JRI news release

The Japan Research Institute, Ltd.
IBM Japan, Ltd.

JRI, IBM Japan Use Grid for Large-Scale Analysis of Electromagnetic Waves Generated by Electronic Hardware

--Working Toward World's First Grid Software Capable of Use in Analyzing EM Fields from Car Antennas, Etc.--

TOKYO, JAPAN -- Oct. 28, 2003 -- IBM Japan, Ltd. (head office: Minato-ku, Tokyo; president and CEO: Takuma Otoshi) announced today that it has successfully conducted the world's first experiment involving grid computing for electromagnetic field analysis simulations, making possible increased precision and significant reductions in analysis time, as well as large-scale operations. IBM Japan and The Japan Research Institute, Ltd. ("JRI"; head office: Chiyoda-ku, Tokyo; president: Shunichi Okuyama) will jointly promote efforts to apply grid technology to JRI's JMAG electromagnetic field analysis software in the future.

Based on the accomplishments of this collaboration, the companies believe it will be possible to run large-scale electrical field simulations that lead to more practical and detailed analysis results, thereby analyzing precise, detailed electrical field distributions that cannot be analyzed with current technologies. Through the analysis of automobile antennas, for example, they could determine the best place to attach an car antenna in order to pick up signals that are stronger and more stable. Experiments have already shown that the IBM® eServer pSeries® UNIX® server can analyze large-scale calculations in fractions of a second that would take more than three days using Windows®. It will also be possible to analyze which parts of the body and brain electromagnetic waves from portable electronic devices, such as cellular phones, are likely to mainly impact, and analyze what sort of interference the body as a whole might receive from e-mail or Web surfing.

Electromagnetic field analysis simulation software is a design tool used for the commercialization of motors that utilize magnetic flux, such as permanent magnets or magnetic coils, as well as for antennas, waveguides, condensers, plasma displays, wireless devices, and household appliances, which have a strong necessity for the analysis of electric fields. The JMAG series commands the top share of the Japanese market for electromagnetic field analysis products, and JRI has been working with IBM Japan to add grid-computing support, with the goal of further increases in precision, substantial reductions in analysis time, and application to large-scale models.

JMAG and other programs in the analysis software sector make extensive use of an analysis technique known as the Finite Element Method. This technique divides an actual substance with a complex shape into a mesh of elements with simple shapes. It then uses specific equations to generate approximate representations of each such element, and uses the solution derived from the combined results of these equations to

predict the movement of the whole.

The basic platforms for JMAG and many other electromagnetic field analysis software packages that use the Finite Element Method can only run on a single CPU. Thus, in processing the complex shapes of substances that have meshes of more than one million elements, the problem has not only been the tremendous amount of time required, but that such systems are also unable to perform high-precision analyses.

By applying to JMAG the Watson Sparse Matrix Package (WSMP), a computation library developed at the IBM Thomas J. Watson Research Center, JRI and IBM Japan have succeeded in carrying out high-speed, high-precision analysis of larger-scale models. Tests conducted on the IBM eServer pSeries running AIX® have already successfully analyzed meshes of more than one million elements, and are now attempting even larger-scale processing jobs. The grid computing environment enables systems development at costs that are lower than before.

JRI is also working with IBM Japan to verify and commercialize grid technologies on its J-OCTA platform for nanotech high-functionality material design.