Poseidon House
Castle Park
Cambridge CB3 0RD
United Kingdom

TELEPHONE: **Cambridge (0223) 323010**
INTERNATIONAL: **+44 223 323010**
FAX: **+44 223 359779**
E-MAIL: **apm@ansa.co.uk**

ANSA Phase III

Briefing for 1994-5 Planning Cycle

Andrew Herbert, Rob van der Linden

Abstract

This document is for circulation to the ANSA Technical Committee (TC) and solicits input from all TC members for use by the Planning Subcommittee. It reports upon the current work in progress and proposed ways in which it could be carried forward in 1994-5. The final section is a questionnaire to be filled in by each TC member and returned to Rob van der Linden by 8th April 1994.

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1 Introduction

This document is for circulation to the ANSA Technical Committee (TC) and solicits input from all TC members for use by the Planning Subcommittee. It reports upon the current work in progress and proposed ways in which it could be carried forward in 1994-5. The final section is a questionnaire to be filled in by each TC member and returned to Rob van der Linden by 8th April 1994.

It has been distilled from documents prepared by each of the current groups in the ANSA team, setting out their plans for the next 12 months. The original documents will be made available to the Planning Subcommittee.

The proposals assume the ANSA team will continue to consist of 12.6 technical staff equivalents, plus Chief Architect, full-time, and 1.5 my of Project Management (divided between Mike Eyre and Rob van der Linden).

1.1 Coherence

An important aspect of the ANSA workprogramme is coherence across the topics being investigated. Coherence enables work in one work area to reinforce that in another, and ensure a consistent architectural approach.

For the results produced in 1993-4 two common threads joint the work in each of the areas of focus:

- targeting the needs of the application programmer in terms of
  - — methodology / guidelines for system structuring
  - — programming abstractions for use in applications
  - — engineering building blocks for system implementation
  - — support for rapid deployment and reuse of system components
- greater use of information carried through to the run-time system from earlier design and programming stages to make management and evolution of systems easier.

The work done supports the development of technology for the provision of “management engines” based upon distributed objects that support applications such as:

- customer service / facilities management systems controlling legacy data processing and messaging functions in large organizations
- networked information services provision

management and operation of telecommunications systems.

The coherence achieved in the first year of the ANSA work programme is valuable to both sponsors and ANSA team and provides a basis for planning 1994-5.

1.2 Focus

The ANSA team currently has three principal areas of focus:

- performance
- federation
- dependability.

A fixed team of three to four staff is assigned to each area.

The fourth area of focus for 1993-4, automated transparency, was cancelled to ensure the listed topics could be fully resourced with available staff. To some extent this has been recovered by the proposed joint work with TINAC (see below), and has required additional work be done by each of the other groups.

It is proposed to continue with the same areas of focus and team organization, since

- each area has successfully started and deliverables are being produced
- the arguments in the 1993-4 plan for work in these areas are still valid
- higher priority areas have not been identified
- the groups structure is working well, ensuring topics are investigated in depth.

In 1994-5 it is expected that pressures to begin work on higher level tools for distributed system analysis, design and automated implementation will rise, especially if end-users join the ANSA Consortium.

Such tools will take much more of a “process and repository” view of systems than has been done thus far. Tools and methods will necessarily have to be extensions or revisions of existing tools for more centralized systems and simple networked systems. This is an important area lacking in architecture.

Sponsors should consider the importance they attach to each area of focus, and the area of tools for rapid prototyping and deployment of new applications and services in distributed systems.

2 Procedures

The 1993-4 plan concentrates heavily on procedures. The success of these procedures should be reviewed for 1994-5, identifying strengths and weaknesses.

From the point of view of the ANSA team the following perceptions hold:

- Technical Committee meetings are important and useful
- Review Groups do not always work because of pressures on sponsor's time
- Smearing out deliverables over the year does not give as strong an impression of progress as an "end of year" baseline.

3 Performance

3.1 Vision

An open architecture for distributed real-time applications consisting of

- binding and quality of service management
- “signals” and “streams” based interaction models
- services for monitoring and synchronization.

3.2 Objective

Demonstrate an application showing real-time use and management of multi-media streams, built to (extended) ANSA principles.

Produce a real-time derivative of ANSAware to support the demonstration.

(Given the nature of the work, constructing a demonstration and measuring it is necessary to validate results obtained).

3.3 Benefit

This work will benefit telecommunications information networking applications and technology suppliers.

