RIKEN's Peta-scale Supercomputer Development and Grand Challenges in Life Science

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Summary

RIKEN is developing a Peta-FLOPS scale supercomputer which will start operation in 2012. It is planed to have both vector and scalar units to achieve 10 Peta FLOPS in LINPACK performance. In this R&D project, not only hardware development but also software development in Nano Science and Life Science as Grand Challenge problems are planed and included. As the Life Science Grand Challenge, we have two approaches to achieve comprehensive understanding of life phenomena and to contribute to our society by creating medicine and developing medical/surgical treatment. Those approaches are 1) theoretical simulation approach and 2) data-driven approach. For the theoretical approach, we have three teams, molecular-scale simulation team, cell-scale simulation team and organ/whole body scale simulation team. For the data-driven approach we have one team, data analysis team. These four teams will complete their software and derive maximum performance of the 10 Peta FLOPS supercomputer until 2010.

Prof. Kidera leads the molecular team to simulate protein function in life phenomena to reveal important subjects in molecular and cell biology. Dr. Yokota is a leader of the cell team to construct cell simulation model based on partial differential equations in each organelle. Dr. Takagi is a leader of the organ/whole body team to develop a human simulator for surgical operation and etc. Prof. Miyano leads the data-alysis team for a fusion of large-scale heterogeneous data analysis and life science simulation.

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