Ph.D. course:
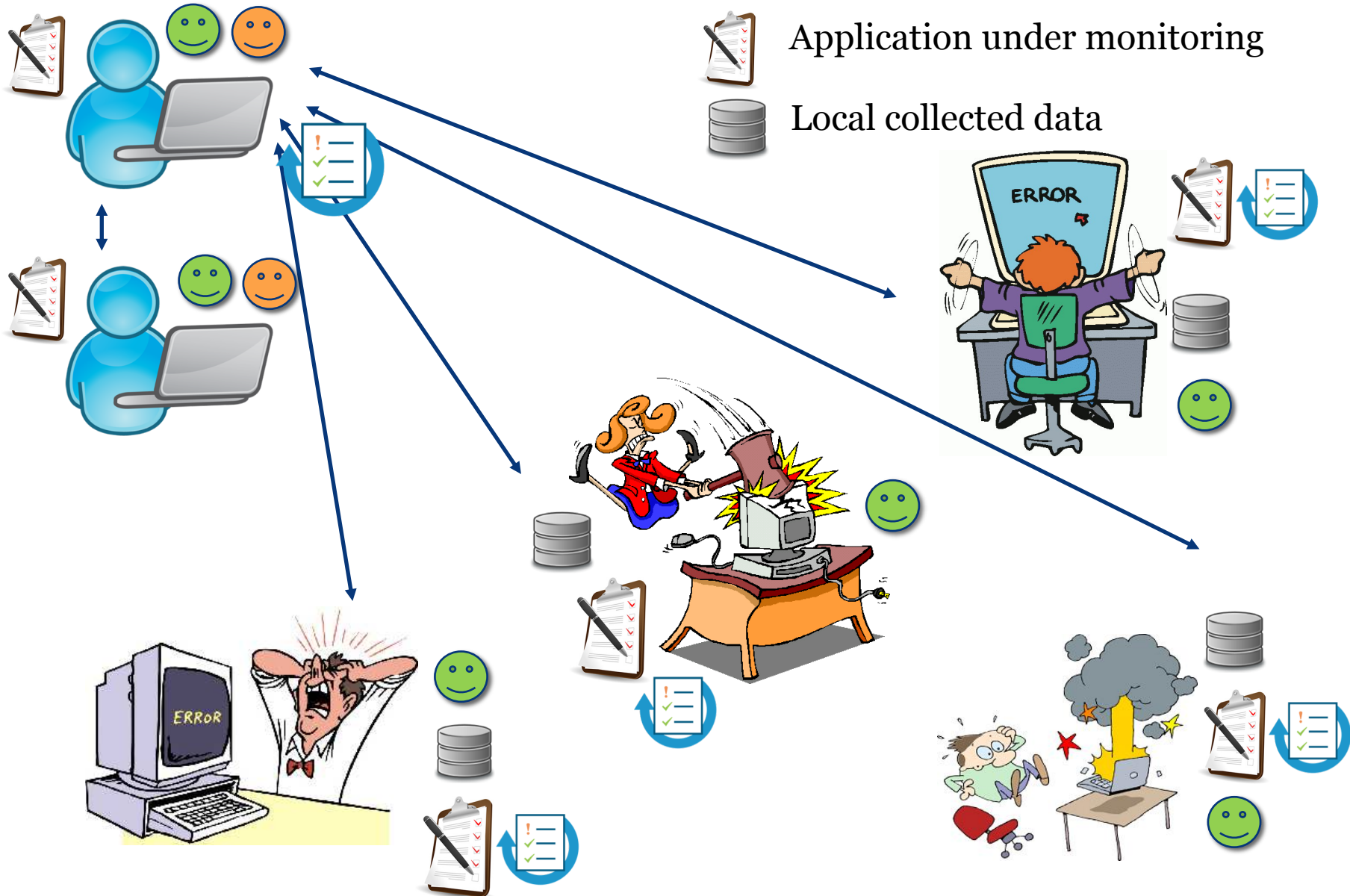# Advanced Distributed Systems Development with Multiagent Systems

