24th VI-HPS Tuning Workshop
PATC course in conjunction with POP CoE

http://www.vi-hps.org/training/tws/tw24.html

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Barcelona Supercomputing Centre

Florent Lebeau & Olly Perks
ARM/Allinea Ltd.

Michael Bareford
EPCC

Wadud Miah
NAG Ltd

Brian Wylie
Jülich Supercomputing Centre

Agenda (Wednesday)

Time	Topic	Presenter
09:00	Welcome	de Tullio, Bareford
09:15	Introduction to VI-HPS & overview of tools	Wylie
	Introduction to parallel performance engineering	Miah
	Introduction to lab setup	Wylie, Bareford
10:30	*Break*	
11:00	BSC performance tools (Paraver/Dimemas/Extrae)	Giménez, Mercadal
12:30	*Lunch*	
14:00	Hands-on coaching to apply tools to analyze your own code(s)	all
17:00	Review of day and schedule for remainder of workshop	
17:30	*Adjourn*	

Agenda (Thursday)

Time	Topic	Presenter
09:00	Instrumentation & measurement with Score-P	Wylie
	Execution profile analysis report exploration with CUBE	
10:30	*Break*	
11:00	Configuring & customising Score-P measurements	Wylie
	Automated trace analysis with Scalasca	
12:30	*Lunch*	
14:00	Hands-on coaching to apply tools to analyze your own code(s)	all
17:00	Review of day and schedule for remainder of workshop	
17:30	*Adjourn*	

Agenda (Friday)

Time	Topic	Presenter
09:00	Allinea performance tools suite (MAP/PR)	Lebeau & Perks
10:30	*Break*	
11:00	POP Centre of Excellence mission & services Review of workshop	Giménez Wylie
12:30	*Lunch*	
14:00	Hands-on coaching to apply tools to analyze your own code(s)	all
16:00	*Adjourn*	

Virtual Institute – High Productivity Supercomputing

- **Goal**: Improve the quality and accelerate the development process of complex simulation codes running on highly-parallel computer systems
- Start-up funding (2006–2011)
  by Helmholtz Association of German Research Centres
- Activities
  - Development and integration of HPC programming tools
    - Correctness checking & performance analysis
  - Academic workshops
  - Training workshops
  - Service
    - Support email lists
    - Application engagement

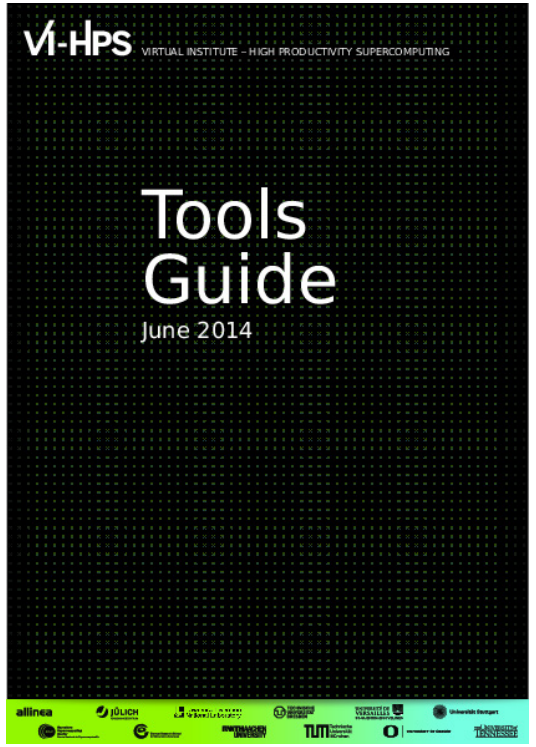
HELMHOLTZ ASSOCIATION

http://www.vi-hps.org

Productivity tools

- MUST & Archer
  - MPI & OpenMP usage correctness checking
- PAPI
  - Interfacing to hardware performance counters
- Periscope Tuning Framework
  - Automatic analysis and Tuning
- **Scalasca**
  - Large-scale parallel performance analysis
- TAU
  - Integrated parallel performance system
- Vampir
  - Interactive graphical trace visualization & analysis
- **Score-P**
  - Community-developed instrumentation & measurement infrastructure

