



Universidade do Minho
Escola de Engenharia
Departamento de Informática

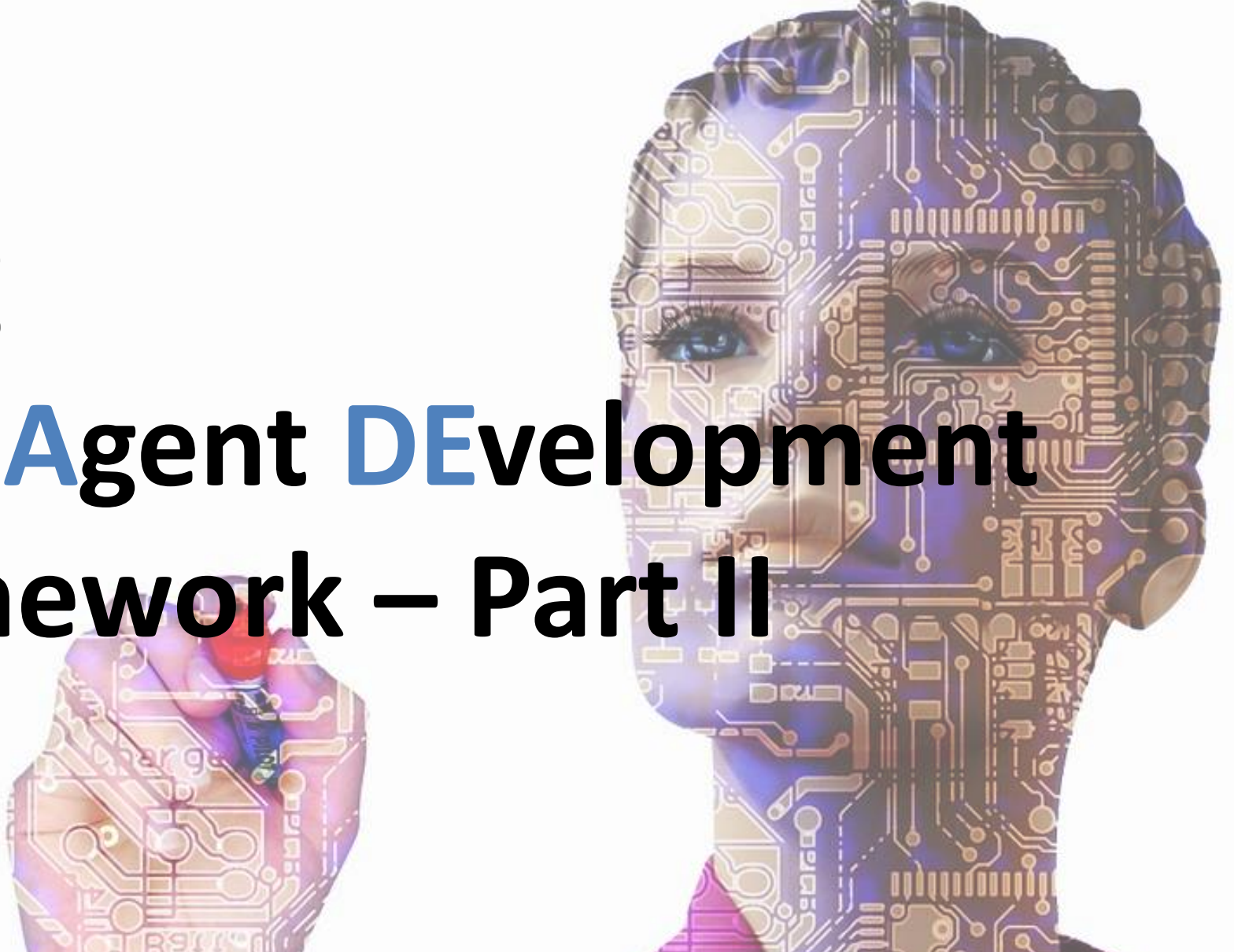
Mestrado Integrado em Engenharia Informática
Mestrado em Engenharia Informática
Agentes Inteligentes
2020/2021

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-
- Departamento de Informática
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Universidade do Minho
 - ISLab – (Synthetic Intelligence Lab)
 - Centro ALGORITMI
Universidade do Minho

