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#605 - The Y2K Problem, Part 2

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Y2K is the shorthand name for Year 2000, a computer problem that may affect both environmental and human health in every industrialized or industrializing country. Many thousands of operating computers currently represent the year by two digits: 25 is 1925 and 98 is 1998. When January 1, 2000 rolls around, these computers will assume 00 means 1900, not 2000, unless their software is fixed. Computers that have this "Y2K date problem" are called "noncompliant."

If you were born in 1935, a computer this year would determine that your age is 98-35=63. However, two years from now that same computer may determine that your age is 00-35=-35. At that point the computer may stop working, or it may pass this incorrect information on to others, including other computers.

This seemingly-simple problem has large consequences.

BYTE magazine, a technical computer journal, calls Y2K "a crisis without precedent in human history." [1] FORTUNE magazine calls it "the biggest screwup of the computer age" [2] and says it may cost \$1 trillion to fix. (The Vietnam War cost half that much, \$500 billion.) The Electric Power Research Institute (EPRI) --a trade association for electric utility companies --says the Y2K problem will begin to disrupt businesses, including electric utilities, a year before the new century begins: "Major disruptions in technical and business operations could begin as early as January 1, 1999. Nearly every industry will be affected," EPRI says. [3]

If the disruptions don't begin January 1, 1999, they may begin July 1, 1999, when fiscal year 2000 begins for 46 out of the 50 states, or on October 1, 1999, when fiscal year 2000 begins for the federal government. But most of the problems will probably surface after midnight December 31, 1999.

Charles Rossetti, commissioner of the U.S. Internal Revenue Service (IRS), told the WALL STREET JOURNAL April 22, 1998, that Y2K is a "very, very serious problem." "There's no point in sugarcoating the problem," he said. "If we don't fix the century-date problem, we will have a situation scarier than the average disaster movie you might see on a Sunday night. Twenty-one months from now, there could be 90 million taxpayers who won't get their refunds, and 95% of the revenue stream of the United States could be jeopardized." [4] Mr. Rossetti went on to say he is confident that these problems will not occur because IRS computer experts will prevent them. Critics of IRS are not so sure. [5]

In addition to many thousands of noncompliant computers needing to be fixed, there are millions of noncompliant "embedded systems" --computer chips embedded in other equipment such as photocopiers, telephones, elevators, traffic lights, electric generating plants, and nuclear missiles --that also need to be fixed or replaced.

The deadline for having everything fixed --December 31, 1999 --is just over 500 days away, and it is an unusual kind of deadline because it cannot be ignored or extended. FORTUNE magazine reported April 27, 1998, that, on average, large corporations are only 34% of the way through the job of making their systems compliant. [2]

Government agencies are doing only slightly better. The Government Accounting Office (GAO) said in March, 1998, "Time is running out for solving the Year 2000 problem. Many federal agencies will not be able to renovate and fully test all of their mission-critical systems and may face major disruptions in their operations. At the same time, systems that have been renovated and tested may encounter unanticipated Year 2000 problems." [6]

The GAO gave examples of what might go wrong:

** The nation's air transportation may face major delays and disruptions because the airlines may not be able to file flight plans

with the Federal Aviation Administration.

** Taxpayers may not receive timely tax refunds because the Internal Revenue Service (IRS) may be unable to process their tax returns.

** Payments to veterans and retirees may be delayed or disrupted by the failure of mission-critical systems supporting the nation's benefit payments systems. [In other words, people may not receive their social security or disability checks in a timely fashion.]

GAO reported June 10, 1998, that 24 government agencies are only 40% of the way toward their goal of Y2K compliance. [7] GAO said it had published 40 reports on government computers during the past two years: "The common theme has been that serious vulnerabilities remain in addressing the federal government's Year 2000 readiness, and that much more action is needed to ensure that federal agencies satisfactorily mitigate Year 2000 risks to avoid debilitating consequences." GAO concluded, "As a result of federal agencies' slow progress, the public faces the risk that critical services could be severely disrupted by the Year 2000 computing crisis."

No one knows what will happen as we approach the year 2000. We do know that many manufacturing processes are dependent upon computers, especially in the chemical process industries. FORTUNE magazine said recently, "The precision and interdependence of process controls in chemical plants, for instance, make a Rube Goldberg fantasy contraption look simple. Let a single temperature sensor in the complex chain of measuring instruments go cuckoo because of a year 2000 problem, and you'll get a product with different ingredients than you need--if it comes out at all." [2]

Even the nation's defense apparatus could be adversely affected. The GAO reported June 30 that the U.S. Navy is far behind in fixing its Y2K problems and concluded, "Failure to address the year 2000 Problem in time could severely degrade or disrupt the Navy's day-to-day and, more importantly, mission-critical operations." GAO said the Navy does not even know how many of its computers have Y2K problems, so it doesn't know how big the task ahead may be. [8]

Why is this seemingly-simple problem so difficult? Merrill Lynch, the financial management firm, says there are four reasons: [9]

1. Pervasiveness. Computers that depend on dates are present in every kind of technology --manufacturing systems, medical equipment, elevators, telephone switches, satellites, and even automobiles.

2. Interdependence: Computers exchange information among themselves. "A single uncorrected system can easily spread corrupted data throughout an organization and even affect external institutions," Merrill Lynch says.

3. Inconsistency: Computer languages do not store and use dates in a consistent way. Dates are labeled, stored, and used in different ways from program to program and even within a single program. Therefore, identifying and correcting dates requires close inspection of the computer code line by line.

4. Size: Most large corporations and government agencies use thousands of programs containing millions of lines of computer code. Each line of code must be inspected manually and, if necessary, fixed.

