COMMISSION OF THE EUROPEAN COMMUNITIES

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REPORT FROM THE COMMISSION TO THE COUNCIL

on the multi-annual programme in the field of data processing

(1985)

EXPLANATORY MEMORANDUM

The Council Decision of 11 September 1979 (79/783/EEC), adopting a multiannual programme in the field of data processing, was modified

- by the Council Decision of 10 April 1984 (84/254/EEC), extending the duration of the programme for two years, from 15 April 1984, for the promotion measures,
- by the Council Decision of 22 November 1984 (84/559/EEC), extending the duration of the programme for two years, from 22 November 1984, for the general measures.

Article 4 of the Council Decision stipulates that the Commission shall submit to the Council an annual report on the execution of the programme.

This document, the subject of the written procedure, is the report of execution of the programme during the year 1985 and its purpose is to present the major activities related to the programme for the period considered.

SUMMARY OF REPORT

All of the new actions foreseen for the period were satisfactorily launched. On-going work continued with no major problems. The administrative and budgetary criteria were met.

For standardization, the period has been characterised by a transition in the nature of the policy, activities and financial support. There has been a limited extension of the support available for the original group of activities and new activities have been launched in keeping with the European Standards Policy.

In the area of public procurement, two topics have been given priority; standardization and contracts. A number of projects have been started dealing with these.

A study was launched to examine the needs and possibilities for Community training for engineers and skilled technicians in the field of new information technologies.

A call for proposals was published during the summer of 1985 dealing with :

- confidentiality and data security;
- protection for computer programs;
- the information society and its environment.

Two major areas, Teleinformatics, and Artificial Intelligence and Pattern Recognition, were selected for support under COST 11ter and COST 13. Financial support has been granted to deal with 18 different projects, involving 140 research teams.

Support for work involving the Ada language continued. 1985 saw the completion of the last projects from the first phase work on Ada and the starting up of the majority of the group of new selected projects. Project support was the major type of support given in this area but it was by no means the only activity. Assistance, albeit of a limited nature, was given to Ada-Europe Working Groups.

Work started on four projects dealing with the subject of distributed data-bases. These projects were largely to do with architecture specification. Towards the end of the year an evaluation of proposals received from the ongoing project teams was carried out in order to select candidates for further support in a possible implementation phase.

Contact points for various projects are given in Annex C. The structure of this annex follows that of the rest of the document in that the same section titles have been used. The project reference numbers are included for ease of cross-referencing.

MULTI-ANNUAL PROGRAMME (1985)

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0 INTRODUCTION

This document presents the work related to the Multi-Annual Programme in the field of data processing during the year 1985.

The Council Decision adopting this programme foresaw the submission of annual reports such as this. This report is the first since the programme was extended in 1984.

It should be noted that it is not the purpose of this report to present technical results. The scope of the report is in fact much wider and covers all of the major activities related to the programme. As many of the main projects only started during the period, initial results of any real significance should only become apparent during the course of 1986 and 1987.

BACKGROUND

The original Multi-Annual Programme (MAP) in the field of data processing ran from 1979-1983 (O.J. L231, 13 September 1979). There were two parts to the programme and each part was then subsequently extended for two years.

Part I, General Measures, was extended for a period of two years as from 22 November 1984 (O.J. L308, 27 November 1984). This part involves :-

- standardization policy;
- public procurement;
- knowledge of the sector, training, protection for data and persons;
  - . data, information and analysis,
  - . education, training and employment,
  - . confidentiality and data security,
  - . protection for computer programs,
  - . the information society and its environment;
- collaboration in research and development.

Part II, Promotion Measures, was extended for a period of two years as from 15 April 1984 (O.J. L126, 12 May 1984). This part involves :-

- general software;
- applications;
- peri-informatics and micro-electronic technology.

The promotion measures concern the software and applications sub-sector, with priority for Ada and new technological developments in the application of distributed data-base techniques in connection with transnational information systems.

The amount and form of the financial aid available under the programme is suited to the nature of the projects concerned. The Council Regulation (EEC) No 1996/79 of 11 September 1979 deals with the support mechanism. The guidelines with regard to the amounts were :

a) feasibility studies with a ceiling of 100 000 European units of account, pilot projects and predevelopment studies in which commercial interest is not the dominant factor and development projects of public interest launched on the Commission's initiative shall receive up to 100% of the total cost of financing the project;

b) predevelopment studies, development projects and pilot projects stemming from undertakings or users may not receive more than 50% of the total cost of financing the project.

With regard to form, certain cases were mentioned. In particular it was stated that the Commission could propose projects and in this case contracts could be concluded in the form of non-repayable aid or grants. In the case of feasibility studies, contracts were to be concluded in the form of non-repayable aid. In the case of development projects or predevelopment studies culminating in a commercial product, contracts were to be concluded in the forms of loans.

Other documents dealing with the programme include :

- COM(85) 473 final, 20 September 1985, Report by the Commission to the Council on the multi-annual programme in the field of data processing (1979-1983);

- EUR 10741, Multi-annual programme (1979 to 1983) in the field of data processing (Second part : Promotion measures).

I GENERAL MEASURES

1 Standardization policy

INTRODUCTION

The period has been one of transition, characterised by an evolution, following the extension of the programme and reappraisal of standardization policy. The type of activity financed previously under the programme has been extended with a view to completing the ongoing work whilst new activities have been launched in the context of the revised European Standards Policy as embodied in the Commission proposal for a Council Directive on Standardization in the field of IT and Telecommunications (see COM(85) 230 final).

Consequently, standardization activities have been funded from the budget applying to the programme (7702) and the newly created standardization budget (7717). As foreseen in the draft directive(1), the Commission has been assisted during this period by advice on standardization policy from the Senior Officials Group for Information Technology Standardization (SOGITS).

During 1985, the following major activities in standardization have been financed under the programme (budget line 7702) :

A) Standardization

a. The IT Launch Contract with the Joint European Standards Institution (CEN/CENELEC);

b. Part of the Conformance Testing Services Contracts;

c. Pre-standardization work and coordination involving dissemination of information, infrastructure and support of international coordination;

d. Completion of ongoing projects, such as the Committee Support System (CSS).

