

Hyperledger Caliper Visualization

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Hyperledger Caliper Visualization

› Introduction

- › **Name:** Jason You
- › **Location:** United States, West Lafayette
- › **University:** Purdue University
- › **Mentors:** Attila Klenik, Feihu Jiang
- › **Hyperledger project:** Hyperledger Caliper Visualization



Hyperledger Caliper Visualization

> Project Description

> Overview & Goals

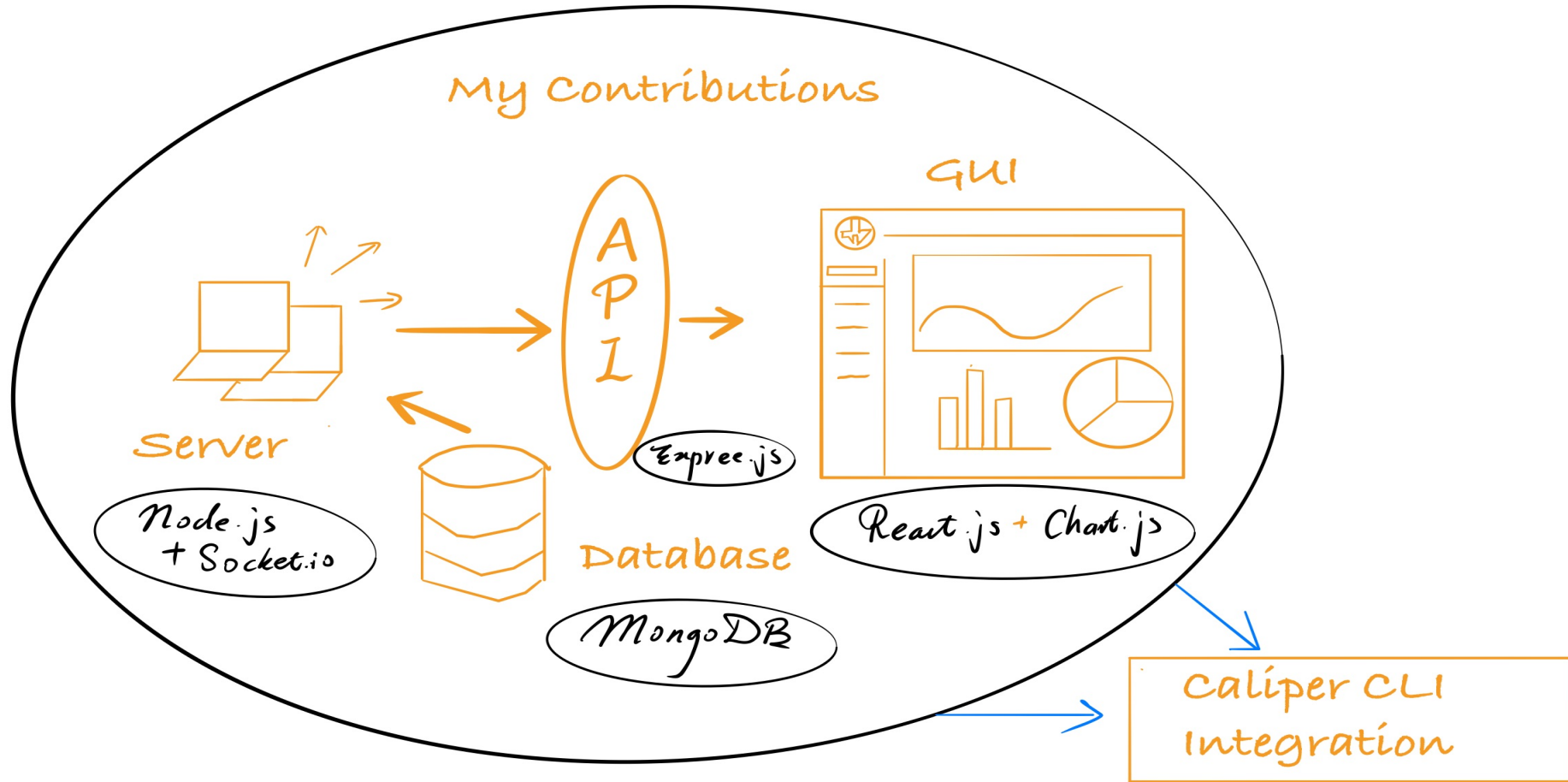
1. Building a GUI (Graphical User Interface) with two main functionalities:
2. Generating customizable **configuration files** for Caliper and Hyperledger Blockchains.
3. Visualizing main benchmarks from Caliper in real time: e.g. ***latencies and throughputs***.

