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CASE STUDY – OS/2 WARP

COURSE CODE : 19CSE103

COURSE NAME: OPERATING SYSTEMS

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MEMORY MANAGEMENT:-

- Memory management is the functionality of an operating system which handles or manages primary memory and moves processes back and forth between main memory and disk during execution.
- memory management keeps track of each and every memory location, regardless of either it is allocated to some process or it is free.
- It checks how much memory is to be allocated to process. It decides which process will get memory at what time. It tracks whenever some memory gets freed or unallocated and correspondingly it updates.

Process Address space:

- The process address space is the set of logical addresses that a process references in its code.
- The O.S takes care of mapping the logical addresses to physical addresses at the time of memory allocation to the program.

There are three types:-

- (i) Symbolic address,
- (ii) Relative address,
- (iii) Physical address.

(i) Symbolic address:-

The addresses used in a source code. The variable names, constants, and instruction labels are the basic elements of the symbolic address.

(ii) Relative address:-

At the time of compilation, a compiler converts symbolic address into relative addresses.

(iii) Physical address:-

The loader generates these addresses at the time when a program is loaded into main memory.

→ Different types of Memory management in windows 10:-

(i) Page file system

(ii) Pre fetch

(iii) Super fetch.

(iv) Ready Boost.

1) Page file system:-

→ when the amount of memory in use by all the running processes exceeds the amount of RAM available in the system, the OS will begin pages of memory out of RAM and temporarily storing them on the hard disk and freeing them RAM for the other uses.

→ when the running processes needs to access the memory that has been temporarily moved to page file, the OS locates the page and returns it to the RAM.

→ The moving memory pages is returned to swapping and paging file is often returned to the swap file. Because the pages of memory are kept intact as they stored on the hard disk.

Prefetch:

Prefetch helps to reduce the problem of overhead while swapping pages between memory, RAM, page files. Under this system the O.S loads key pieces of data and code from disk into memory before its actually needed.

Cache manager monitors the data being moved b/w the disk and RAM and virtual memory applications are loaded. The cache manager constructs a map of directories and files that were referenced for each process. The cache manager will intercept every process that is about to be loaded and will check to see if there is a corresponding map. Once this prefetch is completed, the cache manager will allow the application to continue loading. Due to this, the program finds majority of the files and data already available in the memory. This reduces the disk access and allows the process to load and execute much faster.

Superfetch:-

Superfetch is one step ahead of Prefetch. In addition, Superfetch also constructs Profiles of the applications that we use.

These profiles include information about when and how often you use your application. Superfetch keeps track of the application in your profile and notes any prefetched data you moved.

Out of the page. As soon as it is done, Superfetch will pull the prefetched data back into the memory. Thus whenever we want the prefetched data will be available in the memory and we can quickly pick up where we left.

Ready Boost:-

To improve Superfetch, Microsoft took advantage of the large capacity USB flash drives which are widely available, relatively inexpensive and efficient and faster than hard disks.

Readyboost creates a cache file on the USB flash drive that Superfetch uses to store files copies of its map files - it also stores the same data on the hard disk. That way, if you remove USB flash drive from computer, Superfetch can still function as it just gets from the hard disk.

ADVANCED FEATURES

(i) User Interface & Desktop :-

A new iteration of Start menu is being used, with a list of places and other options on left side and files representing applications on right. Configuring the start menu can be made through settings in the personalisation group. A new feature called Task View displays all opened windows and allows user to switch between multiple workspaces.

Windowed apps now allows universal apps, which previously could be used only in full-screen, can now be used in self-contained windows, similar to other programs. Programmed windows can now be snapped to quadrants of screen by dragging them to the corner. When a window is snapped to one side of screen, task view appears and the user is prompted to choose a second window to fill unused side of the screen, called as snap assist. Action center which displays notification and settings toggle. It is accessed by clicking an icon in the notification area. Notifications can be synced across many devices.

Supports two UI modes :- (i) Optimized for mouse and keyboard.

(ii) Tablet mode best for touchscreen.

(ii) System security :-

Windows system incorporates multi-factor authentication technology based upon standards developed by Fast Identity Online (FIDO) Alliance. The operating system includes improved support for Bio-metric

authentication through windows hello platform. Devices with infrared illumination camera allows user to login with iris & facial recognition. Devices with supported readers allows user to login with fingerprint recognition. Credentials are now stored locally and protected by various layers of asymmetric encryptions. In addition to biometric authentication, windows hello supports authentication with PIN. By default, size of PIN must be a 4-Digit number, by it also also to more complex pin's of any size. However pin is not a simpler password. In addition, weak passwords can be cracked via rainbow tables, Trusted platform module (TPM) chip generates a asymmetric key pair for your pin to be resilient to brute-force attack. It offers additional security features; admins can set-up policy to automatically encrypt sensitive data and block applications selectively from accessing encrypted data.

(iii) Command Line :-

Windows console windows (both for powershell and legacy command prompt) can now be resized without any restrictions. Full screen mode can be enabled by pressing alt+enter, and can used standard-key board shortcuts. The new update added windows system for linux, which allows installation of a user space environment from supported Linux distributions. The subsystem translates Linux system calls into windows NT kernel. The environment can execute Bash-shell and 64-bit command line programs, assuming supporting software is installed.

(iv) Storage Requirements :-

To reduce the storage footprint of the operating system, windows automatically compresses system files. The system can reduce the storage foot-print by approximately 1.5GB for 32-bit system and 2.6GB for 64-bit system. The refresh and reset functions use runtime system files instead, making a separate recovery patch redundant allowing patches and updates to remain installed and future reducing storage footprint by 12GB.



(v) Multimedia and Gaming :-

Windows is greater integrated with X-box ecosystem. It allows user to control and play games from Xbox one console over local network. Windows comes along with Direct-X it aims at providing "Console-level efficiently" with "Closer to metal" access to hardware resources, and reduce CPU and graphic drivers overhead. Hologram was introduced for windows 10, is a set of technologies that enables 3D imaging and hologram projection. Hololens is helpful in holograming. Hololens is a new holographic computer that requires hand-gestures and voice-commands for use. Project Spartan is now working on new browser compatible with modern web and built for windows family. It allows sharing and makes discovery, getting things done online like typing on web-pages easy.