Unit Testing For Kata Containers

NDSU | COMPUTER SCIENCE

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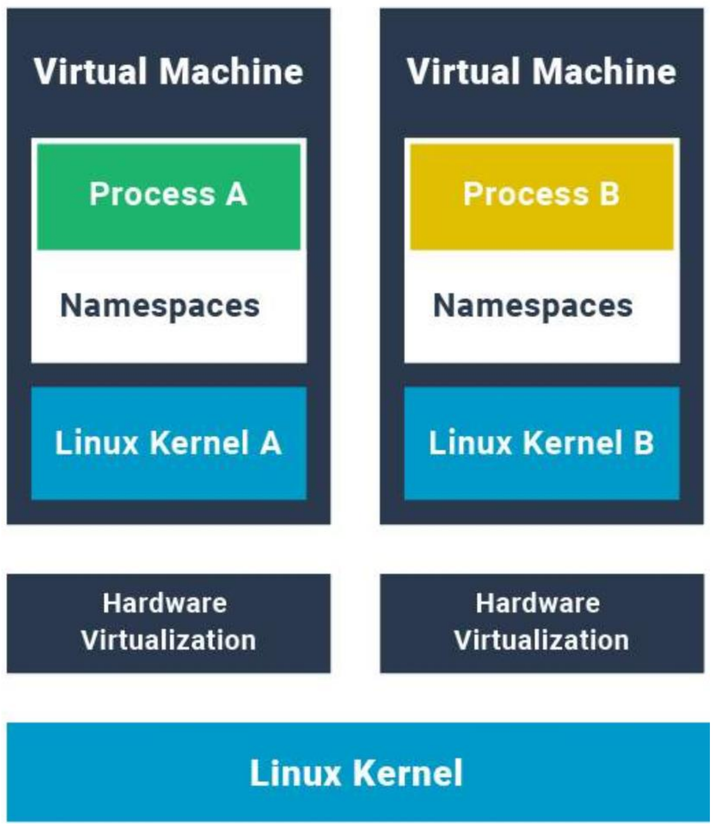
Introduction

Kata Containers is an open-source container runtime with the speed of containers and security of virtual machines.

What is containerization?
Containerization allows services to be sandboxed from other services on the same system, allowing for cross platform compatibility and improved security.



Our Goal

We were tasked with improving unit test coverage for six files.

Our goal was to:
- Improve test coverage in these files by about 20%
- Fix any bugs found
- Improve code quality

Why unit test?
- Catch any future regressions
- A chance to improve quality of code under scrutiny
- Gain in-depth knowledge of the code under test

Results

File	Coverage Before	Coverage After	Change
agent/main.rs	1.5%	22.44%	+20.94%
agent/mount.rs	43.7%	56.58%	+12.88%
agent/rpc.rs	15.3%	36.08%	+20.78%
agent/sandbox.rs	64%	76.97%	+12.97%
rustjail/lib.rs	0%	59.74%	+59.74%
rustjail/mount.rs	83.8%	86.29%	+2.49%

Not measured:
- Tests that require privileges to run
- Functions previously covered with no dedicated tests
- Other improvements including bug fixes and small refactors

Workflow

Kata Containers uses GitHub for project management.
- Contributors from across the world work on Kata Containers
- Communication is primarily asynchronous
- All decisions and discussions are public and tracked in GitHub

Pull Request Process

- ✓ Reviews from two maintainers
- ✓ Integration tests passing
- ✓ Unit tests passing
- ✓ Code style tests passing

Tech Used: Rust

- A relatively new programming language
- Designed to guarantee memory safety
- Offers high performance
- Has a built-in unit test runner