GAP - ATLAS HIGH LEVEL TRIGGER

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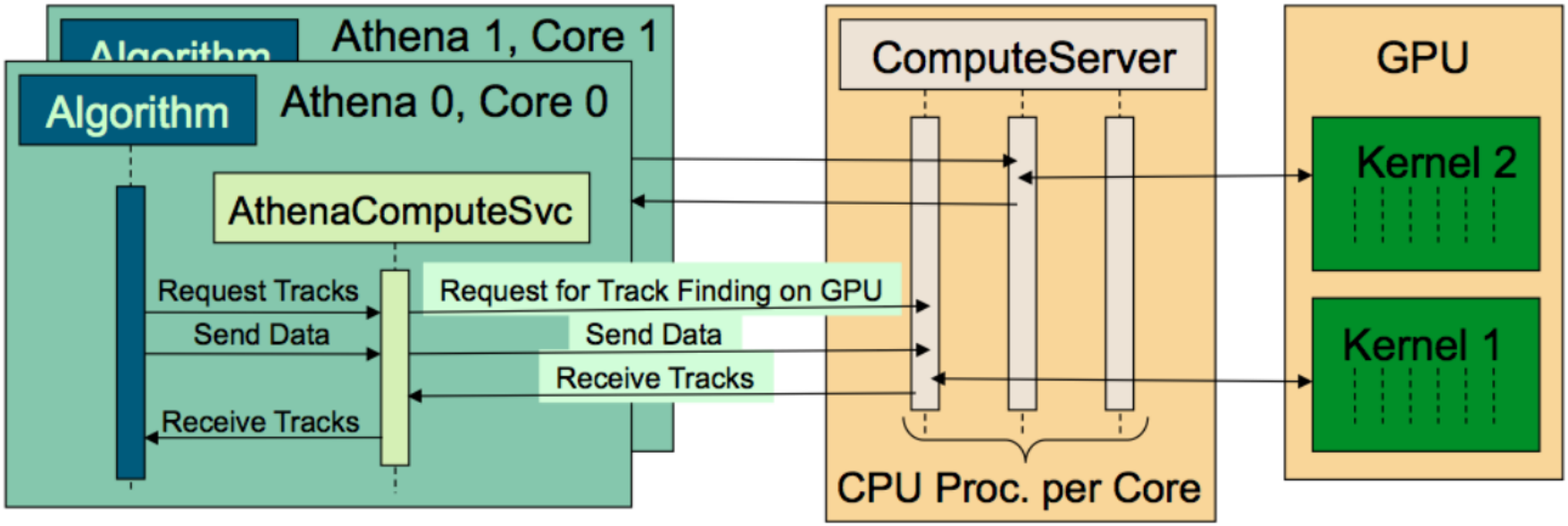
State of the Art

- Discussed at CERN with people that have been working recently on the GPU implementation of the Tracking HLT
  - J. Howard, D. Emeliyanov, S. Kama, A. Oh, N. Van Eldik
- They've done an interesting implementation of GPU in Athena
- Studying the application in our case:
  - several things should be quite similar
  - difficulties in practical implementation

Architectural implementation

- GPU not fully included in Athena code: client-server structure.
- Communication through a *shared* memory

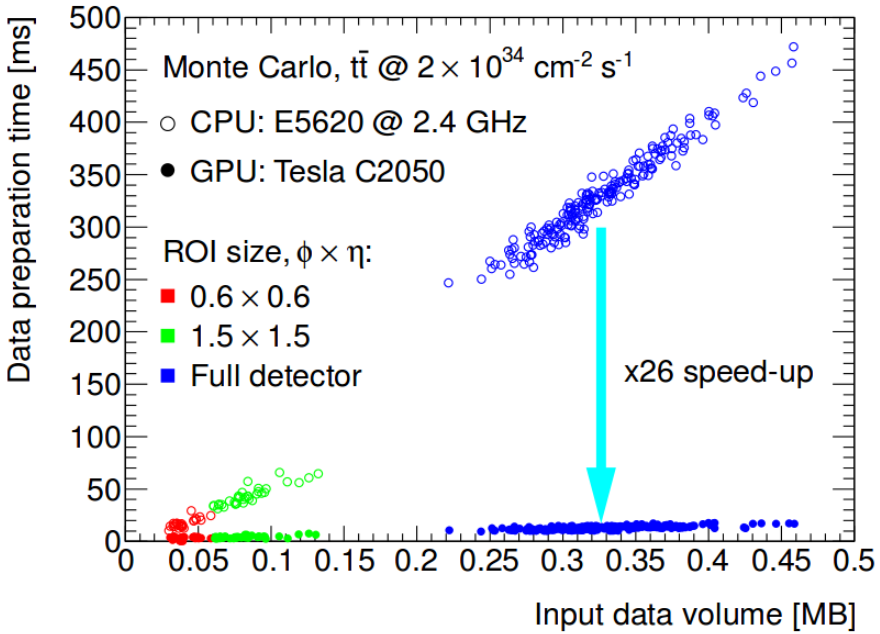


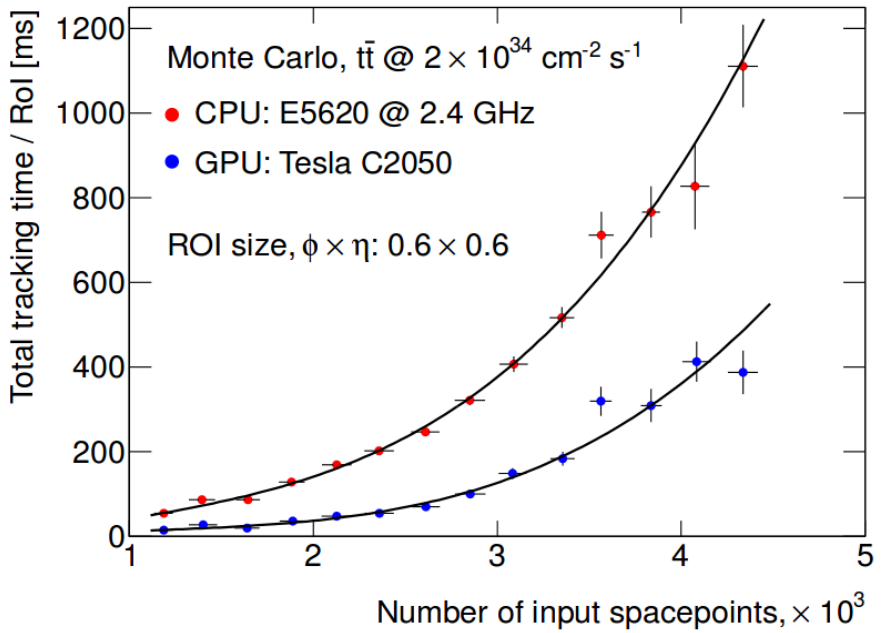
1. **AthenaCompute SVC**: *patch* to include in Athena code, contains instruction for data-trasfer and
2. **Compute Server:** manage all the query for parallel-computing
3. **GPU-device:** contains CUDA kernels and instructions

What can be parallelized

Data Preparation: conversion from detector bytestream to spacepoints (lightweight detector geometry for GPU)

Tracking: Track seeding, extrapolation, merging (`SiTrack` alg.)





- Any parallel task is a different module, can be developed separately.
- Understand the most promising task to parallelize for `MuComb` algorithm

Current status

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Working on practical implementation of this client-server tool

1. Available the version for tracking algorithms: need to be customized
2. Available but not documented and under development
3. To be done almost from scratch: *simply* algorithm parallelization and CUDA translation