NAG Library for SMP & multicore

The NAG Library for SMP & multicore is the largest commercial numerical algorithm library developed to harness the huge performance gains from the shared memory parallelism of Symmetric Multi-Processors (SMP) and multicore processors. At Mark 22, the NAG Library for SMP & multicore contains over 1,600 algorithms, or routines, with over 160 specifically tuned to run significantly faster on multi-socket and multicore systems. Another 360 or so routines benefit from increased speed by enhancements. The flexible routines have proven capabilities for delivering levels of performance and scalability superior to other comparable products currently available.

NAG pioneered the development of SMP tuned algorithms over a decade ago. Since then SMP systems have become the norm, now even PC's have multicore processors putting HPC onto the desktop. Researchers, developers and instructors need to exploit this additional power in their numerically intensive computation. With the NAG Library for SMP & multicore, NAG takes its globally renowned NAG Library one step further for HPC data management, analytics, R&D and application building.

Tuned routines are available in the following areas:

- ‣ Quadrature
- ‣ Partial differential equations
- ‣ Interpolation
- ‣ Curve and surface fitting
- ‣ Orthogonalisation
- ‣ Correlation and regression analysis
- ‣ Multivariate methods
- ‣ Random number generators
- ‣ Time series analysis
- ‣ Sorting and searching
- ‣ Financial option pricing
- ‣ Fast fourier transforms
- ‣ Linear algebra (LAPACK)
- ‣ Sparse systems

Nearest Correlation Matrix Performance Study

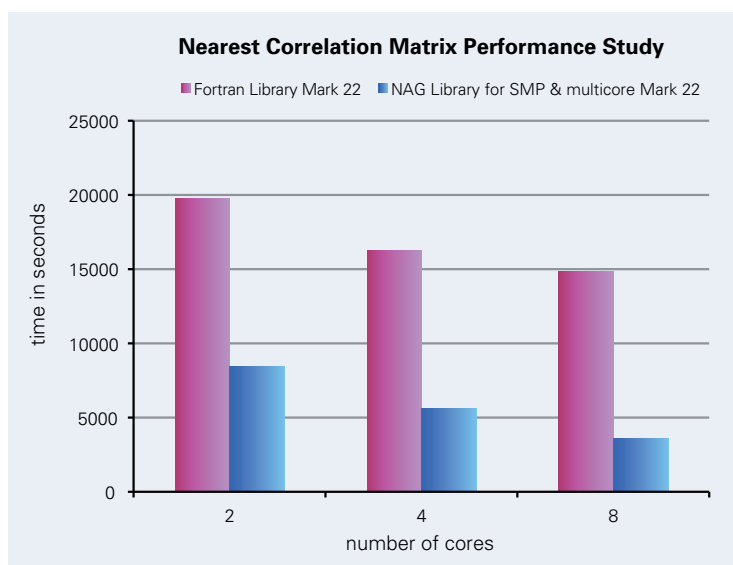■ Fortran Library Mark 22   ■ NAG Library for SMP & multicore Mark 22

Figure 1 shows the speed increases of using the NAG Library for SMP & multicore – NAG routine used 'Nearest Correlation Matrix'. Problem size of N=10,000.

Key features

Mathematical and statistical functionality

NAG's collection of world-class numerical routines are organised into 47 Chapters, each devoted to a mathematical or statistical area. This makes algorithmic selection extremely easy.

Detailed documentation

Each routine is accompanied by highly detailed documentation that outlines the background of each routine, along with advice on the selection of the best algorithm and the interpretation of the results returned.

Every routine has an example program

Each NAG routine has an example program to demonstrate how to access it by solving a sample problem. This template can then be easily adapted to reflect your specific problem and help you manage and analyze your data.

Quality assured

The validity of each routine is tested on each of the machine ranges for which the Library is available. Only when an implementation satisfies our stringent accuracy requirements is it released. As a result you can rely on the proven correctness and reliability of the routines to give you the right answers.

