HP/3000 USERS GROUP MEETING

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THE UTILIZATION OF THE HP/3000 AT PROMON - A BRAZILIAN ENGINEERING CONSULTING COMPANY.

DENIS F LEITE
PROMON
BRAZIL

ABSTRACT

PROMON was not the first company to have installed an HP/3000 but it is surely one of the first to consider it for installation.

The environment where the HP/3000 is located is described. PROMON's characteristics: organizational structure, size, its main projects, etc. are mentioned as well as its computing past.

A description was made of the characteristics of its work and how a hypothetical computer, to best fit PROMON's needs, was derived, based on past experience.

The difficult decision process of buying the HP/3000, how well it fit the profile and the purpose of its usage.

The work being developed since it was installed, in August/74, the accomplishments and drawbacks, both in Engineering and Administrative Aplications.

The computing future at PROMON after six months of experience with the HP/3000.

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HP/3000 USER'S GROUP

1

PROMON'S ENVIRONMENT

Organized in 1960, PROMON is today a leading consulting engineering firm in Brazil, with a multidisciplinary staff that numbers some 1700 people, including some 600 professionals, offering a wide range of services in many areas for the economy.

PROMON is wholly owned by its staff and acts as a fully independent firm.

PROMON has been experiencing significant growth in the past few years. Approximately 2,000,000 hours of engineering and architectural work were produced for over 70 major clients in 1974.

Development

In view of its activities, the structure of its ownership and its market, PROMON can be considered not only as a consulting firm but also as as technological development center.

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In effect, its activities include conception, study and development of engineering techniques applicable to a wide range of problems. PROMON's development is, therefore, closely dependent upon the technological capability of its professionals. The broader their knowledge and skills, the more significant will be the contribution of the company in the projects in which it participates.

Because of the structure of its ownership PROMON is really a community of professional people. It belongs exclusively to its staff members, with approximately 400 stockholders at present, whose individual participation does not exceed 8%.

PROMON's market encompasses, basically, those companies - in Brazil and abroad - which are in a position to invest in large scale projects. As a consulting engineering firm, PROMON shares many common points with them, acting often as an extention of the client's organization.

Offering technology as its end product and operating in a market where government companies prevail, it is only natural that PROMON's objectives should approach those of technological centers and institutes. In this respect, it should be noted that, at present, some 50 PROMON staff members teach in Brazilian Universities.

The firm's technological capabilities, which make possible its participation in projects such as Brazil's first Nuclear Power Plant at Angra dos Reis, are largely due to its long-standing policy of setting aside substantial funds for technological advancement.

Operations

From approximately 160 projects conducted by the company during 1974, the following deserve special mention:

Furnas Centrais Elétricas S/A - Continuation of work on the design of the Nuclear Power Plant of Angra (626 MW) and of the hydroelectric power plant of Marimbondo (1,400 MW), the latter in association with Chas.T.Main, Inc.

Centrais Elétricas de São Paulo S/A - CESP - The detail design for the hydroelectric power plant of Água Vermelha (1,380 MW), in association with Themag Engenharia Ltda.

Telecomunicações Brasileiras S/A - TELEBRÁS - Master Plan of Telecommunications for the States of São Paulo, Piauí and Maranhão.

Telecomunicações do Estado de São Paulo S/A - TELESP - Master plan and basic design for the main telecommunications system of the State of São Paulo metropolitan area and design of the telecommunications system for the Baixada Santista.

Companhia de Telecomunicações do Estado de São Paulo - COTESP - Design and project management of the telecommunications system in the area under COTESP's jurisdiction.

Petroleo Brasileiro S/A - PETROBRÁS - Design of the Marine Terminal of the Baía da Ilha Grande in Angra dos Reis and of the cold storage and handling facilities for petroleum gases, as well as of the electrical design for Santa Catarina-Paraná pipeline stations.

Petrocoque S/A - Industria e Comércio - Continuation of work on the design and installation of the petroleum coke calcining plant, in Cubatão, São Paulo.

Companhia Petroquimica Brasileira - COPEBRAS - Design of a substantial part of a fertilizer complex in Cubatão, São Paulo.

Companhia Vale do Rio Doce - Several design and inspection services, specially for the iron ore fines concentration plant in Itabira, Minas Gerais.

