BCT: A Toolset for Automated Failure Analysis

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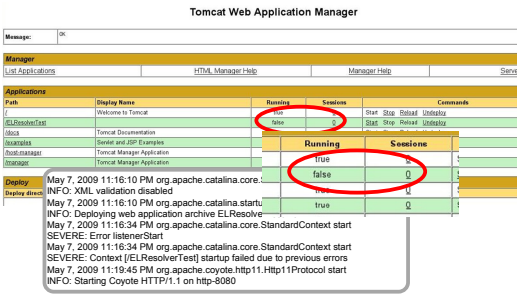
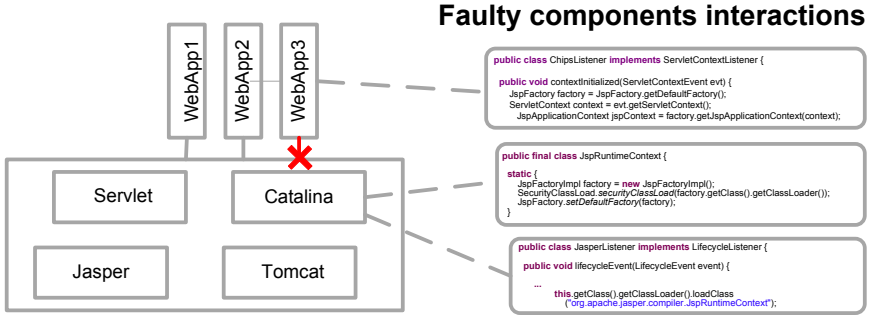
Failures in component based systems



A failure in Tomcat 6.0.4

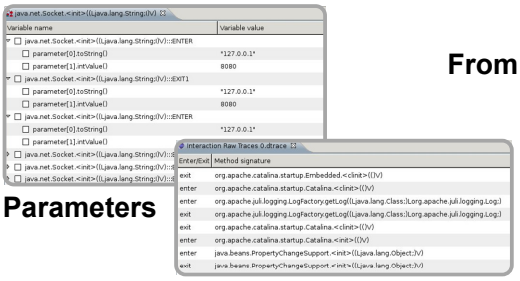
Faulty components interactions



Locating fault is difficult when failure is far from faulty interactions

BCT locates faults in 3 phases

Phase 1: Build behavioral models



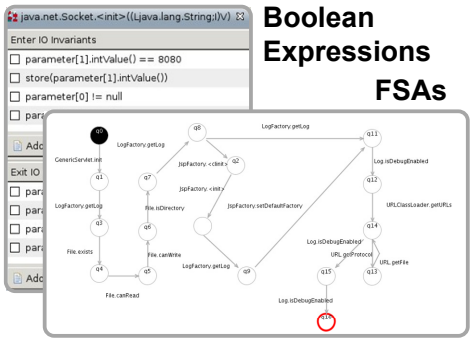
Parameters

Call sequences

From correct execution traces

BCT Inference Engine

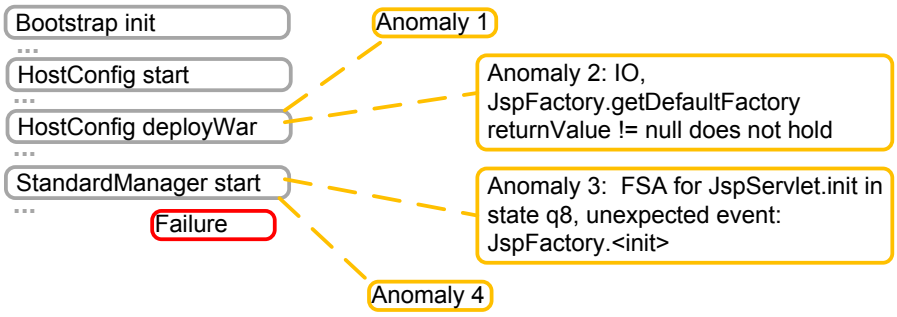
To models of correct behavior



Boolean Expressions

FSAs

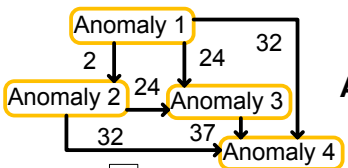
Phase 2: Trace faulty executions



Phase 3: Locate faults

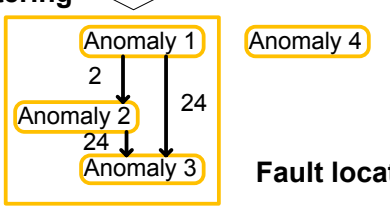
Dynamic call tree

From dynamic call tree to anomaly graph for fault localization



Anomaly graph

Clustering

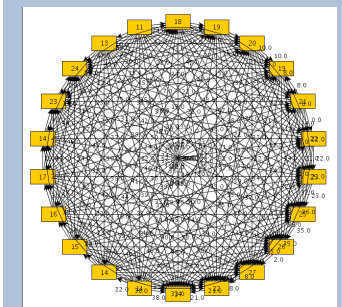


Fault location

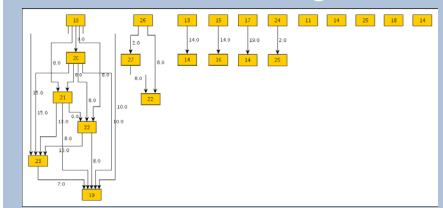
Case studies

Case study	ID	Connected Components	Inspected CC (false positives)
Eclipse 3.3	Bugid: 181288	11	2(0)
Eclipse prokekit chmod issue	ForumId 307527	1	1(0)
Eclipse prokekit EMT64 issue	BugId 157486	1	1(0)
TID OrbJ	BugId 413	1	1(0)
Tomcat 5.5.13	BugId 41939	2	1(0)
Tomcat 6.0.4	BugId 40820	2	1(0)

Eclipse 3.3 analysis



Clustering



Anomaly graph