

IBM Builds on 50 Years of Spinning Disk Storage

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IBM, that oh-so-straight-laced bastion of research, development and commercial success, is kicking back a little to celebrate an anniversary this month and reflect upon how far technology has come since the days of refrigerator-sized computers, Elvis and "I Like Ike."

September 2006 marks the 50th anniversary of the introduction of the world's first commercial hard drive - the 305 RAMAC Computer, with its 350 Disk Storage Unit - that was designed and built right here in what would eventually become Silicon Valley. The Disk Storage Unit was introduced on Sept. 4, 1956, and the 305 RAMAC Computer was introduced on Sept. 13, 1956.

That first computing unit had a total memory storage capacity of a whopping 5MB on 50 24-inch platters.

"The digital photograph of Mona Lisa here in the slide show presentation is bigger than that!" joked IBM vice president of storage Barry Rudolph, who addressed a group of analysts and journalists at a half-day briefing at the company's Almaden Research Center, located in the foothills south of San Jose.

By comparison, the IBM System Storage DS8000 Turbo, introduced in August, can store up to 320 terabytes of information - the equivalent of all the images held in the Guggenheim, the Louvre and the Metropolitan Museum of Art, and more.

Another example of how things have changed: In 1956, the 350 Disk Storage Unit could hold the digital equivalent of the collected works of Shakespeare, while today's DS8000 could hold more than 76 million copies of Shakespeare's works.

IBM goes after EMC with "turbo" storage servers. [Click here to read more.](#)

IBM, based in Armonk, N.Y., used the occasion to look both backward and forward at the state of hard disk drives and storage technology.

"It's fun to go back and see how the first spinning disk was put together, a half-century ago," Rudolph said. "Here's a film proof that we've come a long way: The first magnetic slurry coating on the first disk drive was poured onto the spinning disk from a Dixie cup."

Everybody laughed as the scratchy black-and-white film showed exactly what he described: It looked like a chocolate shake being poured onto a slow-moving, rotating disk about the size of a personal pizza.

"This would leave a very uniform coating on the disk but also left a brown streak across the waist of the engineers' lab coats from the excess

slurry," Rudolph said. "That's how they could tell which engineers were working on the 305."

That was then. Now some people are predicting that as soon as 12 to 18 months from now, we'll see 1TB desktops coming into the market.

IBM infuses new technology into storage

IBM certainly plans to be out front of the current explosion in storage capacity. What it intends to do - and, in fact, is now doing - is to integrate a measure of new technology from other parts of the company into the storage research projects now based at Almaden and its sister facilities in Haifa, Israel, and Geneva.

For example, IBM has been among those companies at the forefront of "autonomic," or self-healing, computing for several years. Autonomic computing is a form of artificial intelligence that allows a computing system to locate and identify programming and other system errors and make corrections without the help of a human administrator.

Some of the key projects going on at the Almaden location that are expected to produce commercial products soon include:

Storage-Class Memory: A new approach to creating faster storage, IBM's SCM (Storage-Class Memory) research project is focused on creating low-cost, high-performance, high-reliability solid-state random-access storage that could compete with or replace disk drives and flash memory. Applications of this technology will range from pervasive mobile devices to storage controllers and would possibly include rapid-booting PCs, which could start up in a second or two after power on, not minutes like today's current systems. Microsoft and Intel are also working on this for the Vista release early in 2007.

Intelligent Data Storage: Future storage systems will be more than repositories for data. They will also include a wide variety of modern data management and analytic features that will permit more efficient management and utilization of data, which will allow storage systems to help companies with fraud detection and identity recognition.

Storage Systems that Compute: Smart movement of computing power is enabled by LPAR (logical partition) technology, which allows virtual servers to be created on the storage server. This can accelerate applications by harnessing storage server resources.

Advances in Storage Management: Where Virtualization and Autonomic Computing Intersect: Managing the proliferation of data is becoming a huge and expensive headache. IBM bases its products on open standards that use autonomic policy-based protocols to manage storage efficiently and economically from a single point of control, the company said.

Hot-button issues

At this week's briefing, IBM scientists described advancements that have enabled tape to remain the most cost-effective method for storing massive amounts of business and personal data.

"This might be Year 50 for disk drives, but it's Year 55 for tape, and we continue to see its value for years to come," Rudolph said. "We are proud of our broad portfolio at IBM, and tape storage will certainly continue to be a big part of what we do."

IBM scientist Spike Naraya offered a detailed explanation of how data densities on tape continue to be improved by leaps and bounds each year.

"Tape data capacities have improved 500,000-fold since 1952, when the best tape available held 100 bpi - bits per square inch - ," Naraya said.

"Now we can store the entire Library of Congress on one cassette."

Other data storage hot buttons that IBM continues to research - besides disk drives and tape - include flash memory, power and cooling, virtualization, long-term (100-year) storage, and storage management software.

IBM has about 500 people working on these projects at Almaden.

Trends IBM said it sees in storage include: Treatment of storage technology as a discipline Tiering and improved scalability Automation Virtualization Continuous accessibility Consolidation of systems at the enterprise level

Yes, we've come a long way from pouring out a chocolate shake over a spinning pizza and calling it a disk drive.

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