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Researchers: Databases Still Beat Google's MapReduce

Computerworld (04/13/09) Lai, Eric

Parallel SQL databases perform up to 6.5 times faster than Google's MapReduce data-crunching technology, concludes a new research paper by Microsoft technical fellow David DeWitt and Vertica Systems chief technology officer Michael Stonebraker. The paper, "A Comparison of Approaches to Large-Scale Data Analysis," will be published by ACM in the June 29-July 2 issue of the SIGMOD Record. Google developed MapReduce to index the World Wide Web on its network of low-end PC servers, and as of January 2008 had used MapReduce to process 20 petabytes of data a day. Recent in-house tests, published in November, show that Google used MapReduce running on 1,000 servers to process 1TB of data in only 68 seconds. MapReduce and Hadoop, an open source version of the technology, have gained wide industry support. However, DeWitt and Stonebraker have argued that MapReduce lacks many important features available in databases, and was generally a "major step backward." Their paper is expected to create controversy over the technical merits of each system. DeWitt and Stonebraker tested two 100-node parallel, "shared-nothing" database clusters against a similarly configured MapReduce cluster of the same size. The researchers found that databases were significantly faster and required less code to implement each task, though databases did take longer to tune and load the data. The researchers also note that MapReduce requires developers to write features or perform tasks manually that can be done automatically by most SQL databases.

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ACM, IEEE-CS Honor Innovative Processor Architect Who Bridged the Industry-Academic Divide

AScribe Newswire (04/14/09)

ACM and the IEEE Computer Society will award the Eckert-Mauchly Award to Intel's Joel Emer for his pioneering contributions to performance analysis, modeling methodologies, and design innovations in microprocessors. Emer developed quantitative methods, including measuring real machines, analytical modeling, and simulation techniques, which are widely used to evaluate the performance of complex computer processors. The Eckert-Mauchly Award, considered the most prestigious award in the computer architecture community, will be presented to Emer at the International Symposium on Computer Architecture, which takes place June 20-24 in Austin, Texas. Emer's major contributions include original analysis and novel architecture research for several VAX and Alpha processors developed by Digital Equipment Corp. and Compaq Computer Corp. Emer's revolutionary approach to performance modeling and evaluation techniques resulted in better quality and more applicable research results. As an industry researcher, Emer worked with university researchers on simultaneous multithreading, which uses a single instance of processor hardware to execute multiple programs simultaneously and has been used in the Intel Pentium 4 processor and the Intel Core i7 processor. Emer also made significant contributions in areas ranging from pipeline organization and vector processing to caches and prediction.

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Q&A: Turing Award Winner Barbara Liskov

CNet (04/10/09) Lomas, Natasha

Massachusetts Institute of Technology professor Barbara Liskov won ACM's 2008 A. M. Turing Award for lasting and major technical contributions to the computing community for her work in developing methods that ease the construction of large software systems. "The work that I did was to develop a way of putting complicated software systems into modules where each module presented to its users a relatively simple interface and then on the inside there could be a complicated implementation," Liskov says in an interview. She also developed CLU, a programming language that was not used outside of academia, but whose underlying concepts migrated into mainstream languages such as C++, Java, and C sharp. Liskov identifies two components of writing good software--comprehending the fundamental techniques that one can use and cultivating craft that has a lot to do with favoring simplicity over complexity. Liskov says her current research focus is distributed computing. She predicts that more and more of data storage is going to be transferred from personal devices to storage delivered via Internet providers fairly soon. Liskov reasons that the Internet is basically insecure, and among her recommendations for preventing data breaches is encrypting the data whenever it is placed on any sort of removable media. She says that innovations in programming languages may be fueled by the programming challenges of multicore systems, and speculates that artificial intelligence techniques may one day yield a more accurate search engine. Liskov agrees that women face obstacles in the pursuit of computing careers, including societal and cultural prejudices.

