EXPLOSION

Scientific Minds In Singapore: Part 2

When you've got to go, you can continue watching the movie

The Shark with a different bite: Sharks in the sea bite. This "Shark" also has bite, but its power is in data storage. Mr Patrick Khoo, showing us the IBM Enterprise Storage System, says that its project name when under development has stuck with industry insiders.

PATRICK KHOO BENG TECK puts great store on the network storage of data. This technology is new and exciting. His mission at A*STAR's Data Storage Institute (DSI) is to develop it, propagate it and get it into your hands. DSI, he says, already has demonstration models of a network storage-enabled consumer product. *What is it?*

Mr Khoo is DSI's Program Manager (Modular Connected Storage Architecture Track) in the Network Storage Technology Division. He draws an analogy with inflight entertainment: "If you fly Economy class on Singapore Airlines, for example, you have a choice of movies to watch. But the movies are broadcast at fixed times. You have to keep to a movie's schedule, or begin watching after it has started.

"If you are in First or Business class, you can choose the movie you want from what's onboard, and start watching it from the beginning whenever you want. You are not tied to any broadcast schedule. You are on a 'movies on demand' system. These systems are still very complex. That is why it is not yet in Economy, which seats many more people."

But similar "movies on demand" technology is coming to your home, except that it will be more sophisticated than in airliners now. In an aeroplane, the system is wired and only gives playback. At home, you will want it to be wireless and with recording capability. "We have demo models of DVRs (digital video recorders) that are network-enabled," says Mr Khoo.

"With those machines, you can have a wireless portable screen, walk around the house and continue watching a movie. You need to go to the toilet? No problem, just take the screen with you! You can also have more than one screen and different members of your family can watch different movies at the same time."

DSI's researchers have got the audio up to speed on their network-enabled DVR prototypes. The video is at VCD quality. The research engineers are working towards DVD quality. "That's not far off," says Mr Khoo. "Similarly, one day soon, you will be able to shoot pictures with your digital camera and simultaneously store them wirelessly on a DVD."

The connected world is moving towards network-enabled storage. Both industry and consumers need more and more storage space. "If at home you are feeling that you are using up your computer's memory at a fast rate, imagine what it is like in a business operation," says Mr Khoo. "So we have to develop new technology to give greater capacity with more reliability and faster access."

DSI started going into network storage development three years ago. Now hard disks are connected to computers by relatively short cables. With network technology, you can connect over longer distances and have much more capacity for storage and simultaneous access by a number of users.

DSI is also developing a network communication protocol that is much more efficient and much cheaper than current technology. It is called Hyper SCSI (small computer system interface). It connects to a hard disk drive via an Ethernet line. Ethernet is the most widely used local area technology, the so-called campus network. "This project demonstrates that we have the capabilities to design a system from top to bottom," says Mr Khoo.

"We have a strong team of both networking and storage specialists. So we have been integrating the two technologies. Our people have learnt that it is possible for them to change their fields, and take up new roles and new challenges. We also learnt that we must embrace multidisciplinary situations. I never thought that I would end up in research and development!"

His background is in computer networking. He studied Computer Science at Western Michigan University in Kalamazoo. His first job was network management in that American university. A tip-off from home in the mid-1990s brought him back: DSI was looking for someone to help build a networking system. He joined DSI as a Network Specialist.

Mr Khoo says that the ability to communicate your expertise in layman terms is very important in both network

management (talking to users) and R&D (to fellow researchers from other disciplines). As Program Manager, he spends most of his time promoting the new technology and looking for partners in industry. He does a lot of training in programmes run jointly with the Economic Development Board. "We need to upgrade the skills of professionals," he says. "Our overall objective is to spur economic growth in Singapore. Network storage is still in its infancy here as in other parts of the world. We are introducing it to local and overseas companies.

"We show the locals how they can integrate network storage into their product lines and become more competitive. For example, a number of local companies produce the handy thumbdrive external storage devices for desktops and laptops. We talk to those manufacturers about making their devices network-enabled. Today's DVRs don't have network capability. Make them network-enabled, we say. To the MNCs, we say that Singapore has the capabilities to support them even in something as advanced as network storage."

Does so much marketing talk come easily to a scientist? Mr Khoo laughs and says: "I'm lucky I'm not the shy-shy type and can talk a lot. In school I was called Motor Mouth. But you don't have to be born with high communication skills. You can pick them up by mixing with people and keeping an open mind."

Does he still have time for research? "Most of the R&D is done by the engineers," he says, "I go to the lab to check progress and give feedback, bringing certain perspectives from my background and also from the market. We exchange views to get better solutions. I read technical reviews, surveys and evaluations, and also write some papers."

The 29-year-old is married to Ms Eileen Tan, an editor of Nanyang Technological University in-house publications. His hobby is photography, mainly landscapes. He would like to also do portraits which, he says, require good interaction with the subjects. "My objective in photography is to preserve an image, keeping it for the future. I have also switched to a digital camera." So says a true data storage professional who must be thinking: *Quick, get it all network-enabled!*