Abstract. The objectives of our project are (1) the development of a basic library of solutions and algorithms required for large scale scientific simulations, which have been developed separately in each field, and (2) its integration into a scalable software infrastructure.

Libraries for vector machines

Libraries for vector machines

Libraries for PC clusters

Libraries for shared memory machines

Benefits

SILC provides independence from libraries, environments, and programming languages. C, Fortran, Java, and Python are currently supported.

Costs in SILC

Primary costs are of data transfer between user programs and SILC servers, although some speedup is likely by means of fast matrix computation libraries.

SILC is a library of iterative solvers for linear systems, providing 12 iterative methods, 10 preconditioners, and 11 sparse matrix storage formats. Both sequential and parallel computing environments are supported, and double and quadruple precisions can be used through a common interface.

1. Deposit data (e.g., matrices and vectors) to a SILC server.
2. Send requests for computation using mathematical expressions in the form of text.
3. Fetch the results of computation.

FFTSS

FFTSS is a fast Fourier Transform library for various computing environments. To achieve high performance, some processor specific instructions such as FMA, SSE2&3, and BlueGene/L SIMD are supported.

Auto-tuning of FFT kernels, radices, and their order

Some of the FFT kernels are unrolled and software pipelined to assist compilers’ optimization. As a result, efficient binary codes are generated and they outperform some vendors’ FFT libraries. The interface of the library is almost compatible with FFTW3 which is the de facto standard library. This makes it easy to port your applications written for FFTW.