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ANSA Phase III

Slides for Boundaries and Interception talk at TC, Mar 94

FedTG

Abstract

This document describes the work on boundaries, domains and interception current in the federation task group at the end February 1994.

This set of slides is used for the TC meeting of 2 and 3 March 1994.

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

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Boundaries, Federation and Interception

(Work in Progress Report)

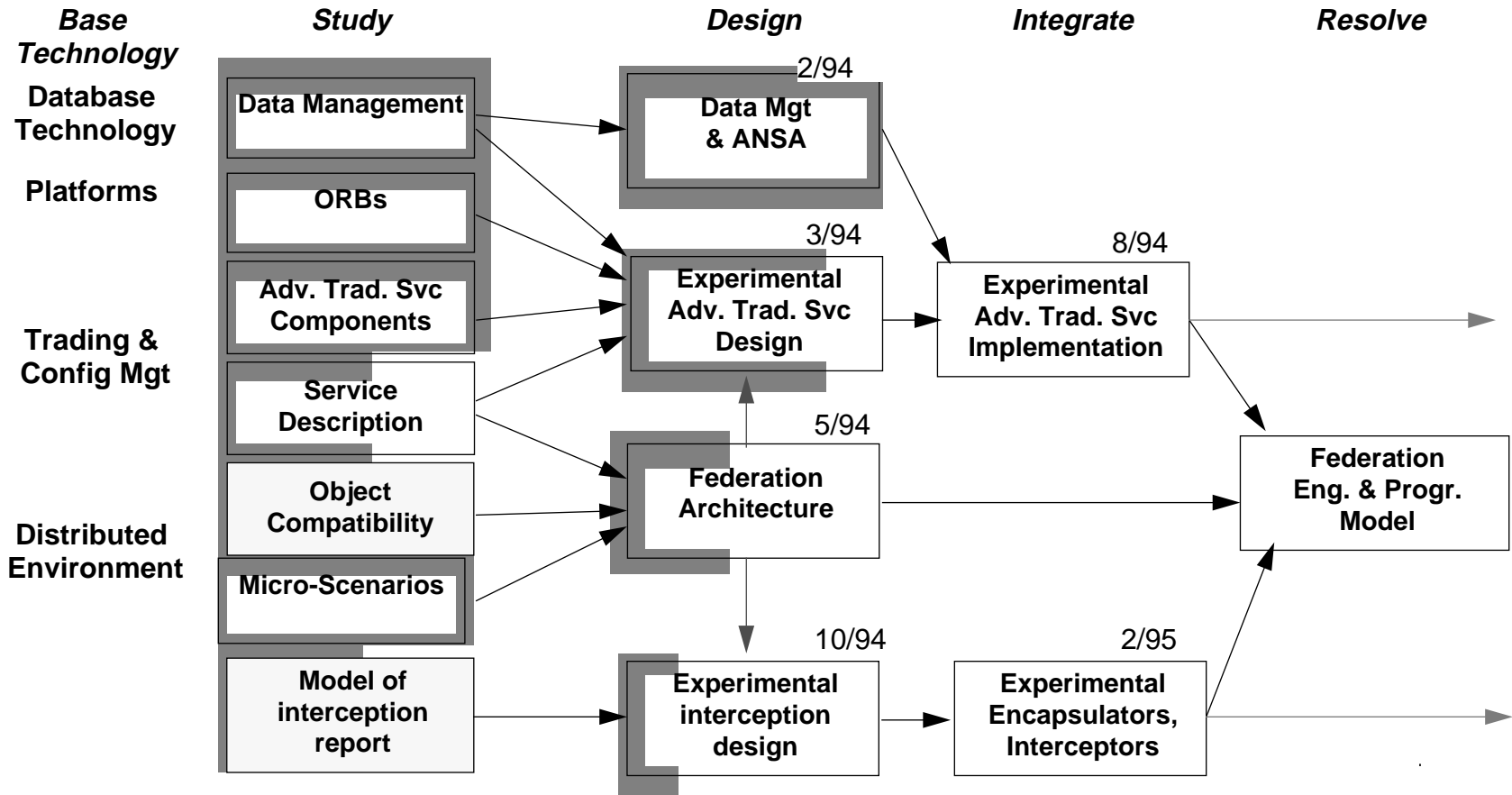
Gray Girling

Federation Group

March 1994



Federation Work





Presentation Overview

- **Motivation**
- **Scope**
- **Approach**
- **Focus**
- **Access Federation**
 - **Federating Implicit Binding**
 - **Federating Invocation**
 - **Local Syntax**
 - **Transfer Syntax**
 - **Abstract Syntax Notation**
- **Engineering Infrastructure - future work**



