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[ADP STANDARDS]

A KEYNOTE ADDRESS

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at

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LANGUAGES (CODASYL)

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I appreciate your invitation to be here today to help celebrate your 20th anniversary. You deserve hearty congratulations for reaching such an eventful milestone. This could not have happened had it not been for the important contributions you have made to the data processing field. The fact that it was done through an all-volunteer effort makes it all the more significant. I know the pressures for time and competition for resources--which I see in my life--must also be felt in yours, so I can appreciate the great value of your efforts; they reflect true dedication to very worthwhile goals.

Anniversaries offer an opportunity to reflect on past efforts and accomplishments, and to reevaluate and set new goals for the future. I understand that your purpose in this conference is to focus on the impact you have had on the user community you serve, and to discuss what's on the horizon.

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I would like to pick up on that theme for a few minutes this morning and discuss the importance of your work to the Government from my perspective and offer a couple of challenges for you in developing your plans for the future.

First, let me talk about standards and their role in competition.

STANDARDS AND THEIR ROLE IN COMPETITION

As a matter of public policy, the Government strives to obtain full competition on all procurements--whether we buy ADP resources or anything else. One purpose, of course, is to obtain the best product for the best price--best price is usually the lowest price, but not always. Another purpose is to assure that no favoritism is given to any particular vendor. With today's environment ringing with allegations of fraud and misuse of public funds, I think this objective takes on added importance.

In my view standards are one of the key ingredients for a meaningful level of competition; indeed standards and competition have become cornerstones of our country's economic philosophy. Competition in this country has brought about tremendous progress and has contributed greatly to our quality of life; and standards have played a major role in the growth of our economy. The success of the Industrial Revolution can be traced in large part to standards. Standards have played key roles in virtually every segment of industry, such as Jack

Jones' railroad; and, of course, there are many more: automobiles, housing, retailing, communications, and banking, just to name a few.

Today we are in the era of the Information Explosion or as some call it, the Information Revolution. The benefits of this revolution, too, will depend in large part on standards, and particularly ADP standards; after all, information is what data processing is all about. The banking industry, one of the heaviest users of ADP technology, and the public as a whole, continue to realize the benefits of the MICR 1/ standard for printing numbers on the bottom of checks so they can be processed automatically. That standard was developed over 20 years ago. It allows both large and small banks to provide the same service and thus compete with one another in providing checking services. If the banking industry didn't have this standard, or if it were not used widely, the banking industry would not function nearly as efficiently as it does. It simply couldn't process, on a timely basis, the more than 32 billion checks we write each year.

Without standards, we undergo considerable difficulty and effort to make sure that replacement parts or new additions work harmoniously with the things we already have. Soon after the turn of the century, for example, Americans who had electric lights in their homes had to take their lamp fixtures to the store when bulbs burned out. It was

1/Magnetic Ink Character Recognition (MICR).

the only reliable way to find the right replacement bulb among the many sizes and shapes available. This inconvenience, like many others that accompanied the growth of an industrialized society, was gradually eliminated through the adoption of standards. With such standards, we can buy the same product from any of several sources. This permits the forces of competition in the free market to act to provide products at acceptable prices.

These principles also apply when we acquire and use computer systems. And, in the last few years ADP standards have been receiving increased attention, primarily because of the role they can play in increasing competition and in reducing conversion costs when changing vendors. Computer language standards often are cited as particularly important in reaching these goals; consequently, the work of CODASYL in developing and maintaining specifications upon which to base such standards takes on even greater importance.

Although this recognition has grown in the last few years, the Congress and the General Accounting Office (GAO) long ago recognized it in the passage of Public Law 89-306, known to many of you as the Brooks Act. The Brooks Act is the centerpiece for Federal ADP procurement and management. The Bureau of the Budget and GAO played an active role in the consideration of this Act, whose objectives are to provide for the economic and efficient acquisition and use of ADP resources by Federal agencies. Prior to passage of the Act

in 1965, GAO had issued about 100 audit reports revealing deficiencies in the acquisition and use of ADP. These reports provided part of the impetus for the legislation.

The Brooks Act established a link between ADP procurement and ADP standards by providing for a standards program to support and provide for more economical procurement of ADP resources. At the time the Congress was considering passage of the Brooks Act, one of the recognized problems in the overall management of the Federal ADP program was the lack of ADP standards. This problem was known to be serious almost from the time ADP equipment first was introduced in Government in the early 1950's. By 1965, the lack of ADP standards was believed to have seriously compromised the Government's overall ADP potential. The Brooks Act, therefore, called for an ADP standards program that would stimulate competition by permitting agencies to procure their ADP requirements from numerous vendors offering low-cost compatible products.

