BugZoo

A Decentralised Platform for Historical Software Bugs

https://www-users.york.ac.uk/~ss44/bib/ss/nonstd/icse2018.pdf

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What is BugZoo?

- Overview:
  - BugZoo is a platform designed for distributing and reproducing historical software bugs.
  - It serves both researchers and developers, particularly those working on testing, analysis, and automated program repair (APR) tools.

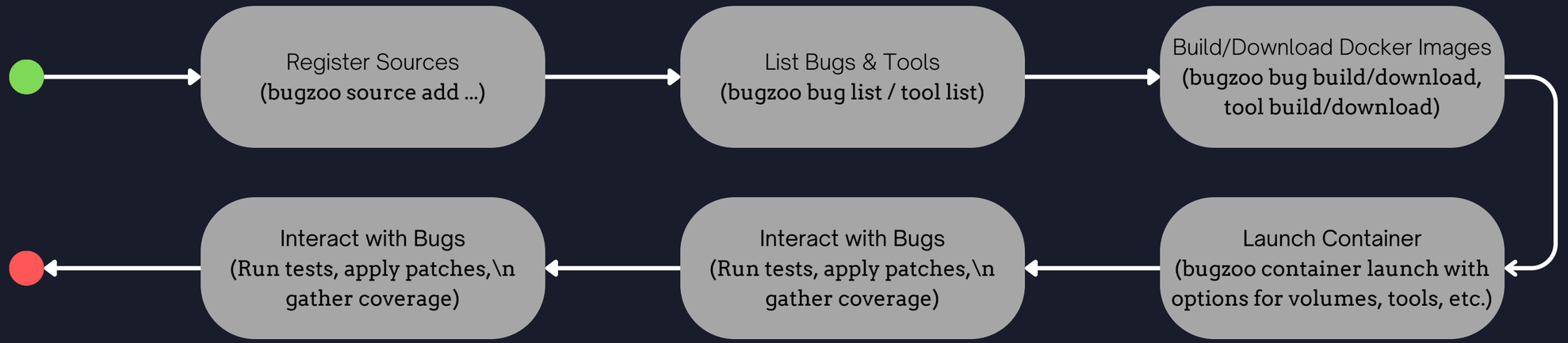
- Key Point:
  - It enables safe and reproducible experiments through containerisation.

How Does BugZoo Work?

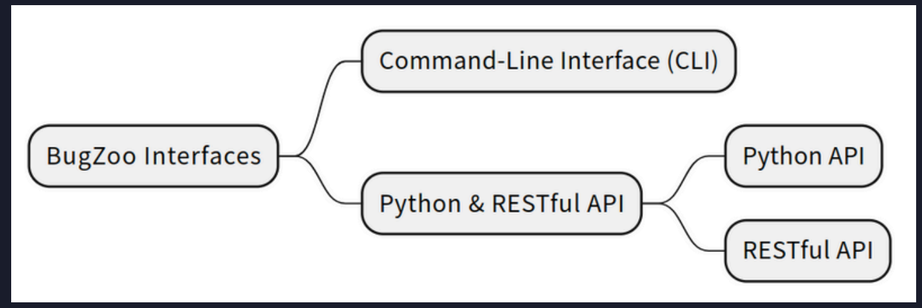
- BugZoo leverages Docker containers to create isolated environments where each bug is packaged as its own minimal Docker image.

Key Processes

1. Source Registration: Users add sources (remote Git repositories or local directories) that contain datasets of bugs or APR tools.
2. Bug & Tool Management: Bugs and tools are listed, built (or downloaded), and managed via the CLI and API.
3. Container Launch: Each bug is run inside an ephemeral container, ensuring isolation and reproducibility.



