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# SECURE AWARE AND TIME GUARENTEED SERVICE PLACEMENT IN EDGE CLOUD

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**Abstract**

This paper proposes a time and security efficient task scheduling framework in the edge-cloud environment. The corresponding computing models are established, such as the security-related model, time model, and the risk probability model. Then, a time-guaranteed and security-aware task scheduling algorithm is proposed including the domain construction, the security-aware task ranking, and the task dispatching. Extensive simulation experiments have been conducted. Results show that the proposed method has better performance than the other four compared methods in general..This project proposes a time and security efficient task scheduling framework in the edge-cloud environment. The corresponding computing models are established, such as the security-related model, time model, and the risk probability model.

Then, a time-guaranteed and security-aware task scheduling algorithm is proposed including the domain construction, the security-aware task ranking, and the task dispatching. Extensive simulation experiments have been conducted. Results show that the proposed method has better performance than the other four compared methods in general.

***Keywords***: *Task Analysis, Security, Edge Computing, Computational Modelling, Cloud,Computing, Internet Of Things*

## I INTRODUCTION

In today's dynamic and interconnected digital landscape, the deployment and management of services within distributed computing environments have become increasingly complex. One critical challenge is ensuring the secure and timely placement of services across diverse infrastructure while meeting stringent performance objectives. The concept of Security-Aware and Time-Guaranteed Service Placement addresses this challenge by integrating security considerations with real-time performance guarantees. This approach not only focuses on optimizing service placement for efficiency but also prioritizes security measures to safeguard against emerging threats and vulnerabilities. By combining security awareness with time-guaranteed placement strategies, organizations can enhance the reliability, resilience, and overall quality of service delivery in modern computing ecosystems. This introduction sets the stage for exploring the intricacies and benefits of this innovative service deployment paradigm

## II LITERATURE SURVEY

The problem of scheduling scientific workflows has been well studied in the literature. Several strategies have been proposed for effective resource provisioning and scheduling of scientific workflows [16]. These algorithms are based on heuristics, meta-heuristics and search-based techniques [10]. Generally, resource scheduling algorithms focus on the reduction in execution time of workflows with two main factors in consideration, monetary cost and deadline. Resource allocation in cloud computing comprises of two phases, resource provisioning and scheduling. Resource provisioning is responsible for the determination of resources required for the execution of workflows. Resource scheduling pays attention to the scheduling, placement and execution of tasks. Although most scheduling algorithms in cloud computing systems propose

resource provisioning and scheduling algorithms for cloud computing systems. Prior research shows that much attention has been paid to resource scheduling strategies [17], [18]. One of the widely used approaches in resource scheduling is Particle Swarm Optimisation (PSO) which was introduced by the authors in [19]. PSO is a self-adaptive optimisation technique that relies on a particles' social behaviour to solve task allocation and resource scheduling problems [2]. In [20], the authors proposed a resource scheduling strategy based on PSO. The proposed algorithm was aimed at reducing the cost of a single workflow execution and load balancing of task based on available resources. In [21], authors proposed Deadline Constrained Level Based (DCLB) which uses Level Load Balancing to refine deadline distribution as well as attaining lower communication cost. Wu et al. [22] also proposed a PSO algorithm to minimise cost and execution time, whilst considering budget and deadline constraints. The proposed algorithm focused on continuous optimisation problems that have no prior information. Rodriguez and Buyya [10] propose a static PSO algorithm for resource scheduling in complex scientific workflows. They introduced several characteristics of cloud services including heterogeneity of virtual machines, lease time interval, pricing model, and acquisition delay. Their algorithm effectively reduced the execution cost and met the deadline defined by the user using a global optimisation technique. One major disadvantage common to the highlighted PSO algorithm was their ability to manage heterogeneous resources. However, these algorithms are not suitable for deployment in Infrastructure as a Service (IaaS) as they do not consider the order of execution of task and the number and type of resources to be leased. The static PSO in [10] assigned tasks to instances randomly, thereby neglecting the characteristics and structure of the workflow. In [8], the authors developed an IaaS Cloud Partial Critical Paths (IC-PCP) for the IaaS model. IC-PCP scheduled all task to the same VM instance which must be the cheapest instance that must meet the deadline given by the user. In IC-PCP, the critical path or set of tasks that is related to the exit node must first be found, then scheduled on the same VM. ICPCP does not add additional overhead to the critical paths. However, the algorithm does not consider the boot time of VMs. Such shortcomings were identified by Calheiros and Buyya [23] who extended the algorithm Enhanced IC-PCP Algorithm with Replication (EIPR), by replicating task using idle instances and surplus in budgets. These enhancements show the possibility of meeting user defined deadlines by an increase in the replication of tasks. Such replicated computation resulted in a

very high computational overhead. Although EIPR showed promising results in the mitigation of variable performance effects by the exploitation of the billing schemes and cloud elasticity. Is performance is low when the task execution time is near the billing period