> Technologies/Tools/Frameworks

1. MERN Stack for GUI (**React**), API (Application Programming Interface), DB (**MongoDB**), and data processing Server (**Node & Express**) implementations.
2. **Chart.js** and **Plotly.js** for visualizations.
3. **Socket.io** for real-time data transmission
4. Different versions of Fabric and Sawtooth **configuration files**, and their architectures.

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> Project Structure (My Contributions)



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› Project Objectives

- › **Obj 1:** Building GUI that integrates with Caliper-CLI from scratch.
- › **Obj 2:** Generating configuration files for major Hyperledger frameworks: Fabric, Sawtooth, Burrow, Iroha, etc.
- › **Obj 3:** Building real time benchmark data visualizations based on Caliper-CLI testing results.



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› Project Deliverables

- › **Deliverable 1: Caliper-GUI** (NPM package, or make it a Docker container)
- › **Deliverable 2: Documentation** for the GUI configuration
- › **Deliverable 3: Screen cast** to help Caliper user to learn the GUI.



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> Project Execution & Accomplishments

> Completed

- > The GUI application and the documentations for its usage.
- > Real time visualizations and configuration file generating functionalities.

> Remaining Tasks

- > User friendly installation scripts for users to run/connect the Caliper-GUI with Blockchain.
- > **Resource utilization visualizations** (now only the benchmarks).
- > **One-click button** to connect/disconnect the Caliper-GUI with the Blockchain Server.

> Most Proud Of

- > Completing a full stack project **from scratch**, and **learned lots of new tools** by doing.
- > Integrating a **new component into a large project**, and solved a few configuration issues.
- > **Confidence** to develop **Blockchain apps** with new technologies acquired.

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- › Recommendations for future work
- › Improvements
 - › Automating the configuration between the Caliper-GUI and -CLI, so that it can be used like Truffle Ganache (TestRPC) for the Ethereum Blockchain.
 - › Cloud service supporting for updating and querying benchmark history of Caliper.
- › Extensions
 - › Supporting **more frameworks**: currently we are only focusing on Fabric and Sawtooth.
 - › Adding more visualization options.
 - › Completing the **real-time Blockchain network topology** graph visualization.

