

# Oracle SPARC Solaris

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HOW IT HANDLES PAGING

# Overview

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- Oracle Solaris
  - Unix operating system
  - Can run on SPARC or X86
- SPARC – Scalable Processor Architecture
  - RISC – Reduced Instruction Set Computer
  - Highly scalable using same core instruction sets
- Demand paged virtual memory
  - Pages are brought into memory as needed
  - Paging begins when memory exceeds a threshold

# Paging Process Tables

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- Multiple levels of tables
- Hashed page tables
  - One for kernel and one for all user processes
- Maps memory addresses from virtual to physical
- Each entry:
  - represents contiguous area of mapped virtual memory
  - Has base address and a span that indicates number of pages that it represents

# The Process

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- Translation look-aside buffer (TBL) use translation table entries (TTEs) from translation storage buffer (TSB)
  - Includes one entry per recently accessed page
- Search the TLB for translation when virtual address reference happens
- TLB Walk
- If match – CPU copies entry to TLB
- If not match:
  - kernel interruption
  - Creates TTE from hash table and stores in TSB

# General Paging Algorithm

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- A memory deficit is noticed
- Page scanner thread runs and walks through memory
- A page is marked as unused
  - If still unused after an amount of time, the page is viewed for reclaim
  - If modified, a request is made to the pageout thread to schedule the page for I/O
- As memory increases
  - increases the pages it chooses for candidates for reclamation increases
  - increases paging algorithm runs.
- Starts at 4% of one CPU for pageout operations and increases until 80% of one CPU is used

# References

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[Paging-Related Parameters - Oracle Solaris Tunable Parameters Reference Manual](https://docs.oracle.com/cd/E23823_01/html/817-0404/chapter2-10.html)

[https://docs.oracle.com/cd/E23823\\_01/html/817-0404/chapter2-10.html](https://docs.oracle.com/cd/E23823_01/html/817-0404/chapter2-10.html)

[Section 9.4 - CSCI 431: Operating Systems | zyBooks](https://learn.zybooks.com/zybook/CSUNIVCSCI431HendersonFall2023/chapter/9/section/4?content_resource_id=79808337)

[https://learn.zybooks.com/zybook/CSUNIVCSCI431HendersonFall2023/chapter/9/section/4?content\\_resource\\_id=79808337](https://learn.zybooks.com/zybook/CSUNIVCSCI431HendersonFall2023/chapter/9/section/4?content_resource_id=79808337)

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