Reducing Memory Power Usage on a CMT System

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Objective

• We are trying to reduce the amount of power used by main memory by turning some of it off.

• This can be made more effective by changing where active virtual memory pages are mapped.

• We want to find the maximum amount of power that can be saved while maintaining performance requirements.
State of the Art

- Most systems currently out there leave memory on full power regardless of whether it is being used.

- Other research has found large power savings at a small performance cost by:
  - turning off parts of memory based on recent access patterns
  - allocating virtual memory pages intelligently
Our New Approach

- We intend to use the many threads the Niagara II supports to diminish the performance penalties of turning memory on and off.
- We will also try to run a workload more representative of datacenter tasks.
- Implementing this on a real system with real power readings will add validity to the results.
Risks

• There may be issues getting full access to the Niagara II box whenever we want.
  • We could use the Niagara I box as a substitute.
  • We must determine an appropriate workload and benchmarks that we can run.
The Plan

- **Week 7** - Gain familiarity with OpenSolaris (compiling on development box)
- **Week 8** - Collect baseline benchmarks for comparison
- **Week 9** - Develop and test power measurement model
- **Week 10** - Experiment with turning off DIMM’s
- **Week 11** - Experiment with page placement
- **Week 12** - Experiment with other techniques
- **Week 13** - Slack to compensate for unforeseen problems
- **Week 14 & 15** - Complete report & poster