Application Software for Insurance in the 1960s and Early 1970s

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As Martin Campbell-Kelly [5] notes in his paper on this panel, data on the emergence of the software industry is sparse, and "In the absence of hard quantitative data, the best historical approach appears to be one based on case studies." While his paper provides case studies of specific software firms, this paper provides a different type of case study: a study of the emergence of application software, especially packaged software, from the point of view of one user industry, life insurance.

From the first adoptions of Univacs and IBM 650s beginning in 1954/55 into the early 1960s, firms who bought or rented computers were faced with the formidable task of programming them. From the very beginning of insurance use of computers, programming time and costs, consistently underestimated, were a major part of the expense of installing computer systems. Early estimates ranged from one third to two thirds the cost of equipment rental [11]. The representative of one insurance company [30, p. 16] explained that many insurance firms turned to computers in response to a cost squeeze; yet, "This interest in using computers to perform many of the routine tasks of data processing, in turn, introduced a new factor into the price cost squeeze": "the tremendous costs being incurred by companies in the area of systems design and programming required to install computers to perform these various functions." He went on to claim that in many cases, companies "were pointing out that programming costs had far exceeded predictions, and the anticipated cost savings were not forthcoming."

Initial attempts to reduce programming costs (for other user industries as well as insurance) came in the adoption of programming languages easier to use and more powerful than machine language, ultimately including COBOL for business programming [11, p. 235; 2, p. 364]. At the same time, hardware vendors were also providing increased support to all users in the form of programmed routines given

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to their customers with the machines. Eventually such collections of software routines took on the identity of operating systems. Like improvements in programming languages, operating systems greatly facilitated programming.

This paper focuses, however, on software application packages designed specifically to accomplish insurance functions. For this story, IBM's 1969 unbundling was a crucial inflection point. I will first survey the emergence and use of insurance application software before IBM's unbundling in 1969, focusing primarily on IBM's bundled insurance software and secondarily on the emerging insurance computer service industry. Then, I will look at the events following IBM's decision to unbundle hardware and software in 1969, opening the way for the rapid expansion of packaged software offered by a variety of newly emerged software specialty firms.

Insurance Software before Unbundling

The earliest pre-developed and tested application software available to the insurance industry was created by the hardware vendors themselves. Initially, the vendors provided training and aid to insurance firm programmers to support application programming. In addition, they supplied libraries of routines for all users [41]. As it became clear that costs of programming were a major factor in decisions to rent or buy computers, however, vendors saw the need to do more than provide generic programs such as report generating programs. They began to supply industry-specific application programs.

'62 CFO

IBM's '62 CFO (Consolidated Functions Ordinary, 1962), designed for the 1401 tape computer, seems to have been the first--and was certainly the best known--of such application programs designed for the insurance industry. The software (it was actually a set of programs) was based on the Society of Actuaries' notion of a Consolidated Functions plan for handling ordinary insurance billing, accounting, and related functions, initially conceived in the 1950s in preparation for the first computers (though based on an earlier, tabulator era notion of integrated applications) but only rarely achieved in the software developed by insurance firms in the first decade of computerization [52, 53]. A few years later the representative of one insurance firm described CFO's inception as follows:

> IBM, one of the computer manufacturers, being close to the problem [of high application programming costs] and aware of its impact on their market set out to do something about it. In addition to engineering changes in computers to simplify programming, they assembled a systems and programming team to develop a Consolidated Functions System for Ordinary Life Insurance with three primary objectives:
>
> 1. To develop a systems approach for computers that will allow automatic processing of all scheduled transactions and requested processing for all non-scheduled transactions involving Ordinary Life contracts.

> 2. To write a series of computer programs for the 1401 which will perform all record-keeping functions on a daily, monthly, or annual cycle for Ordinary Life Insurance contracts and miscellaneous accounting applications that are directly related to Ordinary Life Insurance contracts.
>
> 3. To test and document these computer programs to such an extent that they can be used broadly throughout the Life Insurance Industry as operational computer programs or as a guide in the development of personalized total systems on an individual company basis [30, pp. 16-17].

In spring of 1962, IBM held a one-week course at their Endicott facility to present the unfinished software then called CFO '62 to interested representatives of the life insurance industry. According to an attendee, in developing the programs, "The PAL [Program Application Library] unit of IBM has been guided by a consulting actuary and several life companies" [34]. '62 CFO, as it came to be called, was not yet ready for customers, but was intended to be field tested starting later that year. Indeed, the first two references to CFO '62 in the proceedings of the Insurance Accounting and Statistical Association (IASA--one of several insurance trade associations to devote considerable attention to the use of computers) appeared in 1963, and in neither case had it yet been fully implemented [49, 50].

