allinea

High performance tools to debug, profile, and analyze your applications

Allinea: High-performance Software Tools

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allinea FORGE

allinea DDT

allinea MAP

allinea PERFORMANCE REPORTS

Performance Reports Case Study: KTH, Royal Institute of Technology in Sweden

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Problem	
	Managing several heterogeneous clusters for national and international use
	Wide variety of applications and users (provides access for European PRACE project)
	Utilization of the 36,000 cores available reaching 95% - vital to identify bad performers

Solution	
	Uses Performance Reports to identify which applications are making poor use of system resources
	"Now, we just run Allinea Performance Reports, identify the problems and then allocate the time and resources that we need"
	"If we make sure our resources are used more efficiently, we can support more users"

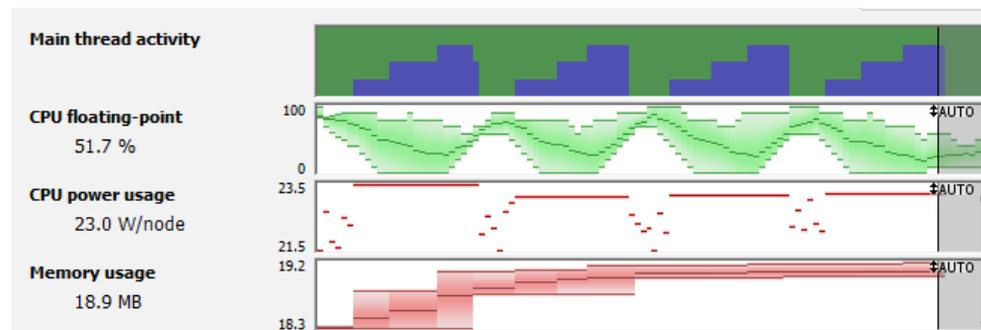## Energy

A breakdown of how the 3.6 Wh was used:

CPU   62.9%
System   37.1%
Mean node power   92.4 W
Peak node power   94 W

Significant energy is wasted during MPI communications. It may be more efficient to use fewer nodes with more data on each node.

Significant time is spent waiting for memory accesses. Reducing the CPU clock frequency could reduce overall energy usage.

Frequency	Energy (uWh) per run	Energy over resting	Time (s)
1.2	410000	157819	58.2
1.3	360000	122075	54.91
1.8	310000	132000	41.08
1.9	300000	130276	39.17
2	310000	148986	37.16
2.1	310000	190669	27.54
Max saved:	3.2%	36.0%	

Main thread activity

CPU floating-point
51.7 %

CPU power usage
23.0 W/node

Memory usage
18.9 MB

Often the best way to improve energy efficiency is to reduce application runtime

Some sites are interested in reducing energy usage without impacting job times

Reducing trapped capacity is about *increasing* energy usage

What if the easiest way to increase utilization and energy usage by *decreasing* application efficiency?