



gem5 Workshop 2023

Welcome Presentation

Presentation by Bobby R. Bruce

It's great to see y'all here



<https://www.gem5.org/events/isca-2023>

The high-level agenda:

- 20 presentations.
- A panel Session: “The Future of gem5”.
- Poster session.
- Awards.

House keeping:

- Coffee Break: 11:00 – 11:20
- Lunch: 12:30 – 14:00
- Coffee Break: 15:30 – 16:00
- Closing: 17:00



Most important thing: WiFi

Network: FCRC2023

Password: fcrc23ACM



Why are we here?



- The leading open-source computer-system architecture simulator.
- Officially released 2011 (though merger of m5, 2002, and GEMS, 2000).
- Over 20,000 commits, over 450,000 lines of code.
- Over 1,000 commits in the last year.
- Distributed development: Industry, Academia, Research Labs, anyone,



Why are we here?



The purpose of the gem5 Workshop is to give members of the gem5 community to meet in person, share their work, and discuss and plan for the future of gem5.



What's happened since we last met?

*A small selection of
noteworthy
achievements.*



What's happened since we last met?

The 2022 Bootcamp



- 50 attendees.
- 5 Full days.
- A comprehensive course on gem5.
- Hosted at UC Davis, all expenses paid.

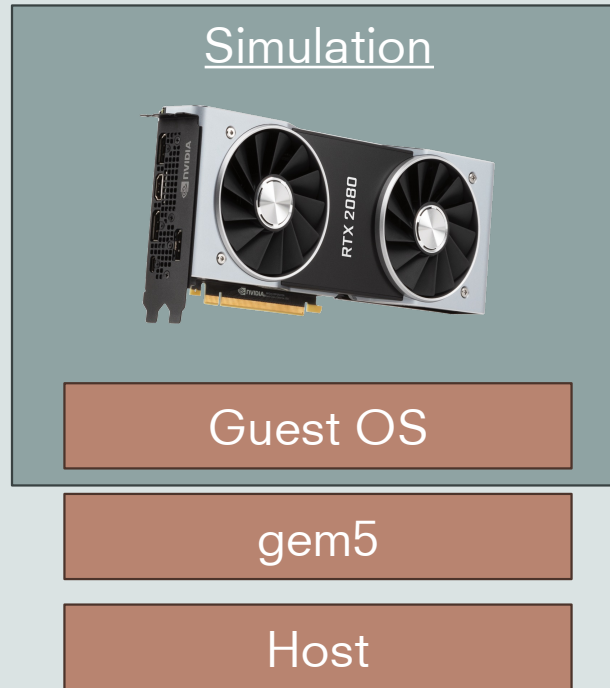
Feedback received:

- 95% "strongly agreed" that the Bootcamp was valuable in getting started with gem5.
- 95% "agreed" or "strongly agreed" that the Bootcamp helped them accomplish their research goals.
- 81% were "more confident" or "much more confident" in modifying gem5.



What's happened since we last met?

