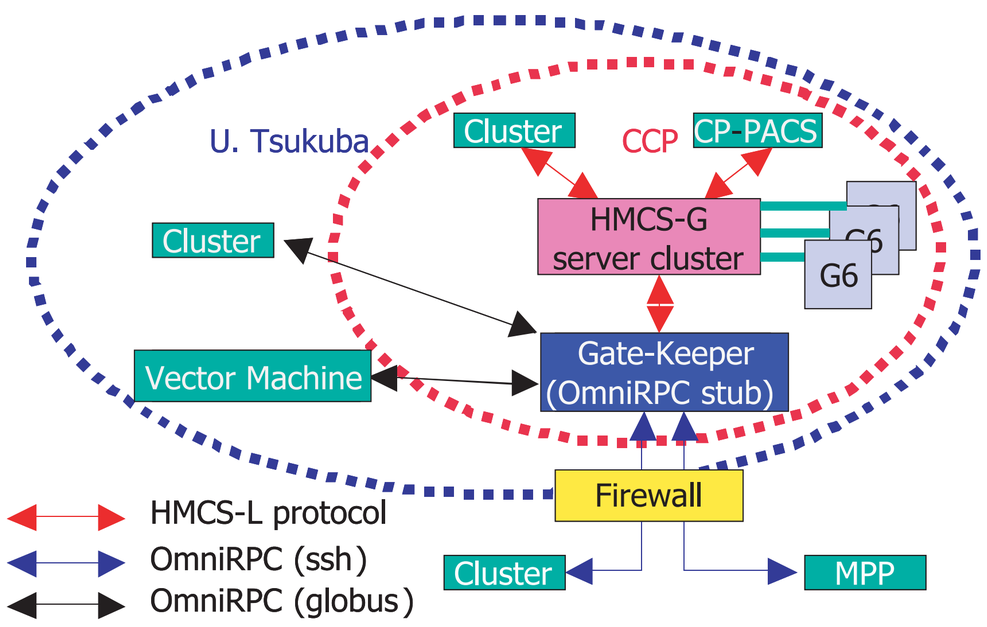
Center for Computational Sciences, University of Tsukuba
http://www.ccs.tsukuba.ac.jp/

HMCS-G: Grid-enabled Heterogeneous Multi-Computer System

Conceptual Block Diagram of HMCS-G



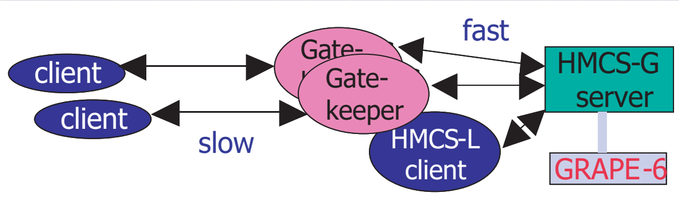
HMCS-G is a gravity calculation service system centering HMCS server with GRAPE-6 gravity engine with GridRPC which enables world-wide access to GRAPE-6 system.

Hybrid computation with gravity calculation (particle system) and other physical phenomena such as hydrodynamics (continuum system) are simultaneously simulated by GRAPE-6 server and client machines, respectively.

OmniRPC is used to enable easy access from any system outside of CCP through either ssh or globus authentication.

GRAPE-6 system is shared by multiple remote clients with high efficiency not depending on network bandwidth nor latency of each client.

OmniRPC Agent in HMCS-G



OmniRPC Agent works as communication buffer to absorb the speed-gap between WAN and LAN.

API for HMCS-G Client

- ***gg6_init(char *agent, int key);***

Initializes & specify agent.

- ***gg6_start(int nio, int mode);***

Specifys # of nodes, utilization mode.

- ***gg6_unit(int np, int unit_t, int unit_x);***

Specifys # of particles and magnitude.

- ***gg6_calc1(double mass[ ], double x[ ][3], double f_old[ ], double phiold[ ]);***

Requests actual calculation.

- ***gg6_wait1(double acc[ ][3], double f[ ])***

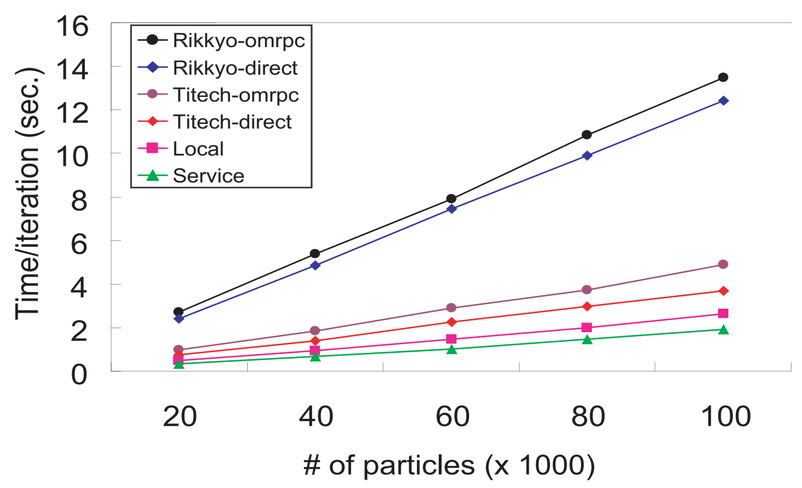
Retrieves calculation result.

- ***gg6_end();***

Finalizes calculation.

Service Time of HMCS-G

Performance with single client



Performance of a client interleaved by another