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ANSA Phase III

Technical Plan 1995 - 1998

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Abstract

This is the Technical Workplan for the period September 1995 to August 1998.

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Project Management (confidential to the ANSA Consortium for 2 years))

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1 Summary

This is the ANSA Workplan from September 1995 to August 1988.

The work is divided into two principal areas.

The first is to successfully transfer the technology developed to date and as they mature, the results from this plan. This will be achieved by a variety of methods, including projects, training and consulting.

The second area is research focused on how to build and make an infrastructure for distributed interactive multimedia applications in the context of heterogeneous, multi-vendor, multi-service networks.

The plan builds on the existing themes of

- basic components of a distributed interactive multi-media infrastructure
- applying distributed systems technology to enhancing World Wide Web technology.

We will investigate how these themes can be merged into a coherent common infrastructure.

We shall continue our existing strategy of working in cooperation with other teams and harvesting university research where appropriate.

To meet the need for timely results, all workpackages are required to deliver significant results within 18 months of their commencement.

Associated results from other projects in which APM is involved and which will contribute to the pool of ANSA Workprogramme results are noted alongside the relevant workpackages for information. These results are available to, but not under the control of the ANSA consortium.

2 Research Vision

The combination of computerized information, interactive multi-media applications and broadband telecommunications is a springboard to new technologies spawning an electronic world of services supporting people going about their work, enjoying their leisure, protecting their health and many other aspects of life.

Whilst the desktop and domestic interfaces to the electronic world are in our grasp, the means to provide, deliver and manage services effectively remains elusive.

The technical challenge in achieving the electronic world is one of systems integration across:

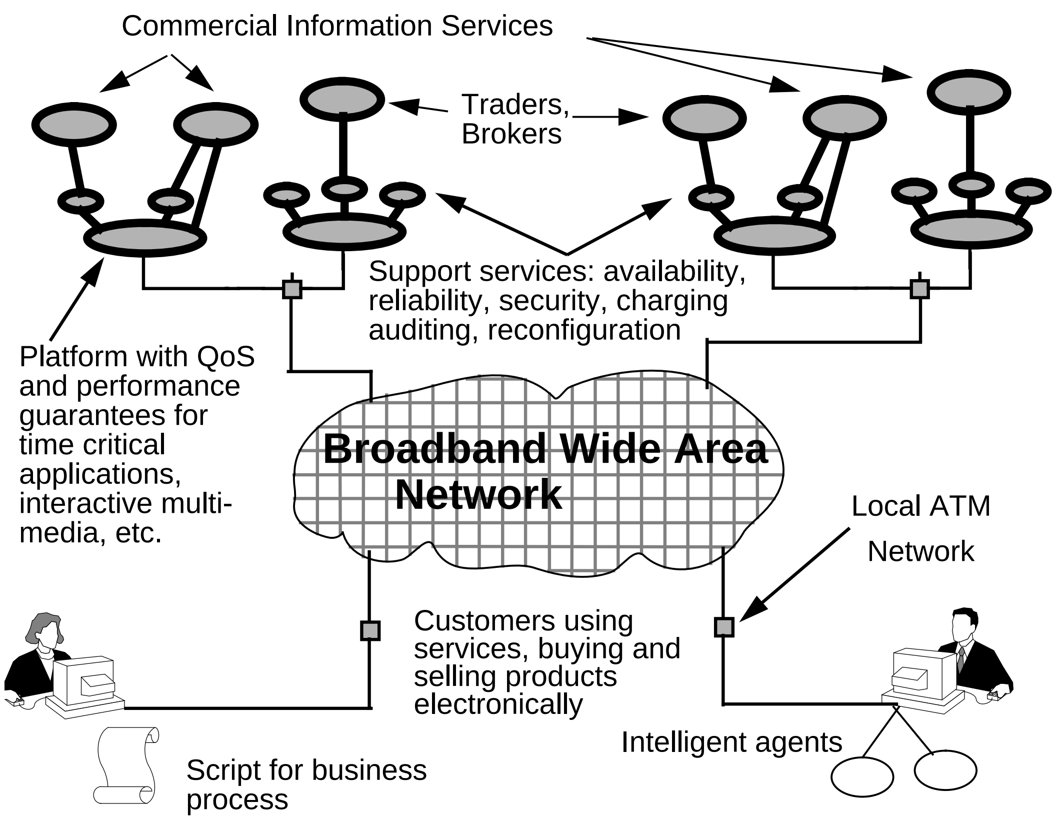
- information networking (e.g., the Internet and its emergent electronic market place)
- the desktop and workgroup (e.g., compound documents, work-flow)
- broadband resource managed networks (e.g., ATM)
- interactive multi-media
- databases
- embedded systems (e.g., in cars, in medicine).

Federated, distributed object systems of the kind created by the ANSA architecture are the key to achieving this goal.

3 Scenario for research work

The scenario is that of the 1994-5 plan, but with a stronger focus on integration of broadband multimedia with World Wide Web (WWW). The scenario is illustrated in Figure 3.1.

Figure 3.1: Electronic Business



The figure suggests businesses and individuals using electronic services, interacting, buying and selling goods and services electronically. It assumes universal, simple and inexpensive network connectivity, in a variety of public and private networks.

Today that connectivity is provided by the Internet: it is easy to connect to and cheap to use, but it offers few guarantees of performance, dependability and security, all of which attributes are essential for commercial use where substantial commitments of money, property, information and similar resources are made.

For example, to deliver interactive multi-media we have to look to the coming broadband wide area network where resource control will be in place and guarantees to deliver trustworthy, effective commercial services can be given.