JADE

Java Agent Development Framework – Part II





ISLab

Synthetic Intelligence Lab

Agentes Inteligentes @ 2020/2021

Cyclic Message Send

```
public class CyclicSender extends Agent
{
    @Override
    protected void setup()
    {
        super.setup();
        this.addBehaviour(new SendMessage());
    }

    private class SendMessage extends CyclicBehaviour
    {
        @Override
        public void action()
        {
            AID receiver = new AID();
            receiver.setLocalName("pingaponga");

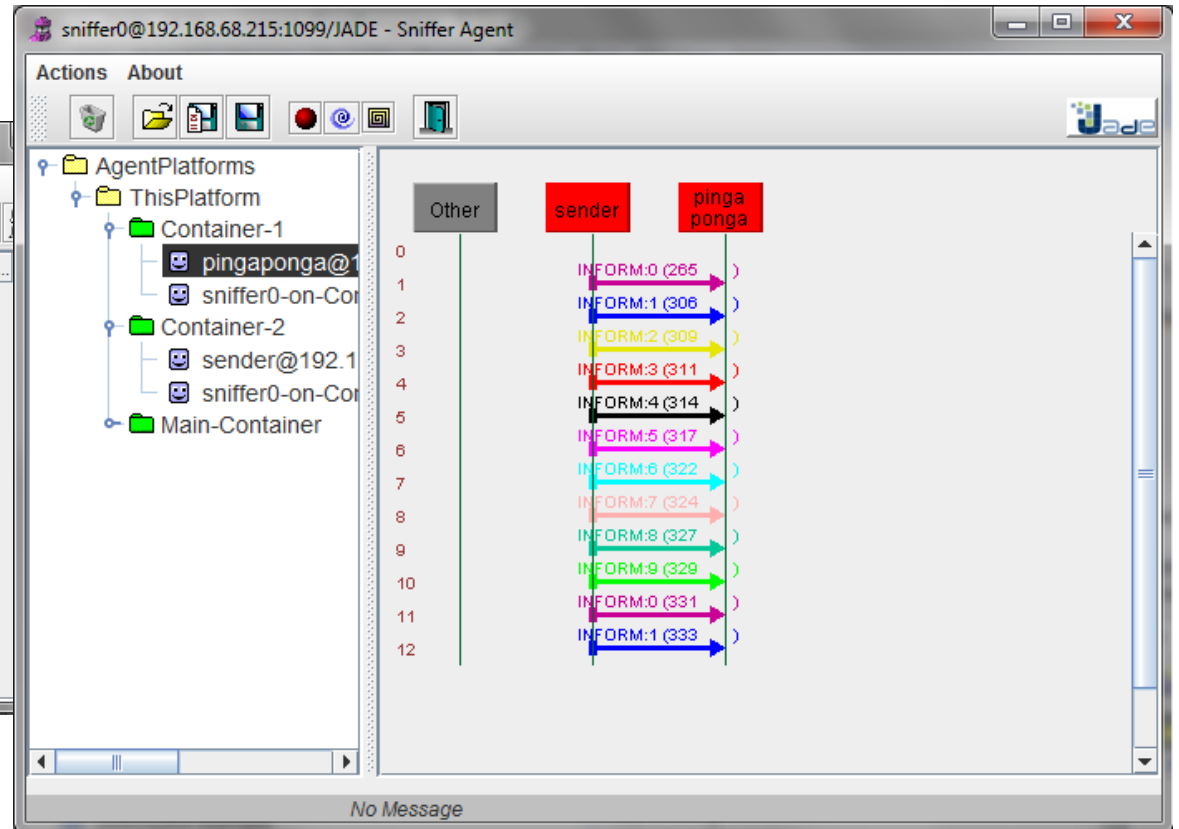
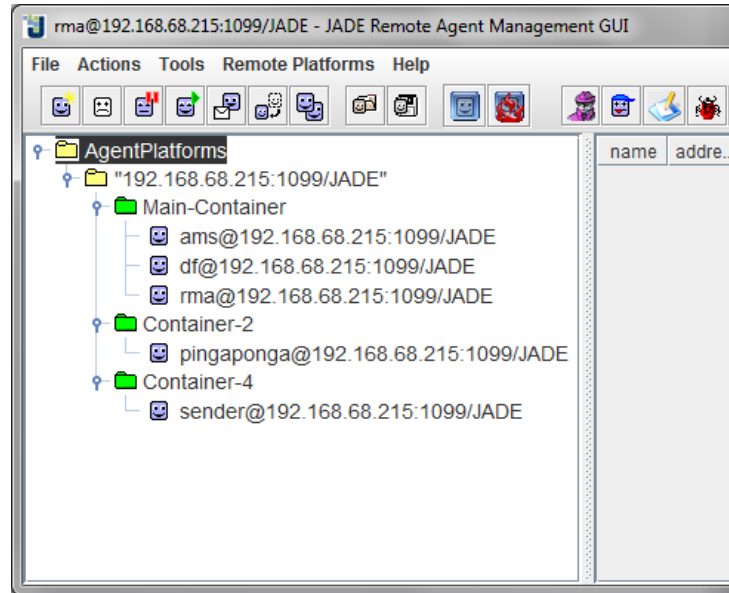
            ACLMessage msg = new ACLMessage(ACLMessage.INFORM);
            long time = System.currentTimeMillis();
            msg.setConversationId(""+time);
            msg.addReceiver(receiver);

            if (time % 2 == 0)
                msg.setContent("ping");
            else
                msg.setContent("not ping");

            myAgent.send(msg);

            block(1000);
        }
    }
}
```

