

Excerpt from

Farewell Millennium Address by the Chairman of The International Middleware Association (IMWA):

Middleware: Getting from Where We Are to Where We're Going

by Bob Scher

The Fundamental Meaning of Software and Hardware

For the moment, let us regard software as giving effective directions that allow users to accomplish tasks in the most comprehensive sense of that word. Consider hardware the physical domain which software makes use of, subject naturally to the constraints of physics, chemistry, biology and any relevant laws and forces, known or unknown. Then both software and hardware should eventually take forms undreamed of now. The primary technology in the world at which we are eventually arriving, I believe, is going to be quantum based, where quanta via quantumware will literally be performing the material labors that bits, bytes, chips, wires, air, and so on perform now.

If hardware is the physical reality and software the conceptual, directional reality, then what is in the middle? The technological answer is "middleware." But the real answer is that it's in the middle, in the gap, where the need for relationships enforces our activity. Distributed computing is, at its core, a system of relationships between human beings. We are in the middle. And only then comes middleware, the technology that can fill the gap. The tasks that computers perform are, after all, extensions of our own physical and mental faculties put to use ultimately for the aims of people.

The next millennium will further expand the gap represented by middleware (or whatever it may eventually be called) and elevate it to the highest status, because computing may actually depend on how we relate and how everything is related. Whatever new possibilities we may discern in the mode of relationships may require new notions and even new thoughts. It is relatively easy to define hardware and software. But middleware is not so easy to pinpoint or explain. It has less connection with the visible surface. It is in the expanding, included middle and it is overwhelmingly rich. Ultimately it is about humans, not about machines.

Decades or even centuries from now, we will come into a world where finer and finer subsections of applications, themselves sub-sections, will interact within smaller and smaller periods of time, until time itself may be unmeasurable by our current methods. So if I say anything more, I will obviously disappear.

An infallible way to attract a surprising future is to predict it.