Motivation

- **Business expansion** ⇒ removing technical and administrative boundaries
- **Preservation of business interests** ⇒ creating boundaries
- **Controlling business activities** ⇒ monitoring boundary crossings

So we need to understand:

- **What a boundary is**
- **What types of boundaries we need to look at**
- **How we control co-operation across different types of boundary**



Scope

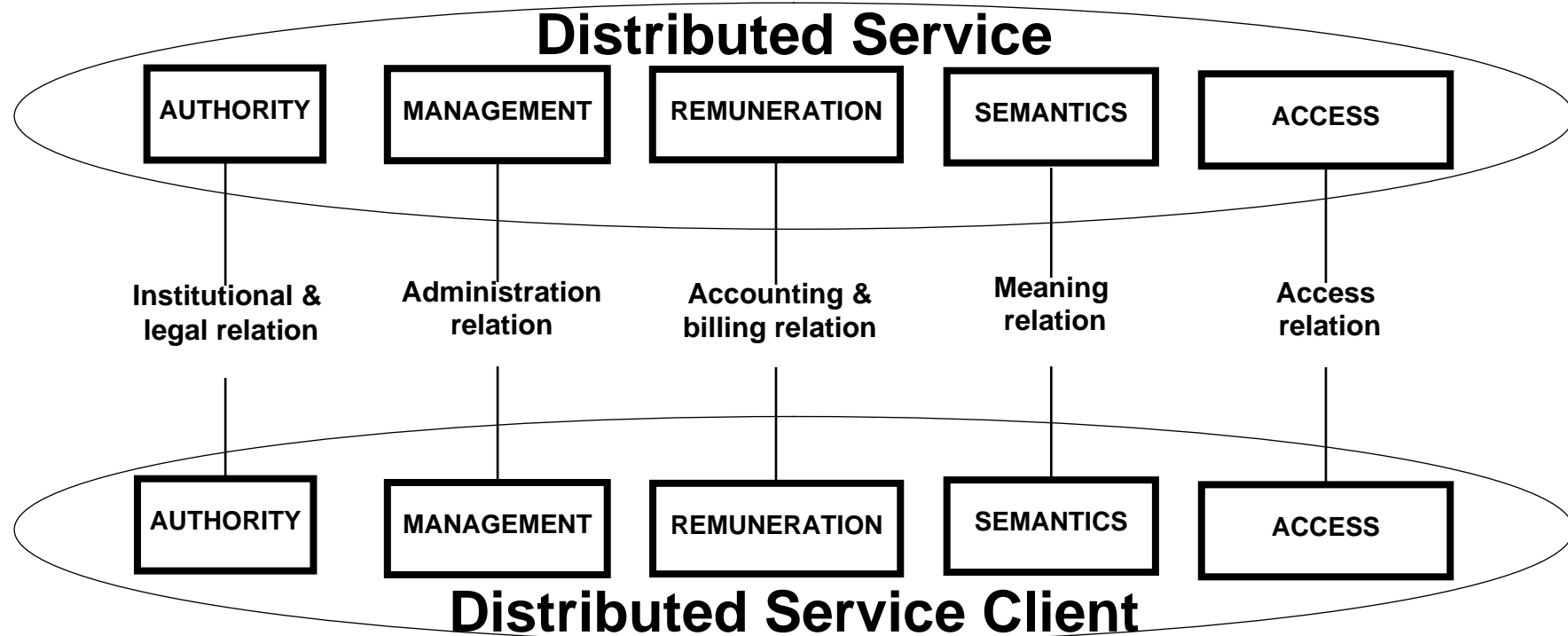
- **Boundaries delineate a difference in some property**
- **The boundary problems that need to be addressed are:**
 - **federation** – enabling co-operation
 - **separation** – preventing co-operation
 - **monitoring** – observing co-operation
- **Boundaries of interest are those that particularly focus on ...**
 - ... **distributed service**
 - ... **development, implementation, deployment, provision, use and maintenance**
 - ... **in Large Scale Distributed Systems.**



Approach - Modus Operandi

- **The way we intend to address federation follows the following path:**
 - **provide a classification of properties that potentially are different**
 - **for each property:**
 - **define the types of co-operation that are required between systems with respect to that property**
 - **for each type of co-operation:**
 - **say what the difference problem is**
 - **say what mechanisms can be used to solve that problem**
 - **for each mechanism:**
 - **say what elements of the mechanism can be supported by infrastructure/engineering components**

