139:1099/JADE", "rma@10.0.4.139:1099/JADE", "ams@10.0.4.139:1099/JADE", "R1@10.0.4.139:1099/JADE", and "gAgent@10.0.4.139:1099/JADE".

An error dialog box titled "Error!" is displayed in the foreground, showing a red octagonal stop sign icon and the message "Agent Not Found!". The dialog has an "OK" button.



In this program, AgentGui takes the parameters from the user using the Gui interface to send a message to the receiver and listens to messages as well. Receiver name is required to send a message, which a user can find out using the agent list features which lists all the available agents.