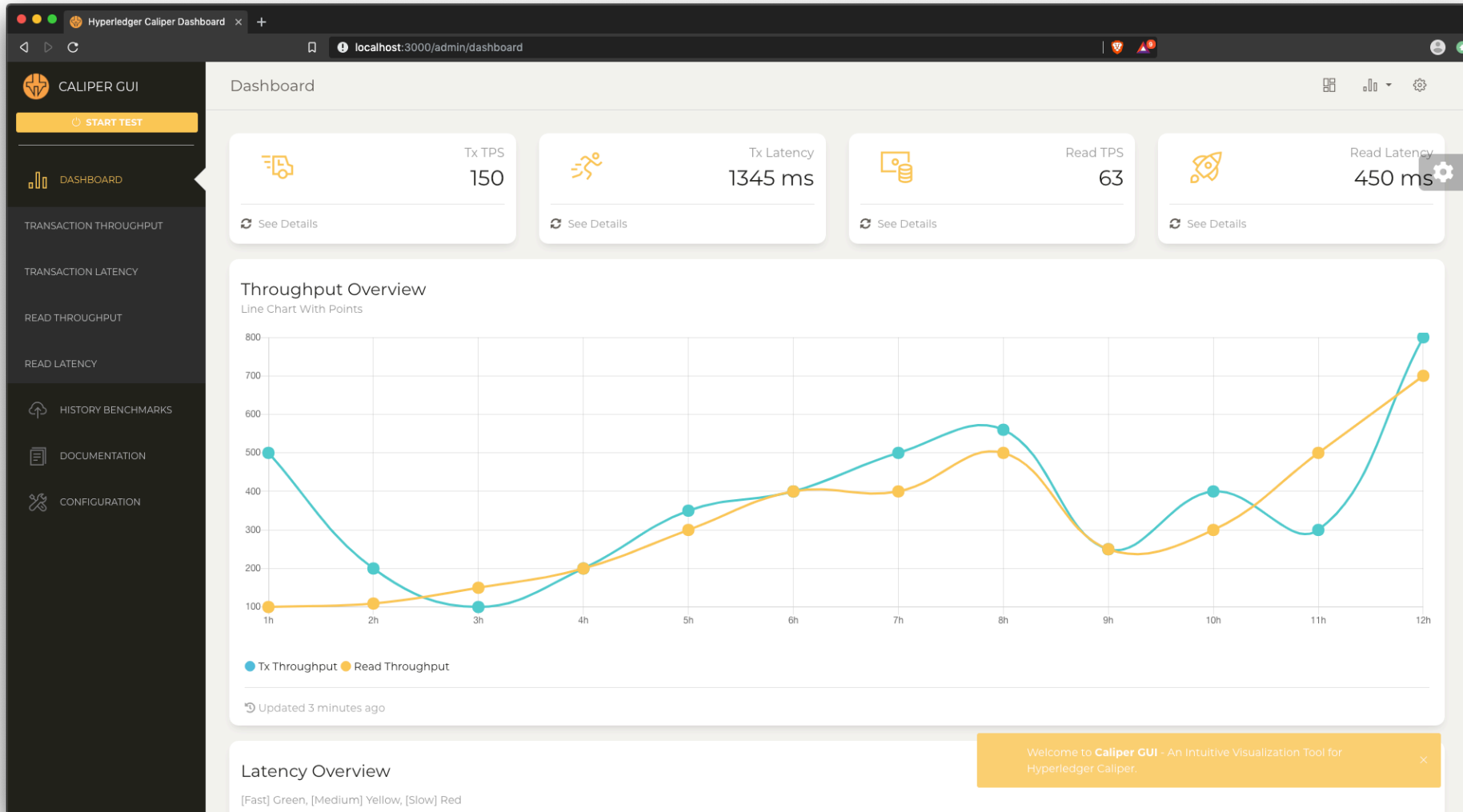
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› GUI Design