There are additional reasons why this is a particularly difficult problem.

** Many business computer programs that run on the largest ("mainframe") computers are written in an obsolete language called COBOL. COBOL hasn't been taught for 10 years, so there is a

distinct shortage of COBOL programmers.[2,10]

** Indeed, there is a shortage of all programmers to work on Y2K problems. Swiss Re (a firm that insures insurance companies against major losses) says, "A total of well over three million programmers would be needed to solve the millenium [date] problem in the US. In actual fact there are only around two million of them at present." [11]

** When computer code is re-written, new errors are introduced at an average rate of one new error in every 14 lines of re-written code. Thus even "Y2K compliant" code may not work right when the time comes. [2]

Therefore, we believe it is reasonable to conclude that portions of the nation's critical infrastructure (water, electricity, telecommunications, and transportation) may be disrupted for a period - - perhaps a few days, but conceivably longer. Essential government services may also be disrupted.

We could be entirely wrong. However we believe it is sensible to hope for the best but prepare for the worst.

Individuals might take precautions to protect their families. They need water, food, shelter, and a cash reserve.[12] They need paper records of bank accounts and insurance policies, in case computerized records are lost. But even more importantly, communities need to begin now to think about ways to mitigate these problems. All is not lost. Much trouble can be averted by focused efforts now. Awareness is the first issue. (A recent survey of 643 individuals found that 38% had never heard of the Y2K problem. Among the 400 (62%) who HAD heard of it, 80% said they believed it would be fixed before the year 2000 arrived. This contrasts with an earlier poll of technology and business executives charged with fixing Y2K problems: only 17% of them said they thought the problems would be fixed before the year 2000.) [13] People need to be told.

Coordinated action is the second issue. People need the resources to fix their own computers.[1] Third, communities need to think creatively about ways to help those who are most vulnerable: people who rely on social security, veterans benefits, and private pensions, for example. What will happen if their funds are delayed? Local governments, churches, and civic groups, could begin now to bring communities together to find ways to avert serious problems that might occur. Approached properly, Y2K could become a catalyst for positive community growth and development in the best sense of those words.[14]

--Peter Montague (National Writers Union, UAW Local 1981/AFL-CIO)

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[1] Edmund X. DeJesus, "Year 2000 Survival Guide," BYTE (July 1998), pgs. 52-62. Good web sites covering this problem include: <<http://www.yourdon.com>>; <<http://www.webcom.com/~yardeni/y2kbook.html>>; <<http://www.euy2k.com>>; <<http://www.year2000.com>>; <<http://www.y2ktimebomb.com>>; <<http://www.garynorth.com>>; <<http://www.y2kwomen.com>>; and <<http://www.transform.org/transform/tlc/Resiliency.htm>>.

[2] Gene Bylinsky, "Industry Wakes Up to the Year 2000 Menace," FORTUNE April 27, 1998, pgs. 163-180. Available on the web: <<http://www.pathfinder.com/fortune/1998/980427/imt.html>>.

[3] See <<http://year2000.epriweb.com/year2000/challenge.html>>.

[4] Tom Herman, "A Special Summary and Forecast of Federal and

State Tax Developments," WALL STREET JOURNAL April 22, 1998, pg. A1.

[5] Peyman Pejman, "Industry rep voices doubt over federal 2000-readiness," GOVERNMENT COMPUTER NEWS June 15, 1998. See <http://www.gcn.com/gcn/1998/June15/industry_rep_voices_doubt_over_f.htm> (omit the hyphen).

[6] Joel C. Willemsen and Keith Rhodes, YEAR 2000 COMPUTING CRISIS: BUSINESS CONTINUITY AND CONTINGENCY PLANNING [GAO/AIMD-10.1.19] (Washington, D.C.: General Accounting Office, March, 1998). Available at: <<http://www.gao.gov/y2kr.htm>>.

[7] Joel C. Willemsen, YEAR 2000 COMPUTING CRISIS; ACTIONS MUST BE TAKEN NOW TO ADDRESS SLOW PACE OF FEDERAL PROGRESS [GAO/T-AIMD-98-205] (Washington, D.C.: General Accounting Office, June 10, 1998). Available at: <<http://www.gao.gov/y2kr.htm>>.

[8] John B. Stephenson and others, DEFENSE COMPUTERS; YEAR 2000 COMPUTER PROBLEMS PUT NAVY OPERATIONS AT RISK [GAO/AIMD-98-150] (Washington, D.C.: General Accounting Office, June, 1998). Available at: <<http://www.gao.gov/y2kr.htm>>.

[9] See <<http://www.ml.com/woml/forum/millen.htm>>.

[10] Rajiv Chandrasekaran, "Older Programmers May Fix Future," WASHINGTON POST March 2, 1997, pg. A1. See: <<http://www.washingtonpost.com/wp-srv/frompost/features/mar97/2000.htm>> (omit the second hyphen).

[11] See <<http://www.swissre.com/download/public/millen-e.pdf>>.

[12] See <<http://www.y2kwomen.com>>. If you need this "how to protect your family" information sent to you by mail, send us \$2.00 to cover postage and copying; we'll mail you 27 pages of information. Please mark your envelope Y2K.

[13] Susan Watson [(508) 935-4190] and Karen Fogerty [(508) 935-4091], "CIO Magazine Study Shows Many Consumers Clueless About Year 2000 Computer Glitch," press release dated June 12, 1998. See <http://www.cio.com/marketing/releases/y2k_release.html> (omit the hyphen).

[14] See, for example, Robert Theobald's work on community responses to Y2K: <<http://www.transform.org/transform/tlc/Resiliency.htm>> (omit the hyphen).

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