Scenario-based Elicitation, Specification, and Comprehension of Transient Software Behavior

Sebastian Frank, Alireza Hakamian, Samuel Beck, Christoph Zorn, André van Hoorn
Transient Behavior can be costly,…
… but hard to comprehend and specify

Amazon's one hour of downtime on Prime Day may cost it up to $100 million in lost sales


https://arstechnica.com/information-technology/2021/10/facebook-outage-likely-caused-60m-loss-impacted-small-businesses/

Quick, Simple, Systematic Elicitation and Precise Requirement Specification

- Successful Scenario Creation
  - Architecture Graph
  - Quick Replies

- Limited functionality
  (Too few metrics, stimuli types, quick replies, …)

5 min / task (after learning)

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RESIRIO: Tool Demo

https://youtu.be/jtdo0h7Jmpc
TransVis: Comprehension

Simple, Interactive Comprehension (and Specification) of Transient Behavior

Specification

Trans. Behavior Identification

Visualization

Resilience Triangle (Bruneau et al., 2007)

- Correct Specification and Comprehension Tasks
  - Helpful + Simple Visualizations

- Chatbot (almost) not used
  - Missing Overview

TransVis: Tool Demo

https://youtu.be/0IraekYS5oA
Current Work: Specification Process

Specification of more *complex, testable, and traceable* requirements

Editor Chain

Elicitation → (Mapping) → Structuring → (Mapping) → Quantification

Natural Language

Scenarios (ATAM)

Logic

Property Specification Patterns

Resilience Curves

Formal Language

PCTL, MTL,…
Conclusion / Future Work

**RESIRIO**

**SW-ARCHITECTS**

**Elicitation**

**Adaptation**

**Specification**

**SOFTWARE SYSTEM**

**Architectural Reconfiguration**

**Transient Behavior**

**Analysis / Learning**

**Verification**

Current Work: Specification Process + Editors

Simulation (MiSim), Model Checking, Chaos Experiments, …

**TransVis**

**Suggestions**

**Process + Editors**