

# APPLICATION CARDIOD

I came across this article in the **HPCwire** magazine dated Oct 24<sup>th</sup> 2012 where the Lawrence Livermore National Laboratory's **SEQUOIA** supercomputer is used in **Heart research**. It has created the fastest computer simulation of the **Human heart**. Though SEQUOIA was built for US Nuclear weapons simulations, it is being used for cardiac simulations before it gets classified. The scientific problem being solved is that due to this advanced capability, scientists have been able to simulate the human heart down to the cellular level and use the resulting model to predict how the organ will respond to different drug compounds.

The simulations were made possible by an advanced modeling program, called **Cardiod**. Until now the best modeling programs could achieve 0.2 mm in each direction. Cardiod can get down to 0.1 mm. Scientists are seeing 300-fold speedups. It used to take 45 minutes to simulate just one beat, but now researchers can simulate an hour of heart activity – several thousand heartbeats – in seven hours. The highly scalable code simulates the electrophysiology of the heart. It works by breaking down the heart into units; the smaller the unit, the more accurate the model.

As of today the SEQUOIA supercomputer stands 2<sup>nd</sup> in the top500 club. With 1572864 cores and having a Linpack performance of 16324.8 TFlop/s is taking modeling and simulation to new heights, enabling researchers to capture greater complexity in a shorter time frame. The Cardiod simulation has been named as a finalist in the 2012 Gordon Bell Prize competition, awarded each year to recognize supercomputing's crowning achievements.

I chose this article because it is very nice to see High Performance Computing being used for the benefit of the society ....

## Reference :

[http://www.hpcwire.com/hpcwire/2012-10-24/sequoia\\_supercomputer\\_pumps\\_up\\_heart\\_research.html](http://www.hpcwire.com/hpcwire/2012-10-24/sequoia_supercomputer_pumps_up_heart_research.html)

For more info on **Cardiod** you can check out this link

[http://researcher.watson.ibm.com/researcher/view\\_project.php?id=2992](http://researcher.watson.ibm.com/researcher/view_project.php?id=2992)