MICHIGAN STATE
UNIVERSITY

Beta Presentation
Android Exploit Fuzzing Analysis

The Capstone Experience

Team Google

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Fall 2022

From Students…
…to Professionals

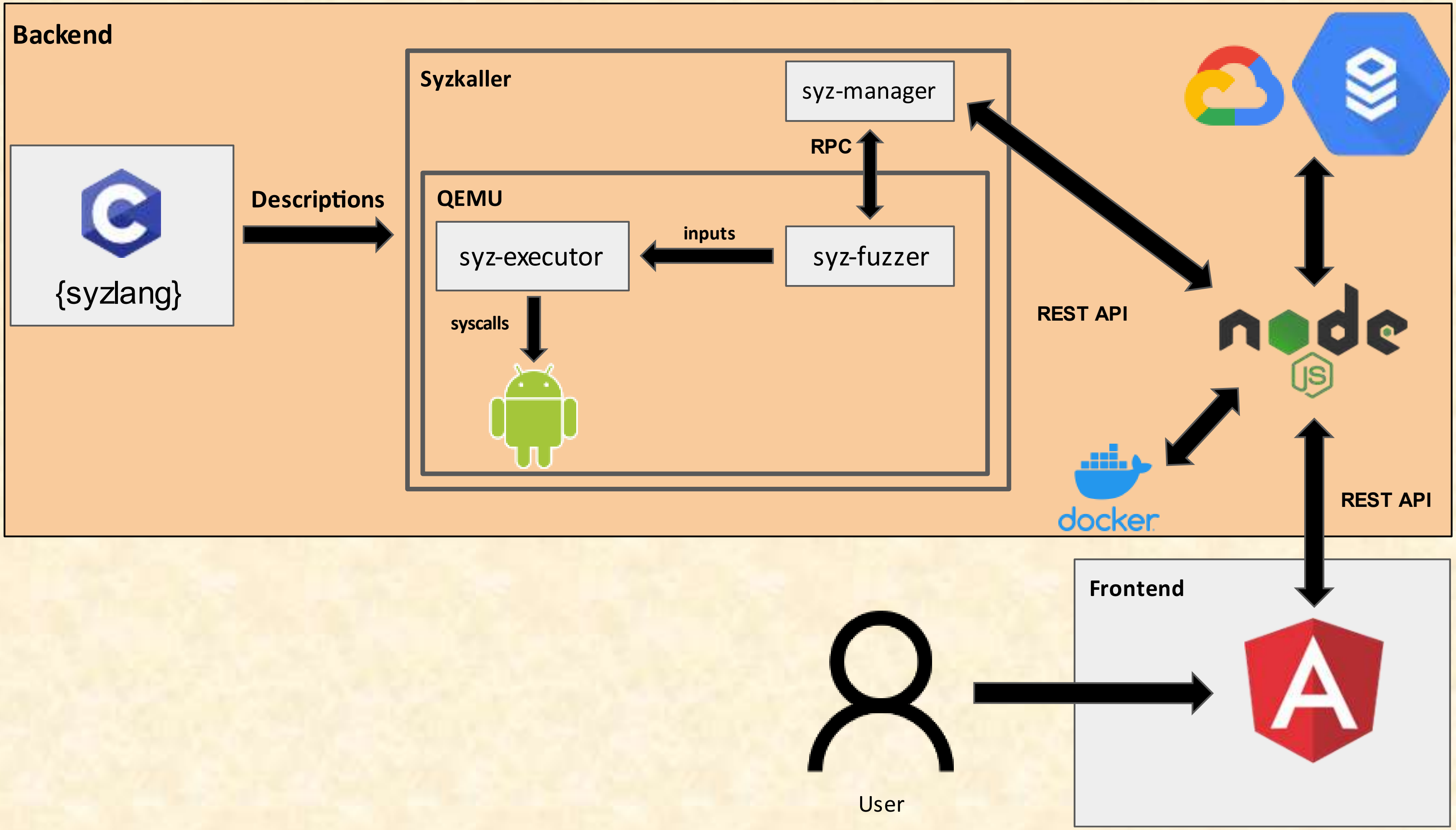
Project Sponsor Overview

- Google – Tech
  - Founded: Menlo Park, CA in 1998
    - Larry Page
    - Detroit, MI; Seattle, WA
    - 50 Countries; 70 Offices
  - Main Product: Search Engine
  - Revenue Source: Ad services
  - Internet connectivity; Smart devices
    - Google Chrome, Google Home
  - Developer of Android OS

