Introducing FastFix

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CREST workshop

May 2011

Maintenance

Software engineers spend more than 50% of their time working on software maintenance tasks (Fjeldstad and Hamlen)

Maintenance

Software maintenance is a key factor to customer's perception of software product quality.

Maintenance

Maintenance constitutes a growing percentage of the software business market.

- Annual maintenance of software products tends to range from 15% to 25% of the software license list prices (Disbrow, and Igou)

FastFix

- June 2010 – November 2012
- Participants

Participant	Country
S2	Spain
Technische Universität München	Germany
INESC-ID	Portugal
Lero	Ireland
Prodevelop	Spain
TXT	Italy

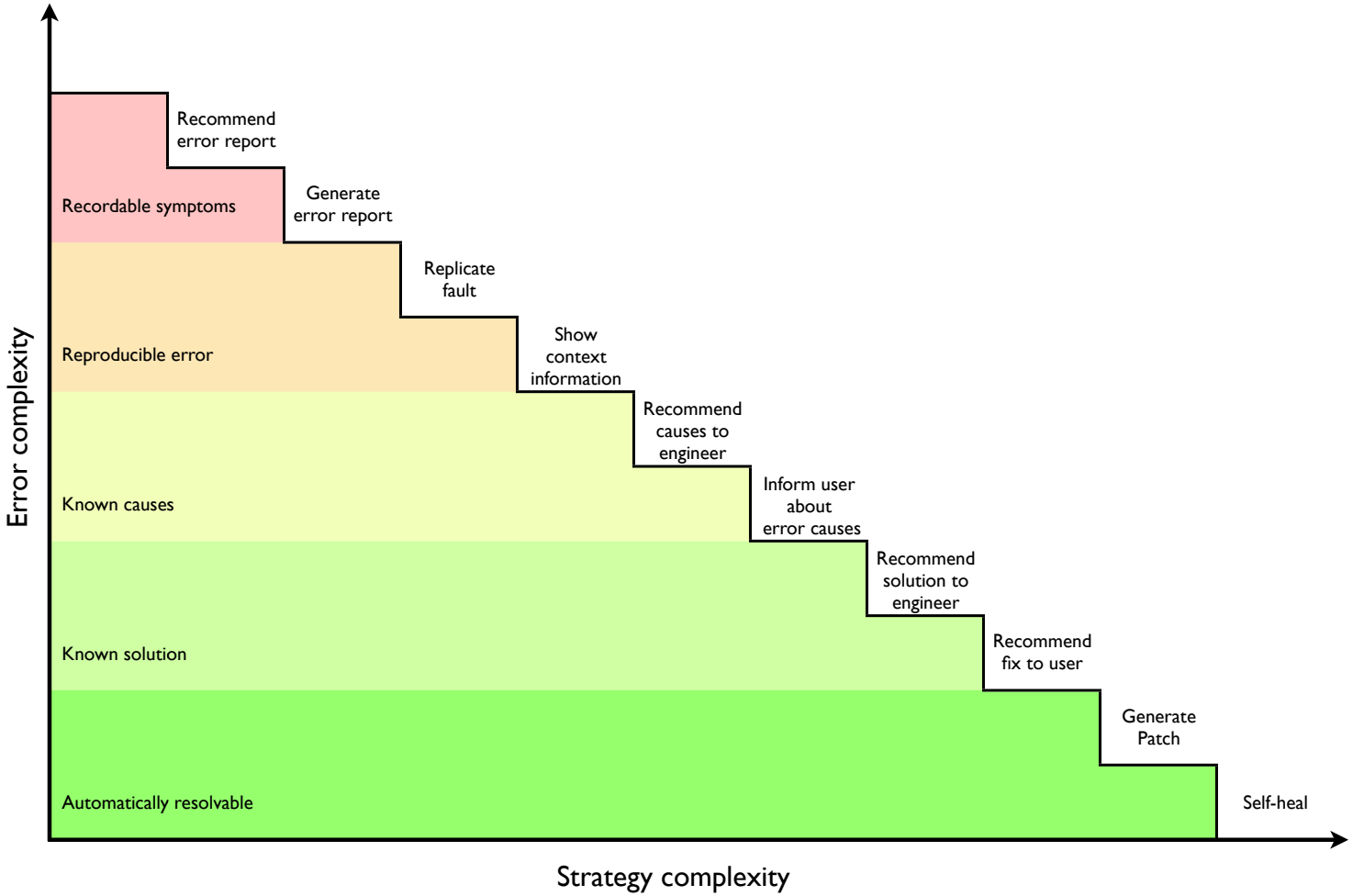
FastFix

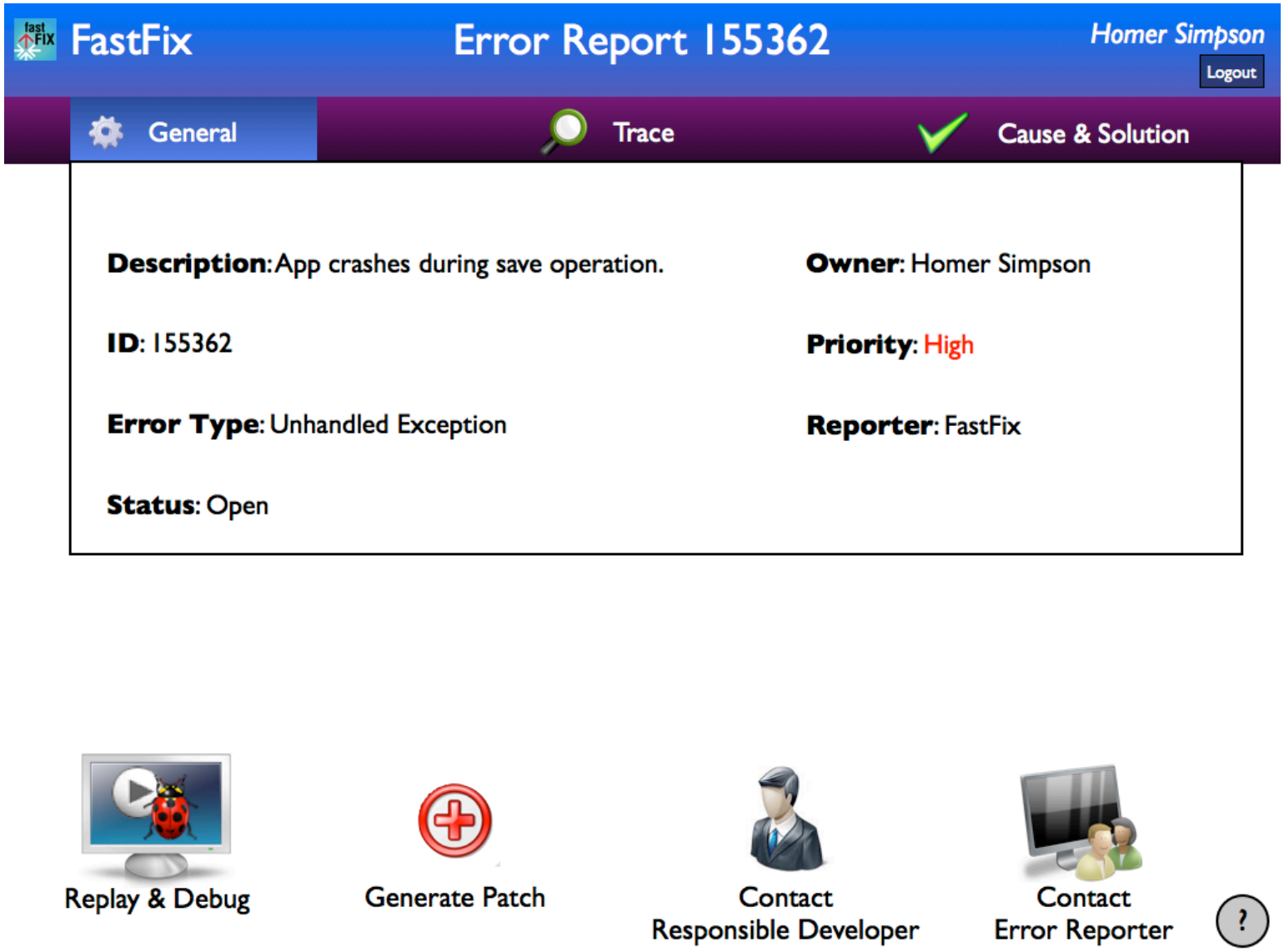
- **Main Goal:** Provide maintenance services to software applications that are:
  - Time efficient
  - Low cost
  - Strongly accurate