B) Public Procurement

Activities of the Public Procurement Sub-Committee (PPSC-IT) related to projects for the application of standards and contractual matters.

This last item, public procurement, is treated later in the report.

(1) Proposal for a Council Directive on standardization in the field of Information Technology and Telecommunications - COM(85) 230 final.

Of the total budget allocated for 1985-86, i.e. 6 MECU, (5 MECU standardization, 1 MECU Public Procurement), the following funds have been engaged:

Public Procurement Projects	0.75 MECU
Conformance Testing	4.20 MECU
Pre-standardization Work	0.70 MECU
	5.65 MECU

STANDARDIZATION

a. The IT Launch Contract (85/C/109)(1) (700 KECU)

In the framework of the new standardization policy the Information Technology Standardization Launch Contract was concluded by the Joint European Standards Institution (CEN/CENELEC) with the Commission (Autumn 1985)(2).

The aim of the contract is to establish within a short time additional procedures and arrangements to reinforce the existing infrastructure within the CEN/CENELEC organisations. This is necessary to ensure the rapid processing of the standardization programme and the production of European norms for the new technologies, working within the context of the overall general standardization contract.

In order to carry out these faster procedures, the "Launch Contract" includes the setting up of a communications infrastructure linking the CEN/CENELEC Central Office and its 33 members, the CEPT and CEC, which will constitute a multi-vendor environment requiring appropriate recourse to standards by the equipment suppliers.

Accordingly, a call for proposals was to be launched by CEN/CENELEC in 1986 and this to be forwarded to a list of potential suppliers (manufacturers and software houses). Additionally, communications facilities are to be requested from the Belgian RTT and talks are to be held with the contractors of the CSS facility with a view to integrating this product into the infrastructure. Discussions are also taking place with the Belgian and German PTT's on questions related to conformance testing and international teletex interfaces to obtain trial phase permission, and on various solutions for a document interchange system.

It is hoped that the equipment will be installed and effective electronic communication established between the respective parties by the end of 1986.

(1) See also Annex C under this project reference.
(2) Similar contract has been signed between EFTA members and CEN/CENELEC to ensure that the structures and procedures cover most European countries.

b. Conformance Testing Services

As part of a series of parallel actions in support of the European Standardization initiatives to develop European standards under the CEN/CENELEC and CEPT procedures, the Commission published a call for proposals (April 1985) with the aim of launching a programme to provide harmonized European conformance testing services. This EC action is to ensure that users of information technology across the European Community have the guaranteed ability to be able to exchange information on the basis of official international IT Standards and CEN/CENELEC/CEPT functional standards (ENVs). Such a situation would benefit both manufacturer and user.

Following evaluation of the proposals and contract negotiations, contracts were signed at the end of 1985 with a number of test centres to develop facilities and cooperative procedures to check conformance of IT equipment to international standards.

The provision of such IT conformance testing services will initially involve new investment for the centres, of which 50% on average is being provided by the Community (to a total contribution of 10 MECU). After this co-funded start-up period, the centres are expected where possible to continue the work on a commercial basis.

The amount of funding to be provided by the Community has come from three budget lines, of which the post 7702 has contributed 4.25 MECU, effectively drawing on most of the remaining resources for standardization.

A list of the contracts for specific conformance testing services are given in Annex A under point 1.

Other activities in Conformance Testing financed from the 7717 budget line include testing for WAN-OSI (Layers 1 to 4), WAN-FTAM and LAN. These are to be followed by a contract for the Coordination of the Conformance Testing Projects.

All contracts except one were already signed at the end of 1985, so that work was anticipated to be well underway by mid-1986. Already, harmonized European testing facilities exist in the FORTRAN, COBOL and Software Quality areas, and "Eurolabs" are foreseen for LAN, WAN and MHS testing by the middle of 1987.

The call for proposals was specifically limited to the mutual recognition of testing suites. Further discussion within SOGITS and CEN/CENELEC-CEPT is continuing on the question of certification in order to find a scheme suitable for the EC Member States and capable of accommodating the growing, overlapping areas.

c. Pre-standardization Work and Coordination

Background

At the end of the first Multi-Annual Programme for Data Processing (1979 - 1983), the Commission undertook an enquiry to ascertain which of the previously supported standardization activities should continue to receive funding. The enquiry, carried out with help from SOGITS and the Advisory Committee for the programme, recommended that support be provided for pre-standardization activities and, accordingly, two expert groups, EWICS TC 7 and ECA/ESONE were short-listed for further funding.

A contract with specific deliverables related to a detailed programme of work in pre-standardization was seen as the most appropriate way of financing such activities. The progress of the work would be regularly assessed against the corresponding work plan, with reports forwarded to the CEC by the contractor at each milestone of the contract.

Activities

EWICS TC 7

The contract (see also Annex C under 85/C/110) was signed in the latter part of 1985 with the objective of a work programme to produce pre-standards for the international standardization process (i.e. ISO/TC 97 and 184, IEC TC's 45A, 63 and 83) in the areas of :

- System Integrity;
- Software Quality Assurance and Metrics;
- Design for System Safety and Reliability;
- Safety Assessment.

This activity is now well under way with initial drafts in the course of completion. At the same time, the EWICS pre-standard on Software Safety, elaborated during the initial part of the programme, has recently been accepted as a draft recommendation with the IEC. EWICS has good contacts, which it is currently reinforcing, with a number of technical committees at the level of international standardization. In particular, the group is very active in the following committees:

IEC/TC 45A,	Nuclear instrumentation;
IEC/TC 63,	Industrial process measurement and control;
IEC/TC 83,	Information Technology Systems;
ISO/TC 184,	Industrial automation systems.

Effective liason has been ensured with the Commission Directorate on Nuclear Energy (DG XII - Direction D) and the DG XII/JRC Ispra-sponsored European Safety and Reliability Association (ESRA) which will support the increasing attention that the various EC Members place on problems of safety and reliability in industrial processes and plants by improved coordination and integration of national efforts in this field.