Cyclic Message Send





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Cyclic Message Send (limited run)

```
public class CyclicSender4Times extends Agent {  
  
    int counter=0;  
  
    @Override  
    protected void setup(){  
  
        super.setup();  
  
        System.out.println(this.getLocalName()+" a começar!");  
  
        this.addBehaviour(new sendMessage());  
  
    }  
  
    @Override  
    protected void takeDown(){  
  
        System.out.println(this.getLocalName()+" a morrer!");  
  
    }  
}
```

Agentes Inteligentes @ 2020/2021

```
public class sendMessage extends SimpleBehaviour {  
  
    @Override  
    public int onEnd() {  
        myAgent.doDelete();  
        return 0;  
    }  
  
    @Override  
    public void action(){  
  
        AID receiver=new AID();  
        receiver.setLocalName("pingaponga");  
  
        ACLMessage msg =new ACLMessage(ACLMessage.INFORM);  
        long time =System.currentTimeMillis();  
        msg.setConversationId(""+time);  
        msg.addReceiver(receiver);  
  
        if(time % 2 == 0)  
            msg.setContent("ping");  
        else  
            msg.setContent("not ping");  
  
        myAgent.send(msg);  
  
        counter++;  
  
        block(1000);  
  
    }  
  
    @Override  
    public boolean done() {  
        if (counter>=4){  
            return true;  
        }else return false;  
    }  
}
```

Cyclic Message Send (limited run)

Configurations

- `container -agents pingaponga:agents.PingPong;sender:agents.CyclicSender4Times`

```

out 23, 2016 2:31:48 PM jade.core.Runtime beginContainer
INFO: -----
      This is JADE 4.3.3 - revision 6726 of 2014/12/09 09:33:02
      downloaded in Open Source, under LGPL restrictions,
      at http://jade.tilab.com/
-----
out 23, 2016 2:31:48 PM jade.imtp.leap.LEAPIMTPManager initialize
INFO: Listening for intra-platform commands on address:
- jicp://192.168.1.76:62333

out 23, 2016 2:31:48 PM jade.core.BaseService init
INFO: Service jade.core.management.AgentManagement initialized
out 23, 2016 2:31:48 PM jade.core.BaseService init
INFO: Service jade.core.messaging.Messaging initialized
out 23, 2016 2:31:48 PM jade.core.BaseService init
INFO: Service jade.core.resource.ResourceManagement initialized
out 23, 2016 2:31:48 PM jade.core.BaseService init
INFO: Service jade.core.mobility.AgentMobility initialized
out 23, 2016 2:31:48 PM jade.core.BaseService init
INFO: Service jade.core.event.Notification initialized
sender a começar!out 23, 2016 2:31:48 PM jade.core.AgentContainerImpl joinPlatform
INFO: -----
Agent container Container-18@192.168.1.76 is ready.
-----

pingaponga a começar!
Recebi uma mensagem de ( agent-identifier :name sender@192.168.1.76:1099/JADE :addresses (sequence http://Laptop.lan:7778/acc ))).Conteúdo: ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.1.76:1099/JADE :addresses (sequence http://Laptop.lan:7778/acc ))).Conteúdo: ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.1.76:1099/JADE :addresses (sequence http://Laptop.lan:7778/acc ))).Conteúdo: not ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.1.76:1099/JADE :addresses (sequence http://Laptop.lan:7778/acc ))).Conteúdo: ping
sender a morrer!

