

# Magnetic tape gets boost

By R. Colin Johnson

IBM Research and Fujifilm set a new world record in magnetic tape density—nearly 30G bits per square inch—which they say will keep magnetic tape alive for another decade.

Magnetic tape might seem old-fashioned, but after a long career it still is a billion-dollar market because it offers higher storage densities, costs less and has a greener footprint, according to IBM Research (Zurich).

“Magnetic tape, which is the greenest storage technology available today, is alive and will continue to be a cost-effective alternative to other storage technologies for at least another decade,” said IBM Fellow Evangelos Eleftheriou in a video (<http://www.youtube.com/watch?v=z2w-pzMjpx0>). “Achieving 29.6G bits per square inch means that a single cartridge 10 by 10 by 2 centimeters in size will hold up to 35 terabytes of uncompressed data.”

The low, one-penny-per-gigabyte price of IBM and Fujifilm’s latest tape formulation will likely keep magnetic tape cost-effective until denser optical disks are developed. Today’s densest optical disks are Blu-ray, which stores just 50GB. Storing the equivalent of one 4-inch tape cartridge holding 35TB (35,000GB) would require 700 Blu-ray disks at about 30 cents per gigabyte.

Alternately, storing that much data on hard disk drives, which hold about a terabyte each, would require 35 drives at about 10 cents per gigabyte. Cloud computers and data centers mostly use HDDs

today because they offer instant access to any datum, but HDDs do not offer tape’s removable media for archiving multiple backup sets. Tape also has a “green” advantage over HDDs, especially for data that is seldom accessed, such as historic archives and documents maintained for regulatory compliance.

“If you take a tape-based library and compare it to a similar HDD-based library, it typically takes 200 times more power than the tape system and, similarly, has a much larger carbon footprint,” said Mark Lantz, an IBM Research staff member. “And the reason for that is that tape is a removable media where one or two tape drives can serve as a library for thousands of tapes, and all of the tapes that are not being accessed do not consume any power. Whereas in disk-based systems, the disks are for reliability reasons always spinning and consuming power.”

IBM Research (Almaden, Calif.) designed a new reduced-friction head assembly for the ultra-narrow, 200-nanometer-wide GMR (giant magneto-resistive) head. The tape formulation used perpendicularly oriented barium ferrite (BaFe) “nanocubic” particles. Track widths were reduced 25 times to under 450 nanometers wide using 24-nanometer accuracy in track positioning.

IBM aims to further increase the density of its tape formulation to 100G bits per square inch in anticipation of massive storage needs for recorded video from the millions of surveillance cameras now recording traffic patterns, the food supply chain, health records and financial transactions. 