



---

**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**

# **Interception (TC presentation 11/94)**

**Yigal Hoffner**

### **Abstract**

The business problem addressed is...

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

The solution being offered is....

---

APM.1371.00.01

**Draft**

7th December 1994

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

---

**Distribution:**

**Supersedes:**

**Superseded by:**



**Interception (TC presentation 11/94)**





**Interception (TC presentation 11/94)**

Yigal Hoffner

APM.1371.00.01

7th December 1994

The material in this Report has been developed as part of the ANSA Architecture for Open Distributed Systems. ANSA is a collaborative initiative, managed by Architecture Projects Management Limited on behalf of the companies sponsoring the ANSA Workprogramme.

The ANSA initiative is open to all companies and organisations. Further information on the ANSA Workprogramme, the material in this report, and on other reports can be obtained from the address below.

The authors acknowledge the help and assistance of their colleagues, in sponsoring companies and the ANSA team in Cambridge in the preparation of this report.

## Architecture Projects Management Limited

Poseidon House  
Castle Park  
CAMBRIDGE  
CB3 0RD  
United Kingdom

TELEPHONE UK  
INTERNATIONAL  
FAX  
E-MAIL

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

**Copyright © 1994 Architecture Projects Management Limited**  
**The copyright is held on behalf of the sponsors for the time being of the ANSA Workprogramme.**

Architecture Projects Management Limited takes no responsibility for the consequences of errors or omissions in this Report, nor for any damages resulting from the application of the ideas expressed herein.



# Interception

Yigal Hoffner

Email: [yh@ansa.co.uk](mailto:yh@ansa.co.uk)

**Technical Review Committee Meeting**

**Cambridge**

**7 December 1994**



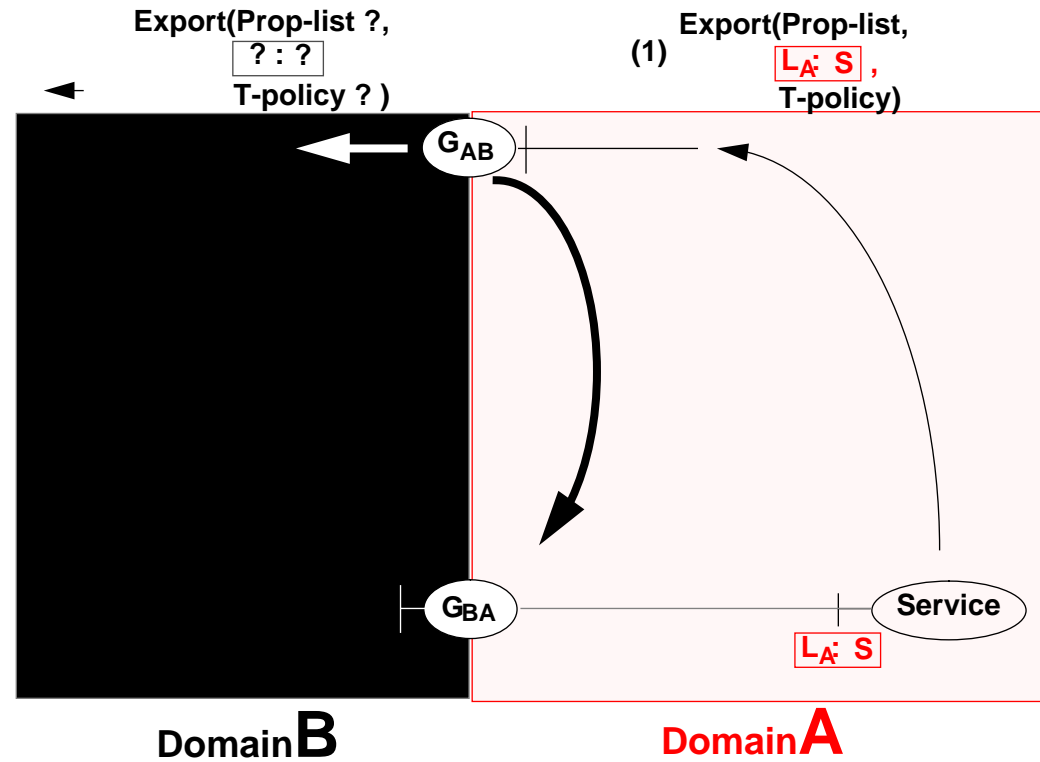
## Overview

- **The problem - crossing domain boundaries**
- **Phases of the interception process**
- **Immediate and deferred resolution strategies**
- **Deferred resolution and relocation**
- **Invocation References (IR) and Binders**
- **Future work and implementation plan**

