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ANSA Phase III

ANSA overview (Bellcore visit 8/95)

Rob van der Linden

Abstract

The business problem addressed is...

The technical problem created by that business problem is ...

The solution being offered is....

APM.1535.01 **Approved** 28th July 1995
Briefing Note

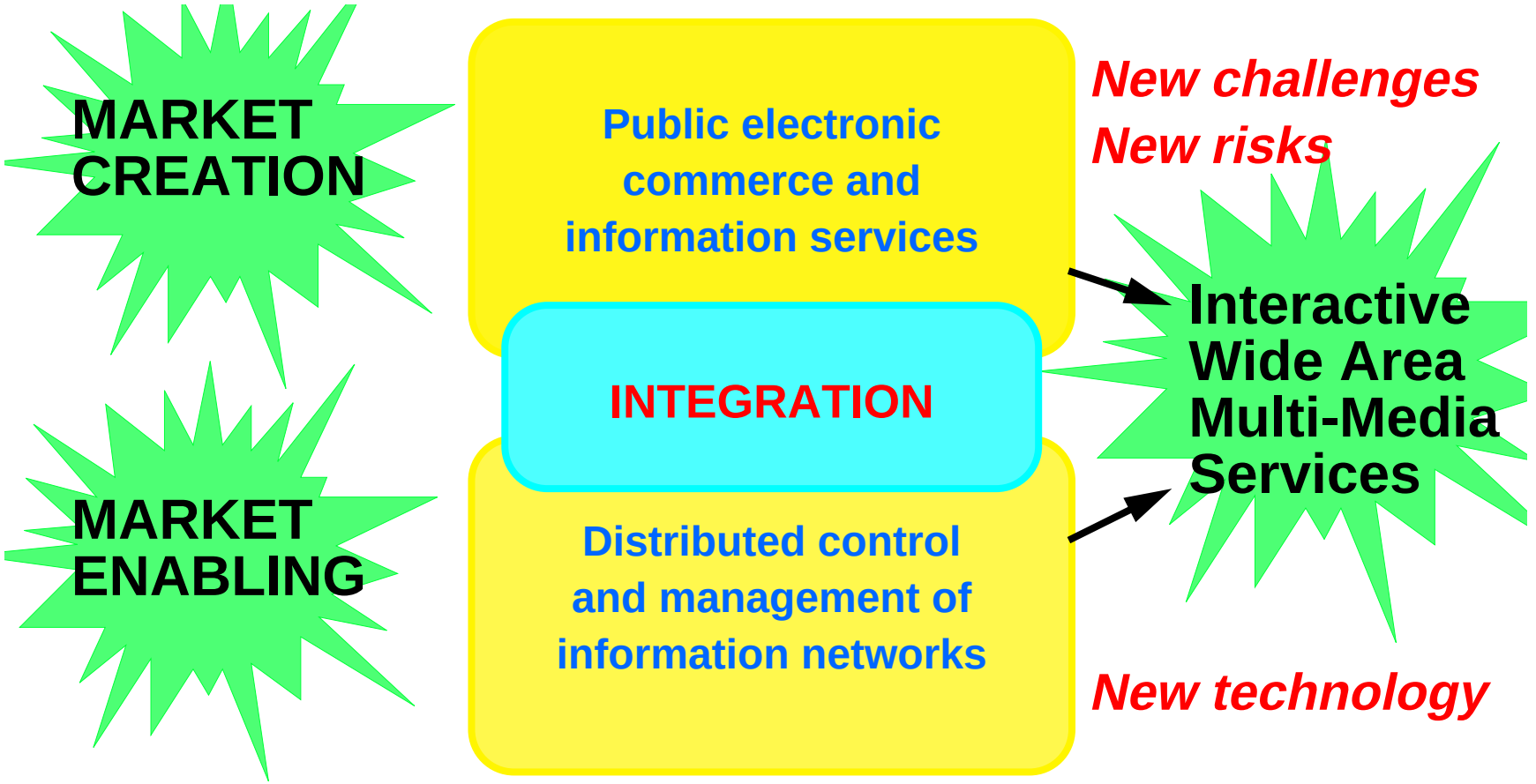
Distribution:
Supersedes:
Superseded by:

