

HiCMA in Action: 27/28 Threads per Node



Samp%	Samp	Imb.	Imb.	Group	
		Samp	Samp%	Function	
			Thread=HIDE		
100.0%	1,005,073.0	--	--	Total	
79.3%	796,711.0	--	--	ETC	
19.7%	198,381.0	215.6	3.0%	mkl_lapack_ilaenv	
7.0%	70,032.0	80.2	3.1%	mkl_lapack_dlarf	
4.7%	47,136.0	167.6	9.4%	__lll_lock_wait_private	
4.7%	46,878.0	109.8	6.2%	mkl_lapack_dgeqrf_pfnr	
3.7%	37,238.0	62.8	4.5%	mkl_blas_avx2_xdaxpy	
3.2%	31,982.0	99.5	8.0%	mkl_lapack_xdlacpy	
3.1%	30,772.0	73.3	6.3%	mkl_lapack_xdlabrd	
2.2%	21,989.0	70.6	8.3%	mkl_lapack_dlarft	
2.1%	21,126.0	40.6	5.1%	mkl_blas_avx2_xdrotm	
1.9%	18,828.0	71.7	9.7%	mkl_blas_avx2_xdtrmm	
1.8%	17,850.0	56.9	8.2%	mkl_lapack_dbdsqr	
1.7%	17,128.0	37.6	5.8%	mkl_lapack_dlarftg	
1.7%	16,841.0	4,321.5	91.0%	__lll_lock_elision	
1.4%	13,695.0	57.8	10.6%	LAPACKE_dge_nancheck	
1.3%	12,667.0	40.9	8.3%	mkl_blas_avx2_xdgemm	
1.2%	12,178.0	44.0	9.2%	mkl_lapack_xdlasr3	
1.2%	11,640.0	37.9	8.4%	mkl_blas_avx2_xdscal	
10.8%	108,166.0	--	--	BLAS	
3.2%	32,424.0	77.1	6.3%	mkl_blas_avx2_dgemm_kernel_nocopy_NT_b1	
2.4%	23,777.0	47.4	5.3%	mkl_blas_avx2_dgemm_kernel_nocopy_NN_b1	
1.9%	19,059.0	51.1	7.0%	mkl_blas_avx2_dgemm_kernel_nocopy_TN_b1	
4.9%	49,274.0	--	--	USER	
1.2%	12,040.0	461.1	52.8%	_starpu_get_worker_task	
4.7%	46,968.0	--	--	PTHREAD	
4.2%	42,114.0	13,536.0	78.3%	pthread_cond_wait	

1 Node: 326 sec

Samp%	Samp	Imb.	Imb.	Group	
		Samp	Samp%	Function	
			PE=HIDE		
			Thread=HIDE		
100.0%	567,334.0	--	--	Total	
49.7%	281,966.0	--	--	ETC	
12.3%	69,902.0	1,266.0	2.4%	__lll_lock_elision	
8.8%	49,681.5	308.5	0.8%	mkl_lapack_ilaenv	
3.1%	17,470.5	260.5	2.0%	mkl_lapack_dlarf	
2.9%	16,433.5	1,022.5	7.8%	__lll_lock_wait_private	
2.1%	11,985.0	401.0	4.3%	mkl_lapack_dgeqrf_pfnr	
1.7%	9,438.5	472.5	6.4%	mkl_blas_avx2_xdaxpy	
1.6%	9,156.0	37.0	0.5%	__lll_unlock_elision	
1.5%	8,235.2	303.8	4.7%	mkl_lapack_xdlacpy	
1.3%	7,646.0	438.0	7.2%	mkl_lapack_xdlabrd	
1.0%	5,579.2	118.8	2.8%	mkl_lapack_dlarft	
43.8%	248,337.2	--	--	USER	
29.0%	164,804.8	2,054.2	1.6%	_starpu_get_worker_task	
1.5%	8,587.0	117.0	1.8%	_starpu_handle_pending_node_data_requests	
1.3%	7,322.5	219.5	3.9%	_starpu_cpu_driver_run_once	
1.3%	7,280.8	256.2	4.5%	_starpu_cpu_worker	
1.3%	7,209.5	209.5	3.8%	_starpu_may_pause	
1.2%	6,573.2	145.8	2.9%	_starpu_datawizard_progress	
1.1%	6,384.5	644.5	12.2%	starpu_memchunk_tidy	
4.8%	27,015.5	--	--	BLAS	
1.4%	8,084.0	177.0	2.9%	mkl_blas_avx2_dgemm_kernel_nocopy_NT_b1	
1.0%	5,929.0	341.0	7.3%	mkl_blas_avx2_dgemm_kernel_nocopy_NN_b1	
1.1%	6,279.0	--	--	PTHREAD	

