PGI Visual Fortran™
For Multi-core x64 Processor-based Systems

Parallel Fortran Compilers and Tools for Visual Studio 2005

PGI Visual Fortran (PVF*) fully integrates the PGI suite of high-performance 64-bit and 32-bit parallel Fortran compilers into Microsoft* Visual Studio* 2005.

High-performance PGI Compilers

PVF features the latest version of PGI's native OpenMP and auto-parallel FORTRAN 77 and Fortran 95 compilers. PGI compilers are supported on and can generate fully optimized code for a broad range of popular high-performance computing platforms including 64-bit x64 (AMD64 and Intel* EM64T) and 32-bit x86 processor-based systems.

PGI Fortran compilers offer world-class performance and features including auto-parallelization, support for multi-core processors, OpenMP 2.5, and the PGI Unified Binary*. The PGI Unified Binary streamlines cross-platform support by combining into a single executable file code optimized for both x64 processor families. State-of-the-art compiler technologies found in PVF include vectorization, parallelization, interprocedural analysis, memory hierarchy optimization, function inlining, CPU-specific optimization and more.

Visual Studio Integration

PVF includes features to enable rapid code development. The Fortran-aware text editor supports syntax coloring, Fortran intrinsics tips and keyword completion. PVF also automatically manages all build dependencies. PVF is interoperable with Microsoft Visual C++ so Fortran sub-programs can call C functions and vice versa. PVF includes a number of DVF/CVF compatibility features including full support for the Win32 API. Sample projects include building Fortran dialog boxes, console and Windows applications, DLLs and static libraries.

Optimized for

Microsoft Visual Studio

PVF augments the Visual Studio debugger with a custom debug engine that provides the language-specific debugging capability required for Fortran. The PVF debug engine supports graphical symbolic debugging of single-thread, multi-thread, and OpenMP applications. It enables debugging of 64-bit or 32-bit applications symbolically using source code or with interleaved assembly code, and it provides full access to the registers and hardware state of the processor. The PVF debug engine is interoperable with the Visual C++.
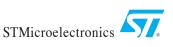
Documentation includes the PVF User's Guide, PVF Release & Installation notes and the PGI Fortran Language Reference manual. Extensive online help for PVF is built into the Visual Studio help system. The PVF User's Guide and PGI Fortran Reference are also part of PVF online help.

A Complete Development Solution

PGI Visual Fortran is available in two configurations. *PVF Workstation Complete* includes a bundled copy of the Microsoft Visual Studio 2005 IDE[1]—the premier Integrated Development Environment for the Windows platform, the current MSDN documentation library, assembly-optimized BLAS/LAPACK/FFT math library routines, PGI's *PGPROF* parallel performance profiler, and a full boxed media kit with CD-ROM's and printed documentation. *PVF Worksation Complete* has everything you need to start developing Fortran applications in minutes. There is no need to acquire or install any third party software packages.

If you already have Visual Studio 2005, *PGI Visual Fortran Standard Edition* is a complete production-quality parallel Fortran 95 project system "plug-in" for developing optimized Fortran solutions for both Intel and AMD processors.

[1] The Visual Studio 2005 included with PVF contains PGI compilers only.

PGI Visual Fortran™

Visual Studio Integration

Fortran aware text editor	Interoperable with Microsoft Visual C++
Fortran intrinsics tips	Bundled Visual Studio 2005 IDE[†]
Keyword completion	Bundled MSDN library[†]
Fortran debug engine	Bundled ACML math library[†]
Automatic Dependency Analysis	

Fortran Compilers

Features

Full 64-bit support on AMD64 and Intel EM64T	Vectorization/Optimization directives
Full 32-bit support and optimization for x86/x87 targets	Integrated *cpp* pre-processor
PGI Unified Binary optimized for both AMD64 and EM64T	Fast compile times
Auto-parallelization	Compile-time optimization listings
OpenMP 2.5 parallelization	Annotated assembly code listings
Inter-language calling	Online and printed documentation
IEEE arithmetic options	

Optimizations

AMD64 and EM64T cross-target optimization	Global dependence analysis
Interprocedural Analysis (IPA)	Global flow analysis
Scalar SSE code generation	Integrated local, global and vector register allocation
Function inlining	Induction variable analysis
Loop fusion	Load/store analysis
Profile-feedback optimization	Tail recursion elimination
Instruction scheduling	Scalar expansion
Invariant code and conditional hoisting	Scalar replacement
Common sub-expression elimination (CSE)	Value propagation
Global constant propagation	Strength reduction
	Dead code elimination

Vector/Parallel Transformations

State-of-the-art dependence analysis	Scalar promotion
Nested loop autoparallelization	Temporary vector creation
Nested loop vectorization	Stripmining, Cache Tiling
Loop interchange	Concurrent call support
Loop splitting, unroll & jam	Inline concurrent code segments
Iteration peeling	Vector SSE code generation
Aligned access optimizations	Software prefetching

Parallel Debug Engine

32-bit and 64-bit targets	Attach to running processes
Debug Fortran and Visual C++	Traceback, Log files, Help
Debug parallel OpenMP and multi-threaded programs	One-touch symbolic display
Interleaved source and assembly language	Multiple format display of values or strings
One-touch breakpoint setting	Track register states
Step into, over, out of functions	Control multiple threads at once[†]
	Program status visualizer[†]

PGPROF Parallel Performance Profiler[†]

32-bit and 64-bit targets	Multiple format displays: Histogram, Percentage, Bar charts, Counts, Absolute value
Profile parallel OpenMP and multithreaded Fortran programs	Sort by line number, value, time
Function-level and source line-level displays	Extensive online help

[†] Feature available in *PVF Workstation Complete* version only.

The Portland Group™

Two Centerpointe Dr., Suite 320
Lake Oswego, OR 97035

Tel: (503) 682-2806
Fax: (503) 682-2637

www.pgroup.com

Sales: *sales@pgroup.com*
Technical Support: *trs@pgroup.com*

STMicroelectronics