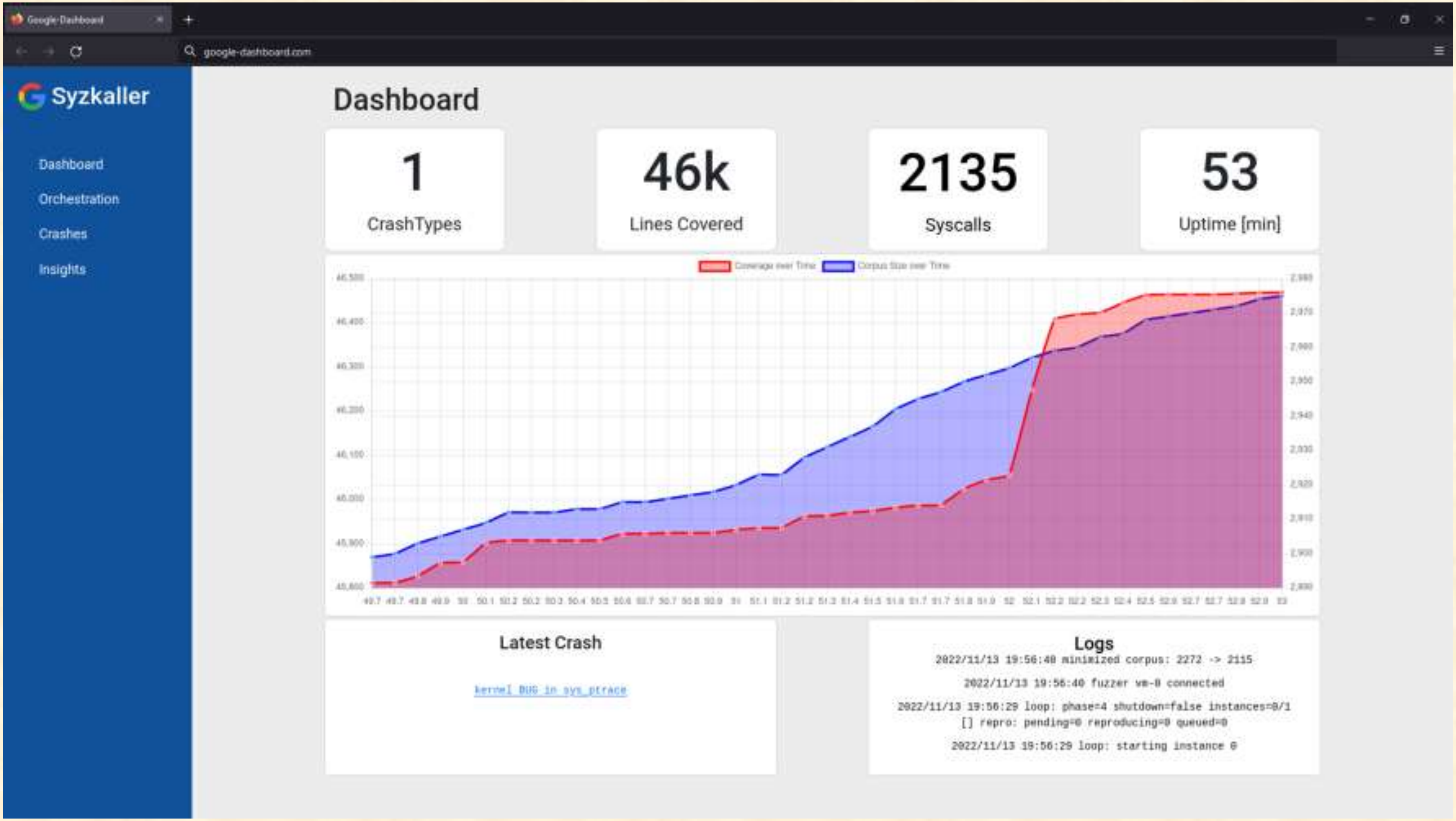
Project Overview

- Problems:
  1. While syzkaller detects bugs in Android OS, the software is constantly evolving and needs improvement
  2. Fuzzing performance can be variable, depending on the configuration
- Solutions:
  - Visualize bugs in the Android kernel intuitively
  - Extending syzkaller descriptions
  - Running multiple syzkaller instances with custom configuration

System Architecture



Dashboard



Dashboard

1	46k	2135	53
CrashTypes	Lines Covered	Syscalls	Uptime [min]

