CRAY
THE SUPERCOMPUTER COMPANY

Profile Visualization with Cray Apprentice2

Heidi Poxon
Performance Tools

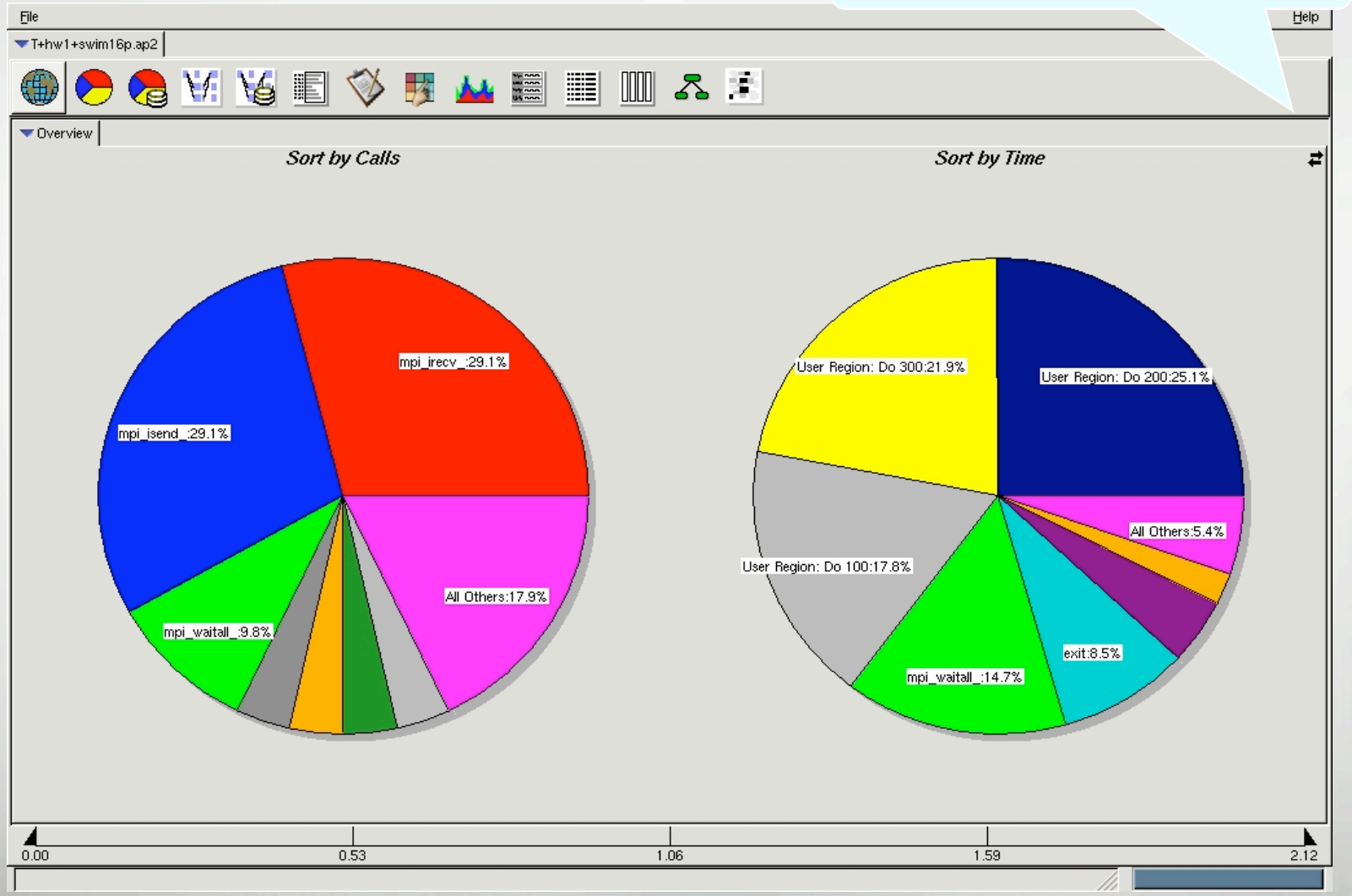
Cray Apprentice^2

- Call graph profile
- Communication statistics
- Time-line view
  - Communication
  - I/O
- Activity view
- Pair-wise communication statistics
- Text reports
- Source code mapping

- Cray Apprentice^2
- is target to help and correct:
  - Load imbalance
  - Excessive communication
  - Network contention
  - Excessive serialization
  - I/O Problems

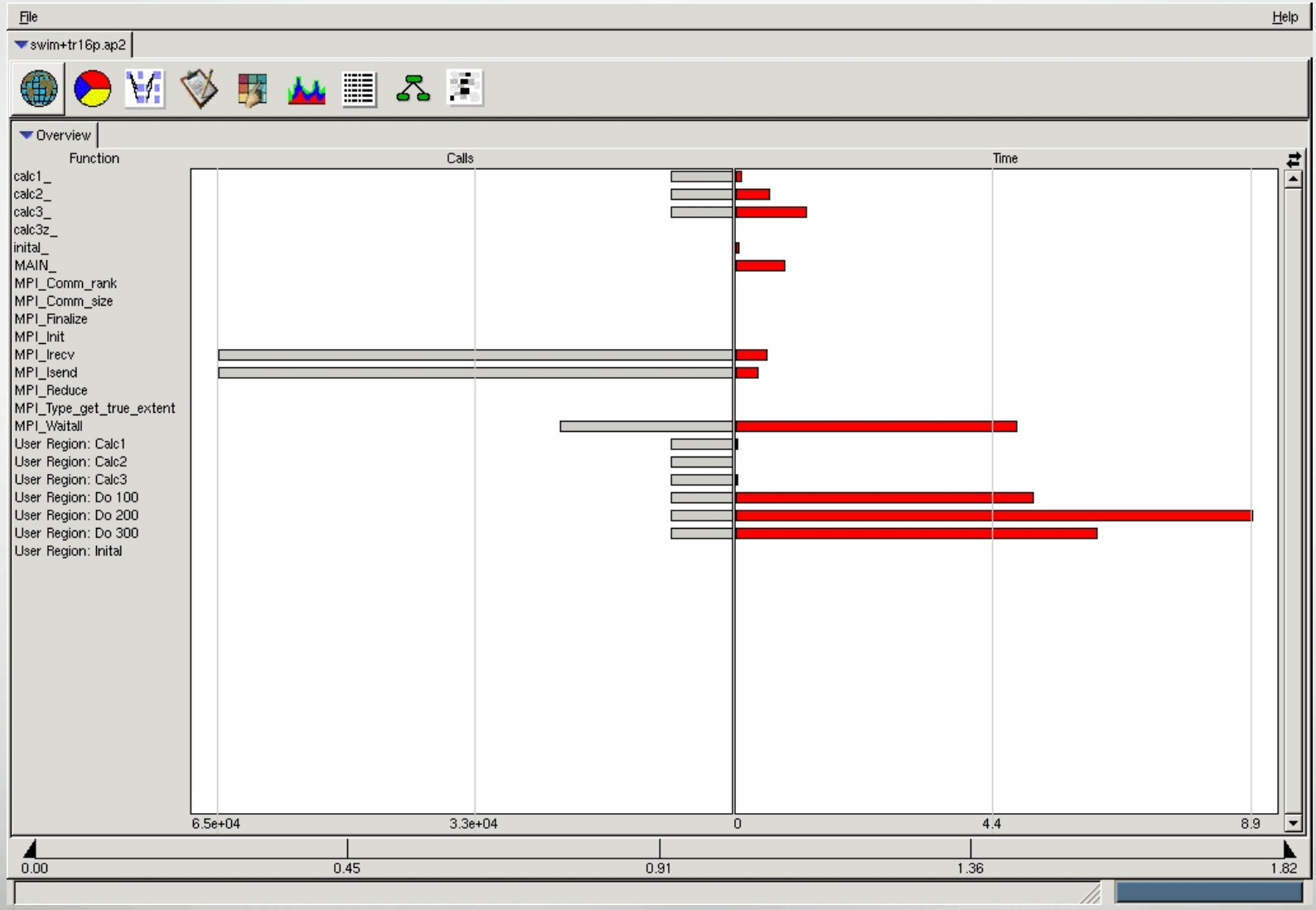
© Cray Inc.