ECA/ESONE (European Camac Association)

ECA/ESONE represents European laboratories. It has already proved competent for the development of standards related to real-time data acquisition. The CAMAC specifications for a modular instrumentation system for data handling were adopted by the IEC more than ten years ago.

The two year contract (see also under 85/C/108 in annex C) therefore established with this group at the end of 1985 includes the maintenance of the existing standards and the preparation of new standards for FASTBUS, recently adopted by the IEE and under consideration within the IEC to replace the CAMAC standards.

Regular reports from the group indicate that the work in this area is on course.

Future Activities

Both contracts have over one year to run and in that time, it is expected that at the international level further discussion will take place on elaboration of standards in the respective areas. However, a greater emphasis will be placed on identifying needs and gaps in aspects of real-time standardization for future processing through mandates established for specific work items. Contacts at this level will need to be reinforced, and evidence shown to this effect, by each of the groups concerned. Ultimately, the transfer of this European work on pre-standards for real-time applications into the CEN/CENELEC domain should be envisaged.

In addition, a further seminar is foreseen to prepare discussions on possible common practices in the use of personal computers and work stations in real-time applications.

Suitable publicity and promotion of each group's activities will be further stressed.

d. Completion of ongoing projects and studies

Work to complete certain study contracts awarded previously under the programme has continued. This is detailed in Annex A under point 2.

Other activities foreseen as studies under A.3 of the Commission proposal amending Council Decision 79/83/EEC in respect of general measures in the field of Data Processing have been included in the CEN/CENELEC/CEPT and Reference Testing activities, e.g. all OSI work, programming languages, software quality assurance, ergonomics and robotics.

2 Public procurement

The activities of the Public Procurement Sub-Committee have been continued and expanded in 1985 towards the establishment of a single internal market, and more harmonized application and better understanding of standards.

The PPSC-IT has defined a work programme covering two priorities, standardization and contractual aspects. This programme of work related to the above areas (see also document PPSC 124.2) includes 7 standardization actions, 3 overview actions and 6 contract actions. The contracts were established following a limited call for proposals.

Of the standardization actions, three aim to produce general background or guidance documentation on the European standardization exercise for the benefit of the user or editor of standards, and two, each divided into two phases, will produce specifications of requirements for procurement versions of standards and for IT conformance testing services for procurement purposes.

The three overview actions concern subjects where it was felt there was an urgent need on the part of the user for clarification, relating to UNIX, system interworking and PSDN Packet Mode Access.

The contract actions cover acceptance testing, the application to DP of Directive 77/62/EEC, guidelines for customer designed software specifications etc..

The first contracts were launched in the second half of 1985 and these are detailed in Annex A under point 3.

3 Education, training and employment

As was foreseen in the Council decision for the extension of the Multi-Annual Programme, the Commission launched a study dealing with :

> "Needs and possibilities for Community training for engineers and skilled technicians in the field of new information technologies"

Since the scope of the study affected the work of Directorate General V of the Commission, work has been closely coordinated with them.

Following a restricted call for proposals addressed to research institutions with a record of competence in this field, the Commission received three offers from proposers. Since the three proposers submitted complementary approaches to the study, they were invited them to work together on the basis of an integrated approach.

As a result three contracts were agreed with :

- Technical Change Centre (London)	52.0 KECU
- VDI-Technologiezentrum (Berlin)	31.5 KECU
- Professor Donio (Paris)	36.5 KECU
	120.0 KECU

The Technical Change Centre assumed the role of prime contractor. Their address is given in Annex C.

The first results were expected to be available in early 1986. The study was expected to be completed in May 1986.

The study was expected to analyse the manpower situation and training requirements as regards IT manufacturers, producers of software, and IT users, while at the same time looking at the training potential of institutions offering courses in relevant areas.

4 Confidentiality and data security

As was foreseen in the decision presented in the Official Journal No L308, 27.11.84, work was to be done in the areas of :

- confidentiality and data security;
- protection for computer programs;
- the information society and its environment.

Prior to 1985, several studies had already been carried out in these areas with Community support, and in particular during the period 1979-1983 :-

- a cooperative study of data security and confidentiality by ADI (France), GMD (Germany) and NCC (UK);
- a study focusing on the vulnerability of European society to incidents involving the automatic treatment of information. This study has recently received a great deal of attention, particularly from the USA;
- a survey with respect to the legal protection of software.

CURRENT SITUATION

A call for proposals was prepared and published in the Official Journal No C204, 13 August 1985, with 7 October 1985 being given as the closing date. The areas to be addressed were (using the paragraph numbering from the call):

3.1 Confidentiality and security of data.

3.1.1 Security of small and medium-sized systems.
3.1.2 Network security: minimum recommendations for users and designers.
3.1.3 Implementation of integrated security systems, including methods and aspects of the classification of risks and systems.

3.2 Protection of computer programs.

3.2.1 Software integrity.
3.2.2 Protection of ownership in regard to computer programs.

3.3 The information society and its environment.

3.3.1 Increasing the awareness of users - security, vulnerability.
3.3.2 User requirements in respect of future legislation on the security and confidentiality of data.
3.3.3 Data protection guide for European users.

This call resulted in the receipt of 30 proposals; some were for smaller projects treating one sub-area, some were for groups of projects covering one of the main areas and one particular proposal covered all areas.

It was stated in the call for proposals that 1 MECU of support was available and in addition it was stated that financial support from the Commission would preferably be limited to 50% of the total cost of any project. In the event, 5.7 MECU of support was requested for eligible projects totalling 10.3 MECU.

The various proposers included organisations in all Member States.

It was interesting to note that a significant number of proposals were received from international audit groups. This is the first time that a call in this area has received such a response from these particular organisations.

An evaluation of the proposals received was carried out by a group of European experts during a week in October. This produced a set of recommendations and these were presented to the Advisory Committee which subsequently gave its opinion during their formal meeting on 25 November.

As a result of this, negotiations were started with certain proposers and at the year end these were still in progress.

Primarily because of the budget allocated to this part of the programme, which was much lower than the initial estimate of the needs, it was decided, as in the past, to limit the involvement to support of a catalytic nature and restrict its field of application to two areas of Information Technology.

