

DOCUMENT RESUME

07921 - [C3388469]

[The Navy's Management of Its Automatic Data Processing Program]. LCD-78-107; B-146796. December 1, 1978. 3 pp. + enclosure (13 pp.).

Report to W. Graham Claytor, Jr., Secretary, Department of the Navy; by Richard W. Gutmann, Director, Logistics and Communications Div.

Issue Area: Automatic Data Processing: Quality of ADP Products (108).

Contact: Logistics and Communications Div.

Budget Function: National Defense: Department of Defense - Military (except procurement & contracts) (051).

Organization Concerned: Department of Defense.

Congressional Relevance: House Committee on Armed Services; Senate Committee on Armed Services.

The Navy has made efforts to improve the management of its Automatic Data Processing (ADP) Program as a result of a 1975 GAO report indicating problems in this area. However, improvements have been slow in developing, and problems continue, such as: prolonged system developments, inadequate standard systems and the use of local programs to supplement the standard systems, and the acquisition of equipment that does not meet the needs of its users. The most significant factor which has caused these problems is the absence of an effective long-range ADP plan that deals with ADP requirements to support overall Navy objectives. The Navy has recently attempted to resolve some of the deficiencies by establishing centralized management. The Secretary of the Navy should: establish complete visibility of the Navy's nontactical ADP Program by including all general purpose computers under the Navy's nontactical ADP program budgetary and inventory control procedures; develop a Navy-wide long-range plan integrating the information requirements and equipment needed by the various commands, bureaus, and offices; evaluate the effectiveness of the Navy's standard management information systems in meeting the needs of users and provide for an effective strategy to correct system deficiencies; identify all central design activities and clarify their duties, responsibilities, and authority; and identify activities developing local computer programs which perform similar functions and evaluate the practicality of standardizing the programs. (HTW)



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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

LOGISTICS AND COMMUNICATIONS
DIVISION

B-146796

DECEMBER 1, 1978

The Honorable W. Graham Clayton, Jr.
The Secretary of Navy

Dear Mr. Secretary:

We have recently completed a follow-up review of the Navy's management of its Automated Data Processing Program.

In April 1975, we issued a report to the Congress entitled, "Ways to Improve Management of Automated Data Processing Resources" (LCD-74-110), indicating that the Navy was having difficulty achieving its Automatic Data Processing (ADP) Program's major objectives, particularly in its efforts to develop standard information and data systems to satisfy manager-user needs. The purpose of our current review was to assess the Navy's efforts to improve the management of its ADP resources.

While undertaking this work we reviewed Department of Defense, Department of the Navy, General Services Administration and other pertinent guidelines and regulations related to the planning for and management of automated data processing resources. In addition, we interviewed responsible officials within the Department of Defense and Department of the Navy and performed work at various naval installations located within the continental United States.

The Department of the Navy uses over 1,160 general purpose computer systems located at 317 Navy activities primarily for logistic and administrative functions. Since 1959, the Navy has spent more than \$3.0 billion--and in fiscal year 1978 reportedly spent about \$471 million--to operate and maintain these computer systems and to design and develop the associated information systems.

The enclosure contains details on our findings regarding the current management of the Navy ADP Program. Our work may be summarized as follows. Improvements in the

LCD-78-107
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management of the Navy's ADP Program have been slow in forthcoming. The Program continued to experience prolonged system developments; inadequate standard systems and the use of local programs to supplement the standard systems; and acquisition of equipment that does not meet the needs of its users.

The most significant factor which has caused these problems, in our opinion, is the absence of an effective long-range ADP plan that addresses ADP requirements to support overall Navy mission and objectives.

The Navy has recognized the deficiencies in its ADP Program management and has recently attempted to resolve some of them by establishing a Data Automation Command to centralize its Program's management. However, due to the short period of existence of this Command, it is too early to tell how successful it will be in eliminating these problems. Our recommendations to you pertaining to those matters which we believe the Command should address are as follows:

- Establish complete visibility of the Navy's non-tactical ADP Program by including all general purpose computers, regardless of the purpose for which they are used or the Federal Supply Schedule from which they were acquired, under the Navy's non-tactical ADP program budgetary and inventory control procedures. This would include the general purpose computers currently classified by the Navy as "special purpose" equipment and computers acquired by Government contractors. This would exclude computers integral to a weapons system.
- Develop a Navy-wide long-range plan integrating the information requirements and equipment needed by the various Commands, Bureau's and offices. The long-range plan should define and prioritize the system development activities underway and planned, giving recognition to the known and future information needs of local commanders.
- Evaluate on a system by system basis the effectiveness of the Navy's standard management information systems in meeting the needs of systems users and provide for an effective strategy to correct system deficiencies, including if necessary, redesign.

