



**Poseidon House
Castle Park
Cambridge CB3 0RD
United Kingdom**

TELEPHONE:
INTERNATIONAL:
FAX:
E-MAIL:

**Cambridge (01223) 515010
+44 1223 515010
+44 1223 359779
apm@ansa.co.uk**

ANSA Phase III

Presentation for ICL

Mike Beasley

Abstract

Slides and notes for a presentation to be given to some of ICL's Legacy Services unit on Thursday 9th February 1995.

APM.1408.00.01

Draft

24th February 1995

Request for Comments (confidential to ANSA consortium for 2 years)

Distribution:

Supersedes:

Superseded by:



Distributed Computing, ANSA and DAIS

Mike Beasley
ICL secondee to the ANSA project
Thursday 9th February 1995



Why Distributed Computing ?

- **Growth of Departmental Computing**
- **Many customers have diverse legacy systems**
- **Mergers and de-mergers are common**
- **ICL's been in it a long time**
- **Research topic since 1970's**
- **Our competitors are doing it**



Introduction to the Technology

- **Remote procedure call**
 - familiarity and ease of use ...
 - ... but must not hide the important differences !
- **Interface definition languages**
 - programming-language neutral (?!)
 - ensures consistency between client and server
- **Threads**
 - servers can handle multiple calls concurrently
- **Exceptions**
 - failure handling
- **How do clients find servers ?**



ANSA (Phase 1)

- 1985-88 under UK Alvey programme
- 12 US/UK partners
- basic architecture
- prototype platform (ANSAware)



ISA (Phase 2)

- **1988-93 Esprit**
- **Now 21 partners in Europe and US**
- **More object orientation**
- **Selective transparencies**
- **Input to standards bodies**



ANSA Phase 3 1993-94

- **Now funded entirely by the sponsors**
- **Performance**
 - **Quality of Service in time-critical systems**
- **Dependability**
 - **transactions and replication, building on Phase3**
- **Federation**
 - **service specifications**
- **Three cultures: database, PC, control**



ANSA Phase 3 1995-96

- **Transfer technology developed so far**
 - projects
 - training
 - consulting
- **Research - multi-vendor, multi-service, heterogenous systems**
 - integration of CORBA and the WWW
 - repositories
 - type checking
 - distributed interactive multi-media



ICL exploitation

- **RIBA**
 - EC-funded with BNR and others - banking and health care
 - transparent database access
 - support for transactions
- **DAIS**
 - commercial product
 - CORBA conformance
 - security option



My own work

- **Federation group 1993-94**
 - evaluation of ORBs
 - edited manifesto and ICL Technical Journal article
 - advanced trader prototype
- **1995 ?**
 - Type checking work

1 Notes

1.1 Why Distributed Computing ?

First of all, what is it ?

- interconnection - getting bytes from one machine to another (X.25, OSI, TCP/IP)
- standardised networking - putting facilities like ftp, telnet, SMTP, NNTP on top of this
- distributed computing - applications talking to each other (we had ADI on various ICL machines in the 1980s).

We're now into object-oriented distributed computing, in which objects interact with each other.

Downsizing - departmental autonomy; example of Cambridge University (IBM mainframe going this year), Nat West Bank. Total costs of running lots of UNIX machines, however, are more than most people think !

For a legacy example, Scottish Hydro with their numerous databases - a major DAIS success story !

Mergers and de-mergers are common.

Commercial systems coming out in early 90's - DCE, CORBA implementations.

ICL has been in it a long time - e.g. Programmer's Workbench, Access Manager.

A research topic since the 1970's (Cambridge Ring).

We thought in 1991/92 that you had to have DCE to survive (!) - just like in 1987/88 you had to have a credible relational database story.

1.2 Introduction to the Technology

Remote Procedure Call - familiarity and ease of use. Saves inventing protocols of your own. But you can fall into the trap of ignoring the differences between local and remote, e.g. partial failure. Say a bit about stubs. Could mention 'call dataname in VME COBOL.

Interface Definition Language - potentially programming-language neutral. Ensures consistency between client and server (c.f. include file in C). Say something about C pointers (how many of the objects pointed at ?) - in fact this is another reversed assumption to do with shared memory. Could comment on some of the different IDLs around - DCE like C, CORBA like C++, ANSAware a bit more neutral.

Threads and exceptions are important concepts.

How do clients find servers ? The ANSA answer is 'by using a trader, of course'. Traders have many advantages over other systems: you can have more than one server of the type you want, you can do type checking.

Reversed assumption list:

- local vs remote
- sequential vs concurrent
- single environment vs diverse environment
- fixed location vs mobile
- single copy vs multiple copies
- synchronous vs asynchronous
- direct vs indirect
- shared vs separate
- global vs context relative
- complete failures vs partial failures
- early binding vs late binding

1.3 ANSA (Phase 1)

This is where it all started ! 12 companies got together with UK Government funding. To do research into Distributed Computing needed a centralised team in Cambridge. APM set up to manage it. Own staff and secondees.

Developed the basics of the architecture.

Principles (if anyone asks):

- distributed systems are different from centralised systems
- hide unnecessary complexity where appropriate
- different users need different solutions
- use object-orientation to maximise simplicity and commonality

Prototype software (ANSAware). This was used by NASA for their Astrophysics Data System.

1.4 ISA (Phase 2)

Funding now from EC under Esprit. Widened to 21 partners. A lot of work on selective transparencies.

Input to standards bodies included OSI ODP, OSF DCE, and support for sponsors in OMG:

- OSF is more engineering-oriented, and concerned with putting products together
- OMG is more computationally-oriented, and concerned with putting specifications together.

Interesting to note that ICL and APM are jointly hosting an OMG meeting in Cambridge at the end of March.

Transparencies:

- location - don't need to know where it is
- access - don't need to know how it works
- migration - it can move while you're using it
- replication - there may be multiple copies
- resource - it might get resources
- partial failure - always a consistent state
- federation - don't need the same administrator

1.5 ANSA Phase 3 1993-94

Funding now from the sponsors.

Sponsors from the beginning:

- Bellcore
- Bell Northern Research (Europe)
- British Telecom
- France Telecom (CNET)
- GEC Marconi
- GPT
- HP
- ICL

We've lost ...

- DEC
- Open Connexion

And gained ...

- IONA
- PRISM
- DRA
- Telefonica
- Barclays on trial sponsorship

Three groups:

- dependability - replication and transparencies, building on ISA results (need for selectivity)
- federation - large scale re-use, availability of service information at all stages in life cycle -> advanced trader prototype. Inter-organisation computing - imposition/removal of barriers.
- performance - concerned with such things as Quality of Service guarantees for mission-critical systems

Continued input to standards bodies.

Recognition that three cultures exist: database, PC, control (transactions).

1.6 ANSA Phase 3 1995-96

Systems integration across: the internet/WWW, interactive multi-media, databases ...

CORBA has got nothing to access, but can do it dependably; the WWW has plenty to access, but not dependably !

1.7 ICL Exploitation

So far it has been based on ANSAware.

RIBA - with some EC funding.

Banking and health care - impressive demo. Transparent databases (RDBMSs and others), support for transactions.

DAIS - commercial exploitation.

CORBA conformance is a major addition here. There is also a security option.

DAIS won a BCS award in 1993.

1.8 My own work

Federation group 1993/94.

Evaluation of ORBs. Twice - summer 1993 and winter 1994/95.

Editing of documents - group manifesto and ICL Technical Journal article developed from that.

Type checking in 1995.