All FEM simulations were done using LS/MPP-DYNA version 971, point release 398, from LSTC, Inc. LSTC releases several versions of each point release for various architectures—two are tested below. In the executable names, "s" indicates single precision and "d" indicates double precision.

All simulations were done on systems running CentOS 4.4. The Opteron 270 system consisted of 2 Opteron 270s (2.0GHz) CPUs on a Supermicro H8DAR-T motherboard with 8GB of RAM. The Opteron 2212 system consisted of 2 Opteron 2212s (2.0GHz) on a Supermicro H8DMR-82 motherboard with 8GB of RAM. The Intel system consisted of 2 Xeon 5140 (2.33GHz) CPUs on a Supermicro X7DVL motherboard with 8GB of RAM.

Opteron 2218 numbers are based on a simple linear extrapolation from the Opteron 2212 numbers.

Note that for all sims with elastic materials, a Poisson's Ratio of 0.499 was used. All times are given in seconds of elapsed (wall clock) time.

Table 1: CIRS phantom simulation. Purely elastic structural simulation with varying element sizes; low memory requirement (195 MB); about 283000 nodes; single loading impulse for point loads

Executable	ncpu	Opteron 270	Opteron 2212	Opteron 2218	Xeon 5140
ls971_s_7600.398_amd64_redhat30	1	1301	1320	1015	919
ls971_s_7600.398_amd64_redhat30	2	781	713	548	539
ls971_s_7600.398_amd64_redhat30	4	479	458	352	344
ls971_s_7600.398_xeon64_redhatas30	1	1052	978	752	611
ls971_s_7600.398_xeon64_redhatas30	2	613	584	449	391
ls971_s_7600.398_xeon64_redhatas30	4	453	356	274	275
ls971_d_7600.398_amd64_redhat30	1	1924	1921	1478	1421
ls971_d_7600.398_amd64_redhat30	2	1116	1066	820	841
ls971_d_7600.398_amd64_redhat30	4	747	697	536	574
ls971_d_7600.398_xeon64_redhatas30	1	1763	1730	1331	1011
ls971_d_7600.398_xeon64_redhatas30	2	1052	1012	778	665
ls971_d_7600.398_xeon64_redhatas30	4	799	687	528	502

Table 2: Thermal simulation. Uses a fixed time step; direct symmetric solver (memory intensive) with 8 Gaussian points / element (1e-7 covergence tolerance). Note that due to very small temperature changes in this model, it will not run in single precision.

Executable	instances	Opteron 270	Opteron 2212	Opteron 2218	Xeon 5140
7600.398_amd64	1	1656	1622	1248	1055
7600.398_amd64	2	1691, 1729	1702, 1639	1309, 1261	1084, 1095
7600.398_amd64	3	2894, 2518, 2861	2311, 2181, 1924	1778, 1678, 1480	1662, 1786, 1598

Table 3: Thermal simulation (same as above), mpp-dyna

Executable	np	Opteron 270	Opteron 2212	Opteron 2218	Xeon 5140
7600.2.398_Intel_linux86-64_lam703	1	2548	2411	1855	1421
7600.2.398_Intel_linux86-64_lam703	2	1326	1252	963	681
7600.2.398_Intel_linux86-64_lam703	4	739	738	568	436
7600.2.398_PGI_linux86-64_lam703	1	2443	2379	1830	1696
7600.2.398_PGI_linux86-64_lam703	2	1234	1146	882	852
7600.2.398_PGI_linux86-64_lam703	4	678	638	491	484

Table 4: Matlab model of a heart phantom, Matlab R14p3. Makes extensive use of tsearchn, hammers on memory (yields high system load).

instances	Opteron 270	Opteron 2212	Opteron 2218	Xeon 5140
1	778	767	590	509
2	766, 760	768, 781	591, 601	662, 662
4	892, 881, 879, 888	838, 845, 859, 846	645, 650, 661, 651	968, 983, 968, 982

Table 5: Field II benchmark, Matlab R14p3 glnx86

instances	Opteron 270	Xeon 5140
1	54:57	42:15
2	54:27, 55:14	42:18, 42:16
4	54:10, 54:06, 54:55, 55:43	42:22, 42:22, 42:20, 42:20