



UNIVERSITY OF LEUVEN (KUL)  
DEPARTEMENT OF COMPUTER SCIENCE

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## Multi-Agent Systems

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## 1 Introduction

This paper will outline a *Delegate Multi Agents System (DMAS)* that uses *Ant Colony Optimisation (ACO)* to solve the dynamic *Pickup and Delivery Problem (PDP)*. The performance of this DMAS will be compared with two other classic *Multi Agent Systems (MAS)*, *ContractNet* and *Gradient Field*.

It is assumed in the dynamic PDP that a truck can only transport one package at the time and that new packages can randomly be added to the system. The infrastructure will also remain the same and no congestion is possible.

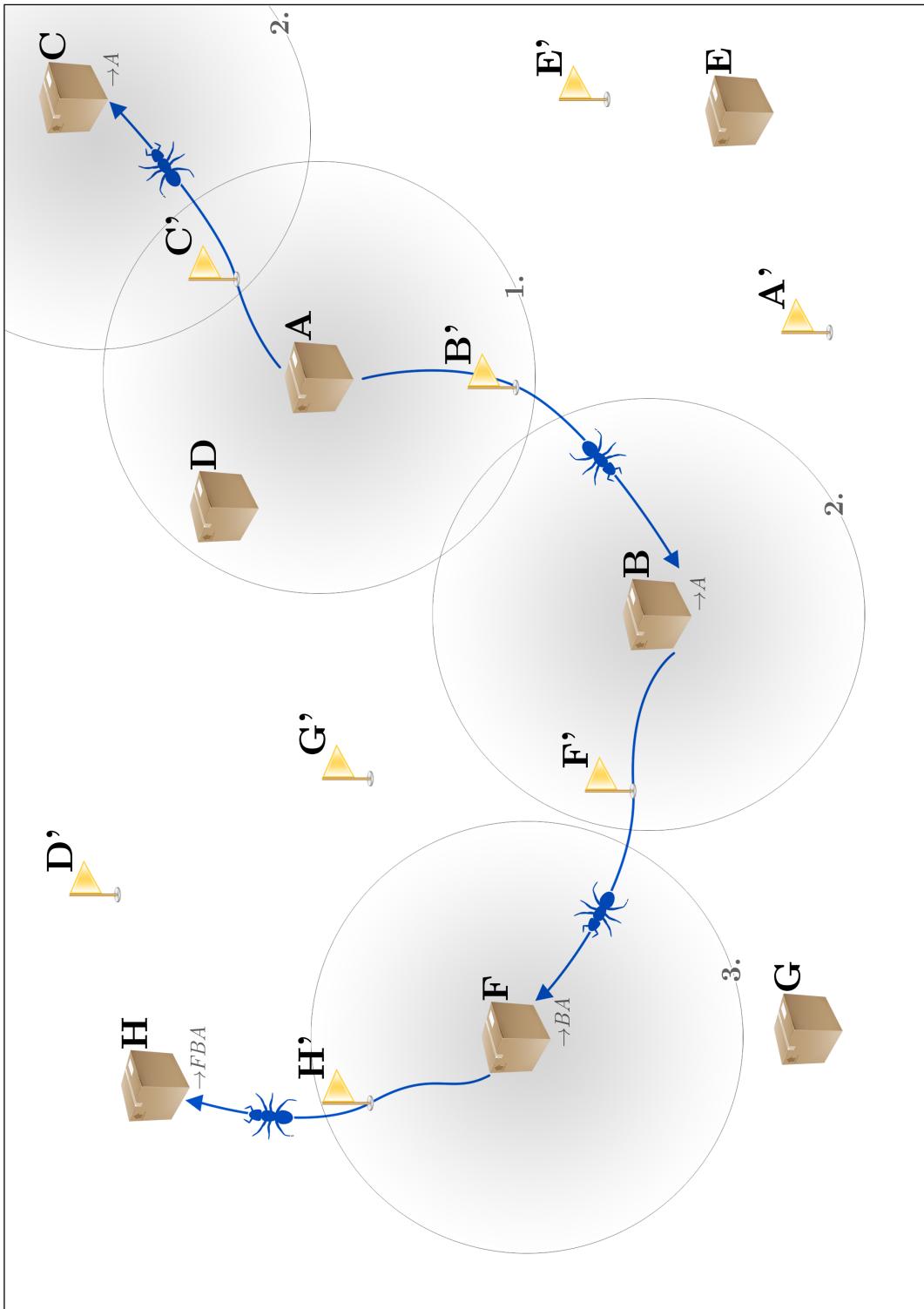
The reader is supposed to have a decent knowledge of *Multi Agent Systems (MAS)* and the applications of *Ant Colony Optimisation (ACO)* in *Delegate Multi Agent Systems (DMAS)*.