Latest Crash

kernel BUG in sys_ptrace

Logs

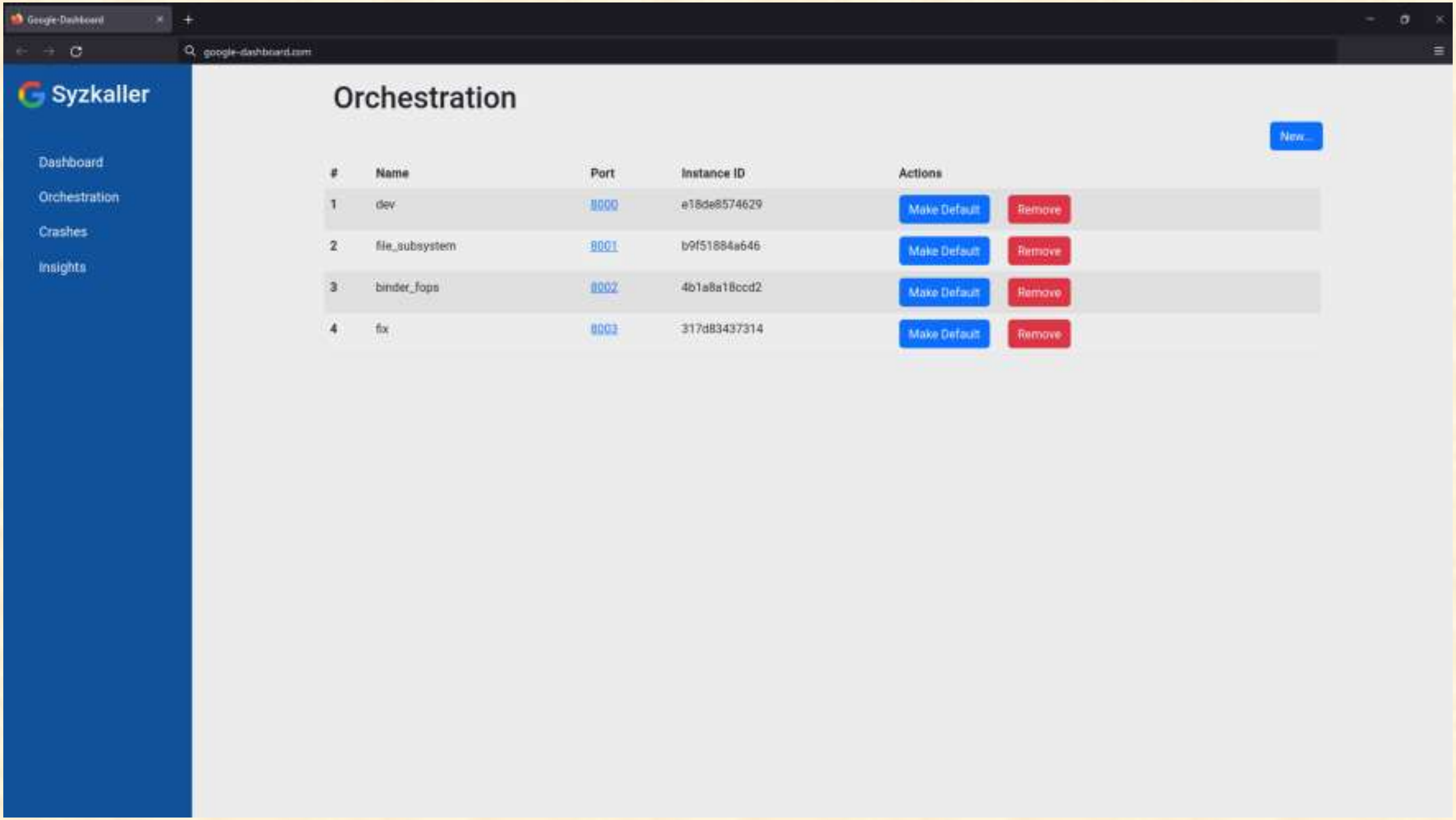
```
2022/11/13 19:56:40 minimized corpus: 2272 -> 2115

2022/11/13 19:56:40 fuzzer vm-0 connected

2022/11/13 19:56:29 loop: phase=4 shutdown=false instances=0/1
[] repro: pending=0 reproducing=0 queued=0

2022/11/13 19:56:29 loop: starting instance 0
```

