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A Resource-saving Job Monitoring System of High-Performance Computing using Parent and Child Process

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High-performance computing has been more important in the past decade. In the present day, data used for processing becomes enormous where a high-performance computing resource is needed to help process the data. Some scientific experiments involving big data which requires high-speed data processing cannot be done by an ordinary computer system. Also, there is a need for support of parallel processing. The solution starts by dividing the job into a number of sections, and then the system sends the calculated result back to the compiled. This mechanism will speed up the processing time to complete the task and generate more output at the same time. Therefore, a solution in this study is to maximize efficiency when using the resources of the computer which involves the processing power of the processor (CPU-Core).

The mechanism can be explained in a scenario as follows. In Thailand, there are government agencies that provide free-of-charge high-performance computing services to facilitate researchers to conduct their research.It is usual that many users request a resource overrun or uses computing resources in an inefficient way.This is because they are not aware of the over-consumption of the resources, leading to unnecessary high costs. For example, a user requests computing resources that does not match the actual usage.Resource requests are calculated in high numbers for maximum processing speed that does not correspond to actual usage, resulting in resource wasting. Thus, a negative effect will go to the hardware system and it will be a hindrance to other users who have to lose an opportunity to use it.

In our previous study, demonstrated in Figure 1, we start checking all running jobs in the system from Job ID number. The CPU-Load that represents the CPU utilization is over or not 100%. Process ID is then analyzed by the Job ID.Displays user details of how many CPU-Core requests are made.Then, it compares with the current CPU-Load that works exactly as requested.We use the tolerance of 20%. If the current resource has a CPU-Load greater than 120% or less than 80%, it will be assumed that the work is running, and the CPU-Core request does not match the actual use. It means that the use of resources is not effective. The system alerts users via email or eliminates the process. However, using this mechanism, the CPU-Load is not correctly analyzed because some software uses unstable CPU-Core. As a result, the decision of the system is wrong.

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