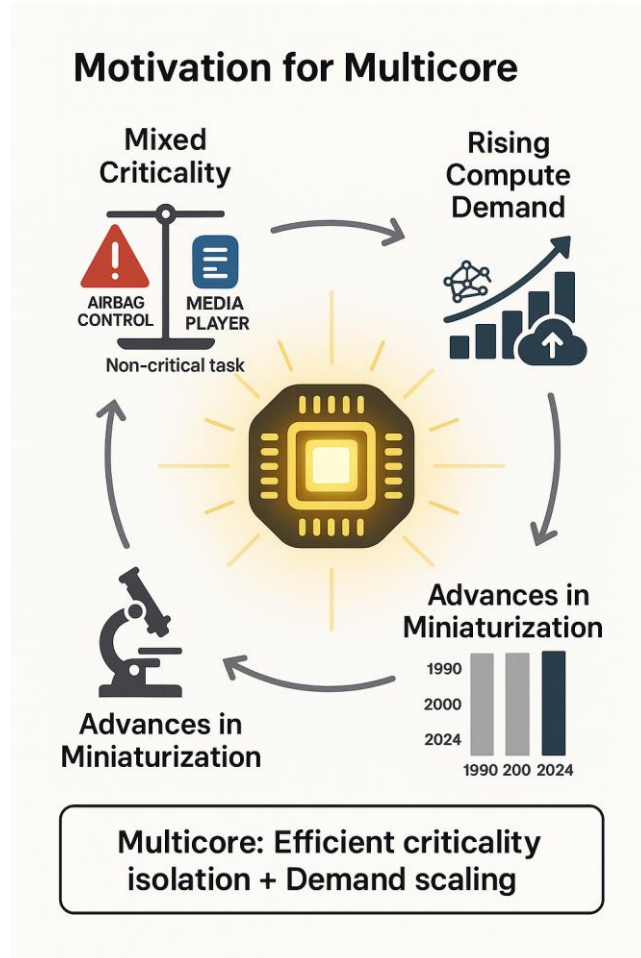


PARTITION- BASED SCHEDULING

Multicore Systems

MOTIVATION



- **Advantages:**

- Task isolation and mutual interference [2].
- Parallel task execution [4].
- Enhances energy efficiency.
- Higher bandwidth [6].
- Lower communication latency [5].

Fig. 1: Motivation for multi-core systems [8].

SCHEDULING MULTI-CORE SYSTEMS

- Two fundamental approaches:
 - **Global Scheduling:** Task may execute on any core and migration is allowed.
 - **Partition-based scheduling:** Tasks statically assigned to cores.

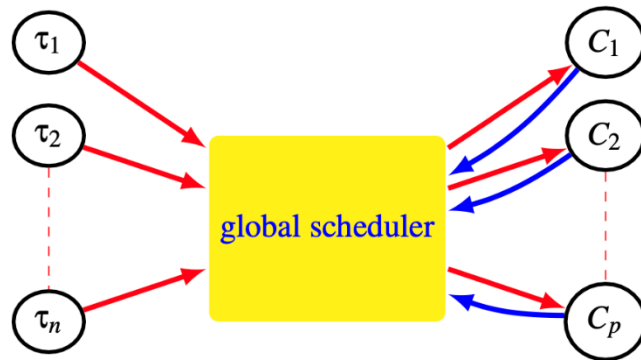


Fig. 2: Global Scheduling [7].

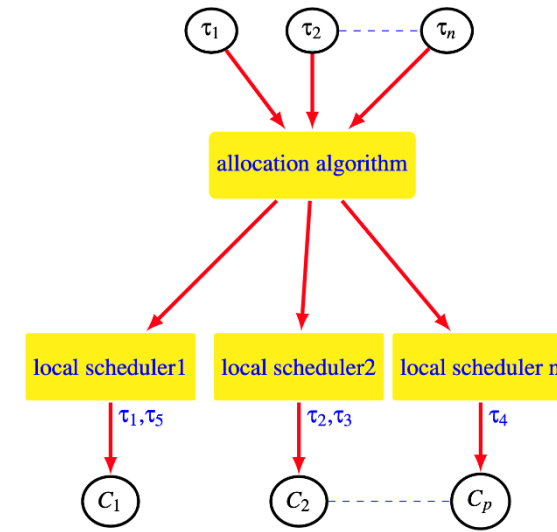


Fig. 3: Partition-based scheduling [7].