```

Two-way Message Sending

```
private class SendMessage extends TickerBehaviour
{
    public SendMessage(Agent a, long timeout)
    {
        super(a, timeout);
    }

    @Override
    protected void onTick()
    {
        AID receiver = new AID();
        receiver.setLocalName("pingaponga");

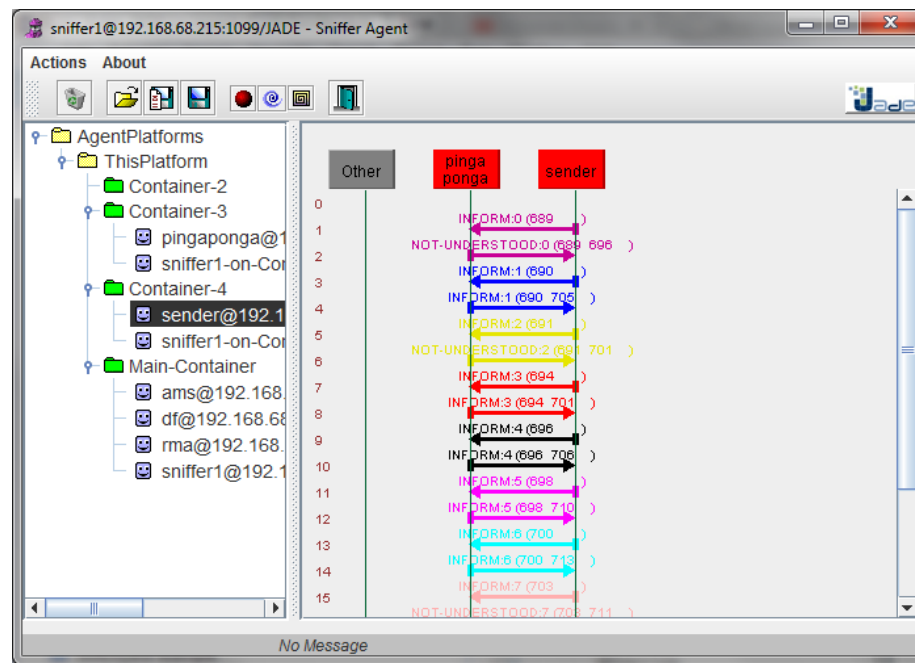
        ACLMessage msg = new ACLMessage(ACLMessage.INFORM);
        long time = System.currentTimeMillis();
        msg.setConversationId(""+time);
        msg.addReceiver(receiver);

        if (time % 2 == 0)
            msg.setContent("ping");
        else
            msg.setContent("not ping");

        myAgent.send(msg);
    }
}
```

```
@Override
protected void setup()
{
    super.setup();
    this.addBehaviour(new SendMessage(this, 1000));
    this.addBehaviour(new ReceiveBehavior());
}
```

```
private class ReceiveBehavior extends CyclicBehaviour
{
    @Override
    public void action()
    {
        ACLMessage msg = receive();
        if (msg != null)
        {
            System.out.println("Recebi uma mensagem de "+msg.getSender()+" Conteúdo: "+msg.getContent());
        }
        block();
    }
};
```

```
Recebi uma mensagem de ( agent-identifier :name sender@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: not ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: not ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: not ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: not ping
Recebi uma mensagem de ( agent-identifier :name sender@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: ping
```

```
Recebi uma mensagem de ( agent-identifier :name pingaponga@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: Não percebi...
Recebi uma mensagem de ( agent-identifier :name pingaponga@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: Não percebi...
Recebi uma mensagem de ( agent-identifier :name pingaponga@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: pong
Recebi uma mensagem de ( agent-identifier :name pingaponga@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: Não percebi...
Recebi uma mensagem de ( agent-identifier :name pingaponga@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: Não percebi...
Recebi uma mensagem de ( agent-identifier :name pingaponga@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: pong
Recebi uma mensagem de ( agent-identifier :name pingaponga@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: Não percebi...
Recebi uma mensagem de ( agent-identifier :name pingaponga@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: Não percebi...
Recebi uma mensagem de ( agent-identifier :name pingaponga@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: Não percebi...
Recebi uma mensagem de ( agent-identifier :name pingaponga@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: pong
Recebi uma mensagem de ( agent-identifier :name pingaponga@192.168.68.215:1099/JADE :addresses (sequence http://192.168.68.215:7778/acc )). Conteúdo: Não percebi...
```