4 Node: 189 sec

COMPUTE | STORE | ANALYZE



HiCMA in Action: 27/28 Threads per Node

16 Nodes: 79 sec

```
Samp% | Samp | Imb. | Imb. | Group
      | Samp | Samp% | Function
      |     | PE=HIDE
      |     | Thread=HIDE
```

```
100.0% | 240,052.9 | -- | -- | Total
```

```
55.2% | 132,564.2 | -- | -- | USER
```

```
||-----||
|| 38.1% | 91,354.4 | 596.6 | 0.7% | _starpu_get_worker_task
|| 2.0% | 4,761.9 | 136.1 | 3.0% | _starpu_handle_pending_node_data_requests
|| 1.7% | 4,049.0 | 110.0 | 2.8% | _starpu_cpu_driver_run_once
|| 1.7% | 4,046.9 | 139.1 | 3.5% | _starpu_cpu_worker
|| 1.7% | 3,988.0 | 113.0 | 2.9% | _starpu_may_pause
|| 1.5% | 3,630.3 | 99.7 | 2.9% | _starpu_datawizard_progress
|| 1.5% | 3,563.0 | 270.0 | 7.5% | starpu_memchunk_tidy
|| 1.0% | 2,415.8 | 86.2 | 3.7% | _starpu_handle_node_data_requests
||-----||
```

```
40.1% | 96,164.7 | -- | -- | ETC
```

```
||-----||
|| 15.8% | 37,941.6 | 733.4 | 2.0% | __lll_lock_elision
|| 5.2% | 12,471.6 | 187.4 | 1.6% | mkl_lapack_ilaenv
|| 2.1% | 4,953.8 | 150.2 | 3.1% | __lll_unlock_elision
|| 1.8% | 4,381.6 | 143.4 | 3.4% | mkl_lapack_dlarf
|| 1.8% | 4,380.8 | 905.2 | 18.3% | __lll_lock_wait_private
|| 1.3% | 3,055.1 | 168.9 | 5.6% | mkl_lapack_dgeqrf_pfnr
|| 1.0% | 2,408.9 | 149.1 | 6.2% | mkl_blas_avx2_xdaxpy
||-----||
```

```
2.8% | 6,779.1 | -- | -- | BLAS
1.3% | 3,093.7 | -- | -- | PTHREAD
||-----||
```

32 Nodes: 60 sec

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Samp% | Samp | Imb. | Imb. | Group
      | Samp | Samp% | Function
      |     | PE=HIDE
      |     | Thread=HIDE
```

```
100.0% | 186,490.6 | -- | -- | Total
```

```
60.8% | 113,478.0 | -- | -- | USER
```

```
||-----||
|| 42.6% | 79,366.5 | 851.5 | 1.1% | _starpu_get_worker_task
|| 2.2% | 4,111.3 | 114.7 | 2.8% | _starpu_handle_pending_node_data_requests
|| 1.9% | 3,523.9 | 145.1 | 4.1% | _starpu_cpu_worker
|| 1.9% | 3,507.2 | 130.8 | 3.7% | _starpu_cpu_driver_run_once
|| 1.9% | 3,469.6 | 128.4 | 3.7% | _starpu_may_pause
|| 1.7% | 3,180.7 | 220.3 | 6.7% | starpu_memchunk_tidy
|| 1.7% | 3,171.0 | 139.0 | 4.3% | _starpu_datawizard_progress
|| 1.1% | 2,113.8 | 94.2 | 4.4% | _starpu_handle_node_data_requests
||-----||
```

```
35.0% | 65,260.3 | -- | -- | ETC
```

```
||-----||
|| 17.7% | 32,934.4 | 589.6 | 1.8% | __lll_lock_elision
|| 3.3% | 6,234.8 | 198.2 | 3.2% | mkl_lapack_ilaenv
|| 2.3% | 4,253.1 | 228.9 | 5.3% | __lll_unlock_elision
|| 1.2% | 2,196.7 | 464.3 | 18.0% | __lll_lock_wait_private
|| 1.2% | 2,187.7 | 94.3 | 4.3% | mkl_lapack_dlarf
||-----||
```

```
1.8% | 3,445.0 | -- | -- | BLAS
1.7% | 3,207.5 | -- | -- | PTHREAD
||-----||
```

```
1.1% | 2,127.7 | 687.3 | 25.2% | pthread_cond_wait
||-----||
```