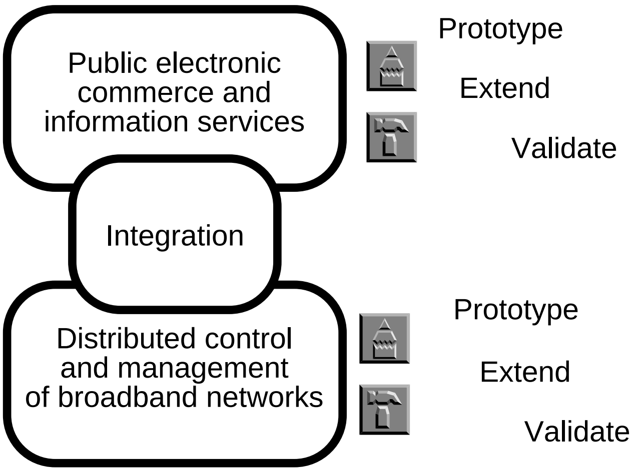
As the broadband network expands, Internet connectivity will be one of many services it provides: a widely available, low cost, simple mode of access to traders and brokers for more demanding services. The first steps towards broadband will be through high performance local area networks (e.g. lightweight ATM) within organizations and ISDN both for organizations and individuals. As wide area broadband connectivity (“telecomms” ATM) becomes more available it will be used by organizations to enhance their end-to-end bandwidth.

4 Focus

There will be two key areas of focus, which are illustrated in Figure 4.1.

- infrastructures to provide support for public electronic commerce and information service applications.
- infrastructures for distributed control and management of broadband networks, addressing core architectural issue of multimedia, performance and management.

Figure 4.1: Activities



Importantly, the plan includes tasks to integrate results from both area into a single coherent infrastructure.

Architecture is a keystone of the approach to integration: the interfaces provided by the infrastructure must offer portability, inter-operability, resource control, quality of service control, dependability and systems management.

Such infrastructure is particularly relevant to the telecommunications and entertainment industry, but is equally applicable to other applications where real-time response, high performance and stream-like communication (e.g. air traffic control) are important.

The strategy of the plan is staged delivery of our distributed interactive multi-media architecture (DIMMA), the capabilities of which at each stage will be demonstrated by portable inter-operating WWW style browsers, agents, scripts and servers in the context of current internet (wide and local area) and local ATM networks.

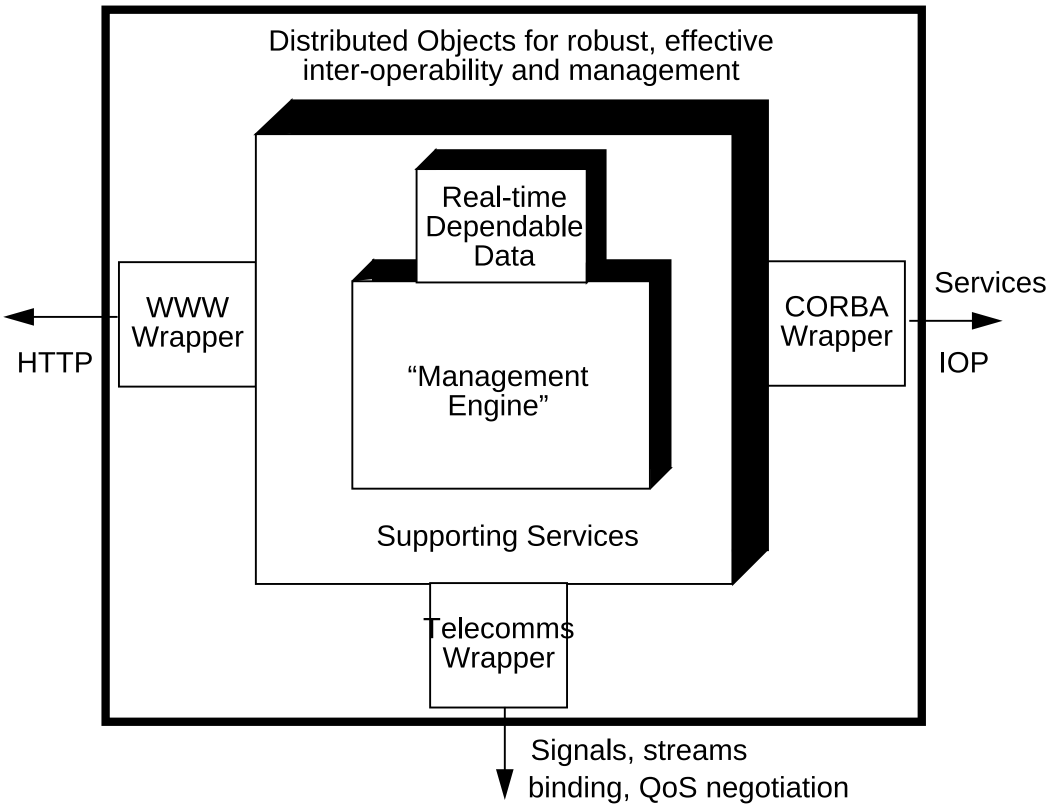
5 Key ingredients

Although not the exclusive or complete solution, we foresee five particular aspects of technology as crucial ingredients for the commercial success of interactive multi-media services.

5.1 Distributed Management Engine

An interactive service takes data from many sources, automates critical business processes and arranges for information to be presented to users interactively in an easy to use way. At its heart is mission critical, real-time, dependable data representing tasks in progress and a distributed “management engine” application coordinating those tasks and the resources of the underlying platform.

Figure 5.1: Distributed Management Engine



The platform inter-works with telecommunications, browsers, and servers using object wrappers that act as gateways or interceptors from the distributed object world to the standards and technologies for these other functions. Since it has to support critical business processes, the platform must provide well defined quality of service guarantees to time-critical functions and enable dependable operation.

DIMMA is an evolution of CORBA, able to inter-work with and federate via CORBA IDL and protocols to other platforms and services (databases, desktops, TP systems and so forth).

5.2 Interactive multimedia

Interactive multimedia requires a “stream” model of communication to be added to the RPC style of interaction supported by current distributed computing platforms. Streams may be routed directly from the network for presentation (or vice versa), or they may be routed through software to enable processes such as filtering, event detection, decompression/compression, synchronization between streams or mixing. Both control and interaction functions must be provided by the infrastructure.

