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MCC: A MICROSERVICES-BASED SYSTEM FOR CROWD COMPUTING

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The ever-growing inordinate capabilities of smart devices (smartphones, personal computers, etc.,) in terms of CPU, memory, sensory capability, and autonomy- have the potential to enable the development of many crowd computing systems. Crowd computing is a way of solving large computational or geographically spread tasks in a distributed manner. Solving computationally intensive tasks requires high-performance computing systems and immense processing time. At the same time, this can be inefficient or computationally impossible to be accomplished by an individual device. Also, the cost involved in the purchase and maintenance of such systems tends to be excessive for several institutions, individuals, and small businesses. This is attained by optimally utilizing the idle processing powers and resources of smart devices owned by the individuals (known as the crowd). Such a crowd of individual smart devices and their huge processing capabilities and resources remain untapped throughout the day. By pooling the idle CPU processing cycles of the hundreds and thousands of individual smart devices, we could solve numerous computationally intensive tasks in an efficient and distributed manner. In this research project, we propose and present a framework named MCC (Microservices-based System for Crowd Computing) a scalable distributed system that enables a crowd computing paradigm on individual smart devices. MCC uses MQTT (Message Queuing Telemetry Transport), a lightweight communication protocol for distributed systems. MCC provides a (React-NodeJS) web dashboard through which the user defines a task through a set of properties and executable files to be sent to a (Spring Boot Microservice) middleware broker. The broker divides the received task into multiple smaller sub-tasks (only if the task is divisible) and keeps them in the processing pool. The broker assigns appropriate worker (Android or Desktop Clients) for each sub-task. The workers execute sub-tasks in the background and send computed results back to the broker. The broker accumulates the sub-results and sends the results back to the user, which will be displayed in the user's dashboard. The current version of MCC supports the following format tasks: JSON, URL, file, Image, JAR, APK.