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ANSA Phase III

DIMMA Projects

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Abstract

Project overview presentation. Includes Amber and Amethyst projects. Presented to shared MC TC 19 March 1996.

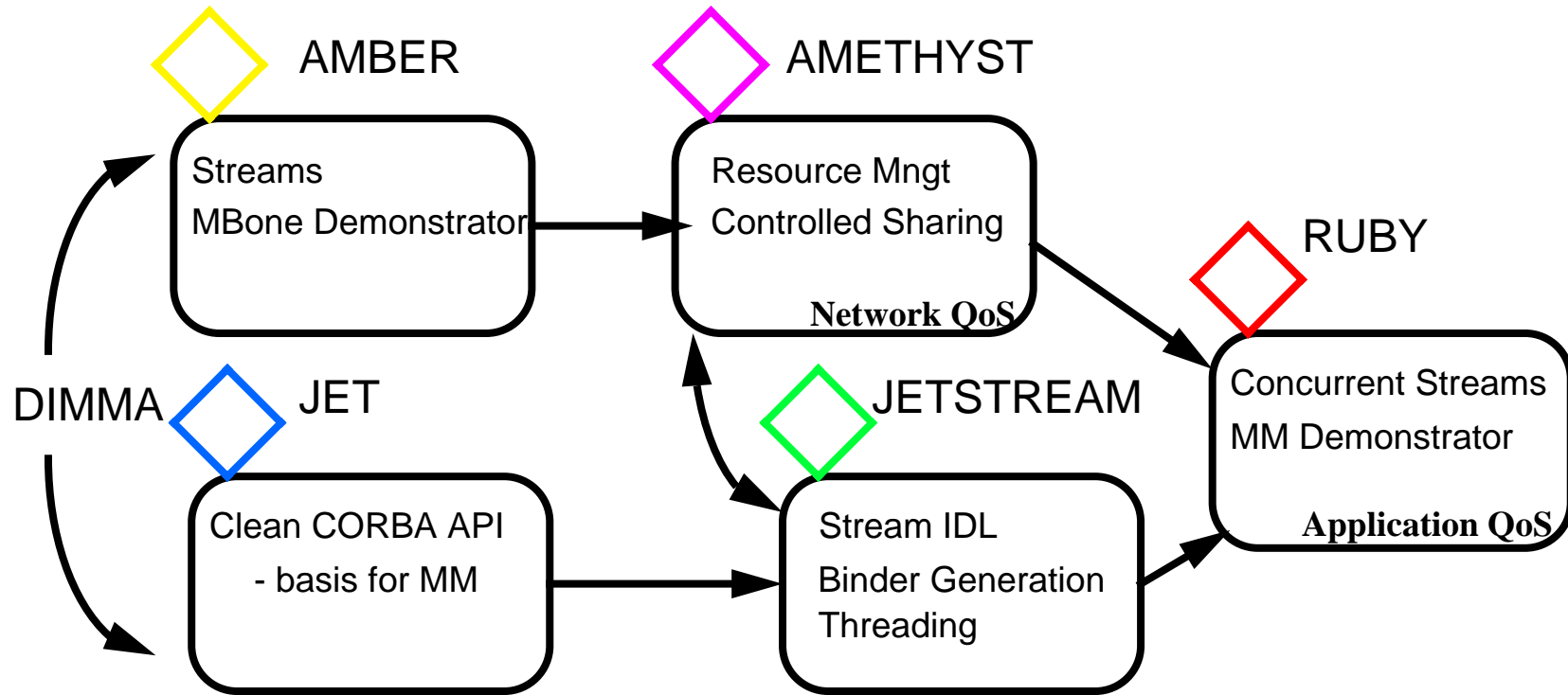| APM.1718.00.01	**Draft**	19th March 1996

Briefing Note

Distribution:
Supersedes:
Superseded by:

Multi-Media enabled CORBA

Project Overview

ANSA path to Multi-Media CORBA

Current Position

- **General ORB versus Specialist applications**
  - **Telecommunication applications, MM, WWW, DAVIC**

- **ORB enhancements**
  - **for CORBA 2.0 and CORBA Services**
  - **for specific application domains**

- **Distributed Multi-Media**
  - *Local* - **No concurrent multi-media support**
  - *Distributed* - **No coordinated management of infrastructure**

=> need enhanced ORB

Technologies

- **Network-level Applications**
  - **ATM APIs**
  - **IETF - IPv6 and RSVP, MBone**

- **Integrated Environments**
  - **Netscape browser plug-ins**

- **CORBA**
  - **Generic application integration glue**

How to extend *CORBA* for advanced Multi-media?

