



**Ain Shams University**  
**Faculty of Engineering**  
**Computer and Systems Engineering Department**  
**CSE411: Distributed Computer Systems**

**Assignment 1**  
**Submitted by:**  
**Mariam mohamed reda ahmed mohamed**  
**ID: 1701405**

## **Summary**

Mobile agents are used in client server model, it travels from one computer to another in DS to carry out tasks. Here we adopted Mobile agents in control traffic in the streets, to collect information from set of sensors, surveillance cameras, electronic traffic signs, send it to computers then collect the requests from the computers and process them based on a global view of the traffic in the whole city (servers).

We designed an ALP that model interaction between client and server

## Contents

<b>introduction.....</b>	<b>1</b>
<b>Role of Mobile Agents.....</b>	<b>1</b>
<b>typical usage scenario for the mobile agents to serve the goals of the system .....</b>	<b>2</b>
<b>The implementation of mobile agents is found in the delivered files .....</b>	<b>2</b>
<b>Application-Level Protocol:.....</b>	<b>3</b>
<b>Between the Sensor Node and the Intermediate Node: .....</b>	<b>3</b>
<b>Implement the ALP at each level of nodes using multi-threaded Java programming:.....</b>	<b>4</b>
<b>References:.....</b>	<b>4</b>

## Table of figures

<b>Figure 1:Application-Level Protocol (ALP).....</b>	<b>3</b>
---	----------

## introduction

This report shows the practical application of DS, in the field of monitoring systems; this system originally consisted of three tiers, a set of (clients), (sensors, surveillance cameras and electronic traffic signs collecting data, a computing node for sensors data collection) and (set of servers) that collect the requests from the computers, process them and provide the reply in terms of a set of recommendations to the computers.

It is required to use the mobile agents which are simply the transmission of a small piece of code between nodes or tiers to increase the efficiency of the system, and then implement the ALP for communication between the different nodes.

## Role of Mobile Agents

Mobile Agents are used as a running program travel between different nodes of the system carrying the information about different parameters like request from (clients) information from (sensors, surveillance cameras, electronic traffic signs... etc.) to feed the (computers) with this information to be able to make initial processing of the collected information for each area in the city, then its travel to (servers)which process them based on a global view of the traffic in the whole city and provide the reply in terms of a set of recommendations to the computers sending recommendations to drivers

## typical usage scenario for the mobile agents to serve the goals of the system

The following scenario is applied:

1. The client send a request for recommendations to computers.
2. The sensors start collecting readings from a set of sensors, surveillance cameras and electronic traffic signs using the mobile agents.
3. When a pre-specified number of readings have been collected, the sensors send information to the next node
4. processing on information done using the mobile agents and recommendation send to drivers.

we use mobile agents in the system to collect information from the different sensors and requests from different clients. Then, at the next level mobile agents analyze data collected from first level agents, initial processing of these data is done at each agent in this level. Finally, mobile agents in the third level receive information from the second layer to process them and reply in terms of a set of recommendations to the computers

The implementation of mobile agents is found in the delivered files

## Application-Level Protocol:

various nodes use message-passing communication to communicate with each other

To have efficient of communication, the system designers must agree on a communication protocol, which is system of rules that allows two or more entities(nodes) of a communications system to transmit information.

This protocol is called the **Application-Level Protocol (ALP)**.

### Between the Sensor Node and the Intermediate Node:

- a. the Server node (which contains sensors, computers and server) send ready signal to the client(driver)
- b. If verified, the connection stays on, and the client node waits server's acknowledge.
- c. if the server node not busy, it sends the acknowledge signal to the client node, and waits for a request from the drivers.
- e. The server node receives the data, processing sensors readings, cameras and electronic traffic signs and make recommendations
- f. server sends recommendations to the drivers
- g. connection close

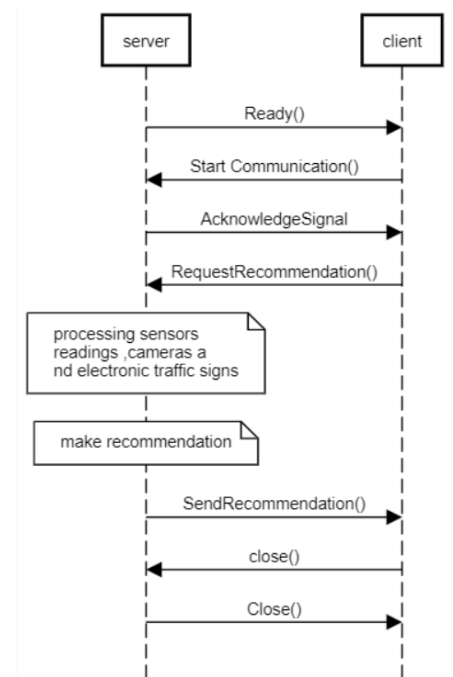


Figure 1:Application-Level Protocol (ALP)

## Implement the ALP at each level of nodes using multi-threaded Java programming:

The implementation is found in the delivered files

### References:

- 1) <http://www.moe-lange.com/danny/docs/wwca.pdf>
- 2) Aglets Specification, Author: Mitsuru Oshima and Guenter Karjoth
- 3) Aglets: Programming Mobile Agents in Java, Authors: Danny B. Lange, Mitsuru Oshima, Gunter Karjoth, and Kazuya Kosaka, Tokyo Research Laboratory, IBM Japan Ltd., Zurich Research Laboratory, IBM Swiss Ltd.