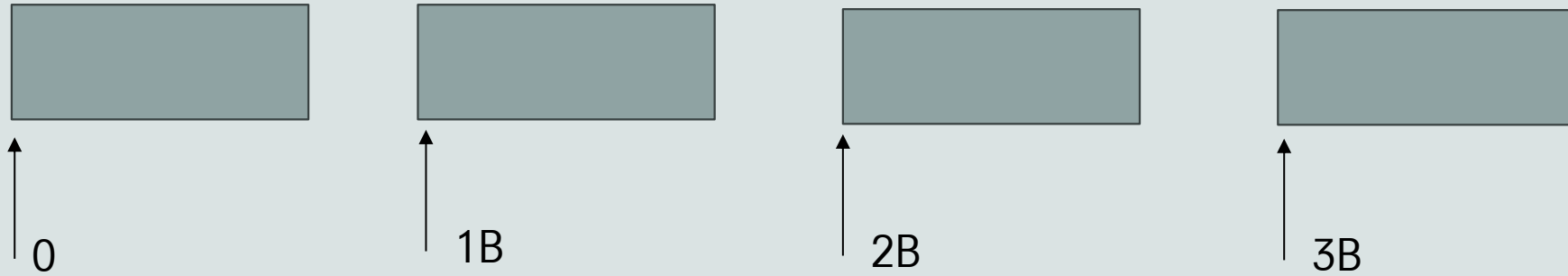
GPU-FS



What's happened since we last met? *Simpoint/Looppoint*



What's happened since we last met? *Simpoint/Looppoint*



Zhantong to
talk about this
at 9:40

What's happened since we last met?