Options

- **Build as CORBA Services**
  - **No binding management**
  - **Difficult to provide type-safety**
  - **Difficult to guarantee QoS**

- **Java route**
  - **Constrained by current runtime infrastructure**

- **CORBA Extensions**
  - **Streams and Explicit Binding**
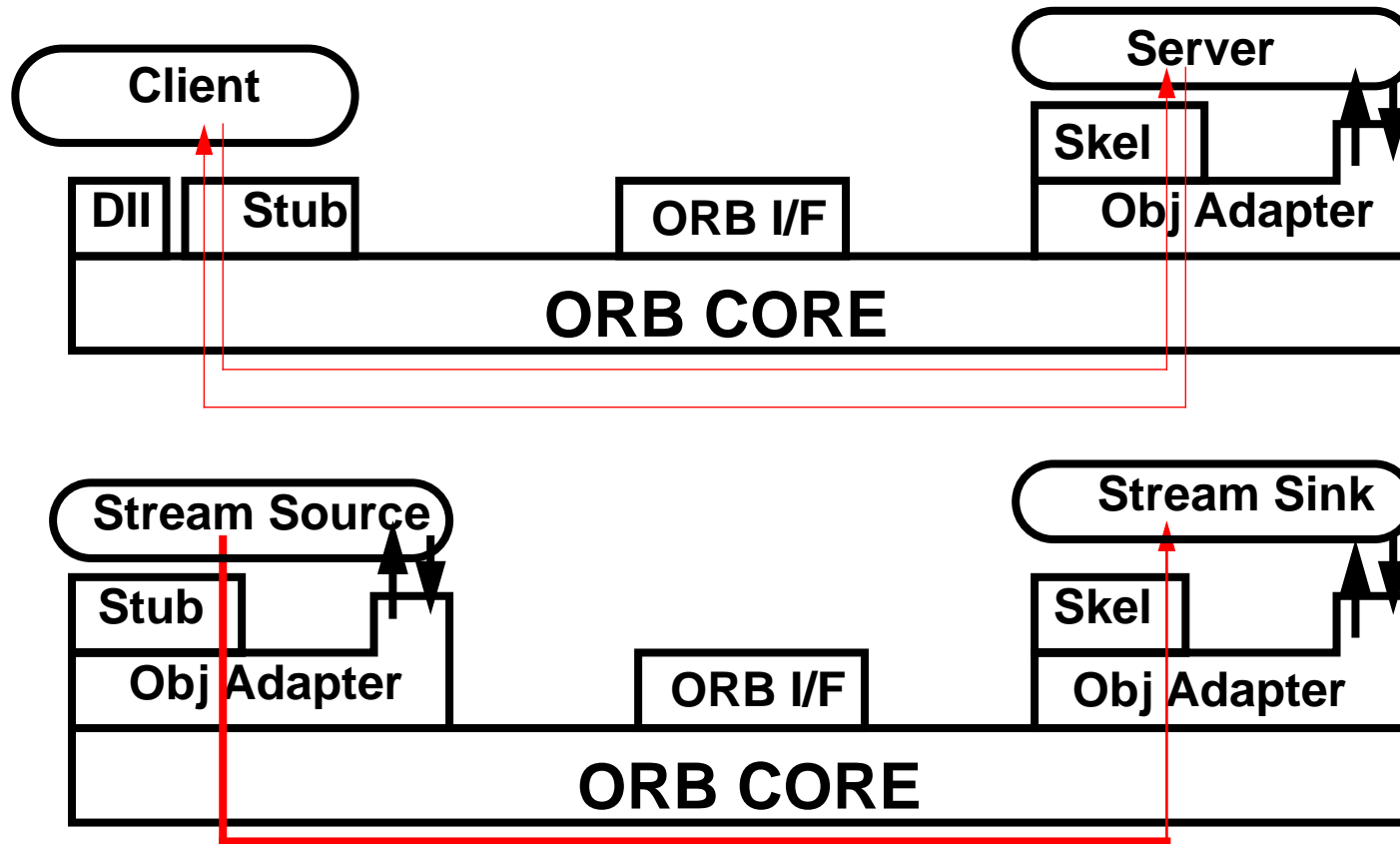 - **Builds on APM expertise: ODP, ANSAWare RT, DIMMA, ReTINA**