Statistics Overview



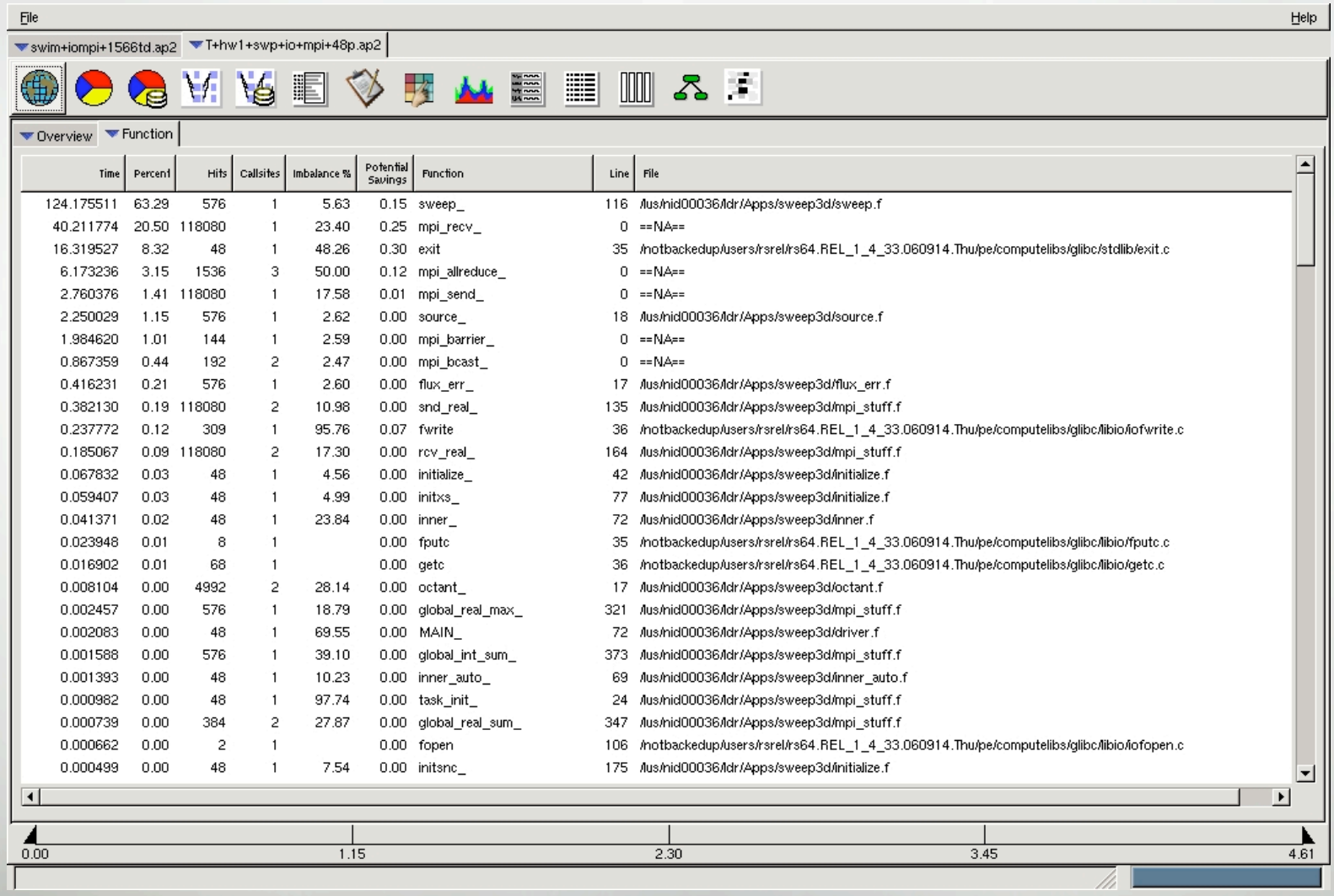
© Cray Inc.

Function Profile



© Cray Inc.

