IBM, Mayo Clinic Aim to Drive Medical Breakthroughs Using Blue Gene Supercomputer

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Mayo Clinic and IBM today announced a broad collaboration to accelerate advances in patient care and research with an aggressive set of technology initiatives. The goal is to take advantage of an explosion in new medical data to drive tighter linkage between research and the practice of medicine **to achieve breakthroughs**.

In an effort to transform the effectiveness and economics of health care, the collaboration will focus on new techniques to harness patient data to improve diagnoses; deep computing power to model diseases to find cures; and new devices to access information to transform how patients and physicians interact, leading to more individualized care.

Under the collaboration, Mayo Clinic will be the first medical institution to tap the power of IBM's Blue Gene supercomputer, providing "on demand" access to the specialized algorithms and tremendous power of the world's most advanced supercomputing architecture. Mayo Clinic will use Blue Gene to advance its work in molecular modeling for disease research.

Additionally, the organizations aim to provide the ability to map current and historical patient records and link them to new types of medical information. The teams will harness the explosion of valuable, yet untapped health care data that is emerging due to breakthroughs in genomics, proteomics and molecular modeling, and the digitization of

patient records.

"Our collaboration with IBM is focused on advancing the Mayo Clinic mission in the areas of patient care and research," said Denis Cortese, M.D., president and chief executive officer, Mayo Clinic. "We are at a point with standards in technology and new genomic based analytic techniques where we can achieve more in the next 10 years than we've achieved in the last 100, and we see in IBM a partner with a very unique capacity to deliver expertise and innovation."

As a first step, IBM and Mayo Clinic have integrated 4.4 million patient records that were in non-integrated formats, into a unified system based on a standard technology platform that incorporates robust security and privacy features. This will allow physicians and researchers access to a comprehensive set of records that can be analyzed with the security and privacy needed to protect patient confidentiality and meet government standards.

"Our partnership with Mayo Clinic is deeply important to IBM. It exemplifies our core value of 'innovation that matters' -- not only advancing the frontiers of computing, but also changing the future of health care delivery, and of the health care industry," said Samuel J. Palmisano, chairman and chief executive officer of IBM. "There is no industry where the potential for reinvention is more exciting, or where the impact on society will be greater, than medicine and life sciences. And Mayo Clinic -- an innovator and leader in both medical research and its application -- is poised to take that transformation to an entirely different level."

Standard Technology Platform for Individualized Patient Care

IBM and Mayo Clinic will each make significant investments in people and technology in joint projects, with the aim of advancing a standard

open technology platform for use in areas such as medicine, life sciences, and pharmaceutical research.

The focus is to create a standard way of integrating patient records for the health care industry and to extend the types of data that can be analyzed into an integrated repository. The next step is to provide the ability to mine patient data in new ways and to compare that data to data of other patients with similar disease characteristics and genomic makeup. In this way, learning from many cases is applied to the benefit of the individual patient.

For example, by understanding the proteins inside the human body, it is possible to more accurately prescribe drugs to combat illness. And, if individual data can be compared to data from previous cases, it is possible to prescribe proven treatments for that patient's exact conditions, replacing the protocol-driven treatment plans of today.

"Wouldn't it be marvelous if a doctor knew not just the exact location of the patient's cancer but its gene characteristics and the outcomes of therapy in the last 500 patients with cancer in that identical location and with those identical genetic characteristics?" said Hugh Smith, M.D., vice president Mayo Clinic and chair of the board of governors Mayo Clinic Rochester. "To do this, there needs to be a consistent way to link these kinds of data, not just in a single hospital, but regionally, nationally and globally. Working with IBM scientists and engineers, these are the breakthroughs we are driving toward."

Projects in Deep Computing, Data Analysis

IBM will apply its industry leading data management capabilities to the collaboration, along with its deep computing expertise - which includes the application of massive computing power to solve complex problems. New projects include:

-- MODELING DISEASE (Deep Computing): Mayo Clinic will tap into IBM's deep computing capability to advance its work in genomic and proteomic research and molecular modeling. The application of IBM capabilities, including Blue Gene supercomputing technology, can accelerate the large scale mathematical modeling work required to better understand gene and protein structures and their interactions, providing the ability to identify disease causes and prevention. This same compute capability can be applied to the modeling of the molecular structure of viruses to better understand their weaknesses and develop vaccines and treatments against them.

-- HARNESSING PATIENT DATA (Biomedical Informatics): IBM and Mayo Clinic will focus on integrating genomic and proteomic data with clinical records and public databases for use by physicians, with a critical focus on effectively utilizing the wealth of information contained in the unstructured text of doctor's transcribed notes. (This is phase two of the original collaboration between IBM and Mayo Clinic that kicked off in 2001). This effort -- based on Mayo Clinic and IBM Research analysis techniques -- aims to mine the massive amounts of text and automatically make sense of it in the same way a human would do, sifting through millions of records for specific patient information, disease characteristics and more. Such technology will enable physicians to suggest the most effective treatments given an individuals genomic make-up and history.

-- CHANGING THE PRACTICE OF MEDICINE (Individualized Patient Care): These projects aim to help Mayo Clinic in their mission to enhance the diagnostic and therapeutic effectiveness of the patient and the physician interaction, using data mining tools to provide customized information for each patient to his or her practicing physician 'on demand'. This could allow doctors to immediately access information related to the specific ailment their patient has, including research, clinical outcomes and response to therapy in other patients with the same

conditions. This could lead to more personalized and effective diagnosis and treatment options for each patient.

Focus on Data Protection, Security

Underlying each project in the IBM and Mayo Clinic collaboration is a strong focus on protecting patient confidentiality through advanced data protection and security built in to each of the projects, including strict controls to ensure only those with approved access can get to the data and only from specific locations, and the ability to trace and audit who accesses what data and how it is used.

The original press release can be found here.