By the 1964 IASA meetings, however, '62 CFO was clearly being used in various ways at several medium-sized companies. Three presenters discussed it extensively. One presented a paper on "The CFO Package as a Guide" in which he explained that his company's specific equipment configuration precluded its using the package directly as written; nevertheless, the firm was finding it very useful as a guide in its own development of a similar system [14]. The package provided guidance in areas from system definition to documentation techniques, and from record format design to training. In spite of this limited use of it, he announced that "Frankly, my impression of the package is rather favorable" [14, p. 13]. The representative of another firm described his firm's adoption of the package with only minor modifications [30]. He was also enthusiastic about it, but noted that it did not eliminate all work involved in converting operations onto a 1401 computer:

> In closing I would like to illustrate my appraisal of '62 CFO in this manner....We now have an objective we wish to reach -- automatic processing of ordinary life insurance -- '62 CFO is the Santa Fe Trail for this objective. It is clearly marked and documented. There will be some hardships along the way. However, if you follow the trail, I'm sure you will reach the objective [30, p. 18].

In general, the package seemed to be well on its way towards widespread acceptance by 1964. In that year the first of three regional CFO user groups was established by insurance companies in the western part of the country [46]. Papers given at IASA in the next few years illustrated that acceptance and gave the clear impression that both insurance users and IBM benefited from it. One speaker, for example, noted that "If a company were to adopt CFO in its entirety, about 35 man-years of research, planning, and programming would be saved"; even with his

company's modifications to CFO, "We realized a savings of approximately 22 man-years in our installation" [43, p. 13]. The representative of another insurance firm noted that his firm "decided to order an IBM 1401, specifically to utilize the IBM 'package' of programs for Life Insurance known as '62 CFO" [48, p. 225].

Indeed, insurance industry sources from that era and from the present consider '62 CFO the most successful insurance software package ever, with the estimated number of users ranging from 200 to 300 insurance companies, many of which had multiple 1400 series computers in their operations [46, 19]. In 1972, seventy-five life insurance companies attended the Midwest-Atlantic CFO user group meeting, one of three regional user groups.

The popularity of '62 CFO was clearly influenced by the popularity of the 1401 computer, which, according to IBM accounts, "quickly became one of the most important and successful products IBM had ever announced," the "Model-T Ford of the computer industry" with over 12,000 (far over the initial estimates) produced [2, pp. 473, 676n]. But the hardware's popularity was in turn influenced by industry-specific software packages such as '62 CFO, which allowed medium and small insurance firms to computerize for a reasonable cost. Firms such as the one cited above adopted the 1401 because the CFO software made doing so feasible even for a small firm; the conversion process for the firm's life and health policies (the latter requiring some modifications to the programs) took only three employees and was completed in one and one half months [48, p. 225]. While the insurance industry was only one industry using computers, one software vendor serving that industry in 1970 asserted that it was "probably the largest user of computers outside the banking industry" [3, sec. 2, p. 55]. Clearly, providing such software free with the hardware made the 1401 more attractive to smaller insurance firms that might otherwise have delayed computerizing or gone to other, less expensive vendors.

The largest insurance firms did not generally use CFO, for at least two reasons. First, firms such as the Prudential, Metropolitan Life, and John Hancock depended on much larger computers than the 1401 to handle their enormous numbers of policies [53]. In addition, these firms tended to prefer to program their computers themselves, with only limited help from vendors or other sources. As someone working in the systems area at the Prudential said, "We liked to do things the Prudential way" [28]. Thus the vendors might provide support and utility programs to such large insurance firms, but the targets of '62 CFO were medium and small firms.

TIP and ALIS

By the late 1960s IBM's success with '62 CFO had been observed and imitated by at least one other vendor and by itself with its next generation of hardware. The three hardware vendors that, according to insurance industry sources, put the most effort into attracting customers from the insurance industry, mounting exhibits at IASA meetings, LOMA (Life Office Management Association) triennial Systems Forums, and other industry events, were IBM, Honeywell, and the UNIVAC Division of Sperry Rand Corporation [15, pp. 140, 155]. While UNIVAC appears only to have provided general purpose programs for functions such as input-output and report generation (its lack of application programs was undoubtedly one of its competitive problems), Honeywell was more competitive on the application programming dimension.

