

32nd VI-HPS Tuning Workshop

University of Bristol, 24-26 April 2019

<http://www.vi-hps.org/training/tws/tw32.html>

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Agenda (Wednesday)

Time	Topic	Presenter
09:30	Welcome	
	Introduction to VI-HPS & overview of tools	Geimer
	Introduction to parallel performance engineering	Geimer
	Introduction to lab setup Building and running NPB-MZ-MPI	Price / Belikov / Geimer
11:30	Cray tools	Roy (Cray)
	Building and running your own code	all
13:00	<i>Lunch</i>	
14:00	Paraver & Extrae performance analysis tools	Giménez
	Paraver & Extrae hands-on exercises	
16:00	Hands-on coaching to apply tools to analyze your own code(s)	all
17:30	<i>Adjourn</i>	

Agenda (Thursday)

Time	Topic	Presenter
09:30	Score-P & CUBE	Geimer
	Score-P & CUBE hands-on exercises	
11:00	<i>Break</i>	
11:30	TAU performance system	Shende
	TAU hands-on exercises	
13:00	<i>Lunch</i>	
14:00	Hands-on coaching to apply tools to analyze your own code(s)	all
17:30	<i>Adjourn</i>	

Agenda (Friday)

Time	Topic	Presenter
09:30	Scalasca automated trace analysis	Geimer
	Scalasca hands-on exercises	
11:00	<i>Break</i>	
11:30	TAU PerfExplorer	Shende
	PerfExplorer hands-on exercises	
12:30	Review of workshop	Geimer
13:00	<i>Lunch</i>	
14:00	Hands-on coaching to apply tools to analyze your own code(s)	all
17:00	<i>Adjourn</i>	