Capabilities



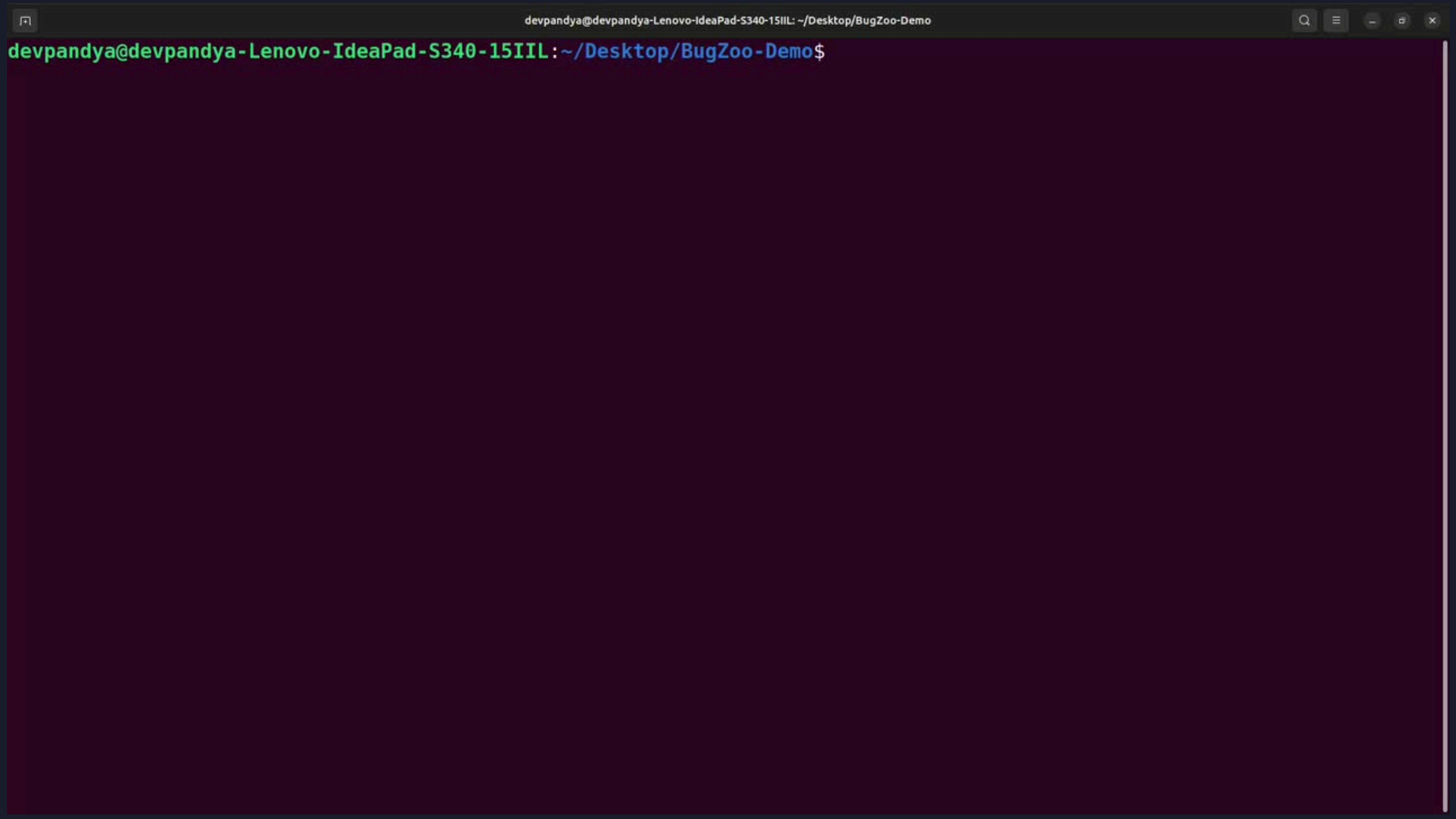
CLI

- Comprehensive commands to list, build, download, and manage bugs, tools, and containers.
- Examples include:
  - *bugzoo bug list*
  - *bugzoo source add*
  - *bugzoo container launch.*

API

- The Python API allows for programmatic control over bug interactions (e.g., executing tests, applying patches).
- The RESTful API enables integration with tools written in other languages.

Demo


devpandya@devpandya-Lenovo-IdeaPad-S340-15IIL: ~/Desktop/BugZoo-Demo
devpandya@devpandya-Lenovo-IdeaPad-S340-15IIL:~/Desktop/BugZoo-Demo$

Advantages

Reproducibility:

- Each bug is isolated in its own container, ensuring experiments can be reliably repeated.

Performance:

- Docker containers launch in under a second, minimizing overhead compared to full virtual machines.

Modularity & Flexibility:

- Bugs and tools are maintained independently, allowing users to mix-and-match without conflicts.

Ease of Use:

- Simple CLI commands and a Python API lower the barrier to entry for users.

Decentralized Architecture:

- Allows easy integration of new datasets and tools without a central repository.

Limitations

OS Dependency

Setup Complexity

Scope of Bugs

Resource Overhead

Professional Applications

- APR Tool Testing:
- Continuous Integration (CI):
- Research & Experimentation:
- Tool Interoperability:

Conclusion

- Summary:
  - BugZoo is a versatile platform that leverages containerisation to offer reproducible, isolated environments for testing and interacting with historical bugs.
  - Its CLI and API capabilities make it ideal for both academic research and professional APR tool development.

- Invitation:
  - Encourage questions and discussions about potential integrations or further applications in your projects.

Thank You