At the end of 1963 when Honeywell announced its forthcoming H-200, which was plug-compatible with the IBM 1401 (but much faster), it also promised a program called Liberator that would translate 1401 programs for the H-200 [38, p. 162]. Liberator was intended to make it easy for IBM 1401 users to upgrade to Honeywell's faster H-200. Thus this program would translate '62 CFO for use on the H-200. In addition, however, Honeywell soon provided its own life insurance application package called the TIP (Total Information Processing) System [15, p. 161]. This package was, according to one software vendor a few years later, "The CFO system ... put into Honeywell language with front and rear extensions" [46, p. 141]. He went on to note that it was an example of "IBM competition recognizing the importance of industry-oriented software." Judging by the lack of discussion of this package in papers presented at the IASA and LOMA conferences, however, its popularity did not approach that of '62 CFO.

A more important development effort was IBM's ALIS (Advanced Life Information System), designed to take advantage of the IBM 360's new capabilities. While IBM also provided ways of adapting '62 CFO to the 360 architecture and language through emulation and adaptation [26, p. 327], these ways did not take advantage of the 360 series' speed nor its direct access storage and inquiry capabilities. Thus in 1964 a group of insurance industry representatives and IBM industry marketers came together to discuss a project for developing a consolidated functions insurance package for the 360/30, and in 1965 IBM began working on the project, with the participation of monitor groups of insurance representatives [46, p. 140]. Scheduled for release at the end of 1966, ALIS was delayed repeatedly, eventually appearing in January of 1969 [36, 4].

ALIS was designed to process a single daily run to accomplish all routine functions concerning a policy, as well as to process special periodic runs for reporting purposes [26, 16]. Most importantly, as one IBM representative explained to members of IASA, it made use of the 360's direct access storage and telecommunications capabilities "to provide status and several types of quotations via a teleprocessing terminal" [16, p. 123; see also 29, p. 119]. This capability was perhaps to be the most innovative and attractive aspect of ALIS to potential users, though it took a long time to realize. For example, one company interested in ALIS noted that "the availability of mass storage facilities with immediate access capabilities" was particularly attractive to it [36, p. 319].

Some of the firms preparing for ALIS were quite enthusiastic about its possibilities in their presentations to IASA and LOMA in 1967 and 1968 [e.g. 39, 40]. The views expressed by the representatives from two of the five insurance company Beta test sites, however, were tempered [35, 36, 31]. One of them pointed out several areas that might pose problems for his company. Perhaps the most revealing problem and its origin was described as follows:

> The ALIS rate file will not be carried on disk. This will make it necessary to create an anniversary extract and provide for a special run against the rate tape to obtain anniversary values. The monitor companies did not agree with this philosophy, but IBM felt the disk approach would raise the minimum machine configuration needed to install and operate ALIS. Herein lies one of the basic problems that must have contributed substantially to the unexpected delays in the completion of the

> ALIS project. The company was committed to provide software for a minimum configuration and this restriction worked hardships on the project team [36, p. 320].

While the 360 series would include a wide range of machines, IBM was attempting to reach the same small to medium sized segment that it had reached with '62 CFO. In fact, at least one of the larger Beta sites [35; 31] using the near-top-of-the-line 360/65, Aetna Life and Casualty, evidently ultimately rejected ALIS in favor of developing its own system, LIAS (Life Insurance Administration System), put into place in 1972 [17].

This targeting decision clearly hurt the package's chances of succeeding with firms buying computers in the middle and upper end of the 360 range. In addition, the late release of ALIS, so long after the first 360 machines were shipped in 1965 [38, p. 171], created problems for some potential users of it [e.g., 36], perhaps accounting for the large number of users who instead opted for an adaptation of '62 CFO to the 360 system, or who developed their own systems. Prudential's similar Advanced Ordinary System (AOS), for example, was conceived before System 360 was announced, built on that platform during the period of ALIS's development, and implemented in the same year that ALIS was finally released [27, 35]. Moreover, ALIS's eventual release occurred only months before IBM's unbundling of software and hardware, which, as will be shown below, changed the nature of the software market permanently. One immediate consequence was that after the unbundling, ALIS was no longer free. These factors undoubtedly contributed to its relatively modest level of success compared to that of its predecessor, '62 CFO. By 1972, when the regional meeting of one of three user groups for '62 CFO included 75 companies, the only ALIS user group in the U.S. included a modest 29 user firms. As a recent retrospective account of computers and insurance described it, "While the 360 quickly became overwhelmingly successful, the insurance software systems written for it by IBM in 1965--ALIS (Advanced Life Insurance System) and PALIS (Property and Liability Insurance System)--did not" [19, p. 28].

