

## TYMES OF TYMSHARE

People chuckle at some of life's coincidences. There is, for example, a fellow named La Roy Tymes working at Tymshare. It turns out Tymshare was not named after Tymes, although he was one of the service company's early employees. It also turns out that Tymes is the designer of the company's communications network, Tymnet. And, at the danger of heaping improbabilities upon coincidences, there is nothing in his background to indicate that at the age of 26, in 1968, he would sit down and conceive Tymnet and then go on to plan and implement the industry's first operational virtual circuit, packet transmission network — and today the nation's largest public packet network.

Tymes joined the company when it had three SDS 940 computers. "They occasionally kept one on the air for several hours at a time," he now says wryly, noting that they had yet to have one run an entire day without some sort of calamity.

A college dropout, in 1963 Tymes left Michigan and became a computer operator at the Lawrence Radiation Labs in Livermore, Calif. While there, he received his bachelor's degree in math from California State Univ. in Hayward, and became a programmer of numerically controlled machines. He went on to receive his masters in math and joined two-year-old Tymshare Inc., now based in Cupertino, Calif.

"Back then, Tymnet existed only in my head," he says. "And I started the network project under a slim budget and stringent deadlines." Tymes comprised the company's communications R&D department, wrote all the network's original code, and almost singlehandedly created the first virtual circuit data network.

"I want, first of all, to correct a common error in terminology," he says. "While Tymnet is a packet transmission network, it is not a packet switched network." With packet switching technology, he explains, packets are of a fixed length and contain data from a single customer; space within that packet length cannot be shared by another message originator, and that can mean more overhead.



LA ROY TYMES—"To me, it all looks very much the same."

By contrast, Tymnet's packets are of a variable length and can contain data from numerous users. Further, logical records associated with each user may also vary in length. "This approach was chosen because of the emphasis on low-speed interactive terminals and because we felt that computer costs were more likely to decline than line costs. Looking back, it's clear this was a good decision."

At first, of course, Tymshare had no network, only SDS 940s with direct dial-up. It got into remote access by doing time division multiplexing on the old Data Machines 620/i minicomputer. This extended its customer base into areas where there was no nearby computer center.

"I wanted to eliminate the need for the 940's attendant customer terminal equipment (CTE) gear, which was then needed to serialize and deserialize characters," explains Tymes. "So one day my colleague Norm Hardy and I devised a scheme on the blackboard in which the 620/i's were to act as concentrators, first for serializing and deserializing characters, and then to pack characters into records so the data could be written directly into the memory of the SDS 940."

He convinced Tymshare cofounder and president Tom O'Rourke of the scheme's feasibility, and the company ordered three more 940s, but without the CTE gear. "This was my first taste of not only implementing a concept and making it work, but to work under the gun and produce on schedule," says Tymes. "We were operating on a financial shoestring in 1969, and if my scheme didn't work, the 940s without the CTE gear would be worthless." Of course, it did work.

In time the 620/i's were made to recognize terminal characteristics, such as baud rates, when a user first accessed the network. This allowed Tymshare to serve terminals running at 110 baud through 300 on the same telephone rotary. "I'm not sure, but I think we were the first to do that," he says. "I think General Electric had tried to do that earlier but declared it impossible."

In 1970 Tymshare created the first network in which particular ports on each 620/i were mapped to particular ports on corresponding 940s. The network supervisor, running on the 940s, was developed. And the nodes, or communications processors, evolved from the Varian 620/i to the V72 and V77 through Interdata 732s to something now called Tymnet Engines, designed and built in-house. Tymshare's common carrier subsidiary, Tymnet Inc., began offering carrier services in April 1977.

Tymnet Engines, nodes in the network now called Tymnet II, are installed at the rate of three a week. More than 500 nodes are expected to be in by the end of this year.

For a young man from a rural community in Michigan, Tymes has come a long way. "Before I came to Tymshare I was primarily a FORTRAN programmer," he says. "I went from there to systems programming and to microcode and from there to hardware. Now I'm designing my own integrated circuits." And it is this freewheeling spirit, combined with an intellectual curiosity, that helps explain his rapid progression across disciplines. He notes that the computer industry is rigidly divided between people who write programs and those who design hardware. He calls this an "invisible bridge" that neither side crosses.

But Tymes sees the hardware side as nothing more than some silicon and copper and a few other materials that must somehow be organized to perform a

