



Kernel Data Structures and its Contents

UNIX

Contents of UArea

1. Current directory and current root.
2. Process size limit and file size limit.
3. Internal I/O Parameter.
4. Array of all file descriptors. (UFDT)
5. Pointers to process table slots.
6. Input parameters of system call.
7. Return value of system call.
8. Error code of System call.
9. Array which indicates signals which are not yet handled by the kernel.
10. Timer field.
11. Permission field.
12. Real and effective user ID.
13. Control terminal field.

Contents of Buffer

1. Device number/ File system number.
2. Logical block number.
3. States of buffer:
Locked/Unlocked/Valid/Invalid/Reading/Writing/Delayed
Write/Reserved
4. Pointer to Data Area.
5. Pointer to next buffer on hash queue of buffer.
6. Pointer to previous buffer on hash queue of buffer.
7. Pointer to next buffer on free list of buffer.
8. Pointer to previous buffer on free list of buffer.

Contents of Process Table

1. Field which is used by the kernel to access UArea.
2. State of the process. (value: 1 - 9)
3. Process size.
4. Different user identifier. (UIDs)
5. Different Process Identifiers. (PIDs)
6. Pointer to PPRT entry.
7. Scheduling Parameter.
8. Event Descriptor set.
9. Signals and its actions.
10. Timer which is used for scheduling purpose.

Contents of PPRT

1. Per Process Region Table is used to share a region by multiple processes.
2. Per Process Region Table is local to every process.
3. In all data structures PPRT is most important.
4. Because it contains mapping between Virtual address and Physical address.
5. If there are three regions in process then there are three entries.
6. Each entry holds starting virtual address of the region.
7. It holds the pointer to region table.

Contents of Region Table

1. Size of region.
2. Type of region.
3. Pointer to inode of executable file.
4. Reference count.
5. Page table.
6. Status of Region: (Unlock/Lock/Being Loaded/Already Loaded)

Contents of Process Table

1. State of Process (State: 1-9)
2. Several UID.
3. Context switch. (Pointer to UArea)
4. Several group Id.
5. Several Pid.
6. Size of process. (virtual address)
7. Event descriptor set. (Unhandled interrupts till now)
8. Static field.
9. Scheduling Parameter.
10. Signal Field.
11. Various Timers.

Contents of Super Block

1. Size of File System.
2. Number of free blocks in File System.
3. List of available free blocks.
4. Index of next free blocks.
5. Size of inode list.
6. Number of free inode.
7. List of free inode.
8. Index of next free inode.

9. Lock fields for free blocks and free inodes.
10. A flag which indicates that the super block is modified or not.

Contents of Mount Table

1. Device number.
2. Pointer of inode of "mounted on" directory.
3. Pointer of inode of root of "mounted file" system.
4. Pointer to buffer of super block of mounted file system.

Contents of Disk inode

1. Owner identifier.
2. Group identifier.
3. Permission.
4. Last file access time.
5. inode last modified time.
6. File last modified time.
7. Link count.
8. File size.
9. Table of disk address. (13 member array)
10. File Type.

Contents of Incore inode

1. All the contents of Disk inode.
2. inode number.
3. Reference count.
4. Status : Locked/Unlocked.
5. The logical device number.
6. Pointer to other incore inodes.

Page Table

1. Physical Page number.
2. Protection bit.
3. Age bit.
4. Copy on write bit (COW).
5. Modify bit.
6. Reference bit.
7. Validity bit.

Disk Block Descriptor Table

1. Swap device number.
2. Block number.
3. Type of page
 - a) Demand Fill
 - b) Demand zero

Page Frame data Table Entry

1. Page Number.
2. Reference count.
3. Logical device number / Block Number.
4. Contains 4 pointers which are used to maintain free and used pages.

Swap use Table

1. Contains information of pages which are swapped out.