Year 2000
Case Study

PRICE Systems
A Lockheed Martin Company

Insurance Company Information System

The Background

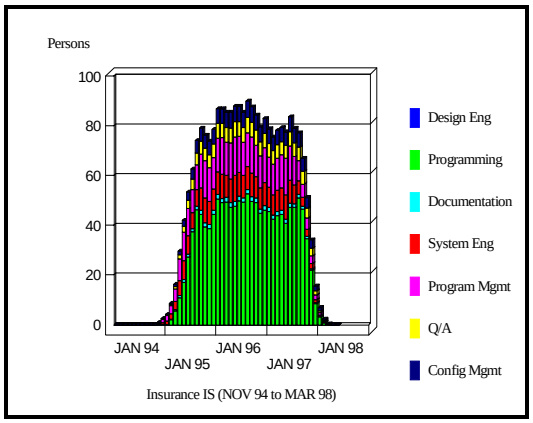
This company began to fix their Year 2000 problem in late 1994. A software upgrade strategy to fix a subsystem at a time was selected for this 47 million LOC, 30 thousand module software system. Due to the size of the task and the need to meet critical deliverables unrelated to the Year 2000 problem fix, this company is using a fairly small internal IT staff and a larger staff of contracted IT professionals to implement the strategy. The total staff size varies from 55 to 65. The solution approach is simple and straightforward, but tedious. Every one of the 47 million LOC is inspected for a date occurrence requiring change. Once identified, the change is made, and the software system tested at the major subsystem level.

The estimates: 2440 labour months over 3.5 years with an average staff of 60. However, the peak staffing required is 85, or 20 above the plan. Because this company began working on the problem early, there should be ample time to rephase work to the planned peak or arrange for additional staffing to meet the forecast peak in order to test the upgraded system before the deadline. A company with a similar system, adopting a similar strategy to meet the Year 2000 problem will most likely not meet the deadline if work is not already underway.

A further note on this case: A strategy to more fully test the upgraded system (module and configuration item testing in addition to system testing) had to be discarded since it would have been impossible to complete in time without a significant increase in staffing. In this case, the problem evaluation and ensuing strategy implementation forecasts help to identify viable solutions.

The summarised results from PRICE S™ are shown below:

ALL Groups Staffing Profile



Insurance Company IS (NOV 94 - MAR 98)

Acquisition Costs / System

Insurance IS System
Costs in Person Months

	Design	Pgming	Data	S/PM	Q/A	Config	TOTAL
Sys Concept	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sys/SW Reqt	0.0	0.0	1.3	12.1	0.8	0.8	14.9
SW Reqment	0.0	0.0	1.9	60.1	3.6	3.6	69.2
Prelim Des	0.0	115.8	8.7	149.3	16.0	16.0	305.7
Detail Des	0.0	173.6	13.1	224.0	23.9	23.9	458.6
Code/Test	0.0	982.7	21.3	170.1	97.6	97.6	1369.2
CSCI Test	0.0	77.7	4.2	36.0	17.9	17.9	153.6
Sys Test	0.0	20.1	0.6	6.8	5.2	10.5	43.2
Oper TE	0.0	8.6	1.1	6.0	4.9	5.2	25.9
Sub-Total	0.0	1378.5	52.2	664.4	169.8	175.3	2440.3
Sys Integ	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	0.0	1378.5	52.2	664.4	169.8	175.3	2440.3
Purchased Costs							0.0
TOTAL							2440.3

The case study analysis performed with PRICE S™ is described in detail overleaf. Background information about this case was obtained from the September 15, 1996 issue of *CIO* magazine (Pp. 53 - 64). The parametric modelling of each case consists of common elements to all Year 2000 problems and case specific elements. The common elements are discussed first.

If you would like more information about the Year 2000 problem, you can access the home page of Year 2000 at: www.year2000.com. If you need help, call us ([1] 47 65 76 33).

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Common Elements

Specification Level:

Cases are treated as a high reliability, commercial proprietary software product (PLTFM = .9).

Management Complexity:

Cases are treated as though the software fix will be done in one location (CPLXM = 1). This is not a strongly supported assumption, since one of the cases will be fixed in part by using third party contractors in another country and at least one other case referred to use of external resources. This is an area where greater differentiation among the cases could be analysed.

Utilisation:

No effect considered (UTIL = .5).

Language:

COBOL used for all. This is somewhat of an oversimplification, since there will be some other language types in each system. However, COBOL is the dominant language. Additionally, previous analyses of commercial IS systems like these reveal that the effort required to account for these other languages is unjustified since it does not significantly alter the analysis results.

Productivity Factor:

A factor of 12 is used throughout. This is the highest reference value of the PRICE S™ Productivity Table. In addition, this value has been validated for use in calibrations of other commercial systems. The value must always be kept in the following context, however - it is on the high side of our observed project performances and its appropriateness to COBOL programmers in the late 1990s is not obvious. For these reasons alone, all results should be interpreted as optimistic.

Fraction of Non-executable LOC:

50% is used throughout (FRAC = .5). This is based on the high incidence of data sections of COBOL applications. 50% is conservative, as we have noted values well above this for similar software systems.

Development Environment Complexity:

Nominal values are used for personnel skill level, product familiarity, software tools, and complicating factors (CPLX = 1).

Hardware Complexity:

No hardware design or usage complications are considered (CPLX2 = 1).

Application:

Cases are treated as software composed of data storage and retrieval modules (50%), Online Communications modules (20%), String Manipulation modules (20%), and Mathematical/Statistical modules (10%). This equates to an APPL of 3.83.

Functions & Tasks:

The following functions (with percent of PRICE S™ defaults) are included: Programming (100%), Documentation (20%), Systems Engineering/Program Management (70%), Quality Assurance (50%), and Configuration Management (50%). The following tasks are included: System Software Requirements Analysis, Software Requirements Analysis, Preliminary Design, Detailed Design, Code and Unit Test, Module Test, System Test, and Operational Test and Evaluation. For the rationale of these values, please see the PRICE Systems™ Metric File documenting commercial software settings for use with PRICE S™.

Case Specific Elements

Internal & External Software Integration:

There is no integration or testing conducted among the subsystems of this system. The module integration within each subsystem is considered to be to closely coupled interfaces (INTEGI = .5), while that of the subsystem integration and test is to loosely coupled interfaces (INTEGE = .3). An experienced team is considered.

Project Start:

The project start is January, 1995, which is when the first subsystem modification began. Other subsystem modifications start in a staggered fashion from February 1995 to March 1997.

Subsystem Model:

This project is modelled as 100 subsystems (CMULT is used to expedite data entry and analysis) requiring modification to a small amount of software and integration and test with that which is not modified.

Modified Code:

Based on other Year 2000 analyses, a 3% change factor was applied to estimate the number of LOC needing modification. This results in 1.4 million LOC for the system, or 140K LOC per subsystem. Each changed LOC was considered to require new design as well as new coding.

Unmodified Code:

This is the remaining 97%, or 456K LOC per subsystem that is integrated with the modified code and tested at the subsystem level.