Abstract

It is well known that the highest temperature under which a processor can operate without mechanical and digital interruptions is 90 °C. For that reason, by approaching the Project of heat sinks of processors concerning to computer architecture, at Courses of Computer Science. It is important to point out the use of appropriate heat sinks at long last this type of hardware can compromise the life of the computer, as well as to jeopardize the performance of software applications in case it has not had the due heat withdrawal when it is necessary to use 100% of the processing capacity. Thus the aim of this research paper is to explore the thermal transfers by using the logarithmic mean temperature difference method in an application of liquid cooling system for computer. As the cooling fluid and the liquid cooling kit achieved for the experiment are from Thermaltake, benchmark company in that segment. An experimental bench for flow measuring, of input and output temperature of fluid of water block and data collection were assembled. Under maximum working load the processor was submitted and the maximum temperatures were 75°C with the standard fan (heatsink + cooler) and of 53°C with the
Analysis of Heat Transfer Refrigeration Systems of Data Processing Units

watercooler kit, at an average flow rate 2825 ml / min. The maximum operating efficiency achieved was of 0.439 Watts of energy savings in comparison with the traditional heatsink that uses ventilation. That efficiency of performance by consuming less energy and increases the processing, proves that the well-sized computer architecture for choosing processor-cooling hardware ensure satisfactory performance in software applications which require high data processing and also decrease the cost of operation of application of long term.

References

3. LORENZONI, R. K. Análise de desempenho e consumo energético entre processadores arm e x86. 2012.
5. LEE, M., KWANG, K., HOPKINS, R., GAWLIK, K. Thermal conductivity measurements of copper-coated metal hydrides (LaNi5, Ca0.6Mm0.4Ni5 and LaNi4.75Al0.25) for use in metal hydride hydrogen compression systems. Int J Hydrogen Energy, v. 34 (7), pp. 3185-3190, 2009.
16. SIDDIQUE, A. B., PRABHU, K. N.; Replacement of heat sink fan by nano coolants for enhancement of CPU efficiency, National Conference on Challenges in Research & Technology in the Coming Decades, 2013.

Index Terms

Computer Science  Circuits and Systems

Keywords

TDP of Processors, Thermal Transfers, Water Block, Liquid Cooling, Watercooler Kit.