Resource Sharing Under a Server-based Semi-Partitioned Scheduling Approach

1. Context and Goal

Goal:
- Adapt MrsP resource sharing protocol to work with servers through bandwidth inheritance
- Adapt NPS-F schedulability test to introduce adapted version of MrsP

2.1. NPS-F

- Semi-partitioned scheduling algorithm
- Server-based approach
- Does not consider shared resources
- Servers serve one or more tasks using EDF

2.2. MrsP

- Generalization of PCP/SRP Response Time Analysis to multicore
- Defined for fully partitioned systems where tasks are scheduled using fixed priorities
- Only one task per processor accessing a resource at any time
- Blocked tasks can undertake load of tasks holding the resource that has been preempted

3. Contribution

Goal:
- Account for shared resources in NPS-F by adapting MrsP

Challenges:
- MrsP is defined for fixed priority while NPS-F uses EDF
- MrsP is defined for fully partitioned while NPS-F uses servers

4. Future Work

1. Prove the correctness of the schedulability test equations provided
2. Define approach for mapping of the tasks to the servers:
   - Challenge → circular dependencies with the schedulability test provided
3. Extend the approach to any server based scheduling algorithm for multicore architectures (e.g., RUN/SPRINT, CBS, SS)

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