An Introduction to ANSA

Rob van der Linden

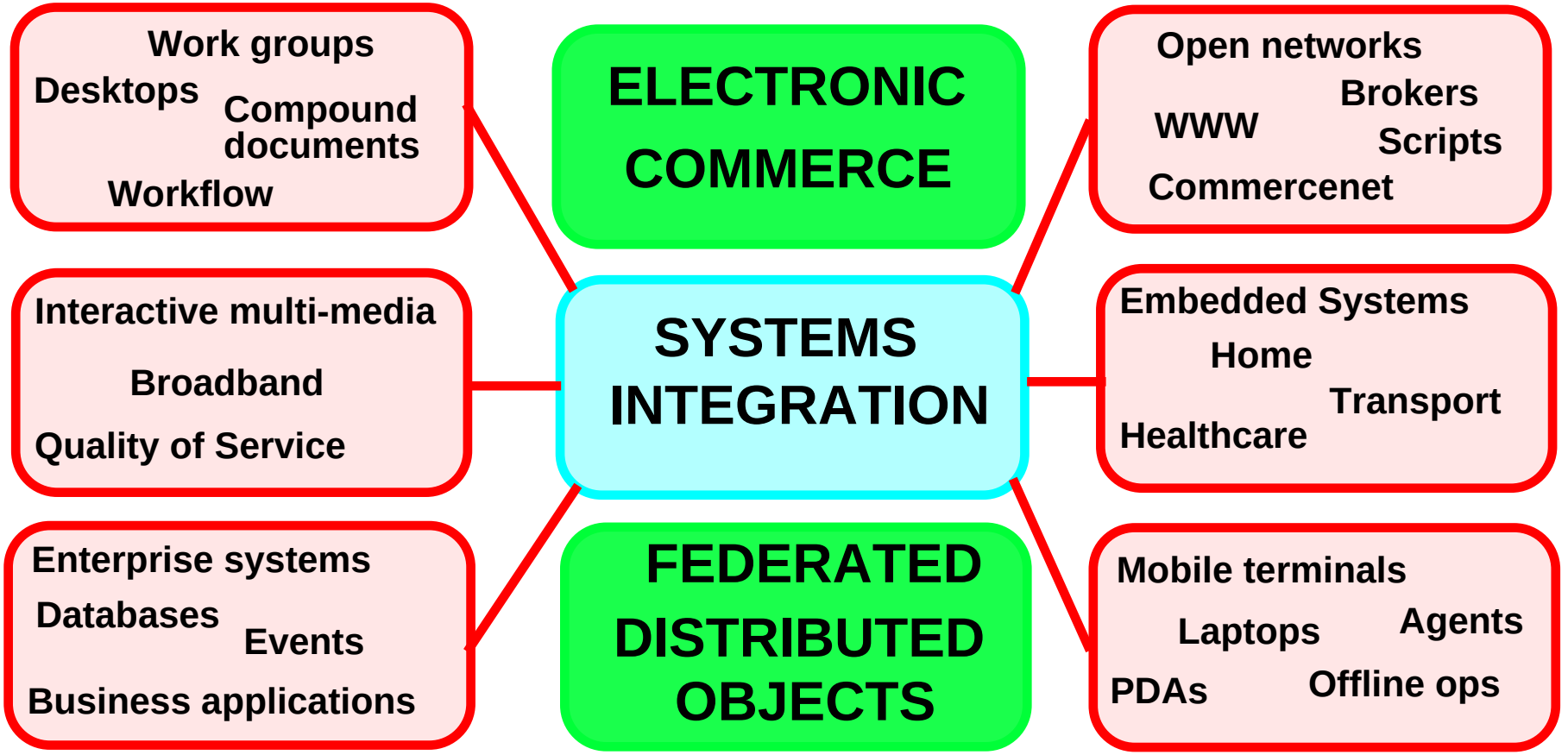
- Drivers
- Workpackages
- Recent Results
- Plans

The Market


MARKET CREATION
MARKET ENABLING
Public electronic commerce and information services
INTEGRATION
Distributed control and management of information networks
New challenges
New risks
New technology
Interactive Wide Area Multi-Media Services


ANSA

ANSA Vision


Work groups
Desktops
Compound documents
Workflow
ELECTRONIC COMMERCE
Open networks
Brokers
WWW
Scripts
Commercenet
Interactive multi-media
Broadband
Quality of Service
SYSTEMS INTEGRATION
Embedded Systems
Home
Transport
Healthcare
Enterprise systems
Databases
Events
Business applications
FEDERATED DISTRIBUTED OBJECTS
Mobile terminals
Laptops
Agents
PDAs
Offline ops

New Requirements

Interactive Multi-media

Performance

Streams

Real-time scheduling

QoS negotiation

CORBA++

Open Networks

Federated naming

Intelligent broking and trading

Cooperative, autonomous management

Security

MS NETWORK ++

Distributed Information

OLE/COM++

Intelligent information filters and agents

Information servers

Computer assisted business processes

Embedded Systems

Down scaling

Streams

Real-time scheduling

CORBA--

Meeting the requirements

- **High profile industry fora**
  - **OSF, X-Open, W3C, CommerceNet ...**
- **Standards groups**
  - **OMG, ISO, ITU**
- **Softly - Softly**
  - **based on a common architecture (ANSA)**
  - **prototype well ahead of discussions**