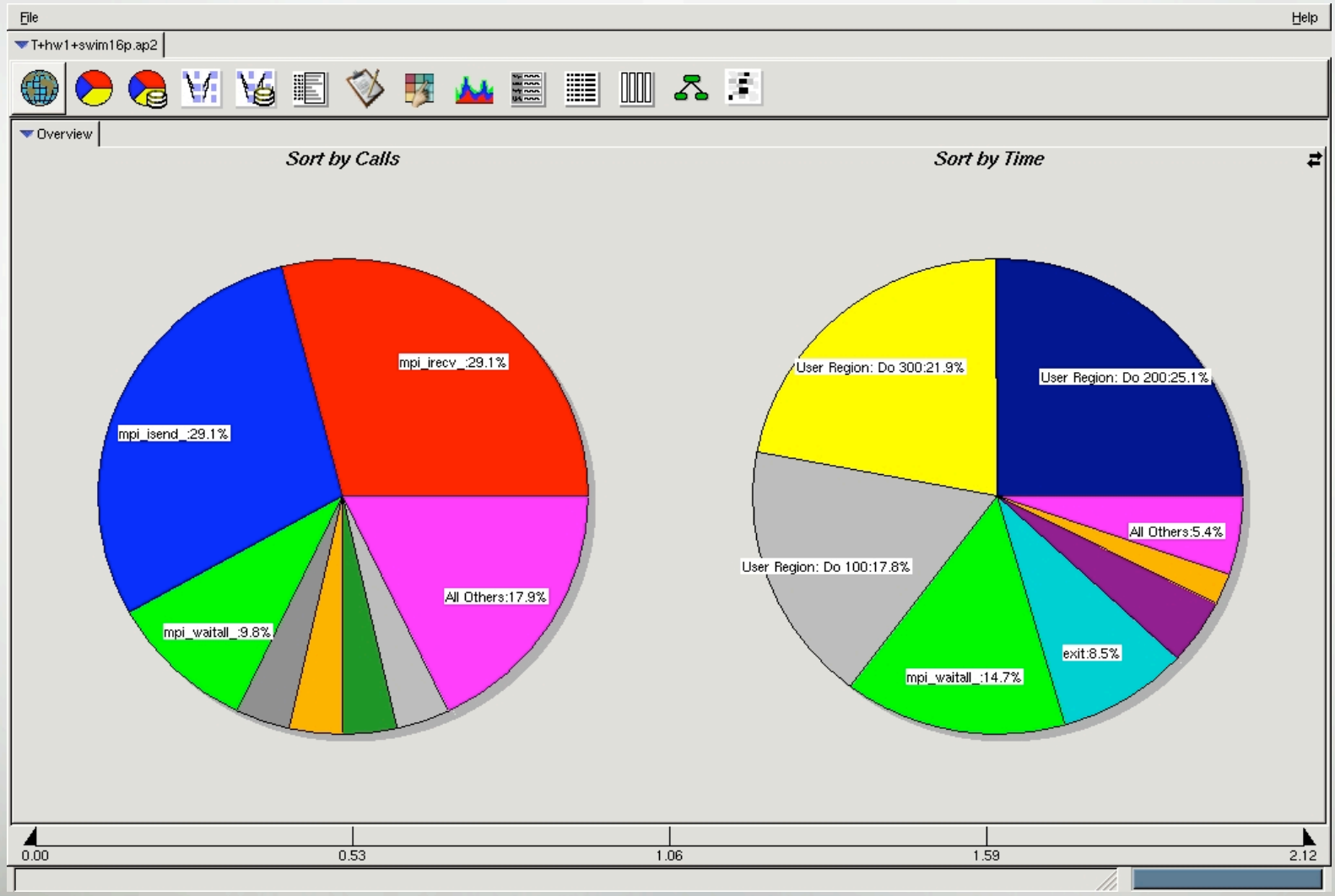
Function Profile



Time	Percent	Hits	Callsites	Imbalance %	Potential Savings	Function	Line	File
124.175511	63.29	576	1	5.63	0.15	sweep_	116	/lus/nid00036/ldr/Apps/sweep3d/sweep.f
40.211774	20.50	118080	1	23.40	0.25	mpi_recv_	0	==NA==
16.319527	8.32	48	1	48.26	0.30	exit	35	/notbackedup/users/rsrel/rs64.REL_1_4_33.060914.Thu/pe/computelibs/glibc/stdlib/exit.c
6.173236	3.15	1536	3	50.00	0.12	mpi_allreduce_	0	==NA==
2.760376	1.41	118080	1	17.58	0.01	mpi_send_	0	==NA==
2.250029	1.15	576	1	2.62	0.00	source_	18	/lus/nid00036/ldr/Apps/sweep3d/source.f
1.984620	1.01	144	1	2.59	0.00	mpi_barrier_	0	==NA==
0.867359	0.44	192	2	2.47	0.00	mpi_bcast_	0	==NA==
0.416231	0.21	576	1	2.60	0.00	flux_err_	17	/lus/nid00036/ldr/Apps/sweep3d/flux_err.f
0.382130	0.19	118080	2	10.98	0.00	snd_real_	135	/lus/nid00036/ldr/Apps/sweep3d/mpi_stuff.f
0.237772	0.12	309	1	95.76	0.07	fwrite	36	/notbackedup/users/rsrel/rs64.REL_1_4_33.060914.Thu/pe/computelibs/glibc/libio/iofwrite.c
0.185067	0.09	118080	2	17.30	0.00	rcv_real_	164	/lus/nid00036/ldr/Apps/sweep3d/mpi_stuff.f
0.067832	0.03	48	1	4.56	0.00	initialize_	42	/lus/nid00036/ldr/Apps/sweep3d/initialize.f
0.059407	0.03	48	1	4.99	0.00	initxs_	77	/lus/nid00036/ldr/Apps/sweep3d/initialize.f
0.041371	0.02	48	1	23.84	0.00	inner_	72	/lus/nid00036/ldr/Apps/sweep3d/inner.f
0.023948	0.01	8	1		0.00	fputc	35	/notbackedup/users/rsrel/rs64.REL_1_4_33.060914.Thu/pe/computelibs/glibc/libio/fputc.c
0.016902	0.01	68	1		0.00	getc	36	/notbackedup/users/rsrel/rs64.REL_1_4_33.060914.Thu/pe/computelibs/glibc/libio/getc.c
0.008104	0.00	4992	2	28.14	0.00	octant_	17	/lus/nid00036/ldr/Apps/sweep3d/octant.f
0.002457	0.00	576	1	18.79	0.00	global_real_max_	321	/lus/nid00036/ldr/Apps/sweep3d/mpi_stuff.f
0.002083	0.00	48	1	69.55	0.00	MAIN_	72	/lus/nid00036/ldr/Apps/sweep3d/driver.f
0.001588	0.00	576	1	39.10	0.00	global_int_sum_	373	/lus/nid00036/ldr/Apps/sweep3d/mpi_stuff.f
0.001393	0.00	48	1	10.23	0.00	inner_auto_	69	/lus/nid00036/ldr/Apps/sweep3d/inner_auto.f
0.000982	0.00	48	1	97.74	0.00	task_init_	24	/lus/nid00036/ldr/Apps/sweep3d/mpi_stuff.f
0.000739	0.00	384	2	27.87	0.00	global_real_sum_	347	/lus/nid00036/ldr/Apps/sweep3d/mpi_stuff.f
0.000662	0.00	2	1		0.00	fopen	106	/notbackedup/users/rsrel/rs64.REL_1_4_33.060914.Thu/pe/computelibs/glibc/libio/iofopen.c
0.000499	0.00	48	1	7.54	0.00	initsnc_	175	/lus/nid00036/ldr/Apps/sweep3d/initialize.f