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LEARN PROJECT

LEARN platforms and services

Application under monitoring
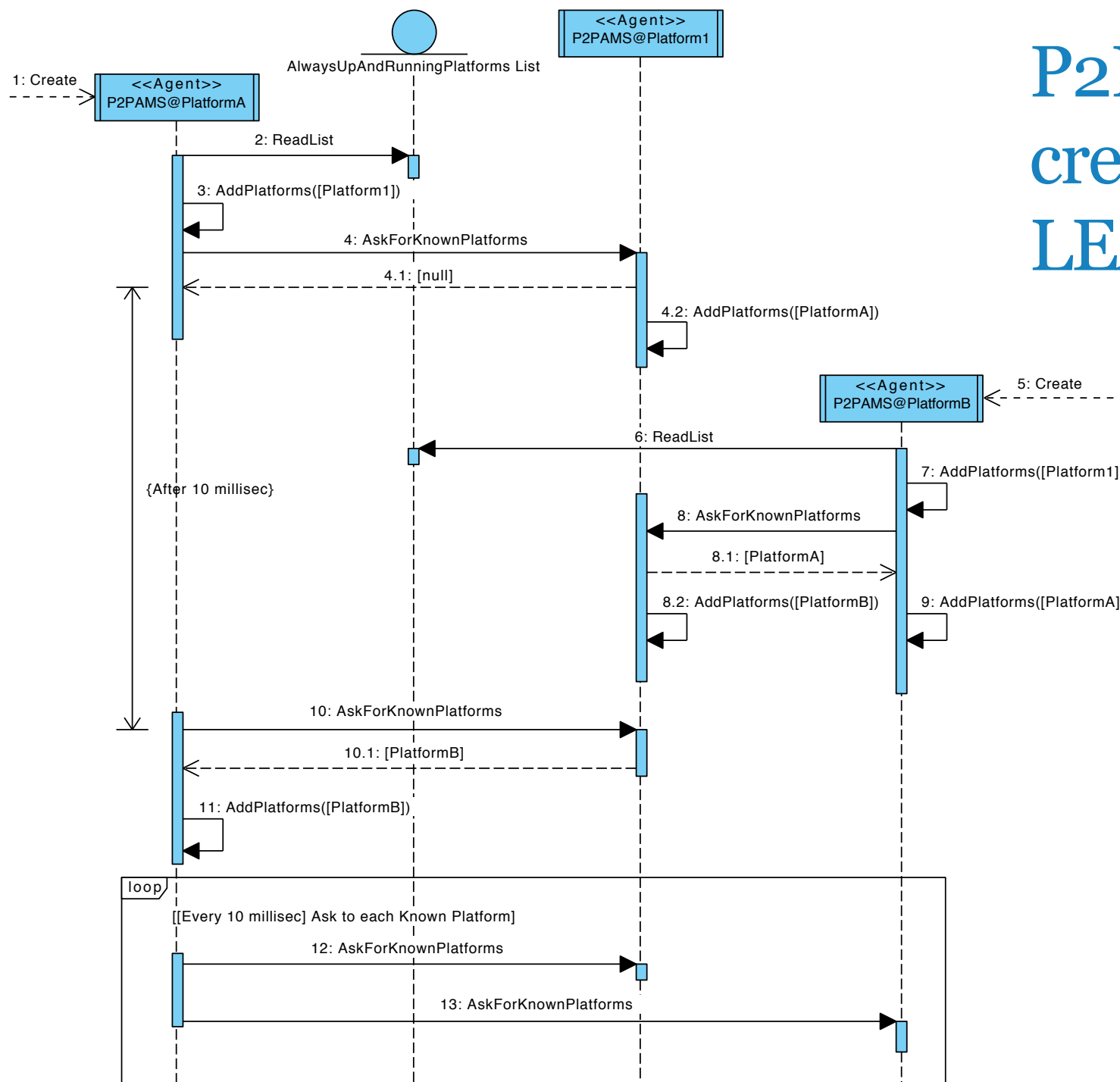
Local collected data