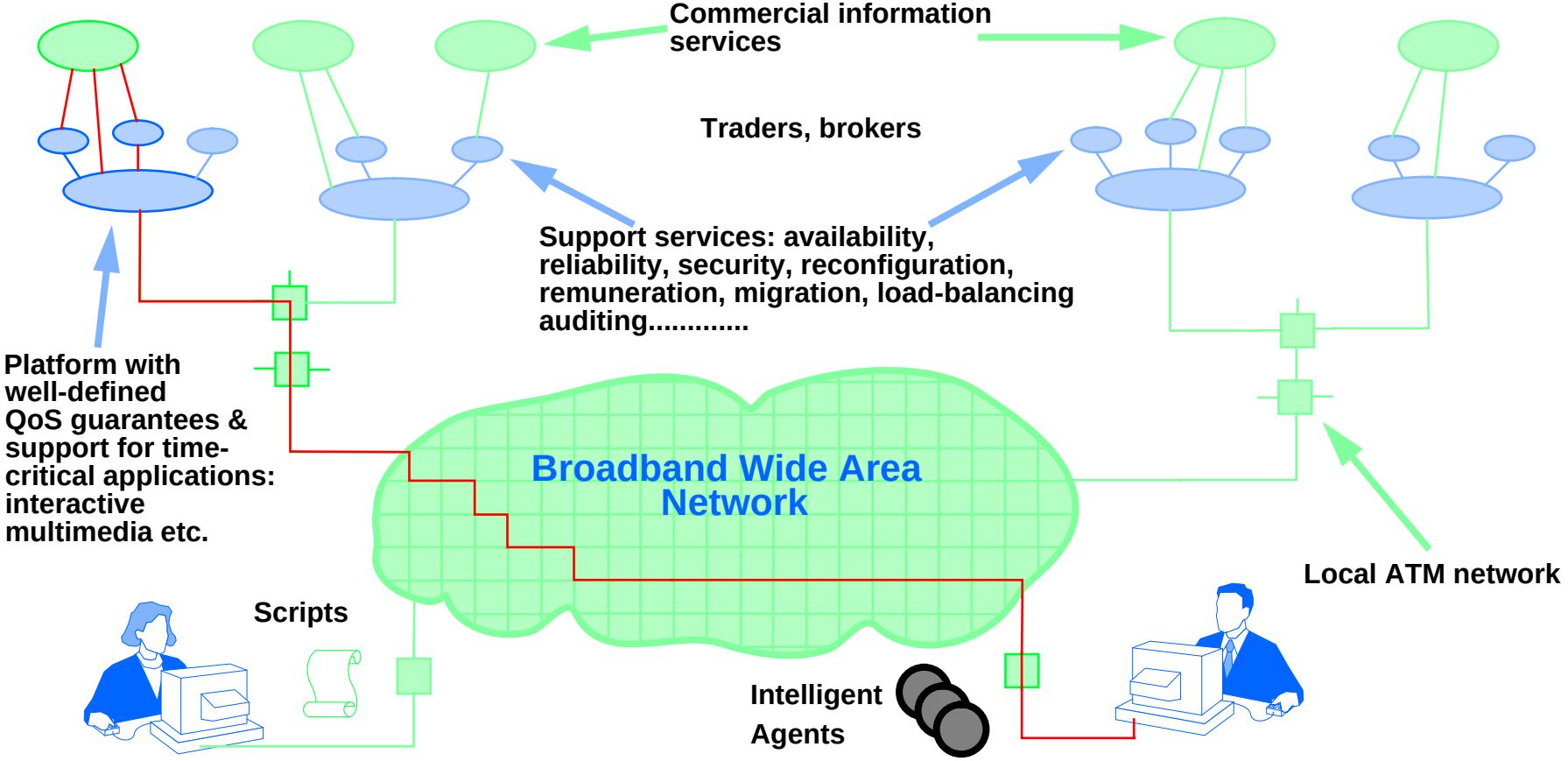
Who is involved?

