e The aggregate peak bandwidth of main memory access in each node must be 40GByte／sec or higher. The performance measure, however, must be 180GByte／sec or higher, if the value includes the bandwidth of the access from accelerators to the main memory and their own memory.

f The theoretical peak bandwidth of inter-node interconnect must be 8GByte／sec or higher for each node and 2GByte／sec or higher for each adjacent node pair, and the bi-section bandwidth of the Subsystem must be 1TByte／sec or higher.

g Each node must have a hardware management mechanism and a software system for monitoring the hardware operating status.

h The Subsystem must operate with peak load consuming 300kW electric power or less.

i The Subsystem must have the software stack shown in Item J.

H Subsystem B

a The Subsystem B must be a highly-parallel supercomputer composed of multiple computational nodes. Hereafter, the computational node, or the node in short, of the Subsystem is defined as a computer system which is composed of 16 or more CPU cores and main memory shared by them.

b The theoretical peak performance on double-precision floating point of each node must be 280GFLOPS or higher, and the total performance of the Subsystem must be 200TFLOPS or higher. The effective performance will be evaluated by benchmark tests.

c The CPU core should have the 64-bit IA32 instruction set architecture.

d Each node must have the main memory of 32GiByte or larger, and the total main memory capacity of the Subsystem must be 20TiByte or larger.

e The aggregate peak bandwidth of main memory access in each node must be 60GByte／sec or higher.

f The theoretical peak bandwidth of inter-node interconnect must be 8GByte／sec or higher for each node and for each adjacent node pair, and the bi-section bandwidth of the Subsystem must be 3TByte／sec or higher.

g Each node must be equipped with hard-disk drives of 250GByte or larger in total and capable of RAID-1 configuration, or with SSD drives of 100GByte or larger in total.

h Each node must have a hardware management mechanism and a software system for monitoring the hardware operating status.

i The Subsystem must operate with peak load consuming 250kW electric power or less.

j The Subsystem must have the software stack shown in Item J.

I Subsystem C

a The Subsystem C must be a highly-parallel supercomputer composed of multiple computational nodes. Hereafter, the computational node, or the node in short, of the Subsystem is defined as a computer system which is composed of 32 or more CPU cores and main memory shared by them.

b The theoretical peak performance on double-precision floating point of each node must be 500GFLOPS or higher, and the total performance of the Subsystem must be 10TFLOPS or higher. The effective performance will be evaluated by benchmark tests.

c The CPU should have the 64-bit IA32 instruction set architecture.

d Each node must have the main memory of 1TiByte or larger, and the total main memory capacity of the Subsystem must be 16TiByte or larger.

e The aggregate peak bandwidth of main memory access in each node must be 135GByte／sec or higher.

f The theoretical peak bandwidth of inter-node interconnect must be 8GByte／sec or higher for each node and for each adjacent node pair, and the interconnect for the subsystem must achieve full bi-section bandwidth.

g Each node must be equipped with hard-disk drives of 2TByte or larger in total and capable of RAID-1 configuration.

h Each node must have a hardware management mechanism and a software system for monitoring the hardware operating status.

i The Subsystem must operate with peak load consuming 50kW electric power or less.

j The Subsystem must have the software stack shown in Item J.

J Software Stack

a Automatic parallelizing compilers for Fortran2003, C99, and C++2003 must be provided. These compilers must support OpenMP version 3.0 or later.

b Java SE6 platform must be provided.

c The communication library MPI version 2.0 or later must be provided.

d A UNIX-like operating system, preferably Linux, must be provided.

e A job scheduler with the following functionality must be provided.

① Each user group has its own job queue.

② Each job queue has three attributes of usable resource amount namely minimum amount, standard amount (upper limit usable for a job) and maximum amount (upper limit usable for all jobs belonging to the user group in total).

③ A job must be judged executable only if the following conditions, where used amount for a group is the total amount of resources used by all executing jobs belonging to the group included that to be used by the job in problem for the group to which the job belongs, reserved amount for a group is the margin from its used amount to its minimum amount, and available amount is the difference between the total resource amount of the subsystem and the sum of used amounts for all groups.

(a) If the available amount is less than the sum of reserved amounts for all groups, the job is judged executable only if the used amount of its group does not exceed the minimum amount, or all of the following conditions are satisfied.

・the used amount of its group does not exceed the standard amount of the group.

・the available amount is not less than the maximum of the reserved amounts for all groups.

・the available amount is not less than the limit predefined as an operation parameter.

・the elapsed time limit of the job does not exceed the limit predefined as an operation parameter.

(b) If the available amount is not less than the sum of reserved amounts for all groups, the job is judged executable only if the used amount of its group does not exceed the maximum amount of the group.