



# RAMA UNIVERSITY

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## FACULTY OF ENGINEERING & TECHNOLOGY

BCS-501    Operating System

Lecturer-36

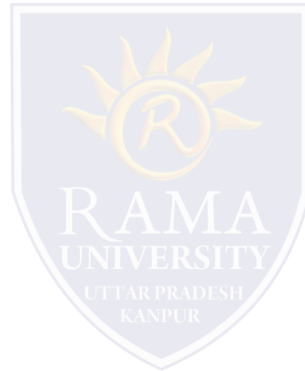
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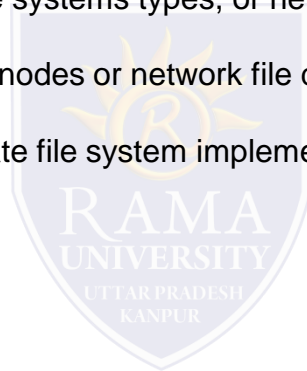
## Virtual File Systems

## Implementation

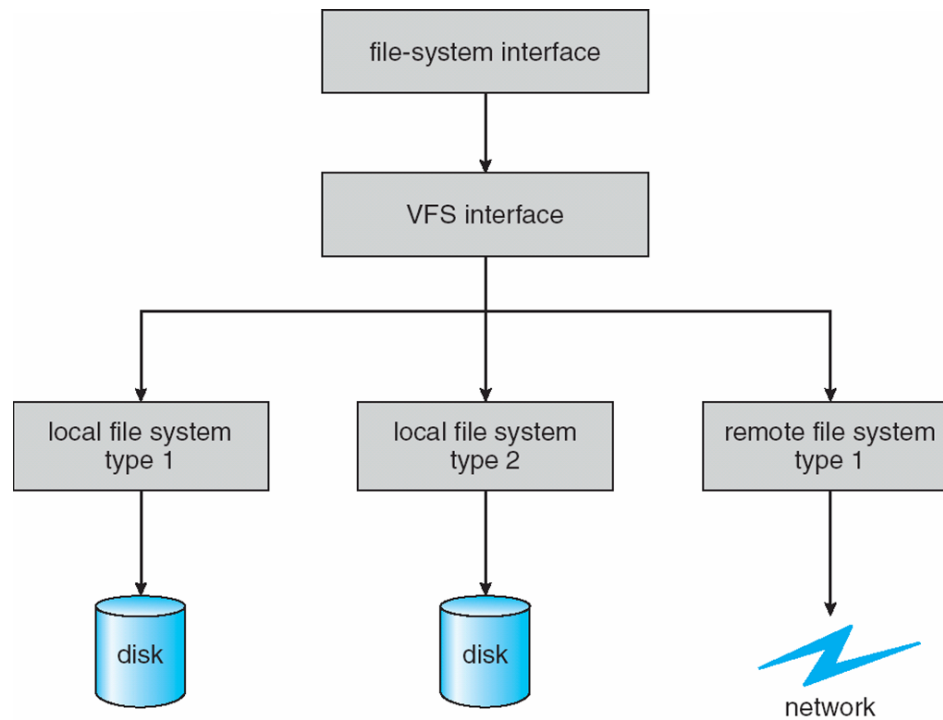


# Virtual File Systems

- Virtual File Systems (VFS) on Unix provide an object-oriented way of implementing file systems
- VFS allows the same system call interface (the API) to be used for different types of file systems
  - Separates file-system generic operations from implementation details
  - Implementation can be one of many file systems types, or network file system
    - ❖Implements vnodes which hold inodes or network file details
  - Then dispatches operation to appropriate file system implementation routines

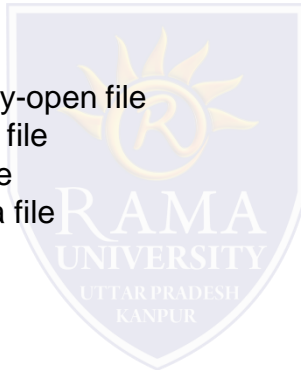


The API is to the VFS interface, rather than any specific type of file system



# Virtual File System Implementation

- For example, Linux has four object types:
  - inode, file, superblock, dentry
- VFS defines set of operations on the objects that must be implemented
- Every object has a pointer to a function table
  - Function table has addresses of routines to implement that function on that object
  - For example:
    - int open(. . .)—Open a file
    - int close(. . .)—Close an already-open file
    - ssize\_t read(. . .)—Read from a file
    - ssize\_t write(. . .)—Write to a file
    - int mmap(. . .)—Memory-map a file



Because of virtual memory, the memory can be shared among:

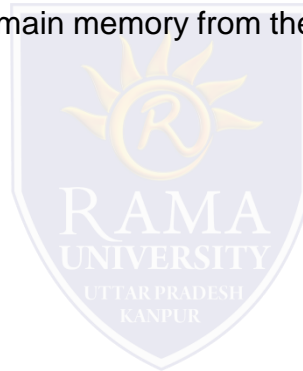
- A. processes
- B. threads
- C. instructions
- D. none of the mentioned

\_\_\_ is the concept in which a process is copied into main memory from the secondary memory according to the requirement.

- A. Paging
- B. Demand paging
- C. Segmentation
- D. Swapping

Swap space exists in:

- A. primary memory
- B. secondary memory
- C. CPU
- D. none of the mentioned



When a program tries to access a page that is mapped in address space but not loaded in physical memory, then?

- A. segmentation fault occurs
- B. fatal error occurs
- C. page fault occurs
- D. no error occurs

Effective access time is directly proportional to:

- A. page-fault rate
- B. hit ratio
- C. memory access time
- D. none of the mentioned