All/gem5

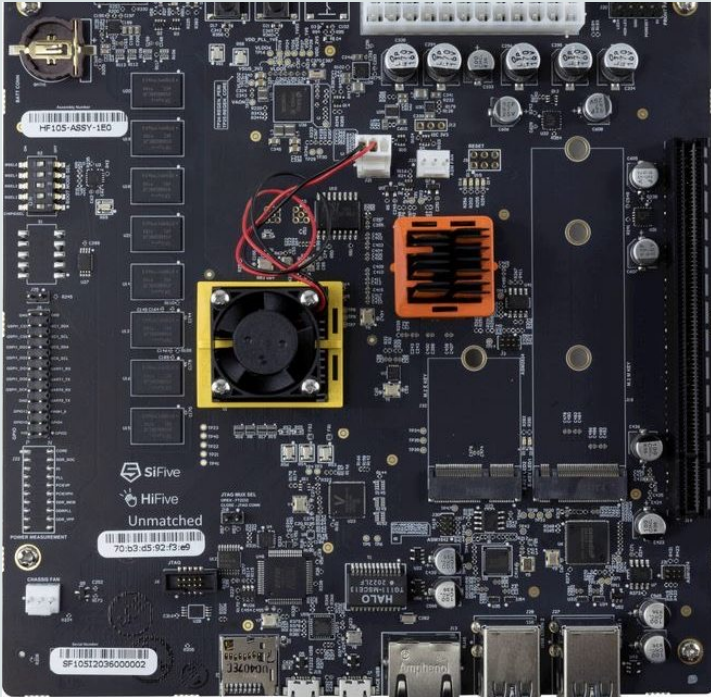


pre-Version
22.1

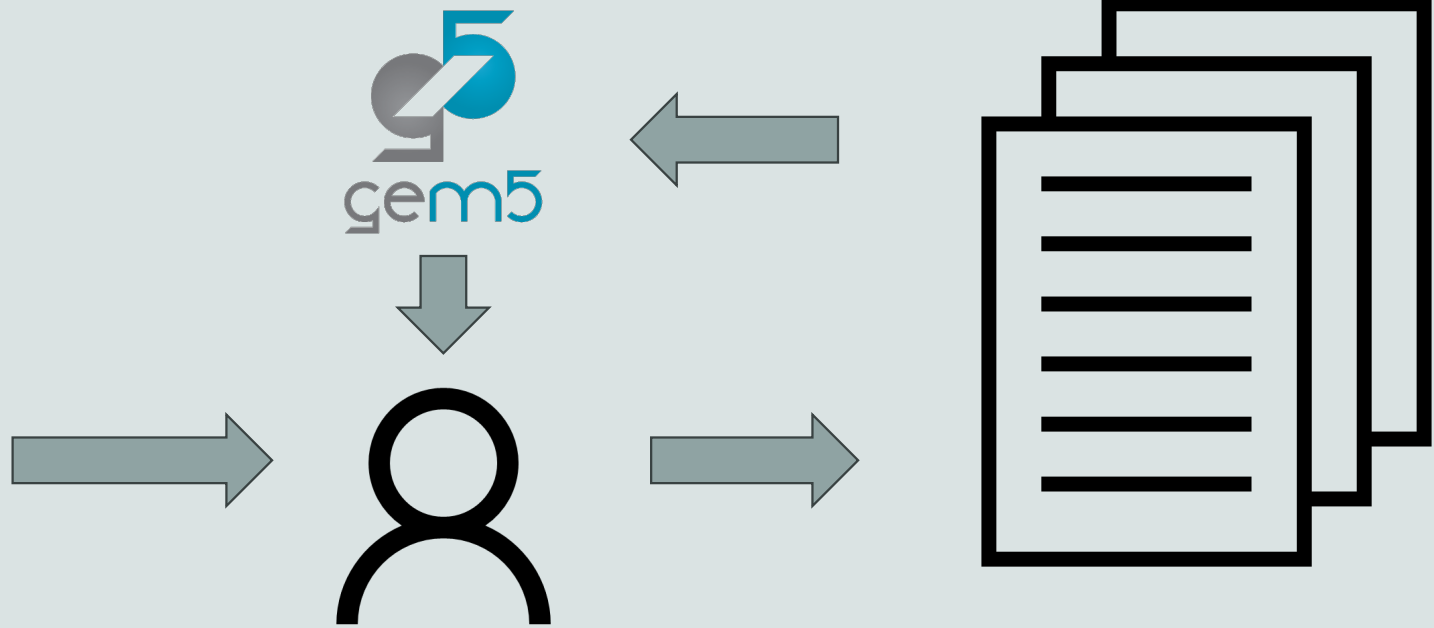


Version
22.1+

What's happened since we last met? *Started "Known Good Configs"*



SiFive Unmatched Board

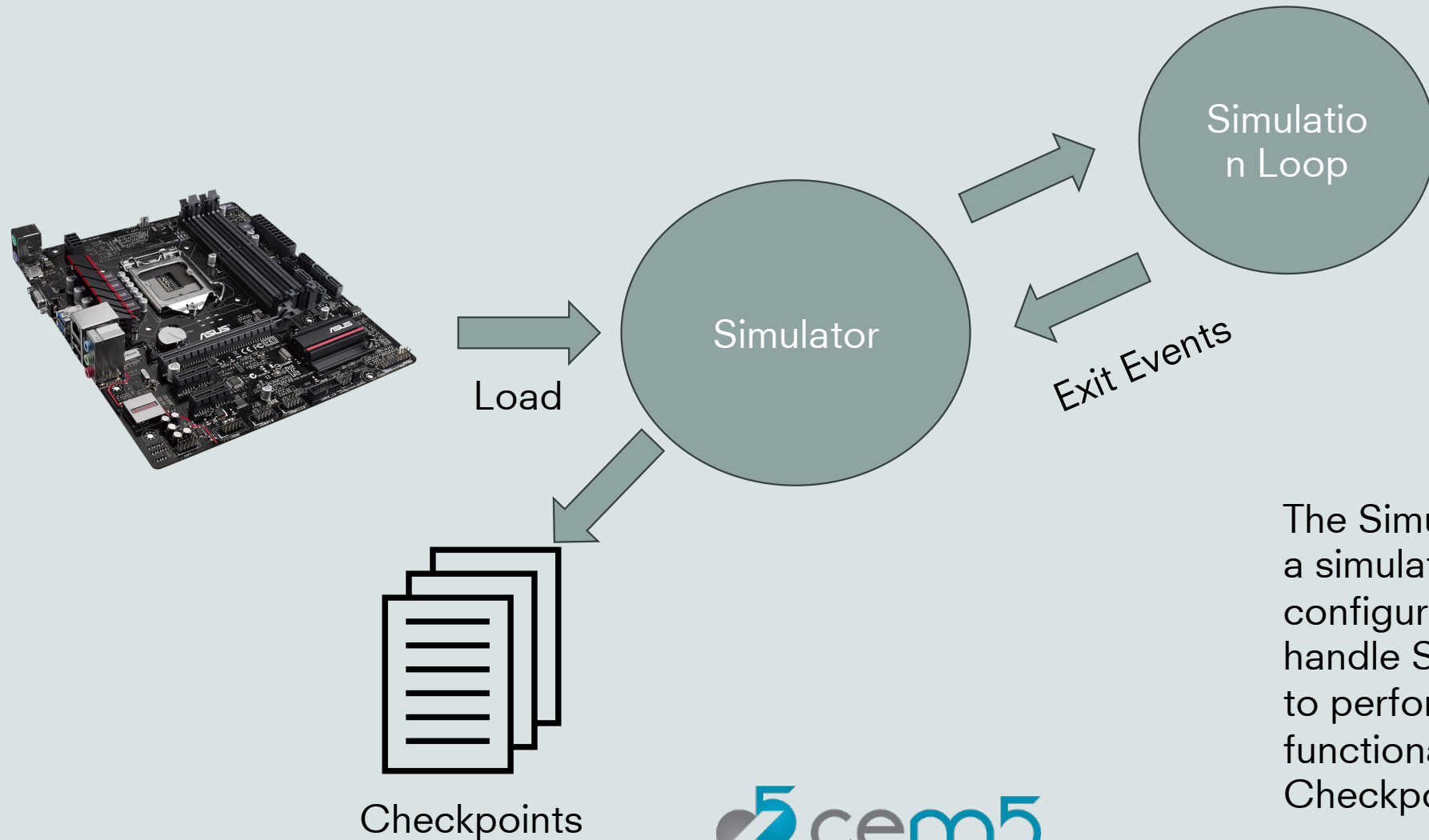


