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ITEA 3 is a EUREKA strategic ICT cluster programme

Exploitable Results by Third Parties

ITEA2 09011 H4H (Hybrid4HPC)

Optimise HPC Applications on Heterogeneous Architectures

Project details

Project leader:	François Verbeck
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Name: OMP2HMPP		
Input(s):	Main feature(s)	Output(s):
OpenMP Source Code	OpenMP to HMPP source-to-source compiler	HMPP Source Code

Unique Selling Proposition(s):	▪ Automatic source code generation from OpenMP to HMPP. Effortless and simply.
Integration constraint(s):	▪ gperf 3.0.x ▪ automake-1.9 (or newer) ▪ autoconf-2.59 (or newer) ▪ libtool-1.5.22 (or newer) ▪ gcc and g++ (4.4) ▪ flex 2.5.x ▪ Mercurium Framework ▪ HMPP
Intended user(s):	Application developers or research engineers without any knowlegseon HMPP programming language that have interest to explore GPU capabilities without effort and the gain on energy/time trade-off that these could offer. The developed application is useful also for more experimented users that will obtain from the tool a GPGPU code that could define optimization starting point in their problems.
Provider:	Universitat Autnoma de Barcelona. Open Source Code. Code available on: https://github.com/sdruix/AutomaticParallelization
Contact point:	▪ David Castells - david.castells@uab.cat
Condition(s) for reuse:	▪ Free Licence
	Latest update: 30 March 2015

Name: Auto adaptive linear algebra library		
Input(s):	Main feature(s)	Output(s):
▪ Processors characteristics and instruction set	▪ Linear Algebra library which select the suitable processor (CPU or GPU) and generate dynamically a binary code optimized for the current data set ▪ Library described using a DSL (Domain Specific Language) allowing to generate hyper fast binary code generators	▪ Auto adaptive BLAS library ▪ Optimal choice at run-time
Unique Selling Proposition(s):	▪ Auto adaptive library for linear algebra ▪ Automatic choice of suitable processor ▪ Data dependent dynamic code generator	
Integration constraint(s):	▪ Work on heterogeneous platforms such as CPU/GPU on HPC cluster or on MPSoCs in embedded systems ▪ No other library needed for code generation ▪ Very small memory footprint, fast code generation Programmers using High performance computation ▪ TRL 4 : need some work/collaboration for end users	
Intended user(s):	▪ Programmers using High performance computation ▪ TRL 4 : need some work/collaboration for end users	
Provider:	▪ CEA-LIST DACLE	
Contact point:	▪ Henri-Pierre Charles - Henri-Pierre.Charles@cea.fr	
Condition(s) for reuse:	▪ Licencing	
	Latest update: 30 March 2015	

Name: DSL		
Input(s):	Main feature(s)	Output(s):
▪ Processors characteristics and instruction set	▪ DSL (Domain Specific Language) to generate binary code generators ▪ Allow to easily use specific CPU instruction (vector, multimedia, crypto) difficult to use in compiler ▪ Allow to generate data dependent code generators	▪ Binary code generators ▪ Hyper fast ▪ Hyper small ▪ Suitable for embedded platforms

Unique Selling Proposition(s):	▪ DSL which help to generate code generators on GPU or CPU ▪ Source to source tool to generate hyper fast code generators with very small footprint.
Integration constraint(s):	▪ Work on heterogeneous platforms such as CPU/GPU on HPC cluster or on MPSoCs in embedded systems ▪ No other library needed for code generation ▪ Very small memory footprint, fast code generation
Intended user(s):	▪ Programmer using dynamic code generation (JVM, JIT, Java, JavaScript, LLVM, …) ▪ TRL 4 : need some work/collaboration for end users
Provider:	▪ CEA-LIST DACLE
Contact point:	▪ Henri-Pierre Charles - Henri-Pierre.Charles@cea.fr
Condition(s) for reuse:	▪ Licencing