Service and Software Companies

In the era before IBM's 1969 unbundling, firms had a third alternative to developing their own software or adopting that offered by their hardware vendor: turning to outside companies as a source of data processing services and/or software. One of the earliest and most unusual service arrangements began in 1955, when the relatively small Aetna Insurance Company (a fire and casualty insurance company not at that time affiliated with the much larger Aetna Life Insurance Company) persuaded three other fire and casualty insurance companies to buy a computer to serve all of them [45]. SPAN (named for the four companies: **S**pringfield, **P**hoenix, **A**etna, and **N**ational) started with the IBM 705 and later progressed to the IBM 7070 and 7074, in each case developing software packages that would serve all of the companies owning and buying services from it. Thus these packages were more widely used than those of a single firm, but not as widely as '62 . In 1963, SPAN was ultimately bought by Aetna Life Insurance Company, though it continued to serve its former owners as well as firms owned by Aetna Life.

One of the earliest independent computer service companies targeting the life insurance firms was EDS (Electronic Data Systems Corporation). Started by dissatisfied former IBM salesman Ross Perot in 1962, EDS sold what came to be called facilities management services: EDS would make a contract to run a firm's entire data processing operation [21, pp. 27-30]. Life insurance firms were among his early targets, and Mercantile Security Life in Dallas was one of his earliest contracts and the first among many insurance company clients. A decade later, a member of another software services firm serving the life insurance industry referred to this contract as "One of the first (perhaps the first) servicing arrangements in which a computer services company used a package system to process the business of a life company" [46, p. 141]. This market was lucrative enough that by the mid-1960s, EDS had hired two life insurance men, who had installed '62 CFO in their former life insurance firms to develop software for and sell services to life insurance firms [42; 7, p. D4-1]. The EDS facilities-management approach required that insurance firms give up a great deal of control. Other service companies also targeted this life insurance niche, though not necessarily with so comprehensive a bundle of services [46, p. 141]. Thus facilities management and other service contracts were another route by which smaller insurance firms or firms that didn't want to develop their own expertise in this area could get application software without having to develop or even install it. In this independent service company option, software for life insurance applications was bundled with services, not with hardware. Such firms continued to sell their services after the unbundling discussed in the next section [7].

Finally, software firms in the still-young but growing software industry of the mid-1960s provided packaged general-purpose software as well as customized software to clients [8, pp. 322-325], including a few life insurance firms. As early as 1956, Computer Usage Corporation, which has claimed to be "the world's first computer software company," had programmed its "first nontechnical application" for the Prudential, an actuarial program that ran on an IBM 650 [20, pp. 65, 67]. Around 1965 it developed Pru-COBOL for that firm [27, p. 8; 28]. By 1969, Prudential had also turned to another independent software firm, Informatics, Inc., for that firm's packaged file management system, Mark IV, to use in its pension work [47]. These contacts, though limited and predominantly centering on customized or general-purpose software, indicate that the insurance industry had some dealings with the young software industry before unbundling.

Unbundling and the Emergence of Packaged Insurance Application Software

In addition to the delays in and lack of enthusiasm for ALIS discussed earlier, the major event triggering an explosion of software firms and software packages for the life insurance industry beginning in 1969 was IBM's unbundling of software from hardware [19, p. 32; 8, p. 323]. Whether in reaction to anti-trust pressures, or as a way of raising prices, or both, IBM ceased to include software and services in the price of hardware [44, pp. 250-252; 8, p. 323]. This move provided an immediate impetus to the insurance software industry, still in its infancy.

In 1969, major players in this sector of the software market began to be founded, by a variety of different processes and constituencies. Cybertek Computer Products was founded by a team that included a member of the IBM programming team that developed '62 CFO [19, p. 28]. According to a later description,

"Cybertek was created in 1969 to provide a broad spectrum of computer-related services to the life insurance industry. [...] Its main products are an automatic policy issue system and support systems for CFO and ALIS" [6, p. 73] Its founders clearly saw an opportunity for profit opening up, and took advantage of it. Tracor Computing Corporation (TCC), a software and service company also started in 1969, developed its own consolidated functions system, Life 70, to compete with '62 CFO [6, p. 73; 22]. By 1971, EDS had decided to offer its insurance customers a standard, rather than customized facilities management package, including its own standard software [13, p. 58].

The insurance industry was not, however, sitting back awaiting action from software firms; as some insurance firms in earlier eras had entered into relationships with tabulator and early computer vendors in order to shape available technology, some of insurance firms now took action to assure software availability in the unbundled era. In 1969, 15 large life insurance firms combined forces to found Insurance Systems of America, Inc. "to develop applications systems and related installation services for the life insurance industry. ISA offers applications packages, consulting services, and custom contract services" [6, p. 73]. Similarly, Equitable Life Assurance society established a joint venture with Informatics, Inc., a general software vendor; the joint venture, called Equimatics, was intended to design software application packages targeted at the life insurance industry. Whether founded by users or by software and service providers, these firms and many others founded within a few years of the unbundling contributed to an expanding market for insurance application software.