- Identify all central design activities and clarify their duties, responsibilities and authority with regard to designing, developing, and supporting the Navy's standard management information systems.
- Identify those activities now developing or processing local computer programs which perform similar or identical functions and evaluate the practicality of standardizing these programs.

We did not solicit formal comments on the enclosure from the Department of the Navy; however, the Navy provided us with informal written comments and we discussed our conclusions with numerous Navy officials. While the Navy disagrees with some of our conclusions, it agrees that improvements can and should continue to be made in the Department's ADP program, and it stated that our recommendations closely correlate with measures already implemented or planned. Since there is agreement concerning our recommendations, we have not addressed in detail the responses by Navy officials, but we have modified the report to reflect their comments where we believed it appropriate.

We invite your attention to the fact that this letter contains recommendations which are set forth in the enclosure. As you know, section 236 of the Legislative Reorganization Act of 1970, requires the head of a Federal Agency to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of this letter and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of this letter.

Copies of this letter are being sent to the Committees indicated in the previous paragraph, to the House and Senate Committees on Armed Services, and the Secretary of Defense.

Sincerely yours,



R. W. Gutmann
Director

Enclosure

MANAGEMENT OF DEPARTMENT OF NAVY'SADP PROGRAM

The Department of the Navy ADP Program addresses the development, acquisition, management, use, and reuse of general purpose ADP resources. These resources are intended to provide Naval Commanders the essential automated support necessary to plan, organize, command, coordinate and control other resources such as personnel, aircraft, weapons and ships in support of assigned missions.

The Assistant Secretary of Navy (Financial Management) is designated as the Senior ADP Policy Official and is responsible for administration of the Department's ADP Program in conformity with Department of Defense policy.

ADP Program Management

Between 1963 and 1968, the management of the Navy's ADP Program was shared between the Chief of Naval Material and the Office of Management Information. There was no central point within Naval Operations to direct ADP policy and oversee the management of general purpose computer systems. Therefore, in January 1968, the Director, Information Systems Division (OP-91) was established to centrally manage the Navy's non-tactical ADP Program within the Office of the Chief of Naval Operations.

The creation of OP-91 resulted in three headquarters staff offices dealing with general purpose computer systems--Chief of Naval Material, Office of Management Information, and OP-91. This management arrangement resulted in duplicate actions and time delays.

To correct the situation, the Chief of Naval Operations directed the Office of Management Information to merge with OP-91. Additionally, OP-91 was assigned responsibility for providing ADP support to (1) the Assistant Secretary of the Navy (Financial Management) as Director, Department of the Navy ADP Management; (2) the Vice Chief of Naval Material, to manage the Naval Material Command's ADP Program; (3) the Director of Program Planning, for overall management of the Navy ADP Program under the Chief of Naval Operations; and

(4) the Director, Command and Control and Communications, as his Information System Coordinator. The key concept within this reorganization was that the Chief of Naval Operations, through OP-91, would maintain a strong central ADP organization and enforce ADP policy.

The new organizational arrangement proved to be ineffective. Due to the demands for ADP support by each superior, OP-91 could not effectively provide the essentials of centralized management such as policy planning and compliance, equipment procurement guidance, and standardization of information systems.

Since there was a lack of centralized direction, guidance, and leadership, individual commanders began to satisfy their own needs independent of the needs of the other commands and without regard to the Navy's overall program mission and objectives. This decentralized approach created organizational barriers which promoted parochialism and non-compliance with established ADP policy and procedures. This same approach precluded the establishment of overall visibility of ADP resources in the Navy; the development of an effective Navy-wide long-range plan; and it fostered ADP Program deficiencies. Such Program deficiencies include: (1) prolonged and uncoordinated system developments, (2) inadequate standard systems and the use of local programs to supplement the standard systems, (3) ineffective use of central design activities, and (4) the acquisition of equipment without proper planning or taking advantage of modern processing capabilities.

