POLYTECHNIQUE MONTRÉAL
UNIVERSITÉ D'INGÉNIERIE

Information and Consent Form

Title of research project: Benchmarking the performance of Blockchain platforms

Research Team:

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Research project funding:

This research project is funded by AppScoop Solutions Inc. (private company), NSERC (federal funding agency), and Mitacs (federal funding agency).

Conflicts of interest

The research team does not have a conflict of interest in terms of the present research project.

We invite you to participate in the online survey that will assess the usefulness of using benchmarking tools to evaluate the performance of various Blockchain platforms. Participants will be randomly assigned a benchmarking tool, either BlockBench or BlockCompass and will be asked to perform a comparative study between two Blockchain platforms, Ethereum and Hyperledger Fabric. The objective of the study is to see how easy such a comparison may become with the help of a dedicated benchmarking tool. Whether the comparison becomes easier will be determined by how fast someone can set up, configure and run an experiment with as few interruptions and retries as possible. The research aims at providing an experimentation and benchmarking platform for Blockchain researchers and practitioners in order to evaluate the performance of a given Blockchain platform and decide among various alternatives.

Prior to consenting to completing this survey, please take the time to fully read all the information provided.

<u>Overall presentation of the research project</u>

The objectives of the research project are:

1. The main objective of our research is to develop self-adaptive capabilities for Blockchain platforms to dynamically maintain their performance, resource utilisation and security.
2. To achieve this objective, we will first develop a benchmark toolkit that will allow us to exercise and compare different Blockchain platform and configurations, and eventually study how the systems perform under certain workloads and configurations.
3. Based on the results obtained with the benchmark toolkit, we will be able to develop a performance model for Blockchain platforms, which in turn will allow us to predict or estimate the system's performance under a variety of workloads and configurations.
4. Using this model, we will be able to create a self-adaptive Blockchain platform that given changes in the workload and by monitoring the system's performance, it will be able to adapt the system's configuration or infrastructure to maintain its performance.

The main objectives of the study that we are conducting are concern the development of the benchmark toolkit and are as follows:

1. We want to see whether such a benchmark toolkit makes the evaluation of a Blockchain platform easy and fast compared to the effort necessary to set up such evaluation experiments manually.
2. We want to see whether the approach we followed in developing our own benchmark platform, BlockCompass, is better compared to existing benchmark platforms, such as BlockBench.

In the context of this project, we are looking for individuals who have sufficient training in computer and software engineering, including in concepts like software quality, software architecture, computing infrastructure, databases, and have a basic understanding of Blockchain. In practice, any student in a Computer and Software Engineering department that

has followed courses on Software Architecture, Software Quality, Software Performance, Software Security, Cloud Computing and/or Blockchain are eligible for this study.

The present survey discusses your experience you had using the designated benchmark tools and setting up experiments for the designated Blockchain platforms.

Risks and inconveniences:

The present activity should not present greater risks than those encountered in daily life. The tasks necessary to participate in this study are the same as those required to complete the course assignment. The additional effort or time required to collect the data for the study should be minimal.

Advantages and benefits

The advantages and benefits from participating in this study are the same as the ones you will receive from complete the course assignment, including increased practical experience with Blockchain and benchmarking tools.

Financial Compensation

No financial compensation will be awarded for your participation in the study.

Voluntary participation and possibility of ceasing participation:

Your participation in this research project is voluntary. Thus, you are free to cease participating at any time, and can decide to cease participation in the activity – simply stop completing the survey. However, in the event that you cease participation, you can request that your data be destroyed. Note however that once analysis has been completed and results have been published and disseminated, it will be impossible to delete data or results that your participation has provided.

Impact to your academic evaluation

Your participation in the study will not affect your evaluation in the course. To ensure this, the data you submit as part of the study will be shared with the academic personnel of the course (the instructor and the lab assistant) only after the final grade for your last assignment has been released to you.

Confidentiality and protection of personal information

The research team will collect and store all personal data in a secure manner, and will respect and protect its confidential nature.

The following is how we will protect your personal information **during collection:**

- Data (i.e., answers in the questionnaire) will be submitted through a Google Form. The data will be gathered in the personal Google account of the co-supervisor of the research project.
- The collected data will contain no identifying personal information except for one occasion, as follows.
- In the last question, you will be asked to provide your email address in case you consent to be conducted by the research team for a follow-up interview after the collection of the questionnaire data. Your email address will be kept by the co-supervisor, but it will be removed from the rest of the collected data.

The following is how we will protect your personal information **during data analysis and transfer** between team members:

- Data will be analyzed locally by the co-supervisor.
- No personal data will be used during analysis and only aggregate results (averages and figures) will be communicated within the research team.

The following is how we will protect your personal information **during result publication**:

- Only aggregate results and visualizations will be presented in written publications (i.e., a journal article).
- Individual responses, with any personal data removed, will be provided as supplementary material in a GitHub repository to become available to users of the benchmarking tool.

The following is how we will protect your personal information **after the end of the research project**:

- Your data will be stored by the Research Team, for a period of 7 years, after the research project has come to an end.
- Individual responses, with any personal data removed, will be provided as supplementary material in a GitHub repository.
- The same results will be kept in the personal Google account of the co-supervisor.

You have the right to view your research data profile to verify the accuracy of information gathered for as long as the research team or Polytechnique Montréal have said information. Note however, that in order to preserve the scientific integrity of the research project, some information will only be accessible upon the research project's completion.

Dissemination of research results

Data gathered for this research project will be available in data tables and visualization stored in a GitHub repository. A link to this repository will be shared with you after the completion of the project. The research is anticipated to result in a scientific publication, understandable to anyone with an understand of computer and software engineering. Once published, a link to the

article will be added to the GitHub repository.

Compensation in the event of participant injury / damages

If your participation in the research project results in any injury whatsoever, you in no way wave your legal rights, nor relieve researchers, funding organizations, and Polytechnique Montréal of their professional and legal responsibilities.

Reference and resource people

If you have questions about **scientific aspects** of the research project, or to **cease participation** in the study, please contact: Mohammadreza Rasolroveicy via email at mohammadreza.rasolroveicy@polymtl.ca

For all concerns regarding your rights or the responsibilities of the research team in regards to your participation in this project, you can contact the *Comité d'éthique de la recherche* at Polytechnique Montréal at 514-340-4711, ext. 4420 or via email at: ethique@polymtl.ca

Consent

1. I have read and understood the attached documentation, which describes the nature and the process of the research project, as well as the risks and inconveniences that this project may incur.

2. I understand that as a participant in this research project, I do not renounce any of my rights, nor do I waive researcher's legal responsibilities.

☐ **I accept** ☐ **I refuse**

Signature: _____ Date:_____

Please email your response and the complete form to Wejdene Haouari via email at haouari.wejdene1@gmail.com.