Companhia do Metropolitano de São Paulo - METRO - Continuation of work on the detail design of Section 3 of the São Paulo Rapid Transit System; it should be noted that PROMON has participated since 1967 in the studies for the construction of the rapid transit system in São Paulo.

Ford Brasil S/A - Design of the foundry and engine plant in Taubaté, São Paulo.

Finance

The company's net revenue in 1974 totaled CR$ 190,000,000.00 representing an increase of 108% over the previous year.

The great expansion of the year when the total staff grew from 1000 to over 1700 people, was financed with the company's own funds.

Conclusions

Market prospects for PROMON are very favorable. Present backlog, as shown in the Financial Statements, totals CR$ 220,000,000.00 assuring the company of continuous development and growth.

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PROMON'S COMPUTING SERVICES

Basic Decisions

Following is a summary of Promon's present data processing activities after 7 years of systematic use of batch machines in service bureaux, for administrative tasks as well as for engineering applications.

During the year of 1967/1968, the first isolated initiatives to use data processing services were made. Thus, the BULL/GE bureau was requested to process the payroll and produce reports on man-hour control and project cost allocation. The bureau was responsible for the analysis, programming, testing and operation of these jobs. Engineering applications were initiated upon request of a few interested users, as piping engineers, who needed a program for pipe stress analysis, using matrix inversion techniques. By the end of 1968, a systems analyst was hired to centralize all effort for the development of a computer program library for internal use.

Data processing services at PROMON started, therefore, with the more typical and widespread computer applications: payroll and matrix inversion.

Two basic points were emphasized in our approach:

a) the existance of a centralized work-team
b) the absence of an in-house machine.

The fact that this working team was centralized allowed a global idea of company wide needs, in engineering as well as in management.

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The absence of an in-house computer, on the other hand, permitted our personnel to think in terms of company needs, not machine needs. Avoiding hardware acquisitions was a deliberate policy made to avoid a commitment that would have been premature because of our limited experience and of the small volume of work being done.

During these years, our competitors acquired their first computers, all based on the IBM 1130 system. Ar first sight, PROMON was placed in a disavantageous position. What was really at stake was a deep-set belief that the choice of a computer should be the consequence of knowledge gained from direct experience.

There is, however, a great difference on how the development of a data processing department is regarded within the company depending on whether it has its own machine or not. In the first case, it is common belief that this development will be achieved through an increase on existing facilities (a typical example would be to expand from an IBM 1130 to an IBM/370-135). The existing system imposes constraints that inhibit consideration of alternatives. This frequently results from the great initial effort spent in making the first equipment operational; pride of achievement and the status obtained by the team in charge encourages a rigidity in outlook that makes it very difficult for the same team to abandon an on-going process and start on an entirely different one. Therefore, the first installed computer determines, to a great extent, the future development of data processing activities in the company; and its selection should then be handle with extreme care.

This selection can be done under the most favorable conditions by those that have chosen the bureau as their learning method, as long as their ambition is not simply to reproduce a bureau in their own center.

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Administrative Area

Up to the end of 1969, the only administrative computer services were those offered by the BULL/GE bureau, and even at that time those services were not satisfactory; at the BULL system start-up, the company had only about 150 employees and one standard way of invoicing; in December 69 the number of employees exceeded 400 and many other ways of invoicing had become necessary, making the reports produced by the bureau practically useless. As the services had been introduced assuming the existence of rigid processing rules, it soon became inadequate and modifications were almost impossible.

Another problem regarding bureau use was to keep under control response time and processing quality, since PROMON did not directly participate in the operation. The computer used, GAMMA 10, could not accomodate any development and backup was nonexistent for practical. purposes.

From this first experience, it was necessary to establish new guidelines for developing applications for the administrative area. Three decisions were taken:

- to transfer the responsibility for program development, implementation and operation to PROMON's EDP group - the company should have its own personnel and only rent computer time from the bureau;

- definition of more flexible programs - which would, therefore, be more stable and would make changes in the final products possible, thus being able to follow the growth and to accomodate new needs of the company without heavy maintenance requirements.

- to use IBM/360 series in DOS, because of availability and backup considerations.

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From de end of 1969 until 1972 that had been the approach taken, which resulted in a working team, consisting of 2 analysts, 2 programmers, one operator and two key-punch operators.

The permanent files in use are all sequential and updated monthly: Personnel, Financial, Time Sheet, Cost/Revenue and Forecast.