## III EXISTING SYSTEM

One of the widely used approaches in resource scheduling is Particle Swarm Optimisation (PSO) which was introduced by the authors in [19]. PSO is a self-adaptive optimisation technique that relies on a particles' social behaviour to solve task allocation and resource scheduling problems

***Disadvantages*:**

One major disadvantage common to the highlighted PSO algorithm was their ability to manage heterogeneous resources. However, these algorithms are not suitable for deployment in Infrastructure as a Service (IaaS) as they do not consider the order of execution of task and the number and type of resources to be leased

## IV PROPOSED SYSTEM

The resource scheduling techniques proposed for scientific workflows in cloud computing. In [24], a budget constrained algorithm was proposed to deal with optimisation in workflow scheduling. In this approach, the total budget as defined by the user was proportionally distributed to each task based on the average time of execution

. ***Advantages:***

The proposed algorithm was aimed at reducing the cost of a single workflow execution and load balancing of task based on available resources. In [21], authors proposed Deadline Constrained Level Based (DCLB) which uses Level Load Balancing to refine deadline distribution as well as attaining lower communication cost. the concept of worthiness as an attribute in scientific workflow applications. In this approach, worthiness was used for resource selection and were determined based on cost and time of execution.

## V IMPLEMENTATION

- ***Cloud user:***

Cloud user will register with application and view all service based priority level files upload by owner which are requested by user and get response from owner and download that service. Cloud user will register with application and store details in database and login to view various types of services uploaded by other owners.

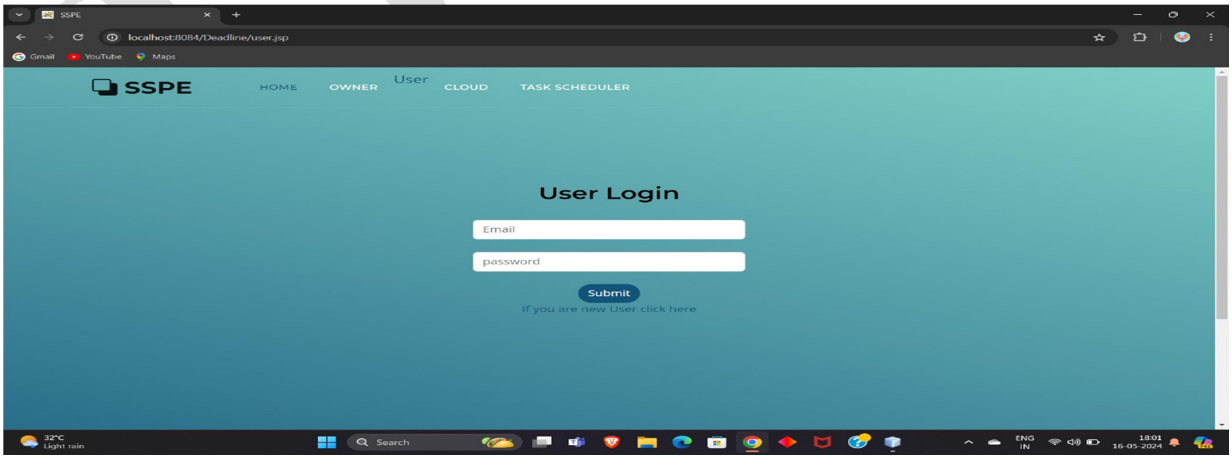
- ***cloud server*** :

