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# Parallel VLSI Partition Algorithms Based on Message Passing Model

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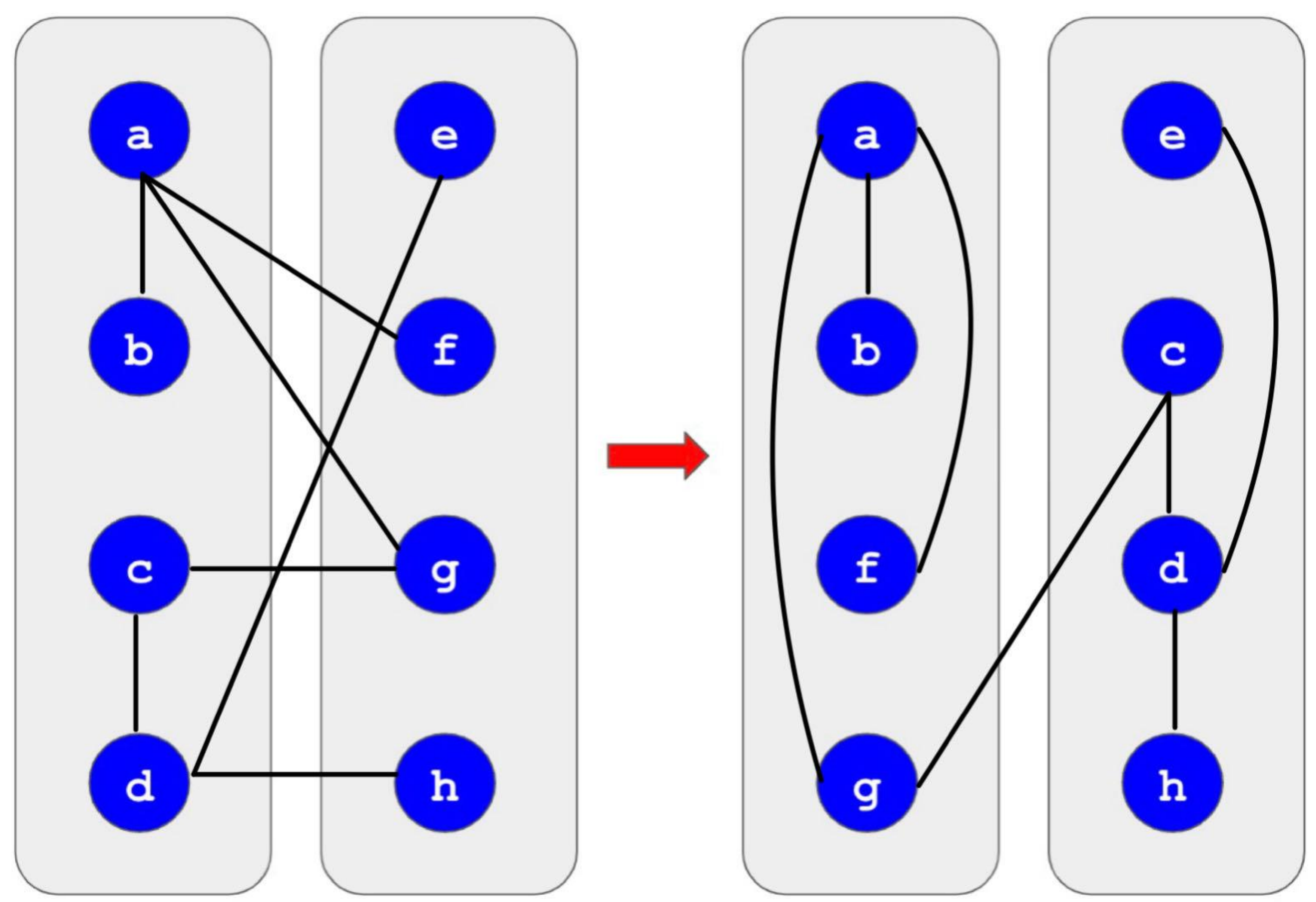
## 1 Background