The two selected areas were the following :

- Teleinformatics, because of its evident international character and because of the existence of a strong scientific community as a result of previous initiatives.

- Artificial Intelligence and Pattern Recognition, because of the importance of these research themes for the evolution of computer science and on the basis of their potential for innovation.

Thus real-time data processing, one of the main areas supported earlier, had to be left out, although the need for basic methods and tools was recognised and although the past activities were very successful.

In accordance with the Council decision the countries of the COST framework were invited to join this part of the Community programme and in November 1985 the Council approved the Concertation Agreements COST 11ter and COST 13, one related to Teleinformatics and the other to Artificial Intelligence and Pattern Recognition. Six countries decided to join : Austria, Finland, Norway, Sweden, Switzerland and Yugoslavia.

Without waiting for the final conclusions on the agreements, calls for proposals were prepared either on the basis of planning work performed previously during the COST 11bis project for Teleinformatics, or on the basis of the discussions of an expert group for Artificial Intelligence and Pattern Recognition. The calls for proposals were circulated in May and an announcement was published in the Official Journal of the European Communities (C137/3 of 5 June 1985).

The requests for information resulting from the announcement in the O.J. and the number of the proposals received clearly confirmed the interest of researchers for actions oriented towards exchanges and coordination at the European level.

In the field of Teleinformatics the call was limited to priority topics identified from the outset, and in spite of this limitation significant reductions in the grants requested still had to be negociated with the proposers. Whereas the COST 11bis activities addressed mainly specific issues in the various upper layers of the ISO reference model for open systems interconnection (OSI), the COST 11ter project, taking into account the evolution of the situation, put emphasis on the investigation of the problems of the application layer and the role of the human user in communication systems.

In the area of Artificial Intelligence and Pattern Recognition the call was less limited in scope and requests for financial support exceeded by a factor of 10 the budget available. The selection was made by strictly applying the criteria of the specificity of the action (basic research) relative to ESPRIT, by reducing the duration of the support to a two year period and by merging different proposals treating the same subject with the aim of moving towards European collaboration around certain important themes.

For each of the two areas, a structure similar to that which had been adopted for the COST 11bis project was put in place. The concertation committees created by the agreements contributed to the scientific and administrative management. A project leader recruited for each area supervised the activities from the scientific point of view, defined them within the context of the related national and international actions and developed the strategy. In addition each individual activity was coordinated by one of the participating institutes and the usage of a common teleconferencing system was encouraged.

On the whole, financial support was granted to 18 different projects, involving 140 research teams. They deal with the following topics:

Teleinformatics

- Man-machine interface for telematic system;
- DSM - Distributed Systems Management in wide area networks;
- FDT-ABM - Formal Description Techniques - Architectural and Behavioural Model;
- Satine-2 : A thin route TDMA satellite system to interconnect local area networks;
- AMIGO - Advanced messaging in groups;
- Security mechanisms for computer networks;
- Open shops for information services.

Artificial Intelligence and Pattern Recognition

- A new language for AI using functions and objects to represent knowledge;
- Knowledge-based automatic speech recognition and understanding;
- Logical techniques in knowledge representation and natural language analysis;
- Machine learning and pattern recognition;
- Low-level vision and image processing;
- Study and development of proof techniques (with incorporation of parallism) and their application to programming;
- Advanced issues in knowledge representation;
- Artificial intelligence and non-standard logic;
- An intelligent computer-aided instructional system for teaching artificial intelligence programming;
- AI based system and the future of language, knowledge and responsibility in professions;
- Artificial intelligence in medical science.

Contact points are given in Annex C for each project.

II PROMOTION MEASURES

1 Software developments - Ada

This section of the report summarises the results of the Ada activities during the period January to December 1985 and sets them in the context of the two tranches of the overall programme. Reference is made to some of the organisational problems encountered and the steps taken to mitigate their effect. Finally some proposals are made concerning future potential related activities which could further enhance the value and application of the work which has been undertaken.

The year of 1985 saw the end of the 1979-1983 tranche of the Ada projects and the launch of the 1984-1986 tranche of projects.

The decision to extend Part Two of the Multi-Annual Programme, while not ruling out other projects, gave priority to Ada and to transnational information systems using distributed data-base techniques. The Commission initiated action concerning these two topics by means of a specific and targeted call for proposals for software and application projects published in the Official Journal of the European Communities (No C231) on 1 September 1984.

Co-operation in this important area, now involving some 34 different industrial, government and academic organisations, represented by more than one hundred managerial and technical staff, has continued in a constructive and effective manner.

PRE-1985 ACHIEVEMENTS

Of the 48 projects in the 1979-1983 tranche, 12 were related to the Ada language, and received Commission support of 7 MECU. Major outputs of these projects are given below.

Portable Compiler Family

A highly portable host compiler (front-end) was designed with particular consideration for flexibility and efficiency of the code generation phase, and a prototype was implemented and tested. This was then used by one of the partners (Alsys) to form the basis for its commercial line of compilers which cover a wide spectrum of host and target machines.

Portable Ada Programming System

Also in this project a front-end compiler was developed, using formal methods, and this was likewise used to form the basis of a commercial series of compiler products by one of the partners (DDC). The main partner (Olivetti) provided a KAPSE (Kernel Ada Programming Support Environment) and some basic tools for the MAPSE (Minimal APSE). This is now to be made available for distribution on a new line of microcomputers under the UNIX operating system.

Feasibility Studies

A number of studies addressed different aspects of Ada of interest to prospective practitioners, such as:

- conversion from current languages (Pascal, RTL/2) to Ada;
- coexistence of CHILL and Ada in an APSE;
- command languages for use in an APSE;
- Ada for distributed targets;
- large portable numerical libraries in Ada;
- management aspects of software development in an APSE.

All of these have contributed to increased awareness and better insight into Ada's possibilities. They have in many cases led to publications that have received wide interest, some of them through the Ada Companion Series of books which was started on Commission initiative.

