

HPDCJ

Tab

Abstract

Heterogenous parallel and distributed computing with Java

Our proposal focuses on the ease of use and programmability of Java for distributed heterogeneous computing in order to make it exploitable by the huge user base of mainstream computing. Based on the previous work (PCJ library <http://pcj.icm.edu.pl> [1]), we will introduce and transparently expose parallelism in Java, with minimal change to the specifics of the language thus allowing programmers to focus on the application. We have demonstrated power and scalability of the PCJ library for the parallel systems and we will extend it for the cases where communication cost and latency could be higher. We will extend existing solution with the capability of running on the heterogeneous systems including GPU and mobile devices. The user will obtain possibility to execute computational intensive parts of the application on the multiple GPUs. Since our solution is based on Java it can be easily run on the mobile devices. Within project we will extend library capabilities with the optimised communication and scheduling mechanism necessary to use fully such devices. We will utilize potential of parallel Java library to process distribute data. The existing solution benefits from the parallel I/O performed by the multiple JVMs. We will use this solution to optimize process of data distribution and storage including streaming od the large data sets. We will address dependability and resilience by adding fault tolerance mechanisms to the parallel Java library including fault detection and rescheduling of the application execution. The mechanism will extend capabilities of the existing PCJ library and will be transparent to the users. We will show the applicability of our framework for distributed heterogeneous systems by a set of selected, key applications including data-intensive Big Data applications. Our potential success will create solution for Java programming that will be attractive to a wide mainstream user base and will thus have a game-changing influence on the European computing industry. We assembled a carefully selected team with complementary focuses and the right degree of overlap. Most of the partners have worked in close collaboration in previous (EU) projects with remarkable success. We believe this to become a key pilot project that can open the way for future research which will have a profound impact on mainstream computing.

(2013)

Heterogeneous Distributed Computing (HDC)

Partnership & Contact

HPDCJ starts in October 2014, lasts 36 months and involves the partnerships below. The financial support of CHIST-ERA is about 1 000 000 €.

Partnership

University of Warsaw	Poland
IBM Research Lab	Switzerland
Queens University of Belfast	United Kingdom
Bilkent University	Turkey

Contact: Dr. **Piotr BALA** (coordinator), bala@icm.pl [2]

Logo EPSRC

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Attachment	Size
CHIST-ERA Call 2013 - HDC Topic - HPDCJ 2018.pdf [3]	195.95 KB

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- [Administration](#)

Source URL: <https://www.chistera.eu/projects/hpdcj>

Links:

[1] <http://pcj.icm.edu.pl>

[2] <mailto:bala@icm.pl>

[3] <https://www.chistera.eu/sites/chistera.eu/files/CHIST-ERA%20Call%202013%20-%20HDC%20Topic%20-%20HPDCJ%202018.pdf>