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

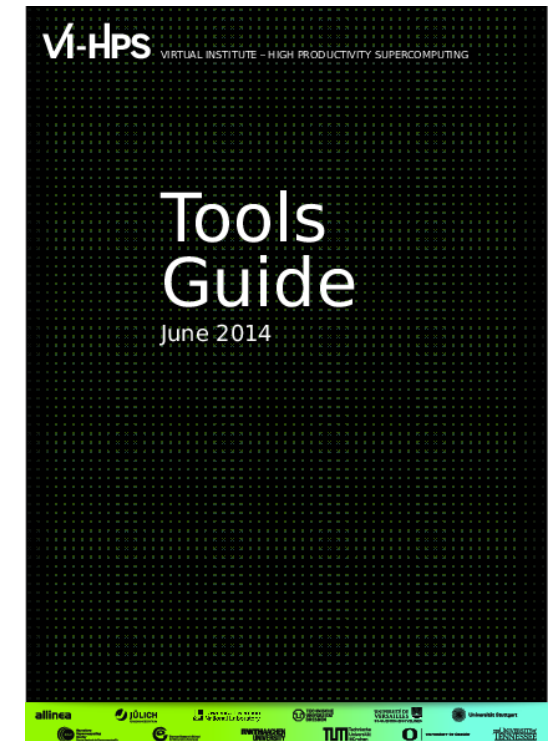
HELMHOLTZ
RESEARCH FOR GRAND CHALLENGES

<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

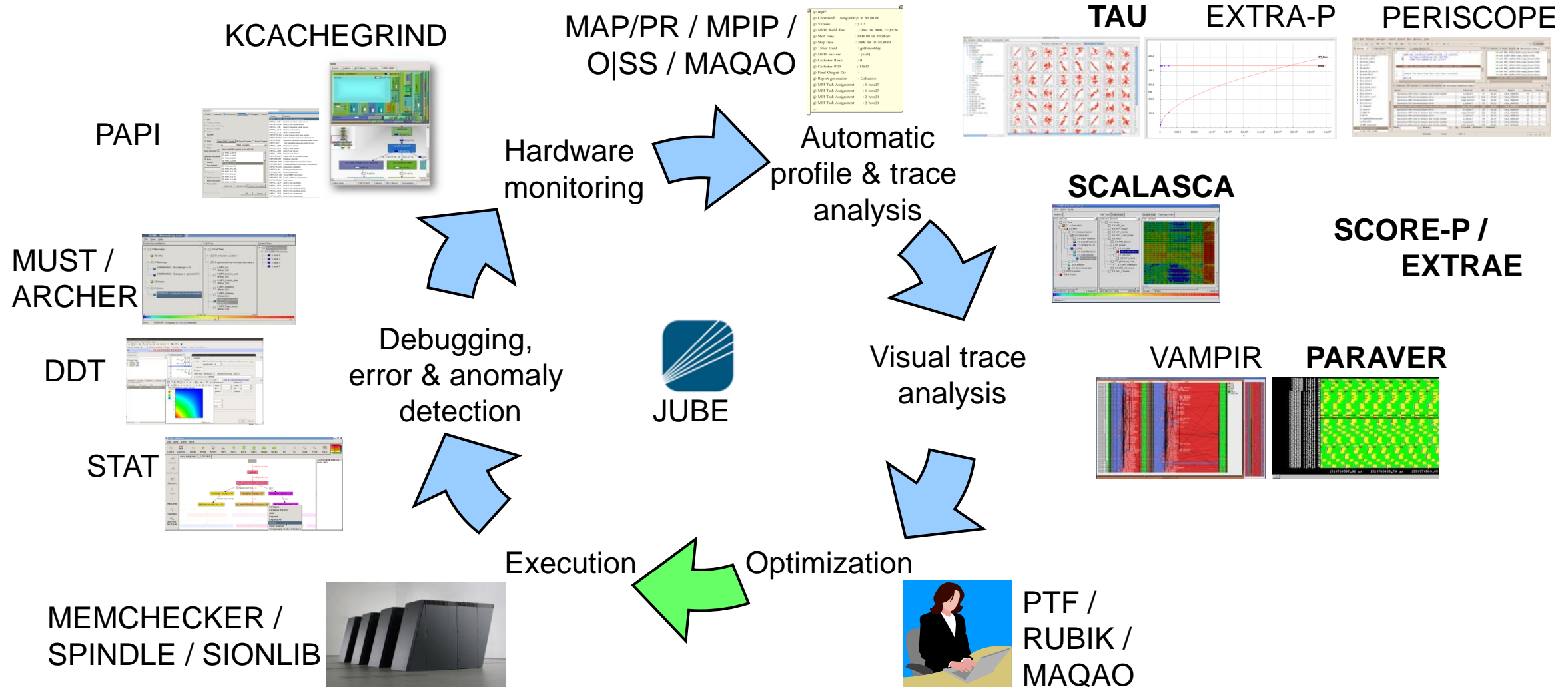
For a brief overview of tools consult the VI-HPS Tools Guide:



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

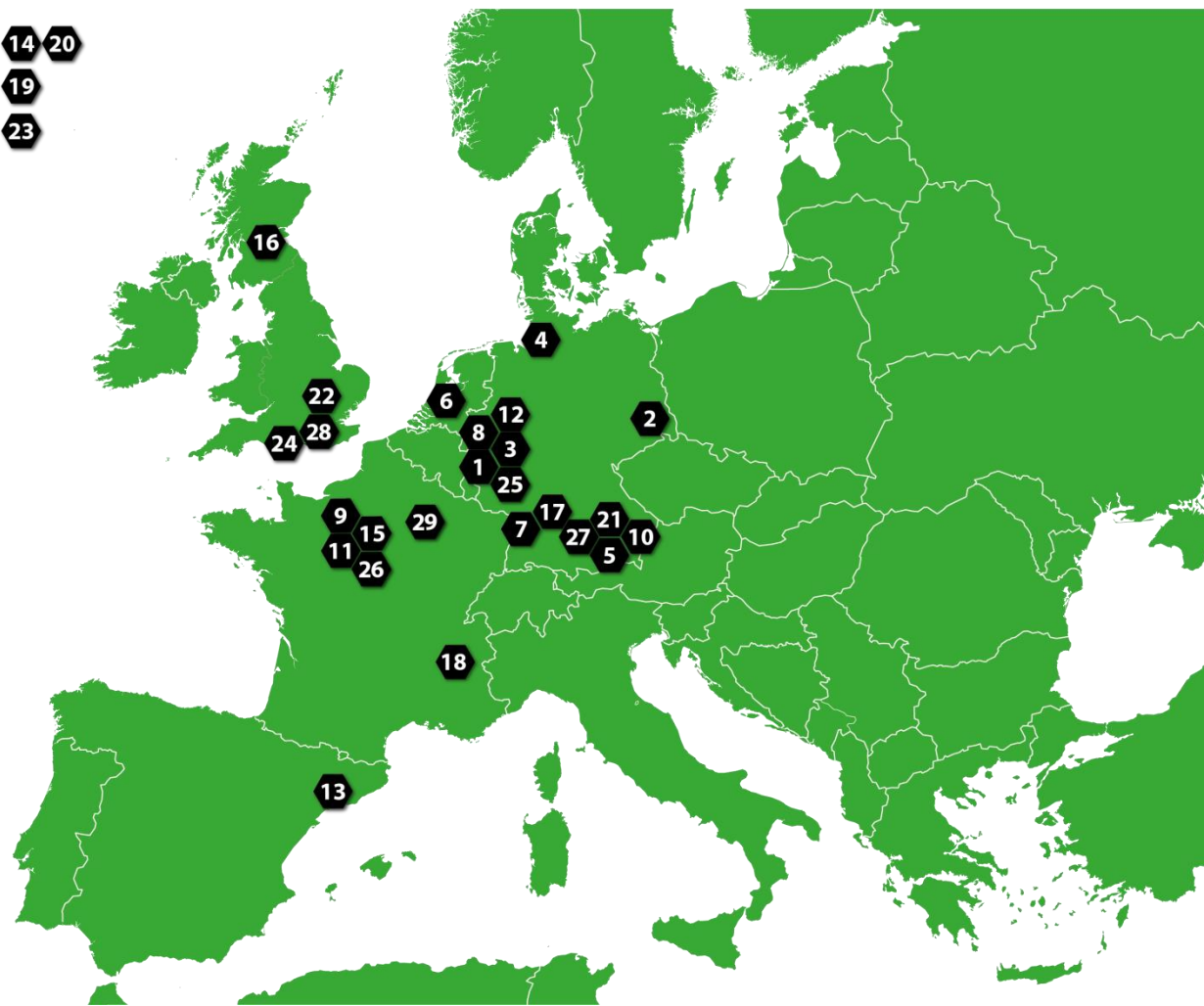
- Goals
 - Give an overview of the programming tools suite
 - Explain the functionality of individual tools
 - Teach how to use the tools effectively
 - Offer hands-on experience and expert assistance using tools
 - Receive feedback from users to guide future development
- For best results, bring & analyze/tune your own code(s)!
- VI-HPS Hands-on Tutorial series
 - **SC'08-11/13/14/15/16/17**, ICCS'09, Cluster'10, EuroMPI'12/14, XSEDE'13, **ISC-HPC'15-18**
- VI-HPS Tuning Workshop series
 - 2008 (x2), 2009 (x2), 2010 (x2), 2011 (x2), 2012 (x2), 2013 (x2), 2014(x4)
 - 2015 ([Stuttgart/Germany](#), [Grenoble/France](#), Santiago/Chile)
 - 2016 (Kobe/Japan, [Garching/Germany](#), [Cambridge/UK](#), Livermore/USA)
 - 2017 ([Southampton/UK](#), [Aachen/Germany](#), Bruyères-le-Châtel/France)
 - 2018 ([Garching/Germany](#), [London/UK](#), [Reims/France](#)), 2019 ([Barcelona/Spain](#), Knoxville/USA)