Validation study

This study identified some requirements for the establishment of European validation facilities for Ada. It has paved the way for more European involvement in this important aspect of the Ada programme (there are now at least three officially chartered Ada Validation Facilities in Europe). It has also been the first to point to the extremely important issue of validation of different configurations of the same compiler, which has only recently been taken up by the US validation authority.

Ada Training Concepts Study

This recently completed study has successfully attempted to put the teaching of the Ada language into a software engineering context, by providing a framework for relating software engineering principles to Ada language features, and identifying classes of trainees and their requirements. The study led to the definition of a highly structured set of course elements which can be adapted to the needs of the particular trainee group and of the application domain, and which are to be combined into different courses and curricula. Explicit rules for the formation of courses were given.

The work on all of the 1979-1983 tranche of Ada projects has been completed, final technical reports have been produced and accepted, and all, but one, final payments have been made and the contracts closed.

Technically the first tranche of work has met all objectives. The work has been completed within the engaged sums. Organisationally, the projects have required more administrative attention than was envisaged (both in the Commission and the Contractor organisations), with the consequence that the projects have generally overrun their planned timescales. However, due to the financial terms of the contracts, this has not entailed the Commission in any additional direct costs, but has increased the monitoring effort by Commission staff.

The experience gathered from the launching, progressing, and termination of these projects is now being applied effectively to the second tranche of projects.

1985 ACTIVITIES

For the 1984-1986 tranche of Ada projects, to be supported by the Commission with about 8 MECU, 23 proposals were received, from which 17 were selected; in two cases the proposers had to subsequently withdraw their participation.

The 15 separate projects form part of a structured programme of work and fall into three main categories:

- Formal methods and tools;
- Compiler and run-time systems;
- Environments, including:
  - . interfaces,
  - . distribution,
  - . vector machines,
  - . tools,
  - . utilities.

All 15 projects went through the complete process of:

- Work costing and agreement of financial terms;
- Identification of work packages and share between partners;
- Technical annex production and agreement;
- Preparation, and agreement by partners, of the formal contract documents.

Summaries of the key features of these projects are listed in Annex B.

The appropriate Council Regulation foresaw that the Community financial aid should be suited to the nature of the project. As the projects result from a Commission initiative the majority of the projects are funded in the form of non-repayable grants equal to 50% of their costs. Exceptionally, a few are similarly funded but at 100% of their costs. These are either feasibility studies or, as in one case, the work is clearly a contribution to the state of the art with no immediate and direct commercial benefit to the consortium involved.

By the end of 1985 the contractors and their partners had given formal notice that they had commenced work on ten projects; the remaining five were to start in the first months of 1986.

1985 RESULTS

The new projects started well. By December 1985, 13 major deliverables have been produced and 2 reviews have been carried out.

The technical quality of the delivered work is of a very high order, and some work, particularly related to the Ada Formal Definition Project (MAP 782) is receiving considerable attention from the Ada community worldwide.

Reviews carried out by experts (usually 2 per project) result in verbal comments given by the reviewers at the meetings and in written comments submitted later. Both sets of comments provide invaluable guidance to the contractors as well as providing an independent channel of advice to the Commission.

An additional channel of expert guidance and forum for creative discussion on the work of the projects has been provided throughout the year by the regular meetings of the Ada Europe Working Groups. Nine groups are currently active in the specialist areas of:

- Compiler evaluation;
- Software reuse;
- Formal semantics;
- Language review;
- Validation;
- Environment;
- Education;
- Formal methods;
- Numerics.

These groups have met, generally four times a year, in accommodation provided by the Commission and received limited, but appreciated, cost reimbursement from the Commission. This financial support has been assured for the remainder of 1986.

During the course of 1985 momentum was maintained in the production of new volumes in the Ada Companion Series of text books in collaboration with the Cambridge University Press. To date 9 volumes have been published and a further 3 titles are in the formative stage. Copies to date, worldwide, exceed twelve thousand - many being in the USA, and now in Japan. All this has been achieved by the joint efforts of the Commission staff, members of the Specialist Working Groups referred to above and the staff of CUP. The sales indicate that this has been a very worthwhile activity, providing both valuable information to the Ada user community, as well as giving the good work of the Multi-Annual Programme extensive and favourable publicity.

The Commission's contribution to the dissemination of the work has included a regular quarterly input to the Ada-Europe Newsletter, notification of availability of public domain project deliverables via AdaKom and EuroKom, and the presentation of papers describing the Commission's work at the following international conferences:

- York, January 1985, AdaUK Annual Conference on Ada;
- Munich, April 1985, German Ada Users Conference;
- Delft, October 1985, Dutch Ada Conference.

POST-1985 PROSPECTS

The decision by major authorities to adopt Ada as a universal programming language in real-time systems has been vindicated. The policy within the programme to support activities which would encourage and expedite the use of the standard has given rise to a number of important projects whose results are now being taken up by the Ada user community and examples of which appear throughout this report. Inevitably, high level technical creativity leads to the identification of further important oportunities for continuing work. This is so with Ada. It is already apparent that the teams currently engaged upon the Ada projects have identified further areas of work which can be beneficially carried out and they have built up a working relationship which is just coming to fruition.

2 Transnational information systems - distributed data-base (DDB) systems

There is an increasing need for techniques and tools that will allow data that is currently present in various computer systems, in various data-bases and in various locations, and thus distributed, for whatever reason, historical or operational or any other, to be made available to data users in an efficient and effective integrated manner.

It is evident that attempts to address this area must not only meet the basic technical requirements but also do this in a transnational context so that the needs at the Community level can be dealt with.

A pre-development study on distributed data management systems was supported earlier in the programme and the final report was submitted at a conference in Berlin on 31 August 1982.

The decision to extend Part Two of the Multi-Annual Programme, while not ruling out other projects, gave priority to this area and to Ada. The Commission initiated action concerning these two areas by means of a specific and targeted call for proposals in order to help identify the best projects for support. The call for proposals for software and application projects was published in the Official Journal of the European Communities (No C231) on 1 September 1984.

