

## **Project Title: Serverless Memory Deduplication using Medes**

### **Introduction:**

Serverless computing has become increasingly popular in recent years, as it provides a convenient way to execute code without the need to manage servers. However, serverless environments can suffer from high memory usage, which can lead to inefficiencies in resource utilization and performance issues. Memory deduplication can help reduce memory usage and improve performance. In this project, we propose to develop a memory deduplication system using Medes for a serverless environment.

### **Objectives:**

The main objective of this project is to create a memory deduplication system that utilizes Medes to identify and share identical memory pages between various function executions. The system should be designed to minimize overhead associated with deduplication operations and address scalability issues that may arise from remote direct memory access (RDMA) connections. Our secondary objective is to evaluate the system's performance on various workloads and compare it to existing serverless environments without memory deduplication.

### **Methodology:**

The project will entail the following steps:

1. Designing and developing the Medes-based memory deduplication system for a serverless environment.
2. Integrating the system with current serverless frameworks such as AWS Lambda, Google Cloud Functions, and Azure Functions.
3. Evaluating the system's performance on various workloads, including memory-intensive workloads, and comparing it to existing serverless environments without memory deduplication.
4. Optimizing the system to minimize the overhead associated with deduplication operations and address scalability issues that may arise with RDMA connections.

### **Expected Outcomes:**

The expected outcomes of this project are:

1. A memory deduplication system that utilizes Medes to reduce memory usage in serverless environments.
2. Evaluation results that demonstrate the system's effectiveness in reducing memory usage while maintaining high performance.
3. Optimization techniques that minimize the overhead associated with deduplication operations and address scalability issues that may arise with RDMA connections.

### **Conclusion:**

In summary, this project aims to develop a memory deduplication system using Medes for a serverless environment. The proposed system is expected to enhance resource utilization and performance by reducing memory usage. By addressing the challenge of high memory usage in serverless environments, this project will contribute to the field of serverless computing.