RISC-V Matched Board



What's happened since we last met?

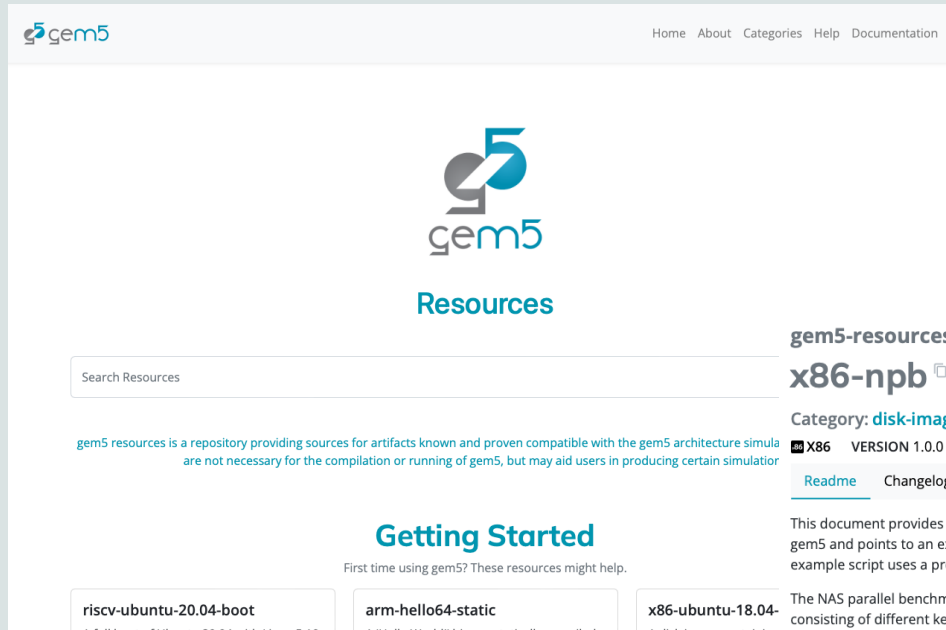
Simulator Module



The Simulator module loads a simulation and can be configured by the user to handle Simulation loop Exits to perform useful functionality. E.g., create a Checkpoint.