In the call for proposals it was stated that the Commission intended to support projects in the DDB area with up to a total Community funding of 3.6 million ECU. It was also envisaged that the Commission would, in a second phase and after an evaluation procedure, support the implementation of one or more of the chosen architectures.

Five projects were eventually selected for support and contracts were signed for four of these. The fifth project ran into problems when one of the contractors for internal reasons eventually declined to sign the contract. Despite the efforts of all concerned it proved not to be possible to continue with the project.

As foreseen in the appropriate Council Regulation, the projects, resulting from basically a Commission initiative, are funded in the form of non-repayable aid. In three cases this is equal to 50% of their costs and in the other slightly less than 50% of their costs.

The supported projects, each with an estimated duration of twelve months, were as follows :

MAP 761 : Multidatabase Services on ISO/OSI Networks for Transnational Accounting.

Partners : INRIA (F), SWIFT (B), Universitat Dortmund (D), Hahn-Meitner-Institut Berlin (D).

The start date was 15 April 1985. The project costs were estimated at 1242 KECU with a Community participation of 591 KECU. The project was foreseen to involve 189 man-months of work.

The aim of this project was to produce both a DDBS structure appropriate to transnational applications and the required design methodology.

MAP 762 : Complete Specification for a Model Independent Heterogeneous Distributed Database System.

Partners : University of East Anglia (GB), Control Data Belgium (B), Thorn EMI Information Technology (GB).

The start date was 1 April 1985. The project costs were estimated at 667 KECU with a Community participation of 338 KECU. The project was foreseen to involve 63 man-months of work.

The project was to establish a complete design specification for a distributed data-base system; compatibility of logical models, transnational operation, relationship with current practice. The project was based on the results of a national project (UK) and involved the specification of a network schema and the design of the final protocols. The project would end with the demonstration of an experimental system in operation.

MAP 773 : Application of distributed data-base (DDB) techniques to trans-national health information systems : design, implementation and evaluation of a system architecture.

Partners : University of Ulster (GB), Trinity College Dublin (IRL), CRAI (I), ICL Ireland (IRL).

The start date was 1 April 1985. The project costs were estimated at 670 KECU with a Community participation of 335 KECU. The project was foreseen to involve 97 man-months of work.

The project would create a system architecture capable of supporting heterogeneous elements and establish a "standard" user requirement specification which would allow the selection of the most appropriate DDBS.

MAP 778 - ARCHEDDA: Architectures for Heterogeneous European Distributed Databases.

Partners : Logica SA/NV (B), Logica UK Ltd (GB), CRI (DK), Italsiel (I), SESA (F).

The start date was 15 January 1985. The project costs were estimated at 1964 KECU with a Community participation of 982 KECU. The project was foreseen to involve 167 man-months of work.

The aims were as follows :

- definition of normalised high level languages for a DDL and DML;
- study methods for integrating the DDL's and DML's of distributed data-base management systems and the high level DDL and DML;
- study the techniques of local management in a heterogeneous context and the repercussions on the design of DDB's and their performance;
- to work in the direction of the normalisation of exchange protocols and of high level DDL's and DML's.

The addresses of the prime contractors for the projects are given in Annex C.

Apart from slight start-up problems of both an administrative and logistical nature within the projects, reasonable progress was reported by all four teams.

The projects were invited, as had been foreseen in the original call for proposals, to submit proposals for a second implementation phase. The date eventually chosen for the evaluation of the proposals was such that there was a good prospect that there need not be a gap between the end of phase one of any selected project and the start of phase two.

All four projects decided to submit a proposal and an evaluation of these took place at the same time as a review was made of the on-going work. This all took place during the last week of October, when all projects had effectively passed their first phase mid-point.

The main points of the review by the experts were :

- for projects No 761 and No 773, satisfaction was expressed with the work carried out and the work plan to complete the first phase;
- certain reservations were put forward concerning the first phase of project No 762;
- dissatisfaction was expressed with the first phase of project No 778.

The experts recommended that the proposals for the second phases of projects 761 and 773 be accepted.

In consequence a draft decision for project 761B was presented at the meeting of the Advisory Committee on 11 December 1985. This was approved unanimously.

The presentation of a draft decision for project 773B was foreseen for early 1986.

Thus it was anticipated that the final results of two of the projects would become available during the course of 1986 while the other two projects would move on into their implementation phase.

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ANNEX

ANNEX A : Part I Projects and Contracts

Contact points are given for all of these projects in Annex C.

1. Conformance Testing Services.

The contracts in this area are as follows:

i) Conformance Testing Services for Teletex according to CEPT and conformant to test for OSI Lower Layers 1 to 4 (85/C/124) (1500 KECU);

ii) Conformance Testing Services for Message Handling Systems according to Recommendation X400 of the CCITT (85/C/123) (1750 KECU);

iii) Extension to COBOL/FORTRAN European Testing Services - Cobol Compiler Testing to a new standard in France, Germany and UK. FORTRAN compiler, planning and specification and implementation phases to a new standard under development (85/C/118) (100 KECU);

iv) Extension to the PASCAL Validation Service (85/C/115) (28 KECU);

v) Graphic Kernel System Conformance Testing, establishing service for up to level 2b in FORTRAN, pilot service for 3d, service up to level 2c in FORTRAN and C, 3d service, internal device interface testing (85/C/114) (755 KECU);

vi) Software Quality Assurance - quality assurance of software production (85/C/117) (125 KECU).

2. Completion of ongoing MAP projects and studies.

Work to complete study contracts awarded previously under the programme has continued as follows :

- Committee Support System (CSS) (83/C/012) : development work completed by the contractor who will now proceed to a trial implementation phase in Member States;

- Development of a Multilingual Latin-Greek Keyboard (82/C/008) : project completed and work to develop a new standard in ISO at an advanced stage (ISO-DIS-8884);

- Tutorial for the OSI Upper Layers (83/C/014, 85/C/107) : study completed;

- IT Standards in Education (83/C/013) : first-phase study completed.

3. Public procurement.

PPSC-IT - Standardization Actions :

Proposal 1.1 (85/C/106)
Parallel explanatory documentation (16.5 KECU). Awaiting finalised report from the contractor.