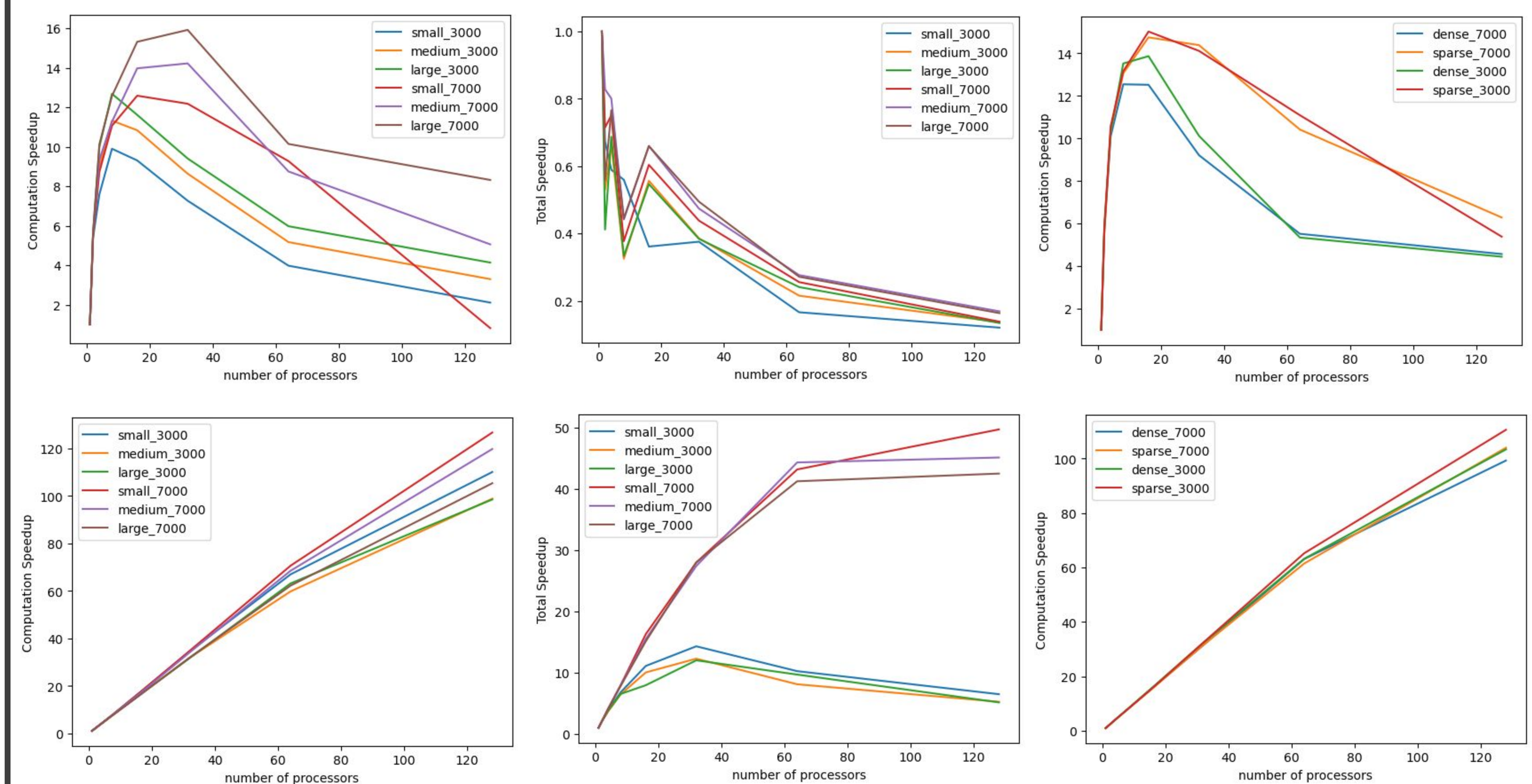
- ***balanced*** vertices in each partition
- ***minimize*** cut between partitions