PROPOSED STRATEGY

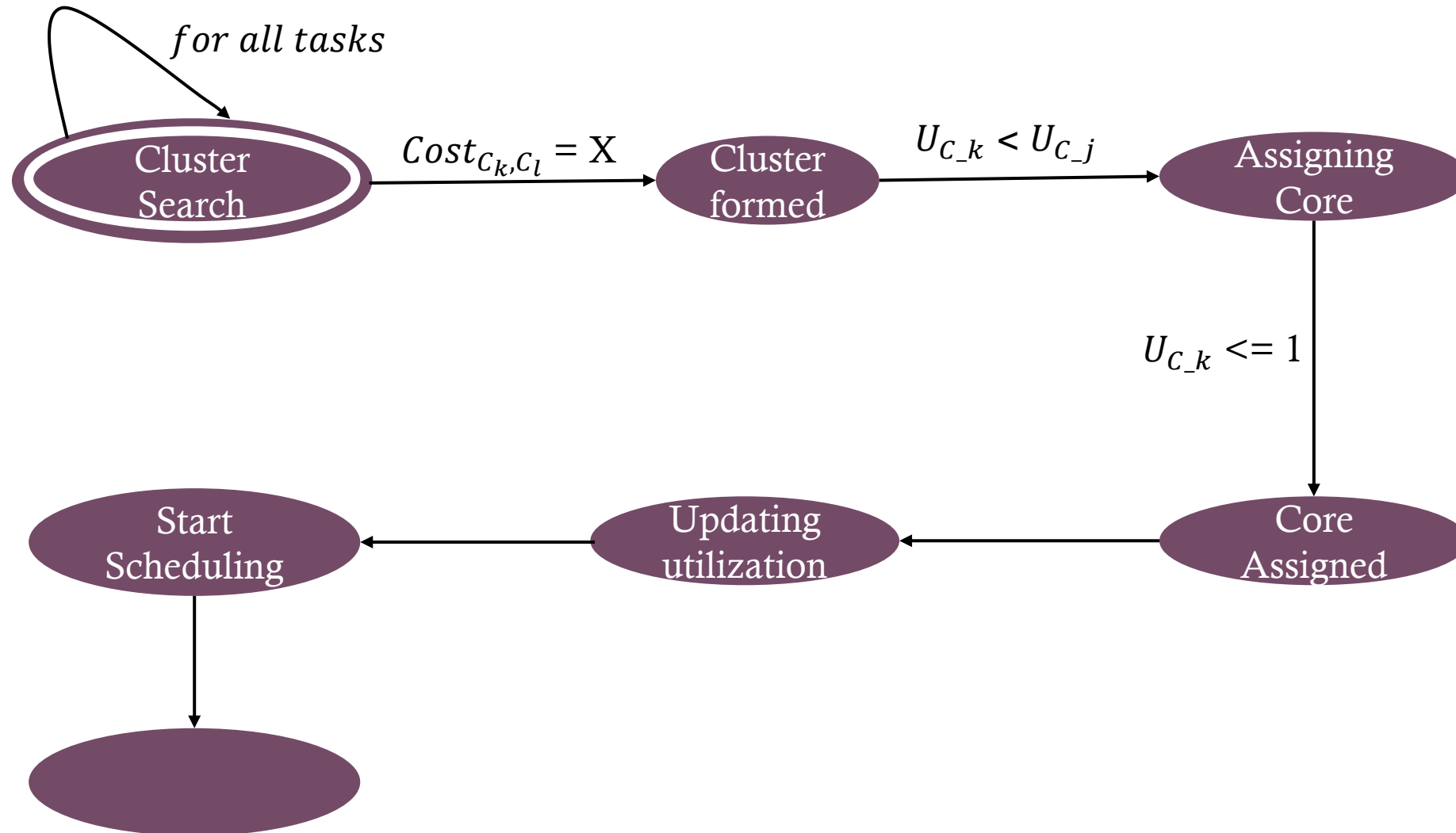
Goal: Reduced Communication Cost between cores.

Partitioning algorithm: Clustering-based.