VI-HPS Tuning Workshop series

JP 14 20
 CL 19
 US 23



1. 2008/03/05+3: RWTH, Aachen, Germany
2. 2008/10/08+3: ZIH, Dresden, Germany
3. 2009/02/16+5: JSC, Jülich, Germany
4. 2009/09/09+3: HLRN, Bremen, Germany
5. 2010/03/08+3: TUM, Garching, Germany
6. 2010/05/26+3: SARA, Amsterdam, Netherlands
7. 2011/03/28+3: HLRS, Stuttgart, Germany
8. 2011/09/05+5: GRS, Aachen, Germany
9. 2012/04/23+5: UVSQ, St-Quentin, France
10. 2012/10/16+4: LRZ, Garching, Germany
11. 2013/04/22+4: MdS, Saclay, France
12. 2013/10/07+5: JSC, Jülich, Germany
13. 2014/02/10+5: BSC, Barcelona, Spain
14. 2014/03/25+3: RIKEN AICS, Kobe, Japan
15. 2014/04/07+4: MdS, Saclay, France
16. 2014/04/29+3: EPCC, Edinburgh, Scotland
17. 2015/02/23+5: HLRS, Stuttgart, Germany
18. 2015/05/18+5: UGA, Grenoble, France
19. 2015/10/27+3: NLHPC, Santiago, Chile
20. 2016/02/24+3: RIKEN AICS, Kobe, Japan
21. 2016/04/18+5: LRZ, Garching, Germany
22. 2016/07/06+3: Uni. Cambridge, England
23. 2016/07/27+3: LLNL, Livermore, California, USA
24. 2017/02/08+3: Uni. Southampton, England
25. 2017/03/27+5: RWTH, Aachen, Germany
26. 2017/10/16+5: Lab. ECR, Ter@tec, France
27. 2018/04/23+5: LRZ, Garching, Germany
28. 2018/06/21+3: UCL, London, England
29. 2018/10/15+5: ROMEO, Reims, France
30. 2019/01/21+5: BSC, Barcelona, Spain
31. 2019/04/09+4: UTK-ICL, Knoxville, Tennessee, USA

Upcoming events

- Half-day Tutorial @ ISC-HPC (16 June 2019, Frankfurt/M., Germany)
- VI-HPS Tuning Workshop (24-29 June 2019, Jülich Supercomputing Centre, Germany)

- Further events to be determined
 - (one-day) tutorials: with guided exercises sometimes using a Live-ISO/OVA
 - (multi-day) training workshops: with your own applications on actual HPC systems
- Check www.vi-hps.org/training for announced events

- Contact us if you might be interested in hosting a training event