- Bellcore
- BT
- France Telecom (CNET)
- Northern Telecom (BNR)
- Telefonica I&D

- Defence research Agency
- Eurocontrol

- Fujitsu Laboratories
- GEC
- GPT
- HP
- ICL
- IONA
- Prism Technologies

Scenario

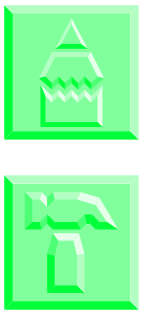

Commercial information services
Traders, brokers
Support services: availability, reliability, security, reconfiguration, remuneration, migration, load-balancing auditing.....
Platform with well-defined QoS guarantees & support for time-critical applications: interactive multimedia etc.
Broadband Wide Area Network
Local ATM network
Scripts
Intelligent Agents

Focus

Public electronic commerce and information services

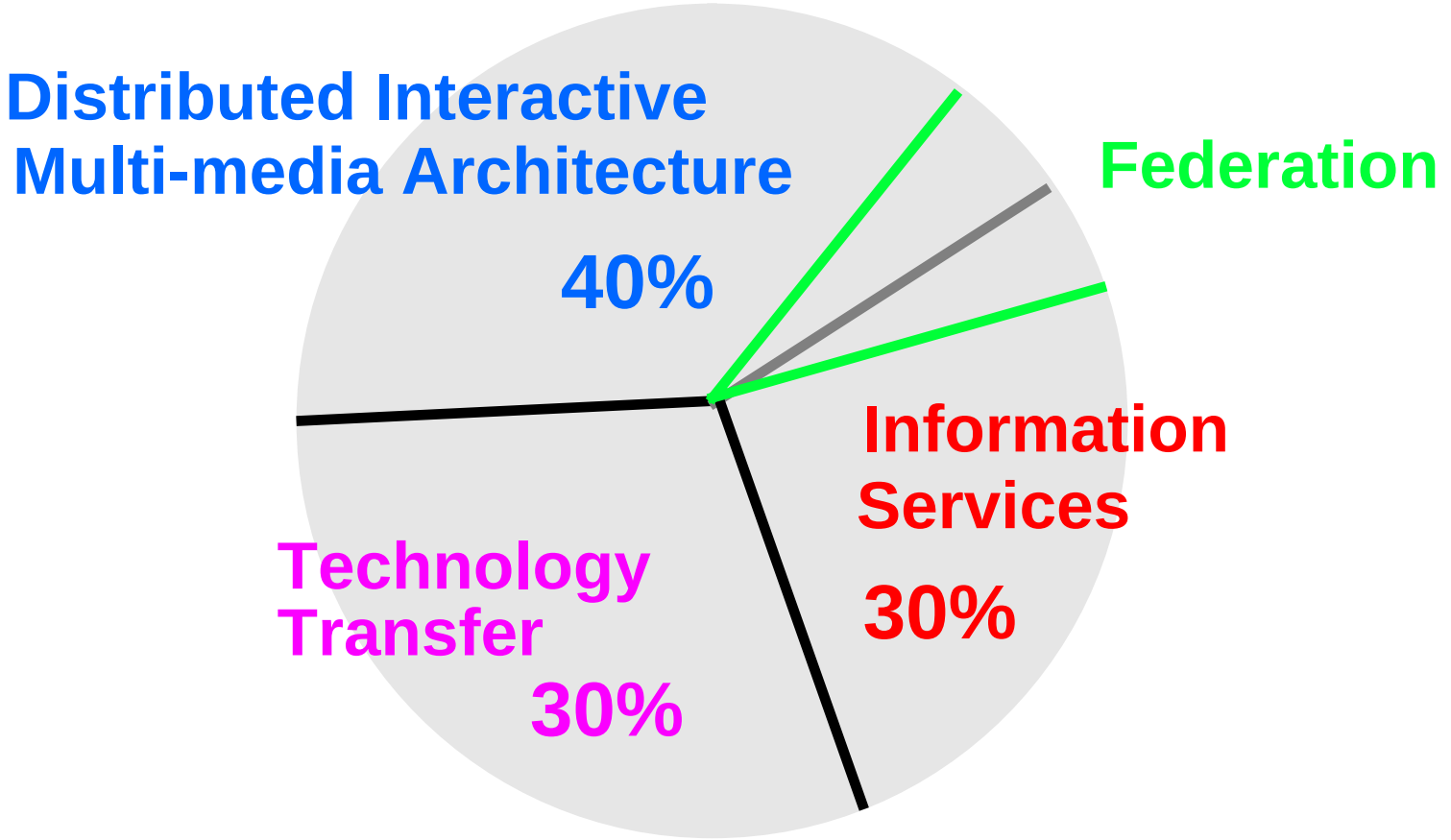
Explore, animate, scenarios

Distributed control and management of information networks



Prototype, extend, validate

1995-6 Work packages



Recent results (Sept. 94 - May 95)

SIX major deliverables completed

1	Object wrapping	ANSAweb	Code & Doc on the Web
2	Agents	Changeling	Code & Doc
3	Multimedia	DIMMA	Architecture defined
4.	Federation	Dynamic Gateways	Code & Doc
5.	Federation	AST type checker and inferencer	Code & Doc
6.	Evaluation	CORBA products	DAIS, Orbix, Orbeline, ILU

Five major deliverables in work

1	ANSAweb -2	CORBA protocols on the Web
2	DIMMA	API for multimedia
3	DIMMA	ANSAware nucleus
4.	Service Management	revised plan by TC: manage services in DIMMA and Web
5.	Evaluation	DSOM, OpenDoc, OLE, DOE.....