## 2 Delegate Ant MAS Approach

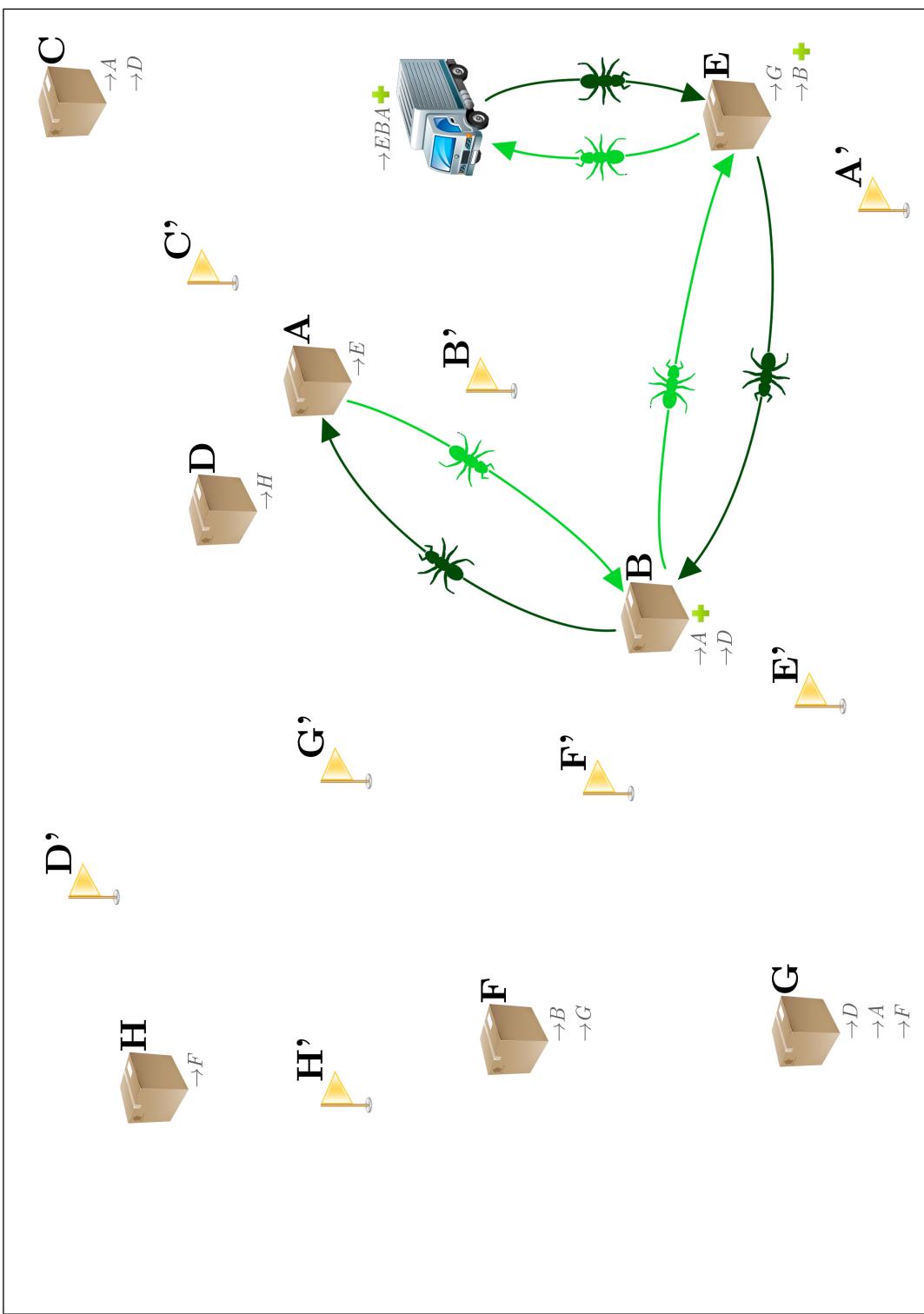
There are many possible ways of using a *Delegate Ant MAS (DMAS)* to solve the *General Pickup and Delivery Problem (PDP)*. This section will outline a solution that defines two agents:

