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FACULTY OF EGINEERING AND TECHNOLOGY

Distributed Systems(BCS-701)
LECTURE-06

Dr. Hariom Sharan

Professor & Dean

Computer Science & Engineering

OUTLINE

- Interaction Model- Computer clocks and timing events
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Interaction Model- Computer clocks and timing events

Each computer in a distributed system has its own internal clock, which can be used by local processes to obtain the value of the current time. Two processes running on different computers can associate timestamp with their events. Even if two processes read their clock at the same time, their local clocks may supply different time. This is because computer clock drift from perfect time and their drift rates differ from one another. Clock drift rate refers to the relative amount that a computer clock differs from a perfect reference clock. Even if the clocks on all the computers in a distributed system are set to the same time initially, their clocks would eventually vary quite significantly unless corrections are applied. There are several techniques to correcting time on computer clocks. For example, computers may use radio signal receivers to get readings from GPS (Global Positioning System) with an accuracy about 1 microsecond.

Interaction Model-Variations:

Two variants of the interaction model are

- Synchronous distributed systems
- Asynchronous distributed systems

Synchronous distributed systems

- It has a strong assumption of time
- The time to execute each step of a process has known lower and upper bounds.
- Each message transmitted over a channel is received within a known bounded time.
- Each process has a local clock whose drift rate from real time has a known bound.

Asynchronous distributed system

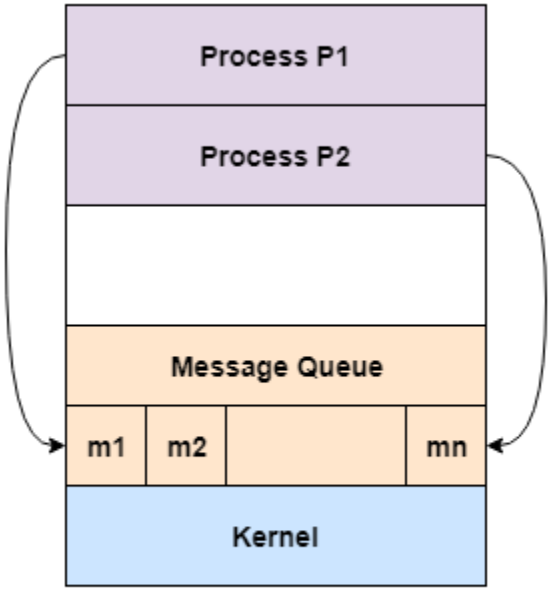
- It has no assumption about time.
- There is no bound on process execution speeds.
- Each step may take an arbitrary long time.
- There is no bound on message transmission delays.
- A message may be received after an arbitrary long time.
- There is no bound on clock drift rates.
- The drift rate of a clock is arbitrary.

Message Passing Model of Process Communication

Process communication is the mechanism provided by the operating system that allows processes to communicate with each other. This communication could involve a process letting another process know that some event has occurred or transferring of data from one process to another. One of the models of process communication is the message passing model.

Message passing model allows multiple processes to read and write data to the message queue without being connected to each other. Messages are stored on the queue until their recipient retrieves them. Message queues are quite useful for interprocess communication and are used by most operating systems.

Message Passing Model of Process Communication



Message Passing Model

Advantages and Disadvantage of Message Passing Model

Advantages of Message Passing Model

- Some of the advantages of message passing model are given as follows −
- The message passing model is much easier to implement than the shared memory model.
- It is easier to build parallel hardware using message passing model as it is quite tolerant of higher communication latencies.

Disadvantage of Message Passing Model

- The message passing model has slower communication than the shared memory model because the connection setup takes time.

References

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