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Mobile Internet, Multimedia Features, and Map Applications Capture Already 40% of Smartphone Face Time

Helsinki University of Technology (04/14/09)

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Up to 90 percent of smartphone users say they want computer-like functions, but only about 40 percent use mobile Internet, games, multimedia, and map applications, according to a dissertation by Helsinki University of Technology doctoral candidate Hannu Verkasalo. His findings in "Handset-Based Analysis of Mobile Service Usage" are based on several surveys and in-device usage measurements of 1,260 Finnish subscribers in annual studies over two to three months. Verkasalo found that only 31 percent of smartphone users who want a mobile email feature actually use email in practice, and the gap between intent and actual use for multimedia messaging (MMS) and mobile Internet browsing was 70 percent and 72 percent, respectively. Internet browsing, MMS, and multimedia applications were desired the most. Verkasalo says that smartphone sensors could potentially be used in building adaptive user interfaces, advertising solutions based on context and behavior, interactive and real-time applications for social media, and services for predicting future movements and actions. "Due to the increasing processing power and more sophisticated sensor capabilities of today's smartphones, various kinds of next generation mobile and Web applications can be built that are context sensitive, capable of learning and real time by nature," he says.

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The Stranger Side of CHI 2009

Technology Review (04/13/09) Grifantini, Kristina

ACM's Computer-Human Interaction (CHI) 2009 conference spotlighted many new inventions and concepts, some of which were decidedly unusual. A wearable system that tracks eye movements to facilitate computer control was showcased by a team of researchers from ETH Zurich. The method involves electrooculography, which measures fluctuations in the eye's electric potential field and enables the accurate calculation of horizontal and vertical movements in conjunction with electrodes placed above, below, and to either side of the eyes. A prototype robot equipped with wheels, arms, and space for a cell phone to dock and function as a face was demonstrated by a team from Canada's Simon Fraser University. A group from Keio University in Japan highlighted turtle-shaped clocks that sync when they touch to display related photos. The researchers say such devices can be used to trigger "collective memory" as well as produce visual correlations between users by understanding their relationships and by analyzing tags affixed to photos. Meanwhile, a team from NTT Cyber Solutions in Japan modified a computer mouse and trackball to change temperature in response to being rolled over different things on a computer screen and tagged objects with temperature data. Another unusual innovation at CHI 2009 was a Massachusetts Institute of Technology prototype of a double-headed matchstick outfitted with a minuscule camera, microphone, and projector. It is designed to record images and sounds in response to being ignited at one end, and play back the recording when it is lit at the other end.

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Internet of Things Plays With Hand of ACEs

ICT Results (04/13/09)

European researchers working on the Cascadas project have developed a new software abstraction called Autonomic Communication Elements (ACEs). The researchers say that ACEs will enable ecosystems for service networks and make possible the "Internet of things," in which people, devices, telecoms, and data networks are integrated into a single network. The Cascadas project was launched with the purpose of investigating autonomies as an emerging technology for creating innovative and flexible service

networks ecosystems for telecommunications and the Internet, says Cascadas coordinator Antonio Manzalini. "Autonomic technology is taking inspiration from the biological characteristics of the human autonomic nervous systems," Manzalini says. "An autonomic system is capable of making decisions on its own. Using high-level policies, it constantly checks and optimizes its status and it automatically adapts to changing conditions, with limited human intervention." ACEs are distributed, lightweight software components capable of self-configuration, self-organization, and self-healing that combine numerous elements to create a service for any type of device or network. For example, ACEs on a mobile phone could self-organize with ACEs on a data network. The ACE components link with the preferred wireless network to aggregate and deliver the service to the user. Manzalini says that ACE-equipped networks and devices can constantly adapt and change to create endless variety and diversity. Cascadas has developed an open source framework and toolkit for ACE ecosystems and ported the toolkit to several application environments, including Google's Android operating system.