These

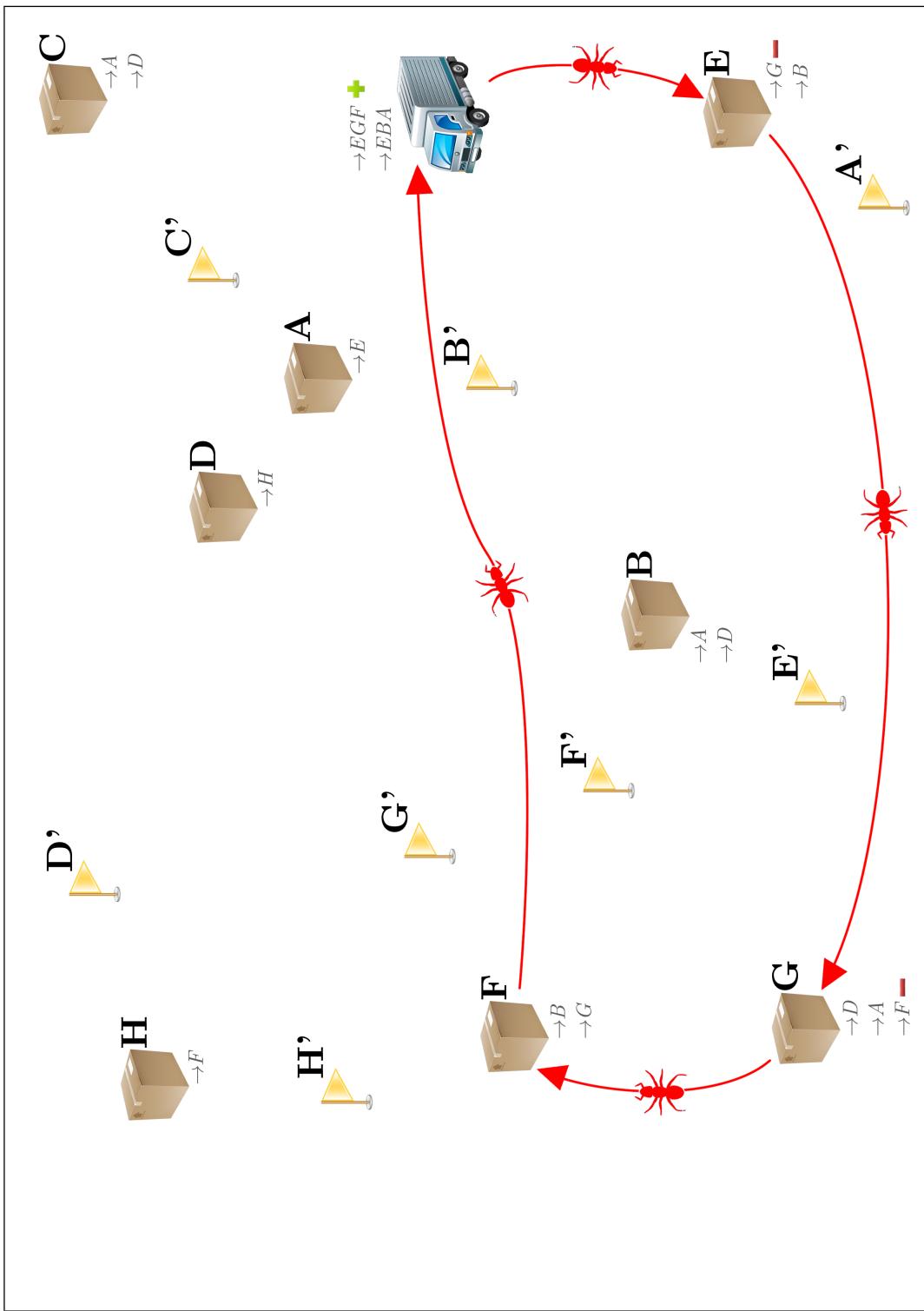
In real life situations will



Figuur 1: Feasibility Ants (example scenario 1)



Figuur 2: Exploration Ants (example scenario 2)



Figuur 3: Intention Ants (example scenario 3)

### **3 Approach**

## **4 Development**

## **5 Evaluation**

## **6 Conclusion**