5.3 Quality of service and synchronization

Handling multimedia traffic and meeting QoS requires the infrastructure to allocate and monitor system and network resources in real-time so that quality of service commitments can be achieved or renegotiated. Therefore applications developers will need to be able to write schedulers, protocol handlers and device managers which behave predictably in real-time and to synchronize between such components. This requires extension of the application programmer’s tool set to include techniques for writing predictable software.

5.4 Security

The work programme will track developments in network security, principally via the ESPRIT E2S (end-to End Security) project and ensure they can be accommodated.

5.5 Management

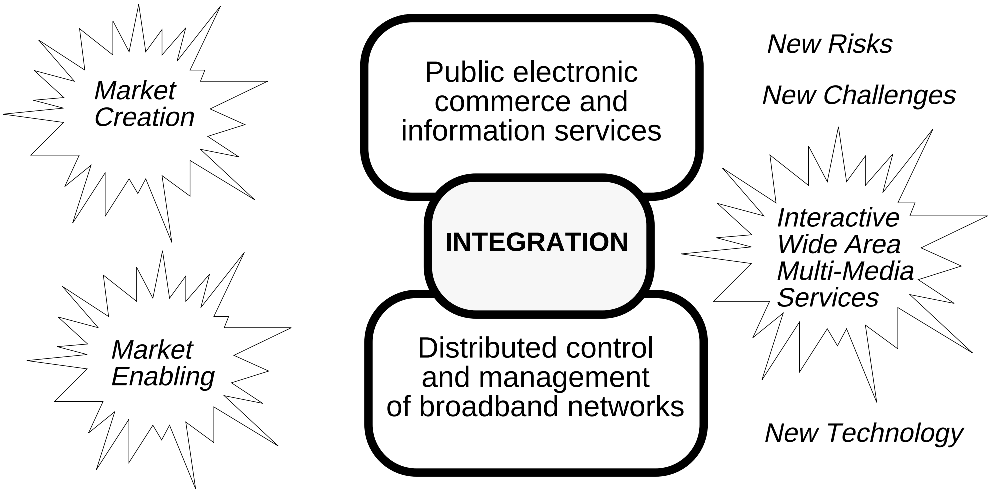
A distributed infrastructure itself requires management and monitoring as much as the applications and services it supports. The support for management and monitoring must therefore integrate with the systems level management. The ANSA Workprogramme will take previous ANSA work on trading and the OMG CORBA Life-cycle and Event services as its foundation.

6 Benefits

The research work will provide the following benefits:

- acceleration of creation of the market for information services
- understanding of the new challenges and risks of that market
- prototypes which provide proof of concept.

Figure 6.1: The market



By focusing on architecture and interfaces between the two areas of Figure 6.1 the planned work provides the benefits shown in the table below.

Results	Enable	Benefit
Well-engineered infrastructure for distributed commerce	Robust services; consensus and products	Revenue from electronic business; user confidence in services
Infrastructure based on distributed objects	Extensible infrastructure, tools for service developers	Faster to market; better services
Integration of agent and scripting technology	More interactive services; Greater automation	User productivity; Reduced management costs
Architecture based on federation principles	Controlled interworking; applications coupling	Faster response to market change
Interactive multimedia infrastructure	Interactive multi-media; distribution of, and into, embedded systems	Deliver interactive services; technology transfer into entertainment and other markets (e.g. air traffic control, test and measurement, medical)

7 Workplan

7.1 Arrangement of work

The work is divided into three series of work packages:

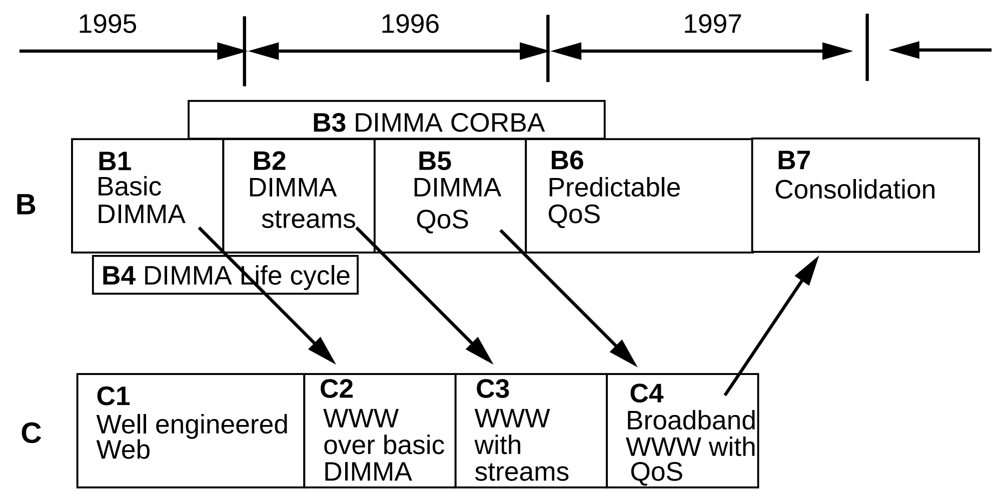
A Technology transfer of the existing results including standards

B Staged delivery of distributed interactive multimedia-ready broadband infrastructure prototype

C Consolidation of current prototype integration of CORBA and the WWW and its evolution to supporting interactive multimedia services.

The structure of work packages B and C is shown in Figure 7.1.

Figure 7.1: outline technical plan



This structure is aligned with the Retina, E2S and DCAN projects so that associated results from these projects can be used to augment the ANSA Workprogramme results.

The forecast division effort for the planned staff of 12 research engineers

- A series 30%
- B series 55%
- C series 15%

An additional allowance is made for the Chief Architect, Programme Direction and staff turnover. The plan fully commits available resources for 1995-1996. For 1997-1998 the plan leaves room for adding continuation tasks or new tasks.

The support infrastructure for the ANSA Workprogramme will be provided by APM as a service funded from APM's other activities.