Lack of Centralized Visibility of Available ADP Resources

The Department of the Navy uses about 1,160 off-the-shelf commercially available computer systems located at 317 Navy activities. The Navy ADP Program, as defined, does not include computer systems: (1) integral to a combat weapons system (tactical ADP resources) 1/, (2) used for "special purposes" (standardized general purpose ADP

1/ADP resources integral to a combat weapons systems from design, procurement, and operational viewpoint. These resources are managed separately.

equipment "ruggedized" for use on board ships, or research and development experiments), and (3) acquired by Government contractors.

Approximately fifty-three percent of the 1,160 computer systems are categorized by the Navy as "special purpose" and therefore, are not included in the Navy ADP Program budget or inventory control procedures.

Additionally, many Navy installations acquire equipment, classified by the computer industry as mini-computers or computer related, from the General Services Administration Supply Schedules which classify this equipment as communications items, test instruments, photographic items, or office machines. The equipment is procured through the use of general plant equipment funds or Navy industrial funds, rather than ADP funds, and therefore, does not require normal ADP approval channels or inclusion in the ADP Program's inventory.

The procurement of the mini-computer equipment from Federal Supply Schedules is within existing Government rules; but, the acquisition of such equipment without centralized accountability and management visibility reduces the Navy's ability to utilize larger computer equipment, which was programmed to support such Navy installations as Air Rework Facilities, for other Navy-wide mission essential purposes. The Navy is not aware of the total amount of the non-tactical ADP resources available in its Program and how and where those resources are being used.

Establishing centralized visibility of available non-tactical ADP resources within the Navy can serve as a starting point for the preparation of an integrated long-range Navy-wide plan for the use of those resources.

Lack of Navy-Wide Long-Range ADP Plan

The development of complex ADP information systems and acquisition of associated computer equipment requires the identification and continuous updating of basic information and processing requirements on a Navy-wide basis. The absence of an effective integrated Navy-wide long-range plan allows activities to develop and acquire their own systems without regard to the Navy's overall program objectives and management needs.

In February 1970, the Deputy Secretary of Defense directed that each of the military services develop a long-range plan to provide a reliable means for monitoring information systems over their life cycle and for identifying problems that cause cost overruns and prolonged delays to systems under development.

The need for a long-range ADP plan was also recognized by the Navy's Senior ADP Policy Official. In June 1975, he directed that a single, coordinated Navy-wide long-range ADP plan be initiated.

The Navy has not developed an integrated long-range plan for its ADP Program. However, at our close-out conference, the Navy's Senior ADP Policy Official informed GAO that positive action is again being taken to develop a Navy-wide long-range plan, and it is expected to be completed in late 1979.

The absence of effective centralized management direction, guidance, and leadership and long-range ADP planning are responsible, we believe, for numerous development and operational ADP Program deficiencies. These deficiencies are amplified below.

Partially Developed Standard Systems

The Navy has been unable, in a number of functional areas, to develop and implement many of its standard management information systems in a timely and cost effective manner. For example, since 1964, a system for use by Naval Air Rework Facilities has been in continuous development and has encountered numerous delays and cost overruns. Operations and development costs, as of October 1977, are estimated at \$123 million and only portions of the standard system have been developed at each of the six Naval Air Rework Facilities. Another system that has been in continuous development since 1965, is the Management Information System for Ordnance Production Activities. Operations and development costs, as of July 1977, are estimated to be over \$100 million.

Prolonged development of computer based systems is not economical and the benefits originally anticipated are not achieved.

The Navy's position regarding prolonged system development cycles has not changed since our previous report to Congress "Ways to Improve Management of Automated Data Processing Resources," LCD-74-110, April 16, 1975. The Navy contends that it is not practical to evaluate large-scale ADP systems from a viewpoint that systems development is not complete until all original objectives of the total system have been met. If portions of the system are operational, then the system should no longer be considered under development.

However, in evaluating systems development we used the same criteria the Navy has promulgated through its ADP Program since 1959. This criteria outlines the major steps of systems development which includes instructions for planning the objectives and meeting the milestones of the system project.