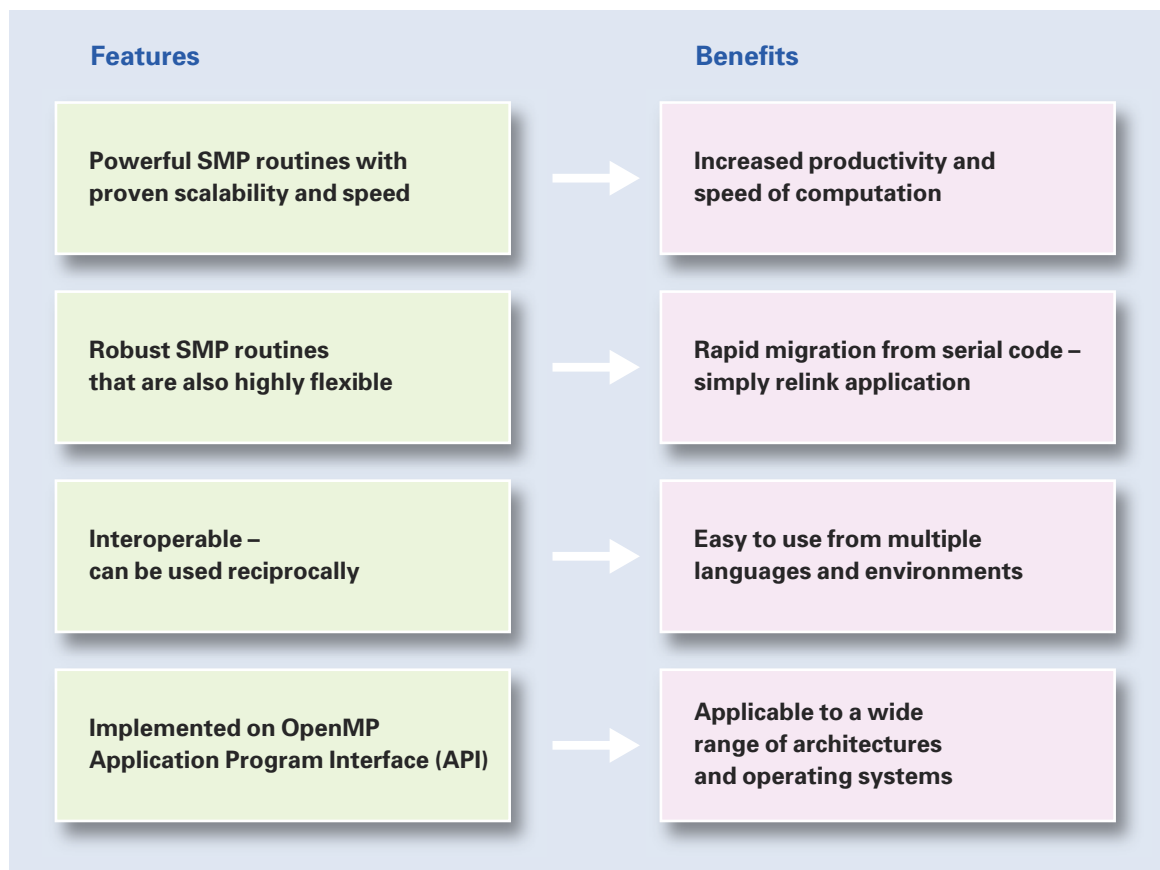**nag®**

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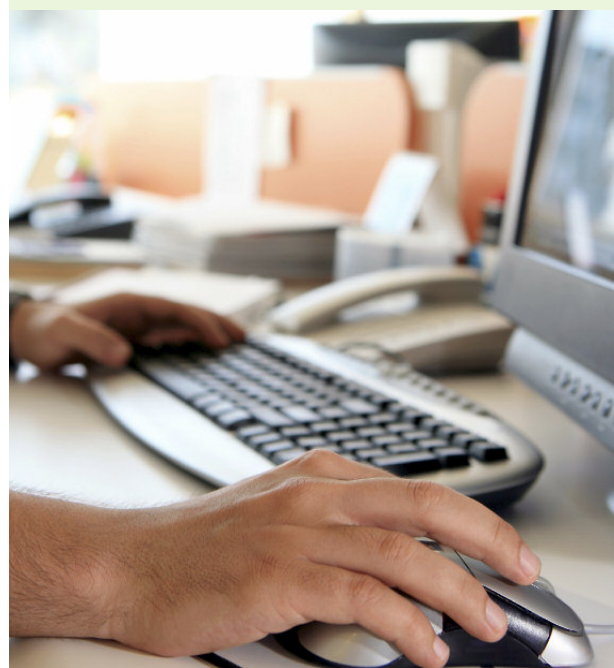
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Why should I use the NAG Library for SMP & multicore?

The NAG Library for SMP & multicore has proven scalability, speed and correctness making it easy to exploit the power of SMP and multicore systems without requiring the user to modify their code. It contains all the powerful, robust and flexible algorithms in the NAG Library but is specifically optimized for SMP and multicore systems, so by purchasing the SMP version of the NAG Library you're future proofing your numerical software investment as your hardware grows.

By subscribing to NAG's dedicated in-house Customer Support Service, not only will you receive product updates which includes new and improved algorithmic functionality, but you can contact NAG experts who will assist with your technical queries or difficulties.

Features	Benefits
Powerful SMP routines with proven scalability and speed	**Increased productivity and speed of computation**
Robust SMP routines that are also highly flexible	**Rapid migration from serial code – simply relink application**
Interoperable – can be used reciprocally	**Easy to use from multiple languages and environments**
Implemented on OpenMP Application Program Interface (API)	**Applicable to a wide range of architectures and operating systems**

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Product availability

The NAG Library for SMP & multicore is available for Unix and Windows on the following platforms: IBM, Fujitsu, HP, Itanium Linux 64, x86-64 Linux, SGI, Sun Solaris 64 and Sun SPARC Solaris.

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