

Topics



- What is a Process, Process Control Block?
- What is Multitasking?
- What is Mutithreading ?
- Thread vs Process?

What is Process ?

- ❑ Process is nothing but an instance of program in execution (Unit of work in modern time-sharing systems)
- ❑ Modern operating systems can concurrently execute multiple processes.

Processes	Performance	App history	Startup	Users	Details	Services
Name	3% CPU	19% Memory	1% Disk	0% Network		
Apps (5)						
> Firefox (32 bit)	0.2%	136.8 MB	0.1 MB/s	0 Mbps		
> Microsoft PowerPoint (32 bit)	0%	44.7 MB	0 MB/s	0 Mbps		
> Skype (32 bit)	0.1%	84.0 MB	0 MB/s	0 Mbps		
> Task Manager	0.4%	9.4 MB	0 MB/s	0 Mbps		
> Windows Explorer (3)	0.1%	48.7 MB	0 MB/s	0 Mbps		
Background processes (34)						
> Adobe Acrobat Update Service (...)	0%	0.9 MB	0 MB/s	0 Mbps		
Application Frame Host	0%	7.0 MB	0 MB/s	0 Mbps		
Calculator	0%	0.4 MB	0 MB/s	0 Mbps		
COM Surrogate	0%	1.7 MB	0 MB/s	0 Mbps		
Cortana	0%	59.4 MB	0 MB/s	0 Mbps		
Device Association Framework ...	0%	4.5 MB	0 MB/s	0 Mbps		
Free Download Manager (32 bit)	0.4%	8.1 MB	0 MB/s	0 Mbps		
Ginger (32 bit)	0.2%	27.7 MB	0 MB/s	0 Mbps		
Ginger (32 bit)	0%	71.9 MB	0 MB/s	0 Mbps		
> Ginger (32 bit)	0%	3.3 MB	0 MB/s	0 Mbps		
HD Audio Control Panel	0%	1.7 MB	0 MB/s	0 Mbps		
Host Process for Windows Tasks	0%	6.2 MB	0 MB/s	0 Mbps		
> igfxCUIService Module	0%	1.3 MB	0 MB/s	0 Mbps		
igfxEM Module	0%	4.5 MB	0 MB/s	0 Mbps		
igfxHK Module	0%	3.0 MB	0 MB/s	0 Mbps		
igfxTray Module	0%	4.7 MB	0 MB/s	0 Mbps		
Kaspersky Anti-Virus (32 bit)	0%	4.2 MB	0 MB/s	0 Mbps		
> Kaspersky Anti-Virus (32 bit)	0.2%	117.1 MB	0.1 MB/s	0 Mbps		
> LavasoftTcpService (32 bit)	1.4%	36.4 MB	0 MB/s	0 Mbps		
Microsoft OneDrive (32 bit)	0%	5.3 MB	0.1 MB/s	0 Mbps		
Microsoft Skype Preview	0%	2.8 MB	0 MB/s	0 Mbps		

What is Process Control Block?

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https://en.wikipedia.org/wiki/Process_control_block

- Process Control Block (PCB) is a Data Structure Maintained by Operating System for each Process
- PCB Contains Information which is Required to Manage Each Process
- A Typical PCB Generally Contains
 1. Program Counter (PC)
 2. Stack Pointer (SP)
 3. CPU Registers
 4. Process State Information



What is Context Switching?

- Each Process Runs in its Own Address Space and OS Maintains a Separate PCB for Each Process [No Sharing of Memory]
- Context Switching Means Shifting the Control of CPU from the Currently Running Process to Some Other Process
- During Context Switching the Present State of the Currently Executing Process is Saved onto a Specialized Memory Area Known as Stack.
- Program Counter, Stack Pointer and Other Important CPU Registers are loaded with values according to the Process which is Going to be Executed Next
- Context Switching is Quite Expensive in Processes

What is Multitasking?

- ❑ ***“The ability to have more than one program working at what seems like at the same time”***

Examples :

- ❑ **You can Edit while Printing a document**
- ❑ **Web Page may be Loading Multiple Images while Accepting User Inputs**

Multitasking Ways

- ❑ **Preemptive Multitasking** → OS Simply Suspends the Currently Running Process and Shifts the Control to Some Other Process (Windows 3.1, Mac OS)
- ❑ **Cooperative Multitasking** → OS Shifts the Control to Some Other Process Only When the Currently Running Process Yields control. (Non-preemptive Multitasking) Linux, Windows NT,95



What is a Multithreading?

- **Basis of Multi-Tasking at an Individual Program Level**
- **An Individual Program will Appear to do Multiple Tasks at the Same Time. Each Individual Task is Handled by a Thread**
- **“A thread of execution is a program unit that is executed independently of other parts of the program” [Light Weight Process]**
- **If a Program Creates Multiple Threads then all These Threads will Execute in the Same Address Space and Will Use the Same Data Structures [Sharing of Memory]**

Process vs Thread

S.No	Process	Thread
1	No Sharing of Memory	Sharing of Memory
2	Can Not Corrupt Data Structures	Can Corrupt Data Structures
3	Context Switching is Expensive	Context Switching is Cheaper

Thank You