› Benchmark Overviews

› Read & Tx. Throughput Visualization

› Sidebar: More details



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> GUI Design

> Test Generator

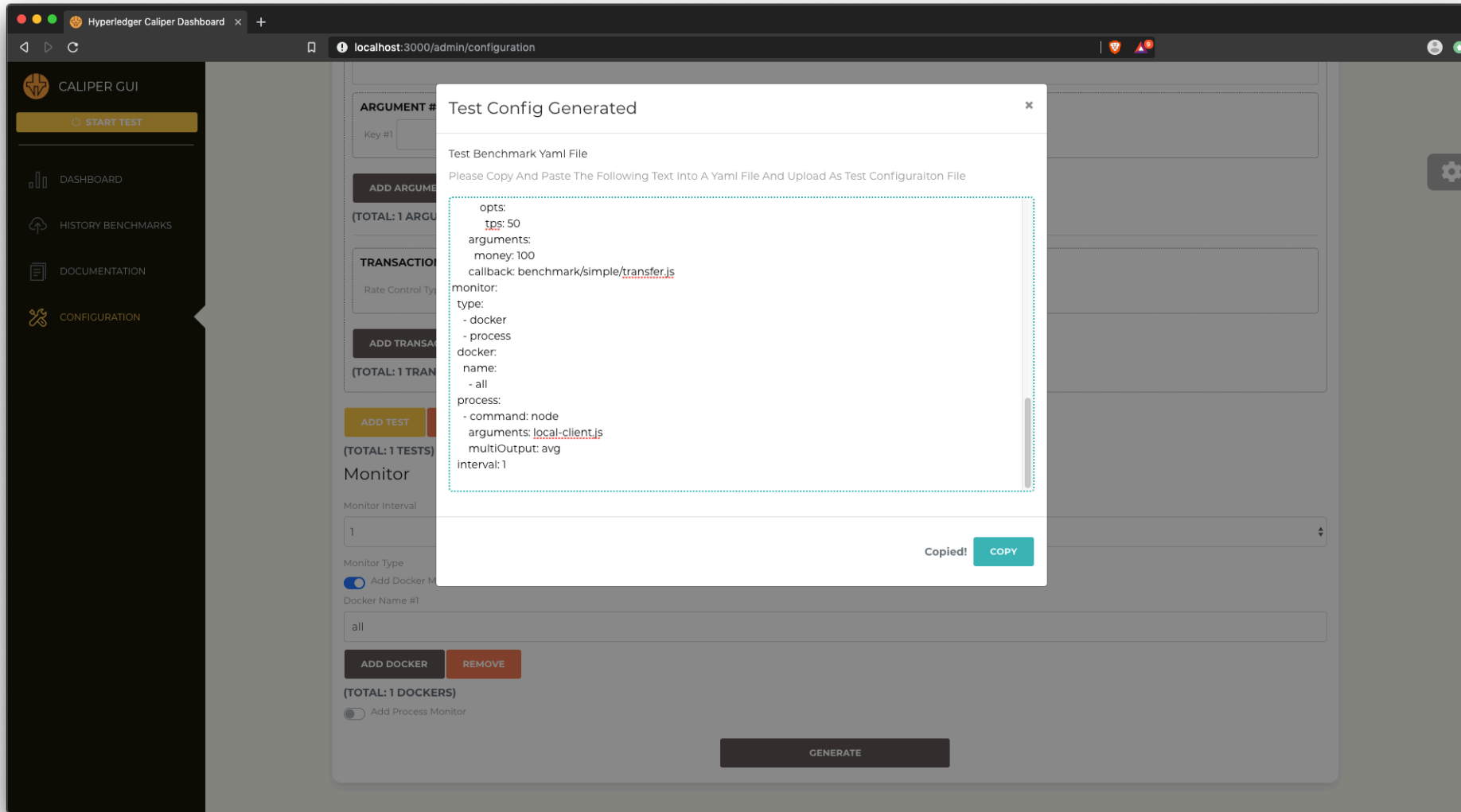
> User Friendly

> Fast Generation

The screenshot shows the Hyperledger Caliper GUI configuration page. The browser address bar indicates the URL is localhost:3000/admin/configuration. The left sidebar contains navigation options: START TEST, DASHBOARD, HISTORY BENCHMARKS, DOCUMENTATION, and CONFIGURATION. The main content area is divided into three sections: ARGUMENT #1, TRANSACTION #1, and Monitor. Each section has input fields and buttons to add or remove items. The ARGUMENT #1 section has a Key #1 and Value #1 input field, with ADD ARGUMENTS and REMOVE buttons. The TRANSACTION #1 section has a Rate Control Type dropdown (set to Fixed Rate), Tx. Number input (100), and Rate Control TPS input (300), with ADD TRANSACTION and REMOVE buttons. The Monitor section has a Monitor Interval dropdown (1), a Monitor Type section with an Add Docker Monitor toggle (checked) and a Docker Name #1 input (all), with ADD DOCKER and REMOVE buttons. At the bottom, there is a GENERATE button.

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> GUI Design



> Editable Output

> One-click Copy

> Direct Usage

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- › **References**

- › Sample GUI Link (Not the full version)

- › URL: <http://zstarter.tech:3000>

- › My Contact Info: jason.shengwey@gmail.com

