RESOURCE ALLOCATION USING ITERATIVE TWO-LEVEL TECHNIQUE

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ABSTRACT

In grid-based utility computing, this research looks into a non-polynomial (NP)-hard combinatorial optimization problem connected to increasing service capacity and improving service reliability. The problem is deconstructed into master and slave sub problems with theoretical justification, and a computationally efficient two-level iterative strategy to solving it is proposed. To solve the slave sub problem, Event-based optimization (EBO) is utilised, together with an approximate model for objective value evaluation. The master sub problem is solved using the bisection approach. In some cases, the answer obtained using the provided method is incorrect. Under certain conditions, the solution obtained using the recommended iterative two-level strategy is best.

I. INTRODUCTION

All resource-allocation-related combinatorial optimization problems are NP-hard. To identify solutions, heuristic techniques like the genetic algorithm (GA) and the simulated annealing (SA) approach are utilised. When the grid is big, calculating the precise dependability of each sort of service takes a long time. Dai et al. proposed a heuristic technique for determining approximate dependability as a result. However, their strategy is inapplicable here since the optimization issue at hand aims to keep the precise reliability of all types of services above a specific threshold, which is expressed as inequality restrictions on exact service reliability.

As a result, GA or SA alone may not be able to produce a reasonable answer in a reasonable amount of time. The investigated optimization problem is divided into iterative master and slave sub problems to overcome the computational complexity challenges that result from the service reliability inequality constraint. The slave sub problem is then solved using an ordinal optimization (OO) technique connected with an approximation model, while the master sub problem is solved using a bisection method.

Sweeney and Ahuja, for example, explore finding the best mix of resources in a grid to service specific computing needs with the least amount of processing time and cost. The one described by Dai and Wang is a grid resource allocation planning challenge. Their challenge is to determine the appropriate collection of resources to buy and the nodes at which they should be put in order to maximise service dependability while staying within a budget. The optimization issue covered in this study is strictly speaking an extension of a previously defined problem.

II. RELATED WORKS

Grid computing brings together machines from many administrative domains to accomplish a similar aim, such as solving a single job, and then vanishes just as rapidly. The use of middleware to split and distribute bits of a programme among several computers, often up to thousands, is one of the major tactics of grid computing. Grid computing is a distributed computing model that may include the aggregation of large-scale cluster computing-based systems. Grids can be small—confined to a network of computer workstations within a firm, for example—or massive, public collaborations involving several organizations and networks.

"A limited grid can also be referred to as intra-nodes collaboration, whilst a bigger, broader grid can be referred to as inter-nodes cooperation." Grids are a type of distributed computing in which a "super virtual computer" is made up of several loosely linked computers that work together to complete massive tasks. This technology has been used in commercial enterprises for such diverse applications as drug discovery, economic forecasting, seismic analysis, and back office data processing in support of e-commerce and Web services, and it has been applied to computationally intensive scientific, mathematical, and academic problems through volunteer computing.

The genetic algorithm (GA) is a search heuristic that imitates the natural evolution process. This heuristic is frequently employed to find practical answers to optimization and search challenges. Genetic algorithms are part of the wider family of evolutionary algorithms (EA), which use approaches inspired by natural evolution to solve optimization issues, such as inheritance, mutation, selection, and crossover.

III. PROPOSED SYSTEM

Improving grid-based utility computing service capacity and reliability, and thereby addressing the resource allocation difficulty in large grids.

To solve the challenges that arise as a result of computational complexity Based on the service reliability inequality constraint, the studied Optimization problem is divided into iterative master and slave subproblems. The slave sub problem is then addressed with an ordinal optimization (OO) technique and an approximation model, while the master sub problem is handled with a bisection approach. In terms of both dependability and performance, they also broadened their research to include tree-structured grid services. On the other hand, the computer grid in this work has a general structure.

