DATA PROCESSING IN THE MEAT PRODUCTION INDUSTRY - A DISTRIBUTED SOLUTION.

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THE LEC'S OWNERSHIP AND CUSTOMER BASE.

The LEC, Landbrugets EDB-Center (the Danish Agricultural EDP-Centre) was established to supply Danish Agriculture with EDP facilities, and to provide any advisory assistance necessary during the solution of EDP-related problems. The Centre was founded in 1962. It is owned by a number of organizations within Danish agriculture. Turnover and profit develop in a positive direction with satisfactory growth rates. At present, the turnover is approximately DKK 350 m, of which 70 per cent is accounted for by the agricultural sector and the balance is distributed on various trades outside the agricultural sector.

The LEC focuses on product quality. The objective is to supply the right quality at the right price. The quality consciousness of the staff is increased in practice by implementing high-quality project with the participation of all staff members.

The approximately 700 employees are organized in four departments: The Market Department has the overall customer responsibility as regards sales, development, advisory service and the running of systems and projects. The Technical Department has the technical responsibility for the quality of the LEC's overall systems architecture and the application of software systems as well as for the training in systems development tools and methods. The Operational Department is responsible for planning and running the daily operations.The Administration is responsible for carrying out tasks of projects concerning finance, staff, buildings and purchase

CONCEPT BACKGROUND

A large degree of production automation has been achieved within the Danish meat production sector in recent years. The implementation of this automation has been comparatively isolated within the individual fields of production such as slaughtering alley, operation, packing, order handling and food processing. Collection of more and more data has been made possible in step with the increasing automation. The objective has been to make use of this data in general planning and control systems. The arguments in favour of and the will to implement such systems have not been lacking. However, there has been no access to communication tools which have been sufficiently efficient for controlling the necessary exchange of data.

Technological developments have progressed at a rapid pace in recent years, particularly within the field of communications. This has provided a better basis for achieving the total integration, both between the individual production processes and between production and administration. As a consequence of these developments, the LEC has worked out a new concept for information processing in the meat production sector. This concept ensures that it will be possible to collect data, process it and distribute the necessary control information within the conpany. An overall control and planning unit operating across the physical structure of the company is thus within reach.

CONCEPT OBJECTIVE.

The objective is to establish facilities for controlling and integrating information within the company. The general goal is to ensure, that the information is available, where it may be required as a basis for making decisions. A further goal is to ensure the achievement of an effective basis for carrying out planning and control.

This may involve data from suppliers and other external partners, from various meat production plants, sales transport of semiprocessed goods and processing data.

This is only possible if all functions have potential access to all data; if they are able to retrieve the information from the central source and use the facilities incorporated in the concept for directing the information to the location where it is required, and, if necessary, to merge this information with data from other functions within the company.

The basis for achieving this flexibility is a uniform hardware and software architecture based on standard products within the fields of communication, user tools and office automation. Furthermore, it should be possible to implement the architecture step by step, with the potential for extending it gradually as the need therefore arises. It should be possible to reassign data and software as the resource requirements increase without thereby making previous investment redundant. It should be possible for programs to be developed, distributed and monitored centrally.

QUALITIES.

The most important quality of the concept is that the interrelations of the system have been fixed in an order of priority through the application of standard communication protocols.

In the present case we have chosen an SAA product line from IBM with local area network as basis. This ensures the satisfaction of extensive requirements for integration between subsystems and for a flexible systems design.

The functions of the system are divided into levels. This satisfies the requirements for stable operation within the sections of production. The following division into levels has been applied:

a. The LEC systems as central host
b. Company/department level
c. Process control level

d. Production level
The concept makes allowance for the physical location of the functions, which may be either local or remote and connected to the main system. A production unit will always consist of levels c. and d. as a minimum, thereby ensuring independence of the surrounding world.

WHICH REQUIREMENTS ARE SATISFIED BY THE CONCEPT.
- Replaces IBM SERIES/1
- Basis for application of standard products, within the field of office automation, for example.
- Potential for new solutions.
- Potential for gradual implementation.
- Potential for differentiated solutions in terms of price.
- Potential for isolated production sections in terms of operation.
Uniform access to functions and data everywhere in the system, relocatable programs (SAA standard).
- Standard systems for the trade, e.g. economics and statistics systems, can be located with the LEC.
- Standardized data transmission to/from the LEC and other mainframe installations.
- Potential for 3270 emulation to the LEC.
- Local PS/2's, integrated into the environment, can be used.
- Potential for integration with the surrounding world, customers, suppliers, pig breeders, public authorities, etc., via through - connections at the LEC.
- Potential for central start-up and operation monitoring.