Multiple Behaviours

```
@Override
protected void setup()
{
    super.setup();
    this.addBehaviour(new ReceiveBehavior());
    this.addBehaviour(new NewSendMessage("ping", this, 5000));
    this.addBehaviour(new NewSendMessage("pong", this, 1000));
    this.addBehaviour(new NewSendMessage("ola!", this, 2500));
}

private class NewSendMessage extends TickerBehaviour
{
    String content;
    public NewSendMessage(String content, Agent a, long timeout)
    {
        super(a, timeout);
        this.content = content;
    }

    @Override
    protected void onTick()
    {
        AID receiver = new AID();
        receiver.setLocalName("pingaponga");

        ACLMessage msg = new ACLMessage(ACLMessage.INFORM);
        msg.setConversationId(""+System.currentTimeMillis());
        msg.addReceiver(receiver);
        msg.setContent(content);

        myAgent.send(msg);
    }
}
```

Multiple Behaviours

Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: pong
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: pong
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: ping
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: ola!
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: pong
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: pong
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: ola!
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: pong
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: pong
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: ping
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: ola!
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: pong
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: pong
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: pong
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: ping
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: ola!
Recebi uma mensagem de	(agent-identifier :name sender@192.168.68.215:1099/JADE	:addresses (sequence http://192.168.68.215:7778/acc))	. Conteúdo: pong



Parallel Behaviours

```
public class SenderParallel extends Agent {

    int counter1=0;
    int counter2=0;
    int counter3=0;

    @Override
    protected void setup(){

        super.setup();

        System.out.println(this.getLocalName()+" a começar!");

        ParallelBehaviour b= new ParallelBehaviour(this,ParallelBehaviour.WHEN_ALL){

            @Override
            public int onEnd(){

                System.out.println("ParallelBehaviour finalizing");
                myAgent.delete();
                return 0;
            }
        };

        this.addBehaviour(b);
        b.addSubBehaviour(new SendMessage1());
        b.addSubBehaviour(new SendMessage2());
        b.addSubBehaviour(new SendMessage3());

    }

    @Override
    protected void takeDown(){

        System.out.println(this.getLocalName()+" a morrer!");

    }

}
```

```
public class SendMessage1 extends SimpleBehaviour {

    @Override
    public void action(){

        AID receiver=new AID();
        receiver.setLocalName("pingaponga");

        ACLMessage msg =new ACLMessage(ACLMessage.INFORM);
        long time =System.currentTimeMillis();
        msg.setConversationId(""+time);
        msg.addReceiver(receiver);

        if(time % 2 == 0)
            msg.setContent("ping1");
        else
            msg.setContent("not ping1");

        myAgent.send(msg);

        counter1++;

        System.out.println("Executing SendMessage1 for the "+counter1+" time!");

    }

    @Override
    public boolean done() {
        if (counter1>=3){
            System.out.println("Behaviour SendMessage1 finalizing!");
            return true;
        }else return false;
    }

}
```