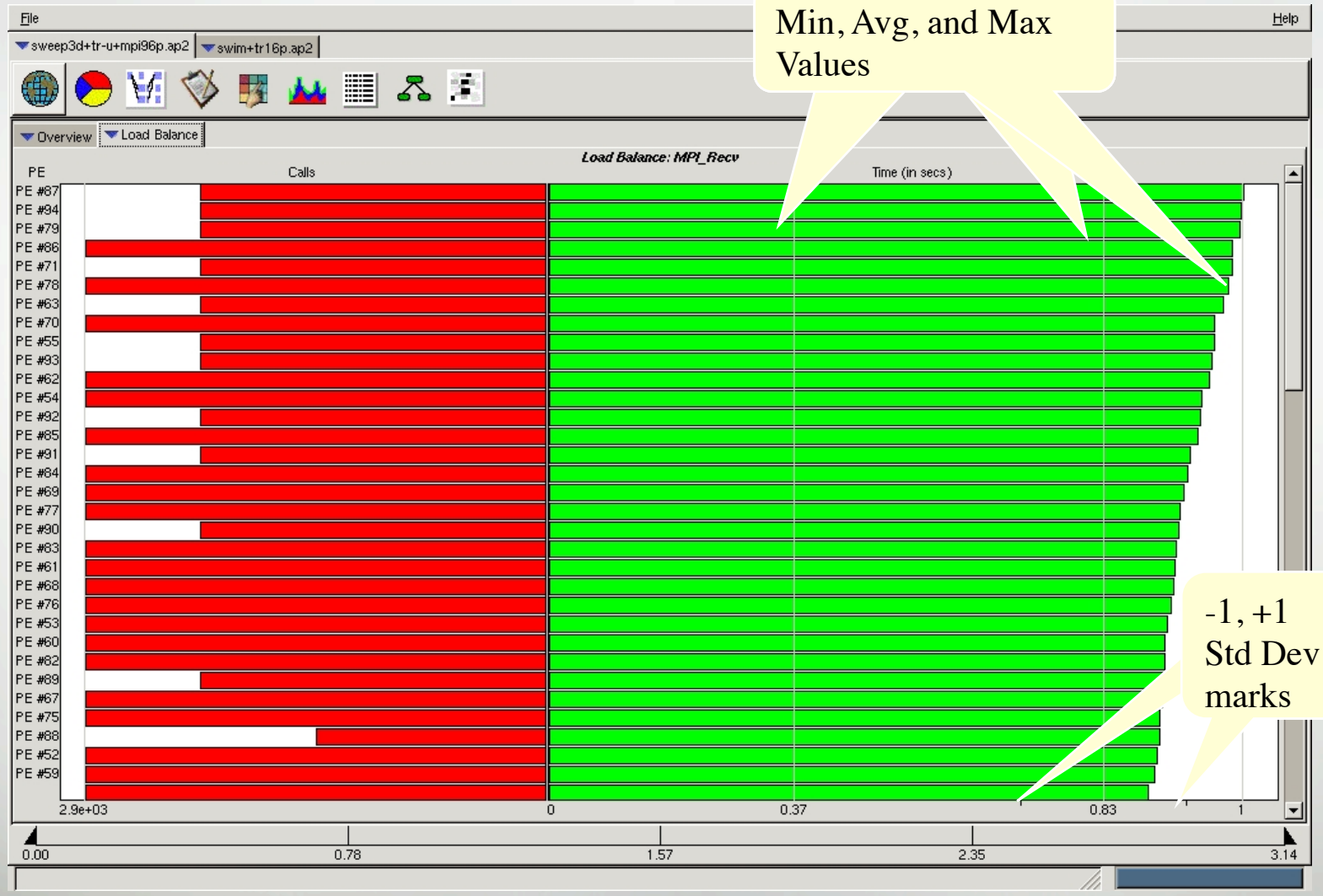
© Cray Inc.

Statistics Overview



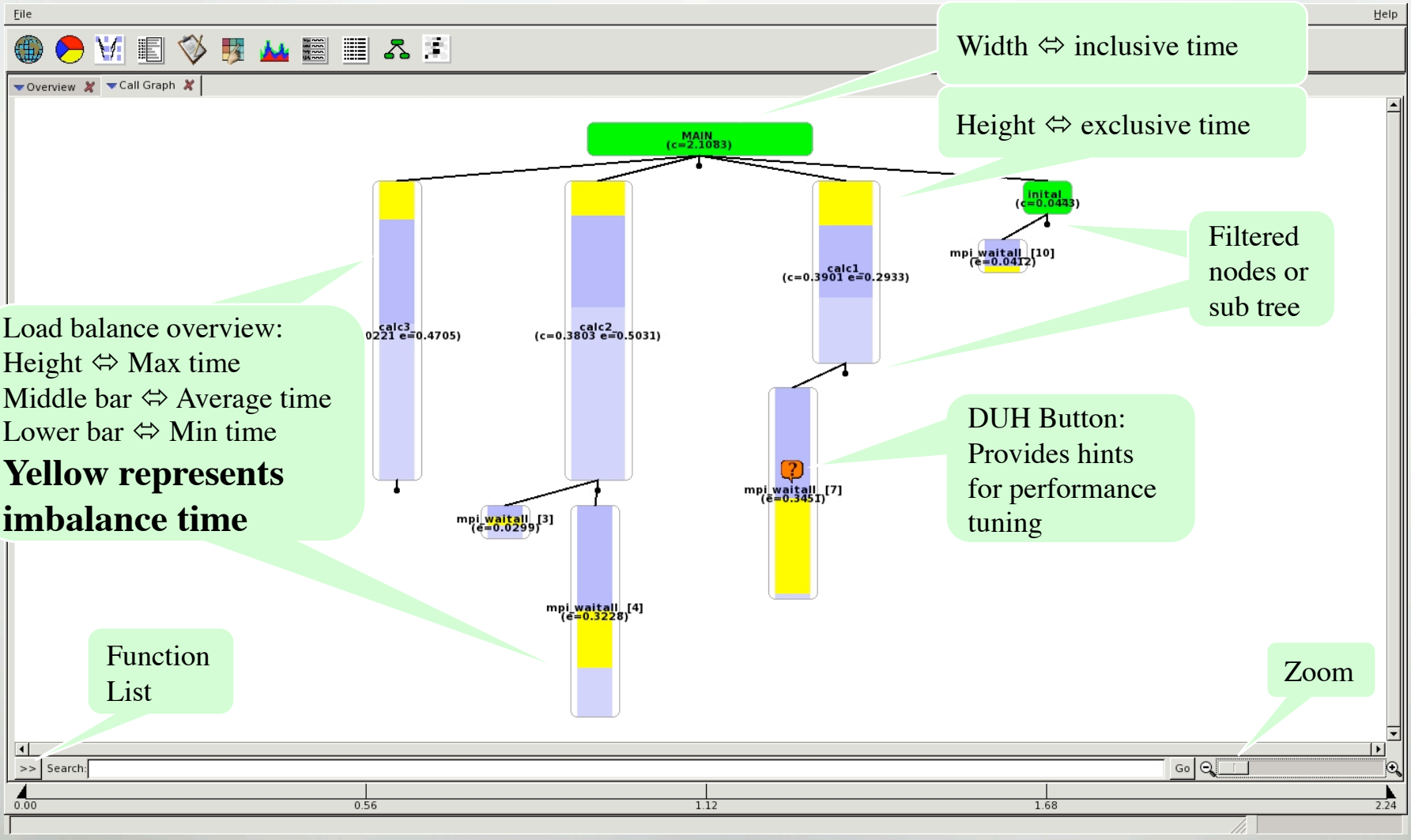
© Cray Inc.