AS/400 REPLACES S/1.
The IBM S/1 is still the most widely used company computer in the Danish meat production industry. However, for the reasons explained above it is about to be replaced by the AS/400, the PS/2 and local area networks.
Collection and exchange of data from the production level is accomplished by means of PS/2 technology and the RIC adapter. The LEC is an authorized IBM agent in this field.
Each individual work station is capable of operating locally, as a terminal of the AS/400 or as connected to the LEC, normally through the AS/400 which is used as a concentrator.
The architecture and design of the AS/400 point towards a primary application within the administrative field. This will involve economic, order processing and office function tasks as well as communication and server function tasks.
Comprehensive communication facilities have been built into the operating system, making the computer very suitable as a participant in a distributed solution in combination with the LEC's central system. The user interface is based on the SAA standard, i.e. it includes a menu and other on-line auxiliary tools, and the security system has been designed for the personal sign-on.

LEC SERVICES FOR THE IBM AS/400.
Together with our recommendation of the IBM AS/400 as a computor in local and distributed solutions, we offer the following services:
a. Configuration
The objective of this service is to find the most economical solution for the existing requirements. We supply advisory services with a view to determining the customer's capacity and function requirements. Then relevant hardware and software combinations are made, including information on prices, discounts and installation conditions, e.g. an evaluation of the extension potential.
b. Installation service
This service includes planning of installations, assistance in connection with installation and follow-up. The follow-up is carried out immediately after the installation in order to ensure that any problems there might be can be solved as quickly as possible. The planning consists of ordering the relevant equipment and coordinating the necessary work tasks. On installation, mounting of control system and possibly application systems is carried out as per agreement. Furthermore, testing and basic instruction are included. Additional training can be established, preferably in connection with an overall assessement of the training requirements of the company.
c. System service
This service includes the operational aspect of the use of the IBM AS/400 at our customer's. It is divided into a hot-line service, telephone answering service, operational follow-up and standby assistance. The most efficient service providing the maximum operational stability is achieved by giving the LEC access to carrying out preventative service on the systems of our customers from our own terminals, for example through the application of HCF (Host Command Facility) and Netview.
Any system service model can be designed to match the requirements of the individual customers.

VISIONS
The concept sketched above will also permit the Danish meat producing companies to hold their own in their competition with foreign meat producers in future.
By applying the concept to its full extent, the meat producers gain the advantage of local data processing at the operational level.

THE LOCAL SYSTEM.
In order to be able to optimize the daily production, it is necessary to have access to fully updated files at all times.
By means of the automatic data acquisition, it is possible for the plant manager to supervise the production, and only in this way will he be able to carry out any necessary adjustments in order to optimize the production process.

He has to know the exact stocks of raw materials, semiprocessed products and finished products.
He has to evaluate these stocks:
- in relation to the production targets set for the day in question
- in relation to the orders that have to be filled
- in relation to the contracted raw material supplies.

The collected production data can at the same time be transferred to the various microcomputers that are built into most production systems. Here the data can be used for optimization of the fat percentage of meat mixtures, for example.

THE CENTRAL SYSTEM.

While the concept permits the meat producing companies to control production at the local level, it also permits them to use the LEC's IBM system as a host for their individual networks at the same time.
This system is used for the administration of the data bases of the meat producing companies, for the filing of data and last but not least as a basis for calculating and printing out statistics and for drawing up the accounts of the companies.
Here the production data together with the other data from the meat producing companies (standards, recipes, sales objective, supply expectations, rates, etc.) should be incorporated into the planning, follow-up and control of the meat production companies.
The Danish meat producers have a tradition in this field for standing together in solving these tasks. They have consequently succeeded in minimizing the costs of developing and running such projects.
While serving as a data base administrator, the LEC is at the same time the connection of the meat producers to the surrounding world.
With the extension of the electronic distribution of documents, the meat producers will in future be able to exchange information with their customers, suppliers, bankers and the public authorities through their data link with the LEC.
In electronic document distribution, orders, order confirmations and invoices are transferred directly from one computer to another without the use of paper and postal services.
The meat producers can use the same system for sending electronic documents to the EEC directorate, the customs authorities and other public authorities, and electronic transfers of money will similarly be possible.

DATA NETWORKS AND ELECTRONIC MAIL.

Through the LEC and its access to several worlwide data networks it is furthermore possible for the meat producing companies to obtain direct connection with offices or agents abroad.
This can be achieved either by using electronic mail or by utilizing the LEC's connection to the worldwide telex/teletex network. From a work station that is connected to the LEC it is possible to transmit messages to 1.5 million subscribers around the world.
In this way it is possible to monitor developments on both the purchase and sales sides closely and take any necessary action immediately when market or purchase conditions change.
This facility is used in a new export system by ESS-FOOD, for example.

INFORMATION DATA BASES.

At the LEC the meat producers also have access to retrieving information from a number of data bases which are serviced by a number of trade organiztions. This involves export information, for example.

SUMMARY

The distributed concept is the LEC's answer to the present and future needs as regards coordinated utilization of data in the meat production industry.
During the past months of 1989 it has become applied at the ØJS (Viking Food). A system to handle salesorders has been developed and installed on a AS/400.
Furthermore comprehensive analysis is progressing with respect to information systems in a project to build a new slaughterhouse. The building of the new slaughterhouse has not yet been approved.
Many more systems and companies are to follow.
The industry is about to develop a new production control system, which is adjusted to the outcome of the classification center.
The LEC expect that within a year four or five companies have installed one or more AS/400's.