Based on those files, the following services were being performed using COBOL and ASSEMBLER programs: Payroll, Invoicing, Project/Production Control, Queries and Forecast.

All these services, in a certain way, were based on the BULL services, and, although they have given origin to more sophisticated files and computer programs, they were not based on new concepts. The benefits have originated more from the availability of the new bureau computer than from any general idea regarding services to be rendered. Essentially, we kept on considering the whole company as inflexible and cyclic system. The programs, presently more resourceful, allowed important variations on processing results, but call for more time of high-cost personnel for the preparation of tables and parameters to guide its execution.

We found out that even for the administrative data processing, batch machines were not apropriate.

a) they are not suitable for data aquisition, and their processing power is of little relevance since the volume of data is relatively small;

b) they lack resources for the implementation of a query system. In PROMON, this activity is at least as significant as the basic cyclic processing.

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Engineering Area

The computer was first used for engineering problems in 1962, using canned programs. The first programs developed in house, in 1969, helped solve very complex problems where there was no alternative but to use the computer. These jobs were concentrated in the civil engineering area.

Having thus made available the more critical programs, a more systematic effort was started in mid-1970 to identify and establish priorities for new applications. The organization of the group (3 engineers and a programmer) in 1972, and of the existing program library reflects the following decision taken at this time: to work in "closed shop", whenever possible; use canned applications; to work in a vertical basis; to assign liaison engineers in the production areas.

The existing library was formed by 3 types of program: PROMON's Programs, Packages and Adapted Programs.

Initially the library was physically located in the same bureau where administrative applications were being performed. As its initial use was infrequent, being restricted to complex programs only, the response time was not too critical. However, once the frequency of small programs started to increase and the average number of runs per day reached 3 or 4, the time lag between filling out the forms and getting the printouts became critical. It was necessary to transfer the library to another bureau that did not work in block time only, and that allowed immediate response. Thus, programs are today available at a /360 - mod. 65 in an IBM bureau, operating in OS.

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CHARACTERISTICS OF PROMON'S WORK

Besides the conventional use of computers in the mechanization of administrative routines and the solution of complex scientific problems, there are some other important aspects in Promon's environment :

- projects tend to be non-repetitive, of short duration and frequently require new skills. Consequently, the entire company organization must have characteristics of great mobility, making it difficult to define and maintain procedures; thus, the use of computer within the conventional framework of mechanization of routines would result in severe limitations of its potential: first, the services would be limited to only some tasks such as payroll, accounting, and general control reports; second, the maintenance costs caused by frequent changes in the company would be high if compared to the small amounts of data to be processed;

- projects start and finish at random dates, generate data in random dates and require control information also in random dates. This suggests a data entry/data retrieval system independent of time cycles, with characteristics similar to those of real-time processing. However, the applications generally implemented in batch machines are routines related to cyclical administrative processing, usually in a monthly basis, thus presuming data collection and reporting in the same cycle;

- projects in Promon are of variable nature and importance. This means that not all of them require the same control procedures. However, in batch processing it is extremely convenient that the company be treated as a whole; thus a single error in a relatively unimportant area may delay the whole process. The processing itself is fast but preparation of files is slow and difficult. The company loses responsiveness and reports are systematically late;

- projects are performed in separate physical locations. This requires the establishment of direct communication means between each location and the data processing center, since the EDP facilities must be available for the whole company. If the EDP center uses batch machines, its physical zone of influence will be restricted to only the adjacent areas, or at best, to areas located in the same city.

- projects require only a small amount of complex calculations. The use of the computer for some calculations is indispensable, but this does not mean a full utilization of computer in a project. The use of the computer for complex calculations reveals in fact a discontinuity in the computing aids available for the engineer: on one side, the slide rule and the desk calculators, on the other, a computer of high performance but of difficult access (not only physically but technically).

Traditional data processing centers do not meet then the needs of medium and small-sized calculations; for this kind of computations, ease of access to the computing facilities is more important than the actual processing capacity of the facilities. It is also very important to recognize the conversational nature of many problems, impossible to satisfy when using batch machines. At present, engineering applications satisfy only a small number of users, in a small number of projects within a short space of time. The attempts to extend use of the computer to some simpler and more frequent applications have not succeeded in many cases. The delay in getting answers has caused the engineers to abandon the use of several programs.