We believe that in order to achieve maximum benefits from standard systems the Navy must establish a centralized monitoring program to insure that all possible management actions are taken to meet milestone completion dates and cost projections and satisfy the users' needs.

Uncoordinated System Developments

The Navy has undertaken the development of an automated data processing information system to implement and integrate its "Total Force" management concept. The "Total Force" management concept requires the concurrent consideration of all elements of manpower and personnel--officer, enlisted, reserve, and civilian--to determine the composition of the force needed to accomplish the Navy's assigned missions in support of National strategies. The "Total Force" management concept is intended to control Navy personnel resources, both military and civilian, active and reserve, from recruitment to retirement.

The Bureau of Naval Personnel is developing a comprehensive personnel management information system called "The Advanced Information System" as the vehicle to support the "Total Force" management concept.

At the same time the Bureau of Naval Personnel was developing the Advanced Information System to control naval personnel resources, both military and civilian, the Office of Civilian Personnel was developing a similar civilian per-

sonnel management information system. This uncoordinated effort was cited in our report to Congress, "The Navy's Advanced Information System--A Personnel Management Information System For The 1980-1990's," LCD-78-122, September 18, 1978. The Director of Civilian Personnel has agreed to consider coordinating the development of their system with the Bureau of Naval Personnel.

Such uncoordinated effort, besides being an unnecessary duplication, could be very costly to redesign or convert for use in another system. Additionally, such uncoordinated effort could lead to the development of so-called standard systems which do not in fact meet all of the users basic information requirements and consequently must be supported by local programs.

The Use of Local Programs to Supplement Standard Systems

Uniform or standard management information systems provide numerous benefits when applied to multiple activities performing the same or similar functions. Secretary of the Navy Instruction 5231.1 provides uniform guidelines for developing and implementing all automated information systems in the Department of the Navy. This instruction directs that automated information systems being developed should consider the needs of all users in the Navy whose requirements are compatible.

However, if not properly designed and implemented, manager-users of the standard information systems are usually dissatisfied with these systems. Their dissatisfaction results from the fact that these systems do not provide reliable information in a timely manner to be of value in making day-to-day decisions, nor do they meet all of their basic information requirements. An example of such standard systems is the Management Information System used by Naval Air Rework Facilities whose development problems have previously been discussed. To supplement the standard information systems and to obtain the basic information they need on a day-to-day basis, these manager-users develop local computer programs to satisfy their individual needs.

Local programs are computer programs developed by an activity to replace, supplement or augment standard management information systems. They are developed to meet local

requirements (which may exist at multiple activities); however, the local programs are not distributed as part of the standard system.

Development of computer programs to satisfy local requirements often duplicate the same or similar functions performed at other Naval activities. For example, the following table shows the number of programs used by two of the Naval Air Rework Facilities.

<u>Standard system</u>	<u>San Diego</u>		<u>Norfolk</u>	
	<u>Local programs</u>	<u>Standard programs</u>	<u>Local programs</u>	<u>Standard programs</u>
Workload control system	61	231	65	201
Material system	222	52	18	52
Financial system	<u>73</u>	<u>0</u>	<u>63</u>	<u>0</u>
Total	<u>356</u>	<u>283</u>	<u>146</u>	<u>253</u>

As shown, each installation supplements the standard system with, or provides, a substantial number of locally developed programs, many performing the same or similar functions. These duplicate systems development efforts constitute costly and wasteful utilization of ADP resources.

In response to our previous report to Congress, "Ways to Improve Management of Automated Data Processing Resources," LCD-74-110, April 16, 1975, the Assistant Secretary of the Navy (Financial Management) informed GAO that the Navy was going to control the number of local programs being developed and, where feasible, replace local programs with standard systems. However, the Navy has not instituted centralized management visibility over the development of local programs. Since 1975, in the activities which we reviewed, a total of 355 new local programs have been developed.

During our close-out conference, Navy officials informed GAO that they are actively pursuing the elimination of redundant local systems; however, it will be a long term objective to be resolved in an evolutionary manner through development of uniform systems.

The Navy has had very little success in standardizing information systems to meet the needs of the user because, in our view, there has been a lack of centralized direction and guidance over the staffing resources responsible for designing, developing and maintaining standard systems.

