Ma(R)S [MaaS]

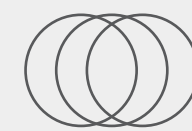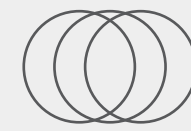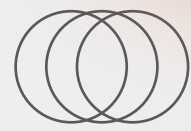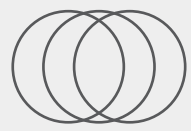## Memory as a [Reconfigurable] service

STRONGLY CONSISTENT DISTRIBUTED SHARED MEMORY SYSTEMS (DSM)
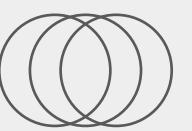
OBJECTIVES

OBJECTIVE 1

Design and Analyze Latency-Efficient Algorithms for Dynamic ADSM

OBJECTIVE 2

Reconfiguration of Orchestration Strategies for Dynamic ADSM

OBJECTIVE 3

Implement, Integrate, and Evaluate the Proposed Algorithms

OBJECTIVE 4

Develop, Deploy and Evaluate Ma(R)S

OVERVIEW

MA(R)S, AIMS TO ENGAGE A PHD STUDENT (PHDS) in conducting state-of-the-art research and industrial development in the fundamental and highly relevant area of Strongly Consistent Shared Memory (ADSM). Supervised by leading researchers in the field, both from academia (University of Cyprus) and industry (Algolysis Ltd), and leveraging on her involvement in the development of a Proof of Concept DSM (under the two partners), the PhDS will work in two fronts/dual fous.

DUAL FOCUS

(I) THEORY: To advance the knowledge in the field of DSM by exploring efficient, robust, and practical solutions in highly dynamic environments, and

(II) PRACTICE: Creating a Memory-as-a-Service (MaaS) platform for deploying and managing DSM, supporting next-gen distributed applications.
Real-World Validation: Testing DSM algorithms on stationary servers and less-powerful peer-to-peer devices for practical testing and validation.

OUTCOMES

(i) latency efficient algorithmic solutions for dynamic ADSM algorithms;

(ii) strategies specifying when and how an ADSM service should reconfigure; and

(iii) a web platform to be used as a portal for the deployment of ADSM services on a set of networked devices, the management of deployed memories, and the access to memory data.

MOTIVATION

MOTIVATION AND GENERAL OBJECTIVES:
Increasing data and computational complexity drive the demand for distributed apps. These apps boost scalability, fault tolerance, and performance by utilizing multiple nodes. Decentralized computation, like blockchain, promotes transparency and trust but presents challenges like asynchrony and node failures.

DSMs are vital for complex cloud apps in emerging tech like IoT and VR/AR providing transparent data storage, retrieval, and coordination. An ADSM provides the illusion of a sequential memory space over asynchronous, fail-prone, message-passing nodes, simplifying the development process.

An ADSM keeps data copies in multiple network locations for availability and survivability, but concurrency issues arise. Several ADSM algorithms exist, but practical concerns like supporting large data, operation speed, liveness, and scalability require more attention.
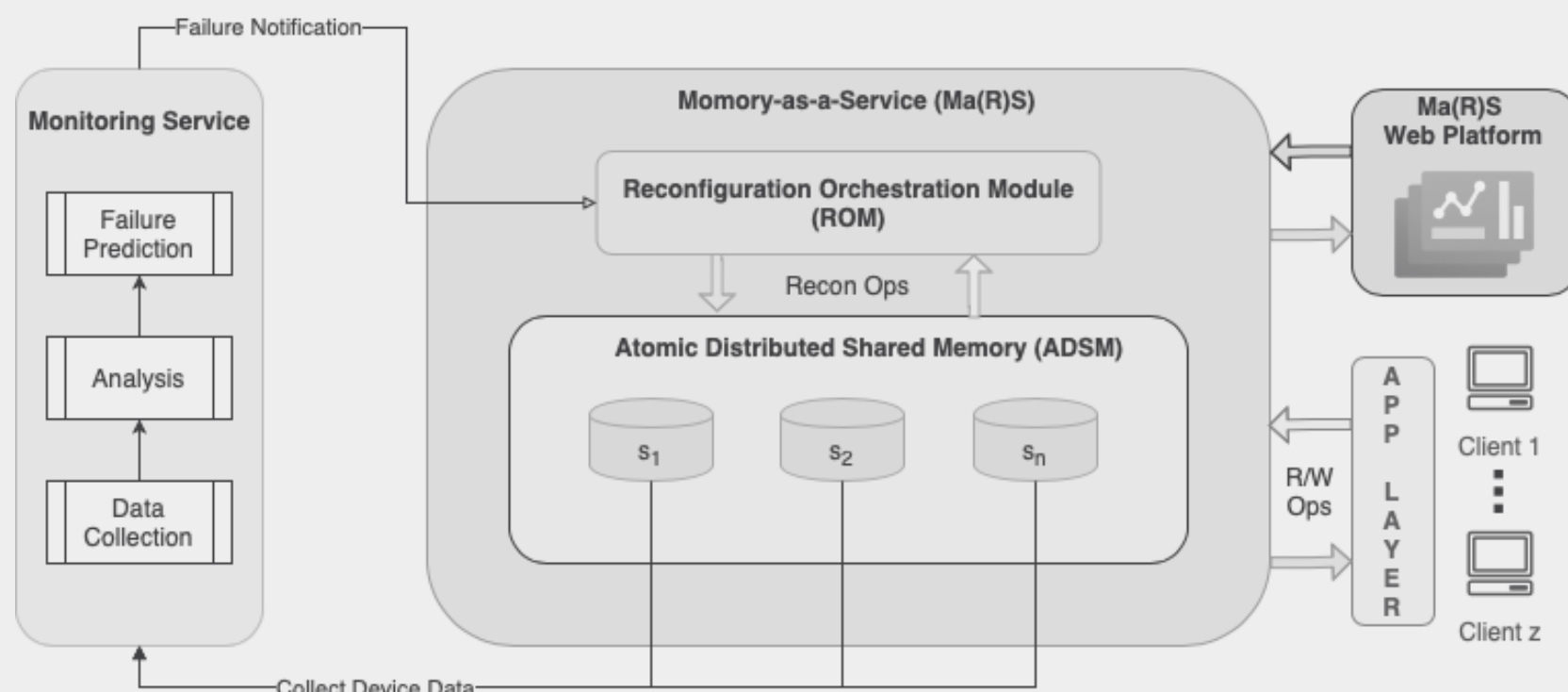

Figure 1: Service Architecture - its components and their interaction.