If these points are ignored, the processing center must become restricted to a marginal role in the company, and its existence and development are limited to a narrow range

of uses. Cost displacement analysis becomes the only criterion for the choice of computer applications, and break even calculations would indicate when to switch from service bureaus to an in-house machine.

In a company like PROMON, this narrow concept of data processing activities was thought, in the long run, to be harmful, and was replaced by the definition of the computer as a generalized information processing machine and as new communications medium. Significant progress is being made today in the use of computer system using this new approach and we are convinced that far-reaching benefits can be expected from a made of operation that stresses man-machine interaction.

It is within this framework that hardware choices were considered in PROMON leading toward time-sharing oriented machines, and not toward batch-oriented machines.

It is also in this context that two long range goals should guide the data processing center activities:

- the implementation of a management information system;
- the development of the company's ability to use advanced computer-aided design techniques.

"Information Systems" are today a rather controversial subject.

Although an integrated information system may appear to be a distant objective, the set up of a MIS Project seems to be the best approach to develop data processing services in the management area.

In the same sense, the engineers do not yet use displays to produce drawings, but should start getting acquainted, through the use of terminals, with computer potentialities, thus preparing themselves to more advanced ways of computer utilization.

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SPECIFICATION OF A HYPOTHETICAL COMPUTER

Applications

It is possible to identify a wider group of applications for a terminal-oriented computer system than it would be possible if only mechanization of routines or the solution of complex engineering problems were being considered.

These applications cover such a large array of processing techniques and require such varied machine characteristics that the difficulty of keeping the cost/performance ratio at adequate levels for all applications in a single equipment soon becomes evident.

One feasible solution would be a combination of a small in-house machine and a large machine in a service bureau. The problems exceeding the capacity of the in-house system could be transferred to the bureau. Even in these cases, PROMON's machine could be used for data preparation and for listing of results. The transfer of the job to the bureau could be made either by physical transportation of tapes or by the use of some kind of inter-machine communication system. We could eventually arrive at a type of solution in which the user would not know where his processing is being made.

The integrated combination of two machines depends however on the interest that the bureaus might have in this kind of service and on the availability of good telephone communications. In São Paulo, this combination of machines is difficult presently, and also would represent a degree of sophistication that is initially unnecessary. The transfer of jobs and results through tapes, as a first solution, was deemed satisfactory.

As to administrative tasks, it is our intention to reach a high degree of integration, including the data collection, file updating, processing and data retrieval phases. In some of these phases, the machine would have to operate in the time-sharing mode and in others it would be used for batch processing. Total compatibility between files created in both modes is then required. Also, the two systems should be available simultaneously so as to avoid schedules and set-ups that would tend to reduce the system throughput, as well as to avoid undue interference in the services being entered via terminal. The connection of the batch and time-sharing modes in the same machine is also important for engineering services. Many of the programs that are being used nowadays and others still to be developed are large and need not be conversational. Therefore, they can be processed in the batch mode, but the user can still use the terminal to place his job in the batch queue.

The variety of applications requires also a corresponding variety of hardware and software, particularly for terminals, languages and file access methods.

Finally, as a continuous increase in the volume of services is expected, equipment performance should be maintained through the installation of additional capacity without having to resort to equipment substitution. Therefore, in order to reach a reasonably lasting solution, the computer must be modular and have a maximum capacity well beyond the needs anticipated today.

All the above characteristics are necessary so that applications such as those listed below can be executed concurrently in the same machine:

- cyclical processing
- engineering and economic calculations
- data entry and retrieval
- text editing and material takeoffs

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Cyclical Processing

This refers to the basic monthly routines. It involves payroll, invoicing, accounting and project and personnel control reports. Associated to this processing we have the core of PROMON's control systems, the manpower allocation and control system. At first sight, it seems to be a typical application of the batch mode.

However it takes 4 or 6 working days, to gather and check all the data originating from various sources, at different dates. The use of display terminals for data entry and eventually for the maintenance of some files to be kept on-line and the reduction of the time span between periodical data collection - time span need not to be monthly nor must it be the same for all types of data - will improve the process.

Engineering and Economic Calculations

This refers both to engineering computations executed by project personnel and to administrative computations. The basic difference is that the computations relating to administrative applications, such as cash flow, budget, statistics, vacation pay, severance pay, break even analyses, etc. are relatively straightforward. These calculations are very frequent for middle management, although they are also sometimes performed by senior staff personnel.