Ineffective Use of
Central Design Activities

Navy policy requires that automated data systems be centrally designed, developed, and maintained. To implement this policy several of the Navy's major commands have established central design activities.

Central Design Activities (CDA's) are responsible for (1) designing, developing, and maintaining information systems which are common and standard within or between one or more commands and (2) providing effective standard management information systems to support functional organizations--shipyards or air rework facilities--throughout the Navy.

Some of the CDA's staffing resources are dispersed throughout the Navy's 317 data processing installations. Many of these installations are dedicated to providing data processing support to a single functional organization where these installations are located. As a result, these staffing resources tend to be more responsive to the needs and priorities of either the local installation commander or the functional organization manager rather than to the CDA to which they are assigned.

Thus, while the central design activity has the overall responsibility for the design and development of standard systems it lacks adequate authority over the programming staffs on which it must rely. Local interests are of primary concern rather than the needs of the central design activity and the development and maintenance of the standard systems.

An example involves the CDA that supports the Naval shipyards. As subsequently discussed on pages 9 and 10, the shipyard management information system was not responsive to the needs of the manager-users. Corrections of simple deficiencies, which should have been taken care of by the CDA, would take months and major improvements and changes would take years to complete. Instead of providing adequate staffing for the CDA, the Navy allowed program managers to use

these staffing resources to develop local programs which augmented the standard information system to meet local needs.

Therefore, each local installation commander or functional manager has optimized his own individual use of these staffing resources, but in so doing has suboptimized the efficient and effective utilization of these resources throughout the Navy as a whole.

During our close-out conference the Navy officials stated that long term action is planned for phased reassignment of local design personnel, where appropriate, to central design activities to facilitate the further development of standard systems.

Lack of Proper Planning for
Computer Equipment Procurement
and Subsequent Software Conversion

Before acquiring new computer equipment, it is first necessary to identify the information needs or requirements of known and anticipated users. A formal long-range plan based on functional specifications, rather than restrictive hardware specifications, to support users' projected missions and programs serves as a foundation in establishing these requirements.

Additionally, Department of Defense Directive 4105.55 and Secretary of the Navy Instruction 5236.1A require computer programs to be redesigned when new computer equipment is acquired. Acquisition action which does not provide for redesign at the time of installation must be accompanied by documentation supporting the decision, including estimated costs for redesign and a plan identifying appropriate tasks and milestones for early redesign subsequent to installation.

In 1972, the Navy acquired new computer equipment (Honeywell 6060) for each of its shipyards to replace old computer equipment considered to be obsolete and inadequate to meet users' needs. This equipment was needed to process the Naval Shipyard Management Information System.

The shipyard information system was developed in 1963. Its design did not take full advantage of the new computers' processing capabilities, such as systems scheduling or multi-programming which allows up to 63 jobs to be in concurrent

execution. However, the Navy converted this system to the new computer equipment (1) even though it was aware of the system's needed improvements, and (2) without a plan for future redesign.

Subsequent to converting the standard system to the Honeywell 6060 computer equipment, shipyard managers realized that the standard system would not meet their requirements and, therefore, began designing and developing local programs to supplement the standard system.

Recognizing these and other constraints, the Navy developed a "Five Year Management Plan" in 1975 for redesign of the Shipyard Management Information System. However, during our close-out conference, Navy officials advised GAO that the Honeywell 6060 computer equipment would not be sufficient to process the redesigned shipyard standard information system and would need either an interim upgrade or replacement computer system.

The lack of proper planning and compliance with established ADP procedures not only will involve the cost of a larger computer system for the shipyards, but also the probable cost of a second conversion.

In another case, more recently, the Navy, in March 1977, acquired UNIVAC computers for its six data processing service centers to replace 26 obsolete computer systems. Each service center provides primary functional ADP support to a single Air Rework Facility and other Navy customers within its geographical area.

At one of the Rework Facilities we visited, a Navy official stated that the UNIVAC procurement would not totally satisfy the Rework Facility's information processing needs and, therefore, they had to supplement the UNIVAC procurement by acquiring mini-computers to support such applications as the Computerized Workload Planning and Budgetary System.

