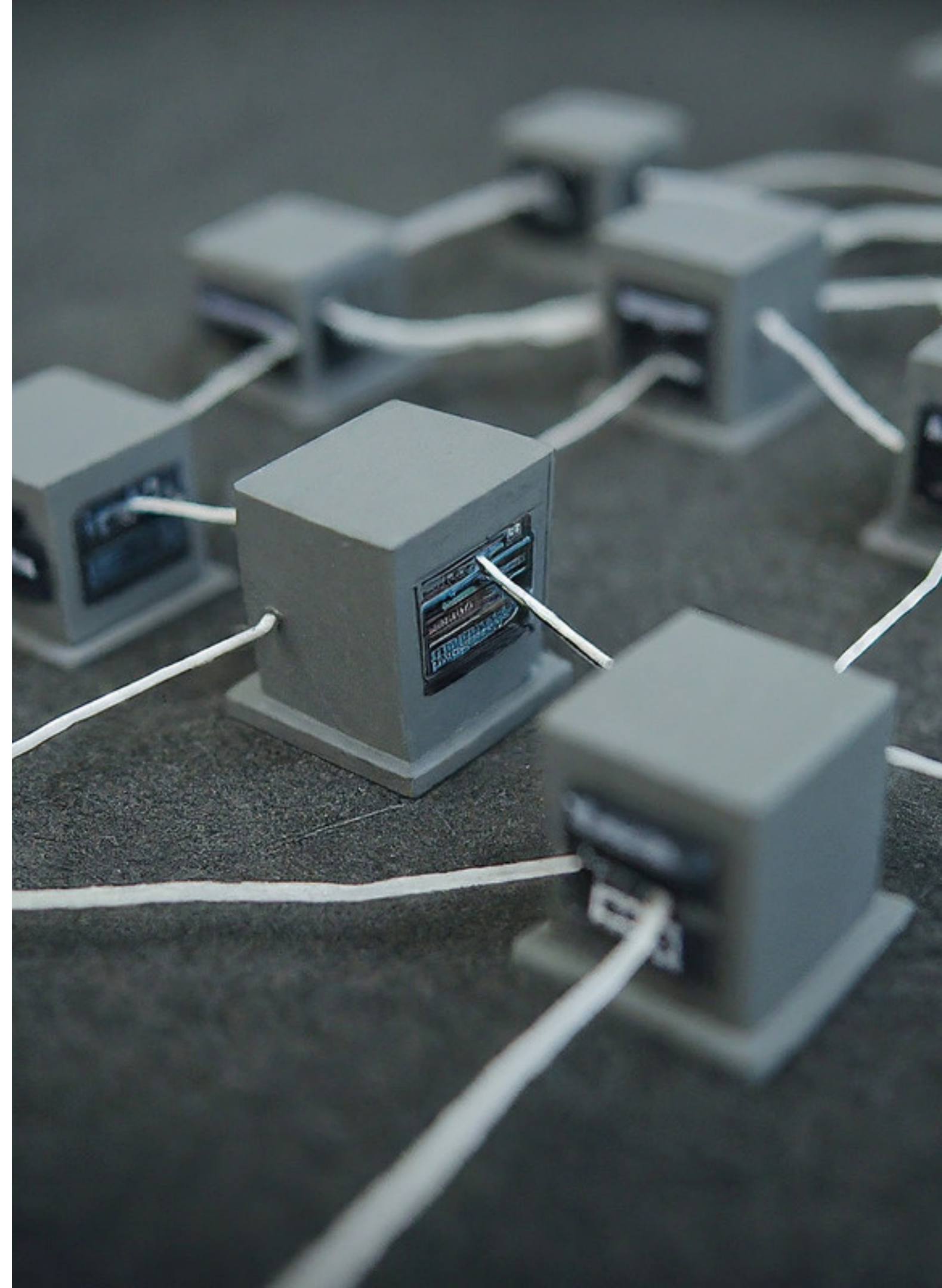


Lamport Algorithm

For Mutual Exclusion



What is Mutual Exclusion?

Ensures only one process can access a shared resource (critical section) at a time.

Prevents data corruption and inconsistencies in concurrent access scenarios.



Challenges of Distributed Mutual Exclusion

No central coordinator

Decisions must be made based on local information exchange.

Clock synchronization

Maintaining consistent time across distributed processes can be complex.

Message delays

Communication between processes can be slow and unreliable.



