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Development Tools for HPC & Multicore applications

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Allinea Software (UK)

- Allinea Software is offering next generation tools for parallel application development from HPC to the desktop & embedded applications
  - Traditionally for clusters, SMPs and MPPs
  - Focus on usability and scalability
- First **Grid Ready software development products** for Scalar and Parallel applications
  - **Allinea DDT** Distributed Debugging Tool
  - **Allinea OPT** Optimization & Profiling Tool
- Powerful, scalable, intuitive, easy to use, cross platform
- **Leicester, Vanderbilt universities, IFP, Total, Caspur, IDRIS, AWE, Cineca, Bristol, ICHEC,** Dresden, Aston, Cerfacs, Jülich, CEA , HLRS, Oxford, Lawrence Livermore, Nottingham, University, EADS, DLR : part of our customers' list – (**bold are IBM's)**
- Now starting in North America

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DDT

Distributed Debugging Tool

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DDT: Distributed Debugging Tool

- **A mature, powerful & highly intuitive tool**
  - Traditional focus has been HPC
- **Cross-Platform:**
  - Linux, Solaris (Sparc & x86-64), AIX
  - Absoft, IBM, Intel, PGI, PathScale, Sun, compilers
  - EM64T, x86-64, IA64, Power, UltraSparc architectures
  - Across most MPI / OpenMP implementations
  - Support for all major scheduling systems

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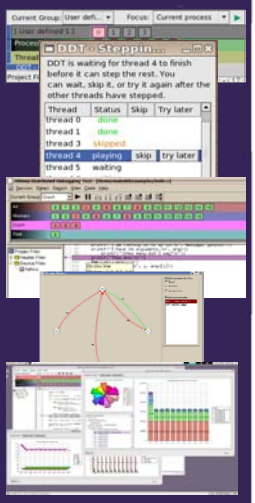
DDT: Distributed Debugging Tool



- **Scalar features**
  - Advanced F95, C, C++ support including: STL, namespaces, virtual functions, templates
  - Advanced Fortran 90, 95 and 2003 support including modules, allocatable data, pointers and derived types
- **Multiple Thread & OpenMP features**
  - Control actions by Individual or Groups of Threads
- **MPI Features**
  - Control actions by Individual or Groups of Processes
  - Visualize message queues

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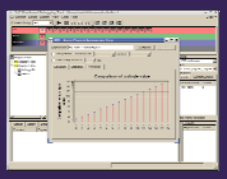
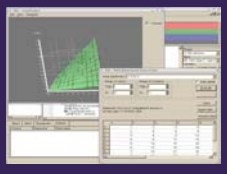
... and lots more





- **Cross process / thread comparison**
- **Visualize multidimensional data**
  - `3D OpenGL array viewer (stereo !)`
  - `From 2D viewer to new multidimensional viewer`
- **Advanced user-defined data display**
  - Program DDT to display your data using your software!

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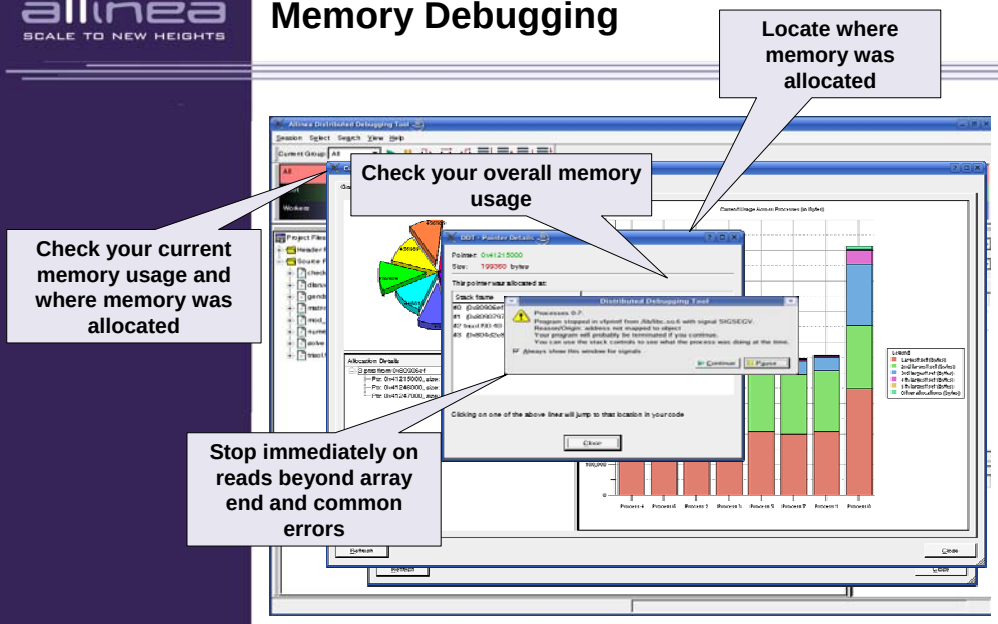
Memory Debugging



