National University
of computer and emerging sciences

Computer Networks

Project Proposal

Project Name

Distributed Task Queue System Using Socket Programming

Members

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Project Description

Overview:

In today's distributed computing environment, efficient task management is crucial for optimizing resource utilization and maximizing throughput. Our project aims to design and implement a Distributed Task Queue System using socket programming, enabling multiple nodes to collaborate in executing tasks asynchronously across a network. This system will facilitate workload distribution, fault tolerance, and scalability, offering a practical solution for distributed computing scenarios.

Objectives:

- Develop a distributed task queue manager capable of handling task submissions, task assignment, and task completion notification.
- Implement worker nodes capable of connecting to the task queue manager, retrieving tasks, and executing them.
- Design a network protocol for communication between the task queue manager and worker nodes, ensuring reliability and efficiency.
- Ensure fault tolerance and scalability by implementing error handling mechanisms and support for dynamic node addition/removal.
- Provide a user-friendly interface for monitoring and managing the task queue system.

Resources Required:

- Development Environment: Python programming language, IDE (e.g., PyCharm, Visual Studio Code)
- Libraries: Standard Python libraries for socket programming, concurrency (e.g., threading, multiprocessing), and user interface development (e.g., Tkinter, Flask)
- Hardware: Personal computers or cloud instances for development and testing purposes

Conclusion:

In summary, the development of a Distributed Task Queue System using socket programming offers a hands-on opportunity for students to deepen their understanding of distributed computing and network communication. Through this project, students will refine their programming skills while tackling real-world challenges such as fault tolerance and scalability. Moreover, collaboration on the project fosters teamwork and communication, enhancing essential soft skills vital for future success in the field. Overall, the completion of this project not only strengthens technical proficiency but also instils confidence and prepares students for future academic and professional pursuits in computer science and engineering.