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ANSA Phase III

Objective

ANSA Technical Committee

Abstract

This document sets out the objectives and overall framework for the ANSA Phase III workplan for the two years from March 1993..

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1 Objective

1.1 Scope

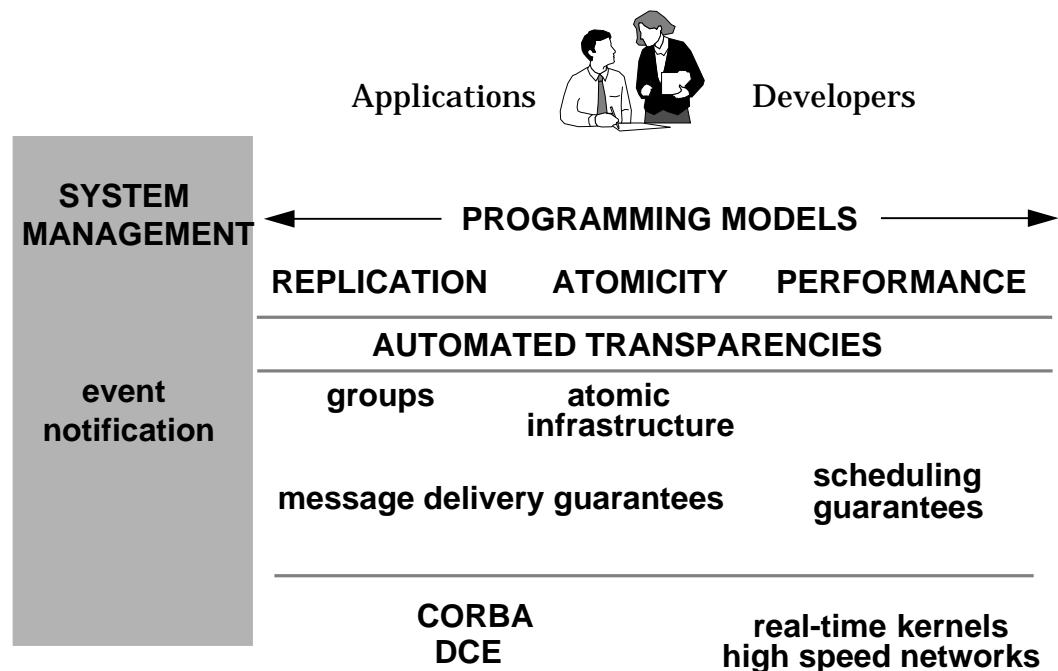
This document sets out the objectives and overall framework for the ANSA Phase III Workplan for the two years following the date of issue.

The document is under the editorial control of the ANSA Technical Committee. The document will be reviewed and updated regularly by the Technical Committee to roll forward the planning horizon.

1.2 Objective

The objective for the first two years of the ANSA Phase III work programme is to continue and complete as far as possible, work on dependability and performance¹ in a time-frame that will influence industry consensus and manufacturers of distributed systems infrastructures. This work will emphasize the use of automated transparency and provision for federation to ensure that the workprogramme results in a single widely applicable architecture. Figure 1.1 shows the work area with a number of key concepts and technologies.

Figure 1.1: Key areas of focus



1. Performance covers the notion of "real-time".

The deliverables of the first two years will populate a computational and engineering architecture to the point where they are prototyped. To enable rapid technology transfer and interaction with sponsors, the ANSA team will produce prototype quality, incremental software. It is not an objective to produce a supported platform.

1.3 Benefits

The principal benefits of the work will be:

- support for existing applications requiring dependability and/or performance within an open system, thus eliminating the need for closed special purpose and expensive infrastructures
- more distributed applications may be written because of increased functionality and support, and hence more revenue may be obtained from distributed systems technology
- higher productivity of applications programmers because of higher functionality and hence reduced application costs and time to market.

1.4 Results

The main results for the next two years will be an integrated architecture which will include:

- dependability
- performance

The architecture for dependability will consist of:

- A set of concepts and a taxonomy for dependability
- An engineering model¹ for groups, replication and atomic actions
- A programming model² for dependable applications
- Automated transparencies for dependability

The architecture for real-time will consist of:

- A set of concepts and a taxonomy for performance
- An engineering model for real-time, including quality of service specification
- A programming model for time critical applications
- Automated transparencies for performance

The engineering models will address the management and federation requirements of dependable, time critical applications and system owners.

1. An engineering model is a set of functional components and a set of recipes for connecting those components together.

2. A programming model is a set of abstractions allowing for the selective use of transparency. The semantics of these abstractions are provided by the ANSA computational model.

1.5 Market

Distributed computing is becoming the technology of choice for building and integrating applications in a diverse range of markets.

Current commercial offerings of distributed infrastructures are reaching a stage of maturity where the application interaction functionality is now being delivered in a consistent manner, the OSF DCE and OMG CORBA are good examples. In many markets (e.g. financial, telecoms, large MIS environments) the customers are asking for dependability and (especially in telecoms) performance. The manufacturers are now looking at how they can meet these requirements with internal research projects which are currently aimed at understanding the problem.

The purpose of the work programme is to develop the architectural framework over the next two years within which the requirements for dependability and performance can be developed into commercial products through industry wide consensus. The window of opportunity to have a major impact on the development of the next generation of distributed systems infrastructure products exists now and will probably be open for a couple of years.

1.6 Focus

Building and integrating applications is by definition specific to a customer's business needs. While they can be built using commodity, standard, software components there is a significant customization left to the user. The ever increasing pace of change strains IT users' ability to restructure existing applications and add new ones to keep pace with changes in their business. This is stimulating greater use of application toolkits and application generators to reduce development time and increase programmer productivity. The purpose of the ANSA work on automated transparency is to apply these approaches to distributed computing

Dependability (and especially availability) represents a range of options and solutions. From the client view an available service may mean that the service is always ready for connection, but that errors in an existing use of the service cause the action to abort and the client must recover; or the action may abort and the action data is maintained consistently by the service; or the server may fail but the action is continued by another server transparently to the client. These options may be enhanced by performance requirements. The purpose of the ANSA work in this area would be to investigate the parameters of this range and architect the systems needed to meet a range of requirements for dependability from simple replication up to continuously available real-time.

Distributed systems technology is currently deployed within specific application areas, but is increasingly viewed by customers as the means to achieve coupling between application areas. Such coupling often spans organizational boundaries; some of the organizational boundaries may also be technical boundaries. This justifies a focus on how to evolve existing technology to distributed systems and on the issues of federation and autonomy.

1.7 Application

The primary application of the results from the ANSA work will be:

- input to various standards bodies to achieve industry consensus
- use by development engineers in sponsors' companies to assist them in developing products and applications.

Prototypes will be:

- used by sponsors to test out the ideas in specific applications and feedback their experiences to the ANSA team
- used by the ANSA team to test ideas and gain deeper understanding of design and implementation issues.

1.8 Sponsor involvement

To ensure focused and timely transfer of architectural results into the appropriate standards groups, particularly OSF and OMG, the sponsors will need to liaise closely between themselves and the ANSA team. Subgroups of the ANSA Technical Committee should be established to focus on particular standards activities and ensure a coordinated and timely output.

The sponsors will collaborate to develop a small number of field trial applications using the prototype software, which will act as proofs of concept in specific application areas. The sponsors will work closely with the ANSA team in providing requirements from the applications and in providing feedback on the utility of the solutions in meeting their requirements. It is hoped that at least two applications, in different areas, can be developed to test the generality of the results.

It is hoped that some of the universities associated with the project will be involved in the development of the applications and providing feedback on the architecture and its engineering.