LEARN Project

- Foreseen Solution
  - Decentralized LEARN platform
  - Autonomous entities monitoring applications under analysis
  - Collective sharing of collected data
  - Collective analysis of collected data
  - Specific nodes able to create the fixes
  - Sharing of the fixes
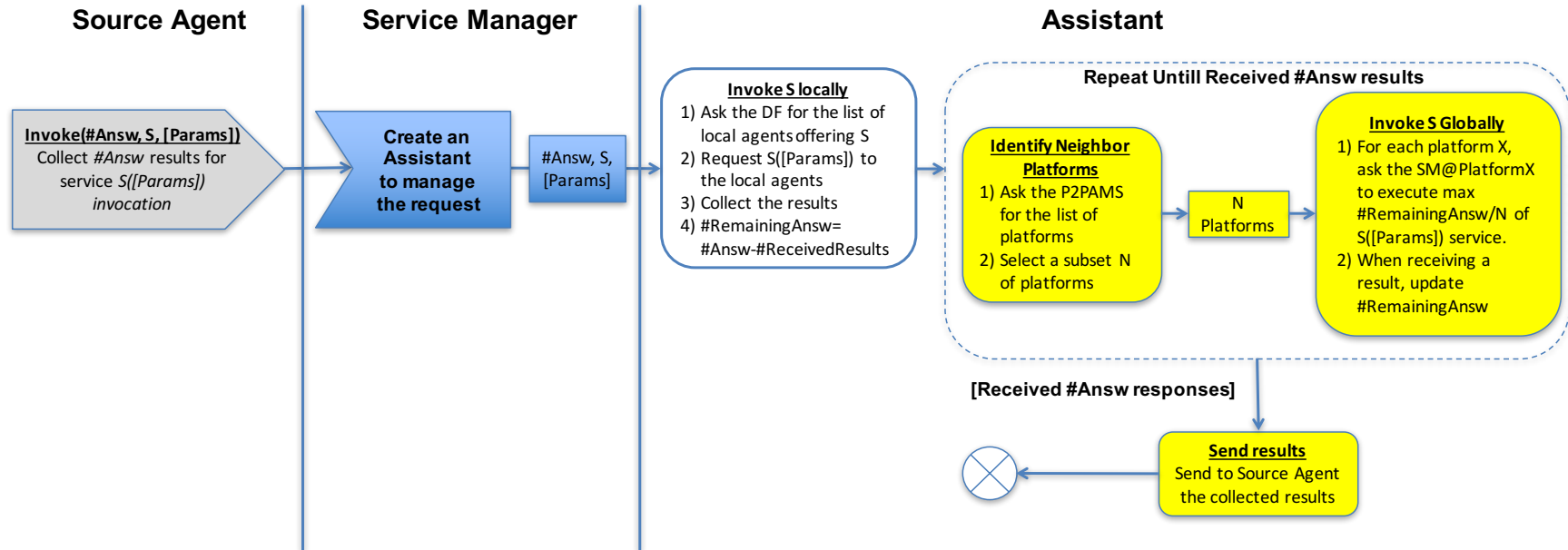 - On the field testing

LEARN MAS [SPELEARN]

