

AGENT SYSTEMS AND APPLICATIONS

---

## **Report: Exercise 2**

---

STUDENTS:

GEORGE, SANDO

GRINDA, CONSTANTIN

LOZANO, DAVID

FACULTY OF MATHEMATICS AND INFORMATION SCIENCE  
WARSAW UNIVERSITY OF TECHNOLOGY

GUIDED BY:

PROF. DR HAB. MARIA GANZHA (IBS PAN)

PROF. DR HAB. MARCIN PAPRZYCKI (IBS PAN)

Summer 2016

## CONTENTS

List of Figures	1
1 Introduction	2
2 Experiment Design	2
2.1 Scenario . . . . .	2
2.2 Machine Configuration . . . . .	2
3 Results	3
3.1 Number of Machines vs Runtime . . . . .	3
3.2 Number of Teams vs Runtime . . . . .	3
3.3 Number of Laps vs Runtime . . . . .	4
4 Conclusion	4

## LIST OF FIGURES

1	Num. Machines vs Runtime . . . . .	3
2	Num. Teams vs Runtime . . . . .	3
3	Num. Laps vs Runtime . . . . .	4

## 1 INTRODUCTION

Mobile agents are those agents that can migrate between networked systems in an effort to carry out a given task. This is a report on experiments conducted to test the performance of the agent mobility features of the JADE agent platform. The experiments were in the form of a simulated relay race between teams of mobile agents.

## 2 EXPERIMENT DESIGN

### 2.1 Scenario

The simulation is made up of teams of agents racing between containers located on different machines. To begin the simulation, an agent from each team is placed on each machine. In addition to this, a *runner* agent from each team is placed on each successive machine so as to alternate the machines on which they begin the race.

On receiving a signal to start, a runner agent moves from its container to the container of the next agent on its team. Upon arriving at the next container, the runner agent sends a message to its team mate on the container instructing it to move on to the next container. The previous runner agent remains at its new location. When a given number of laps around the network is completed, the team signals to a *judge* agent that it has completed the race. When all teams have completed the race, the judge agent records the total time taken for all teams to complete the race.

The test parameters are varied as follows:

- increasing the number of machines gradually from 3 to 7.
- varying the number of teams from 3 to 21.
- varying the number of laps from 1 to 15.

### 2.2 Machine Configuration

The experiment was carried out on machines with the following configuration:

- Compute: 1 CPU core
- Memory: 1024MB
- Storage: 24GB SSD
- Operating System: Ubuntu 14.04 LTS
- Linux Kernel Latest 64 bit (4.5.0-x86\_64-linode65)
- Oracle Java 1.8
- JADE 4.4.0

### 3 RESULTS

The results obtained from the experiment are shown below.

#### 3.1 Number of Machines vs Runtime

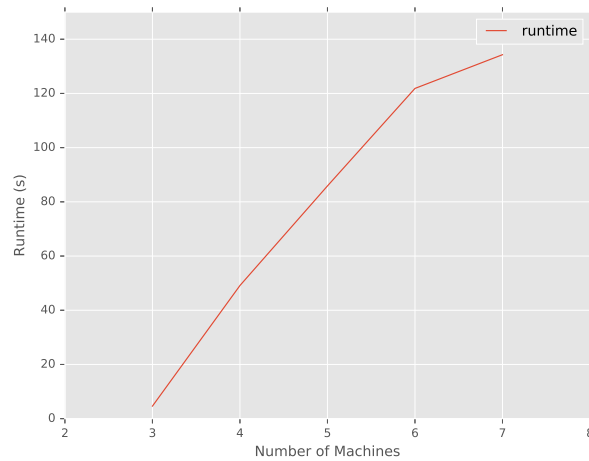


Figure 1: Num. Machines vs Runtime

#### 3.2 Number of Teams vs Runtime

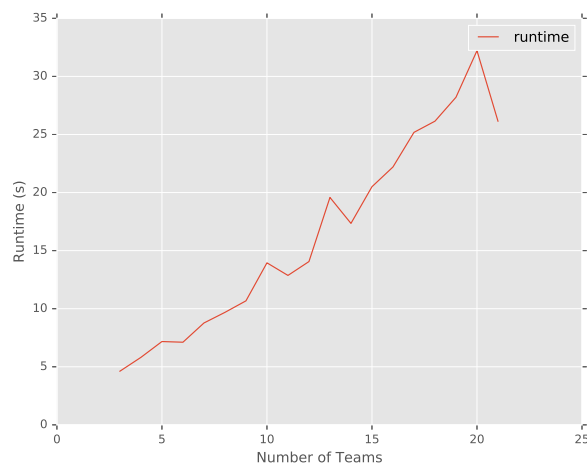


Figure 2: Num. Teams vs Runtime

### 3.3 Number of Laps vs Runtime

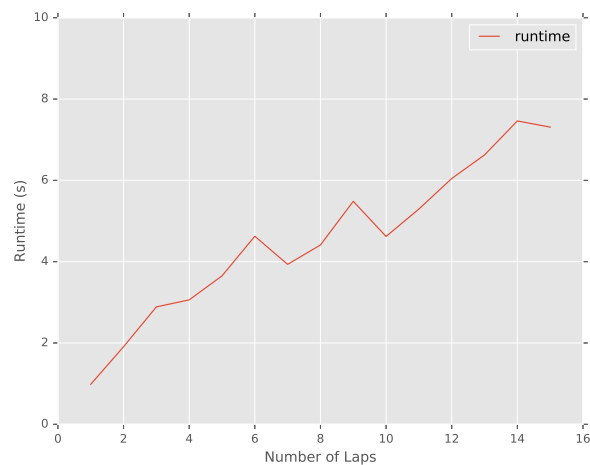


Figure 3: Num. Laps vs Runtime

## 4 CONCLUSION

From the results, it can be concluded that the performance of the mobility feature of the JADE agent platform scales with a general trend of linearity. This should, therefore, be taken into consideration when designing systems, with JADE, that will employ agent mobility.