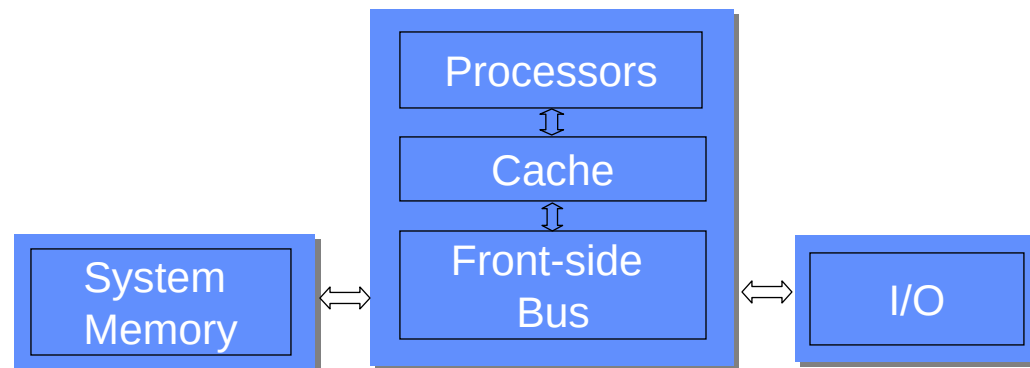

Real-time Scheduling for Cell Broadband Engine

Presenter: Bach Duy Bui

Advisor: Dr. Marco Caccamo and Dr. Lui Sha

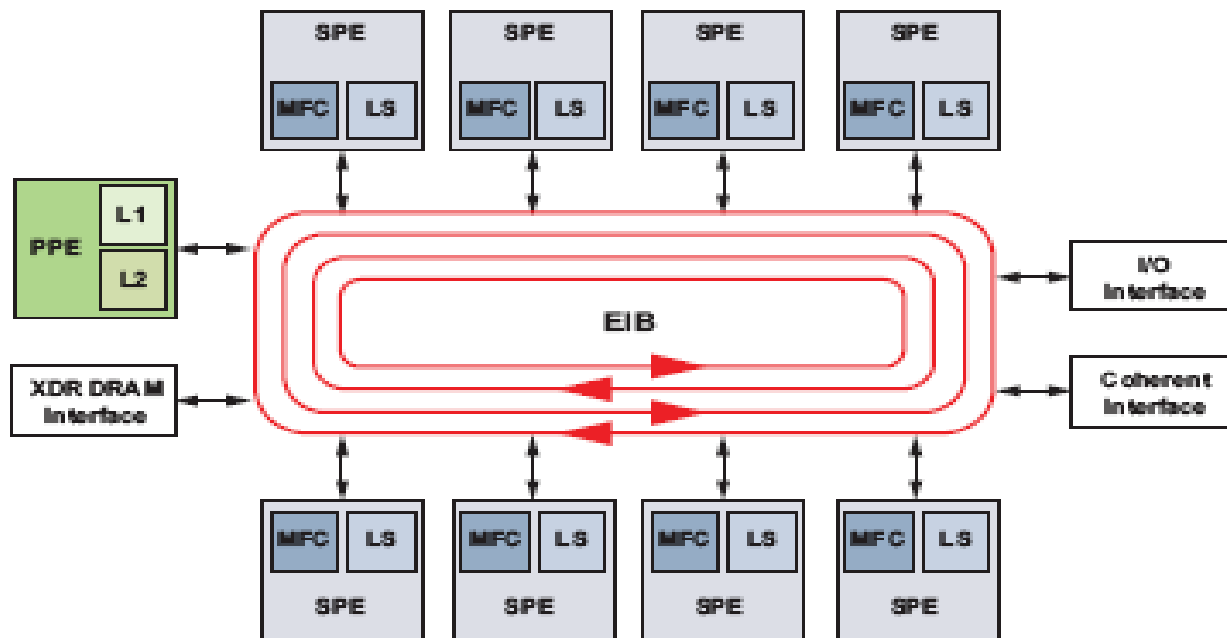
Problem with the Cache-based Processor Architecture

- **Problem with the Cache-based Processor Systems**
 - A task execution time can be unexpectedly extended by the execution of other tasks or DMA-enabled peripherals.
 - Our experiments showed that the extension in the task execution time is as high as 44%.
 - Naïve solutions such as cache disabling significantly reduce the system performance.



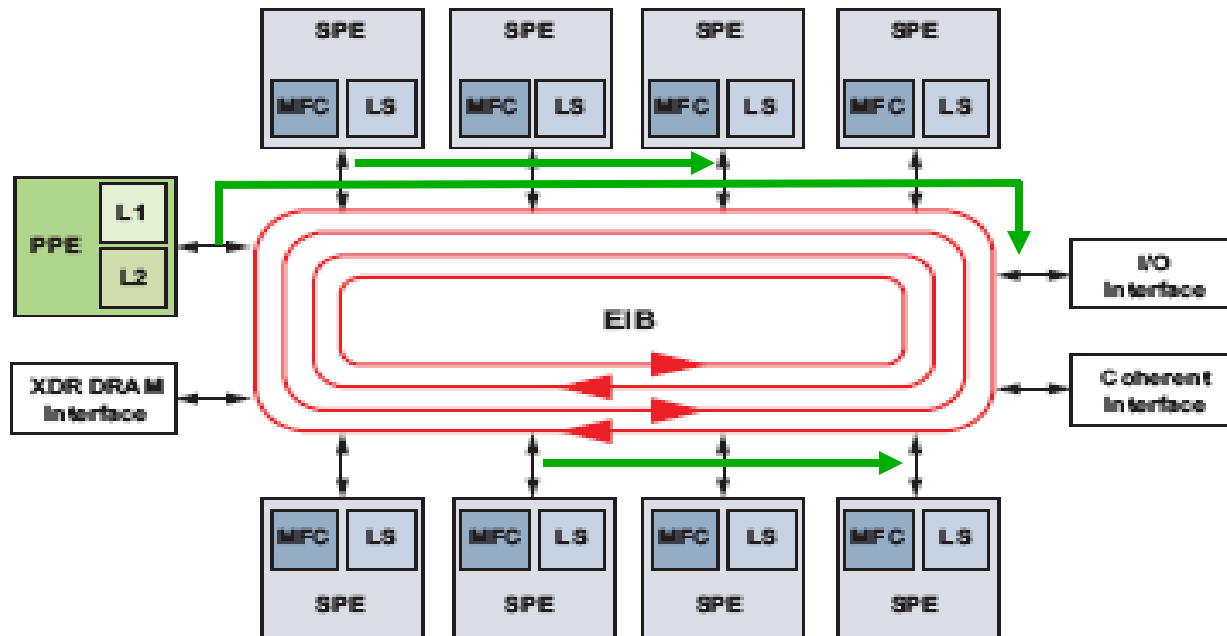
Cell Broadband Engine Advantages

- High speed Local Storage.
- Software controllable Front Side Bus.



New challenges

- Real-time scheduling of the tasks together with the transactions on the bus
 - Utilizing multiprocessors and multiple degree of bus parallelism



Results on Bus Scheduling

- Under the worst-case condition, we proved that the bus system with a periodic transaction set equivalents to a multiprocessor system with an extended task set in terms of schedulability
- We also proved that the PFair schedule preserves its optimality under the extended task model therefore the PFair schedule is also an optimal solution for the bus scheduling problem in the worst case condition.