Approach

- **Develop**
  - **Streams: Non-RPC interaction paradigms**
  - **Adapters: Binding control and resource management**

- **Demonstrate in multi-media application domain**
- **Feed-back results into CORBA standardisation effort**

# Business case

Advanced ORB targets distributed multi-media

Adapters

Client

DII | **Stub** | **ORB I/F** | **Skel** **Obj Adapter**

Server

ORB CORE

Stream Source

Stub **Obj Adapter** | **ORB I/F** | **Skel** **Obj Adapter**

Stream Sink

ORB CORE

Streams

- **Directional, isochronous or a-periodic (high volume) flows**

- **Typed CORBA interfaces**

Adapters

- **Re-use Object Adapter concept for explicit binding**

- **Adapter types: Primitive, Compositional, Templated**

- **Adapters resourced for QoS**

Templated Adapters

M JPEG I/F + **Conf. call** = **Video Conf.**
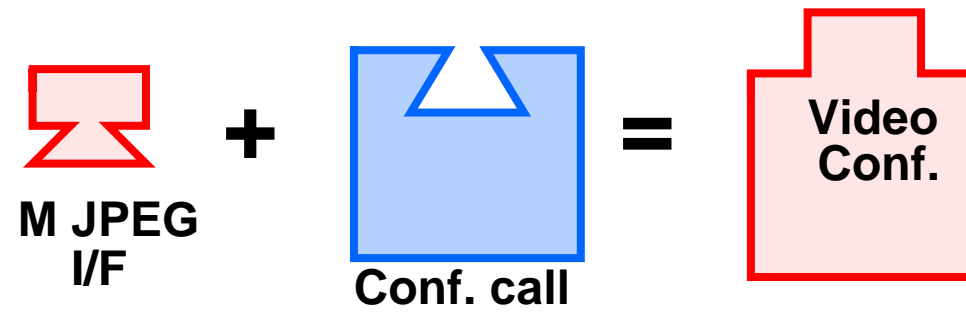
Results

- **Extensible QoS controlled ORB (ReTINA)**

- **Light-weight switching via DCAN**

- **Multi-media Demonstrators**

Multi-media <=> CORBA <=> Telecommunications

The ANSA Projects

- **Multi-media streams demonstrator - AMBER**

- **CORBA C++ Mapping and API - JET, JETSTREAM**

- **Resource control framework - AMETHYST**

- **QoS controlled, concurrent stream processing - RUBY**

AMBER

Conferencing Streams

Current Position

- **ATM**
  - **Constant Bit Rate**

- **MBone**
  - **Adaptive approach**
  - **Scalable conferencing over best-effort networks**