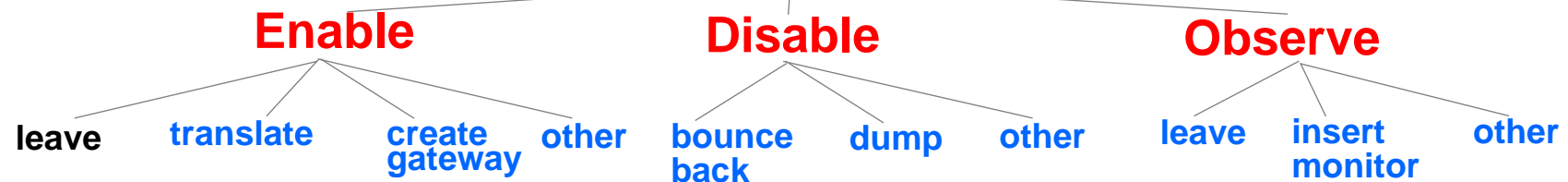


# Problem overview

- Export() across a boundary:
- What do we have to do to enable crossing ?
  - leave untouched
  - translate
  - build gateways
- How to do it ?
- What mechanisms are necessary ?
- Where can mechanisms be put ?
- What information is necessary ?
- Where should the information reside ?
- What changes are required to each domain to enable solutions ?
- What are the minimal changes required ?



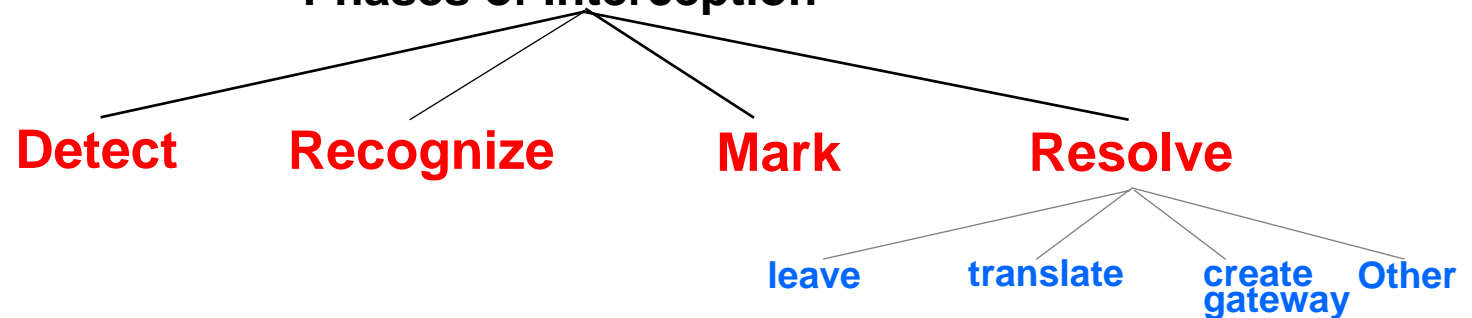
## Introduction Interception



- **Interception is necessary in order to deal with the federation of domains which are sufficiently different from each other to require intervention in order to:**
  - **enable the crossing of boundaries: perform the necessary transformations to overcome the differences**
  - **disable the crossing of boundaries: prevention where the differences cannot be overcome or where for enterprise reasons it is not desirable**
  - **observe the crossing of boundaries: where monitoring events crossing the boundaries are important (issues of liability, security or remuneration are involved, for example)**