- P2P style service invocation and data sharing
  - JADE Extension needed!
- Ontology formalization
  - Application under monitoring
  - Available Services
- Services development
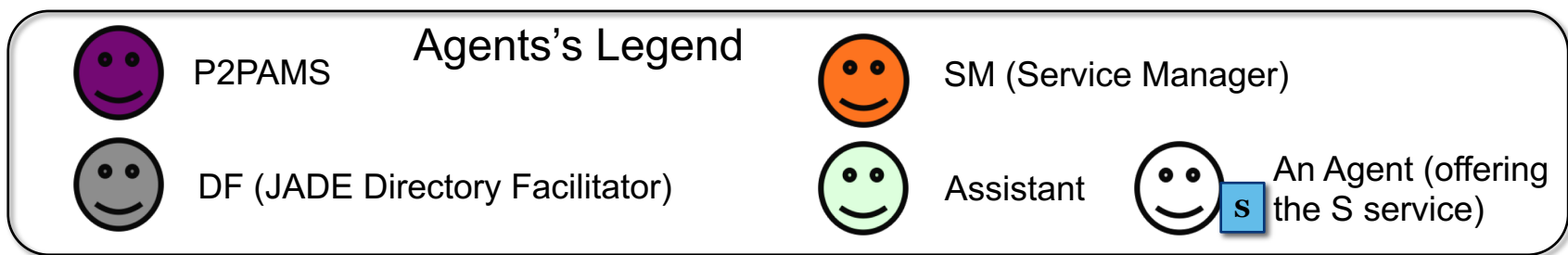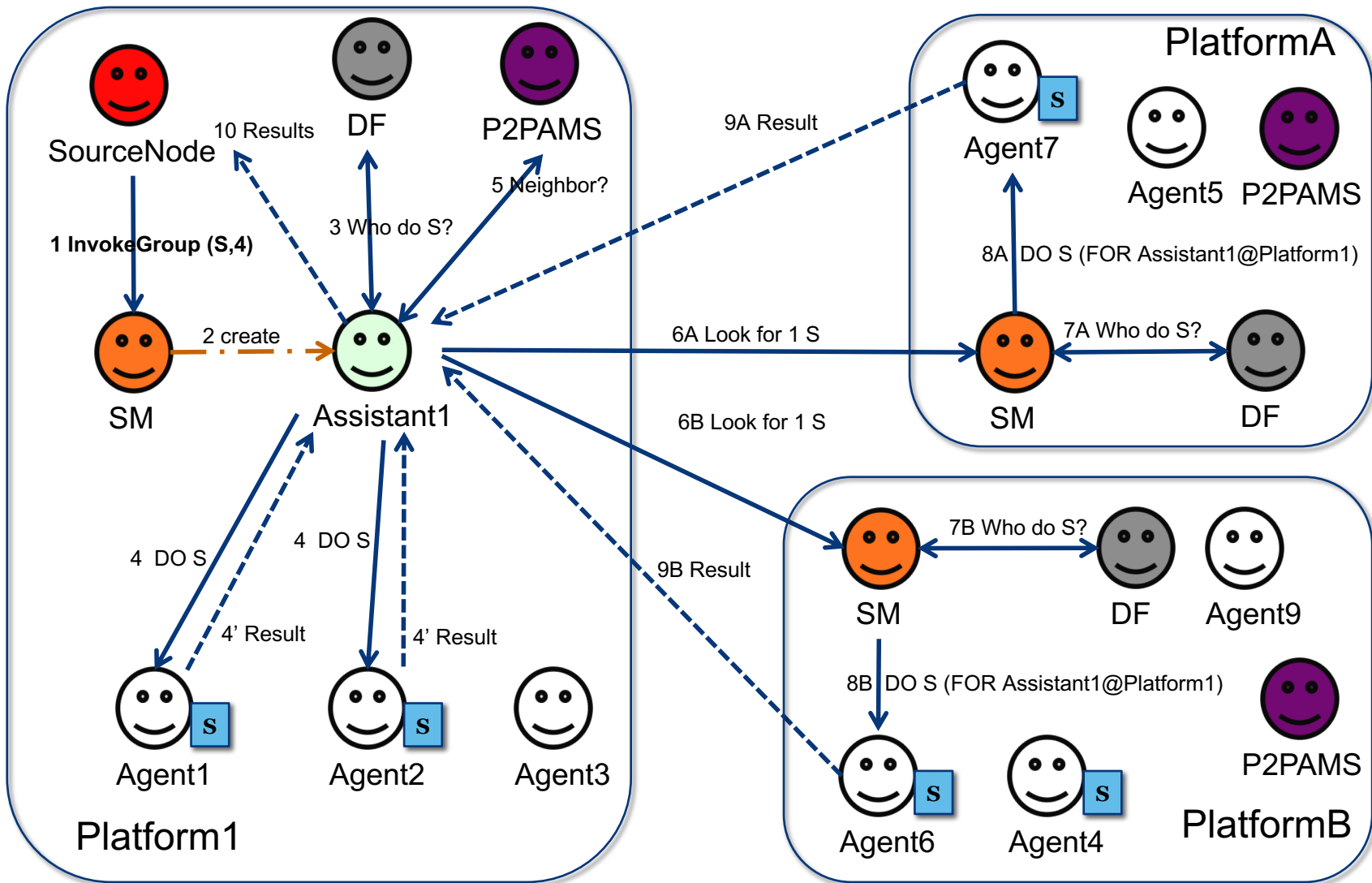- Testing and Simulation (SimJade Platform)

