An Approach to Resilient System Design using Railway-Oriented Programming

Classifications

* ACM – D.2 SOFTWARE ENGINEERING – D.2.11 Software Architectures – Patterns
* AMS – 68 Computer Science - 68N19 Other programming paradigms (object-oriented, sequential, concurrent, automatic, etc.)

Contents:

Abstract

In modern times, software applications have evolved from simple, singular instances of a system designed to fulfil a single purpose or requirement, to complex webs of software systems, distributed across different hardware units, interacting over varied communication channels and managed by foreign agents. This evolution continues entropically towards the complexity singularity, increasing over time the strain on software engineers to preserve the stability of systems. This paper aims to shape the concept of resiliency in the context of a software system, whilst proposing a concrete way of attaining it, through the use of a recently emerged programming pattern – Railway Oriented Programming (ROP). The novelty of this approach is conferred by the use of a Functional Programming Pattern – ROP, in the context of distributed system design, where Object-Oriented Programming is prevalent due to the stateful nature of inter-process communication. The resulting system uses a hybrid design, capable of leveraging the strengths of both practices.

Chapter 1: Introduction