Small time-sharing programs, would solve these problems well, and it would even better if general files (such as information on personnel, manhour estimates, accounting entries, etc.) could be consulted. As to engineering computations they can be devided into "conversational", and"non-conversational" ones. The former should be processed in time-sharing, and the latter in batch mode

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either in the in-house machine or in a bureau. In any case, the engineer would always use the same terminal for both types of applications. If communication with the bureau is through the physical transportation of the tape the user statements in the terminal should enable the generation of the corresponding job stream. For the engineer, the availability of such a terminal, plus a desk calculator would define a continuum of facilities:

- desk calculator;
- time-sharing terminal;
- in-house batch processing;
- batch processing in the bureau.

Data Entry and Retrieval

These are applications generated by the need for special information (based on the latest available data) at random dates. These applications are important to PROMON and can not be obtained through the cyclical processing. Thus, in several cases, data acquisition would be more frequent than necessary for monthly processing only.

Data retrieval is oriented to the following basic systems and to combinations thereof:

- man-hour allocation system
- financial and accounting system
- manhour forecast system
- technical information system
- personnel system
- marketing system

The data retrieval imagined for PROMON would be made in two levels: the first one would consult small files and would produce simple reports, with a small amount of

printed information and not requiring elaborate output formats. Searches in large files, searches requiring use of data from several files or reports requiring specially formatted printouts would be part of the second level of retrieval. In the first case, the files could be kept on-line and the data retrieval could be made in the time-sharing mode. Second level data retrieval could be made in the batch-mode.

In addition to the basic software to support the development of application programs, it will be necessary to have special file access methods to make data retrieval efficient.

Text Editing and Material Takeoffs

Included here are the typing of long texts requiring frequent modifications, that can be assembled from standard paragraphs used as building blocks, such as proposals, contracts, and major equipment specifications. Also included are material takeoffs from detailed drawings for the preparation of material requisitions. These tasks are typical time-sharing applications, requiring only a terminal or printer with good printing quality having both lower and upper case letters, since the output will be considered as final document. The material takeoff programs can also be used to prepare, as a byproduct, preliminary material cost estimates.

Characteristics Required

We can now proceed to analyse these uses as a function of the following basic variables:

Volume to be processed

Time required for results

Degree of planning necessary for use

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Man-machine interaction

Number of direct users

These variables, when considered in terms of batch or time sharing operating systems are not independent. Figure 1 shows the type of the qualitative dependence: the volume being processed, time for results and degree of planning are considered large when in batch systems and very small in time-sharing. Inversely, a large number of direct users and a strong interaction with the computer are characteristics of time-sharing only. A batch system is not designed for these purposes. The shaded areas in the right hand side of Figure 1 indicates the most suitable solution for each of the above mentioned applications. From Figure 1, it is obvious that a computer for PROMON should be able to operate on both time-sharing as well as on batch basis.

Following the idea explained under item 4, the PROMON computer would itself be the terminal of a larger machine.

The trade-off point between a PROMON machine and the use of the bureau has to be displaced to medium size batch uses,leaving to the bureau only the very large processing tasks such as for example, calculations of structures by finite elements, or again, the use of packages such as ICES.

However, since it has been stated that the best solution for the problem would involve a combination of in-house hardware capabilities and use of bureaus, it will be necessary for the in-house machine to have tapes compatible with IBM equipment, and furthermore that it be compatible with IBM systems for Remote Job Entry.

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Another important feature, as mentioned above, is the possibility of modular expansion. This would increase the system useful life, by making it possible to acommodate future needs.

The main core capacity, assuming an efficiency similar to IBM machines, should be at least 64 kbytes (a /360 model operating in DOS with this size core is sufficient for all engineering and business applications developed to date). Naturally, this estimate may prove inadequate, depending on the space taken up by the operating system, on the efficiency of the object code, or on the performance requirements for time-sharing operation.

For time-sharing it is important that three types of terminals be considered as standard: teletype (for engineering and queries), display (for data acquisition) and "hard copy" terminals with upper and lower case letters and good printing quality (text editing).

