

Abstract:

The **Automatic Redeployment Rescue System (ARRS)** is a novel approach designed to address critical issues in modern cloud-based applications and services, such as downtime, service failures, and performance degradation. ARRS aims to enhance the availability, reliability, and efficiency of deployed applications by automatically detecting anomalies and initiating redeployment procedures without human intervention. In the event of a failure or degradation in service performance, ARRS will use real-time monitoring data and predictive algorithms to identify problematic components within a system. Upon detection of issues such as server crashes, memory leaks, or resource exhaustion, the system will autonomously trigger a redeployment process to restore the service to its optimal state. This will not only ensure a faster recovery time but also minimize human intervention, thereby reducing the risk of human error and improving the overall resilience of the system. ARRS employs machine learning models for anomaly detection and predictive maintenance, which are integrated into continuous integration/continuous deployment (CI/CD) pipelines to facilitate seamless application management. The system's architecture supports both containerized environments (e.g., Docker, Kubernetes) and traditional virtual machines, providing flexibility and scalability across a range of deployment environments. This paper explores the design principles, technical framework, and potential use cases for ARRS, as well as the challenges and opportunities presented by automating the redeployment process in modern application infrastructure. Through empirical analysis and case studies, we demonstrate how ARRS can significantly reduce downtime, enhance system reliability, and improve operational efficiency in cloud-native environments.