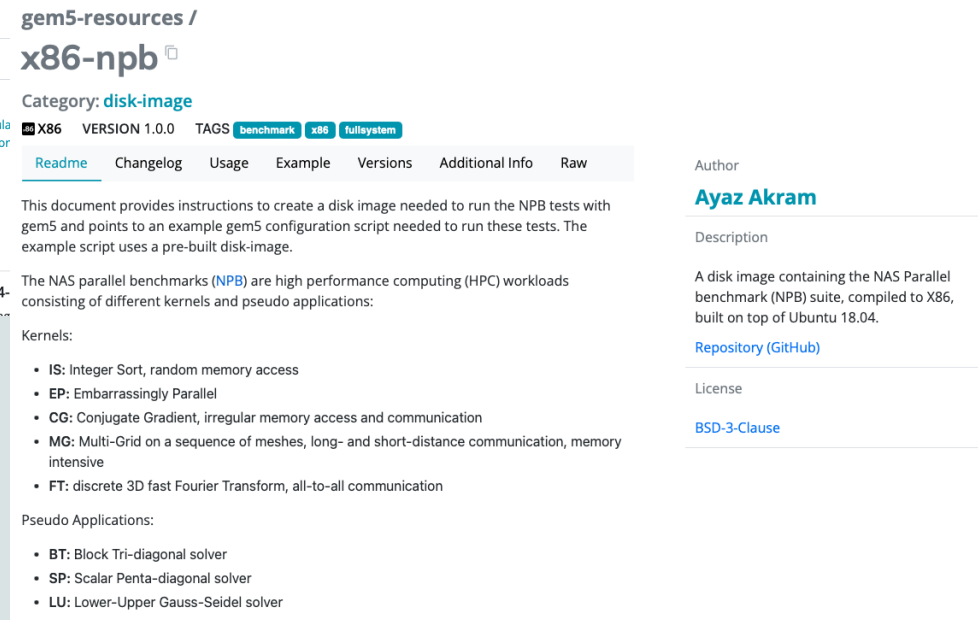
What's happened since we last met?

gem5 Resources Improvements



The screenshot shows the gem5 Resources website. At the top left is the gem5 logo and navigation links: Home, About, Categories, Help, Documentation. The main heading is "Resources" with a search bar below it. A paragraph states: "gem5 resources is a repository providing sources for artifacts known and proven compatible with the gem5 architecture simulators. These artifacts are not necessary for the compilation or running of gem5, but may aid users in producing certain simulation results." Below this is a "Getting Started" section with the text "First time using gem5? These resources might help." and three resource cards: "riscv-ubuntu-20.04-boot", "arm-hello64-static", and "x86-ubuntu-18.04-boot".

Resources data now stored primarily in a Mongo Database.



The screenshot shows the resource page for "gem5-resources / x86-npb". The category is "disk-image". It features tags for "X86", "VERSION 1.0.0", "TAGS", "benchmark", "x86", and "fullsystem". Navigation tabs include "Readme", "Changelog", "Usage", "Example", "Versions", "Additional Info", and "Raw". The main text reads: "This document provides instructions to create a disk image needed to run the NPB tests with gem5 and points to an example gem5 configuration script needed to run these tests. The example script uses a pre-built disk-image." Below this, it states: "The NAS parallel benchmarks (NPB) are high performance computing (HPC) workloads consisting of different kernels and pseudo applications:"

Kernels:

- **IS:** Integer Sort, random memory access
- **EP:** Embarrassingly Parallel
- **CG:** Conjugate Gradient, irregular memory access and communication
- **MG:** Multi-Grid on a sequence of meshes, long- and short-distance communication, memory intensive
- **FT:** discrete 3D fast Fourier Transform, all-to-all communication

Pseudo Applications:

- **BT:** Block Tri-diagonal solver
- **SP:** Scalar Penta-diagonal solver
- **LU:** Lower-Upper Gauss-Seidel solver

On the right side, the author is listed as "Ayaz Akram". The description states: "A disk image containing the NAS Parallel benchmark (NPB) suite, compiled to X86, built on top of Ubuntu 18.04." A link to the "Repository (GitHub)" is provided. The license is listed as "BSD-3-Clause".