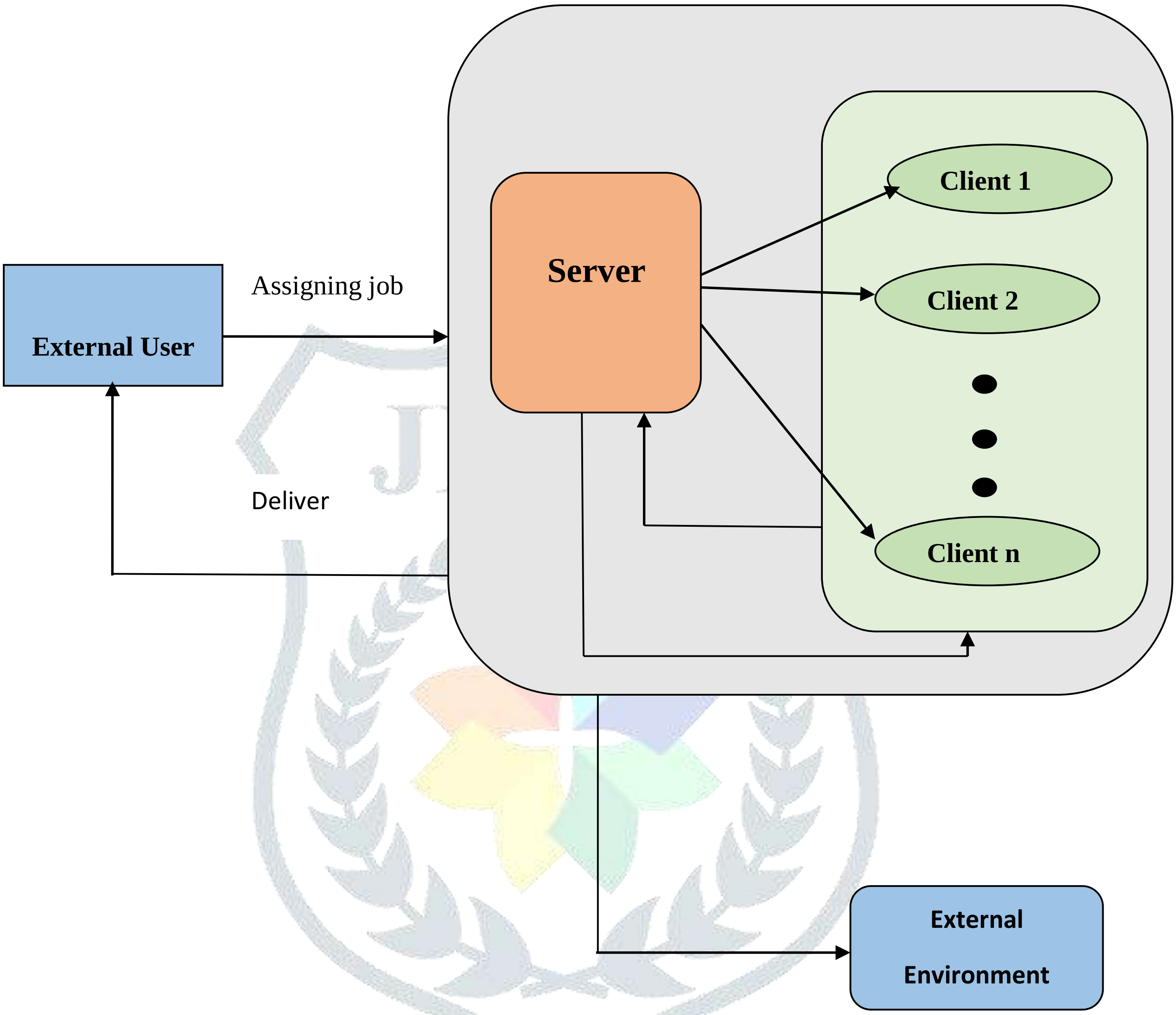

Figure 1: BLOCK DIAGRAM OF PROPOSED METHOD

The block diagram consists of server, client, and external user together with external environment. The external user assign job to the server and the server is connected to n number of clients.

IV. RESULT AND DISCUSSION

The output of proposed work is given as screenshot in the following:

