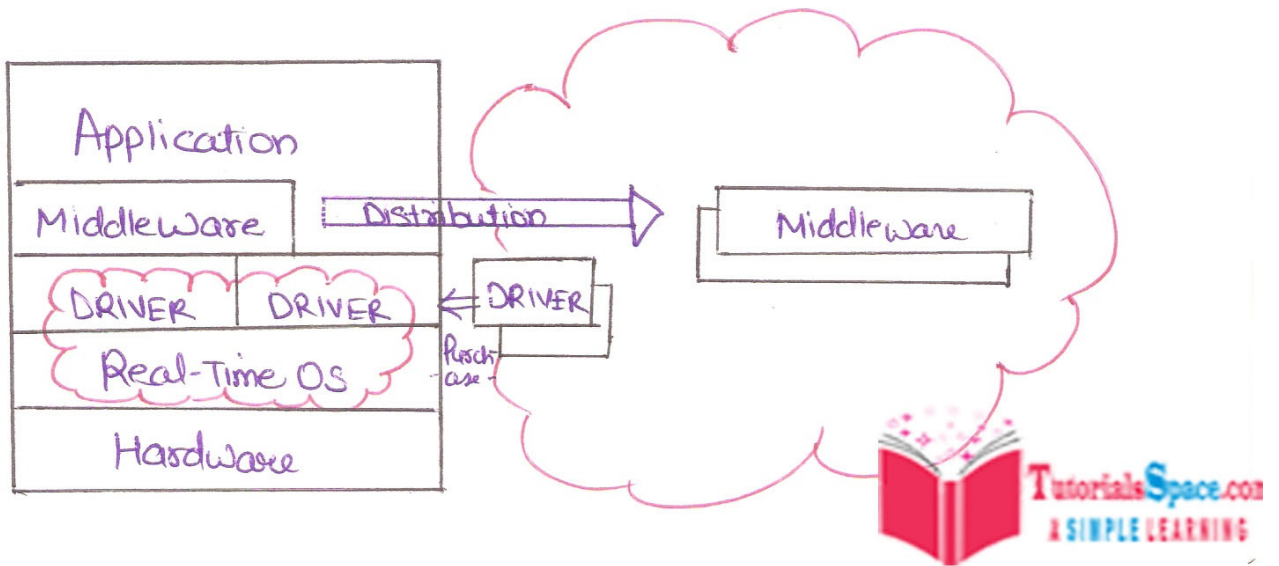


# Real-Time Operating System

A Real time system is defined as a data processing system in which the time interval required to process and response to inputs is so small that it controls the environment.

Time taken from Input to output task is Response time.



→ A real-time operating system must have well-defined, fixed time constraints, otherwise the system will fail.

For Example:- Scientific experiments, medical imaging systems, industrial control systems, weapon systems, Robots, air traffic control system etc.

These are two Real-time Operating Systems:-

Hard Real time System

Soft Real time System

## Hard Real Time Systems:-

It guarantees the 'on-time' completion of 'CRITICAL' tasks.

In this Secondary storage is limited or missing and the Data is stored in ROM. In this systems, Virtual memory is almost never found.

## Soft Real Time Systems:-

A critical Real-time task gets priority over other tasks and retains the priority until it completes.

These systems have limited utility than hard Real-time systems. for example:-

Multimedia, Virtual Reality, Advanced Scientific Projects like undersea Exploration and planetary Rovers etc.

Advantage:- • Maximum Consumption :- Gives more OP while using all the resources and keeping all device active.

Task Shifting :- Less time is needed in shifting the task which is around 3 microseconds.

Focus on Application :- focus on applications which are running and usually give less importance to the other application residing in waiting stage of life cycle.

Used in Embedded system also :- Due to small size of program RTOS can also be used in embedded system like in transport and others.



Error free:- RTOS is error free so it has no chance of errors in performing tasks.

24-7 system:- RTOS can be used for any applications which run 24 hours and 7 days b/c it do less task shifting and give maximum output.

Memory Allocation :- Best managed in these.

### Disadvantage :-

- Use heavy System Resources
- Expensive
- Low Multitasking
- Not easy to program
- Complex- Algorithm
- Low priority task : LPT not get time to run.
- Device Drivers and interrupt signals
- Thread priority



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