<https://resources.gem5.org>

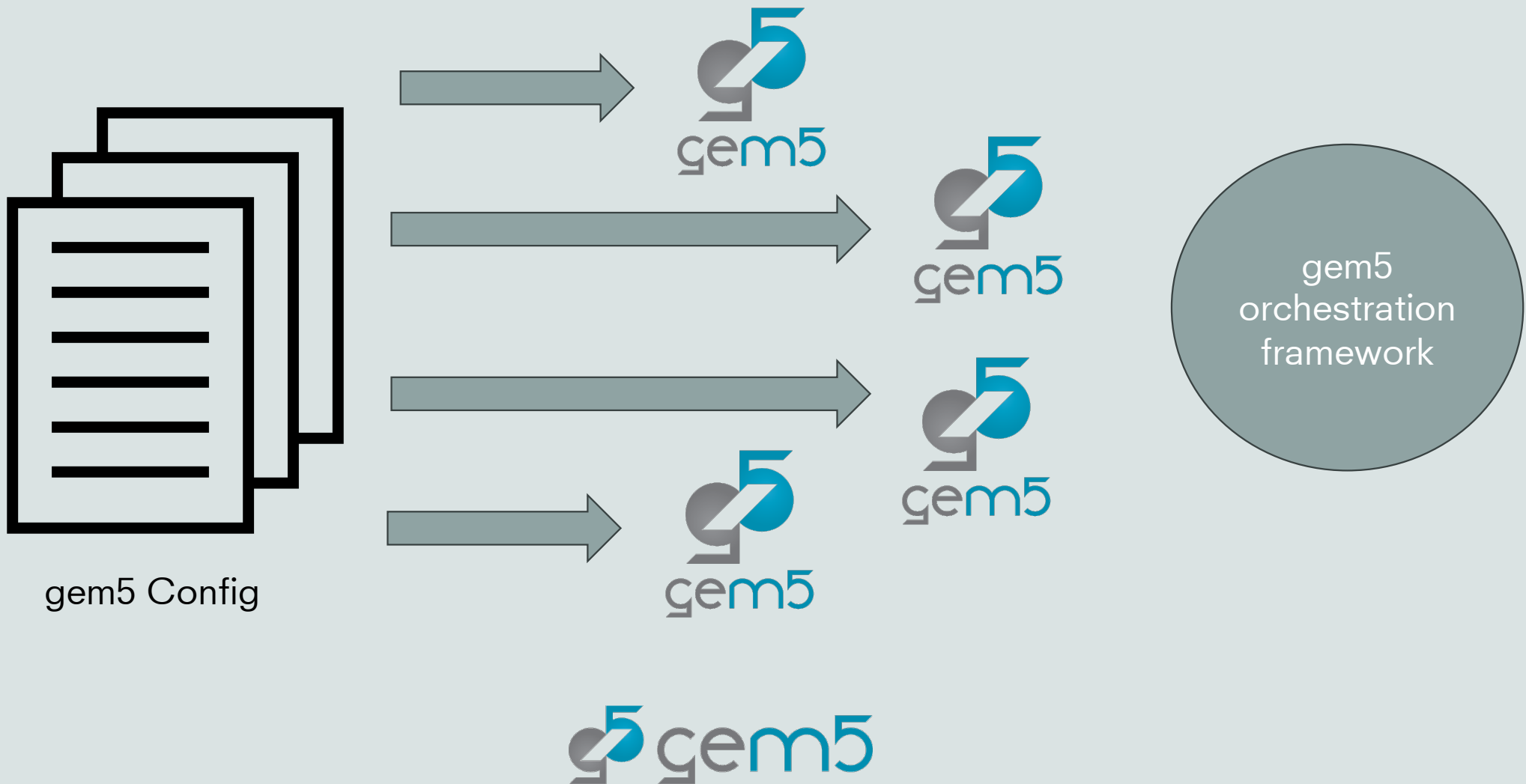


What are we working on?

*A sneak peek of
features to come.*



What are we working on? *Multiprocessing*



What are we working on?

