Briefing of PAC'14

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October 12, 2014

Chapter 1

Event Background

PAC2014 (Parallel Application Challenge 2014) is a national HPC application competition of China. It is held by CCF-TCHPC (China Computer Federation, Technical Committee on High Performance Computing), Intel China and organized by *PARATERA*(Beijing PARATERA Tech Co.,Ltd). The challenge started in 2013 while it develops fast and achieves a great nation-wide success. This year, the number of attending teams grows to 83, nearly triple of the number of last year. The challenge of 2014 aims to boost the development of Intel's Xeon Phi programming in China, and thus has got substantial support from Intel China.

1.1 The Agenda of PAC2014

PAC2014 has set up two best prize: 1) The best Application Prize. 2) The best Scalability Prize. In the road to the best prize, each team should go through a preliminary contest, a semi-final and the final contest. Before the Preliminary contest, each team has accepted a summer school training course specially for the Xeon Phi programming.

1.1.1 Preliminary Contest

The Preliminary Contest was from 31 August to 14 September. It has accepted the inscriptions from 83 teams. These teams come from all the prestigious universities and institutions in China. All the teams are divided into four regions. Each team should provide their own application as its contest subject. Their submission should include the following contents:

- A report and a slide for presenting their work.

- A log file and results files as a proof of their execution on machines.

- The source code of application, but is not compulsory.

The review of the work has been done by the PAC2014 committee. Each team's work is firt reviewed by all the 15 committee members. Each committee member gave out their adjudgement and ratings. If any work has a large variance of ratings, it shall be reviewed again in a second turn by all the members. By doing so, 24 teams have won their tickets to the semi-final contest, and their work would be exposed in the website to the public.

1.1.2 Semi-Final Contest

The Semi-Final Contest has began in 15 September and ended in 28 September. Each of the 24 team have time to improve their own work. The evaluation of their work is decided by the committee and the votes from each team's supporters of network polls. In Semi-Final Contest, the committee also invited a foreign team which comes from a French HPC laboratory, *Maison de la Simulation*. After the competing, 8 team has

entered the Final contest of *The Best Scalability Prize*, and 6 teams has entered the *The Best Application Prize*. The invited French team has also entered into the Final contest. Table **??** gives out all the teams

Table 1.1: Teams for the Best Scalability Prize

Team Name	Subject
Beijing University	A Parallel Dark Channel Prior Algorithm
NUDT team 1	Lattice Boltzmann methods (LBM) in CFD simulation
Shanghai Jiaotong Univ	3D Elastic Wave Modeling
USTC	Binomial model based Option Price
IPE,CAS	Molecular Dynamics Simulation
ICT,CAS	High efficient SVD on MIC
CNIC& National Observatory	NMaker: a new N-body numerical simulation software
ISCAS	Parallel Optimization of aerography software Package *MPAS*

running for best scalability Final contest. Table **??** presents all the teams competing for *Best Application*

Table 1.2: Teams for the Best Application Prize

Team Name	Subject
Beijing University & Dalian CAS	Gromacs optimization on MIC platform
NUDT team 0	BigData in bioinformation DNA analysis
NUDT team 1	Lattice Boltzmann methods (LBM) in CFD simulation
IPE,CAS	Molecular Dynamics Simulation
CNIC& National Observatory	NMaker: a new N-body numerical simulation software
Dalian CAS	Protein molecular dynamics Simulation based on quantum mechanics

Final Contest. Part of the Semi-Final Contest work would be selected as Application cases to be published in China HPC annual conference 2014.

1.1.3 Final Contest

The Final Contest shall be held during HPC China annual conference 2014 in Guangzhou. The competition for the *Best Application Prize* is based on the improvement of their Semi-Final work. The contest of the *Best Scalability Prize* has give a subject to all the teams. *The optimization of Gromacs software on Tianhe2A*. The resource provided by the organizer includes 8 nodes from the Tianhe2A cluster and the source codes of Gromacs software both in CPU version and MIC version (symmetric mode). The optimization object is to maximize the performance (minimize the walltime) of Gromacs under the premise of correctness and precision. The optimization codes must run on the computing resource provided by the organizer, and then the results could be accepted in the competition. All the team in Final Contest shall present their work and answer the questions from the jury and audience in the conference. A voting process of the audience is also considered in the final decision. The Final contest will have

- Gold Prize for Best Scalability Challenge, 1 team, awarded of 8154 US dollar

- Silver Prize for Best Scalability Challenge, 2 teams, awarded of 1630 US dollar

- Bronze Prize for Best Scalability Challenge, 5 teams, awarded of 815 US dollar

- Gold Prize for Best Application, 1 team, awarded of 3261 US dollar

- Silver Prize for Best Application, 2 teams, awarded of 1630 US dollar

- Bronze Prize for Best Application, 3 teams, awarded of 815 US dollar

Chapter 2

Subject introduction

Blah blah blah...