Web Interface for Distributed Platform for Volunteer Computing - BOINC

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Nowadays, in the era of vast amount of online data, researchers are more likely to face the problem of processing outputs of their work. Despite the growth of computing power, there is still a lack of resources for handling and processing data currently used in all areas of research. Following the idea of scaling out - distributing challenging tasks to more participants, University of Berkley created an open source platform for distributed computing - BOINC [1] [3]. The aim is to share, mostly unused, computing power of common devices to deliver a meaningful research results by collecting partial results of BOINC's project participants. The more users participate the sooner and quicker are the valuable results delivered.

As mentioned, the power of distributed computing system is made by the community of its participants. The more people you want to involve working on your project, the more requirements are related with usability of work distribution system you provide to them and the harder it is to motivate the end users to participate. Default BOINC installation brings a basic web interface, which may not be suitable for every end user. The aim of our system is both to spread the word about the BOINC platform and involve people to participate in the faculty projects by creating web interface easier to use in the context of user experience. We want to contribute to BOINC open source project in the form of brand new accessible web interface for BOINC applications administration.

The analysis of the default version of web interface points out several user experience issues, namely:

– difficult sign up process,

– insufficient analytical interface for project administrators,

– no interface for task submission,

– missing notifications for key computation events such as no volunteers for computing, all task completed etc.

Currently, only few users can submit tasks [2] for computing to the BOINC server because a direct SSH connection with proper credentials is required and the task submission process overall
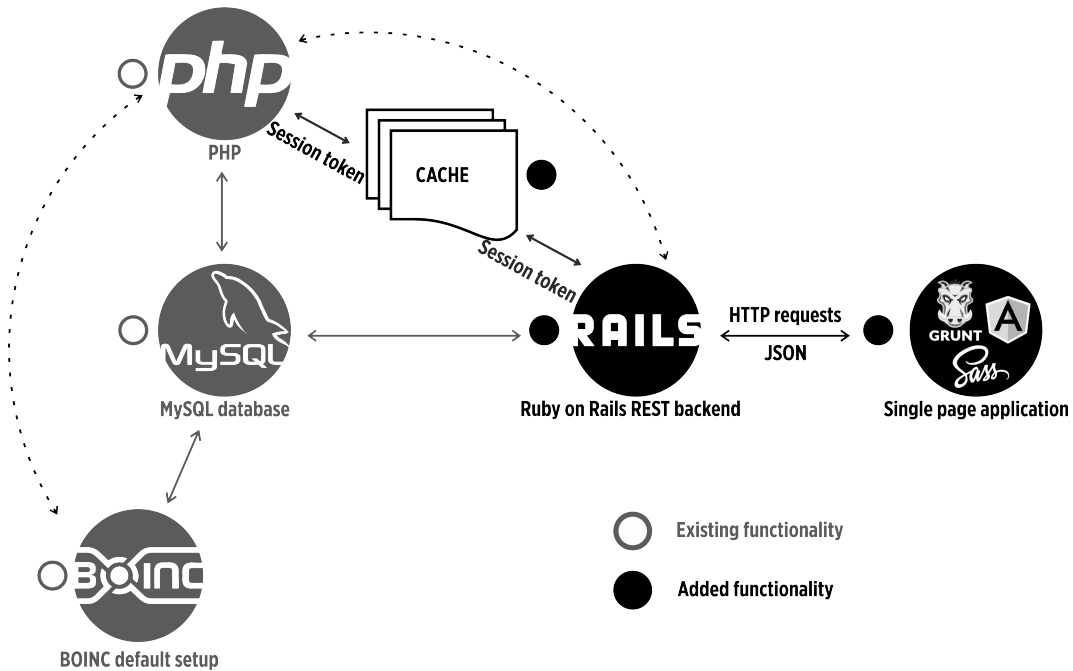

Figure 1. Architecture overview of the proposed solution.

is rather difficult for an inexperienced user and demanding in terms of required skills. We want to transform the whole process of computation task setup to an easy, zero-time consuming procedure in the form of a user-friendly web interface. The easier task submission the more tasks will be available for computation and project will be more attractive for volunteers.

Figure 1 shows system architecture with respect to the new interface which is completely redesigned and developed with RESTful API in mind. BOINC PHP backend core is replaced with modular Ruby on Rails REST API code. Entities in the picture describe system core technologies from the existing functionality point of view and the new one.

We implemented functionality for a quick scan of the computing tasks for security threats, such as memory leaks or malicious activity attempts hidden in the submitted tasks. This feature protects contributors from malicious software, possibly distributed using BOINC infrastructure.

Over time we would like to deliver a newer, cleaner and more usable version of web interface which will have an extended analytical features for project administrators that will deliver the usage statistic data in an easy to understand form, thereby helping BOINC project administrators to understand and monitor utilization of their projects.

References

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