Proposal 1.1+ (85/C/122)
Tutorial information on the use of standards (16.5 KECU). First draft report under preparation.

Proposal 1.2 (85/C/119)
Information content for procurement purposes (10 KECU). Final report completed and distributed.

Proposal 1.2+ (85/C/120)
Short description on the application of existing standards (16.5 KECU). First draft report expected by summer 1986.

Proposal 1.3 (86/C/126)
Diffusion of documentation (16.5 KECU). First draft report expected shortly.

Proposal 2.1 1/2 (85/C/112)
Specification of requirements for procurement version standards - Phase 1 (Phase 2 not yet started) (17.5+ KECU). Final report - nearing completion.

Proposal 2.2 1/2 (85/C/104)
Specification of requirements for I.T. conformance testing services for procurement purposes - Phase 1 (Phase 2 not yet started) (60 KECU). Final report completed.

Overview Actions :

Proposal 3.1
Unix V+ - to study the need for a European standard to be used not only for purchasing but also applications to be executed in a Unix environment (40 KECU). Study under consideration.

Proposal 3.2
System interworking - to study requirements for interworking and interconnection between WAN and LAN (80 KECU). Study under consideration.

Proposal 3.3
PSDN Packet Mode Access (10 KECU). Study under consideration.

Contract Actions :

1. Possibilities of Acceptance Testing (86/C/129) (54 KECU). Contract finalised.

2. Drafting of a handbook for the practical application to the data processing sector of the procedure laid down in 77/62/EEC for Procurement (85/C/128) (51 KECU). Contract finalised.

3. Guidelines related to the specifications of customer designed software (86/C/130) (41 KECU). Contract finalised.

4. Description of practices concerning default and penalties in the context of IT contracts (85/C/125) (3.7 KECU). Contract finalised.

5. Software documentation (50 KECU). Under study by the committee.

6. Better understanding of IT Standards by procurement officers (85/C/127) (12 KECU). Contract finalised.

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ANNEX B : Ada Projects

The addresses of the prime contractors for the following projects are given in Annex C.

MAP 750 : Pilot Implementaion of Basic Modules for Large Portable Numerical Libraries in Ada (PIA).

Partners : NAG (UK), NPL (UK), CWI (NL), Trinity College Dublin (IRL).
Cost : 600 KECU, Community Participation : 50%.

The main objective of this project is to design and implement the foundations of a portable and efficient large scale numerical library in Ada for application by both the scientific and real-time communities.

MAP 755 : Standard Formally Specified Distributed Ada Programming Support (SFD-Ada).

Partners : Olivetti (I), Werum (D), IABG (D), Systems & Management (I).
Cost : 2000 KECU, Community Participation : 50%.

This project follows on from the Portable Ada Programming System (PAPS) project carried out under the 1979-1983 tranche of the programme, and aims to investigate the possibility of convergence of PAPS with the definition of the Common Apse Interface Set (CAIS) and with the Portable Common Tool Environment (PCTE); it also aims to develop additional tools for the PAPS environment.

MAP 756 : Study and Definition of a Full Scale Ada Life Cycle Support Environment.

Partners : Selenia (I), INTECS (I), CRISS (F).
Cost : 1500 KECU, Community Participation : 50%.

This project involves a planned study, followed by a practical approach, to tackle the deficiences in current Ada Programming Support Environments (APSE). The identified deficiencies are, among others, lack of support to distributed environments, life cycle methodology and other programming languages. The ultimate intention is to have an APSE free of the above deficiencies and with an integrated set of tools especially tailored for embedded-computer systems applications; it could serve as a valid contribution to the planned revision of STONEMAN.

MAP 757 : Computer Aided Testing of Real-Time Software (IDAS).

Partners : ESD (F), Systeam (D).
Cost : 800 KECU, Community Participation : 50%.

IDAS is a hardware and software system for computer aided testing of real-time software. It has been designed so as to minimize the workload for an adaptation to a new language or a new machine; in fact it is made up of several parts most of which are independent from the language of the programs under test, the machine under test and the test machine. This project addresses the adaptation to Ada.

MAP 759 : A Command and Response Language for the PAP (UNCLE II).

Partners : Generics (IRL), FU Hagen (D).
Cost : 100/320 KECU, Community Participation : 100/50%.

This project aims at designing an advanced, user-oriented, command and response language for the user of the Portable Ada Programming System (PAPS). The main emphasis of the project is to provide a highly reliable, portable general user interface which can be tailored to the individual users needs and skills.

MAP 765 : Ada Execution Tool For Embedded Applications in Industrial Real-Time Systems (ASTERIX).

Partners : TECSI (F), GMD Karlsruhe (D).
Cost : 1200 KECU, Community Participation : 50%.

ASTERIX aims to provide a basis for the use of the Ada programming language in industrial real-time microcomputer systems, by retargetting an existing Ada compiler onto a Motorola 68000 microprocessor and extending it to support some Ada features important to real-time applications. Also, an existing portable real-time operating system, already ported onto the Motorola 68000 and based on the European Standard SCEPTRE, will be modified to support the specific requirements of Ada, especially in the areas of task synchronisation, communication, debugging and monitoring. The study will also assess how the target executive can provide facilities for supporting distributed systems and inter-site communications in a real-time time environment. Finally, the resulting implementation will be tested and the performance measured.

MAP 767 : Management Issues in a Distributed Ada Programming Support Environment (MIDAS).

Partners : TECSI (F), GEC Software (UK).
Cost : 100 KECU, Community Participation : 100%.

This study project examines some of the management issues which will arise in the design and use of a distributed Ada Programming Support Environment (APSE). These issues have been divided into three classes for the purpose of this project: product, project, and environment management.

MAP 769 : Software Engineering Tool for the Production of Ada Software (MIRA-Ada).

Partners : E2S (B), KUL (B), ATM Computer (D).
Cost : 300 KECU, Community Participation : 50%.

This project will adapt and further develop the existing Pascal-based software engineering tool MIRA to assist in the production of Ada software. MIRA was designed to assist in the transformation of an ambiguous specification into a reliable software product. Its input consists of an attributed formal specification with embedded high-level programming language texts. This input is checked for consistency (on a mathematical basis) and a running program is generated.