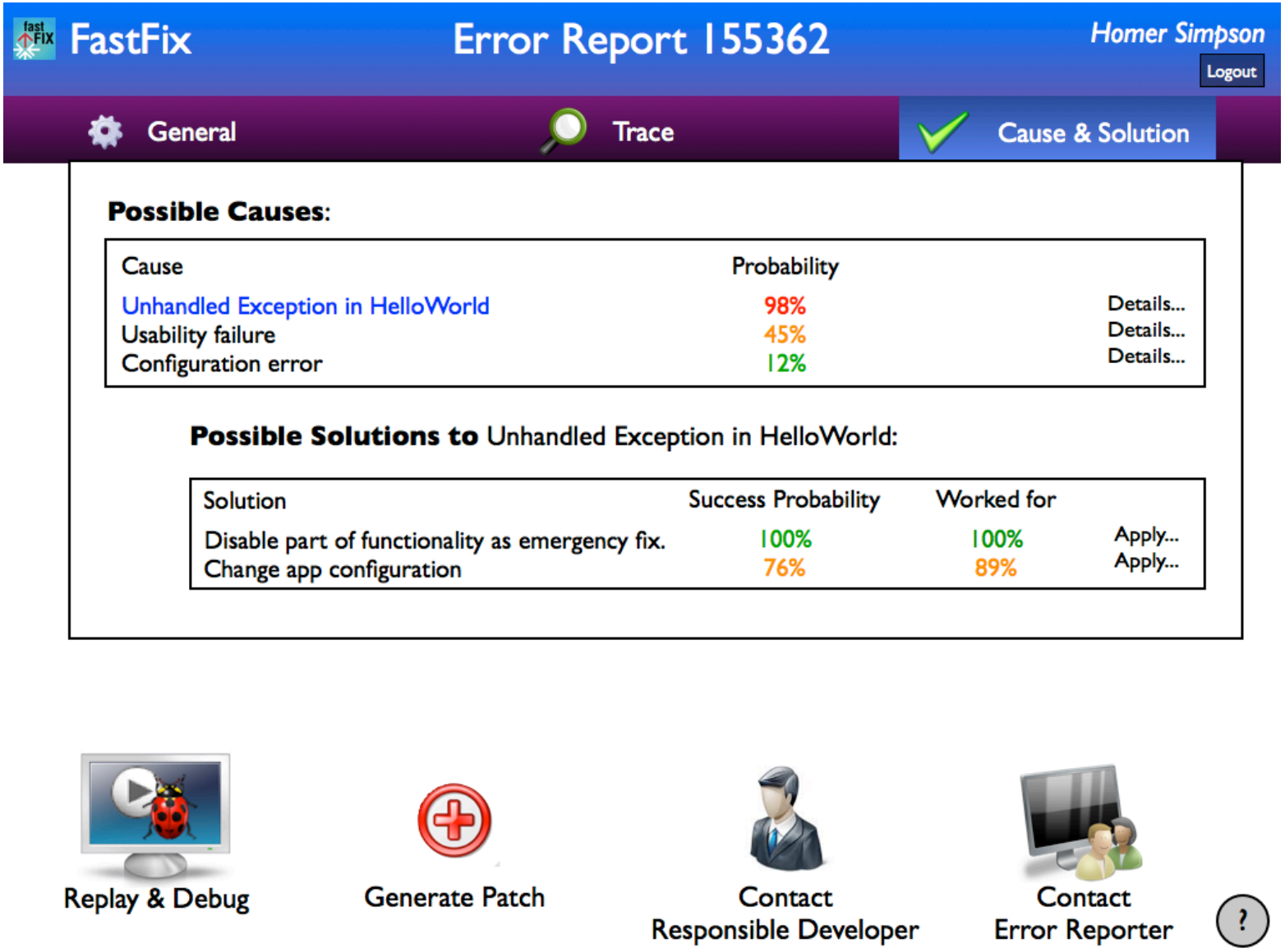
How

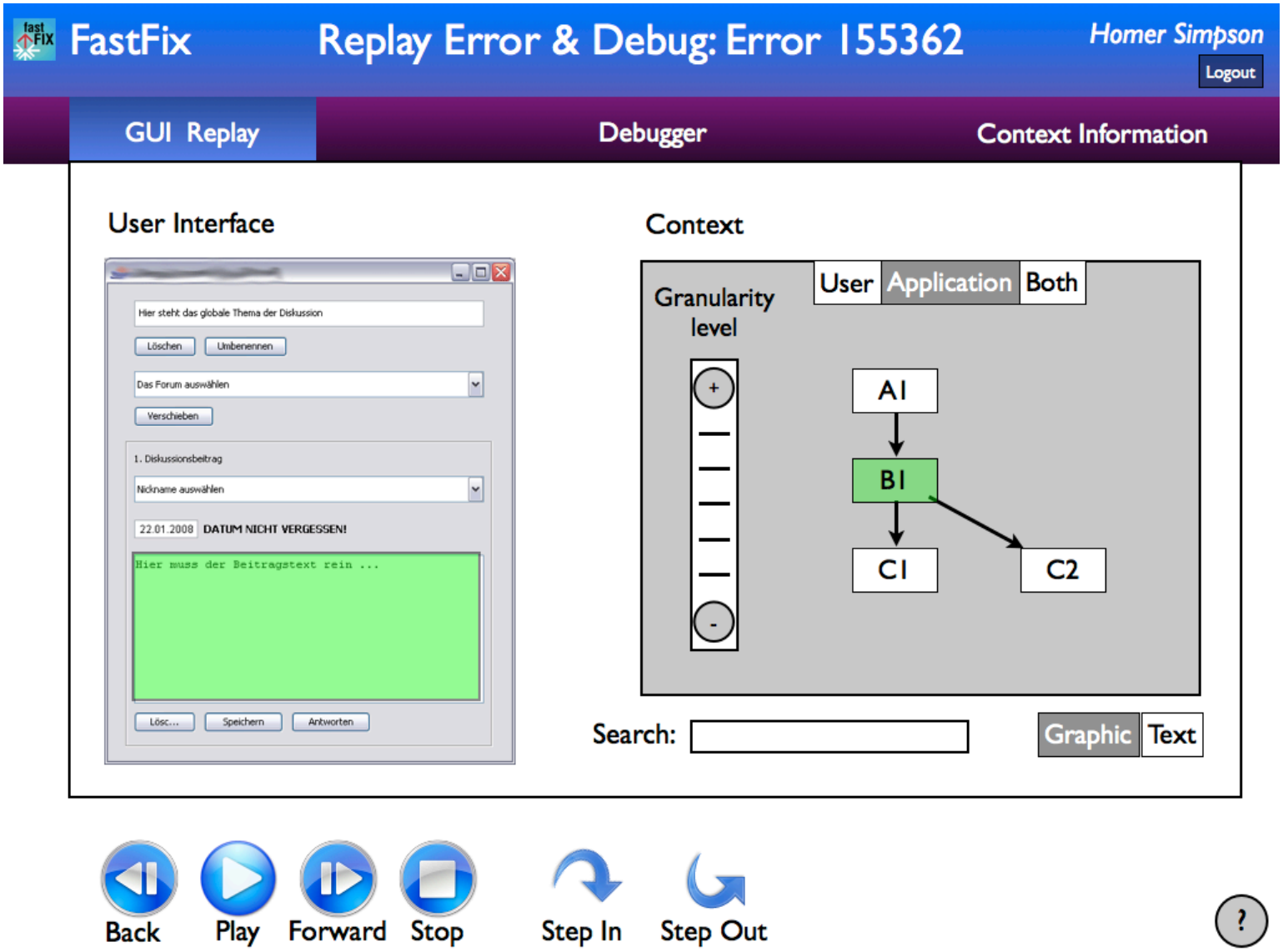
- Collect information about application execution and user interaction
- Use collected information to:
  - Detect faulty situations (execution errors, performance degradation
  - Possible causes for faulty situations
- Support automatic fault replication
- Generate and deploy patches