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New Features 2007

- **DDT 2.0 - released April 2007**
  - Multithreading, easy to control threads
  - Improved memory debugging
    - Illegal read/write instantly spotted
    - Even possible to continue after segfault
  - Extended signal information
  - Icons on the desktop!
- **DDT 2.1 - released August 2007**
  - New message box when processes stop
  - Faster, improved multidimensional array viewing
  - New breakpoint setting box
    - Manually add breakpoints in files or functions
    - Support for pending breakpoints

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New Architectures 2007

- **DDT IBM Cell BE (released)**
  - Fedora Core 6, IBM Cell SDK 2.1
  - IBM QS 20 or Sony Playstation 3
- **DDTLite (Q4 2007)**
  - Simplify development on the Microsoft® platform
  - Bringing features from DDT into Visual Studio®
- **DDT NEC SX8 (Q4 2007)**
  - Port of DDT backend to vector platform
  - Remote launch facility
- **DDT Cray XT4 (Q4 2007)**
  - HPC high end systems

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OPT

Optimisation & Profiling Tool

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OPT Optimisation & Profiling Tool

- **A new approach to code optimization**
  - Emphasis on ease-of-use & scalability
  - Guides users through the optimization process
  - Initial focus on MPI applications
- **Cross-platform**
- **Grid ready**

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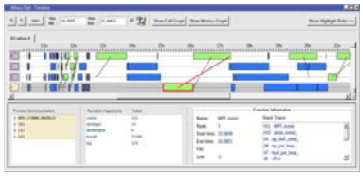
Optimizing in a Parallel Universe…

- **Traditional tracers**
  - Timelines: good for watching messages and memory accesses to pick out problems visually
  - But not (currently….) scalable!



- **Can log everything but…**
  - Vast quantities of data are generated
    - Analysis becomes an expert task
    - Is it really necessary?

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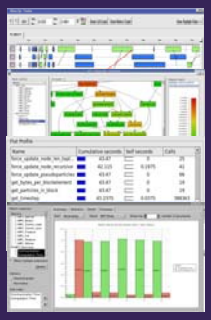
OPT



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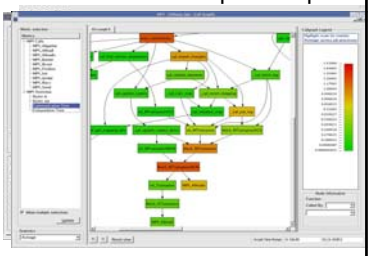
- **Traditional features**
  - Timeline shows local problems with sends/receives paired up



- **…and new features**
  - Callgraph shows problems
    - Linked with timeline
    - Statistical values
    - Highlights problem functions
    - Aggregated gprof timing data
  - Charts show distribution of performance
    - Across processes
    - And statistical views (bar/pie)

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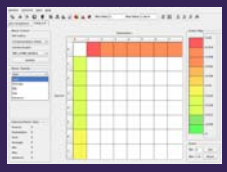
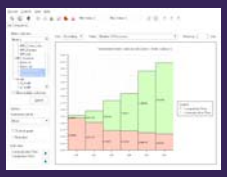
… and more





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- **Communication matrix**
  - Shows communication patterns
  - Ranks communication between processes
- **Compare multiple runs**
  - With different algorithms
  - Across different architectures
  - Across increasing numbers of processors

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...Keep It Simple

- **Focus is the key**
  - Too much visual information is a bad thing
  - Too many tools is a bad thing
- **Good parallel tools should simplify things**
  - Target the useful 90%
  - Direct the user to his performance problem
- **Embrace a top-down approach**
  - Call-graph first - see the “Big Picture”
  - Drill down successively for more information..
  - Don’t drown non-expert users in their data

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How OPT works...

- **Under the hood**
  - Database back end
    - If data is vast, database should handle it
    - Easy to optimize when necessary
    - New capabilities are just new queries
  - Client/Server architecture
    - Web services interface
    - Thin client with small memory footprint
    - Client pulls only information needed over WAN/LAN/Internet
    - A real GRID tool?
- **MPIs, compilers....**
  - Most MPIs, all compilers

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New Features 2007

- **OPT 1.3.x - released July 2007**
  - Flat profile in call graph
  - Pruned call graph
  - C++ name demangling
  - Local Server feature
    - Simplify program start up
  - Addition of function level profiling
    - Adding gprof information to callgraph

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お問い合わせ

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http://www.allinea.com/

30日間のお試しライセンス有り

上記 URL よりダウンロード可能