Virtual Memory

A Project for CS854

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February 15, 2016

Proposal

Our proposal has 3 parts:

Proposal

Our proposal has 3 parts:

1. Literature Review

Proposal

Our proposal has 3 parts:

1. Literature Review
2. Experimental Design

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1. Literature Review
2. Experimental Design
3. Implementation

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Proposal: Literature Review

We wish to investigate the following operating systems:

Proposal: Literature Review

We wish to investigate the following operating systems:

1. Linux

Proposal: Literature Review

We wish to investigate the following operating systems:

1. Linux
2. OpenBSD

Proposal: Literature Review

We wish to investigate the following operating systems:

1. Linux
2. OpenBSD
3. OpenIndiana
   (Previously Solaris)

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For each OS, we wish to answer the following questions:

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- How is physical memory managed?

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We wish to investigate the following operating systems:

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For each OS, we wish to answer the following questions:

- How is physical memory managed?
- Are there data structures for physical pages, separate from the page tables?

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- Are there data structures for physical pages, separate from the page tables?
- How are contiguous regions of memory managed?

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- How are contiguous regions of memory managed?
- How is memory freed?

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  - What happens when the kernel runs out of memory?

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For each OS, we wish to answer the following questions:

- How is physical memory managed?
- Are there data structures for physical pages, separate from the page tables?
- How are contiguous regions of memory managed?
- How is memory freed?
  - What happens when the kernel runs out of memory?
- Do they do anything special on Non-Uniform Memory Access (NUMA) architectures?

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Proposal: Experimental Design

Proposal: Experimental Design

- Make a *testable* hypothesis based on lit. review

Proposal: Experimental Design

- Make a *testable* hypothesis based on lit. review
- Design *simple* experiments to test this hypothesis

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Proposal: Implementation

Proposal: Implementation

- Implement a memory management system for KOS

Progress

We have made some progress:

- OpenBSD data structures

Progress: OpenBSD

- 386BSD
  ↓
  NetBSD
  ↓
  OpenBSD

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  ↓
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- VM based on NetBSD

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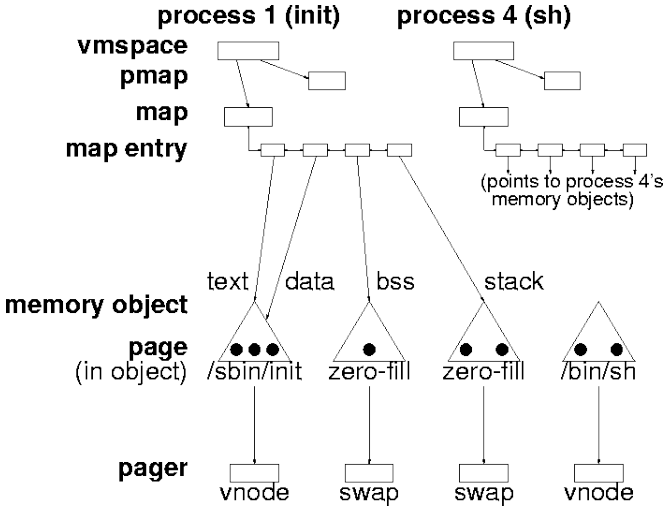

Summary

1. Literature Review
   - Some progress on data structures!
2. Experimental Design
3. Implementation

References

- UVM dissertation:
  `http://vorpal.math.drexel.edu/course/opsys2/uvm-project/uvm.pdf`

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