Load Balance View (Aggregated from Overview)



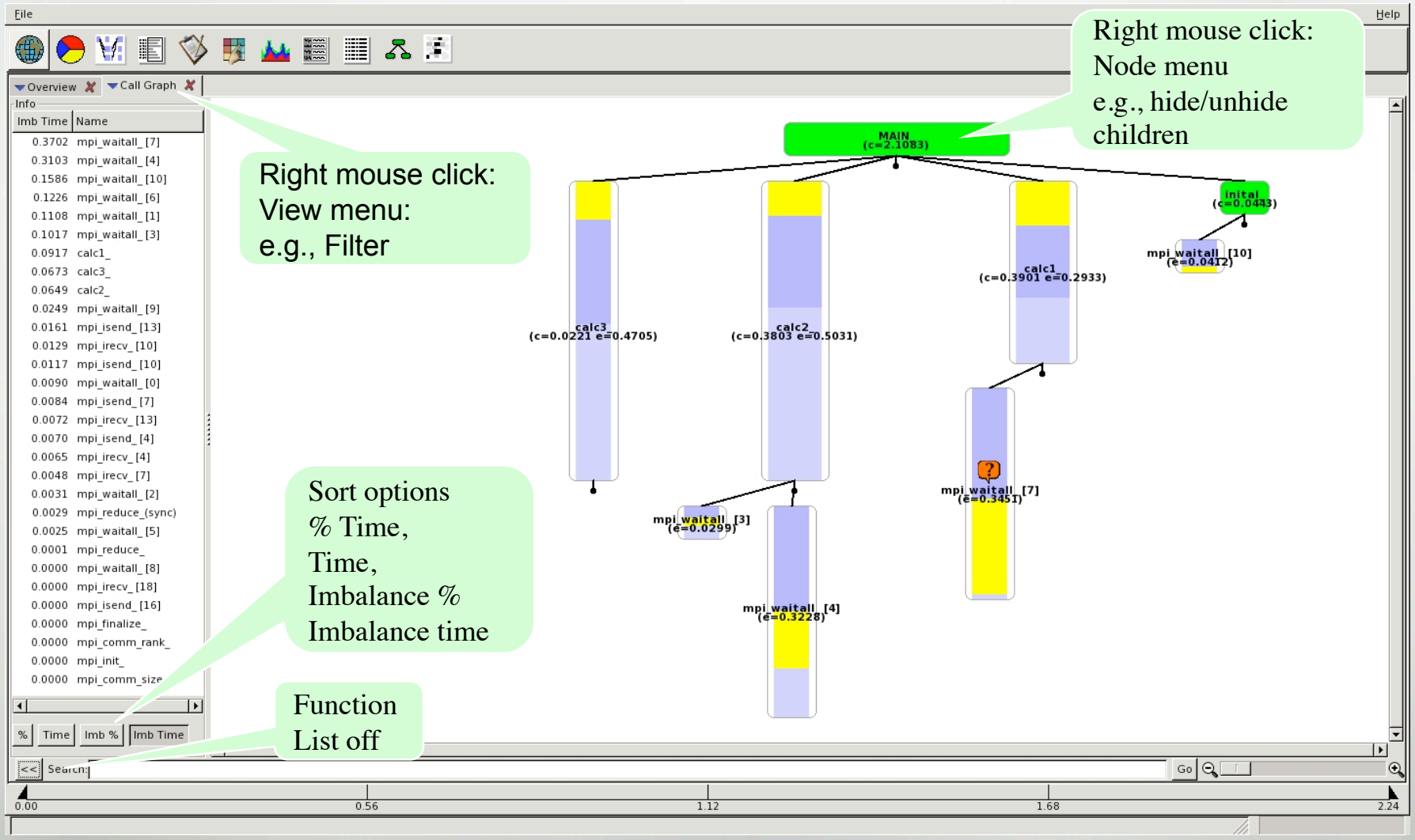
© Cray Inc.

Call Tree View



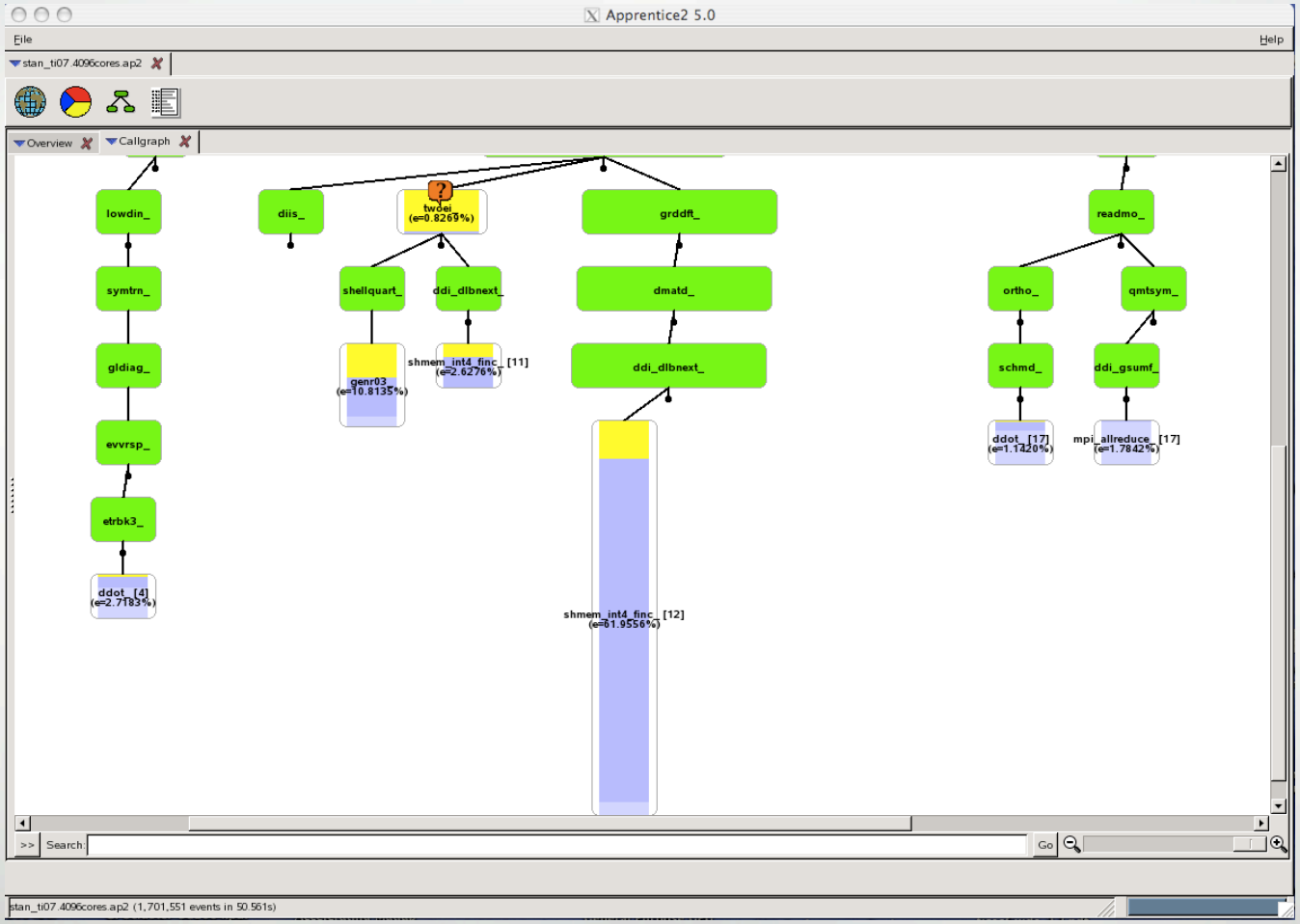
© Cray Inc.