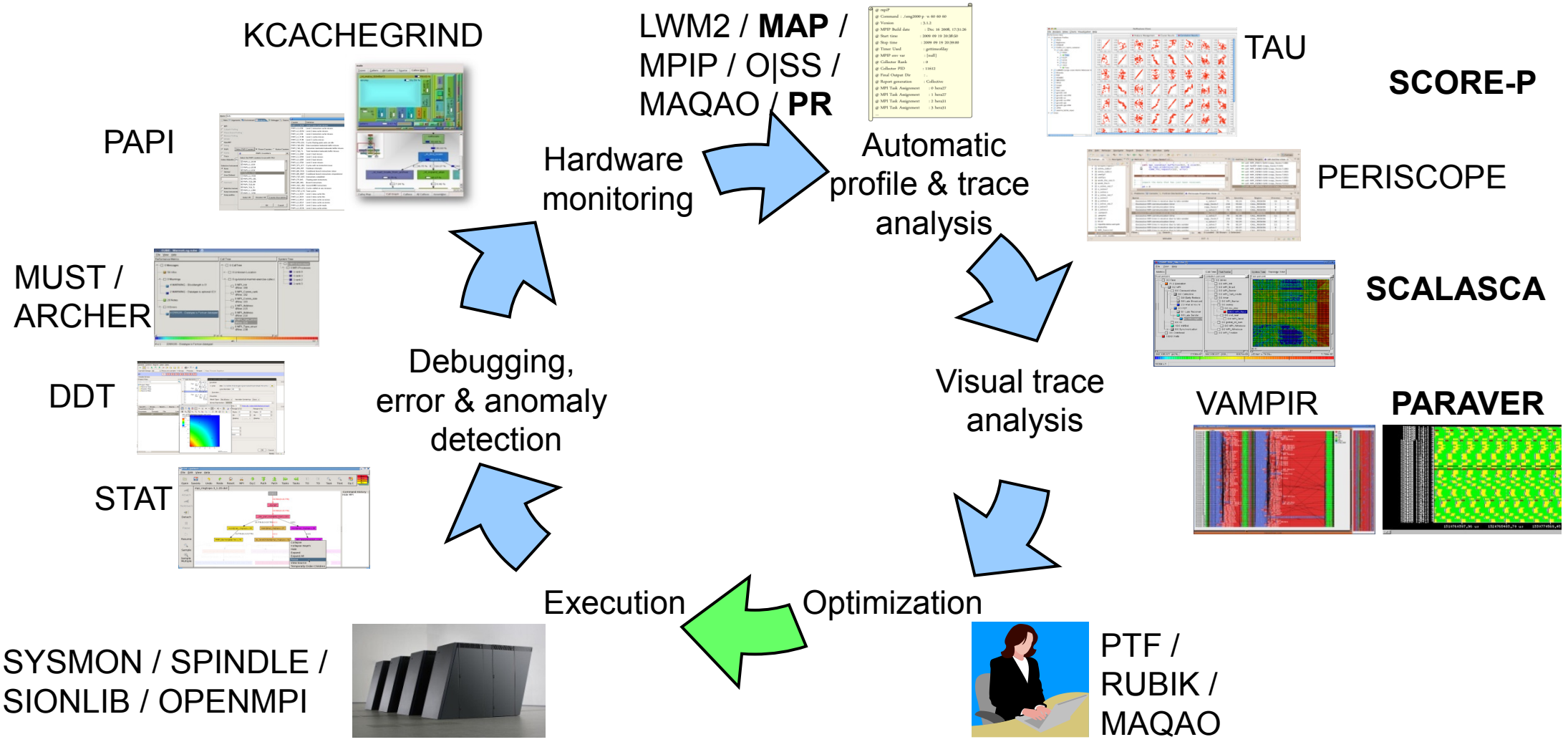
For a brief overview of tools consult the VI-HPS Tools Guide:



Productivity tools (cont.)

- DDT/**MAP/PR**: Parallel debugging, profiling & performance reports
- Extra-P: Automated performance modelling
- Kcachegrind: Callgraph-based cache analysis [x86 only]
- MAQAO: Assembly instrumentation & optimization [x86-64 only]
- mpiP/mpiPview: MPI profiling tool and analysis viewer
- Open MPI: Integrated memory checking
- Open|SpeedShop: Integrated parallel performance analysis environment
- **Paraver/Dimemas/Extrae**: Event tracing, graphical trace visualization & analysis
- Rubik: Process mapping generation & optimization [BG only]
- SIONlib/Spindle: Optimized native parallel file I/O & shared library loading
- STAT: Stack trace analysis tools
- SysMon: Batch system monitor plugin for Eclipse PTP

Technologies and their integration



Disclaimer

Tools will ***not*** automatically make you, your applications or computer systems more productive.

However, they can help you understand ***how*** your parallel code executes and ***when / where*** it's necessary to work on correctness and performance issues.

VI-HPS training & Tuning Workshops

- Goals
  - Give an overview of the programming tools suite
  - Explain the functionality of individual tools
  - Teach how to use the tools effectively
  - Offer hands-on experience and expert assistance using tools
  - Receive feedback from users to guide future development
- For best results, bring & analyze/tune your own code(s)!

- VI-HPS Hands-on Tutorial series
  - SC'08/09/10/11/13/14/15/16, ICCS'09, Cluster'10, EuroMPI'12/14, XSEDE'13, ISC-HPC'15/16
- VI-HPS Tuning Workshop series
  - 2008 (Aachen & Dresden), 2009 (Jülich & Bremen), 2010 (Garching & Amsterdam/NL),
    2011 (Stuttgart & Aachen), 2012 (St-Quentin/F & Garching), 2013 (Saclay/F & Jülich)
    2014 (Barcelona/E, Kobe/Japan, Saclay/F, Edinburgh/UK)
    2015 (Stuttgart, Grenoble/F & Santiago/Chile)
    2016 (Kobe/Japan, Garching, Cambridge/UK, Livermore/USA)