Latest update: 30 March 2015

Name: PAS2P (Parallel Application Signature for Performance Prediction)		
Input(s):	Main feature(s)	Output(s):
▪ MPI Parallel Applications	▪ Analyse the parallel application and automatically extract its most relevant phases to create its signature whose execution, on different parallel computers, lets us to predict the application's performance.	▪ Analysis of relevant phases ▪ Application signature for performance prediction

Unique Selling Proposition(s):	▪ Dynamic application instrumentation without re-compile application source code. ▪ Machine-independent application model.
Integration constraint(s):	▪ The PAS2P library has been adapted to use different MPI libraries. ▪ The signature execution time is a small fraction of the entire runtime of an application.
Intended user(s):	▪ Accurate performance estimations are thus instrumental in helping a system resource scheduler efficiently schedule user's jobs. ▪ Programmers concentrate on the significant portions of the application, which are the components of the signature.
Provider:	▪ HPC4EAS Research group
Contact point:	▪ Emilio Luque - emilio.luque@uab.cat
Condition(s) for reuse:	▪ Licencing

Latest update: 30 March 2015

Name: MAQAO Perf		
Input(s):	Main feature(s)	Output(s):
▪ Binary to profile ▪ Measurement method ▪ Output path	▪ Find function hotspots ▪ Find loop hotspots ▪ Module level time categorization	▪ Profiling results ▪ Either text or HTML GUI

Unique Selling Proposition(s):	▪ Lightweight profiler ▪ Module level time categorization (time spent in MPI, OpenMP, etc…)
Integration constraint(s):	▪ Linux Standard Based OS ▪ Kernel requirement when using hardware counters (>=2.6.40)
Intended user(s):	▪ End user ▪ Performance evaluation expert ▪ Researcher
Provider:	▪ University of Versailles Saint-Quentin-en-Yvelines
Contact point:	▪ William JALBY - william.jalby@uvsq.fr
Condition(s) for reuse:	▪ LGPL license

Latest update: 30 March 2015

Name: MAQAO CQA		
Input(s):	Main feature(s)	Output(s):
▪ Binary to profile ▪ Target microarchitecture ▪ Target function(s) or loop(s)	▪ Asses code quality (vectorization, arithmetic intensity, architecture bottlenecks) ▪ Provide human readable reports ▪ Help optimize application	▪ Performance issues reports ▪ Workarounds/Hints ▪ Either text or HTML GUI

Unique Selling Proposition(s):	▪ Tracks issues at core level (microarchitecture) ▪ Human readable reports ▪ Provides source level context/link
Integration constraint(s):	▪ Supports x86_64 and Xeon Phi architectures
Intended user(s):	▪ End user ▪ Performance evaluation expert ▪ Researcher
Provider:	▪ University of Versailles Saint-Quentin-en-Yvelines
Contact point:	▪ William JALBY - william.jalby@uvsq.fr
Condition(s) for reuse:	▪ LGPL license

Latest update: 30 March 2015

Name: bullx SuperComputer Suite (SCS)		
Input(s):	Main feature(s)	Output(s):
▪ RedHat Linux	▪ Management center ▪ Resource & batch manager SLURM ▪ Parallel File system Lustre ▪ Communication libraries PGAS-SHmem, MPI ▪ Software development environment including BullXprof profiling tool	▪ Advanced Edition 3 ▪ Validation reports ▪ Performance reports
Unique Selling Proposition(s):	▪ Large scale HPC infrastructure management software suite ▪ Performance management and optimization for infrastructures and applications ▪ Massive data management	
Integration constraint(s):	▪ Software suite is delivered with Bull new HPC hardware ▪ Supports of new material: X86 processors, Xeon Phi… ▪ Support of new programming models PGAS…	
Intended user(s):	▪ End user ▪ Performance evaluation expert ▪ Researcher	
Provider:	▪ Bull (ATOS Technology)	
Contact point:	▪ Denis Foueillassar – denis.foueillasar@bull.net	
Condition(s) for reuse:	▪ Mostly GPL & BSD licenses ▪ Some proprietary licenses	
	Latest update: 30 March 2015	