Call Tree View – Function List



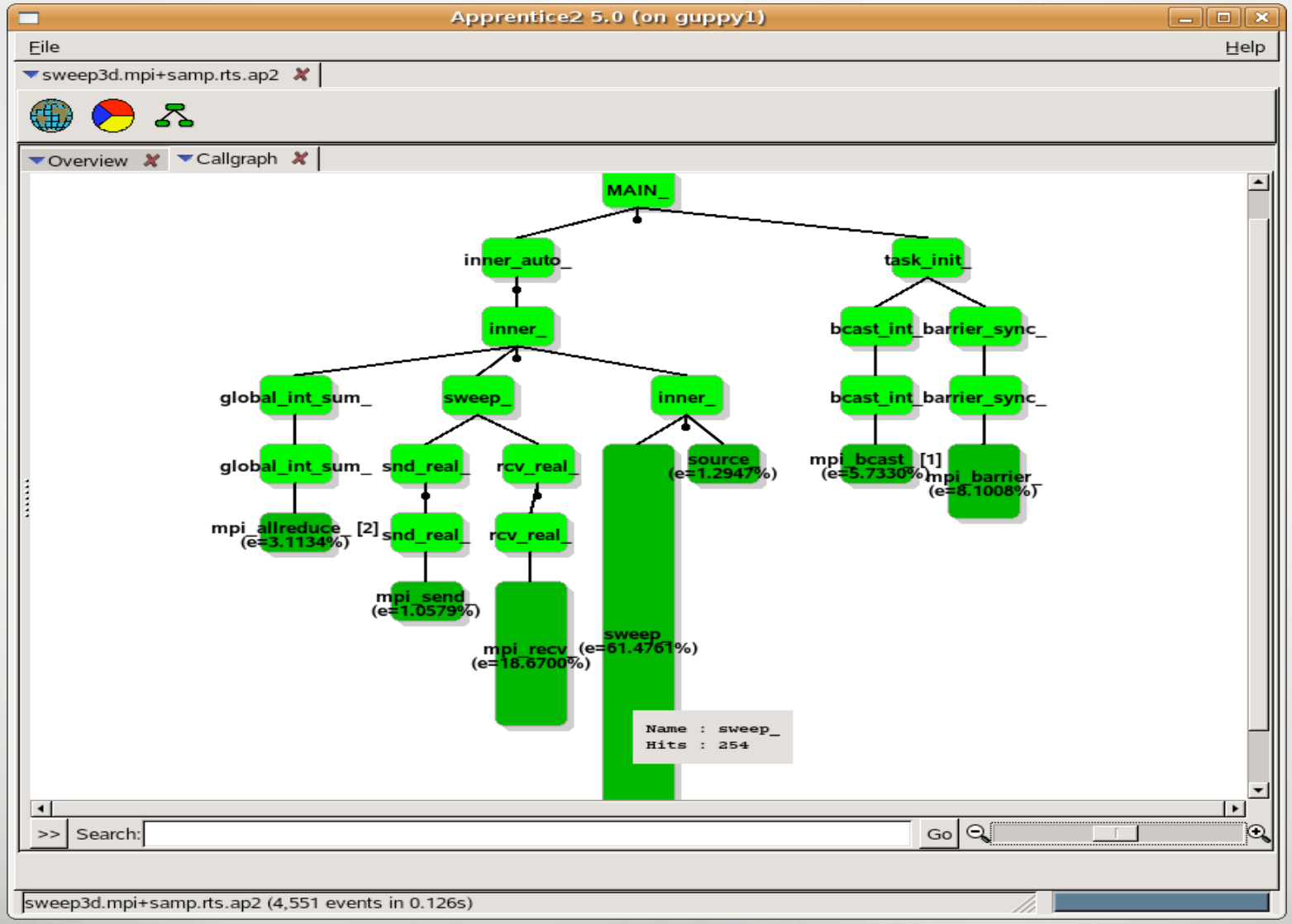
© Cray Inc.