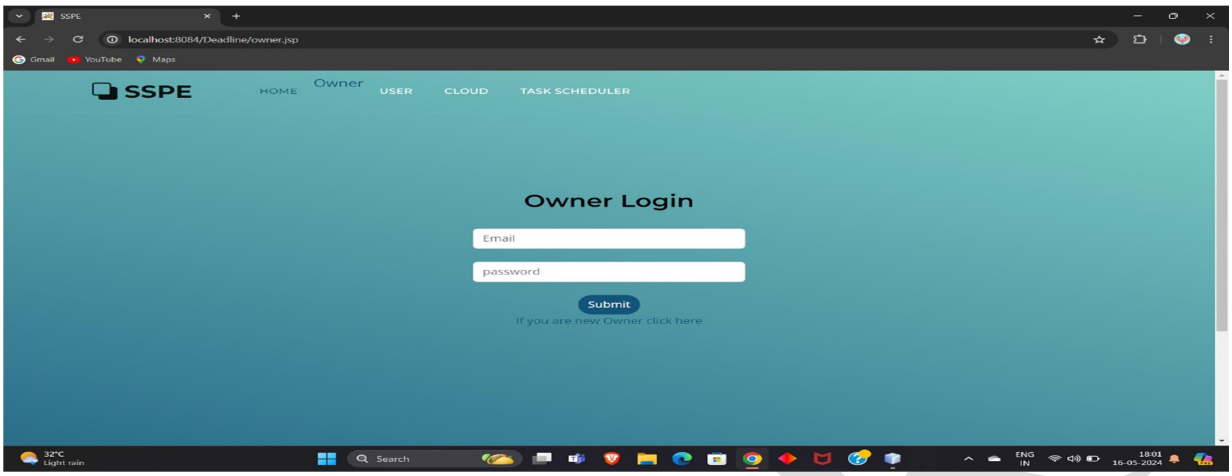
Cloud server is a storage space like drive hq which is used to store user uploaded data based on priority based and time based task execution . Cloud can see all types of services uploaded by owner and type of priority level and time of uploading.

- ***task scheduler:***

Task scheduler can view details of various files uploaded by owner which has level, time based on owner priority task schedule will execute schedular algorithm to check which cloud has less time and send high priority based request to cloud and generate cost for each request. Cost will be decided based on priority of task and time when to complete task.