7.2 Key deliverables

Table 7.1: Key deliverables

Task id	Deliverable	Date
B1	DIMMA AST tool kit, API, Nucleus	Feb.-96
C1	Well engineered web	Dec.-95
B3a	DIMMA CORBA interworking	Jan.-96
C2	WWW over basic DIMMA	Jun.-96
B2	DIMMA streams, AST tool kit, API, Nucleus	Jul.-96
B4	DIMMA Life-cycle	Aug.-96
C3	WWW with streams	Dec.-96
B5	DIMMA QoS, AST tool-kit, API, Nucleus	Jan.-97
B3b	DIMMA CORBA portability	Mar-97
C4	WWW with QoS	Jun.-97
B6	DIMMA controlled QoS	May.-97
B7	Consolidated DIMMA	Aug.-98

This chapter describes each major item in the workplan.

7.3 A series - Stockpile Technology Transfer

7.3.1 Focus

There is still much to do to achieve full transfer to sponsors of results from the work done so far in ANSA. The sponsorship package includes a defined number of “consultancy days” for each sponsor, with options to take additional days and this workpackage group provides effort for that work.

Increasingly the needs of this work are not common to all the sponsors, rather they are appropriate to individual companies or smaller groupings of one or two sponsors. This will also involve confidentiality - and this is provided for in the Phase III Contracts.

It is also convenient to place the standards work in this series, since once again the work is increasingly done for groups of sponsors rather than the whole consortium.

7.3.1.1 Workpackage A1

Title:	Sponsor Consulting
Objective:	To provide the consulting days available sponsors.
Method:	As selected by individual sponsor, including participation in sponsor’s projects, training of sponsor’s staff, workshops, building specific pieces of software.
Continuity:	Uses all previous results and ongoing work as required, linking results available from other APM activities.
Results:	Correct number of sponsor consultancy days delivered.
Effort:	32 pm.
Timetable:	average 1 person month per month for the whole period of the plan.

7.3.1.2 Workpackage A2

Title:	Technology Transfer
Objective:	Take-up of results by ANSA sponsors.
Method:	Provide electronic access services and maintain these. Set up demonstrations, make code and documents available and provide technical support where needed.
Continuity:	Continue, and improve current WWW and ftp services, email discussion groups
Results:	Full range of electronic access services to prototypes and documents, including indexes and “white papers”.
Effort:	40 pm.
Timetable:	average 1.25 person month per month for the duration of the plan.

7.3.1.3 Workpackage A3

Title:	Standards
Objective:	Input to selected industrial standardisation organizations; monitoring of relevant standards
Method:	Work to be selected and authorised by the Management Committee.
Continuity:	Continue IETF activity on naming and addressing in the Internet.
	Remain an active member of W3C. Provide code and documentation of prototypes at appropriate times and support it where necessary.
	Continue to monitor OMG and TINA-C.
Results:	ANSA impact on relevant standards.
Effort:	7 pm.

7.4 B-series - distributed broadband interactive multimedia architecture

7.4.1 Focus

We shall focus on architecture for distributed interactive multimedia service provision as an evolution from the ANSA/ODP architecture and CORBA standards.

Workpackages will address:

- the extensions and refinements that are needed to CORBA C++ APIs and associated tools to enable applications to monitor, control, synchronize and configure multimedia sources and sinks
- the extensions that are needed to CORBA C++ APIs and associated tools to enable applications to generate and receive interactive multimedia information interactively.
- the extensions that are needed to current CORBA implementations to enable fine grained allocation, monitoring and scheduling of resources to give integrity to quality of service guarantees.

No current or announced CORBA products provide programming support for streams, synchronous programming, explicit binding or extensible types, all of which are key components of DIMMA. Therefore technology must be developed including:

- libraries, macros or extensions for C++ which adds stream, signal, binding and synchronous programming related concepts to the API
- a type inferencer and type conformance checker for operation, stream and signal interfaces, so that interfaces are extensible and support subtyping
- C++ libraries wrapping the engineering support
- engineering support for fine -grained resource control
- engineering support for real-time protocols.

The 1994-1995 Workprogramme is in the process of delivering early versions of these technologies including:

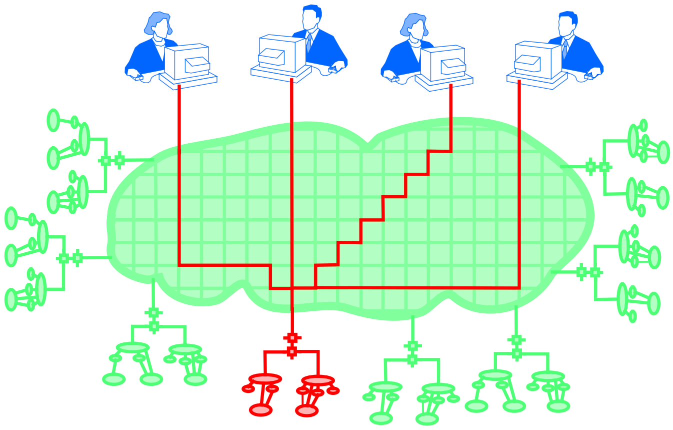
- an ODP C++ API for operations
- a nucleus with resource control facilities
- a CORBA IIOP implementation for interoperability with CORBA
- an abstract syntax tree (AST) based stub generator
- a type inferencer for the AST.

The planned work for 1995-1998 will

- complete the architecture outlined above
- continue to develop an evolving prototype that shows what has to be added to current distributed object computing systems to meet the above requirements
- identify strategies for enhancing the manageability, performance and predictability of current distributed object systems and their supporting operating systems.

Example areas in which the results should contribute to infrastructure products are shown in Figure 7.2.

Figure 7.2: B-series results



We plan an incremental stream of architecture and prototype technology primarily directed at sponsor’s broadband interactive multi-media development projects (e.g. Retina). We will have access to the results of the DCAN project to enable validation of the ANSA results in the context of lightweight local ATM networks and optimised micro-kernel operating systems.

7.4.1.1 *Workpackage B1*

Title: Basic DIMMA.