Approach – relation between service and its user





Approach - Focus

- **Differences in these following properties need to be addressed**
 - **authority, management, remuneration, semantics**
 - **access**
 - **between infrastructures**
 - **between client/server**
 - **between distributed service configuration and its client**
- **Top-down analysis yields a very large number of areas of work**
- **All these areas are hard – we need a focus – we choose “access federation”**
- **Access methods must support**
 - **interface binding (implicit and explicit),**
 - **invocation and**
 - **stream use**

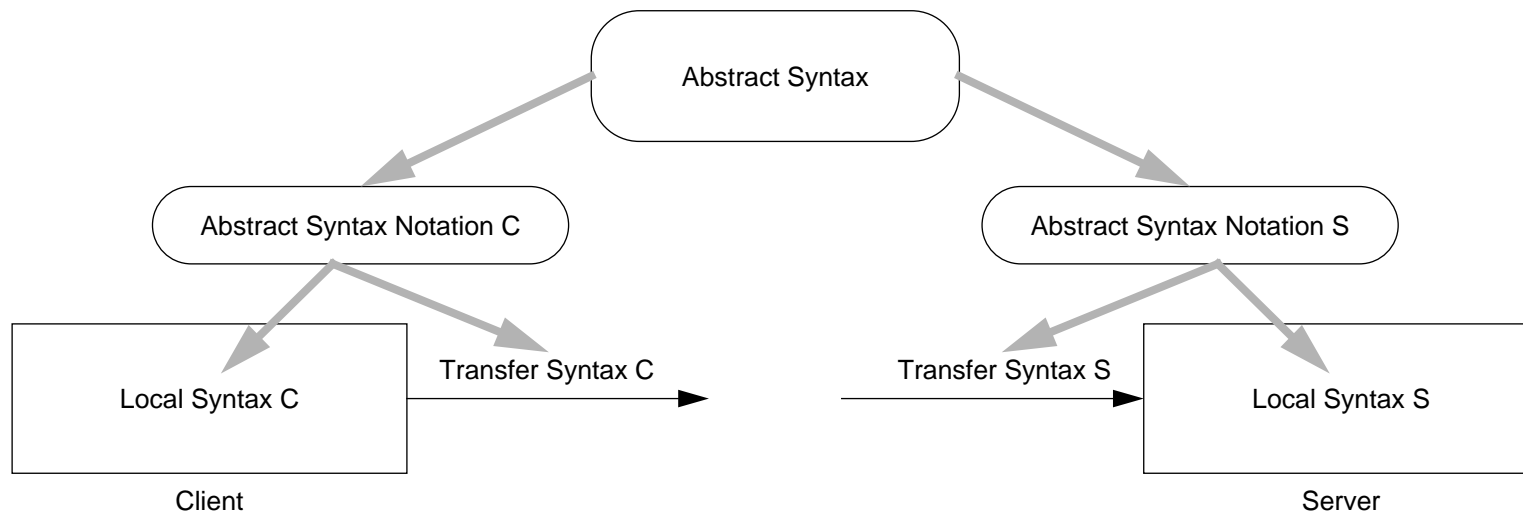


Federating Binding

- **Binding exists in ANSAware, Orbix (CORBA), DCE, etc.**
- **Basically the same semantics exist in each case**
- **But there are the following engineering differences**
 - **form of the binding operations (c.f. a binding API)**
 - **the format of binding information: representation and semantics**
 - **the binding protocols used**
- **Possible mechanisms to bridge these differences**
 - **universal binding information package specification**
 - **binding interceptor mechanism**
- **Need to investigate explicit binding and rebinding**

Federating Invocation

- **The following syntax differences may exist**
 - **local syntax (in client and server)**
 - **transfer syntax (between client and server)**
 - **abstract syntax notation (used to describe the above, e.g. IDL)**



