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Bad day ahead?
A look at the Y2K problem and questions about its cost

by Tapen Sinha

In the second half of 1997, magazine and newspaper reports started appearing in droves about the presumed doomsday of Jan. 1, 2000, for any and all activities associated with computers. Many businesses did not take the problem very seriously until the publication of Staff Legal Bulletin No. 5 (1997) by the U.S. Securities and Exchange Commission (SEC). In that bulletin, the SEC asked corporations to report any known costs associated with the problem, known as the "Y2K problem" (see the revised version of the document at *www.sec.gov/rules/othern/slbcf5.htm*).

At about the same time, Edward Yardeni, chief economist of Deutsche Morgan Grenfell, testified before the U.S. Senate about this problem. He believes that the probability of a global recession in the year 2000 due to the Y2K problem is 35%. (His testimony is posted at *www.senate.gov/~banking/97_11hrg/110497/witness/yardeni.htm.*)

What is this hoopla about? What is the actual problem?

The problem is this: If the date function in computer software programs does not have four digits for the year, at the turn of the century such programs will begin operating as though the world had moved to an earlier point in time. This problem has been called by different names: the Year 2000 Problem (hence the inevitable abbreviation "Y2K"), the Date Problem, and the Millennium Bug, among others.

Illustrating the problem

Any function or machine dependent on a computer — especially an old personal computer — represents a potential problem. A simple test will illustrate the problem on your PC. If you set the time and date on your personal computer to 23:58 1999, switch the PC off, wait five minutes, switch the PC back on, and then check the date, the result is likely to be Jan. 4, 1980, for many computers

(why that date, only the microchip manufacturers know). If the date is accurate, create a file using a not-so-recent computer program, and then check the creation date; it probably will be wrong. A test conducted over the Internet with about 1,000 participants indicated that 75% of all PCs will fail this test.

How the Y2K problem arose

There are several causes behind the potential problem.

Lack of date standards: No standard representation of dates has been internationally accepted and implemented. The numbers "01-02-97" mean Jan. 2, 1997, in the United States but Feb. 1, 1997, in the United Kingdom. There have been several attempts at standardization, such as the International Organization for Standardization's recommended standard of ISO-8601, which would set the date storage format as YYYYMMDD (the first four digits for the year, then the month, and finally the day). However, there has been no commercial acceptance.

Computer resource constraint: Perhaps the most important reason for adopting YY rather than YYYY was the constraint on memory in the early days of computers. When punch cards were used, only 80 columns were available for data entry. Taking up four columns to protect the millennium seemed a big luxury.

Greater success than expected: Programs developed in the 1960s and '70s were not expected to last very long, so it seemed unnecessary to change the date format. But some programs have survived and are still being used.

Reusing old codes: Many new applications have algorithms or codes embedded from previous systems. Applying parts of old programs to new processes may have inadvertently hidden the problem of two-digit date formats. This may be the most critical factor of the looming problem.

Data decentralization: As the use of personal computers became widespread, programs percolated to the lowest level of the organization; they are no longer limited to storage in a few big computers. This means that the problem needs to be addressed for each computer separately.

How costly, really?

The problem is largely a software problem (although some hardware has the date function embedded). Therefore, most estimates of costs to fix the problem are based on altering lines of code in software.

In 1996, the consulting firm The Gartner Group stated that, worldwide, 225 billions of lines of code would have to be fixed. At that time, the cost was estimated at $1.10 per line for a total of $250 billion. The firm further declared that in three years, the cost could escalate to $2.50 per line, meaning the problem would grow into a $600-billion headache.

This estimate has several problems. First, it assumes that lines of code need to be fixed one at a time. However, several programs are available that fix many programs in a PC at once and cost very little (in fact, some are free through the Internet). Second, many older programs can be scrapped and replaced at a much lower cost than that of fixing the codes. The entire cost of such

programs should not be allocated to the Y2K problem because the new programs will enhance productivity as well.

Legal concerns

The Y2K problem is much more predictable than most risks. Thus, if a Y2K-related difficulty leads to a major disaster for a company, directors and officers (D&O) may become liable if they are seen not to have taken "due care." Some insurance companies are offering insurance policies for the Y2K problem. D&O liability insurance will cover liability (typically with a large deductible) but not gross negligence. Under these plans, professional errors and omissions (E&O) are covered. However, it is difficult to judge ahead

of time what types of claims there will be and, therefore, whether E&O provisions will cover them.

Some tricky legal problems have not been settled. For example, most software companies do not allow users to modify programs. To fix the Y2K problem, users might have to alter a program's source code, and so questions might arise about breach of contract.

Risk management and the Y2K problem

Swiss Re has produced an interesting document on the issue of risk management of the Y2K problem (*www.swissre.com/download/public/millen-e.pdf*). The problem exhibits all the classic elements of risk management. However, unlike many other risks, the exact date when problems could begin is clearly defined. The risks will continue well past Jan. 1, 2000.

Basic elements of risk management are: (1) identifying exposures to accidental loss; (2) examining feasible alternative risk management techniques for dealing with these exposures; (3) selecting one or more of what appear to be the best risk management techniques; (4) implementing the chosen

risk management techniques; and (5) monitoring the techniques' results to ensure that the risk management program remains effective.

How do we perform risk management for the Y2K problem? The basics outlined by the OMB are worth quoting:
1. Raise management awareness of the problem.
2. Assess the scope of the problem by inventorying systems and deciding which ones to change, replace, or discard, renovating the systems to be changed.
3. Validate and test the changes in the systems.
4. Implement the revised systems (including developing a contingency plan).

These steps apply not just to government bodies but to any organization. It is also important for an organization to set a timetable for making changes. Otherwise, Mon., Jan. 3, 2000, could be a very bad day.

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Interesting Y2K links

Those interested in the Y2K problem might find a Yahoo! Web page useful, says Tapen Sinha. The site contains a long list of hyperlinks to informative Web sites. The URL is: *http://headlines.yahoo.com/Full_Coverage/Tech/Year_2000_Problem/*.

Going global (continued from page 3)

questions that didn't exist a decade or two ago, such as 'Who's qualified to sign a pension statement that's filed on an international stock exchange?' There are only about 30,000 actuaries worldwide. To thrive or even survive, we have to be even better organized to be able to demonstrate that our members have something important to offer. Financial analysts, accountants, and others will move into our professional territory if we don't protect ourselves. We can't afford the luxury of, in the future, having to reinvent the wheel in each country separately, such as in the area of educational standards for actuaries."

The IAA Web site

Collett also noted that whether or not

the measure passes, SOA members should keep up with IAA activities and provide input. If the measure passes, "The SOA would be a major dues-paying member of this organization, and we would need to be sure our impact is felt," he said.

One way to monitor the IAA's activities is through its Web site at *www.actuaries.org.* Information is presented in both English and French. The results of the vote for the IAA/IFAA merger will be posted there. Also, visiting the Web site is a good way to keep up with the IAA Council, the committees, and their actions. Those involved with the IAA need to know your views.

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