Objective: A prototype framework for DIMMA populated by an initial set of fundamental components.

Method: Finalize the basic DIMMA architecture, API, stub compiler and nucleus and RPC protocol support.

Continuity: This task consolidates tasks C1 and C4a of the September 1994 work plan [APM.1275.02].

Results: DIMMA prototype components: AST tool-kit (AST structure, type checker and inferencer), basic DIMMA API for DIMMA nucleus and ANSAware, and basic DIMMA nucleus. These components can be used together or separately. Incremental enhancements will be made to the first deliverable (viz. additional data types in the API, integration of other RPCs, support for buffer fragmentation and a interface reference scheme supporting federation).

Effort: 19 pm to complete from August 1995.

Timetable:

Table 7.2: Basic DIMMA

Deliverable	date
ANSA C1 and C4a as defined in APM.1275	Sept. 1995
Implement IIOP in the nucleus framework	Nov. 1995
Consolidation of basic DIMMA	Feb.1996

Associated results:

Table 7.3: Associated results

Deliverable	date
DCAN 3.1 - ATM MM API definition	Nov. 1995
ReTINA WP.1.A1 - Kernel V0	Jan. 1996

7.4.1.2 Workpackage B2

Title: DIMMA with streams.

Objective: To extend the basic DIMMA components with streams, signals and explicit binding.

Method: Extend the AST to handle stream specifications and extend the stub compiler technology. Provide protocol support for signal access to TCP streams. Add stream handlers and schedulers to the nucleus. Implement an explicit binding system.

The DCAN project will provide a test-bed for using the streams prototype to drive ATM protocols, in particular AAL5.

Continuity: From B1 and streams, signals and binding architecture developed in the 1994-5 ANSA Work programme. [APM.1392, APM.1393].

Results: Enhanced version of basic DIMMA prototype with support for streams. This will allow the first multimedia stream implementation on a CORBA style infrastructure.

Effort: 30 pm for TCP streams and binder; 26 pm for ATM.

Timetable:

Table 7.4: DIMMA with streams

Deliverable	date
AST + Streams	Jun. 1996
TCP Streams	Jul. 1996
Binder implementation	Jun. 1996
AAL5 stream protocol	Sept. 1996
DIMMA with streams on ATM	Mar. 1997

Associated results:

Table 7.5: Associated results

Deliverable	date
DCAN 3.2 - ATM Stream API UNIX implementation	Apr. 1996
ReTINA WP.1 Kernel requirements	Apr. 1996
DCAN 3.3 - Optimised ATM stream API UNIX implementation	Jan. 1997

7.4.1.3 Workpackage B3

Title: CORBA personality for DIMMA.

Objective: To enable use of CORBA applications with DIMMA.

Method: (a) extend the DIMMA tool chain to allow CORBA IDL to AST conversion and vice versa. This will enable interoperability via IIOP built into the basic DIMMA nucleus.

(b) develop a CORBA API to DIMMA engineering mapping. This will provide portability of CORBA applications onto the DIMMA platform.

Results: (a) Demonstration of interoperability between DIMMA and standard CORBA applications.
(b) Demonstration of porting CORBA applications onto DIMMA

Effort: 10 pm.

Timetable:

Table 7.6: DIMMA with streams

Deliverable	date
CORBA interoperability demonstration	Jan.1996
CORBA portability demonstration	Mar. 1997

7.4.1.4 Workpackage B4

Title: DIMMA life cycle management.

Objective: Provide basic configuration management capabilities for DIMMA infrastructures.

Method: Provide CORBA compatible basic life cycle and trading services on DIMMA. Provide event monitoring and recording tools for DIMMA networks. Integrate the use of the above through a single logical management information base (MIB) as seen from the point of view of the system manager.

It is anticipated that non-DIMMA specific aspects of these tasks will migrate to Object Lab.

Availability of CORBA service technology from sponsors could accelerate this work.

Results: Prototype management system for DIMMA.

Effort: 18 pm.

Timetable:

Table 7.7: DIMMA life cycle management

Deliverable	date
Life cycle and trading functions on DIMMA	Jan. 1996
Event management	May. 1996
Management information base	Aug. 1996

Associated results:

Table 7.8: Associated results

Deliverable	date
DCAN 4.3 - distributed device control system design	Jan. 1996
DCAN 4.4 - distributed control system implementation (UNIX)	Oct. 1996
DCAN 5.4 - ATM device management MIB server	Oct. 1996

7.4.1.5 Workpackage B5

Title: DIMMA with QoS negotiation.

Objective: To extend the DIMMA streams framework with QoS negotiation functions.

Method: Extend DIMMA AST to handle QoS specification and extend the stub compiler so it will create stubs which use binding objects to help negotiate QoS. Extend the binder to negotiate QoS parameters at bind-time and introduce a QoS controller object to monitor QoS once a binding has been established. Augment the nucleus and DIMMA API with resource allocation and monitoring functions for QoS controllers.

Results: Enhanced DIMMA prototype supporting Quality of Service negotiation and control.

Effort: 22 pm.

Timetable:

Table 7.9: DIMMA with QoS negotiation

Deliverable	date
Binder extensions	Oct. 1996
Resource allocation in nucleus and DIMMA API	Dec. 1996
AST + QoS	Jan. 1997

Associated results:

Table 7.10: DIMMA with QoS negotiation

Deliverable	date
DCAN 2.3 - Redesigned and re-engineered nucleus	Jul. 1996
ReTINA WP.1 Kernel architecture release 1	Jul. 1996
ReTINA WP.1 Kernel implementation version 1	Oct. 1996

7.4.1.6 *Work package B6*

Title: DIMMA with controlled QoS.

Objective: Enable the construction of QoS managers (e.g. protocol drivers for isochronous protocols, schedulers for statistical QoS and resource management) as distributed applications.

Method: Use synchronous programming tools to write predictable modules (viz. drivers, schedulers) controlling asynchronous modules. Use signal interfaces at boundaries between synchronous and asynchronous system components. Use streams to drive remote signal interfaces. Extend the ANSAware programming tools to support predictable execution of signals. Aim to reuse c/C++/Estrel/Reactive C++ obtainable from France Telecom.

