

COP 5611 Operating Systems
Paper Topic Proposal
Process Migration for Mobile Computing
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Abstract

The paper will discuss mobile computing process migration improvements through the introduction of a migrated process (MP) multilevel queue along with an efficient migrated process schedule algorithm as well as logging of migrated processes to be transmitted and migrated process caching on remote mobile computers in an effort to reduce power consumption.

Hypothesis

We hypothesize that the efficiency of migrating processes on small mobile computers can be improved through the introduction of a multilevel queue with an appropriate scheduling algorithm for processes to be migrated. In addition, processes to be migrated will be blocked together for transmission to reduce the overhead associated with migrating a process. Lastly, process caching on remote mobile computers will be introduced to potentially reduce the number of processes to be migrated.

Thus we propose to answer the following question: Given the above parameters, is there a measurable difference in efficiency over current process migration models, for improving power consumption for mobile clients?

MP Schedule Multilevel Queue with Process Schedule Algorithm

In mobile computing, how are processes that are to be migrated to a mobile computer queued by the operating system? The requirements for a process to be migrated are certainly different than those of kernel processes or user processes. The mobile computing environment must be considered.

MP Logging

Once the processes to be migrated are efficiently queued and ready for transmission logging can be employed. The act of taking several smaller processes and blocking them together to make fewer larger transmissions should contribute to improved process migration.

MP Caching

Once a process has been migrated to another computer in a mobile computing environment, the process can be cached so that if that computer were to be asked to run that same process again the process would not have to be transmitted.

Research Approach

There are two possible options to explore for showing the potential enhancement in process migration using the ideas presented in this proposal:

1. Use actual mobile computing devices and establish a mobile computing environment. The operating system on the mobile devices would be changed accordingly to implement the suggested ideas. This option would provide the most accurate measurement. There is also a cost in obtaining the equipment and this is also very ambitious for a ten-week project.
2. Create a simulated environment. A network of simulated mobile computing devices would be established using the ideas suggested. This method would only produce simulated measurement but has little to no cost and could be more realistic for a ten-week project.

Conceptual Model

Figure 1 shows the mobile computing environment taking advantage of process migration with the potential enhancements in place. The “Migrated” multilevel queue on Mobile Computer A is in place scheduling process to be migrated efficiently utilizing an efficient scheduling algorithm. Before those processes are transmitted they are blocked together, and logged, to reduce transmission frequency and overhead. Finally, the migrated processes are cached on other mobile computers in a Migrated Process Block table to potentially eliminate having to send the process in the near future.

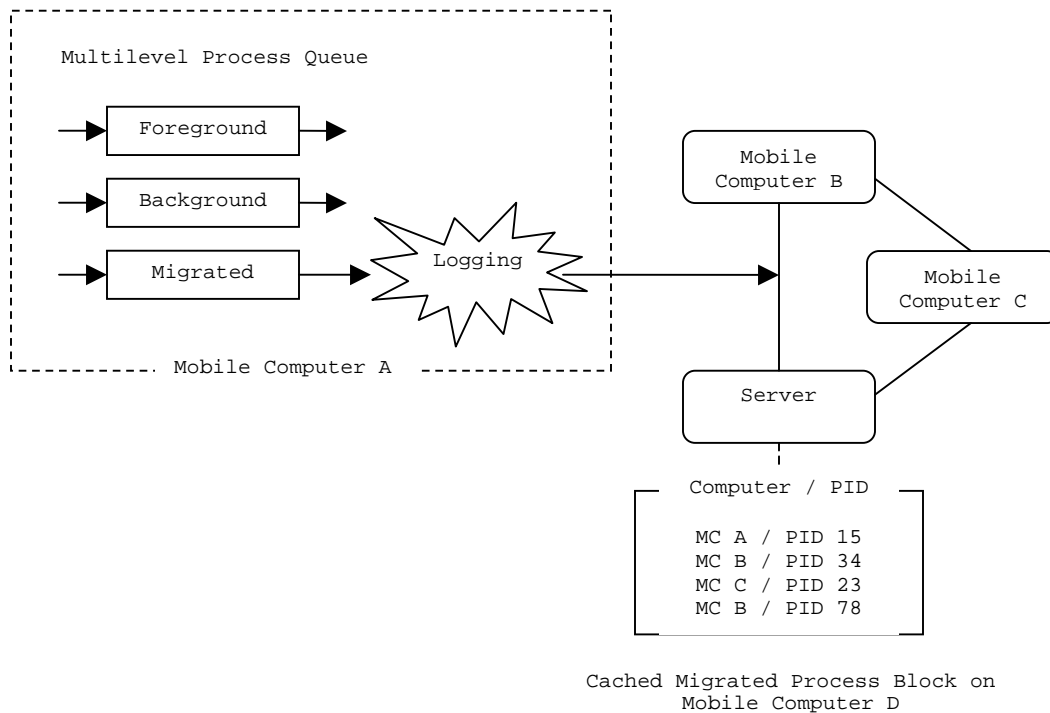


Figure 1

Measurement

We are aiming to measure power consumption changes using the ideas presented in this proposal. Secondly, any improvement in processing throughput would want to be measured.

Because this is a preliminary ten-week research project, we would also record how much effort it would take to implement these suggested ideas for process migration improvement along with any challenges in doing so.

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