

Combating the millennium bug

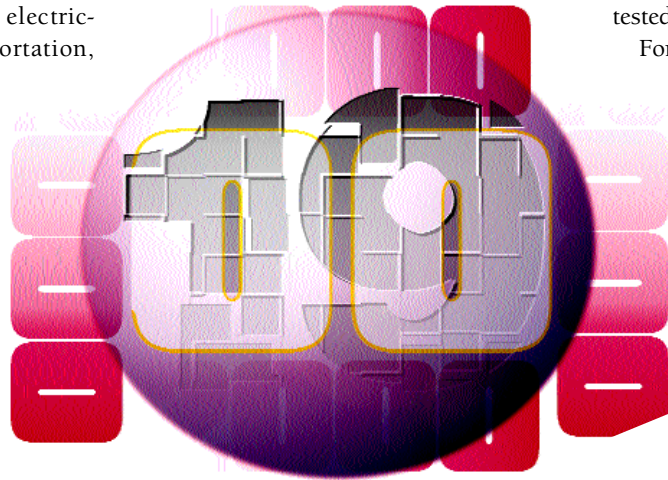
Doomsayers are having a field day. Some predict that the year 2000 glitch in computers will shut down almost everything that is run or controlled by electricity. More pragmatic forecasters say that isolated shut-downs and minor interferences may occur, but that massive disruptions of electric-power, communications, transportation, banking, and government systems are unlikely because the core computers that operate these systems will receive sufficient remedial work in good time.

The problem, briefly stated for those who may have been out of town for the last few years, is that many computer systems are programmed to use only two digits to represent the year (for example, 1998 is stored as 98), and in most instances, the digits 00 represent the year 1900. So when the year 2000 arrives, these computers will read the date as 1900, which will affect every calculation involving dates made by every program running on them. Old mainframe computer systems are the most vulnerable, particularly systems that use unique, custom programs such as those written for many of the large companies and federal organizations.

Mainframe computer systems are not the only ones afflicted by the year 2000 problem. Although Unix computers themselves do not have the Y2K bug, the software for these machines often does. Also, millions of older personal computers (PCs) still in use have a built-in Y2K bug. In general, PCs with Intel's 386 and older microprocessors will not roll over to the year 2000. In addition, some Intel 486 and Pentium microprocessor chips are not Y2K compliant. Microsoft claims that Windows 98 and NT 5.0 are or will be Y2K compliant; however, reports from independent evaluators reveal that Windows 95 and 3.1 and previous versions of NT are not fully compliant. Macintosh computers, on the other hand, can handle the year 2000 date without any problem because they do not employ the two-digit shortcut.

Even if a computer is capable of accurate

dates beyond the year 1999, commercial software applications such as spreadsheets, databases, and accounting and personal finance programs may make erroneous calculations because they substitute a two-digit designa-



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tion for the year. So to ensure that a computer system will function correctly in the year 2000, every program in the system that uses dates to make calculations or to sort data has to be identified and tested. Because the year 2000 is a leap year, tests must include the dates Feb. 28, Feb. 29, and March 1.

Microprocessors hidden inside operating equipment and devices may create the greatest problem. Older embedded microprocessors have internal clocks and operating systems that use two-digit dates. VCRs and programmable coffee-makers are examples of consumer products that are controlled by date-dependent, embedded microprocessors. Such microprocessors are also found in manufacturing-control systems and in the heating, lighting, and security systems in office buildings. These devices often are linked directly to computer databases. The danger in the year 2000 is that embedded systems with the Y2K bug will send faulty dates to computers, which can cause problems even if the computers are Y2K compliant. Thus, Y2K remedies must also take embedded systems into account.

The task of checking for potential Y2K malfunctions in either large or small comput-

er systems is daunting. To eliminate the Y2K bug, every component of the computer system—hardware, operating systems software, and peripherals such as auxiliary data-storage devices and laser printers—and any software applications used at any time must be tested and then fixed if necessary.

Fortunately, considerable help is available from the government and from associations and vendors. The Institute of Electrical and Electronic Engineers (IEEE) is developing both terminology definitions for the year 2000 problem and industry standards for testing Y2K compliance. The standards are available on its Web site (<http://engine.ieee.org/usab/y2k/index.html>).

On the federal front, the National Institute of Standards and Technology (NIST) has developed a computer-based tool for assessing and finding problems caused by the millennium bug. The tool was developed to help smaller manufacturers identify equipment and systems at risk. The tool also helps a company to rate the importance of equipment and systems (including embedded systems) to its business survival, and then to develop contingency plans. The tool also provides guidance on planning and managing a remedial program.

The Y2K tool is available on NIST's Web site (www.nist.gov/y2k), which also has documents on year 2000 testing and remedies, information on NIST's Conversion 2000 training program, and links to recommended Y2K Web sites. The Small Business Administration also has a Web site (www.sba.gov/y2k) that offers a test and guidance for self-assessment as well as links to providers of Y2K remedial services.