Results: Synchronous programming tool kit for DIMMA prototype comprising: compiler or preprocessor, run-time interpreter and scheduling functions.

Effort: We have assumed the use of reactive C++ under licence from France Telecom, resulting in an effort requirement of 12 pm to adapt the code generation tool chain.

total effort: 20 pm.

Timetable:

Table 7.11: DIMMA with controlled QoS

Deliverable	date
Compiler or preprocessor	Mar. 1997
Run-time interpreter	Mar. 1997
Resource allocation and scheduling in DIMMA nucleus and API	May. 1997

Associated results:

Table 7.12: Associated results

Deliverable	date
DCAN 2.4 - ANSA programming tools for real time	Jan. 1997
ReTINA WP.1 Kernel architecture release 2	Apr. 1997
DCAN 2.5 - Support for isochronous ATM components	Jul. 1997
ReTINA WP.1 Kernel implementation version 2	Oct. 1997

7.4.1.7 Work package B7

Title: DIMMA consolidation.

Objective: Alignment of DIMMA with sponsors ongoing developments and projects.

Method: Several sponsors have developments predicated on use of DIMMA technology. This task is left open-ended to allow for additional work, such as performance enhancements, porting to other platforms, alignment with evolution of CORBA. and CORBA services, support for the TINA architecture, wrappers for other platforms and so forth.

Results: Consolidated DIMMA prototype.

Effort: Total effort: 16 pm.

Timetable:

Table 7.13: DIMMA with controlled QoS

Deliverable	date
Consolidated DIMMA	Aug. 1998

Associated results:

Table 7.14: Associated results

Deliverable	date
ReTINA WP.1 Kernel implementation (refined)	Aug. 1998

7.5 C Series - Broadband World Wide Web

7.5.1 Focus

The existing WWW technology is subject to a number of problems and shortcomings:

- The performance of HTTP is a serious problem.
- naming is tied to physical network addresses.
- Extensibility using CGI is difficult:
  - demand for transactional services is hard to satisfy.
- Resource discovery is not directly supported:
  - meta-data formats and management methodology are needed;
  - client-side support for query construction is needed.
- There is no native object framework, with the additional consequence that existing infrastructure does not support mobility of either clients or servers.

In the 1994-5 Workprogramme we began development of a “re-engineered WWW” using CORBA technology to overcome many of these shortcomings. In the 1995-8 workplan we carry forward this activity and add to it evolution towards DIMMA to add interactive multimedia capabilities.

7.5.2 Constraints on the solution

- Existing functionality must be preserved
- Evolution not revolution:
  - the solution must inter-work smoothly with the existing WWW. This will require new clients and servers to be able to use HTTP
  - existing resources must be usable via the new technology
  - it must be easy to replace old tools with new (or upgrade)
- Conformance with standards
- Simplicity
  - the solution should compromise the simplicity of the existing WWW systems as little as possible.

7.5.3 Rationale for DIMMA / WWW integration

7.5.3.1 Connection management

We want to avoid the latency overhead which is presently introduced by opening a new TCP connection for each HTTP request. The fundamental issue is control of resources and multiplexing, which is enabled by DIMMA.

7.5.3.2 More efficient encoding of HTTP

Recent work has shown that one of the major causes of latency in HTTP is the time taken to parse ASCII HTTP headers. This implies we need a better encoding of HTTP request headers. One way of doing this would be to map HTTP to CORBA IDL, and then use CORBA marshalling/unmarshalling technology to decode the headers. The DIMMA work has investigated optimised marshalling schemes.

7.5.3.3 Extensibility

WWW is often used to create a “uniform information space” by inter-working with (and providing a gateway to) legacy sources of information. Service providers often have specific requirements which cannot be satisfied by a standard WWW server, but which would be addressed by providing a CORBA back-end to the server. Moreover this would bring the benefits of CORBA management and dependability mechanisms to WWW servers.

7.5.3.4 Immediate Rendering and Stream objects

Browsers such as Netscape Navigator render text and images as they arrive. This is a very popular feature: it helps the user make up their mind faster about where their interest lies within the document. This is important for clickable images and, in the future, for user-influenced down-loading. It fits naturally to the DIMMA streams model.

7.5.3.5 Concurrent retrieval and rendering

This shows a need for integration of threads and communications; DIMMA provides advanced features in this respect within an overall quality of service management framework.

7.5.3.6 Incorporate meta-data

The ideal from an information system perspective is to be able to treat the web as a library of knowledge: ask for material by name and have it supplied transparently. If you don't know what it is called, describe your requirements and have your system try to match them and then return the results. This requires a scheme incorporating meta-data, along with some form of trading or brokering service that can be added in a scalable fashion. This could be based on meta-data stored in the form of URCs (Uniform Resource Characteristics) together with ANSA-type trading technology.

7.5.3.7 Object Oriented Browsers

There is a widespread view that the client side of the WWW will be re-designed and re-implemented, so that it consists of multiple collaborating objects, talking to each other through CORBA IDL defined interfaces using the ORB's favourite protocol to communicate with each other. For example, we may have separate HTTP, FTP, Gopher protocol clients which are ORB objects. The benefit of this is that it allows incremental evolution and promotes backwards compatibility, by making interfaces explicit. Multi-protocol support is a key element of DIMMA.

It is envisioned that in the medium to long term, the client side will develop support for meta-data browsing and meta-data querying [MADSEN95]. This is most simply accomplished by writing objects that have interfaces to the requisite script languages (Java, Obliq, Safe-Tcl,...). This will allow dual benefits:

- rich meta-data objects can be created and manipulated;
- the infrastructure then exists for the system to support mobile agents.

7.5.4 Workpackages

7.5.4.1 Workpackage C1

Title: Well-engineered WWW

Objective: To complete the WWW re-engineering work started in the 1994-5 ANSA Workprogramme.

