

The Year-2038 Bug

Written by Paul Sheer

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The year-2038 bug is similar to the Y2K bug in that it involves a time-wrap problem not handled by programmers. In the case of Y2K, many older machines did not store the century digits of dates, hence the year 2000 and the year 1900 would appear the same.

Of course we now know that the prevalence of computers that would fail because of this error was greatly exaggerated by the media. Computer scientists were generally aware that most machines would continue operating as usual through the century turnover, with the worst result being an incorrect date. This prediction withstood through to the new millennium. Affected systems were tested and corrected in time, although the correction and verification of those systems was monumentally expensive.

There are however several other problems with date handling on machines in the world today. Some are less prevalent than others, but it is true that almost all computers suffer from one critical limitation: Most programs work out their dates from a perpetual second counter - 86400 seconds per day counting from Jan 1 1970. A recent milestone was Sep 9 2001, where this value wrapped from 999'999'999 seconds to 1'000'000'000 seconds. Very few programs anywhere store time as a 9 digit number, and therefore this was not a problem.

Modern computers use a standard 4 byte integer for this second count. This is 31 bits, storing a maximum value of 2^{31} . The remaining bit is the sign. This means that when the second count reaches 2147483647, it will wrap to -2147483648.

The precise date of this occurrence is Tue Jan 19 03:14:07 2038. At this time, a machine prone to this bug will show the time Fri Dec 13 20:45:52 1901, hence it is possible that the media will call this The Friday 13th Bug.

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