

Oracle SPARC Solaris Paging

System Analysis and Software Design
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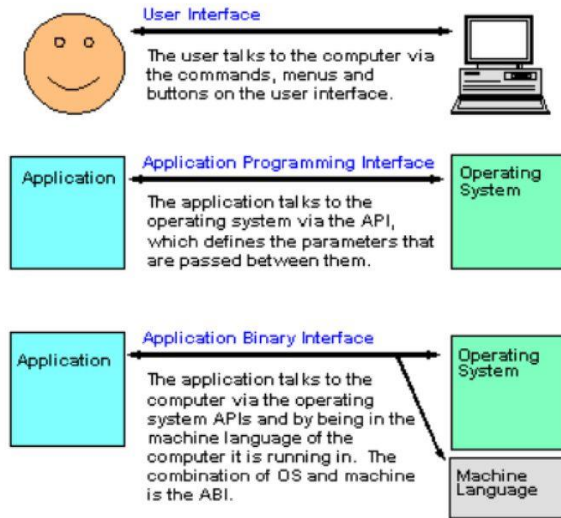
What is Solaris?

- Unix based operating system
- First released in 1992
- First developed by Sun

Microsystems

Founded by Betchtolsheim,
Kholza, Joy and McNealy

Application Binary Interface (ABI)



taken from <http://www.yourdictionary.com/api>

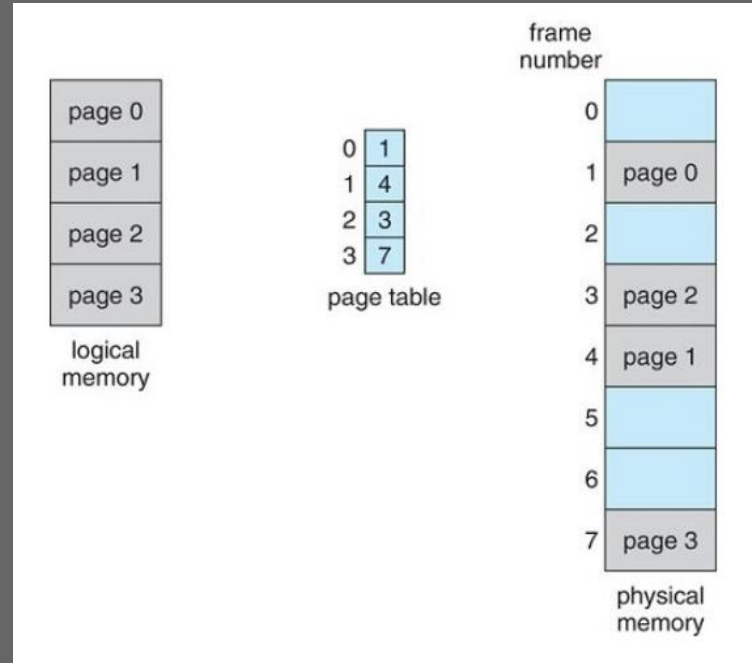


Benefits of Solaris

- ✓ Scalable
- ✓ Portable
- ✓ Interoperable
- ✓ Compatible

Paging Overview

- Memory-management scheme that permits a process's address space to be noncontiguous.
- Avoids external fragmentation and associated need for compaction.
- Used most within Operating Systems.
- Implemented through the cooperation between the operating system and computer hardware.



Paging in Oracle SPARC Solaris



- Uses a “demand paged virtual memory system”, which loads only necessary parts of a program into memory, rather than the whole program.
- Pages are brought into memory as needed.
- When memory is occupied above a certain threshold, paging begins.
- Paging goes through several levels controlled by certain parameters.

Paging Algorithm in Solaris

- When a memory deficit is noticed, a page scanner thread runs through the memory.
- Pages are marked as unused.
- Page is still unused after a time interval, the page is considered for reclaim to other pages.
- If a page has been modified, the time interval for timeout is increased.
- Page is reclaimed for another page once timed out.



Paging Algorithm in Solaris

- Memory pressure increases, the algorithm becomes more aggressive in the pages it considers for reclamation.
- Amount of memory scanned increases linearly.
- System constraints to use no more than 4 percent of one CPU for page operations.
- Increases up to 80 percent when memory pressure increases.
- Stops when enough pages are found to satisfy memory, planned number of pages are looked at, or too much time elapsed.

How Solaris Uses Page Tables

- Utilizes hashed page tables
 - Maps virtual memory to physical memory
 - CPU Implements a TLB
 - Enacts a TLB walk when a TLB miss occurs
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