Virtual Lecture On

Linux
Windows 8
Android

Memory Management

By

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Objectives

At the end of the session students will be able to

- To learn Basics of Memory Management.
- To learn Basics of Windows 8 Memory Management.
- To learn Basics of Android Memory Management.
- To Differentiate between above memory management techniques.

Prerequisites

Terms

- Single Partitioning
- Multiple Partitioning
- Contiguous Allocation
- Non Contiguous Allocation
- Paging
- Segmentation

Problems

External Fragmentation

Internal Fragmentation

- Linux Memory Management.
- Windows 8 Memory Management.
- Android Memory Management

Differentiation

Distribution of Process Address Space

Windows

- Windows on 32 bit x86 systems can access up to 4GB of physical memory.
- Windows allows each process to have its own 4GB logical address space by using paging.
- The upper 2GB is kept for windows kernel mode.
- The lower 2GB of the address space is reserved for user mode.

Linux

- 3GB of memory space is reserved for user mode
- 1GB is kept for Kernel mode

Paging

- Linux uses demand paging with no pre paging
- Linux do not swap the entire process instead uses a lazy swapper.
- It never swaps a page into the memory unless that page is needed.
- Instead of swapping in a whole process, the pager swaps only necessary pages into memory.
- Windows uses cluster demand paging
- Pages are brought in the memory when they are needed.
- Instead of bringing pages one by one, eight pages are brought in the memory simultaneously.
- It makes use of working set model.

It thus avoids reading pages that will not be used, this decreases swap time and amount of physical memory required.

To distinguish between the pages that are in memory and are on the disk we use valid and non valid bits.

If bit is valid it shows that the page is legal and is in the memory and if bit is set to invalid it indicates that it is on the disk.

Linux uses three level paging

- Working set is the amount of memory currently assigned to the process.
- It contains the pages that are in the main memory.
- Size of working set can be changed accordingly.
- Windows uses Two Level Paging

Address structure

Linux

Linear address is broken into four parts:

- Global Directory.
- Middle Directory.
- Page Table
- Offset.

Windows

- Address is divided into two parts:
- Page number
- Page offset

THANK YOU