**INTRODUCTION**

If area (and power) is a constraint in mapping, then tiles may be reused to temporally pipeline the processes. Significantly, using active partial reconfiguration allows the dynamic balancing of the compute pipeline on the basis of space limitation on fabric.

**Motivation Example**

Significantly, using active partial reconfiguration allows the dynamic balancing of the compute pipeline on the basis of space limitation on fabric.

**Overall Flow**

Application in C/C++ → Task Graph → reBalanced Task Graph → Optimal Mapping → reBalanced Task Graph

**Mapping**

**Goals:**
- Map a large application with more tasks than the PEs available on the fabric
- Map more than one application onto the fabric

**Objectives:**
1. Minimizing total reconfiguration cost
2. Minimizing the application’s total execution time

**Formulated for:**
1. Mapping acyclic task graphs onto 2D mesh platform
2. Mapping cyclic task graphs onto 2D mesh platform
3. Mapping onto 3D mesh platform
4. Mapping onto any arbitrary interconnect

**Future Work:**
- Proof of Optimality
- (M)ILP formulation for “heterogeneous” platforms
- Integration into Daedalus Framework

**Mapping: Formulation**

Some of the rules in our (M)ILP:
- Each task can be mapped onto one and only one tile.
- Each tile can be assigned to one task or any number of edges originating from the same source task.
- If source task of an edge is mapped to a tile, destination task can be mapped to any neighboring tile in the same snapshot or to a tile in the next snapshot.
- If an edge is mapped to a tile, destination task of the edge can be mapped to any neighboring tile in the same snapshot or to a tile in the next snapshot.

**Mapping: Results**

When objective is “min-execution”, solver requires 31.1X more time than when it is “min-reconfiguration” while the total execution time of the application improves by an average of 13.97%.

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