Technology Transfer

13 full weeks of “company consultancy days”
10 full weeks of “common to all” technology transfer

Standards

CORBA/2 task force
OMG interoperability proposal accepted
hosted OMG meeting with ICL

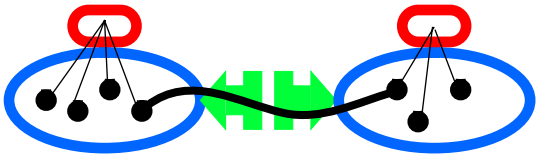
ODP RM completed

W3C and IETF: joined and contributed

The ANSA Architecture

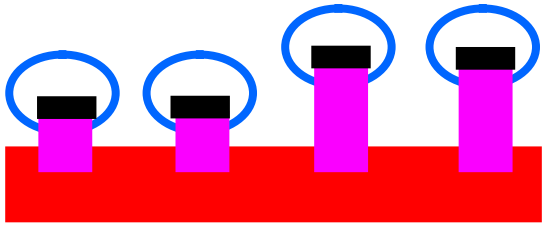
Trading and Federation

Controlled interoperability



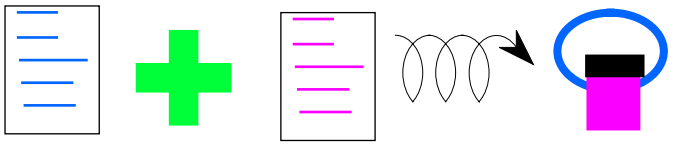
Selective Transparency

One size does not fit all



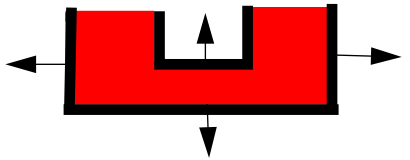
Abstract & Automate

Tools replace APIs



Modular Engineering

Architected internal interfaces



ANSAweb

- WWW is creating a “Uniform” information space
  - Good presentation and authoring tools
  - Poor navigation, administration and development tools
  - Protocols inefficient
  - No support for active documents

- Distributed objects can help
  - tool based approach
  - apply protocol experience
  - apply federation principles

Web browsers over CORBA

ANSAweb Phase 1: A Stub Compiler for the web

Browser

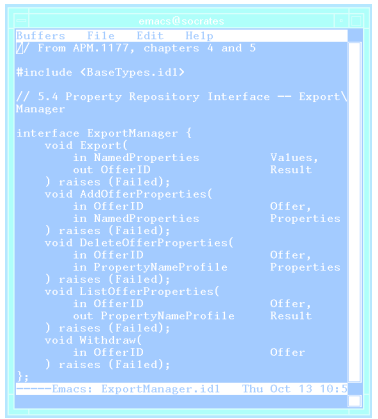
HTTP Server

Application

IDL Skeleton

CGI program

CORBA IDL for Service



Generate
Form (on the fly)

