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If we accept these arguments, where does this leave us? In summing up his assessment of the prospects for software engineering, Brooks suggests it's unlikely that there will be any "inventions that will do for software productivity, reliability, and simplicity what electronics, transistors, and large-scale integration did for computer hardware." In other words, "building software will always be hard. There is inherently no silver bullet"—we've run into a brick wall.

Scaling the wall

Faced with a situation like this, our greatest challenge in advancing any discipline is always to break free from the shackles of our past. In this regard, David Harel's advice provides a signpost to where software engineering is and should be heading: "It is our duty to forge ahead to turn systems modeling into a predominantly visual and graphical process."³

What Brooks calls the "essence" of software entities has little to do with the conceptual view of systems. Systems are built out of a network of interacting components (some of which might be systems in their own right). Such a view implies all systems might have designs that can be embedded in space. It doesn't matter whether we're talking about systems we intend to implement in software, hardware systems, other physical systems, business systems, or any other conceptual systems. In all cases, the system components encapsulate and exhibit individual behavior, and they interact by passing control and data to other components. This results in the overall system exhibiting integrated behavior.

An appropriate representation of this behavior can provide the ladder that lets us climb over the brick wall—to get complexity and change under control, to overcome the so-called invisibility of software, to make gains with conformity, and, as a side benefit, to detect requirements problems early. With a suitable behavioral representation, we can systematize and simplify