

SpiralGen

Accelerating Innovation in Computing

SpiralGen Technology:
Solutions that give you
the optimization you
need, when you need it.

**Is your algorithm optimized for
the latest architecture?**

SpiralGen can deliver software
components to your specifications.

**How long did it take to perform
your last optimization?**

SpiralGen technology can deliver
code in days instead of weeks, or
weeks instead of months.

**Are you prepared to do it again
for the next platform?**

SpiralGen can easily port to new
architectures. Your optimization
will have a longer life.

How reliable is your optimized code?

SpiralGen software components are
symbolically and numerically verified.

**What happens to your optimization
when your algorithm changes?**

With SpiralGen, algorithm changes
are done at the symbolic level, not
in C or assembler. Your algorithm
becomes maintainable and portable.

**Would you like to achieve a
higher power efficiency?**

SpiralGen software components
can exceed the performance of
code written by human optimization
experts, delivering more
GFLOPS/Watt.

Contact SpiralGen at 412.213.8788
or info@spiralgen.com for more
information about our services.

simplifying **PERFORMANCE**

Highly Optimized **Source Code** for...

Your Platform

- SSE 2/3/4 and FMA4
- AVX
- MIC and LRBni
- VMX/AltiVec/VSX
- Atom
- ARM
- SPARC
- Core i3/i5/i7
- Opteron
- BlueGene/L/P/Q
- Fermi and Tesla
- Radeon and FireStream
- FPGA acceleration
- Others...

Your Algorithm and Application

- Electronic structure computation
- Quantum chemistry
- Physics and cosmology
- Seismic analysis
- Uncertainty quantification
- Biology and bioinformatics
- Climate Modeling
- Finance and optimization
- Finite elements
- Particle in cell
- CFD
- Fast multipole and n-body
- Integral codes
- Social Networks
- Cloud computing
- CS education
- Visualization
- HPC Challenge

Your Library Interface

- MKL
- IPP
- ACML
- (P)ESSL
- NAG
- IMSL
- GSL
- FFTPACK

Your Functionality

- Fast Fourier Transforms (FFT)
- Small Matrix BLAS
- Correlation and Convolution
- Wavelets and Filter Banks
- Others...

Your Implementation Details

Data

- Single/Double/Extended and mixed Precision Floating Point
- Array of structs vs. struct of arrays
- Others...

Memory Allocation

- Stack
- Dynamic (Heap)
- Dynamic (User-Provided Memory Allocator)
- Others...

Threading and Messaging

- Fork / Join, Leverage Existing Threads (Multiple Entry-Points)
- OpenMP
- PThreads
- MPI
- GASNet
- Global Arrays
- UPC and CAF
- CUDA
- OpenCL
- Boost
- Thread Building Blocks
- HPCS languages (Chapel, X10)
- MapReduce
- Others...

Language

- C & C++
- Fortran 77, 90, 95
- Java, C#
- Others...

Operating System

- Unix
- Linux
- Windows HPC Server
- AIX

SpiralGen Services

Highly Optimized Custom Components

SpiralGen provides performance-critical software components for your target application, standard, and platform.

Performance Consulting

Review your application/algorithm and recommend an architecture, hardware, and software approach.

Benchmarking

Benchmark and analyze the performance of your application, estimate realizable speedup, and recommend relevant software components and services.

Integration and Maintenance

Installation, integration, testing, and upgrade services for SpiralGen components.

SpiralGen Expertise

SpiralGen components harness the expertise of some of the world's leading experts on parallel programming and high performance optimization and deliver it to your application.

SpiralGen holds the exclusive license to the Spiral software generation and optimization technology developed under the lead of Carnegie Mellon University. The technology is the result of more than a decade of research and \$12M of funding, and combines the collaborative research and development output of faculty members from signal processing, algorithm design, computer architecture, compilers, computer algebra, high-performance computing and machine learning, 25 graduate students, and 5 postdoctoral researchers. Results have been published in more than 20 journal and 60 peer-reviewed conference articles.

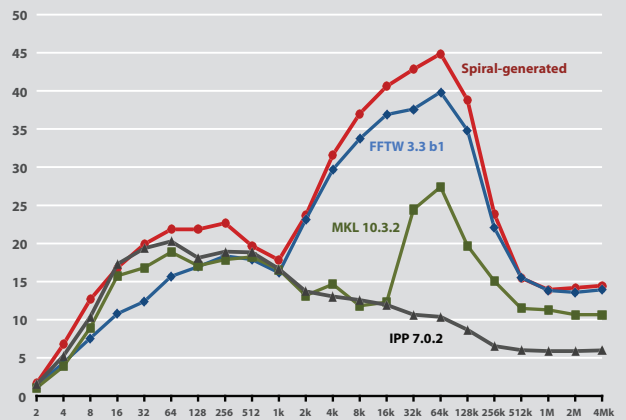
SpiralGen delivers superfast software components for cutting edge parallel platforms. Contact us to discuss your optimization needs and see how SpiralGen can help you now.

SpiralGen Benefits

- Faster time-to-market
- Higher performance
- Higher reliability
- Higher maintainability
- Faster porting to new architectures
- Plug-n-play with your API
- Reduced risk

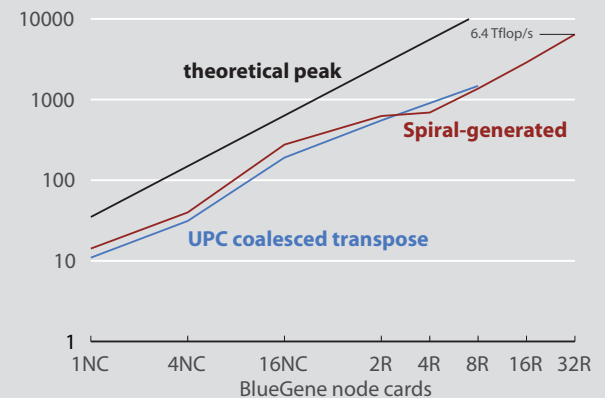
1D DFT on 3.3 GHz Sandy Bridge (4 Cores, AVX)

performance [Gflop/s]



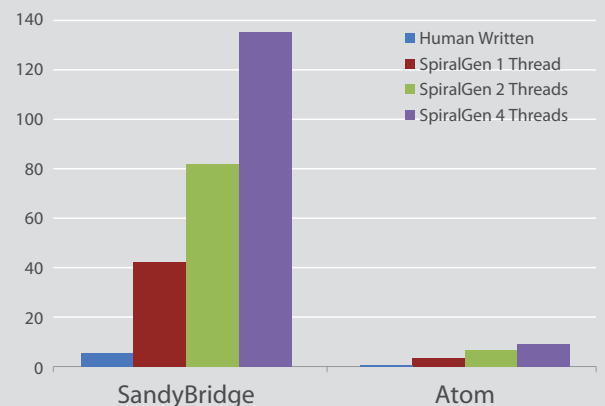
UPC and Spiral-Generated FFT on Blue Gene/P

[Gflop/s]



Performance of Ultrasound Beamforming

[frames/sec]



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