

resulting in strong Conceptual Integrity. As an exemplar of embedded system software architecture, the A-7E OFP certainly belongs in our gallery.

Another architecture that we would want to include in our gallery is the software architecture for the Lucent 5ESS telephone switch (Carney et al. 1985). The 5ESS has been a global commercial success, providing core telephone network switching for networks in countries around the world. It has set the standard for performance and availability, with each unit capable of handling over one million call connections per hour with less than 10 seconds of unplanned downtime per year (Alcatel-Lucent 1999). The architecture's unifying concepts, such as the "half call model" for managing telephone connections, have become standard patterns in the domains of telephony and network protocols (Hanmer 2001). In addition to keeping the number of call types that must be handled to $2n$, where n is the number of call protocols, the half call pattern links the operating system concept of process to the telephony concept of call type, thereby providing a simple design rule and introducing a beautiful Conceptual Integrity. A development team of up to 3,000 people has evolved and enhanced the system over the past 25 years. Based on success, persistence, and influence, the 5ESS architecture is a fine addition to our gallery.

Another system to consider for inclusion in our Gallery of Beautiful Architectures is the architecture of the World Wide Web (WWW), created by Tim Berners-Lee at CERN, and described in Bass, Clements, and Kazman (2003). The WWW has certainly been commercially successful, transforming the way that people use the Internet. The architecture has remained intact, even as new applications are created and new capabilities introduced. The overall simplicity of the architecture contributes to its Conceptual Integrity, but decisions such as using a single library for both clients and servers and creating a layered architecture to separate concerns have ensured that the integrity of the architecture remains intact. The persistence of the core WWW architecture and its ability to continue to support new extensions and features certainly qualify it for inclusion in our gallery.

Our last example is the Unix system, which exhibits conceptual integrity, is widely used, and has had great influence. The pipe and filters design is a lovely abstraction that permits rapid construction of new applications.

WHAT'S AN ARCHITECT?

A stranger is traveling down a road on a hot summer day. As he progresses, he comes upon a man working by the side of the road breaking rocks.

"What are you doing?" he asks the man.

The man looks up at him. "I'm breaking rocks. What does it look like I'm doing? Now get out of my way and let me get back to it."

The stranger continues down the road and soon comes upon a second man breaking rocks in the hot sun. The man is working hard and sweating freely.