Operating Systems Design: Critique

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- **Exokernel: An Operating System Architecture for Application-Level Resource Management**

  Exokerenel is new type of micro operating system, which provides application-level resource management. This architecture separates system in two parts: exokernel which is minimal kernel for resource multiplexing and library operating system that works above the exokernel for higher-level abstractions.

  This new system provides better flexibility and performance than monolithic OS and other microkernel systems. However, exokernel can be difficult to manage total system because it pushes many decisions to the user level.

  Currently, only one library OS (ExOS) has been loaded, but it would be nice if there were more OS for many GPUs or additional contents tailored to machine learning.

- **Lottery Scheduling: Flexible Proportional-Share Resource Management**

  Lottery scheduling is a new random resource allocation method that uses probability to allocate resources proportionally. It distributes tickets to threads that need resources, randomly picks one of those tickets, and the thread with that ticket has the resources. At this time, the allocation ratio is set by distributing the number of tickets differently.

  This algorithm has easy concept and it ensures fairness and proportionality with probability. Also, it is good solution for starvation problem. However, fairness over time is not perfectly ensured. This type of problem is solved to extent through the subsequent paper.

  In order to solve the problem of change in fairness over time, scheduling is necessary for some time unit. This is presented in the stride paper and actually shows an improvement in the accuracy of fairness.