MAP 770 : Ada on a Distributed Target (DIADEM).

Partners : GEC Software (UK), Imperial College (UK), TXT (I).
Cost : 700 KECU, Community Participation : 50%.

This project is a pilot project to implement a microprocessor architecture with a distributed run-time system supporting Ada and reconfiguration.

It will build on the feasibility study "Ada for distributed multiprocessor systems" performed under the first tranche of the Multi-Annual Programme which concluded that, since the Ada language does not offer suitable solutions for programming distributed targets, it is the MAPSE/APSE that should control and prepare programs for them. The main object will be to demonstrate the feasibility of distributing a single Ada program so that its constituent tasks execute on different processors (nodes), and communicate with each other (e.g. by the rendezvous) using the links between nodes. Ada program design techniques will be developed to support this approach. The multiprocessor target will be linked to a SUN-2 workstation as host. The Verdix Ada compiler will be used, but the run-time system, normally linked into the compiled programme, will be replaced by the distributed run-time system, developed as part of this project.

MAP 782 : Draft Formal Definition of ANSI/MIL 1815-A Ada (Ada-FD).

Partners : DDC (DK), CRAI (I).
Cost : 1700/200 KECU, Community Participation : 100/50%.

This project aims at making a formal definition of Ada as it is described in the Reference Manual and pointing out residual inconsistences and ambiguities in the narrative description. The definition will be supplemented by various explanatory documents, and tools will be provided to manipulate the definition text, thus increasing its usability.

MAP 783 : Syntax-Orientated Program Handling and Instrumentation for Ada (SOPHIA).

Partners : Inf. Int. (F), LDRA (UK).
Cost : 1000 KECU, Community Participation : 50%.

The project aims to effect a technology transfer by re-engineering an existing prototype of a syntax-editor into a comprehensive program manipulation system. The MENTOR system of INRIA (France) and the Software Testbeds of LDRA (UK), both available for a number of languages, but not Ada, will provide the basis of the project.

MAP 785 : Formal Design Methods and Tools for Asynchronous Concurrent Systems (SFDM).

Partners : Systems Designers (UK), University of Passau (D).
Cost : 100 KECU, Community Participation : 100%.

The objective of this project is to investigate the feasibility of producing a formal design method with tool support for asynchronous concurrent systems. A further objective is to make the formal method a natural evolution from currently used pragmatic design methods based on a structural formalism.

MAP 786 : Parallel Numerical Processing Through Ada (PNPA).

Partners : Inf.Int. (F), Ath.School of Ec.& Bus. (GR), Trinity College Dublin (IRL), Siemens (D).
Cost : 700 KECU, Community Participation : 50%.

This project investigates the capability of Ada to formulate efficient programs and algorithms for vector computers for large scientific applications; it also considers how Ada compilers should be constructed in order to translate such programs into highly parallel machine code.

MAP 792 : A Portable Optimising Compiler for a Production Quality European APSE.

Partners : Systems Designers (UK), Systeam (D).
Cost : 600 KECU, Community Participation : 50%.

This project aims to produce, for inclusion in a Support Environment, the design of a portable optimising compiler capable of generating code of the highest quality. Therefore the major objective is to implement and study the effectiveness of the Ada compiler optimisations, particularly those which follow from a flow analysis of the compiled program.

MAP 793 : Formal Specification and Testing Tools for an Extended European Ada Compiler Base (ADEPT).

Partners : STC (UK), DDC (DK), ICL (UK).
Cost : 1600 KECU, Community Participation : 50%.

The project uses as its starting point the Ada compiler and tools produced by DDC; this is actually the first validated Ada compiler developed in Europe, based on work done by DDC as part of the PAPS project under the 1979-1983 tranche of the programme. At present the VAX version of the compiler is only available on VMS, and one of the objectives of this project is to make it available for a wider range of hosts and targets; this will be achieved by using UNIX, which has become a standard base operating environment. The other objective is to extend the existing toolset, also on UNIX, to cover the areas of formal specification, design, validation and testing.

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ANNEX C : Project Contact Points

This annex gives contact points within the Commission for the various items mentioned in this report.

Contact points within the various projects are also given. This is normally someone with the prime or main contractor.

The general postal address for the Commission staff is :

CEC - Commission of the European Communities,
DG XIII - Telecommunications, Information
Industries and Innovation,
Multi-Annual Programme in the
field of data processing,
Rue de la Loi 200,
B-1049 Brussels.

Telephone number : +32-2-230-11.11
Telex number : COMEU B 21877
Telecopier : +32-2-235-0299

General enquiries should initially be addressed to Mr Emile Peeters (+32-2-235-7330).

Many of the people mentioned can be also contacted via EuroKom, or where appropriate AdaKom.

The structure of this annex follows that of the rest of the document in that the same section titles etc. have been used. The project reference numbers have been included for ease of cross-referencing.

I GENERAL MEASURES

1 Standardization policy

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b. Conformance testing services contracts

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2 Public procurement

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3 Education, training and employment

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Study on availability of highly qualified manpower

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David Gleave, +44-1-370-5770

4 Confidentiality and data security

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Projects in preparation only.

5 Collaboration in research and development - COST

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Teleinformatics

Man-machine interface for telematic system

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DSM - Distributed Systems Management
in Wide Area Networks

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FDT-ABM - Formal Description Techniques
- Architectural and Behavioural Model

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Satellite Satine-2 to interconnected
Local Area Network

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AMIGO - Advanced messaging in groups

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Security mechanisms for computer networks

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OSIS - Open shops for information services

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Artificial Intelligence and Pattern Recognition

FLORIAN - A new language for AI using functions and objects to represent knowledge

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Knowledge-based automatic speech recognition and understanding

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Advanced issues in knowledge representation

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Artificial intelligence and non-standard logic

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An intelligent computer-aided instructional system for teaching artificial intelligence programming

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AI based system and the future of language, knowledge and responsibility in professions

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II PROMOTION MEASURES

1 Software developments - Ada

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Ada Projects

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