5. Conclusion and Future work

This paper developed analytical models (and conducted empirical studies) for predicting (and measuring) CPU availability of JVMs supported by single- and multi-core architectures. As would be

expected, degradation in CPU availability occurs when total CPU loading is greater than the total capacity of all CPU cores. In addition to total CPU loading, the total number of concurrent threads is a factor in predicting CPU efficiency; more threads generally incur more context switching overhead, which results in degraded availability. When the total load is less than the total capacity of all cores, the relative alignment of the working and sleeping phases of the threads can have a significant impact on CPU availability. Specifically, increased overlap of the work phases implies lower availability. It was demonstrated that shifting the relative phasing of the threads to reduce possible work phase overlap can improve the performance (i.e., CPU efficiency). Random aggregate load and phase shift values for concurrent threads were assigned for each for an extensive number of experimental measurements. A thread availability scatter plot provides a clear visualization of measured performance based on the density of the dots in the plot. These empirically measured availability values are showed to generally fall within theoretically derived upper and lower bound

formulas. A 90% confidence interval for measured availability is shown to provide significantly tighter upper and lower limits than the theoretically derived formulas for upper and lower bounds.

Links:-

<http://www.cs.ou.edu/~antonio/pubs/conf061.pdf>

<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4100484>