For batch processing, the usual peripheral equipment would be necessary: 2 tapes, 1600 or 800 bpi (compatible with IBM) card reader and printer (132 columns). The card reader and the printer would not have to be very fast (at present, in the bureau, 60.000 cards are read and 1.300.000 lines are printed monthly). However, as their performance is not high, it would be interesting if multi-programming in batch and the possibility of using spooling techniques were available. Disks with fixed heads because of construction or for convenience.

The software needs are:

Accounting routines - to appropriate computer usage to the several projects and the internal accounts of the company.

High level languages - FORTRAN, COBOL, and BASIC, all with advanced features.

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Machine-oriented language.

Conventional utility programs for time-sharing, such as text-editing and routines for statistical calculations.

Conventional utility programs for batch applications, such as SORT/MERGE.

Basic supporting software for the information system (of a nature similar to the IMS - Information Management System of IBM).

Extensive library of application programs.

5

DECISION ON BUYING THE HP/3000

Based on our profile, described earlier, we started looking for the closest fit, in the market, to our hypothetical computer.

The main companies marketing computers in Brazil in 1972 were by order of size: IBM;Burroughs, UNIVAC, Honeywell-Bull, HP, NCR, Siemens (Germany) and C.I.I. (France).

We had our first contact with the HP/3000 through a copy of a preliminary external specification in the 3rd quarter of 1972.

It is easy to understand our excitement since it was almost a perfect match to our profile.

From then on we stopped looking for others and started studying the HP/3000 move deeply.

In Brazil, the selling of the idea and taking of a decision, in this matter, is not an easy task. IBM holds about 60% of the market and Burroughs 30%. The last 10% were divided among the other companies.

We submitted a preliminary order based on a preliminary proposal. The plans were to start the HP/3000 project in 1973 and have it installed in January 1974.

In february 1973 we received an advanced word that the HP/3000 had project delays and that it would not be marketed in Brazil in the foreseeable future.

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The following events developed next:

- Feb-May/73 - Look for an alternative and comparison of the considered systems.

- June/73 - Issuing of a report recommending the PDP-11/45 with RSTS/E and RSX-11.D

- June/73 - Visit to several PDP/11 installations in USA.

- August/73 - Acceptance of DEC proposal and issuing of a draft contract.

- November/73 - HP/3000 back to Brazilian market with a concrete proposal.

- December/73 - Visit to HP in USA.

- January/74 - Contract signed with HP.

- July/74 - HP/3000 installed.

6

WORK IN DEVELOPMENT

Administrative

In this area we are developing the first phase of the project which should be running in July/75.

It is essentially a "conversion" of the Bureau applications, i.e., we are going to have essentially the same services in the HP/3000, hopefully, much better services, on line and with an enlarged Data Base. The applications in the Bureau are all batch with sequential files. In the HP/3000 we are using IMAGE with many more data items.

In this first phase we still keep some programs in the Bureau mainly the heaviest batch ones. Communication will be done by tapes.

The HP/3000 will do all data collection and validation. Validated files will go to Bureau processing on tapes, and results on tapes will be fed back to HP/3000 for report and consultation.

The first phase should be ready by mid 75. Our plans are to have all Administrative Systems run in the HP/3000 by the end of 1976.

This will be possible because the data processing problem in Promon is bounded more by dinamic changes in the system and also by response time than by large volumes of data.

Engineering

In this area the work is being developed in three fronts:

1.
Conversion of Bureau Programs to run on the HP/3000:

1.1
In batch with no changes besides the ones required for conversion.

1.2
With small I/O changes to make the program conversational.

1.3
With complete redesign to incorporate the capabilities of on-line processing.

2.
Design of Medium and Small Size Programs

With the experience of use in the Bureau we concluded that only very large and complex applications were done in computer. The response time to run small and medium size applications was prohibitive. A batch system in-house would have helped but not much. The idea is to develop a core of day to day engineering application and let the project groups themselves develop new ones as they arise.

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3.
Engineering Training

There are courses being run to train Engineers and Technicians in the Engineering Areas to do their own development and use of programs. The expectation is that in the long range small and medium size programs will be developed by the engineers (users) themselves and only the large programs that require computer expertise will be left to the Computing Department. The courses are:

Basic for Beginners
Advanced Basic
MPE for Beginners
Advanced MPE
Fortran Refresher
HP/3000 Subsystems and Programs

To avoid duplication of work and coordination in the development, there is a commitee composed of members representing one or more related areas of engineering to decide on polices and also audit the work being developed.

