

Issues and Opinions

What Will the Change of the Millenium Do to Our Data Processing Systems?

The arrival of the next century, the year 2000, has implications which must be planned for by data processing professionals. Current computerized information systems store dates in Gregorian (YY/DDD), Julian (MM/DD/YY) or standard (YYMMDD) formats; these formats use no more than two digits to describe the year. Two digits are not enough for an orderly representation of dates at the end of the century with respect to dates at the beginning of the 21st century.

To make the matter clear, consider the following example. In medical insurance claims processing, the system checks each claim to see if the policy effective date is before the date of medical service for which coverage is claimed. Suppose the policy effective date is April 1, 1997, and medical service was rendered after the effective date, namely on April 1st, 2002. The traditional system would compare the dates represented in standard format. The test would incorrectly reject the claim since 970401 is greater than 020401. This is a simple example and the knowledgeable reader will probably be able to construct many other examples.

The problem lies with the fact that two significant digits to describe the year will not be enough. Furthermore, since at the end of this century the millenium changes too, three digits are not enough either.

The necessity of changing the date format will be felt both in the areas of system design and in maintenance. As the end of the century approaches, systems analysts will become aware of the fact that the life expectancy of a new system being designed will go past the end of the century, and the problem will be tackled in the analysis phase.

In other cases where no special provisions will have been made for handling the new date format, maintenance projects will be undertaken. The size of a maintenance project to change the date format of a system is not a negligible one. A simple example is offered by the zip-code change from five to nine digits. Although no time pressure for the change has been applied in most cases, the change requires a considerable amount of maintenance effort. Online programs, batch programs and data stores have to be converted. The elements of the system which are affected by the change have exceeded the number of those which actually process the zip-code information. Programs and data stores had to be converted just for the sake of system consistency. In the case of the date format change, the aggregate impact on the data processing industry will definitely be large since this change will have a deadline.

Systems to undergo date format changes will be primarily systems which will, at that time, function beyond their initial projected lifetime. It is precisely the systems which are designed today that are most likely to face this problem. It is the systems we design today which will have exceeded their lifetime and for which organizations will find it more difficult to justify maintenance work.

The high personnel turnover in the DP industry is a factor which indirectly contributes to the deferment of the date format change problem. Most of the individuals who are likely to be responsible for ensuring proper functionality of the DP systems at the turn of the century will probably face the problem in a different position or place than they are now. The result: too little attention is currently being paid to the issue in question.

The following are recommended steps in the analysis process by which necessary date format changes are identified and solutions developed:

1. Identify the date comparisons.
2. Identify the sort procedures which involve date keys.
3. Identify whether date comparisons and sorts are performed for dates across different periods like months or years.
4. Estimate how long the problem will persist

if no change is undertaken and evaluate the cost of making no system modification.

5. Design the program and data store changes.
6. Develop a conversion and implementation plan.

The system changing needs will vary widely from one system to another. As two extreme cases, an insurance system will typically need many modifications, while in an accounting system the problem can be eventually solved by judiciously handling the closing periods.

Systems which are currently being designed should explore the impact of the millenium change. As the end of the century approaches, each organization should at least initiate a major analysis project to estimate and evaluate the impact of the date change and decide upon one of the following four alternatives:

1. Accelerate the termination of the old system and replace it with a new system which is able to handle the date transition.
2. Modify the existing system, in which case design, planning and conversion has to take place. If data structures are being changed as a result of the modification requirements, then the project will be of considerable size and adequate use of database dictionaries can help the conversion process.

3. Modify the system locally. In this case, careful analysis must be conducted to identify the boundaries of the change.
4. Do nothing.

There will be a great variability of the degree of impact from one system to another and from one organization to another. No automatic conversion will be possible and skilled technical professionals will be needed to carry out the changes. It is even possible that the date format change will have an impact on the job market, creating an excess demand for qualified programmers and possibly an excess supply of such individuals when the crisis is over. The date change problem at the end of the millenium should not be underestimated and the time has come for analysts and DP managers to think about it.

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