StarPU + Simgrid
SONGS plenary meeting

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January 27, 2014
WHAT are simulating?

- StarPU applications and runtime are *emulated* (since the actual code is executed)
- All operations related to thread synchronization, actual computations of CPU-intensive kernels and data transfer are *simulated*
- Control part of StarPU is executed to dynamically inject computation and communication tasks in the simulator
- Our typical experimentation workflow:
  1. StarPU calibration
  2. Run native StarPU
  3. Run StarPU+Simgrid
  4. Compare the results

- Article draft (chapters 3 and 4):
  [infra-songs]/WP4/StarPUSG14-article
HOW precise are we?
Good predictions for 4 different types of GPUs with 2 dense linear algebra applications
HOW precise are we?

Comparing cleaned up Paje traces

State
- Allocating
- AllocatingReuse
- Callback
- chol_model_11
- chol_model_21
- chol_model_22
- DriverCopy
- DriverCopyAsync
- FetchingInput
- Freeing
- PushingOutput
- Reclaiming
- WritingBack

Good predictions for 4 different types of GPUs with 2 dense linear algebra applications

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WHO can benefit from it?

StarPU developers:
- Quickly checking the impact of a parameter/algorithm modifications
- Debug code on a local machine (no need for CUDA or large clusters)
- Compare performance of the real execution and simulation; if they do not match—maybe there is something wrong with the reality!

StarPU users:
- Obtain reproducible performance predictions for unavailable platforms (exascale?)
- Test different schedulers

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Testing different Schedulers

Attila Cholesky dmda

Matrix dimension

GFlop/s

Experimental Condition

native

smart

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Future Work

- Continue in two directions:
  1. Experiment on different platforms
  2. Experiment with different applications:
     - MORSE cholesky
     - qr mumps
     - Maybe even FMM

- Publish current results

- Add everything properly to both StarPU and Simgrid
Bogus QuadroFX 5800 GPU
Benchmarks of computation

Standard ggplot

Counts

Time [ms]

Count

Time [ms]