7

ACCOMPLISHMENTS AND DRAWBACKS

The strongest features of the HP/3000 are well advertised by HP and according to our view the following are really proved:

- Versatility
- Capability
- Simplicity of use
- Hardware reliability
- Project (Hard/Software) Integration
- Price/performance

Although it may sound strange to you the weakest points exist because of its nicest features.

One which is, by now, well known, specially by HP, is a software, too powerful for its hardware. We are counting on a better CPU and more real memory. Since the capabilities are there, people tend to use them and, at this point, all feel a lack of more processing power.

Cobol and Sort under version B are extremely slow,relatively speaking. We have indications that Sort was improved a lot under version C. We expected a much better Cobol compiler and it came slower. If it, at least, would not degrade the over all system performance as much as the old version it will be acceptable. We do not have indications on that as yet.

There are some inconsistencies in the System that are hard to believe in such an Integrated System :

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- Use of a Data Base restricted to the specific account and group where it was created. This completely breaks the accounting capabilities. No way of charging different users without loosing some of the account security.

- A data file created by Star is incompatible with the Editor.

- Integer in Fortran on a single word. One of the more frequent conversion problems.

- Logical records in unformatted reads or writes are incompatible with IBM Systems. This is specially bad when using BACKSPACE.

- Intrinsics incompatible with Cobol and Fortran due to addressing problems parameters.

- Lack of spooling and capability of freeing the terminal on long sessions (available on version C).

We have not run into any big problem conversion, except for a few, more or less easily detected, mainly in syntax differences compatibility in parameter passing, lack of entry points in Fortran, dificulty in finding detailed information in manuals, - when not missing - , segmentation and file conversion.

We think the commercial features can and should be improved.

Manuals should also be improved specially, Fortran, Cobol and Image. Perhaps there is a manual, missing, in the set, for use of the subsystems. Something of the kind of IBM Programmer's Guide that explains how to use the system when you already know a language and do not want to read the big MPE manual.

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Error messages and debugging aids at run time should also be improved. This is specially true in Cobol where, together with the slowness of the compiler, you almost loose the conversational capabilities of the HP/3000.

Special Problems:

In Brazil, due to our pioneer installation, for which even HP Brazil was not quite prepared, we had three major problems: internal trainning, software and SPL programming.

1.
The backgrounds of most of the Brazilian computer professionals are developed on IBM machines running DOS and using Cobol and Assembler. It was not easy to convey some of the different concepts of the HP/3000.

It took about 3 months of actual use for them to get confidence and we spent a great deal of man power in training. HP ran only one course of System Utilization, in English, when the machine was not installed yet and most of the appreciation for the course was lost.

2.
We did not plan to have our own software specialist from the very beginning since we were the only installation and we would have one software specialist from HP. However, this did not work. In the day to day operation, many times, we felt the need for a handy software specialist to quickly give an answer to a user who was not sure about the reason of his problem, whether misuse or software problems.

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3.
We did not foresee at the beginning so much SPL programming. Actually we did not plan for any SPL programming. Our intention was to use Cobol all the way and use SPL later for optimization. This was not possible due to the complexity of the project and also slowness of Cobol which would become prohibitive in some instances. To teach SPL was also difficult. Algol and PL/I like languages are not very much used yet.

Nevertheless it was SPL that made it possible seriously to start using Structured Programming. We even derived our own rules for making Structured Programming also possible in Basic, Fortran and Cobol. We are having great success using this technique.

In the Engineering Area we are done with conversion and running on schedule with new developments.

The administrative project is also on schedule with no major problems due to HP/3000 besides the ones already pointed.

8

FUTURE

So far we are very happy with our decision on buying the HP/3000.

We are convinced it is presentely the machine that best fits our profile. We are counting on its own future with improvements in performance. We know however, that when they come they may already be somewhat late for us.

We foresee a future where we would have a dual HP/3000, one backing up the other, doing all internal administrative processing and all medium and small size engineering programs. For large programs we would be linked, through the HP/3000, to larger machines doing remote job entry or even working as a front end computer to a time-sharing Bureau.

All branches of PROMON nationwide will be linked through portable terminals to our computer.

All indications are that all this will be possible in the near future.