## VI RESULTS

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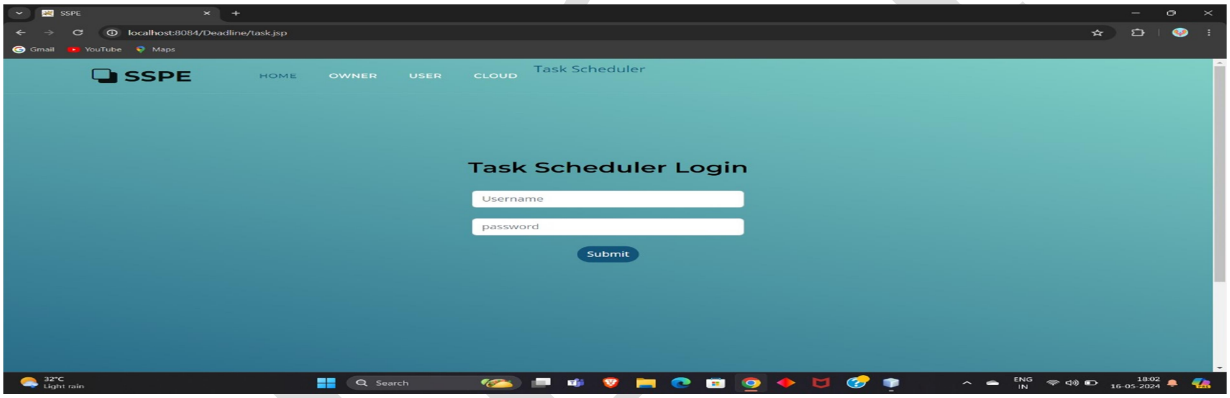
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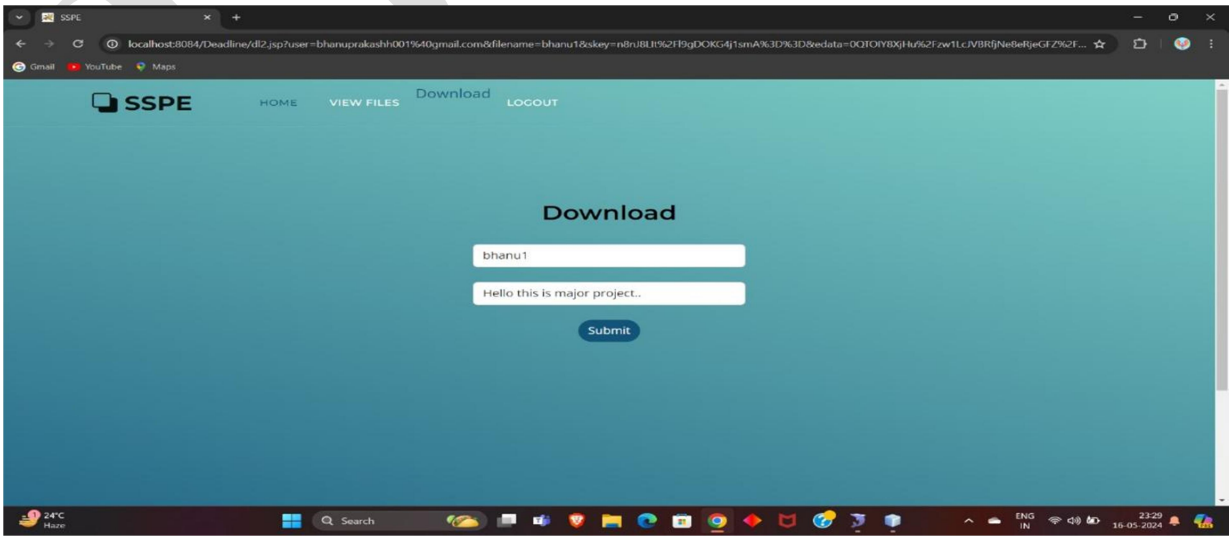
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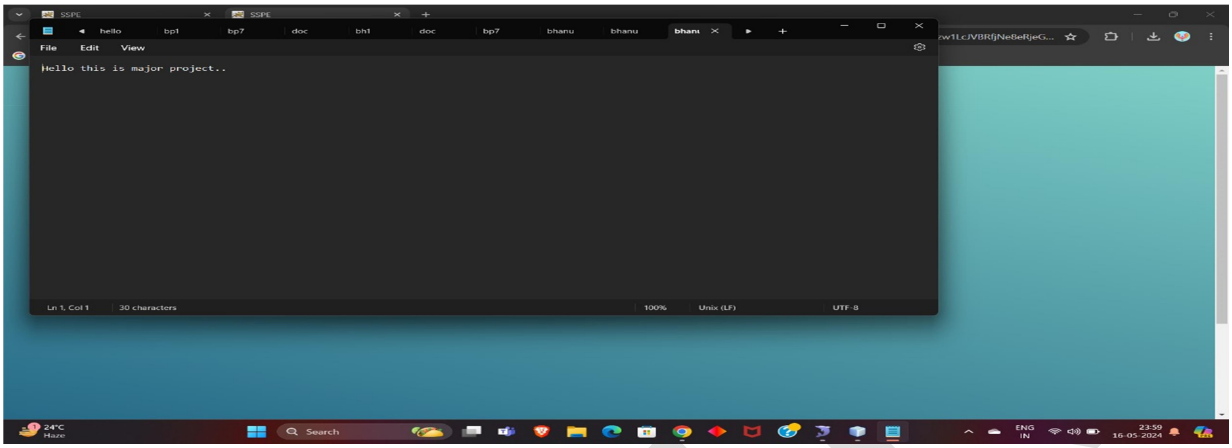


## VII CONCLUSION

In conclusion, the concept of Security-Aware and Time-Guaranteed Service Placement represents a pivotal advancement in the field of distributed computing and service deployment. By emphasizing the integration of security considerations alongside real-time performance guarantees, this approach offers a comprehensive solution to the complex challenges faced by modern digital ecosystems. The key benefits of this paradigm include enhanced reliability and resilience of service deployments, as well as improved protection against evolving cyber threats and vulnerabilities. By strategically placing services based on both security requirements and time-sensitive performance criteria, organizations can optimize resource utilization while ensuring the integrity and availability of critical applications. Looking ahead, further research and innovation in Security-Aware and Time-Guaranteed Service Placement will continue to refine and expand the capabilities of this approach. This includes exploring advanced techniques such as dynamic adaptation mechanisms and intelligent placement algorithms to address evolving security landscapes and dynamic workload demands. In summary, Security-Aware and Time-Guaranteed Service Placement represents a foundational pillar in the pursuit of secure, efficient, and resilient distributed computing environments. Its holistic approach underscores the importance of integrating security as a core consideration in service deployment strategies, paving the way for more robust and adaptive digital infrastructures in the future.

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