In April 1978, we issued a report 1/ on ADP standards and pointed out that competitive procurements have been hampered by a weak Federal ADP Standards Program. We found that Federal agencies have become "locked-in" to suppliers of computers and related services either because certain essential standards have not been developed or agencies were not

1/The Federal Information Processing Standards Program: Many Potential Benefits, Little Progress, and Many Problems, FGMSD-78-23, April 19, 1978

complying with existing standards. As a result, agencies often are faced with a "Hobson's Choice" of either making nomcompetitive procurements or making competitive procurements and incurring substantial costs to convert their computer programs and data for processing on a new manufacturer's system. Software conversion alone now costs the Government an estimated $450 million each year.

Competitive procurements of ADP by the Federal Government are at a very low level as a result of this situation. The House Government Operations Committee reported in October 1976 that only 36 percent of the procurements in 1975 were done on a fully competitive basis. More recent data shows that many procurements are still made on a sole-source basis.

Many "locked-in" Federal agencies are finding that without standards, conversion costs are exceedingly high, making it difficult to justify a change in vendors even with full competition. At one agency, for example, the annual lease cost of hardware and operating system software was about $4.8 million; under a fully competitive procurement, the cost might be reduced 15-20 percent--say 20 percent or about $1 million. The agency questions, "Should we spend $8.5 million to save a million or so?" The $8.5 million is an estimated cost to convert software and data files if a different vendor is selected. I could cite many other examples to illustrate this dilemma.

To digress for a moment--the question of how to handle conversion costs in determining the lowest bidder is of great concern to us at GAO and to the Congress. We are now studying a number of procurements with high conversion costs so we will have hard factual information on which we hope to propose some alternatives for resolving the issue.

Now, let me return to the issue of standards for a moment. At the agencies we visited in our study, the lack of standards or the failure to follow standards contributed significantly to the "locked-in" situation--that is, high conversion costs. Prominent among these standards are those for computer languages and data base management systems.

Now, as many of you nongovernment types may not realize, the Federal Government has only one approved high-level language standard--it is, of course, COBOL, a standard I know you recognize and one for which you deserve much of the credit. Unfortunately, we do not yet have approved for Government-wide use standard high-level languages for scientific, engineering, and other purposes. We also lack standards for data base management systems even though a variety of these systems are becoming increasingly common in Government. To be candid we need far more standards than we have now. Unfortunately, the process for developing standards takes a long time even under the best of circumstances. In our study we estimated that it takes about 5 years to develop a national standard.

Perhaps one of the greatest contributions you could make would be to suggest ways and means to shorten this process.

Progress in implementing existing standards has also left much to be desired. Many agencies still make considerable use of machine-dependent languages rather than high-level standard languages. Also, some agencies are using other high-level languages for their business systems in lieu of COBOL. Even those who are using COBOL are making extensive use of vendor-unique, nonstandard features of COBOL, which requires at least partial program conversion if other equipment is acquired.

The policy implication of this situation is indeed significant. Specifically, it is becoming increasingly difficult, in the absence of standards, to fully justify on a cost-benefit basis competitive procurements--our Government's basic procurement policy.

In spite of this rather dim picture, I want to emphasize that we, in Government, are deeply indebted to CODASYL for developing and maintaining the specifications upon which the COBOL standard is based. Judging by its acceptance as a Federal, national, and international standard, COBOL is probably one of the most successful and important standards ever developed. Your efforts in COBOL alone would be just cause for you to be proud and celebrate this 20th anniversary. But, your other efforts are not going unnoticed; we, in Government, and GAO in particular, are looking forward to the

results of your present and future work in developing and maintaining other language specifications in such areas as data base management systems and common operating systems.

The Executive Branch is now undertaking several initiatives to strengthen the Federal ADP standards program. Commerce has committed itself to a revitalized program and the Congress has authorized nearly a three-fold increase in funding for the program. The Office of Management and Budget (OMB) is giving more recognition to standards, and ADP is one of the major areas being addressed by the President's Reorganization Project.

These initiatives and those yet to come will require the concerted efforts of all of us because our conversion problems and the need to increase competition are still before us. And the process for developing standards generally does not respond in a timely fashion with the faster pace of changing technology. So, I urge you to increase your momentum and continue to help identify those language requirements and techniques that will minimize future conversion costs and increase competition; and expedite, as much as possible, the development of the specifications necessary for adopting standards.