## 2 Parallel Simulated Annealing

- Search ***optimal*** by accepting worse local solutions
- ***Asynchronous*** message passing ignores old update
- ***Cluster-based*** transmission limits message number
- Global ***broadcast*** to synchronize balance constraint
- Fail when cells are extensively ***interconnected***

## 4 Results and Analysis

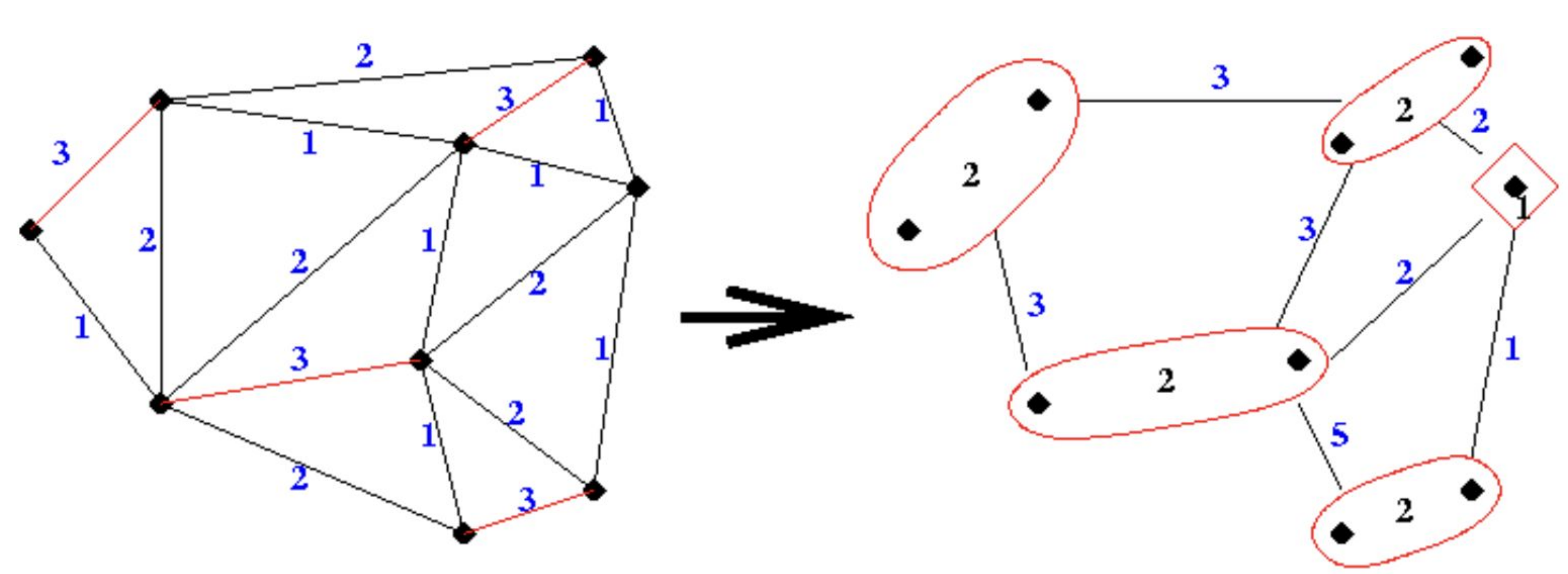



## 3 Multilevel Approach

***Steps:***

1. ***Coarse*** - Maximal Matching
2. ***Kernighan–Lin*** Partitioning on coarsed Graph (Switching node to obtain *local optimal*)
3. ***Uncoarse*** - obtain final partitioning

***Parallelization***: node switching over threads



## 5 Challenges and Our Contributions

- ***Dependency***: Coarse the graph makes cell inter-connections less complex
- ***Load Balancing***: Decompose work into even tasks with low dependency and balance loads between threads
- ***Communication Costs***: Reduce number of messages with Master Slave message Passing