Week 2

Paper Critique

Exokernel An Operating System Architecture for Application-Level Resource Management (SOSP 1995)

This paper proposes Exokernel, an operating system architecture, that enables applications to control machine resources by implementing those resources at application level. This is done by moving all the hardware abstractions into libOS (library Operating System).

The advantage of Exokernel is that the application can take advantage of efficiently using hardware resources since they can be aware of the resource availability and allocation. The disadvantage of Exokernel is that the flexibility in the user-space might causes reduced consistency between the applications.

The improvement that can be done for Exokernel is that since it is dealing with the virtual memory in the application level, the scheduling of the request from the application in the application level rather than the level below would make request scheduling more transparent to the application.

Lottery Scheduling: Flexible Proportional-Share Resource Management (OSDI 1994)

This paper proposes lottery scheduling that tries to solve the conventional problem of starvation in a priority-based scheduling. It gives the ticket as a credit to the processes to differently proportionate the serving of the request. The scheduler randomly selects the ticket of the process to dispatch. It solves the starvation problem by giving more ticket to the one who is not served for the long time.

The advantage of using lottery scheduling is that it does not only consider the priority of the process but the served time and the threads within a process. This helps to control resource consumption rates more precisely. The disadvantage of it is that it cannot guarantee the process will be able to access resources it requires in an appropriate amount of time since lottery scheduling acts in a random way.

The improvement that can be done for lottery scheduling is that since current Linux kernel supports Cgroups to control the memory and block I/O resources, lottery scheduling can combine with the function of Cgroups to support more precise proportionality even with the random manner of scheduling.