Supercomputer aids mapping of cold virus

Using fast Fourier transformations and a supercomputer to process their data, researchers from Purdue University and the University of Wisconsin have mapped the atomic structure of a common cold virus, rhinovirus-14. The mapping could lead to the development of vaccines for colds and other viral ailments because it provides insight into how a virus works.

Michael G. Rossmann of Purdue led the research effort. Using a Cornell University synchotron—which accelerates electrons to near-light speeds—as an X-ray machine with 100 times the resolution of conventional X-rays, the team solved the virus's structure to a resolution of three angstroms.

The X-ray diffraction data was translated into a map of the electrons' patterns with novel fast Fourier transformation techniques developed by Rossmann, said John Connolly, head of the National Science Foundation's Office of Advanced Supercomputing. The office funded the supercomputing and computer graphics phase of the research.

The final set of computations that determined the virus structure took about a month to complete on a Cyber 205 supercomputer—compared to 10 years without a supercomputer, the NSF said.

Connolly described Rossmann's work as "a straightforward technique to examine viral structures." The research will be used to examine other troublesome viruses in the search for vaccines against them. There are about 100 strains of cold-causing rhinoviruses to be mapped, as well as the hepatitis and acquired immunity deficiency syndrome (AIDS) viruses. Rossmann will focus his efforts on the latter two viruses.

New British tool center a response to software complexity

Ware Myers, Contributing Editor

The United Kingdom has decided to set up a software tool demonstration center in Manchester, England, next year, based at the National Computing Centre there. Geoffrey Pattie, Britain's minister of state for industry and information technology, made the announcement at the Eighth International Conference on Software Engineering in London, England, on August 28.

"It will provide a center where tool users can gain experience on tools currently in the market and receive impartial advice," said Pattie, whose responsibilities include oversight of the Alvey computer research program.

The center will provide an outlet for products of the Alvey and Esprit software engineering programs, as well as for products of private vendors.

The tool center is a response to the British government's belief that "software has become a crucial enabling technology that is having a fundamental effect on the competitiveness of a growing range of industries," Pattie said.

Depending on elaborate software systems "increasingly permeates the entire infrastructure of our societies, inevitably raising more and more questions about the safety and reliability of those systems," he declared.

Blunt talk. As a result, software quality and reliability have become important concerns of governments. In turn, members of the software engineering community bear "immense responsibility for insuring that the systems they design function correctly," Pattie said.

"To put the point very bluntly—and I suspect that everyone here will accept that a problem exists—too much delivered software is still unsatisfactory," he said. "It is still too often delivered late, costs more than expected, sometimes fails to work in the way required, and quite often consumes excessive resources in what is euphemistically called maintenance."

"Even more seriously, many of today's most advanced systems are of such size and complexity as to be approaching the limits of the human capability to design and build them with any reasonable certainty of correct operation," Pattie told the conference.

When building systems that involve critical control applications, such as nuclear power plants or air traffic control centers, much more than reasonable certainty is required, he asserted. "Total reliability is imperative."

Correction

In the September 1985 issue of IEEE Software, the biographical sketch of Nathan H. Petschenik, author of "Practical Priorities in Systems Testing," stated his company's name incorrectly. Petschenik works at Bell Communications Research, which is jointly owned by the seven regional Bell companies and has no affiliation with AT&T.