Call Tree Load Imbalance



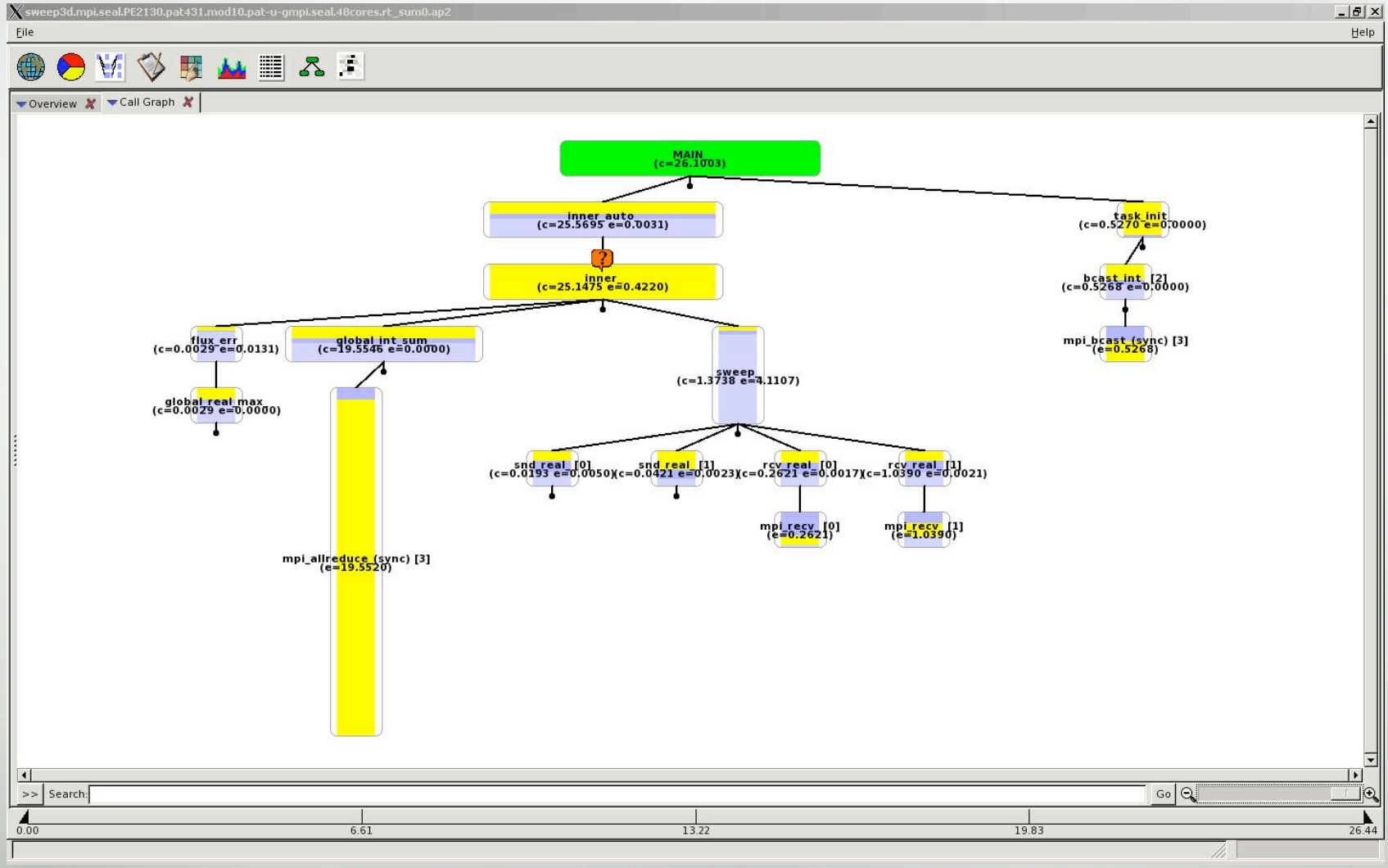
© Cray Inc.

Apprentice^2 Call Tree View of Sampled Data



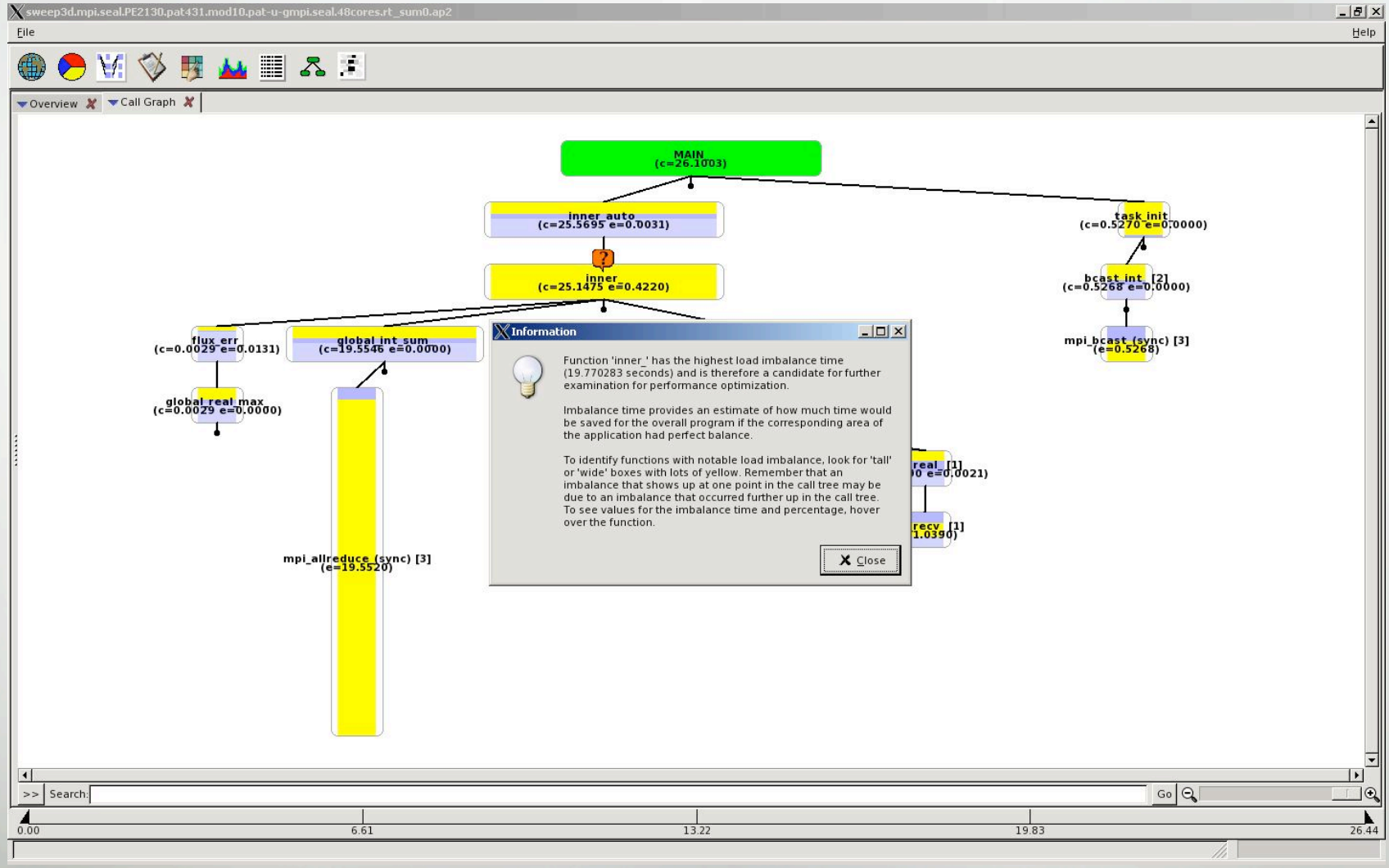
© Cray Inc.