Parallel Behaviours

```
public class SendMessage2 extends SimpleBehaviour {

    @Override
    public void action(){

        AID receiver=new AID();
        receiver.setLocalName("pingaponga");

        ACLMessage msg =new ACLMessage(ACLMessage.INFORM);
        long time =System.currentTimeMillis();
        msg.setConversationId(""+time);
        msg.addReceiver(receiver);

        if(time % 2 == 0)
            msg.setContent("ping2");
        else
            msg.setContent("not ping2");

        myAgent.send(msg);

        counter2++;

        System.out.println("Executing SendMessage2 for the "+counter2+" time!");

    }

    @Override
    public boolean done() {
        if (counter2>=5){
            System.out.println("Behaviour SendMessage2 finalizing!");
            return true;
        }else return false;
    }
}
```

```
public class SendMessage3 extends SimpleBehaviour {

    @Override
    public void action(){

        AID receiver=new AID();
        receiver.setLocalName("pingaponga");

        ACLMessage msg =new ACLMessage(ACLMessage.INFORM);
        long time =System.currentTimeMillis();
        msg.setConversationId(""+time);
        msg.addReceiver(receiver);

        if(time % 2 == 0)
            msg.setContent("ping3");
        else
            msg.setContent("not ping3");

        myAgent.send(msg);

        counter3++;

        System.out.println("Executing SendMessage3 for the "+counter3+" time!");

    }

    @Override
    public boolean done() {
        if (counter3>=13 ){
            System.out.println("Behaviour SendMessage3 finalizing!");
            return true;
        }else return false;
    }
}
```

Cyclic Message Send (limited run)

Configurations

- container –agents pingaponga:agents.PingPong;sender:agents.SenderParallel

```

sender a começar!
out 23, 2016 3:46:27 PM jade.core.AgentContainerImpl joinPlatform
INFO: -----
Agent container Container-38@192.168.1.76 is ready.
-----
Executing SendMessage1 for the 1 time!
Executing SendMessage2 for the 1 time!
Executing SendMessage3 for the 1 time!
Executing SendMessage1 for the 2 time!
Executing SendMessage2 for the 2 time!
Executing SendMessage3 for the 2 time!
Executing SendMessage1 for the 3 time!
Behaviour SendMessage1 finalizing!
Executing SendMessage3 for the 3 time!
Executing SendMessage2 for the 3 time!
Executing SendMessage3 for the 4 time!
Executing SendMessage2 for the 4 time!
Executing SendMessage3 for the 5 time!
Executing SendMessage2 for the 5 time!
Behaviour SendMessage2 finalizing!
Executing SendMessage3 for the 6 time!
Executing SendMessage3 for the 7 time!
Executing SendMessage3 for the 8 time!
Executing SendMessage3 for the 9 time!
Executing SendMessage3 for the 10 time!
pingaponga a começar!
Recebi uma mensagem de ( agent-identifier :name sender@192.168.1.76:1099/JADE :addresses (sequence http://Laptop.lan:7778/acc )) .Conteúdo: not ping1
Executing SendMessage3 for the 11 time!
Recebi uma mensagem de ( agent-identifier :name sender@192.168.1.76:1099/JADE :addresses (sequence http://Laptop.lan:7778/acc )) .Conteúdo: ping2
Executing SendMessage3 for the 12 time!
Recebi uma mensagem de ( agent-identifier :name sender@192.168.1.76:1099/JADE :addresses (sequence http://Laptop.lan:7778/acc )) .Conteúdo: not ping3
Executing SendMessage3 for the 13 time!
Recebi uma mensagem de ( agent-identifier :name sender@192.168.1.76:1099/JADE :addresses (sequence http://Laptop.lan:7778/acc )) .Conteúdo: not ping1
Behaviour SendMessage3 finalizing!
ParallelBehaviour finalizing
sender a morrer!

```

Other ParallelBehaviour Arguments:

-*WHEN_ALL* (condition that terminates when all its children are done.)