The major processing application to be placed on the UNIVAC computers is the management information system for use by Air Rework Facilities, whose development problems have previously been discussed. This information system is presently being converted to UNIVAC computer equipment without redesign or a plan for subsequent redesign.

Both Department of Defense and Navy directives make the determination on systems redesign (as opposed to conversion not preceded by redesign) an optional one. However, the option to replace ADP equipment without immediate data system redesign, if appropriate, is only temporary. The directives do indicate that redesign subsequent to installation is required.

Navy officials stated that the information systems which supports Air Rework Facilities would not benefit from parallel redesign and conversion to the new data processing service center equipment. This conclusion may be justifiable, however, in its present partially developed condition, the information system is not effectively supporting the Air Rework Facilities. Therefore, it may not be cost effective to convert the present system at all. An alternative that the Navy should have considered, in our opinion, is the development of a new management information system for use by Air Rework Facilities.

Need to Resolve ADP Management Deficiencies

The management of the Navy's ADP resources received considerable criticism from the Congress, the Office of the Assistant Secretary of Defense (Comptroller) and the General Accounting Office. Such criticism included (1) allowing standard systems to be unnecessarily modified by local commanders, (2) producing inadequate information system design; (3) inadequately justifying system efforts; and (4) failing to control ADP growth.

The Navy also recognized the deficiencies in the management of its Automated Data Processing Program. In an effort to help resolve these deficiencies, the Chief of Naval Operations established a Staff Study Group, headed by the Assistant Vice Chief of Naval Operations--Director of Naval Administration, to determine whether another reorganization of the ADP Program management structure was necessary. In June 1976, the Group issued a report and stated that the Navy's decentralized ADP management structure fostered immobility, duplication of effort, inadequate career development and the maldistribution of computer resources. The Group also concluded that decentralized management of the large automated data processing installations has made it difficult, if not impossible, to accurately forecast overall

Navy automated data processing requirements, and to develop and implement a consolidated long-range ADP plan. The Group submitted various recommendations; among them was the establishment of a Data Automation Command under which to centralize the management of those resources.

Following an evaluation of the Study Group report, the Secretary of the Navy, on January 1, 1977, announced the establishment of the Naval Data Automation Command to centralize the management of the Navy's ADP resources.

CONCLUSIONS

The Department of the Navy recognized the deficiencies created within its ADP Program because it lacked a strong centralized ADP activity to provide leadership, direction and guidance and the ability to develop an integrated long-range Navy-wide ADP plan. These ingredients are necessary to develop timely and efficient information systems and to provide Navy commanders the kinds of ADP support they need to accomplish their assigned missions.

The Navy did respond positively to these needs by establishing the Naval Data Automation Command to centralize the management of the Navy's ADP resources to insure that these resources are controlled and coordinated Navy-wide by one command.

We recognize that the Naval Data Automation Command did not begin to acquire professional staff until about October 1977, and is at present, not yet fully staffed. We could not, therefore, ascertain that the Command will or will not be successful in eliminating the Navy's ADP Program deficiencies. However, many problems remain for the Command to address. The following recommendations pertain to those problem areas, previously discussed, which we believe require continuing attention by top level Navy management.

RECOMMENDATIONS

We recommend that the Secretary of the Navy direct the Senior ADP Policy Official to:

- Establish complete visibility of the Navy's non-tactical ADP Program by including all general

purpose computers, regardless of the purpose for which they are used or the Federal Supply Schedule from which they were acquired, under the Navy's non-tactical ADP program budgetary and inventory control procedures. This would include the general purpose computers currently classified by the Navy as "special purpose" equipment and computers acquired by Government contractors. This would exclude computers integral to a weapons system.

- Development of a Navy-wide long-range plan integrating the information requirements and equipment needed by the various Commands, Bureau's and offices. The long-range plan should define and prioritize the system development activities underway and planned, giving recognition to the known and future information needs of local commanders.
- Evaluate on a system by system basis the effectiveness of the Navy's standard management information systems in meeting the needs of systems users and provide for an effective strategy to correct system deficiencies, including if necessary, redesign.
- Identify all central design activities and clarify their duties, responsibilities and authority with regard to designing, developing, and supporting the Navy's standard management information systems.
- Identify those activities now developing or processing local computer programs which perform similar or identical functions and evaluate the practicality of standardizing these programs.