While such firms began to sprout immediately, the life insurance industry did not immediately recognize the importance of the changes taking place. The IASA meetings in 1970 showed that insurance firms and service companies serving the insurance industry were struggling to understand the impact that unbundling and its consequent higher costs would have on their own operations [51; 18]. The one conclusion that seemed inescapable was that "The new repricing of hardware and software will make all of us think quite differently in the future" [18, p. 92]. By 1971, however, the emphasis had shifted to evaluating insurance software systems and services that had proliferated on the market [12, 37, 32]. At the 1971 IASA conference, one speaker gave his assessment of buying packaged software:

> It is usually, but not always, quicker to achieve results, but for this you must pay more dollars. It may be more error free, but for this you have to fit your operation into their package; it may save you some analysis and programming time to implement, but you may pay for this by more time to adapt and maintain through its lifetime. These and many other items are to be weighed in the evaluation of a proposal [37, p. 47].

In spite of these trade-offs, insurance firms were anxious to take advantage of the opportunities created by the proliferation of software firms, products, and services in the wake of the unbundling. By 1972, responding to "the vast number of software packages being developed" for insurance, to the "increasing utilization of these packages by the life insurance industry," and to the many software-related inquiries made to its offices, LOMA issued the first of its Software Catalogs, a series that has continued to the present [9]. The first edition was actually in the

form of two Systems and Procedures Reports: "EDP Software and Service Companies," and "EDP Software Catalog" [23, 24]. The information on software and service vendors contained in these reports came from a survey of LOMA member life insurance firms [9, p. 23]. These vendors were subsequently surveyed to produce data on 81 vendors and over 275 software packages. The catalog broke the application packages into 25 categories, of which the most numerous were Individual Insurance--Life, Actuarial, CFO Support Systems, and ALIS support systems.

A co-founder of Cybertek explained later that "'...nearly all the [insurance-oriented] software companies that were founded right after IBM unbundled started out by providing the peripheral functions a company needed to make '62 CFO more versatile'" [19, p. 28]. Even in the 1977 edition of the LOMA software catalog, most of Cybertek's products are still CFO-related, though running on the IBM 360 or 370 platform [22]. Many other companies responded to the market opportunity created by ALIS's limited success by developing alternative packages for moving CFO users up to IBM 360 hardware [19, p. 32]. Other firms developed application packages for different hardware bases, such as Network Data Processing Corporation's LILA (Life Insurance Logistics Automated) and related programs for the Burroughs, Honeywell, UNIVAC, and NCR hardware [22, pp. 35-44; 6, pp. 73-74]. But many of the firms listed in the LOMA catalog had multiple packages, going beyond the consolidated functions operations into a variety of areas from file management systems to real estate and mutual funds applications. Thus software packages were expanding from the consolidated functions application at the center of life insurance data processing to a variety of other application areas in the insurance business.

1972 was an important year in the insurance industry's recognition of how completely the insurance software picture had changed. In addition to the first LOMA software catalog, a series of other LOMA publications also attempted to address the software and its evaluation [6, 25]. Similarly, the IASA conference program for 1972 included several papers on evaluating software packages, including one by a representative from a firm that claimed it had evaluated 20 software packages/services in the preceding four years, and purchased 14 of them [10]. These guides to evaluating software were designed to help member companies choose from the rapidly expanding array of options in custom and packaged software as well as computer services. In addition to such guides, some of the new software companies themselves presented new packaged software projects, such as a package to assist in underwriting, at the conference [33].

Conclusion

The explosive growth of insurance application software that began in 1969 was not caused solely by IBM's unbundling. As computer technology became more powerful, especially with IBM's System/360 line, more functions could be computerized; at the same time, the enormity of the programming task also grew, making packaged software increasingly attractive financially [8, p. 323]. But until the unbundling move, the large life insurance firms generally developed their own software, and the small to medium sized ones tended to adopt IBM's bundled CFO or, to a lesser extent, ALIS. Over time, the lower level of popularity of ALIS might have encouraged the growth of the small independent software industry. By

separating the software from the hardware decision and by increasing and making visible the cost of IBM software, however, the unbundling decision gave impetus to the emerging insurance-focused application software industry. Moreover, from SPAN to ISA and Equimatics, the insurance industry also continued its tradition of shaping, as well as being shaped by, the information processing industry.

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