

Bioinformatics and High-Performance Computing



Growth, health, temperament, occupation—every human life is a complex interaction between genetics and the environment. Bioinformatics and computational biology, two highly related fields, combine methods from applied mathematics, informatics, statistics, advanced computer science, and artificial intelligence to seek new understandings of important natural phenomena.

As a multidisciplinary research firm whose strength is assembling scientific teams worldwide, RTI International is highly qualified to conduct genomic studies that identify these interactions.

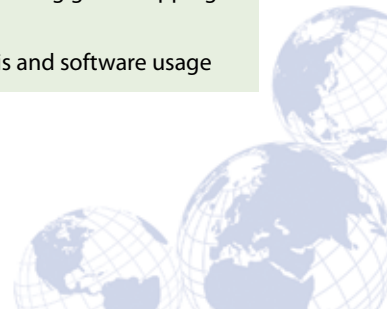
Our work entails the use of statistics, high-performance computing, bioinformatics, biological assays, environmental assessments, and policy analysis. At RTI, our goal is to use these tools in multidisciplinary studies that enable the analysis and interpretation of genomic and epidemiological data gathered from a variety of population samples often involving tens of thousands of people. Through a partnership we call MEGEH—Molecular Epidemiology, Genomics, Environment, and Health—RTI collaborates with academia and industry to conduct genomics studies and to fulfill our mission to improve the human condition.

The global bioinformatics market continues to experience double-digit growth. Against this backdrop, most major hardware manufacturers are making significant investments in life sciences by developing internal capabilities, forming strategic partnerships, and establishing new ventures. RTI is leveraging its expertise in computational, chemical, and life sciences to conduct

bioinformatics research for our public and private clients. Through our partnership with scores of renowned computational scientists, chemists, and biologists, RTI's bioinformatics team has a depth of expertise not found in smaller, less mature companies.

Our project experience includes

- Application service provider (ASP)—Construction of high-performance bioinformatics systems
- Large-scale relational database and data warehouse construction
- Industry-standard and cutting-edge proprietary methods of data mining
- Data validation and integration across heterogeneous data sources
- Development of laboratory information management systems (LIMS)
- Custom solutions for microarray and protein expression analysis
- Quantitative genetic analysis, including gene mapping and genotype prediction
- Training in bioinformatics analysis and software usage



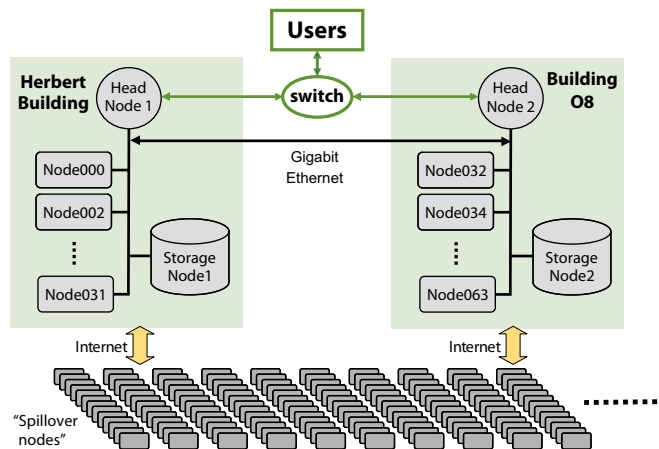
Industry reports have shown that a typical biotechnology company will invest 10% to 25% of its resources in the capture, analysis, and management of data. Working with RTI, clients have access to a broad range of skilled bioinformatics professionals who can guide this investment for optimum results. We offer a number of services:

- Consultation on how to approach bioinformatics problems
- “Bioinformatics-in-a-box” appliance construction of hardware and software to meet an organization’s specific needs
- Data mining services for existing data repositories
- Custom data validation and integration of in-house data with public databases
- Parallelization of bioinformatics software

High-Performance Biocomputing

High-performance biocomputing can enable more effective analysis of complex genomics and epidemiological data sets. RTI can provide high-performance biocomputing resources, tools for data analysis, and high-density storage systems.

RTI provides computational capabilities to several of its scientific partners by managing access to either our 176-core or our new 496-core Linux clusters or by facilitating access to the various supercomputer centers available through the National Science Foundation TeraGrid. The TeraGrid is an extensible computational infrastructure that supports grid-enabled scientific applications by linking eleven major supercomputer centers across the United States. That effort has resulted in the development of new hardware, networks, software, and policies that allow for transparent availability of a combined 2.5+ petaflops of computational power and 50+ petabytes of online storage. Such capabilities can be leveraged by a growing number of projects that can reuse a robust set of computational platforms for collecting, managing, and distributing data and facilitating collaboration.



RTI's high performance computing infrastructure

Some of the software that we support capitalizes on the newest evolution of computer languages for parallel and distributed processing, which are fueling the development of a high level of integration between back-end hardware resources and front-end data analysis, manipulation, and visualization tools that are paving the way for “interactive supercomputing.”

More Information

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