Guaranteed quality versus flexibility

Demonstrate

Streams and Application level MM processing
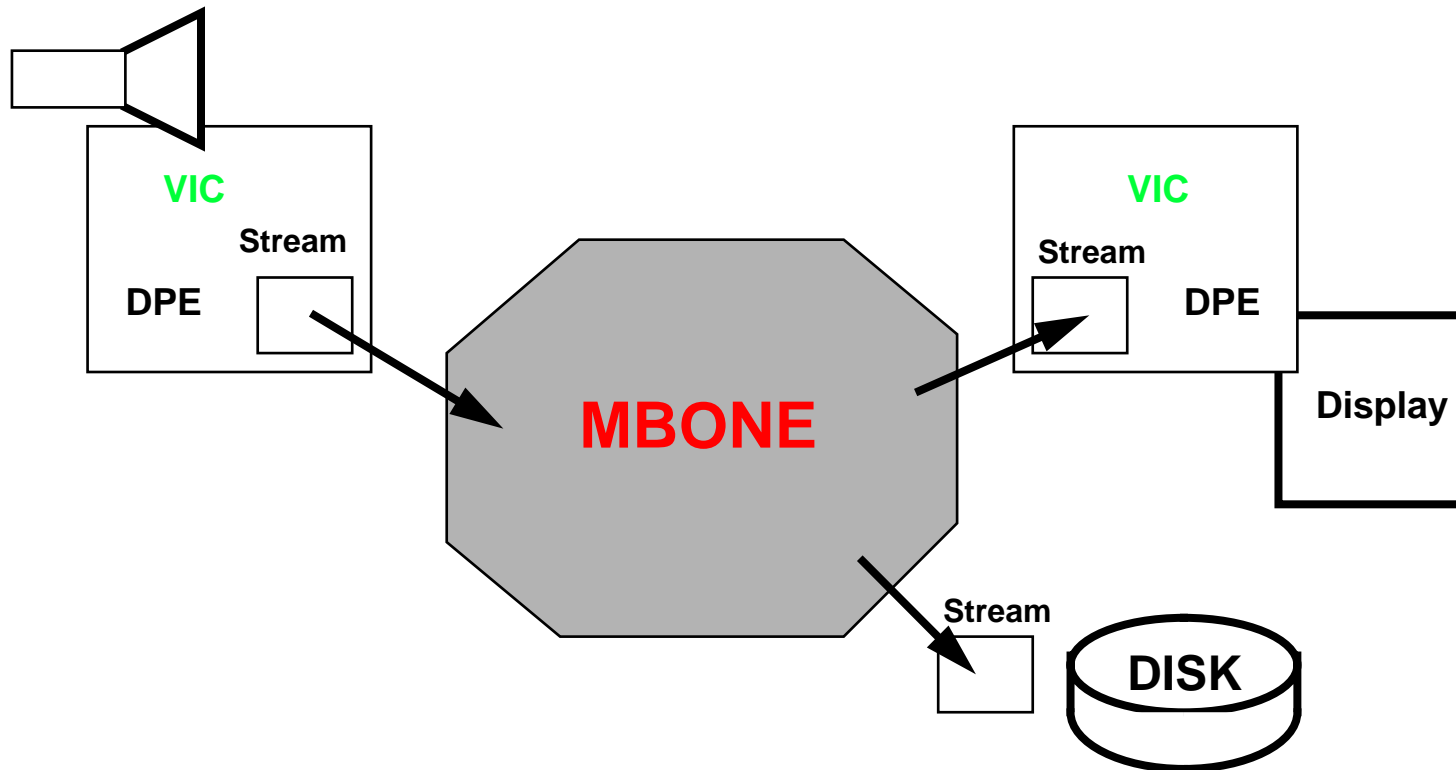
Demonstrator Options

- **Connection management only: plugs and sockets**

- **Special video protocol e.g. Vosaic**

- **MBone VIC video conferencing tool**
  - **Framework for multiple encodings**
  - **Application Level Framing**
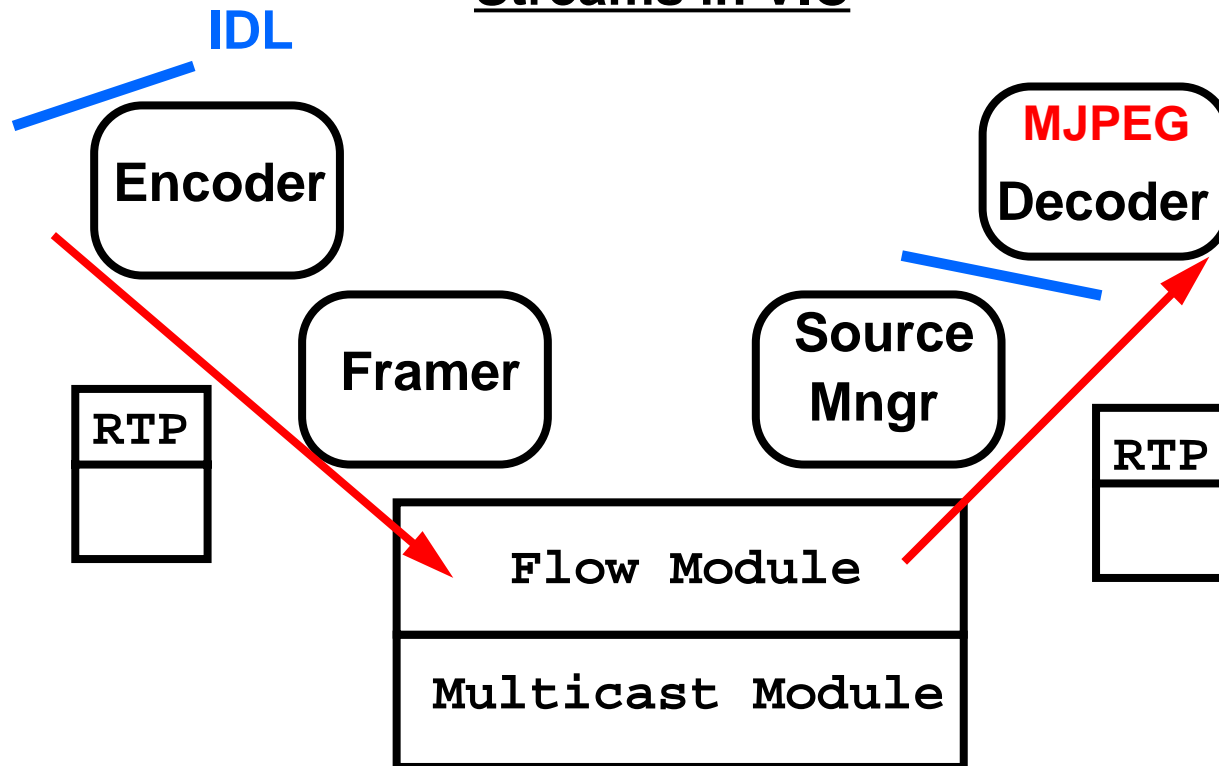 - **Loose conferencing model**