All telecommunications information networking applications have to meet timing constraints, particularly those close to the network control system. Such applications will often couple interactive telecommunications as well as data communication. Such applications will not in general be supplied by the network provider. Therefore there must be a means for tele-communications systems to become open, and to maintain their real-time properties.

An open architecture for distributed real-time will benefit

- telecommunications operators by enabling additional services to be provided by others and hence increase revenue
- telecommunication service providers by enabling the use of open systems technology and hence reduced costs and technological risks
- open systems technology vendors through increased opportunities in the telecommunications sector.

This has been identified as an medium term target for TINAC.

3.4 Progress to date

This work is already significantly under way, with inputs available from 1993-4 work, CNET, University of Kent and University of Cambridge work.

40pm invested. Performance Framework delivered. Work-in-progress on Binding and Engineering Design reported.

3.5 Work items

It is proposed to work on

- quality of service: qos specification, qos engineering, resource specification, resource management engineering
- explicit interface binding: scenarios for use in applications, programmer's interface, binding engineering
- signals and streams (i.e.,non-rpc interfaces): programmer's interfaces, communications engineering
- orchestration of distributed real-time applications: functions, control points, management guidelines.

3.6 Risks

This work will depend upon the joint tools development with TINAC to provide the programmer's interface to the engineering mechanisms.

The demonstration to be credible will need support by the sponsors in terms of requirements and access to technology.

4 Dependability

4.1 Vision

A methodology for analysis and design of distributed applications with strong dependability requirements.

4.2 Objective

An ANSA “Dependability Manual” giving business cases, methodology, architectural principles and tutorial working examples of how to construct and manage dependable distributed applications in an open distributed processing environment.

A number of prototypes and experimental systems may be produced as part of this work, but a dependable version of ANSAware is not a proposed objective.

4.3 Benefits

Dependability in distributed systems is currently either ignored or obtained by the use of proprietary facilities such as transactions systems or process group systems. Interworking between different proprietary facilities is difficult, and systems are often slow because the facilities cannot exploit knowledge of the application in achieving dependability.

A methodology for analysis and design of dependable distributed systems will benefit:

- end users: by enabling more applications to be made dependable, reducing revenue losses due to system failures
- systems integrators (including telecommunications vendors): by enabling interworking with and between dependable systems
- open systems technology vendors: by increasing the market for their systems by penetrating sectors previously restricted to proprietary dependability solutions.

4.4 Progress to date

46pm invested. Dependability Manifesto and Failure Model delivered. Work-in-progress reported on Extended Transaction Framework.

4.5 Work items

The following items of work are proposed:

- analysis and design of dependable, distributed applications: design and programming guidelines, infrastructure components, programming tools
- reliable business processes: transactional workflow in distributed systems, engineering support and programming tools for extended transaction framework, emphasizing a business process view of applications
- dependability engineering: architecture for adding dependability to DCE and CORBA-based platforms and for managing dependability within emerging systems management frameworks.

4.6 Risks

This work depends upon access to realistic scenarios, and to sponsor's experts versed in the principal proprietary dependability technologies.

There is an emerging dependency on aspects of the federation work.

5 Federation

5.1 Vision

An architecture supporting

- rapid prototyping and deployment of distributed systems, with
- full integration of existing applications and services
- management of system change and evolution.

5.2 Objective

A demonstration of federated interworking between two examples of a distributed repository supporting applications construction, deployment and configuration, and showing federated management, security and billing.

5.3 Benefits

Current approaches to distributed software construction, deployment and configuration assume a single design authority and perform minimal checking to ensure the integrity of operational systems. This makes systems unsafe, difficult to change, and thwarts interworking between federated systems.

Providing rapid prototyping, deployment and integration benefits:

- end users: by reducing risks through ensuring systems are safe and extensible
- systems integrators (including telecomms vendors): by enabling larger systems to be built by interworking between federated subsystems
- open systems technology vendors: by increased revenue resulting from increased end-user confidence in distributed systems.

5.4 Progress to date

42pm invested. Work in progress reported on Applications building tools, New Trader, Database integration. Prototyping under way.

5.5 Work items

- extensible, advanced trading: dynamic type checking, interface repository capability, links to resource and configuration management, integration with databases
- architecture for interception: boundaries, interception mechanisms, automated generation and configuration of interceptors, including interceptors for legacy technologies

- management, security and billing in federated systems: their impact on interception and trading across system boundaries
- high level approaches to building and configuring applications: process modelling, work flow modelling, application configuration - programming and repository requirements.

