SOFTWARE TOOLS USERS GROUP

By Deborah K. Scherrer

In 1976, when the UNIX philosophy had yet to reach beyond a dozen or so universities, Brian Kernighan and P. J. Plauger, both with Bell Labs backgrounds, produced their now famous little book *Software Tools*. The original purpose of the book was to teach good programming practices through the examination of carefully written codes which were clean, efficient, easy to read, and easy to modify. As examples the authors chose pared-down versions of the UNIX utilities they had come to rely on, rewritten in a system-independent manner. The book, along with a magnetic tape containing the programs, became immediate best-sellers.

As users began to experiment with and enhance the programs, they realized that the tools offered more than simply a useful set of utility programs. Researchers, primarily at Lawrence Berkeley Laboratory, expanded the original package to include a powerful subroutine library, a UNIX-like shell, and many more of the UNIX utilities. By providing all three levels of a user interface -- command interpreter, utilities, and programming library -- the tools could offer the functionality of UNIX in conjunction with virtually any operating system. Their enhanced package was widely distributed and implemented on a diverse assortment of machines, ranging from Crays to micros.

The result has been the availability of UNIX capabilities on a large number of non-UNIX machines and, perhaps more importantly, a consistent user interface across many different systems. This consistent interface is the key not only to being able to move programs from system to system without change, but also move users between systems without costly retraining. This emphasis on making people portable, as well as their code, differentiates the Software Tools movement from most other vendor or operating-system-dependent projects.

Aside from its consistency with the UNIX interface, the tools package became so widely popular for two major reasons: first, portability - the package could be implemented on virtually any operating system. This portability was achieved by using a programming language available on most all machines and by isolating system independencies into "primitive" function calls that must be implemented separately for each different system. Second, since the source for most of the tools originated from government-funded laboratories or universities, it was public domain and users did not have to pay the high price typically charged for products built upon many, many manyears of effort.

The need for co-ordination and co-operation among implementors and users of the Tools led to the formation of the Software Tools Users Group, originating at Lawrence Berkeley Laboratory and initially funded by the Department of Energy. Since its inception in 1978, the group has become an international body performing the following functions:
* establishing and publishing standards for the primitives and utilities
* collecting and evaluating new utilities, enhancements, and variants
* holding semi-annual meetings in conjunction with the USENIX UNIX users group
* publishing a newsletter and software catalogue
* collecting and distributing information on current developments to avoid duplication of effort
* distributing tapes containing collections of utilities from different sites, both those standardized upon and those available for experimentation and evaluation

The Software Tools package represents a unique compromise between the desire for user control and the need for vendor support. The Software Tools Users Group collects and distributes new utilities and enhancements early in their development phase, thus allowing users to experiment with new ideas, incorporating valuable ones into their own projects and rejecting those that prove unportable or undesirable. Utilities and enhancements which receive popular support are eventually incorporated into the STUG standards. Thus the standards are always based on ideas tested and proven by the user community, rather than on newly-designed

products or untested concepts. And the users generally have access to the (high-level) source code, allowing for tailoring to individual needs.

On the other hand, though much of the tools source is public domain, the primitives (that is, the machine-dependent portions of the library, which form the backbone of the system interface) are often vendor developed, licensed, and supported. To handle issues of portability and implementability on different systems, STUG supports an Implementors Group consisting of representatives from industry and institutions with an interest in the future of the package. Changes and extensions are carefully evaluated by this group before vendors incorporate them into the supported primitive sets.

STUG conferences are the primary forum for exchanging new ideas and co-ordinating development of new projects. Because the meetings are held in conjunction with the USENIX conferences, advancements in the UNIX community can quickly be examined and evaluated for possible inclusion in the Tools community. The UNIX community, in turn, benefits from the discussions on portability and user interface methodology addressed by Tools researchers.

As with UNIX, the original utilities were primarily oriented toward program development. However, the Tools approach is applicable to many software projects. Among those of current interest to STUG researchers are networking, electronic mail systems between heterogeneous systems, experimental shells and high-level user interfaces, data management, word processing, and data analysis packages.

The widespread availability of the Software Tools package has given many users their first introduction to the UNIX environment. The compatibility of the package with the local operating system encourages experimentation and learning of the new "world view" without the traditional difficulties in introducing and moving to a completely new system. Many early Tools users became enamored of the UNIX environment and have subsequently moved to it. For those whose needs require they remain with non-UNIX systems, the Tools can still provide the elegance and functionality of the UNIX environment while also providing a consistent interface across systems from micros to mainframes.

For Software Tools Users Group membership and services information write: Software Tools Users Group, Inc., 1259 El Camino Real, Box 242, Menlo Park, CA 94025.

Biography:

   While a Research Computer Scientist at Lawrence Berkeley Laboratory, Deborah K. Scherrer was one of the original researchers to experiment with the software tools concept. She founded the Software Tools Users Group and served as its co-ordinator for 4 years. She is also active in the UNIX community, currently serving as Vice President of the USENIX Association and having participated on its Board of Directors since its incorporation. She is also a member of the Board of Directors of the C Users Group, participates on the UNIX Expo Advisory Board, is a Contributing Editor for *Unix/World* and a member of the Editorial Review Panel for *Unix Review*. Ms. Scherrer is currently a Computer Scientist for mt Xinu and President of Carousel MicroTools, Inc.