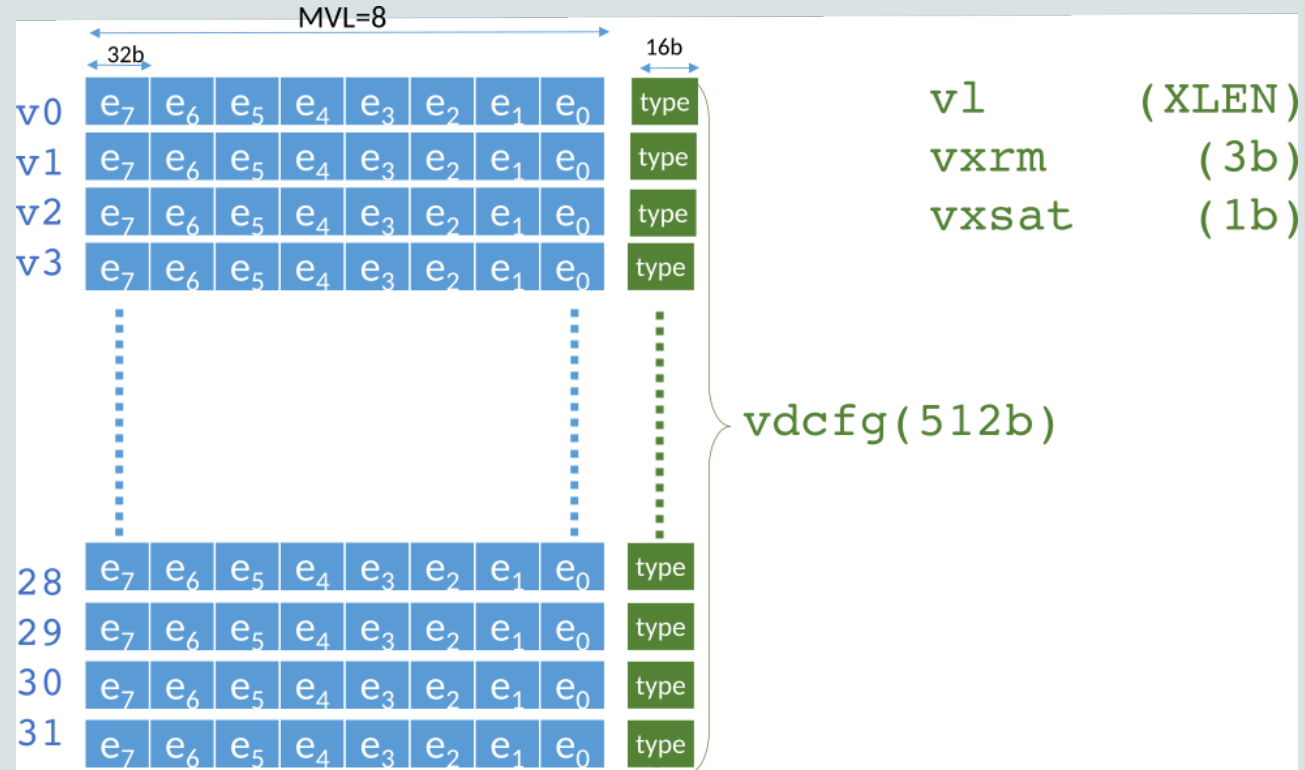
gem5Art Revival



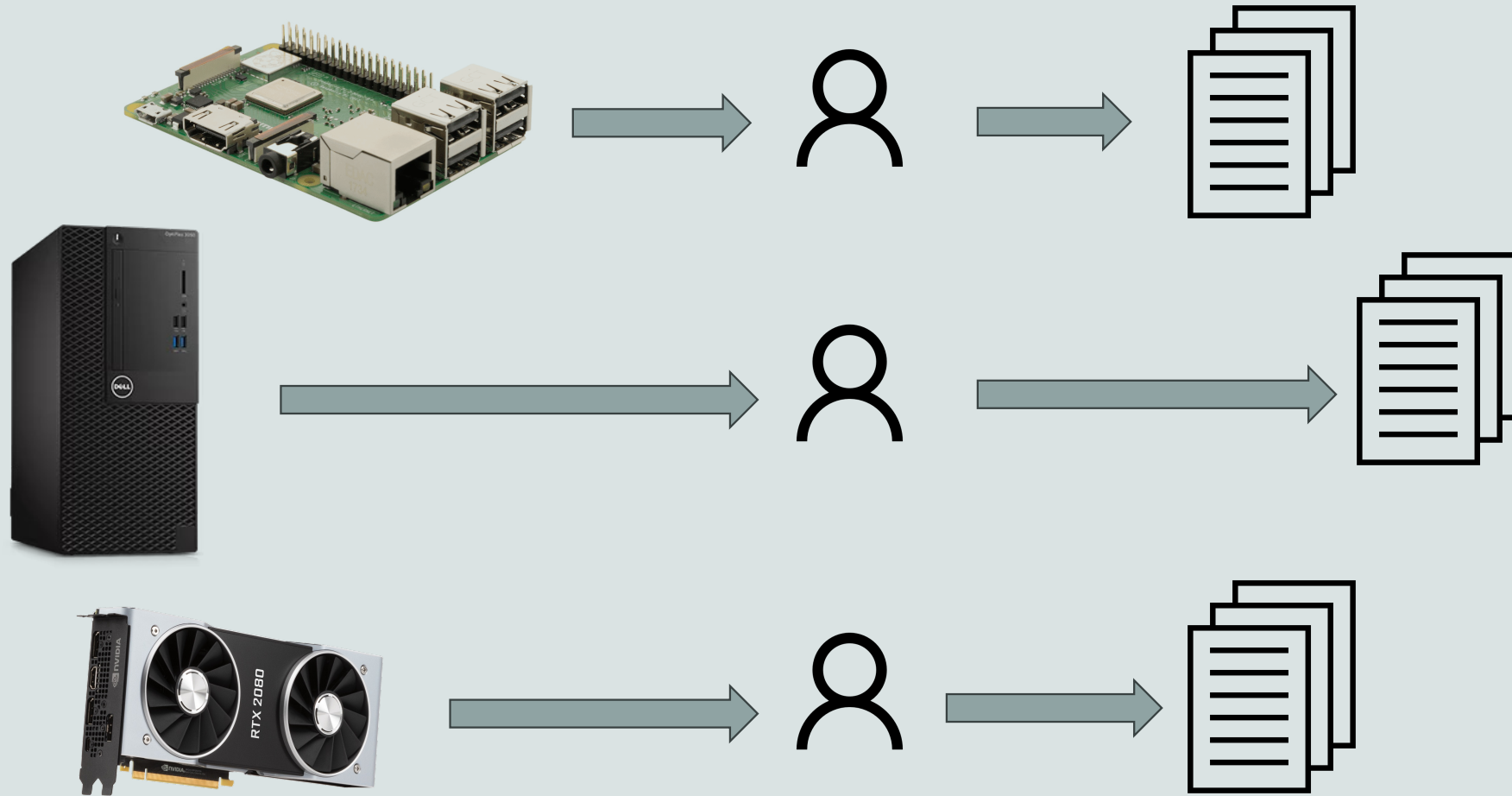
- Automatically log the state of a simulation.
- Enables reproduction of a simulation.
- Completely recreate a simulation run via a standardized definitions of a simulation.
- Better manage simulation outputs (a cleverer "m5out").



What are we working on? *RISC-V Vector Extensions*



What are we working on? *More Known Good Configs*



Announcement!

We have positions available!

Joint MIT-UC Davis postdoc to model systems over time:

<https://tinyurl.com/mit-ucd-pd>

<https://arch.cs.ucdavis.edu/projects/investigating-performance>

Full-time software developer position at UC Davis coming soon

