

Reinforcement of Large-scale Computer System for Scientific Computation

Purpose:

The large-scale computer system in this laboratory was updated between 2005 and 2006; i.e. a vector computer and scalar computers (total theoretical operation performance of about 4.4Tflops), etc. were introduced. In recent years, however, there has been a remarkable increase in calculation demand in the fields of weather forecasting/analysis by high spatial resolution, mid/long-term forecasting of global warming on a world-wide scale, and atomistic simulation for material properties prediction, etc. To address this increasing demand, the present equipment was introduced.

Outline:

The principal part of this equipment is a massively parallel cluster system of the blade type where 1024 Intel Xeon quad-core processors (4096 cores) and 16TB of memory have been installed, and the total theoretical operation performance of the system is 45.8TFlops. Even when operation is massively parallel, performance is maintained through the following features; (1) high memory bandwidth of 25.6GB/second per CPU socket, (2) use of shared memory nodes and non blocking connections, and (3) double Hyper-Cube network. A parallel distributed storage system is adopted for work storage which greatly improves computational speed. Not only is overall theoretical performance of this system high, but also its effective benchmark performance with the latest meteorological model WRF.

Specifications:

(1) Main body of the computer for parallel scalar processing: SGI Altix ICE 8200 EX

- Theoretical operation performance: 45.8TFlops
- CPU (total main memory): Intel Xeon X5560(4core 2.8GHz) 1024CPU (16TB)

(2) Storage system for work area: Panasas ActiveStor Series 7

- Total effective capacity: About 110TB (4 shelves, RAID1/RAID5)
- Transfer rate: 1200MB/s for each shelf

(3) Disk unit for home area: SGI InfiniteStorage350

- Effective capacity: 12TB(RAID5) × 2
- External interface: 4Gb fibre channel × 4/units

Location and Date of Installation:

Abiko Area, March 2010

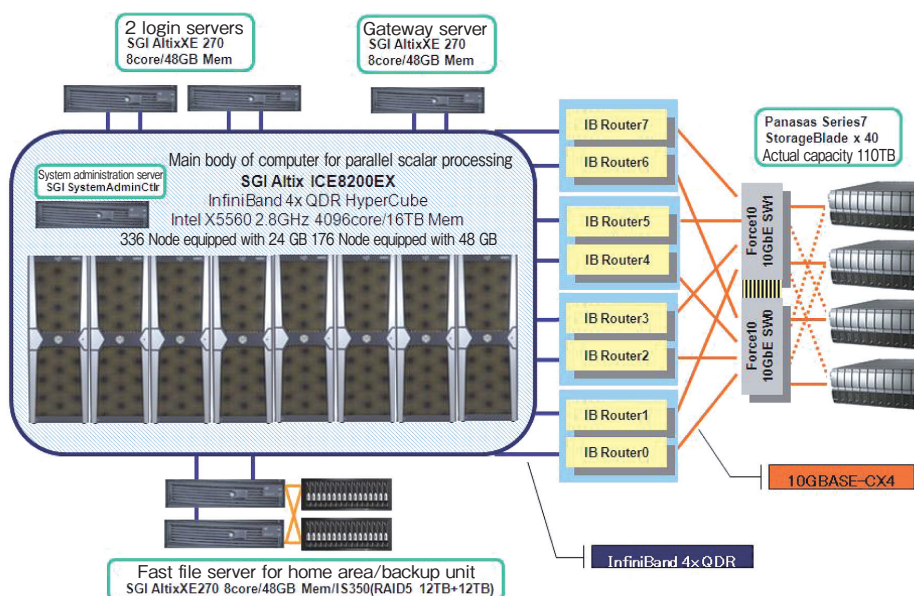


Fig. System structure