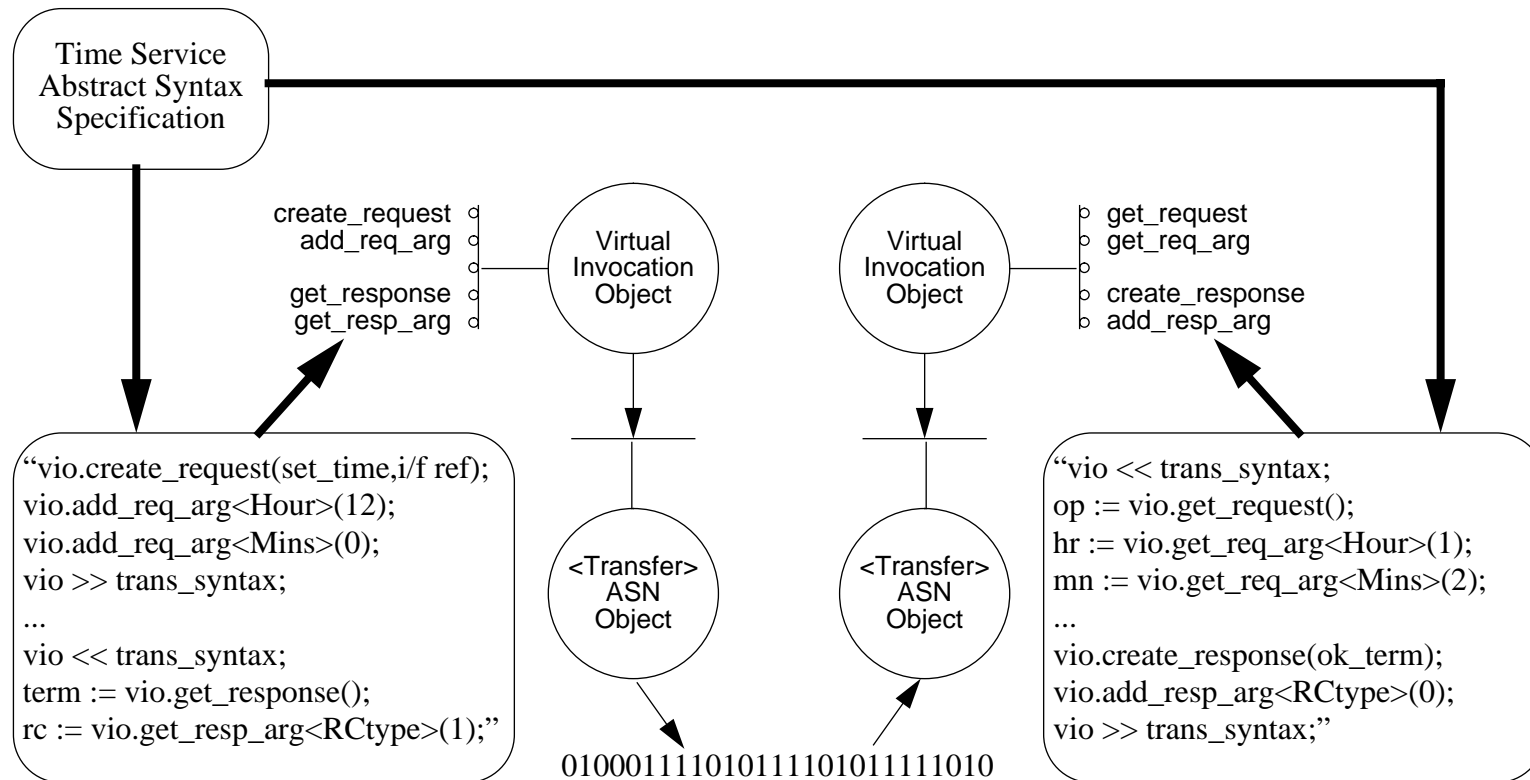


Federating Invocation - Local Syntax Differences

- **Epoch variations of the problem:**
 - known operation template & argument types (e.g. ANSAware)
 - unknown operation template & argument types (e.g. SQL DBMS, CORBA)
- **Possible mechanisms to bridge these differences**
 - traditional access transparency mechanism (like ANSAware)
 - virtual invocation object mechanism (almost CORBA)



Virtual Invocation Object Mechanism





Federating Invocation - Transfer Syntax Differences

- **Transfer syntax client uses is not the one the client uses**
- **Possible mechanisms to bridge these differences**
 - **transfer syntax negotiation mechanism**
 - **common abstract syntax notation: transfer syntax interception mechanism**



Federating Invocation – Abstract Syntax Notation Differences

- **Abstract syntax notations (e.g. an IDL) are based on**
 - a selection of base types, and
 - a selection of type construction mechanisms
- **What if the selections made in abstract syntax notation (ASN) are different?**
- **Possible mechanisms to bridge these differences**
 - ad-hoc interface-specific interception mechanism
 - ASN x ASN-specific interception mechanism
 - generic ASN interception mechanism
 - call by reference mechanism



Engineering Infrastructure - future work

- **Purpose: infrastructure to support mechanisms such as those above**
- **Differences in semantics, remuneration, management and authority – federation, separation and monitoring also need consideration**
- **Some work has already been done, e.g. in HARNESS**
- **All needs to be brought together as part of a coherent architecture**
- **Anticipated components in architecture**
 - **binding interceptors**
 - **transfer syntax translating interceptors**
 - **abstract syntax notation mapping interceptors**
 - **abstract syntax repository**
 - **engineering encapsulators (for separation)**
 - **wrappers (co-located interceptors?)**