At this point I would like to make a slight shift in subject and make a few comments on the importance of the user in standards-making activities.

THE IMPORTANCE OF THE USER IN STANDARDS-MAKING ACTIVITIES

In our study of standards, we continually confronted a problem, i.e., the difficulty of assuring an adequate level of user participation in the standards-making process. The user can ill afford not to be involved because he is the ultimate beneficiary of standards. Conversely, the user is the one who must eventually "pay the price" for a lack of standards. Most users, particularly the "small guys," cannot afford large conversion costs. Even those "large users"--such as major corporations and the Government--should not have to pay such costs when they can be minimized greatly by standards. Ultimately these costs are borne by the general public. Over the long term, a "locked-in" situation is an untenable position for any user, regardless of size. Users should always have the option and flexibility to switch vendors to take advantage of price changes and advances in technology.

The history of standards has shown that the development of specifications, and their eventual adoption as standards, generally can be done on a timely basis if users are actively involved. Your organization's efforts and the subsequent standardization of COBOL is a good example. As many of you know, the user has played a key role with the computer industry in developing and standardizing this language. For example, recapping some of your own history:

--The Department of Defense called the first meeting of CODASYL, and it has provided energetic leadership. Defense and many other users--both Government and and nongovernment--have participated regularly and actively over the years. Many have also provided logistical support. The Canadian government has provided printing services, and both the Navy and Air Force--as well as several commercial organizations--have supplied mailing services for many years. I understand that Jack Jones and the Southern Railway and many others have also made large contributions of time and resources.

--Users were instrumental in initiating steps to enhance the compatibility of the COBOL developed by computer manufacturers. The first COBOL compilers were not compatible because the manufacturers were free to include in their compilers whatever parts of your specifications they wanted. Working through your organization, users were able to get procedures established that identified those specifications that must be included if the manufacturer-produced language was to be called COBOL.

--Users also provided an incentive to the manufacturers to develop COBOL by requiring it to be provided with acquired equipment. For example, Defense issued a directive in September 1963 which stated that the

selection of computers for business applications would be limited to computers for which COBOL compilers were available.

These and other significant events occurred and continue to occur in COBOL largely because of active user involvement with the computer industry.

However, such success has not been evident in all standards activities. A case in point is input/output interface standards. Efforts in this area have spanned 14 years; a national standard still doesn't exist, and a Federal standard was adopted only a couple of months ago. During the first several years of this effort, no national standards emerged, largely because the major system manufacturers opposed them. At that time, these manufacturers dominated the membership of the technical committee responsible for developing the standards; user participation was low. A national standard was proposed recently, largely because smaller peripheral manufacturers began to dominate the membership of the committee. This group believes such a standard will help them better compete in the marketplace. User participation remained largely unchanged even though they too wanted such a standard.

In our view, active participation by users is critical to the successful and timely development of standards. However, it can be an expensive proposition, particularly for the "small guy"--whether he is a vendor or user. In our study we

estimate that Federal agencies other than the National Bureau of Standards (NBS) spend about $1 million yearly to attend and participate in various standards committees in the ADP area alone. The National Bureau of Standards spends several million more than this. Several peripheral manufacturers estimate that the cost for them to participate is at least $25,000 per person per year.

Hence the dilemma: the smaller user can least afford to be without standards, and is the one who cannot afford to participate in their development. So, I believe a high priority needs to be placed on devising ways for assuring active user participation in standards work. Short of that, ways need to be found for assuring that users'--particularly the "small guys"--requirements for standards are met.

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If we are to realize more fully the potential benefits that standards can provide, then we urgently need some answers to these issues. I believe your organization has the knowledge, experience, and foresight to help provide those answers. In summary, therefore, the challenges I wish to put before you are to

(1) identify and develop specifications for language standards that will minimize conversion costs and increase competition,

(2) suggest ways and means for creating specifications and standards more swiftly

without compromising quality and the achievement of user and manufacturer consensus, and

(3) find ways to provide greater user participation and to assure that the standards requirements of small users are met.

In the last 20 years we have seen a great deal of change, and we will see even more in the next 20. While it is difficult to make good predictions of these changes, I am content in the knowledge that your organization will continue to carve new paths and provide answers that will guide the Government and the country.

Your past history is distinguished; I wish you continued success and thank you again for asking me to help celebrate your 20th anniversary.