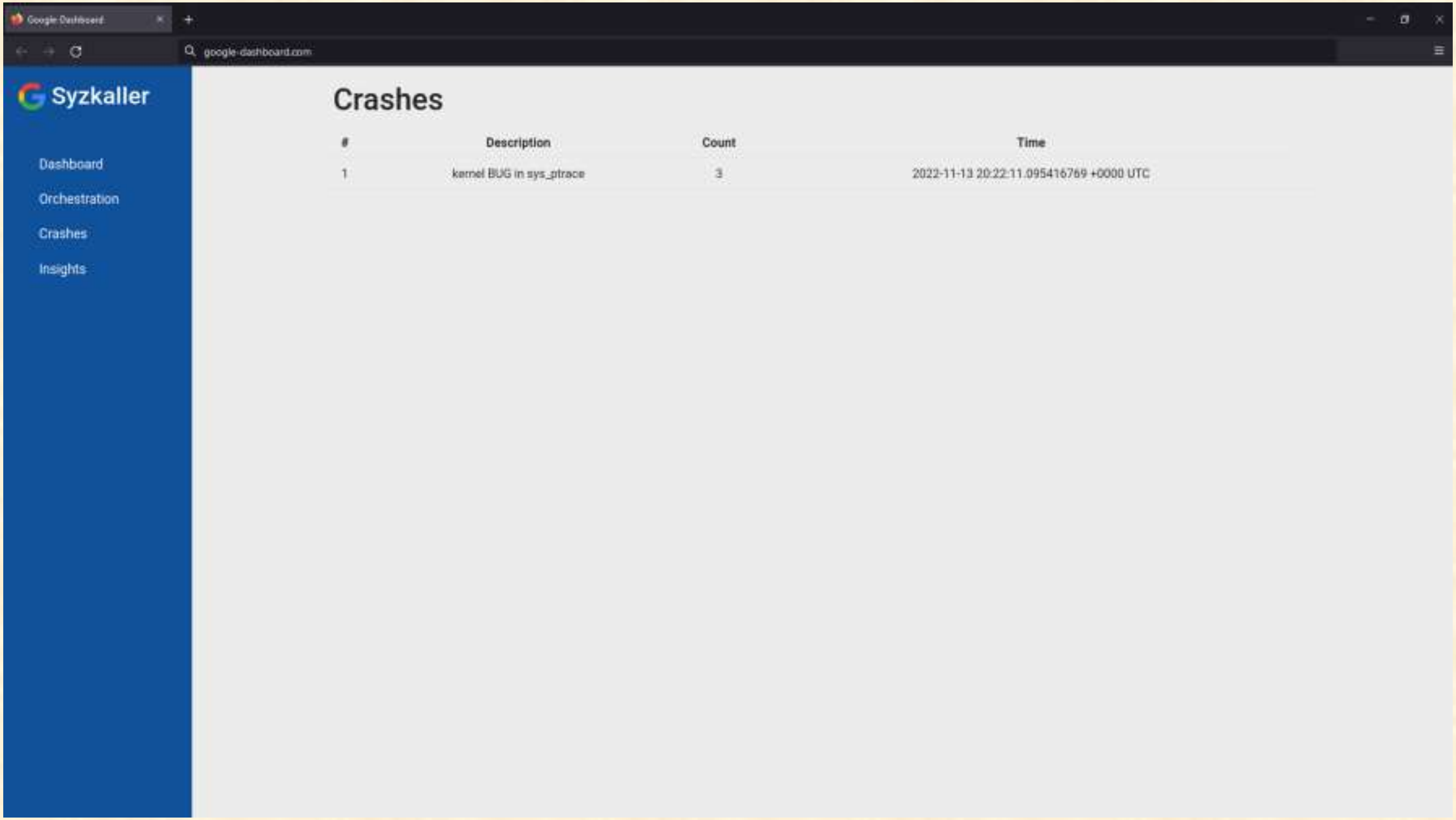
Orchestration



Orchestration

#	Name	Port	Instance ID	Actions
1	dev	8000	e18de8574629	Make Default Remove
2	file_subsystem	8001	b9f51884a646	Make Default Remove
3	binder_fops	8002	4b1a8a18ccd2	Make Default Remove
4	fix	8003	317d83437314	Make Default Remove