Call Tree Visualization (Sweep3d)



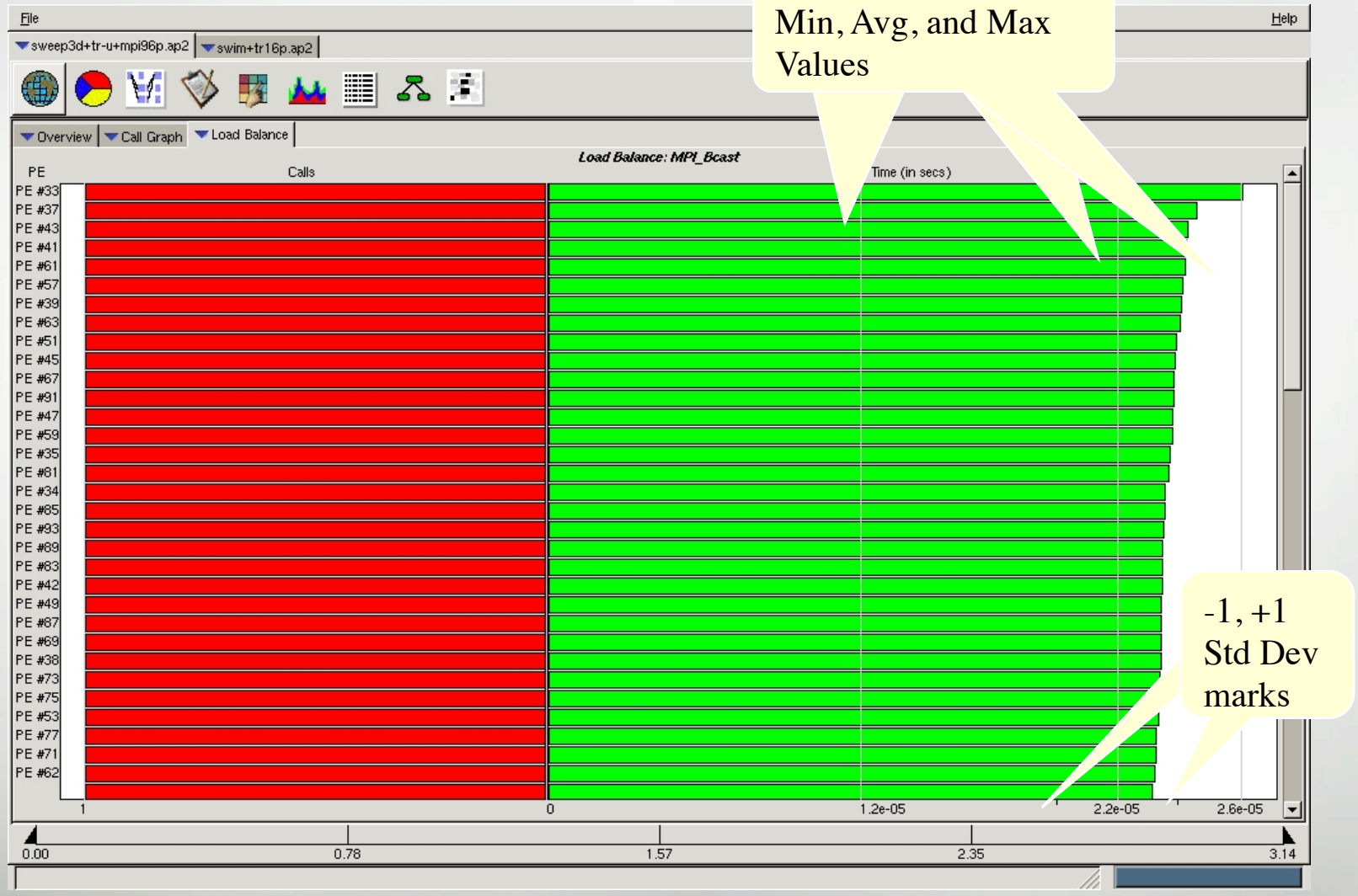
© Cray Inc.

Discrete Unit of Help (DUH Button)



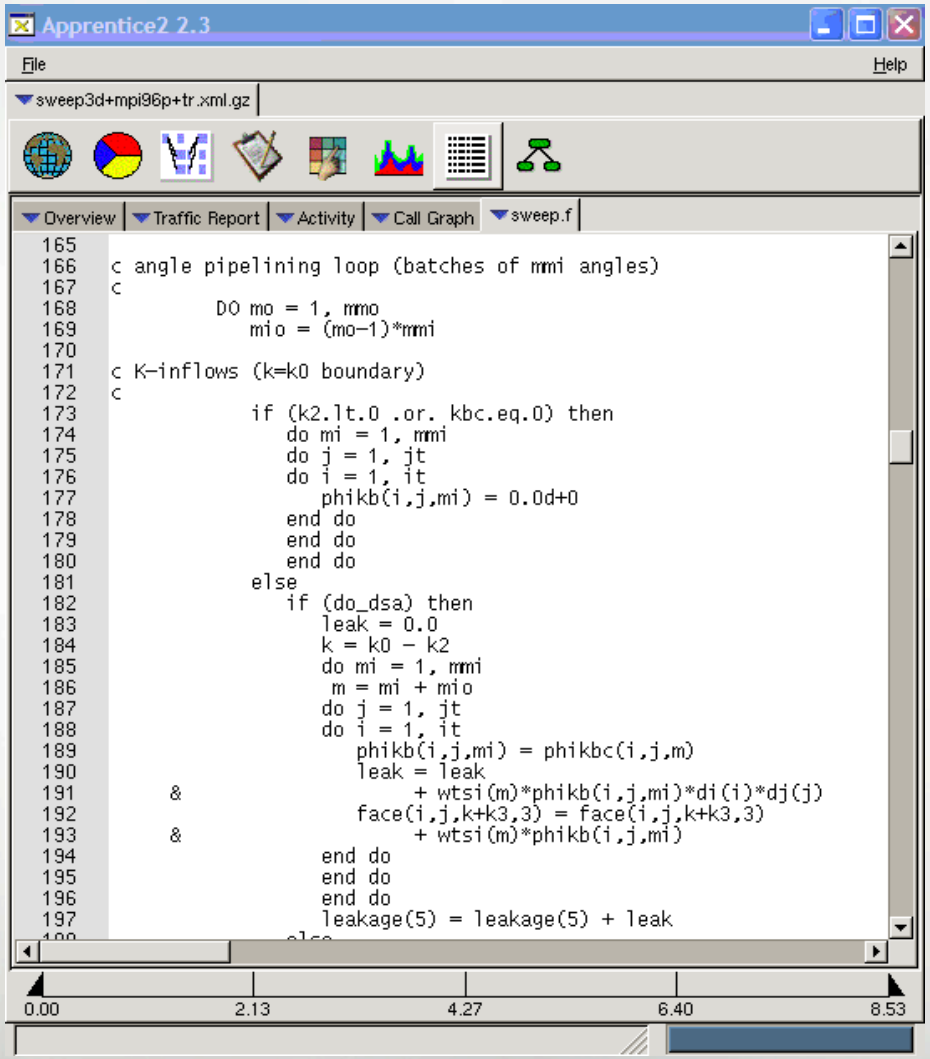
© Cray Inc.

Load Balance View (from Call Tree)



© Cray Inc.

Source Mapping from Call Tree



© Cray Inc.

CRAY
THE SUPERCOMPUTER COMPANY

Profile Visualization with Cray Apprentice2

Questions / Comments
Thank You!