Scheduling algorithm: Earliest Deadline First (EDF).

Fig. 6: Proposed strategy and goal.

PARTITIONING MODEL



SCHEDULING MODEL

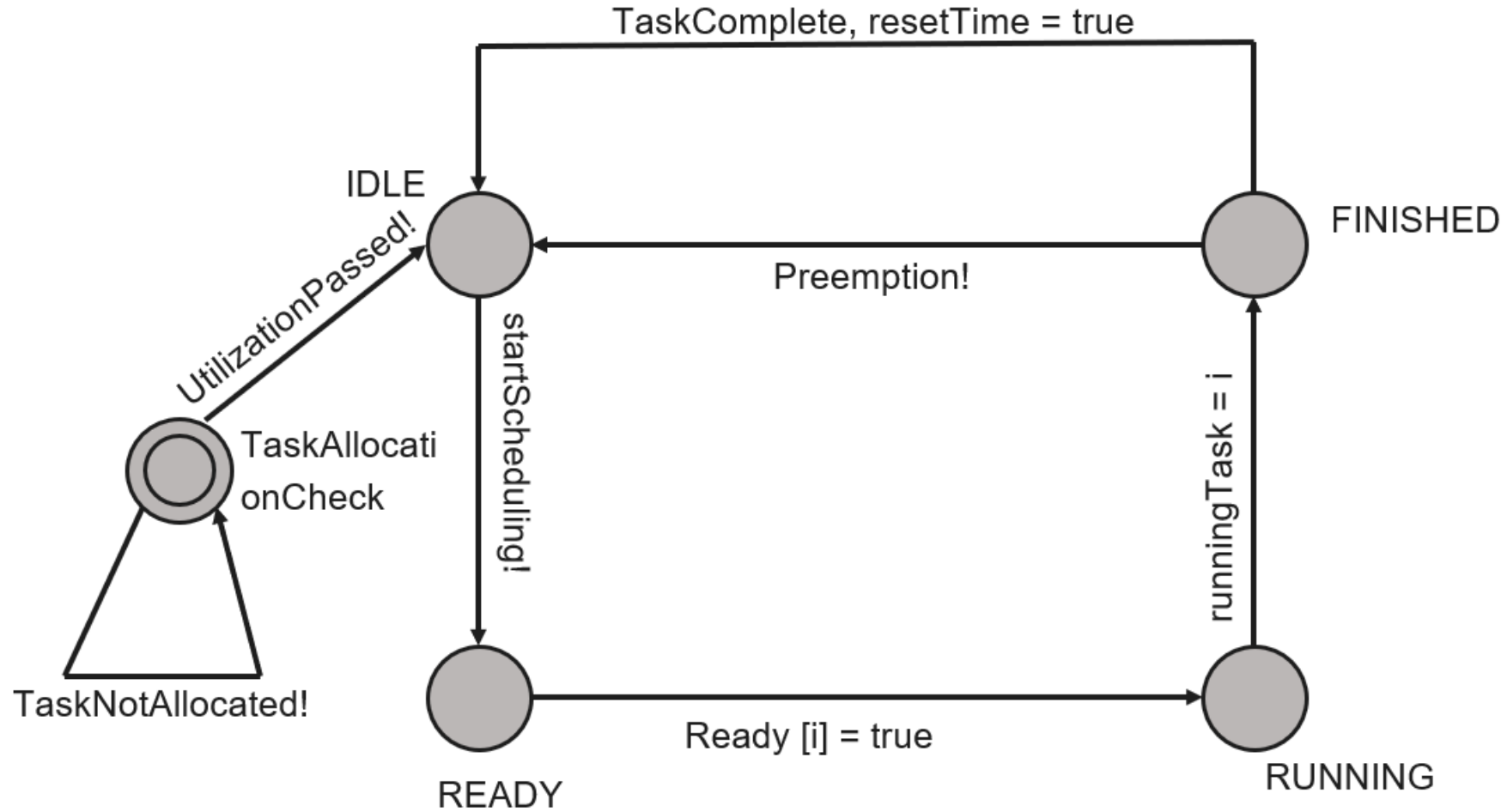


Fig. 8: Modelling of scheduler

IMPLEMENTATION AND EXAMPLE

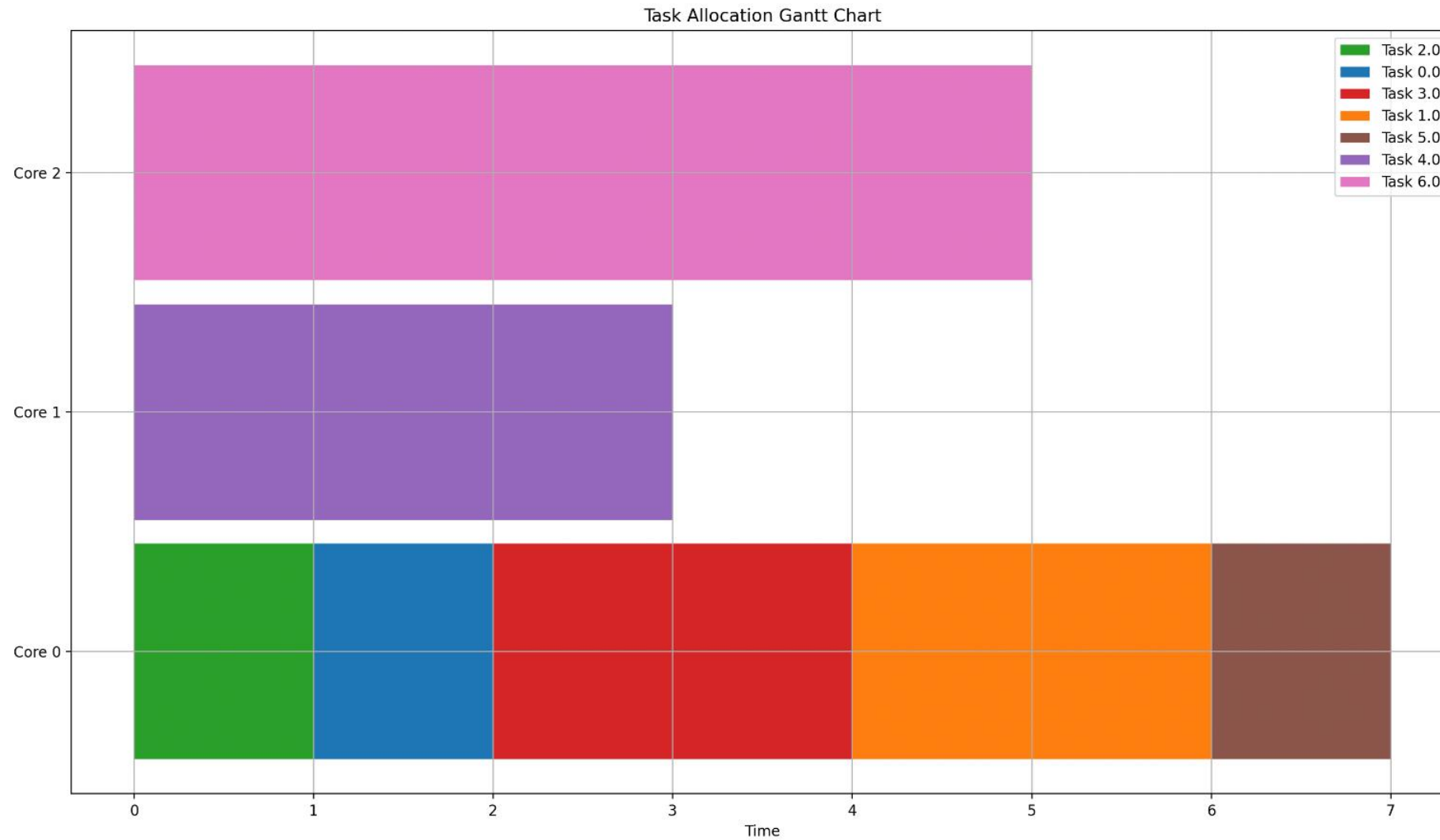


Fig. 7: Task dependency matrix

OVERVIEW AND CONCLUSION



Partition-based scheduling on multi-core systems is decided upon.



Implementation in C with FreeRTOS (Repository).



Simulation illustrated in UPPAAL.



Tasks with frequent communication formed cluster.



Clusters allocated on nearby cores, with schedulability constraints.



Communication cost reduced.

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