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Putting Twitter's World to Use

New York Times (04/14/09) P. B1; Miller, Claire Cain

Researchers have discovered that the flood of short messages or "tweets" that flow from the Twitter online social network can be mined to gain insights into emerging public sentiment. Companies can learn what their customers are thinking about when they use products by studying Twitter, and apply that knowledge to targeted marketing efforts. Some believe that pairing sensors with the social network could be utilized to transmit home security alerts or keep doctors apprised of a patient's medical readings. The technology also could be used to aid medical researchers by providing real-time data streams. Futurist Paul Saffo describes Twitter as an inversion of the group concept, in that the group self-organizes around the messages rather than the messenger creating the group he or she desires. Some developers are creating tools to help companies track public interest, and a Microsoft researcher is attempting to devise a method to identify which experts are most influential on given topics by automatically studying the content of their tweets and who is in their Twitter network. Microsoft could exploit this information to determine which Twitter users it should contact to generate buzz about a new product. "Twitter lets people know what's going on about things they care about instantly, as it happens," says Twitter CEO Evan Williams. "In the best cases, Twitter makes people smarter and faster and more efficient." However, more people will need to use Twitter to maximize its value as a research tool.

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Our Ears May Have Built-In Passwords

New Scientist (04/13/09) Marks, Paul

University of Southampton researchers are investigating a possible biometric security technique that uses the subtle noises produced by the human ear to verify the user. The human ear makes noises, called otoacoustic emissions (OAEs), which are only detectable by supersensitive microphones. OAEs could be unique to each individual, potentially leading to a biometric security technique that call centers and telephone-banking operations could use to identify callers. OAEs emanate from within the spiral-shaped cochlea in the inner ear. Southampton engineer Stephen Beeby says OAEs can be provoked when a series of clicks are played into the ear. The resulting sounds comprise signals between 0 and 5 kilohertz and vary in amplitude. Click tests are used

to check newborn babies for signs of hearing difficulties. The power and frequency distribution of the OAEs provoked by a specific series of clicks are highly distinctive between people due to the internal shape of each person's ear. Beeby is researching whether OAE patterns can be used like iris scans or fingerprints. In the controlled conditions of a lab, everyone's OAE emissions are unique, but whether this is a practical security measure in the real world is still undetermined.

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Implementation Plan for Voting System Requirements Set

Government Computer News (04/07/09) Jackson, William

The U.S. Election Assistance Commission (EAC) is expected to complete work on a revised set of voluntary guidelines for voting systems later this year. A total rewrite of the guidelines is expected to be finished in 2011. EAC's Voluntary Voting System Guidelines establish a set of standards that states can use to certify voting equipment. Although the guidelines are voluntary, most states require that their voting systems are in compliance with some version of them. The EAC's Technical Guidelines Development Committee and the National Institute of Standards and Technology (NIST) have been working on a major rewrite of the guidelines, called the Next Iteration, for the past year. The NIST also is developing a series of standard tests for the Next Iteration guidelines that would replace current proprietary tests currently used by accredited laboratories to test voting equipment. The guidelines and the tests are intended to address concerns about the reliability and security of voting systems, particularly electronic-voting systems, which critics say are vulnerable to security flaws. Some of the major issues addressed by the Next Iteration include developing a threat assessment of voting systems, possibly developing requirements for a common interface language for peripheral voting equipment such as e-pollbooks, and addressing recommendations such as software independence in voting equipment and open-ended vulnerability testing.

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A Google Whiz Searches for His Place on Earth

New York Times (04/12/09) P. 1; Richtel, Matt

Visa and immigration rules are creating conflicts with immigrants who are having a sizable impact on the U.S. technology industry. One such immigrant is Sanjay G. Mavinkurve, a Google engineer who helped establish the platform for Facebook while a student at Harvard, but resides in Canada because his wife could not get a visa to work there. Immigration scholar Vivek Wadhwa says the founders of many Silicon Valley companies and technology giants came from overseas. Technology executives argue that restrictive immigration measures will discourage talented foreigners and entrepreneurs from emigrating, and will greatly contribute to the country's waning economic power. The United States currently allows no more than 65,000 temporary H-1B work visas for skilled workers, and there has been a widening chasm between the number of H-1Bs sought and those granted since 2004. "The thing distinctive about this [immigrant] generation, and I think unprecedented, is that they are coming with the highest level of skills in the leading industries," says AnnaLee Saxenian of the University of California, Berkeley. Foreigners also can drive innovation by expanding understanding of overseas consumers. Working for companies based in the United States but living elsewhere, as Mavinkurve does, can put a strain on foreign workers' productivity and enthusiasm.