Generate
IDL stubs for clients

Generate IDL
skeletons for servers

IDL stub
libwww

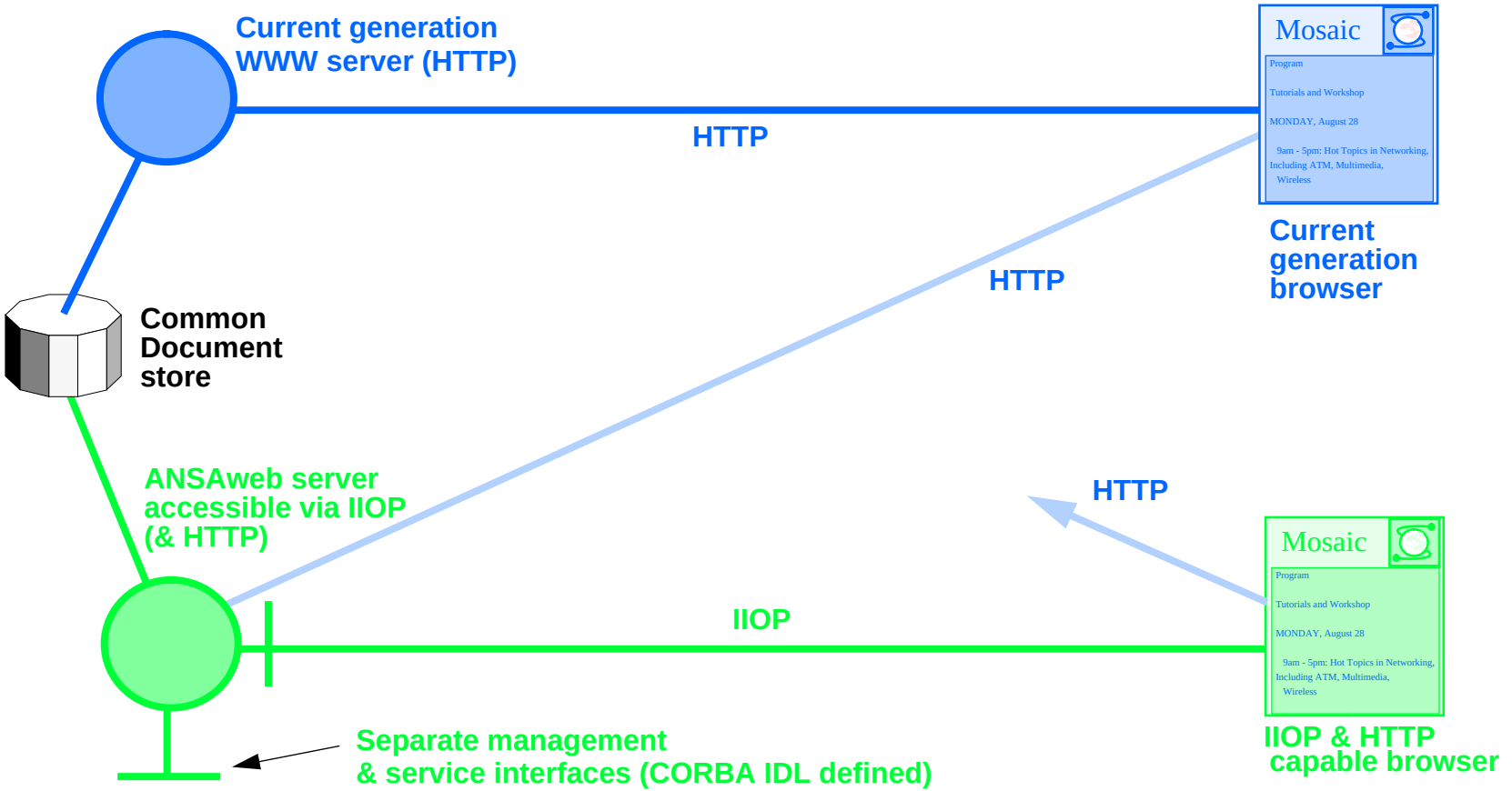
Bespoke client

ANSAweb Phase 1 — Benefits

The benefits arise from having to write less code

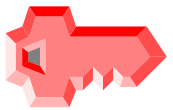
- **Productivity**
  - It is easier to interface existing systems into WWW
  - Do not require a deep understanding of platforms and protocols
  - Remote invocations look like local invocations
- **Less errors**
  - Template forms are correct HTML
  - Template forms, stubs and skeletons are consistent
- **Protection against changes**
  - Skeletons and stubs abstract the programmer from underlying platform — if the platform or protocol changes change the stub compiler and regenerate the stubs, do not have to rewrite the application.

ANSAweb Phase 2: Migrating the web to Distributed Objects



The benefits

- **Extensibility**
  - The ANSAweb server is essentially a CORBA object
  - The ANSAweb server gateway to the CORBA world
  - Interfaces defined and extensible in IDL
  - Integrating third party systems is a strength of CORBA
- **Clients (browsers) migrate to object technology**
  - Move away from the concept of the monolithic client which is difficult to upgrade
- **Performance of IIOP**
- **Manageability**



Backwards compatibility — no changes to HTML, preserve the http:// scheme, no new schemes (e.g. iiop://)

Objectives for distributed interactive multimedia

- Add real-time capabilities to the ANSA/ODP architecture
  - without destroying its ability to cope with:
  - federation, heterogeneity, scaling
- Provide interoperability between real-time and non real-time objects
  - predictable islands in a an unpredictable sea
- Provide real-time guarantees in an asynchronous distributed system
  - make high performance distributed systems
  - make predictable distributed systems
- Application driver is multi-media

Distributed Interactive Multimedia Architecture (DIMMA)

