STE Simulator

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It is necessary to prepare a consistent computer system in both the supercomputer side and the remote user side and to use a high speed network connecting between the both sides in order to use efficiently the supercomputer and to execute the large scale simulation from remote entry site. Moreover, it is also important to make a common simulation code by software such as the compiler due to the parallel computation. We have carried out the collaborative research program by using a supercomputer in the Computer Center of Nagoya University in the Solar-Terrestrial Environment Laboratory, Nagoya University in these 10 years. Then we have found for a reasonable computer system in the supercomputer side and remote user side and a method to efficiently use the supercomputer through network. It is important to construct a supercomputer system with a good balance of four important functions, namely computation speed, main memory, capacity of disk and network, and it is also true on the remote user side. At the same time, it is a key issue to develop a common simulation code to efficiently use the supercomputer. By using accumulated experience and achievements we would like to consider what are needed to efficiently use supercomputer connected through a high speed network and propose a idea of the Computer-Network-Virtual-Laboratory to carry out a advanced simulation in the STE (solar-Terrestrial Environment) research through a high speed network like Super SINT.

In the research field of STE, it has been realized to execute a computer simulation to be able to directly compare with the ground-based observations and satellite observations, to solve self-consistently the coupling processes between different scale size phenomena, and to solve self-consistently the nonlinear phenomena in strong turbulent plasmas obtaining a new insight by quick development of the computer and network. We also have had an experience to use occupied usage of the vector-parallel supercomputer, Fujitsu VPP5000/56 in the Computer Center of Nagoya University to simulate the STE phenomena. We are planing to systematically carry out the collaborative research program in STE study in (1) space weather and space climate study, (2) development of a unified simulation model in STE research, and (3) progress in study of nonlinear plasma physics. Thus we will try to prepare and construct the infrastructure of software in STE simulation and to evolve into a new stage of STE research.