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UCL Study: Natural 'Barcodes' Help Us Recognise Faces

UCL News (04/04/09)

Humans recognize faces by organizing facial features such as eyebrows, eyes, and lips into simple black and white lines of information, say Dr. Steven Dakin of the University College London (UCL) Institute of Ophthalmology and professor Roger Watt from the University of Stirling. The researchers manipulated the images of celebrities and found that their facial features could be rendered in horizontal stripes of information that are similar to the barcodes used on commercial products. Dakin and Watt also studied other natural images, such as flowers and landscapes, but found that faces are unique in conveying useful information this way. They say the barcode pattern is recognized efficiently by the visual parts of the brain, is easy to locate in complex scenes, and may be resistant to changes in the overall appearance of the face. Their research has the potential to improve face recognition software and CCTV cameras. "To improve face recognition software, we need to look towards biology and see how we have solved the problem," Dakin says. "If we are looking for barcode-like images to tell us that 'this is a face,' then software could be developed to mimic this skill."

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Robot Body Language Affects Human Responses

The Tartan (04/06/09) Chin, Courtney

Carnegie Mellon University Human-Computer Interaction Institute Ph.D. candidate Bilge Mutlu is researching ways in which humans can better interact with robots. Mutlu is working with Japan's Advanced Telecommunications Research Institute International (ATR) on designing social mechanisms for robots and sharing information. He says "the primary goal is to establish basic communication capabilities of robots, which also needs some degree of understanding of humans about how they perceive anthropomorphized robots." He has conducted several experiments that focus on human perceptiveness toward a robot and found that the more human-like the robots act, the more social and cognitive benefits people receive. "Robots have to serve as a central interface for other forms of technology around us and offer us a social interaction paradigm to interact with them," Mutlu says. To determine how humans can be more attentive to robots, Mutlu and ATR's Takayuki Kanda and Hiroshi Ishiguro performed several tests in which robots exhibited human idiosyncrasies. In one test, a robot read a story to several subjects, who were tested for the number of details they remembered from the story. The more the robot looked at the subject, the more details the subjects remembered. A second test challenged a subject to determine which object a robot selected, though the robot did not physically move. The subject could ask the robot questions to determine which object it selected, and the researchers found that when the robot subtly glanced at the object, the subjects were able to correctly guess which object after fewer questions even though most subjects said they did not notice the eye glances. Mutlu believes that his research will help identify complex social behaviors in humans and design those behaviors for robots.

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Engineering Professor Explores Underwater Wireless Communications

Northeastern University News (04/01/09) Salk, Susan

Northeastern University professor Milica Stojanovic says the discovery of the Titanic in 1985 underscored the need for underwater wireless

communications technology. "When the Titanic sank, people knew approximately where it went down, but it wasn't until Woods Hole designed that small robotic vehicle that we knew the truth," Stojanovic says. "When that robot was sent down, it was attached to a long cable connecting it to a surface ship. The cables are very expensive and heavy, and they limit the movement of the robot." She says there are applications that would benefit from the ability to communicate underwater without cables, including pollution control, climate recoding, ocean monitoring for natural disturbances, and the detection of objects on the ocean floor. Stojanovic says that communicating through water is difficult, as water slows down the signal propagation and creates background noises and echoes, all of which she is working to solve. Stojanovic is trying to create clearer signals through "equalization," as well as developing underwater networks that mimic the communication networks on land.

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