Glowworm Swarm Optimisation Based Task Scheduling for Cloud Computing

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1 ABSTRUCT

Task scheduling is a non-deterministic polynomial-time hard (NP-hard) optimisation problem, thus applying metaheuristics is important. In this paper, we employ glowworm swarm optimisation (GSO) to solve the task scheduling problem in cloud computing to minimise the total execution cost of tasks while keeping the total completion time within the deadline. Simulation results show that GSO based task scheduling (GSOTS) algorithm outperforms shortest task first (STF), largest task first (LTF) and particle swarm optimisation (PSO) algorithms in reducing the total completion time and the cost of executing tasks.

1.1 Introduction

Task scheduling is crucial in cloud computing, which is a process that maps users' tasks to suitable resources in the form of virtual machines (VMs) to execute. There are two types of task scheduling in cloud computing, i.e., (i) Static task scheduling where all tasks arrive at the same time and they are known a priori to scheduling. In this case, tasks are assigned to VMs in a static way. (ii) Dynamic task scheduling where all the tasks are scheduled instantly once they arrive. When users' tasks need to be scheduled, users usually sign a service level agreement (SLA) with cloud providers.

Figure 1: graphics

VM type	RAM (MIPS)	MIPS capacity	price
—p50 pt—p50 pt—p30 pt			
Type 1	(MIPS	2000	0.34
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$$min f = \sum_{i=1}^{m} EC_i j \tag{1}$$