Method: Place IIOP beside HTTP and ensure a migration path from existing client and server technology to CORBA based clients and servers.

Results: “ANSAweb” prototype: a tool-kit which eases the implementation of CGI applications for the Web and a gateway into the CORBA environment. The tool-kit is to be placed in the public domain.

Effort: 12 pm (to complete from Sept. 1995).

Timetable:

Table 7.15: Well engineered web deliverables

Deliverable	date
Alpha code release	Sept. 1995
Beta code release	Dec. 1995

7.5.4.2 Work package C2

Title: WWW over basic DIMMA.

Objective: Integrate the basic DIMMA components with the ANSAweb tool-kit.

Method: Integrate the ANSAweb deliverable with the new nucleus and API developed as basic DIMMA. Replace Sun's interorb engine with DIMMA. Ensure interoperability as well as portability assuming a subset of the CORBA API.

Results: Results ANSAweb prototype ported as an application to DIMMA prototype. Portability and interoperability between the “DIMMA ANSAweb” prototype will be provided, allowing us to make the Interorb version available in the public domain whilst keeping the real time DIMMA version for the sponsors.

Effort: 12 pm.

Timetable:

Table 7.16: Broadband WWW deliverables

Deliverable	date
Basic broadband W3	Jun. 1996

7.5.4.3 Workpackage C3

Title: WWW with streams.

Objective: To provide CORBA and ODP stream support for Web applications

Method: Integrate the result of C2 with the result of B1. Web immediate rendering is performed with DIMMA streams. Multimedia information to be shipped by DIMMA infrastructure and rendered in standard Web browser technology. Do not re-write the browser.

Results: Demonstration of advanced DIMMA stream features in DIMMA ANSAweb. Only available on DIMMA ANSAweb, not the Interorb engine version.

Effort: 12 pm.

Timetable:

Table 7.17: Broadband WWW and streams deliverables

Deliverable	date
Broadband W3 with streams	Dec. 1996

7.5.4.4 *Workpackage C4*

Title: Broadband WWW with QoS.

Objective: To bring ODP (and CORBA) QoS support to Web applications

Method: Integrate the result of C3 with the result of B2. Extend the server end to include stream and QoS support. The browser end is more complicated. A choice will be made depending on what is available in the (public) market at the time. The effort estimate is provisional on this.

Results: Demonstration of live audio/video, web media phone prototypes using (hopefully) standard browsers.

Effort: 12 pm.

Timetable:

Table 7.18: Broadband WWW and QoS deliverables

Deliverable	date
Broadband W3 with QoS	Jun. 1997

7.6 Something new

From November 1996, the plan provides for an increasing amount of effort for new developments.

We already mentioned the possibility of integrating the results of E2S with the modular DIMMA nucleus, to provide a complete vertical security solution.

Another possibility is to further extend Web server technology with ANSA principles, improving server re-configuration capabilities.

Effort: 1 pm/month in November 1996, rising to 5 pm/month in April 1997 and to 8 pm/month in July 1997.

7.7 Security

In the design of the 1995-8 Workplan, the need to consider security aspects has been a recurrent theme. Whilst there are no planned ANSA Workprogramme activities in this respect, we pass on results available to APM from the ESPRIT E2S (End-to-End Security) project to ANSA sponsors.

The objective of E2S can be summarised as:

- investigate secure commercial and business operation over the Internet in a multi-cultural and multi-country context;
- state the architectural principles for the design;
- design and implement end user and server facilities as prototype application packages for assessment by consortium members;
- contribute to standards and market development.

The key E2S results are listed in the following table.