Approach

- **Build MBone demonstrator based on VIC**

- **MBone Streams: protocol and buffer support for RTP**

- **Enhanced platform:**
    - **Flow buffers, Flow bindings and stubs**
    - **Stream IDL, Stream Adapter, Stream Processing**

VIC AMBER

VIC

DPE

Stream

MBONE

VIC

Stream

DPE

Display

Stream

DISK

Streams in VIC

IDL

Encoder

MJPEG

Decoder

Framer

Source Mngr

```
RTP
```

```
Flow Module
```

```
Multicast Module
```

```
RTP
```

Deliverables

- **Demonstrator**
- **Enhanced Platform**

Dependencies

- **Basis for AMETHYST, JETSTREAM**
- **RUBY demonstrator**

Status

- **Completed March '96**

AMETHYST

Resourcing for distributed Multi-media

Current position

- **Stream and Adapter concepts in AMBER**

- **Nucleus Protocol Framework**

- **QoS mismatch - Network QoS and Application level perceived QoS**

Risk

- **No abstractions for resource control =>**

- **No predictable performance given diverse target environments:**
  - **DCAN Unix, Nemesys, AMBER MBone**

- **Complex low-level programming =>**

Application QoS not met!

Central Issues

- **Resource separation**

- **Generic portable resource management**

- **QoS specification and management**

Stop cross-talk, priority inversions!
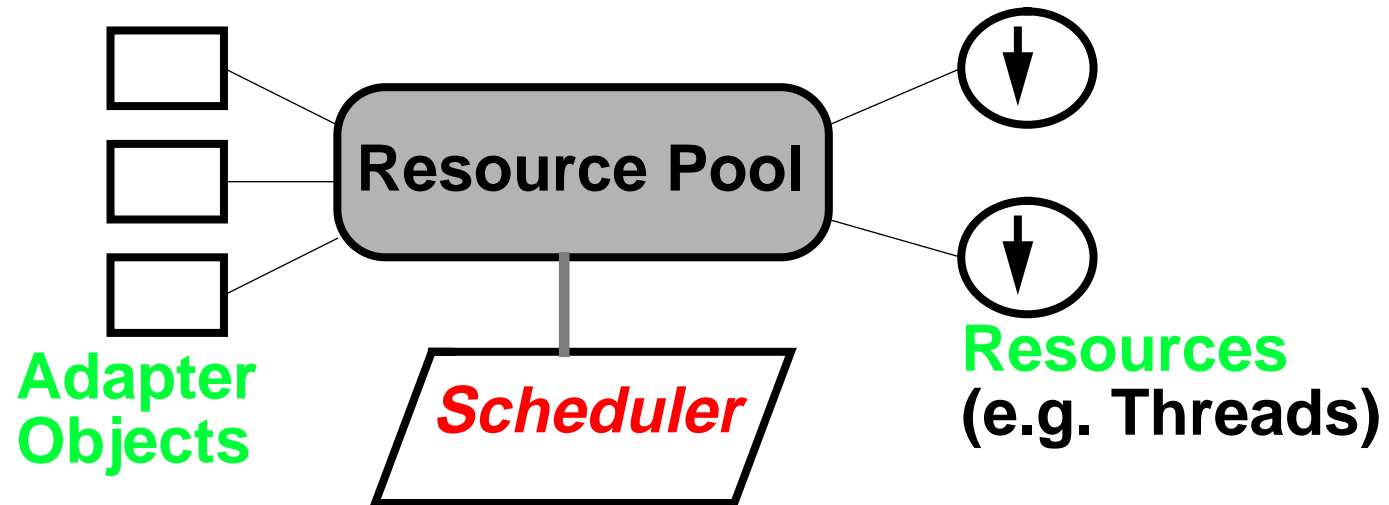
Development Environment Options