-*WHEN_ANY* (condition that terminates when any of its child is done);

-*n* (number of child behaviours that must end before the composite behaviour ends)



Arguments Management

```
public class SenderArgument extends Agent{  
    protected String message;  
  
    @Override  
    protected void setup(){  
        super.setup();  
  
        System.out.println(this.getLocalName()+" a começar!");  
  
        Object[] args = getArguments();  
  
        if (args != null && args.length > 0) {  
            message = (String) args[0];  
            System.out.println("Sending "+ message+"!");  
  
            this.addBehaviour(new SendMessage());  
        }  
    }  
}
```

```
public class SendMessage extends OneShotBehaviour {  
  
    @Override  
    public void action() {  
        AID receiver=new AID();  
        receiver.setLocalName("pingaponga");  
        ACLMessage msg =new ACLMessage(ACLMessage.INFORM);  
        long time =System.currentTimeMillis();  
        msg.setConversationId(""+time);  
        msg.addReceiver(receiver);  
        msg.setContent(message);  
        myAgent.send(msg);  
    }  
}
```

Arguments Management

Configurations

- container -agents pingaponga:agents.PingPong;sender:agents.SenderArgument(ping)

```

out 23, 2016 2:54:34 AM jade.core.Runtime beginContainer
INFO: -----
      This is JADE 4.3.3 - revision 6726 of 2014/12/09 09:33:02
      downloaded in Open Source, under LGPL restrictions,
      at http://jade.tilab.com/
      -----
out 23, 2016 2:54:35 AM jade.imtp.leap.LEAPIMTPManager initialize
INFO: Listening for intra-platform commands on address:
- jicp://192.168.1.76:61474

out 23, 2016 2:54:35 AM jade.core.BaseService init
INFO: Service jade.core.management.AgentManagement initialized
out 23, 2016 2:54:35 AM jade.core.BaseService init
INFO: Service jade.core.messaging.Messaging initialized
out 23, 2016 2:54:35 AM jade.core.BaseService init
INFO: Service jade.core.resource.ResourceManagement initialized
out 23, 2016 2:54:35 AM jade.core.BaseService init
INFO: Service jade.core.mobility.AgentMobility initialized
out 23, 2016 2:54:35 AM jade.core.BaseService init
INFO: Service jade.core.event.Notification initialized
sender a começar!out 23, 2016 2:54:35 AM jade.core.AgentContainerImpl joinPlatform
INFO: -----
Agent container Container-1@192.168.1.76 is ready.
-----

Sending ping!
pingaponga a começar!
Recebi uma mensagem de ( agent-identifier :name sender@192.168.1.76:1099/JADE :addresses (sequence http://Laptop.lan:7778/acc )).Conteúdo: ping

```


Yellow Pages Service

- Register agent represented by the pingaponga agent in directory facilitator (DF)

```
super.setup();

DFAgentDescription dfd = new DFAgentDescription();
dfd.setName(getAID());
ServiceDescription sd = new ServiceDescription();
sd.setType("ping pong");
sd.setName("JADE-replies-pong");
dfd.addServices(sd);

try {
    DFService.register(this, dfd);
} catch (FIPAException e) {
    // TODO Auto-generated catch block
    e.printStackTrace();
}
```

Remove log

```
super.takeDown();

try {
    DFService.deregister(this);
} catch (FIPAException e) {
    // TODO Auto-generated catch block
    e.printStackTrace();
}
```



ISLab

Synthetic Intelligence Lab

Agentes Inteligentes @ 2020/2021

Yellow Pages Service

```
public class SenderFinder extends Agent{  
  
    private AID[] pingpongAgents;  
  
    @Override  
    protected void setup(){  
  
        super.setup();  
  
        System.out.println(this.getLocalName()+" a começar!");  
  
        this.addBehaviour(new SendMessage());  
  
    }  
}
```

```
public class SendMessage extends OneShotBehaviour {  
  
    @Override  
    public void action() {  
  
        DFAgentDescription template = new DFAgentDescription();  
        ServiceDescription sd = new ServiceDescription();  
        sd.setType("ping pong");  
        template.addServices(sd);  
  
        DFAgentDescription[] result;  
        try {  
  
            result = DFService.search(myAgent, template);  
            pingpongAgents = new AID[result.length];  
            for (int i = 0; i < result.length; ++i) {  
                pingpongAgents[i] = result[i].getName();  
            }  
  
            ACLMessage msg = new ACLMessage(ACLMessage.INFORM);  
            long time = System.currentTimeMillis();  
            msg.setConversationId(""+time);  
            msg.addReceiver(pingpongAgents[i]);  
            msg.setContent("ping");  
            myAgent.send(msg);  
        }  
        catch (FIPAException e) {  
            // TODO Auto-generated catch block  
            e.printStackTrace();  
        }  
  
    }  
}
```