How: Error Handling Strategies

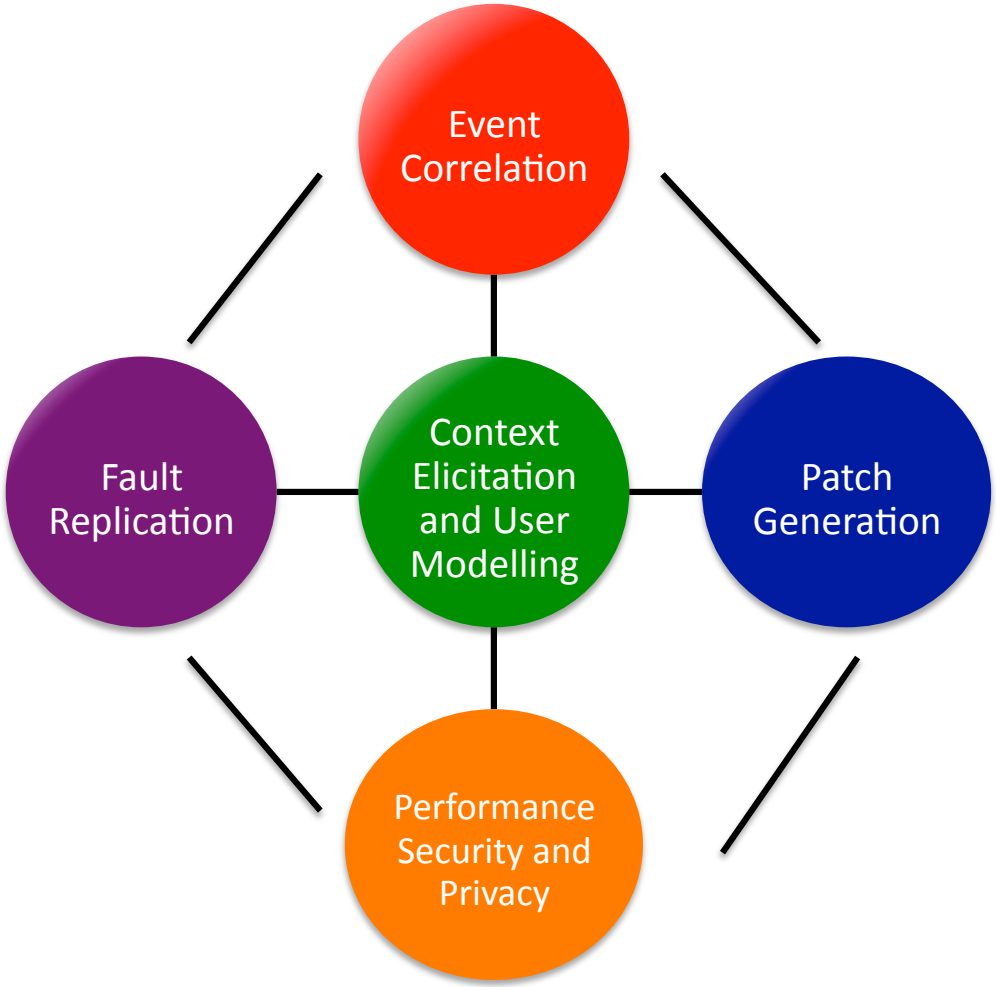



FastFix
Error Report 155362
Homer Simpson
Logout
General
Trace
Cause & Solution
Description: App crashes during save operation.
Owner: Homer Simpson
ID: 155362
Priority: High
Error Type: Unhandled Exception
Reporter: FastFix
Status: Open
Replay & Debug
Generate Patch
Contact Responsible Developer
Contact Error Reporter
?