- user registration,
- Resource allocation to the clients.
- Client job

Figure 2: User registration

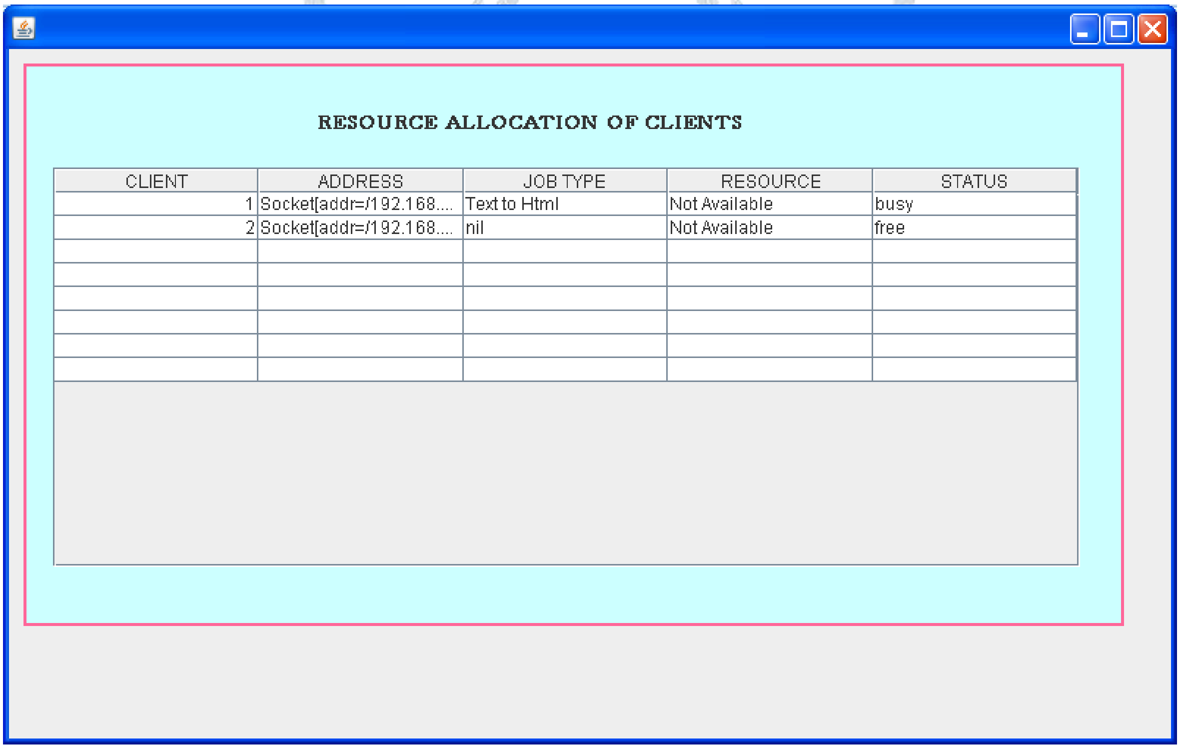

Figure 3: Available resources

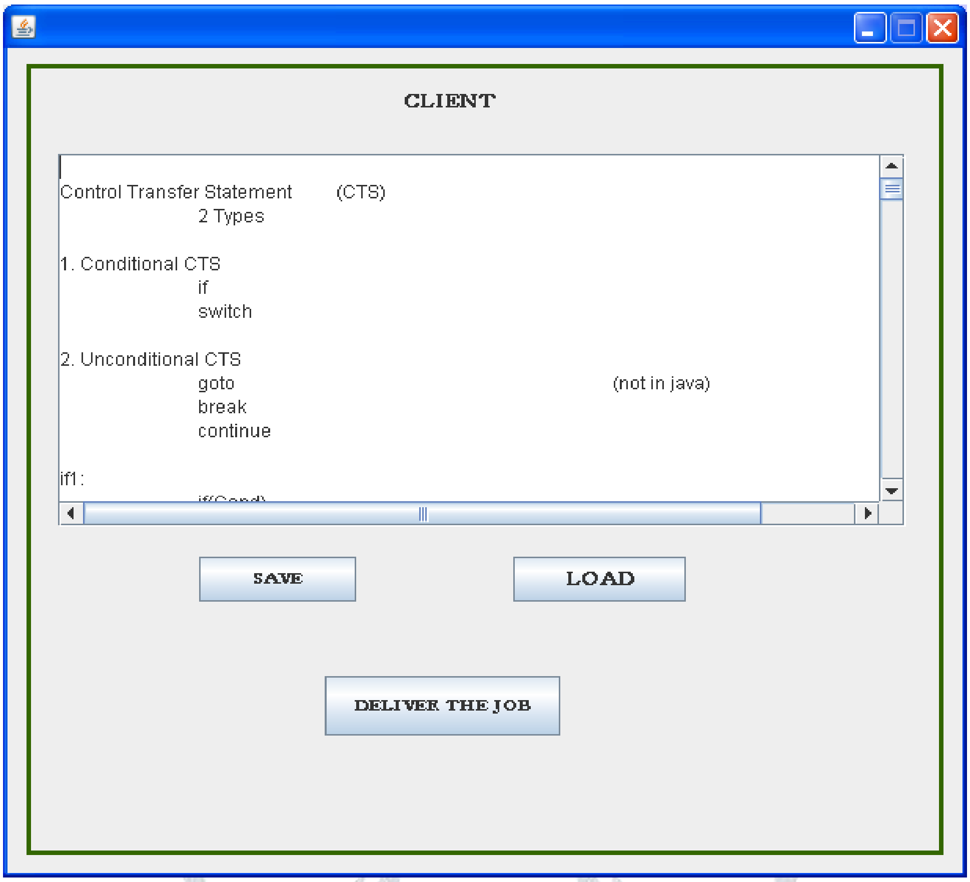

Figure 4: Client job

V. CONCLUSION

This work proposes an iterative two-level technique that uses an approximate model to calculate service dependability and the OO-based n-stage method to address a slave sub problem for the first time. In addition, certain suitable requirements are defined, and if they are met, the solution discovered using the iterative two-level approach is optimal for (1). The reduction in the computer time required to achieve an optimal solution to the problem of interest (1), which is an NP-hard combinatorial optimization problem, is one of the study's most significant achievements.

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