NIST conducts seminars and workshops on the year 2000 problem at its nationwide network of Manufacturing Extension Partnership (MEP) centers (Web site at www.mep.nist.gov). An estimated 10,000 small manufacturers have participated in this project. In addition, MEP field staff will help participating companies select the tools and services needed to plan and implement cor-

rective projects. NIST's Information Technology Laboratory has developed a software-code scanner that organizations can use to evaluate their software.

A General Services Administration (GSA) Web site, the U.S. Federal Government Gateway for the Year 2000 (www.itpolicy.gsa.gov/mks/yr2000/y2khome.htm), serves as a primary information source for government-wide Y2K policies and compliance status. The GSA also maintains the Commercial Off-the-Shelf (COTS) product database (www.itpolicy.gsa.gov/mks/yr2000/comply.htm), which contains detailed information about the Y2K compliance of specific products and vendors, and the experiences of federal agencies with them.

Recent "Good Samaritan" legislation passed by Congress and signed into law by the president provides limited safeguards from liability lawsuits. It protects companies that share information about Y2K problems and solutions with each other and with the government, even if they inadvertently supply information that later proves inaccurate. The legislation also mandates that the GSA establish a Web site that will serve as a year 2000 clearinghouse for consumers, small businesses, and local governments.

The new legislation received support from business and industry groups such as the U.S. Chamber of Commerce, the Semiconductor Industry Association, the Information Technology Association of America, and the National Association of Manufacturers. A trial lawyers group opposed it, even though the bill does not deal directly with liability lawsuits for losses caused by Y2K problems.

Insurance companies hope to limit their liability to claims arising from the year 2000 problem. The industry has sought rulings from insurance regulators in all 50 states that will allow them to exclude claims for losses associated with the year 2000 problem unless such coverage is specifically defined in the policy. Companies that want to purchase Y2K insurance before the year 2000 may have to submit to an audit of their computer systems and software products. The insurance industry has adopted criteria developed by the nonprofit Software Productivity Consortium

(www.software.org) to evaluate certification of Y2K-compliant software. Insurance companies will use the results of the certification evaluation to determine the insurability of companies for product liability or business disruption losses.

Several companies, such as Software Testing Assurance Corp. (www.stacorp.com) and National Software Testing Laboratories (www.nstl.com), offer independent testing and verification of hardware and software for year 2000 compliance, and issue certificates of compliance. Some computer vendors are using the term "year 2000 ready" instead of "year 2000 compliant" for legal reasons.

IBM, for instance, refers to its hardware and software products as "year 2000 ready." The company defines this phrase to mean that its products will correctly process data between the 20th and 21st centuries if used according to the documentation and if all other features and products properly exchange accurate data with them. IBM says it discontinued marketing products that are not year 2000 ready at the end of 1997.

Vendors and Web sites

Oracle Corp., a major database vendor, offers midsize companies a fixed-price Y2K solution. Oracle claims that the \$300,000 package can be implemented in 60 days or less. It includes new financial accounting software, consulting, education, and support. In effect, Oracle is offering to replace existing financial computer systems with its new one. Other major vendors of computer hardware and software are essentially doing the same. IBM, Hewlett-Packard, Microsoft, and Computer Associates all encourage their customers to upgrade to new Y2K-compliant systems. Although support for remedying existing systems is available, it is limited; it carries no guarantee; and it may be expensive. Many vendors have developed software tools for automatically testing PCs for year 2000 capability. The basic test determines whether the PC's internal clock and BIOS (basic input and output systems) can handle year 2000 dates correctly. Some BIOS can be upgraded with software patches that correct the date automatically; others require repair

in the form of an add-on card or board. Many Y2K tools also check the operating system and all the applications being used on the PC for Y2K compliance. Remedies can be as simple as routing date functions through the updated clock and BIOS, or as complex as replacing all of the dates stored in the application files—a major undertaking. Finally, after making the BIOS and applications Y2K compliant, there remains the need to check newly installed applications for year 2000 compatibility. Some Y2K tools continue to check imported data as well.

Hundreds of software tools for finding and fixing Y2K problems have been developed, and it is difficult to evaluate the merits of each. Some vendors claim that their Y2K tool will not only find year 2000 glitches in PC hardware and software, but will automatically repair them. Obtaining advice and guidance from persons experienced with Y2K remedies is recommended.

Year 2000 Web sites are excellent starting places for information about Y2K solution vendors and consultants. In addition to the NIST and SBA Web sites, there is a well-respected Web site (www.year2000.com) created by industry consultant Peter de Jager. EDS, which operates computer databases for about 4,000 corporate and government clients, recently made public a Web site (www.eds.com/vendor2000) with information about 125,000 computer products from about 3,000 vendors. Many computer publications—and even some newspapers—have set up year 2000 pages on their Web sites.

The Information Technology Association of America (www.itaa.org), which represents about 11,000 companies that provide information technology services, has tried since 1995 to raise public awareness of the year 2000 crisis. It is particularly concerned about small business enterprises because many have ignored the potential danger they face. Surveys conducted by the ITAA show that some companies are already experiencing operating failures because of the Y2K problem. Unless companies take action to rectify the Y2K glitch, operating failures are going to be widespread at the beginning of the new century. 