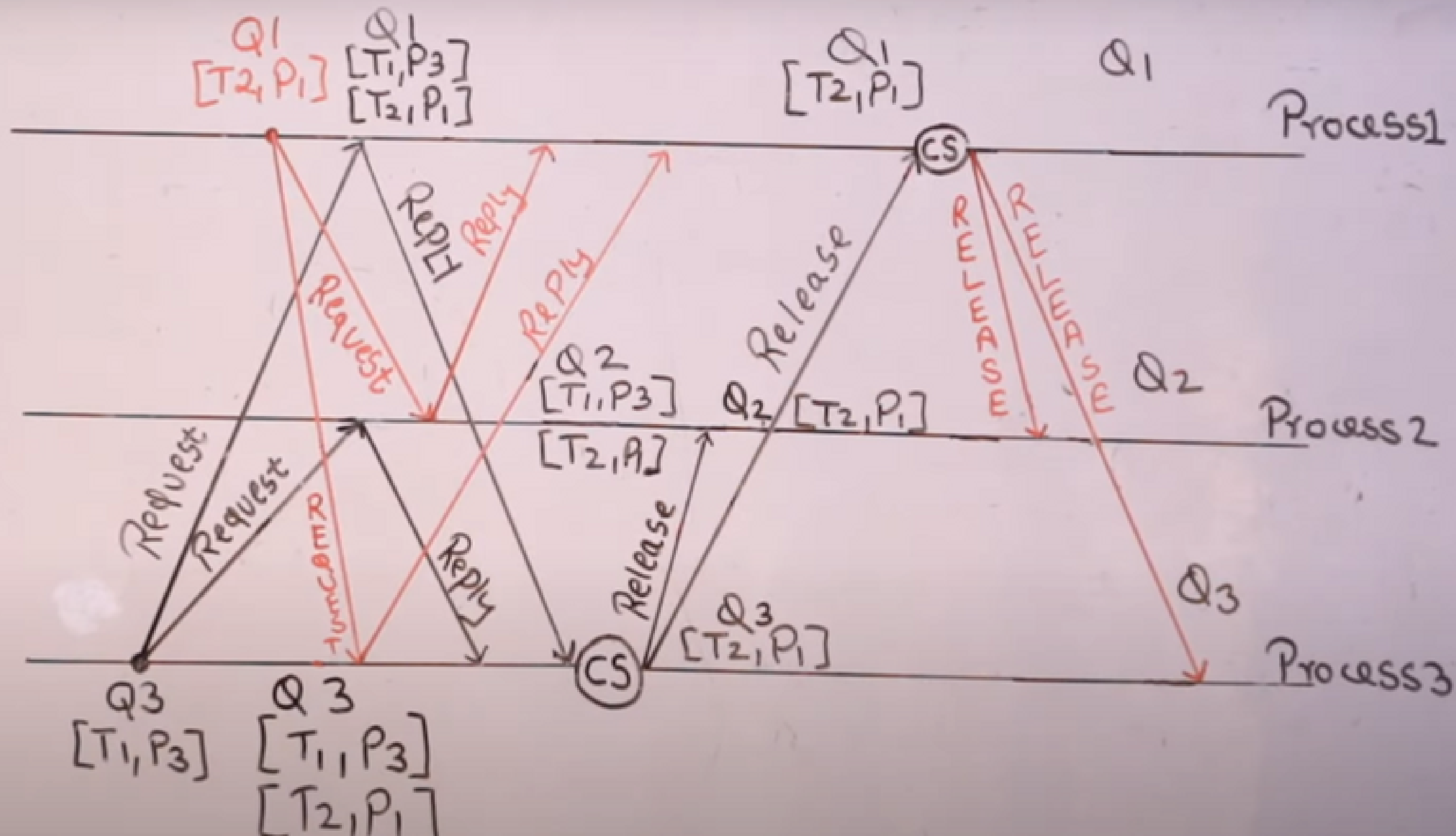
Lamport's Algorithm - Core Idea

- Uses logical clocks and timestamps to order requests.
- Processes maintain request queues to manage incoming access requests.



Lamport Algo with Example





Performance

- $3(n-1)$ messages Per CS invocation
- $(n-1)$ Reply
- $(n-1)$ Request
- $(n-1)$ Release

The difference between Ricart-Agrawala
and Lamport algorithm?

Lamport's algorithm requires between $3(N - 1)$ and $2(N - 1)$ messages per CS execution. The Ricart-Agrawala algorithm assumes the communication channels are FIFO



Advantages & Disadvantages of Lamport's Algorithm for Mutual Exclusion in Distributed System

Advantages

- Simplicity
- Fairness
- Scalability
- Compatibility



Disadvantages

- Message Overhead
- Delayed Execution
- Limited Performance
- No Fault Tolerance





Conclusion



IT solutions are the future of hospital management
and dialogue between policymakers and
hospital administrators.



**Thank You
For Your Time!**