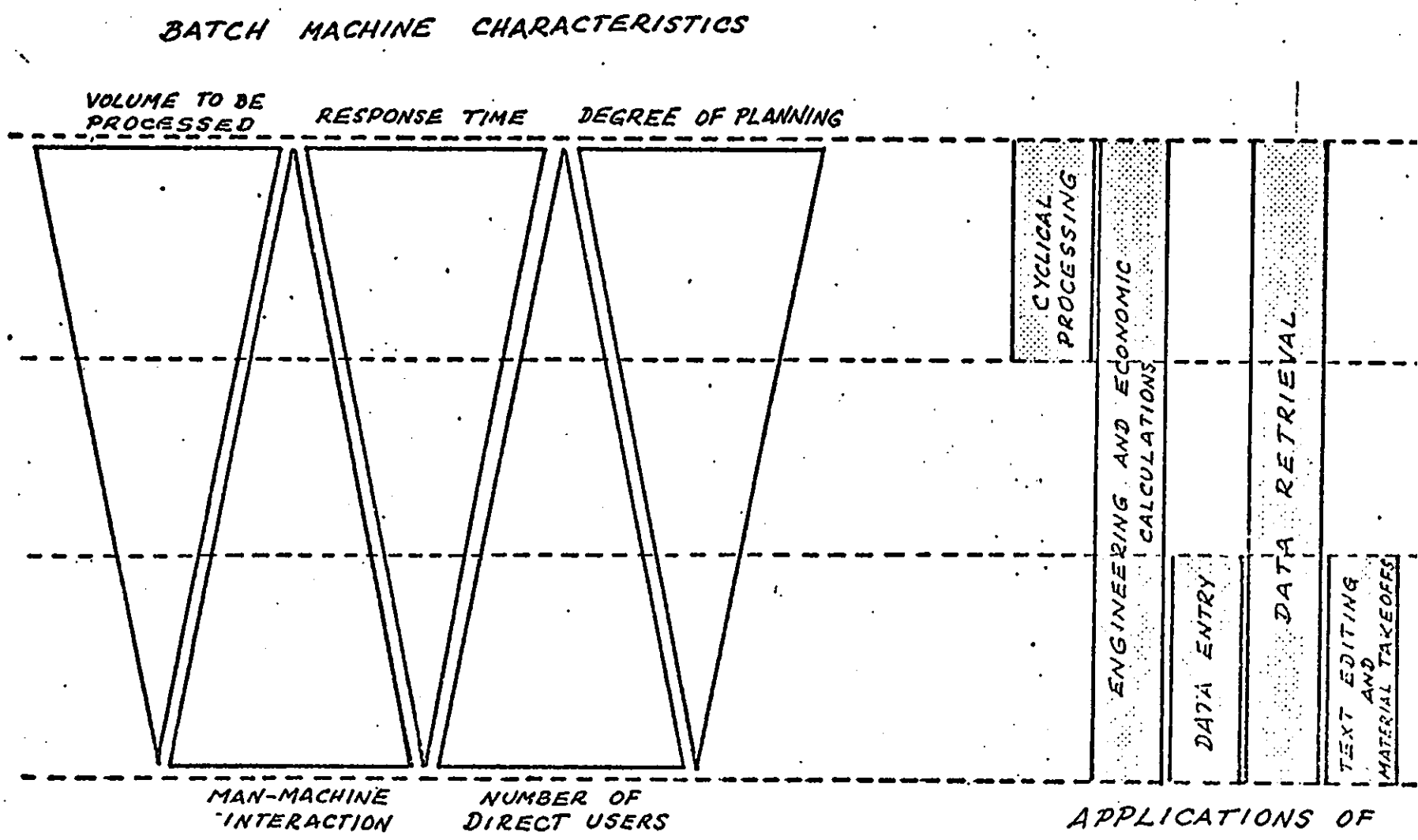
BATCH MACHINE CHARACTERISTICS
VOLUME TO BE PROCESSED
RESPONSE TIME
DEGREE OF PLANNING
MAN-MACHINE INTERACTION
NUMBER OF DIRECT USERS
TIME-SHARING MACHINE CHARACTERISTICS
CYCLICAL PROCESSING
ENGINEERING AND ECONOMIC CALCULATIONS
DATA ENTRY
DATA RETRIEVAL
TEXT EDITING AND MATERIAL TAKEOFFS
APPLICATIONS OF DATA PROCESSING IN PROMON

FIGURE 1

HP3000

INITIAL CONFIGURATION FOR PROMON