- **API approach: Network Protocol or Real-Time OS programming**

- **Object-oriented template based approach:**
    - **Abstract framework - Resources**
    - *Design Patterns* **- Pools and Schedulers**
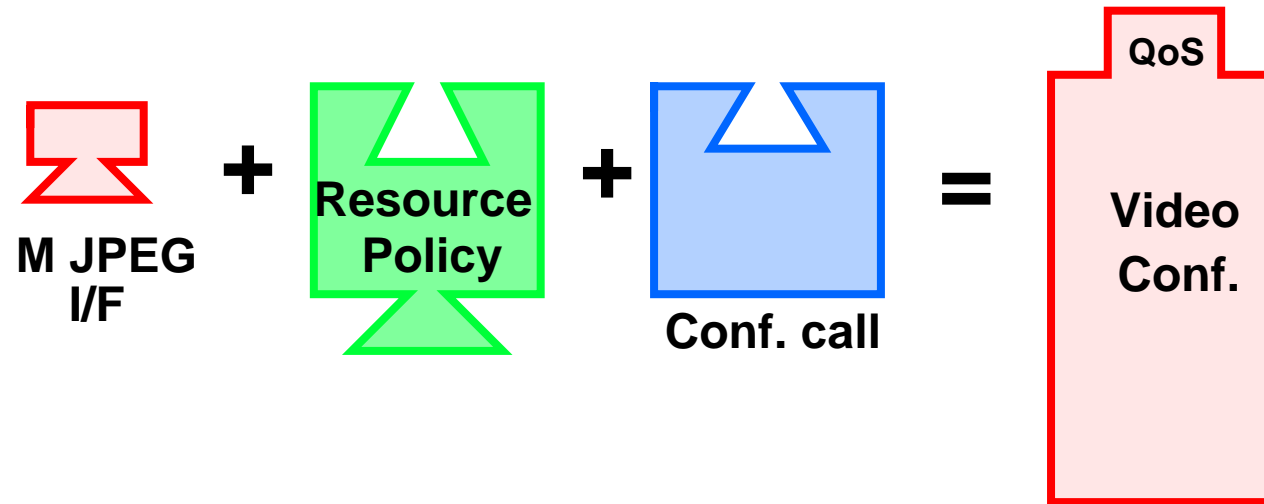   - **Delivered to applications via Adapters**

Approach

- **Extend support for Streams and Adapters**

- **Identify resource abstractions**
  - **Threads, connections, buffers, maps**

- **Provide**
  - **Generic resource pools**
  - **Resource Schedulers (static, statistical or adaptive)**
  - **Multiplexers**

- **Enhanced development environment**
  - **JET, JETSTREAM tools**

Resourced Stream Adapters

Adapter Objects

Resource Pool

Scheduler

Resources (e.g. Threads)

Scheduled Adapters

M JPEG I/F + **Resource Policy** + **Conf. call** = **QoS Video Conf.**

Deliverables

- **Resource controlled ORB**

- **Streams and Adapter Templates using pools**

- **Portable Multi-media**

Dependencies

- **Builds on AMBER, platform for JETSTREAM**

- **Basis for RUBY demonstrator**

Status

- **Starts end of March '96, Estimated Completion October '96**