The Role of MPPs at NASA and the Aerospace Industry

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Talk Outline

- NASA Aeronautics Computational Resources
- NASA Utilization & Availability Metrics
- NASA Aeronautics Parallel Software
- Aerospace Industry

NASA Aeronautics Computational Resources

http://www.nas.nasa.gov/aboutNAS/resources.html

- **Aeronautics Consolidated Supercomputing Facility (ACSF)** is a shared resource for supercomputing for Ames, Dryden, Lewis and Langley. It is located at NASA Ames.
- **Numerical Aerospace Simulation Facility (NAS)**

  The NAS Facility provides pathfinding research in large-scale computing solutions. NAS serves customers in government, industry, and academia with supercomputing software tools, high-performance hardware platforms, and 24-hour consulting support. NAS is also located at NASA Ames.

An Overview of ACSF Resources

- A CRAY C90 (Eagle) consisting of an 8-processor system with 256 MW (64 bits/word) of central memory and 512 MW of SSD memory. The CRAY C90 has a peak performance of 1 GFLOPS per CPU.
- A cluster of four SGI/Cray J90 systems (Newton). The configuration consists of one 12 processor J90SE (512 MW), one 12 processor J90 (512 MW), one 8 processor J90 (128 MW), and one 4 processor J90SE (128 MW) systems.

An Overview of NAS Resources and Services

- The IBM SP2 (Babbage) is a 160 node system based on RS6000/590 workstations. Each node has 16 MW of main memory and at least 2 GB of disk space. The nodes are connected with a high-speed, multi-stage switch. Peak system performance is over 42.5 GFLOPS.
- The CRAY C90 (von Neumann) is a 16-processor system with 1 GW (64 bits/word) of central memory and 1 GW of SSD memory. The CRAY C90 has a sustained aggregate speed of 3 GFLOPS for a job mix of computational physics codes. Peak performance is 1 GFLOPs per CPU.

An Overview of NAS Resources and Services

- SGI Origin 2000 (Turing) consisting of 2-32 node systems configured as a 64 CPUsystem with 2 GW. Each CPU delivers about 400 MFLOPS.
- The NAS HPCC workstation cluster, an SGI PowerChallenge Array (Davinci), consists of one front end system and eight compute nodes. The front end system is the host that users log into. The front end is an SGI PowerChallenge L with four 75 MHZ R8000 CPUs and 48MW memory, and serves as the system console, compile server, file server, user home server, PBS server, etc. There are eight compute nodes (four two-CPU nodes & four eight-CPU shared-memory nodes).

An Overview of NAS Resources and Services

- Two 2-processor Convex 3820 mass storage system
- Silicon Graphics 8-processor 4D/380S support computers
- Silicon Graphics, Sun, IBM and HP workstations
- All the machines are currently connected via Ethernet, FDDI, and HiPPI. ATM network adapters from both SGI and Fore Technology are currently being tested

An Overview of NAS Resources and Services

File Storage:

- 350 GB on-line CRAY C90 disk
- 1.6 TB on-line mass storage disk
- 5 Storage Technology 4400 cartridge tape robots (50 TB of storage)

HPCCP Resources at Goddard

A Cray T3E with 256 processors. Each processor has 128 MB of memory, 32 GB total. Peak performance 153 GFLOPS. An additional 128 processors and 480 GB disk to be installed in June with peak performance of 268 GFLOPS.

Summary of Resources

Program	Type	Name	Processors	Memory GW	Comp. rate Gflops
ACSF	CrayC90	Eagle	8	.256	8
ACSF	Cray J90 cluster	Newton	36	1.28	16
NAS HPCC	IBM SP2	Babbage	160	2.5	42.5
NAS	CrayC90	v.Neumann	16	1	16
NAS	SGI Origin	Turing	64	2	25
NAS HPCC	SGI PC array	Davinci	44	1.7	3
HPCC Goddard	CrayT3E		384	6	268