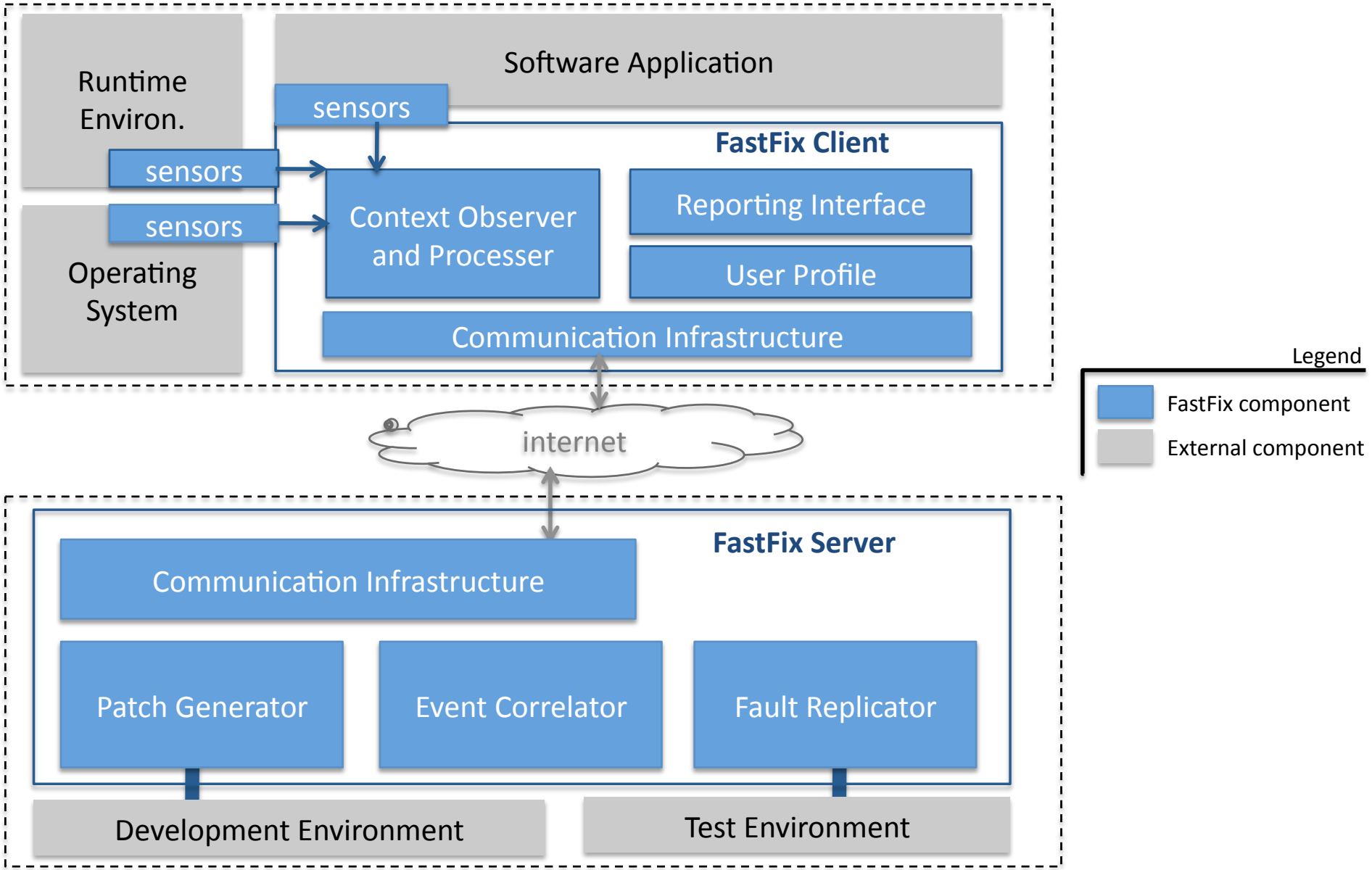

FastFix
Error Report 155362
Homer Simpson
Logout
General
Trace
Cause & Solution
Possible Causes:
Cause
Probability
Unhandled Exception in HelloWorld
98%
Details...
Usability failure
45%
Details...
Configuration error
12%
Details...
Possible Solutions to Unhandled Exception in HelloWorld:
Solution
Success Probability
Worked for
Disable part of functionality as emergency fix.
100%
100%
Apply...
Change app configuration
76%
89%
Apply...
Replay & Debug
Generate Patch
Contact Responsible Developer
Contact Error Reporter
?


FastFix
Replay Error & Debug: Error 155362
Homer Simpson
Logout
GUI Replay
Debugger
Context Information
User Interface
Hier steht das globale Thema der Diskussion
Löschen
Umbenennen
Das Forum auswählen
Verschieben
1. Diskussionsbeitrag
Nickname auswählen
22.01.2008
DATUM NICHT VERGESSEN!
Hier muss der Beitragstext rein ...
Lösc...
Speichern
Antworten
Context
Granularity level
User
Application
Both
A1
B1
C1
C2
Search:
Graphic
Text
Back
Play
Forward
Stop
Step In
Step Out
?

Research Lines



FastFix Overall Architecture



What does all this have to do with search-based software engineering?

FastFix and Search-based Software Engineering

- Currently search-based techniques are not being used in FastFix.
- Some possible applications could help answer the following questions:
  - Which code blocks give more information concerning a certain feature or are more relevant for a programmer executing a certain task (e.g. fixing a bug)?
  - What is the best way to fix a certain bug?(self-healing) / What is the best patch?
  - What is the best allocation of human resources for a task? (automatically assign developers to a bug based on previous software contributions)

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