PARALLEL PROGRAMMING...

Parallel Programming: Overview

SESSION 6/6

SPECX

Why ?

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- Shares many similarities with StarPU.
- Written in modern C++ (20).
- Task-based execution system.
- Able to also support speculative execution, which is the ability to execute tasks ahead of time if others are unsure about changing the data.

StarPU

- StarPU is a task scheduling library for hybrid architectures.
- Design systems in which applications are distributed across the machine, feeding all available resources into parallel tasks.
- Optimized heterogeneous scheduling, cluster communication, data transfers and replication between main memory and discrete memories

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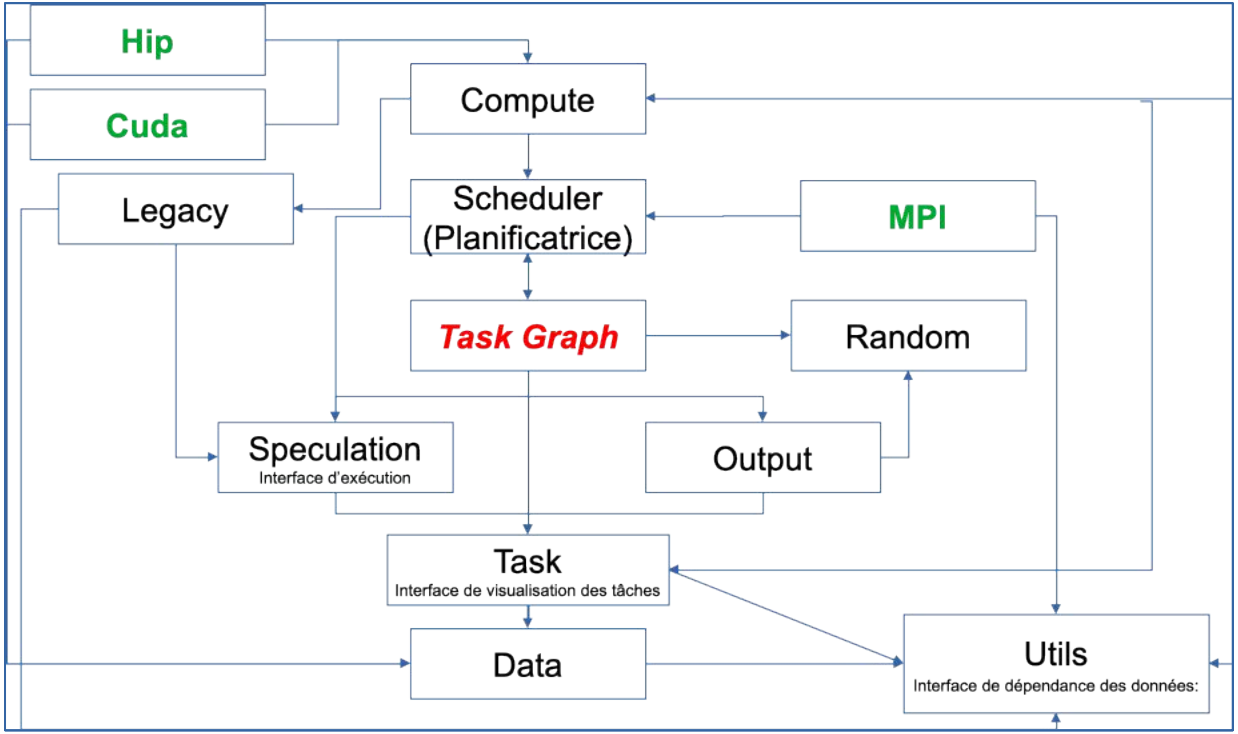
Workflow



Execution interface: Provides functionality for creating tasks, task graphs and generating traces. Can be used to specify speculation model.

Data Dependency Interface: Forms a collection of objects that can be used to express data dependencies. Also provides wrapper objects that can be used to specify whether a given callable should be considered CPU or GPU code.

Task visualization interface: Specifies the ways to interact with the task object.

Future developments

- The main objective is to reduce the calculation times,
- To manage the use of the different calculation resources, the different typical workloads, in particular in the case of multicore machines equipped with several acceleration machines.
- Plan to separate thread management from execution. To change the prototype of the predicate, to be able to consider additional data or different to make the decision.
- Develop decision graphs to optimize available hybrid resources (CPU, GPU, GPGPU, TPU,...) to increase computational speed for given problems.
- To provide effective and high -performance tools to the user.

Thank you for your attention !