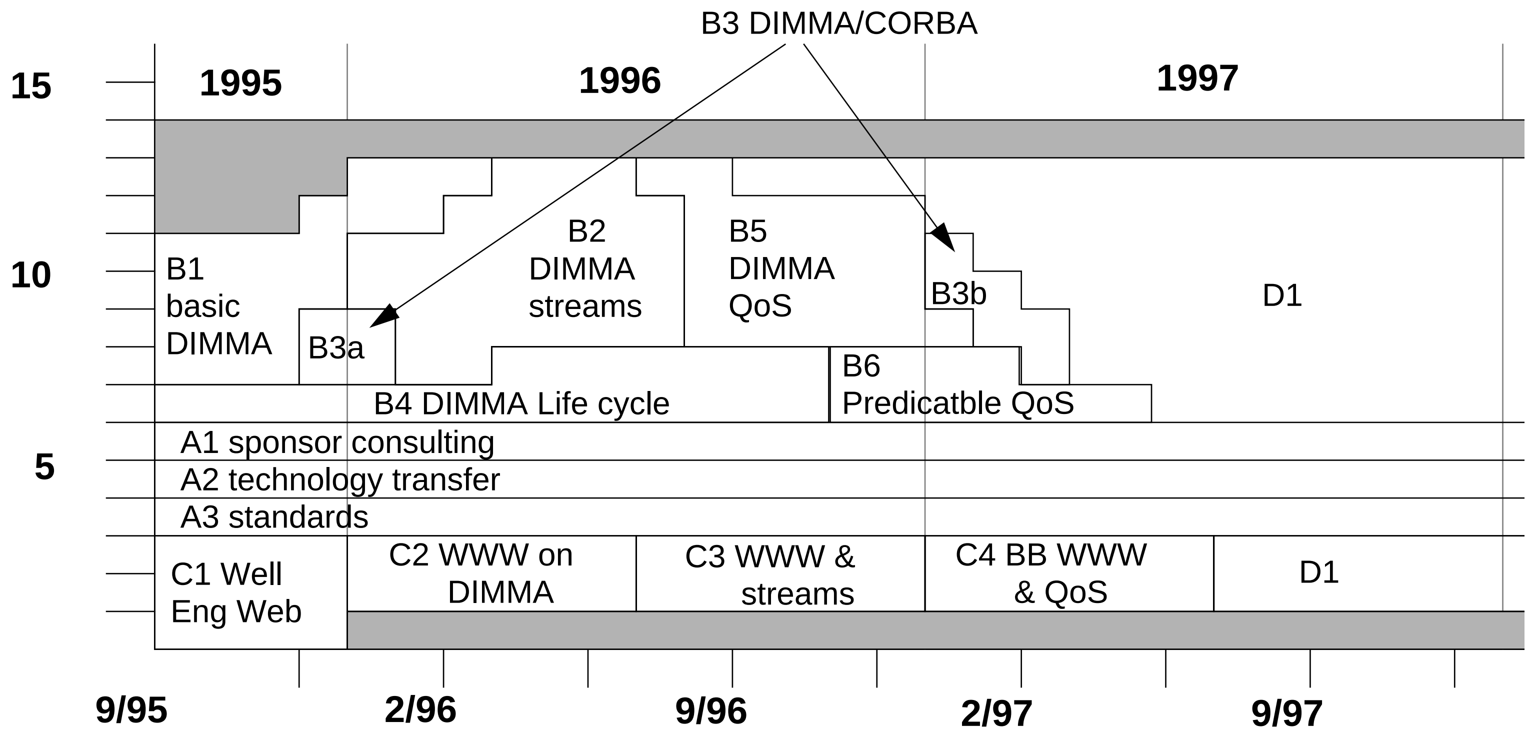
Table 7.19: E2S associated results

Deliverable	date
E2S D1 - Overall architecture	May1996
E2S D2 - System design	Aug.1996
E2S D3 - Security Models and policies	May. 1996
E2S E1 - Implementation plan	Feb. 1996
E2S E2 - Implementation specifications	Feb. 1997
E2S E3 - client tools	May 1997
E2S E4 - transaction security authorisation tools	May 1997
E2S E5 - Server tools	Nov. 1996

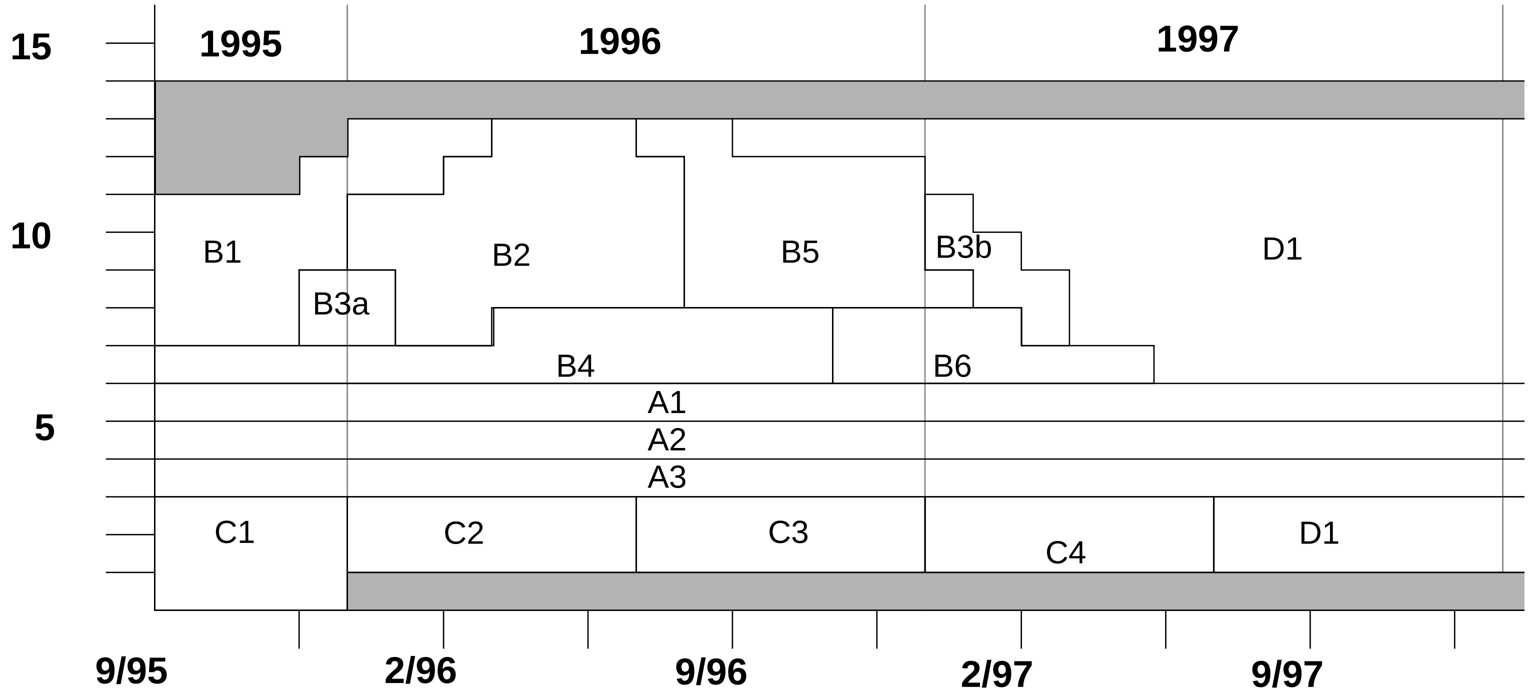
8 Charts

The attached charts show the dates and staffing for the period September 1995 to September 1997.

Dates


B3 DIMMA/CORBA
15
10
5
1995
1996
1997
B1
basic
DIMMA
B3a
B2
DIMMA
streams
B5
DIMMA
QoS
B3b
D1
B6
Predicatble QoS
B4 DIMMA Life cycle
A1 sponsor consulting
A2 technology transfer
A3 standards
C1 Well
Eng Web
C2 WWW on
DIMMA
C3 WWW &
streams
C4 BB WWW
& QoS
D1
9/95
2/96
9/96
2/97
9/97

Staffing



15
10
5
1995
1996
1997
B1
B2
B5
B3b
D1
B3a
B4
B6
A1
A2
A3
C1
C2
C3
C4
D1
9/95
2/96
9/96
2/97
9/97

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