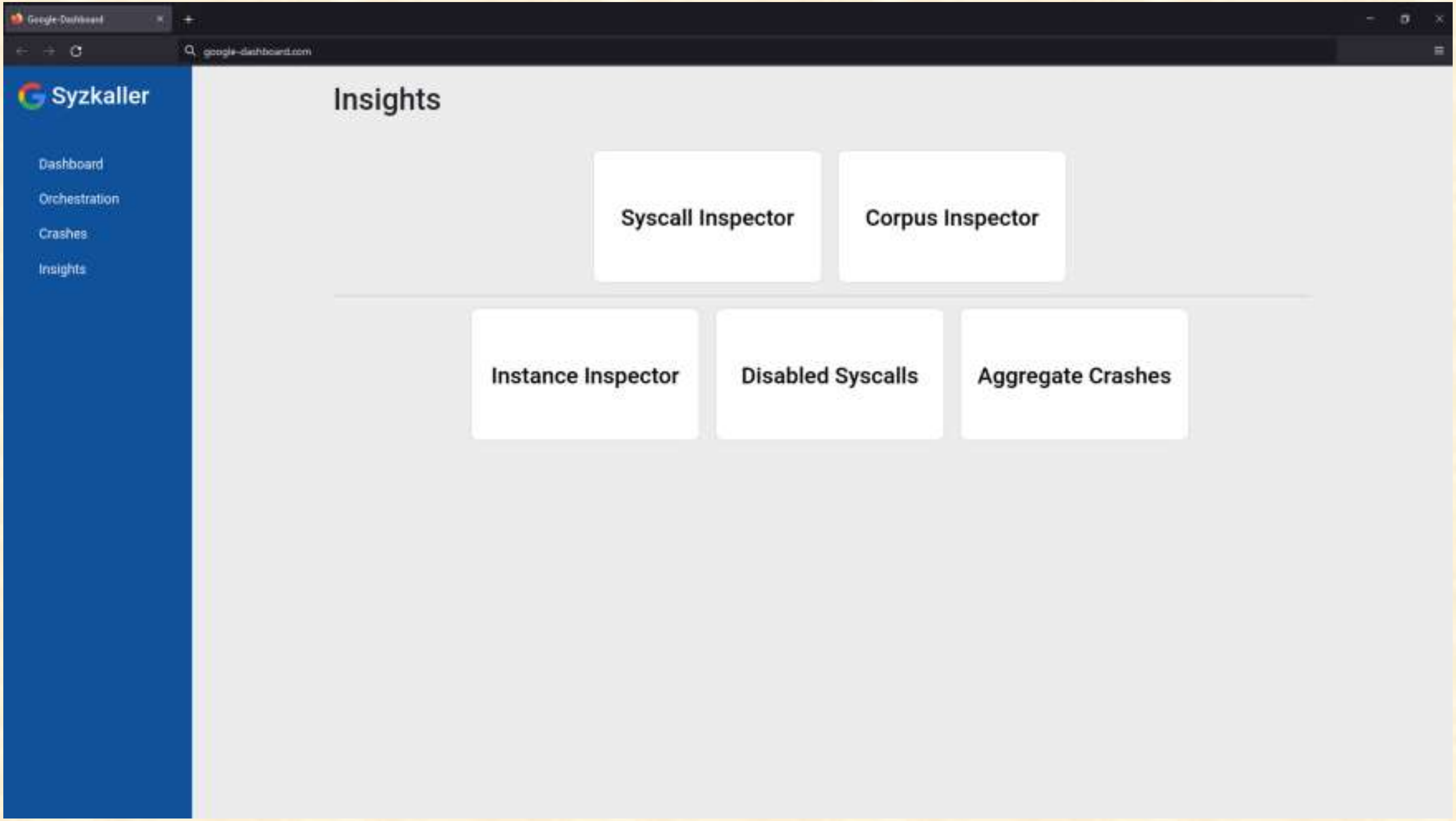
Crashes



Crashes

#	Description	Count	Time
1	kernel BUG in sys_ptrace	3	2022-11-13 20:22:11.095416769 +0000 UTC

Insights


Google-Dashboard
google-dashboard.com
Syzkaller
Dashboard
Orchestration
Crashes
Insights
Insights
Syscall Inspector
Corpus Inspector
Instance Inspector
Disabled Syscalls
Aggregate Crashes

What’s left to do?

- Features
- Stretch Goals
  - CPU Utilization
  - Make Syzkaller Run on Google Cloud Engine
  - Analyze exploits to Write Descriptions
  - Write more Binder IPC Descriptions
- Other Tasks
  - Aesthetic fixes for Orchestration Tab

Questions?

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