5.6 Risks

Management, security and billing in federated systems are unexplored topics, that will become increasingly important as “information networking” develops. These items are considered in the work on federation, but not a first priority. They may need to be given more priority and become a focus in their own right.

This work area is at risk from less architectural (and less capable) solutions produced by software vendors blinding end users to the longer term issues.

6 Standards

In 1993 to 1994 the team resourced two major standards activities:

- editing ISO RM-ODP Part 3 (5pm)
- chairing OMG CORBA 2.0 RFP process (5pm).

In addition some help was given to sponsors in preparing inputs to OMG and ISO.

The RM-ODP work should complete in January 1995, requiring an additional 1.5pm effort. The ISO ODP activity for 1994-5 will consist of work on:

- Part 1 (Tutorial)
- Trader standard
- New Work Items (to be decided, but, likely to be drawn from Naming, Binding, Transparency, Security).

It is proposed to assign 1pm/yr effort to supporting UK input to the Trader standard. No other ODP activity is proposed.

The CORBA 2.0 process will complete within the next 6 six months. Thereafter it is proposed to continue attending OMG Technical Committee meetings, monitoring OMG documents and helping sponsors with OMG inputs as requested. A maximum effort of 4pm/yr will be assigned to OMG standards.

No involvement in other standards activities is proposed.

7 TINAC

In 1993 to 1994 the ANSA team cooperated closely with the TINA core TINAC:

- showing TINAC how to use RM-ODP to structure TINA
- explaining details of ANSA and ANSAware to TINAC
- reviewing TINAC deliverables
- guiding the planning of TINAC DPE development.

The work of providing regular architectural advice and review to the TINAC core team is expected to continue at an effort of approximately 6pm/yr.

Joint development of programming tools for use by TINAC and ANSA has been agreed by the ANSA Management Committee, and 12pm effort budgeted. This work has effectively restarted some of the “automated transparency” work that was cancelled in 1993-4 and is relied upon by the performance group as part of the baseline for prototyping.

8 Consultancy and scenarios

Consultancy was provided to nearly every sponsor in 1993/4. Each company was allocated a nominal 10 days. The effort impact is larger since most days involve several team members. The activities that occurred included:

- giving courses / extended presentations on ANSA
- meetings with sponsor's product teams
- design review of sponsor's work in progress
- development of sponsor-specific scenarios for use of ANSA concepts and technology (approximately 4pm).

It is proposed that this activity be continued into 1993-4, since it provides significant benefits to both sponsors and ANSA team with an effort of 4pm assigned.

9 Support and infrastructure

The team has to invest some effort in its own infrastructure and the means to enable access to ANSA work programme results by sponsors etc.

6pm in 1993-4 was invested in the Document Management System, installing new equipment and software and basic software “house-keeping”. In 1994-5 support and infrastructure work can be managed back to 4pm.

10 Next actions

This document is being circulated to all sponsors to gather data that can be considered by the Planning Subcommittee appointed at the last ANSA Technical Committee.

10.1 Focus

Are you content to continue with the current three focus topics?

Do you want them all treated equally?

Do you agree that analysis, design, prototyping and implementation tools are important?

Do you want to see this added to the areas of focus - as an addition, or in place of another area?

10.2 Plan

To assist in arriving at a shared agreed plan between all the sponsors, please indicate how you would allocate 170 man months across the key items outlined above, and he kind of deliverables that would be most useful to you in each area:

10.2.1 Performance

1. quality of service
2. explicit interface binding
3. signals and streams
4. orchestration of distributed real-time applications

10.2.2 Dependability

5. analysis and design of dependable, distributed applications
6. reliable business processes
7. dependability engineering

10.2.3 Federation

8. advanced trading
9. architecture for interception
10. management, security and billing in federated systems
11. high level approaches to building and configuring distributed applications

10.2.4 Standards

12. completion of ISO RM-ODP Part 3
13. ISO Trader standard progression
14. OPD new work items (please specify priorities)
15. OMG CORBA 2.0 TF chair
16. OMG monitoring (please specify priorities)

10.2.5 TINAC

17. TINAC review and architectural guidance
18. TINAC DPE joint development

10.2.6 Consultancy

19. Consultancy to individual sponsors
20. Development of scenarios for application of ANSA results

Are there ways in which the consultancy activity could be made to deliver better results?

10.2.7 Support and infrastructure

21. Support

10.3 Procedures

What changes would you like to see to the existing procedures for

- Technical Committee meetings
- Review teams
- Deliverable documents
- Deliverable software
- Management and Progress Reports

10.4 Others

Are there other items you would want to see added to the plan review?