Yellow Pages Service

Configuration

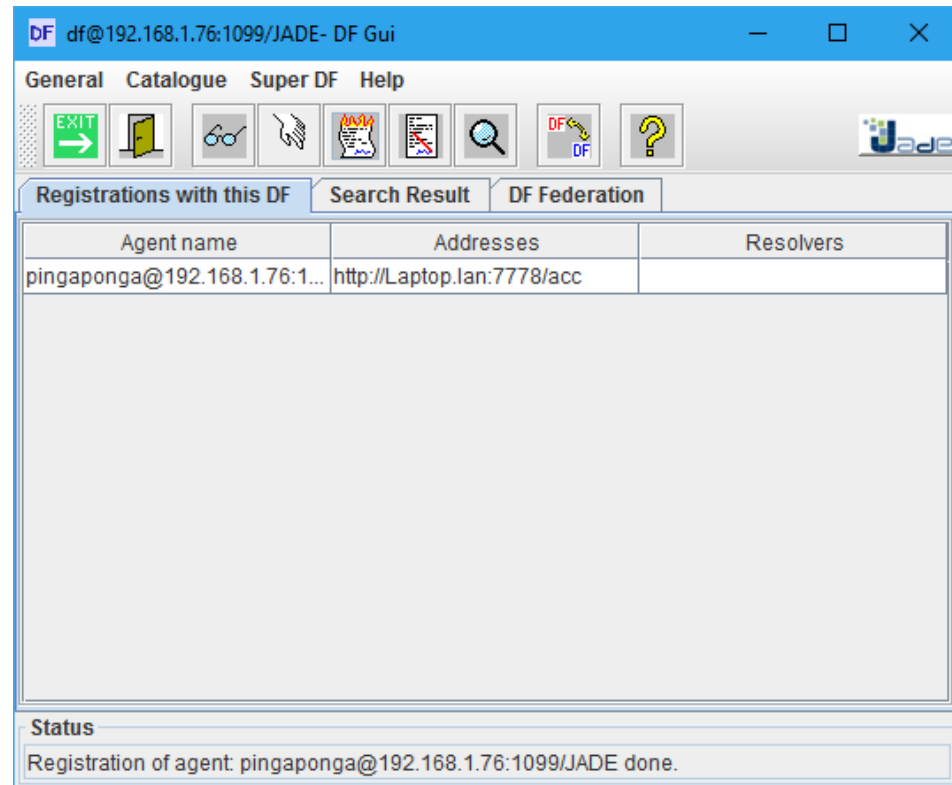
- container -agents pingaponga:agents.PingPong;sender:agents.SenderFinder

```
out 23, 2016 3:10:29 AM jade.core.Runtime beginContainer
INFO: -----
      This is JADE 4.3.3 - revision 6726 of 2014/12/09 09:33:02
      downloaded in Open Source, under LGPL restrictions,
      at http://jade.tilab.com/
      -----
out 23, 2016 3:10:29 AM jade.imtp.leap.LEAPIMTPManager initialize
INFO: Listening for intra-platform commands on address:
- jicp://192.168.1.76:61528

out 23, 2016 3:10:30 AM jade.core.BaseService init
INFO: Service jade.core.management.AgentManagement initialized
out 23, 2016 3:10:30 AM jade.core.BaseService init
INFO: Service jade.core.messaging.Messaging initialized
out 23, 2016 3:10:30 AM jade.core.BaseService init
INFO: Service jade.core.resource.ResourceManagement initialized
out 23, 2016 3:10:30 AM jade.core.BaseService init
INFO: Service jade.core.mobility.AgentMobility initialized
out 23, 2016 3:10:30 AM jade.core.BaseService init
INFO: Service jade.core.event.Notification initialized
out 23, 2016 3:10:30 AM jade.core.AgentContainerImpl joinPlatform
INFO: -----
Agent container Container-4@192.168.1.76 is ready.
-----
sender a começar!
pingaponga a começar!
Recebi uma mensagem de ( agent-identifier :name sender@192.168.1.76:1099/JADE :addresses (sequence http://Laptop.lan:7778/acc ) ).Conteúdo: ping
```

Yellow Pages Service

- Tools > Show the DF GUI





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