TINA Personality Module

Synchronous Objects

Asynchronous Objects

CORBA Personality Module

Distributed Multi-media Object Runtime

Real-time
Explicit binding
Streams
QoS control

Nucleus
Capabilities

ORBLITE

ORBIX

ANSAware 4.1

ANSAware RT

DCE

OSF/1

Nemesis

Chorus

Real-time RPC

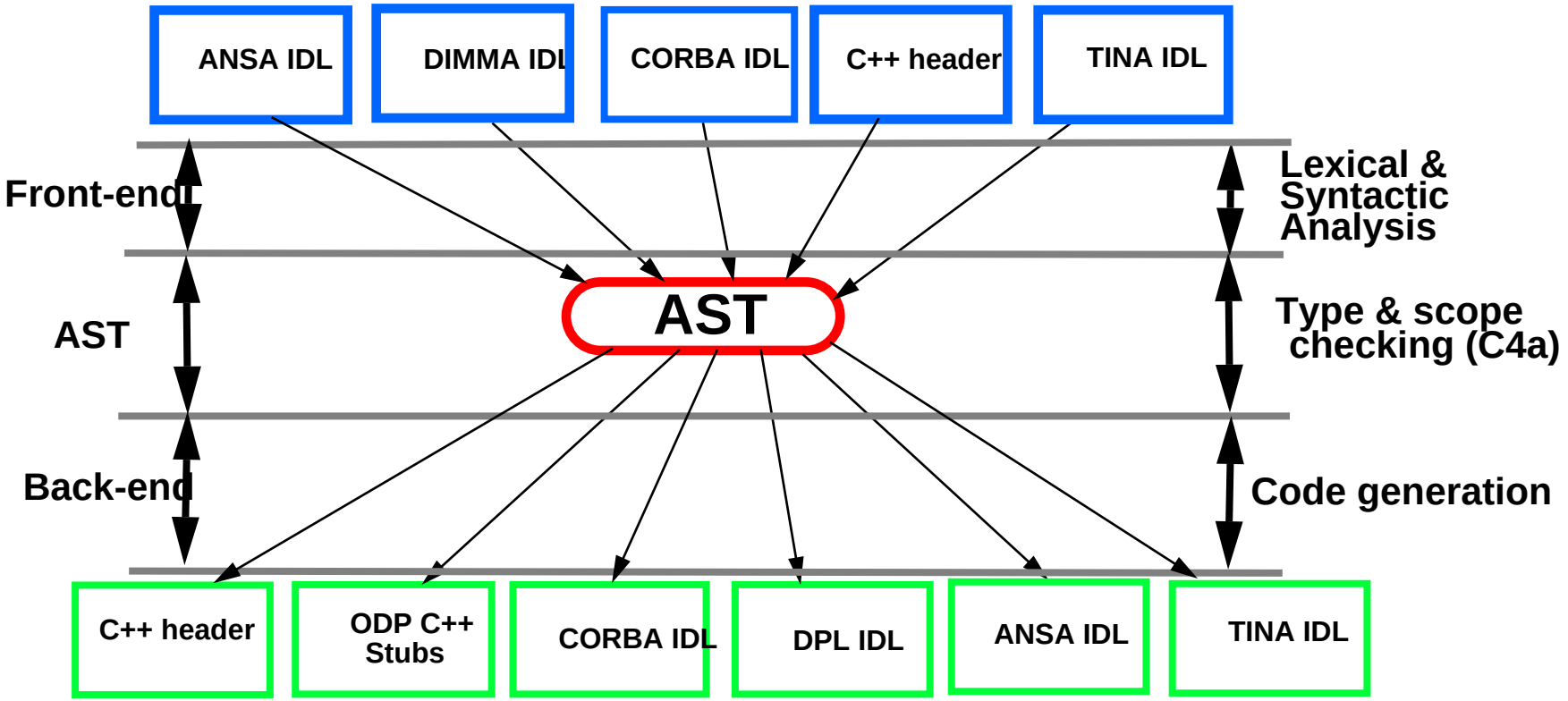
CORBA-IIOP

Other RPC

AST based IDL compiler
Objectives:

- **Support several input notations to describe service interfaces (CORBA IDL, C++ headers, TINA IDL, etc.).**
- **Generate headers, stubs and skeletons targeting a language mapping (e.g C++) and an engineering API (e.g DIMMA nucleus)**
- **Output the type information required for type-safe trading**
- **Translate an input IDL notation to another equivalent IDL notation (e.g DIMMA IDL -> CORBA IDL), flagging incompatibility**