P2P network creation in LEARN

Distributed Service Invocation

Source Agent

Invoke(#Answ, S, [Params])
Collect *#Answ* results for service *S([Params])* invocation

Service Manager

Create an Assistant to manage the request

#Answ, S, [Params]

Assistant

Invoke S locally
1) Ask the DF for the list of local agents offering S
2) Request S([Params]) to the local agents
3) Collect the results
4) #RemainingAnsw= #Answ-#ReceivedResults

Repeat Untill Received #Answ results

Identify Neighbor Platforms
1) Ask the P2PAMS for the list of platforms
2) Select a subset N of platforms

N Platforms

Invoke S Globally
1) For each platform X, ask the SM@PlatformX to execute max #RemainingAnsw/N of S([Params]) service.
2) When receiving a result, update #RemainingAnsw

[Received #Answ responses]

Send results
Send to Source Agent the collected results

- The P2PAMS creates and maintains the P2P network
- The Service Manager Agent exploits the underlying P2P network to search for, and invoke, the requested services
- P2PAMS, Service Manager and Assistant are new agents, cooperating with the standard JADE platform agents
- JADE is unaltered, we only add new agents to offer P2P services

PlatformA

10 Results

DF

P2PAMS

SourceNode

9A Result

Agent7

Agent5   P2PAMS

3 Who do S?

5 Neighbor?

1 InvokeGroup (S,4)

8A DO S (FOR Assistant1@Platform1)

SM

2 create

Assistant1

6A Look for 1 S

7A Who do S?

SM

DF

6B Look for 1 S

4 DO S

4 DO S

7B Who do S?

SM

DF   Agent9

4' Result

4' Result

9B Result

8B DO S (FOR Assistant1@Platform1)

Agent1

Agent2

Agent3

P2PAMS

Platform1

Agent6

Agent4

PlatformB

Agents's Legend

P2PAMS

SM (Service Manager)

DF (JADE Directory Facilitator)

Assistant

An Agent (offering the S service)

LET'S DO SOME PRACTICE

Try to model this domain as a MAS

- Our university offers a set of phd courses to its phd students
- Each Professor may present a proposal for a (or more) phd course to the phd management (we represent it as an unique entity). Each proposal must include:
  - The name of the course
  - The list of teachers (may be one or more professors, of the university or external)
  - The minimun number of students needed to start the course
  - The number of lessons
  - The reference book (title and authors needed)
- The phd management can accept or not the course (you can chose whatever criterion for accepting a course). When a course is accepted, it has to be made public to the phd students, with a dl to enroll to it

- Phd students can access the list of available courses, and they can sign up to all they want: the professor of the course is responsible to manage the subscription
- The course is started only if there are enough participants: after the DL the professor will confirm, or cancel, the enrolments to the course
- If the course starts, then the professor must provide the number of foreseen lessons (you chose how "provide" is concretized), and at the same time the students must buy the requested book (they need it to submit their final exam)
  - Agents Selling books may offer the book to different prices, and students can buy it where they prefer
- After all the lessons have been provided, students can submit they final exam, and the teacher will let the students know if they passed or not the exam