IDL Master Plan



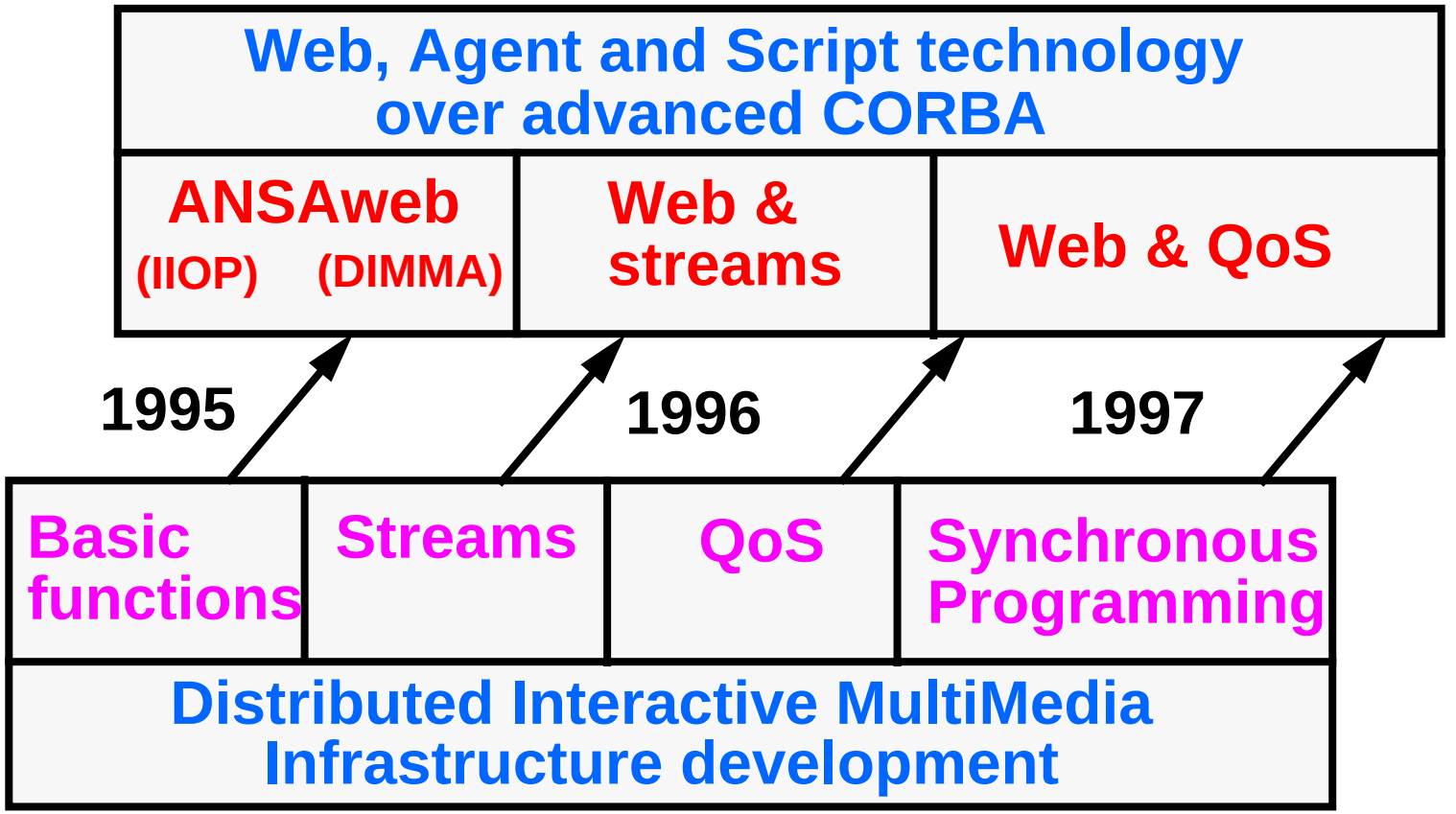
Modularity in the Nucleus

- communication
  - a generic communication framework
- processing
  - many threading schemes (multi-threading, non-threaded, real-time threading)
- memory management
  - many buffering schemes (eager, continuous, linked list (mbufs, fbufs))
  - many Protocol Data Units (PDUs)
- event processing
  - synchronous
  - asynchronous
  - half synchronous/asynchronous

Computational API

- **Stage 1:** objects
  (operational) interfaces
  multiple results
  basic types
  the type “Any”
  (operational) signatures
  invocation references
  named terminations
  local garbage collection
  (hand coded) trader client stub
- stage 1 implemented over DIMMA and (almost) over ANSAware 4.1]
- stage 2: structured types, threads, service withdrawal
- stage 3: streams, explicit binding, QoS
- stage 4: synchronous programming, preprocessor

Plan


Web, Agent and Script technology over advanced CORBA
ANSAweb (IIOP) (DIMMA)
Web & streams
Web & QoS
1995
1996
1997
Basic functions
Streams
QoS
Synchronous Programming
Distributed Interactive MultiMedia Infrastructure development