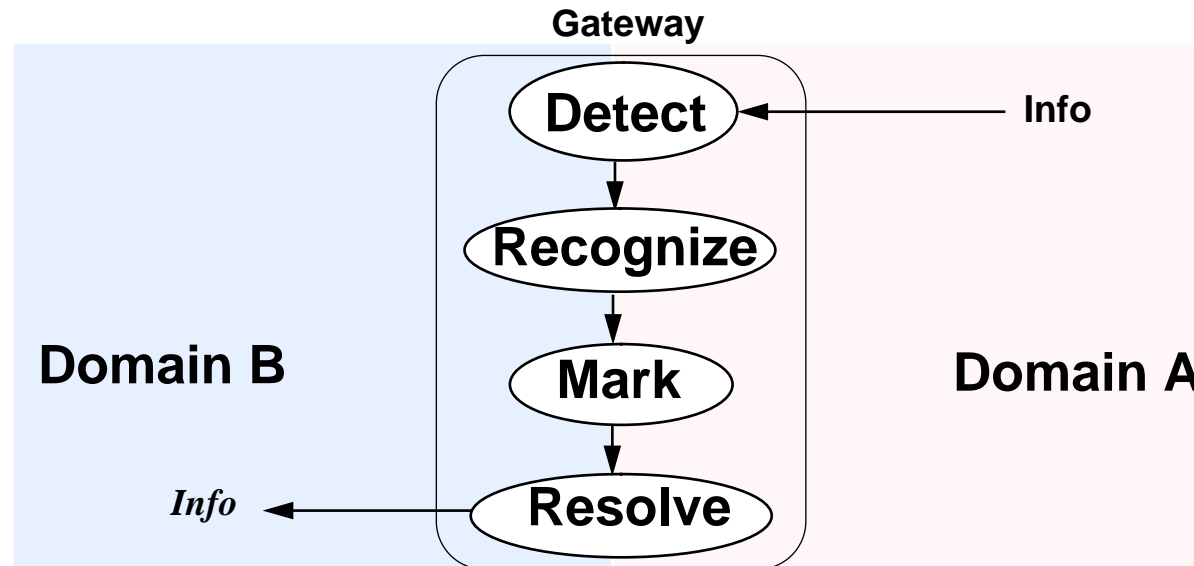
## Phases of the Interception process (I)

### Phases of Interception



- **DETECT:** the crossing of the domain boundary
- **RECOGNIZE:** the information which should effect or be affected by the crossing
- **MARK:** the recognized information
- **RESOLVE:** act according to or on the marked information

## Phases of the Interception process (II)



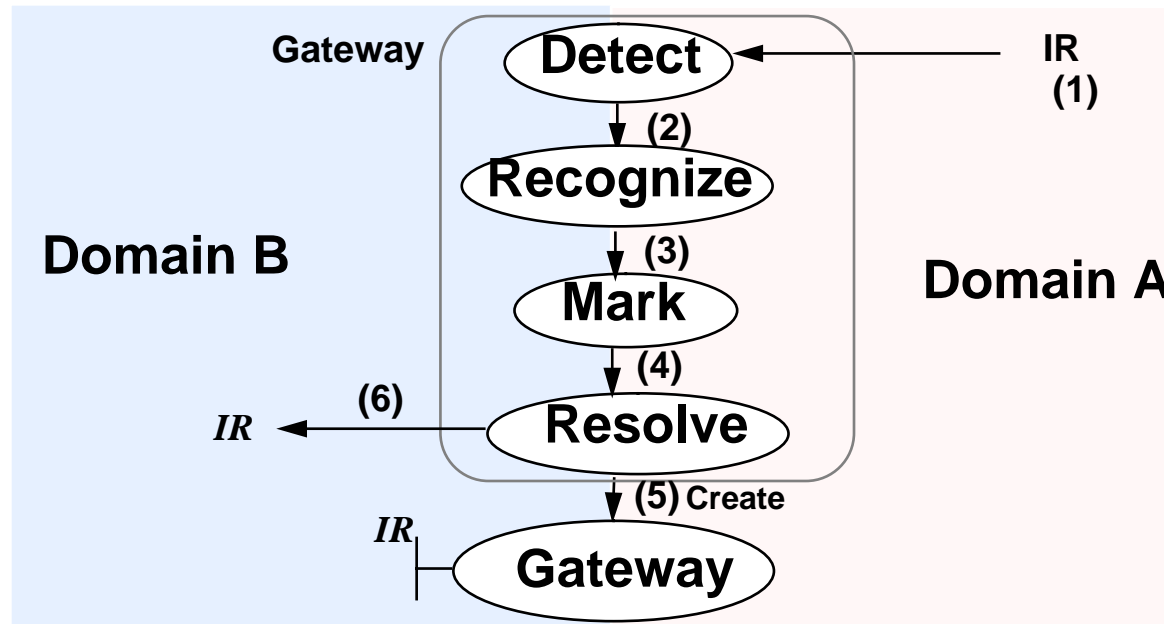
- **Marking and Resolution - distribution in time and space:**
  - how much to resolve immediately or how much to leave for later
  - how much information to keep in gateway or how much to forward
  - resource utilization and performance issues



## Resolution strategies

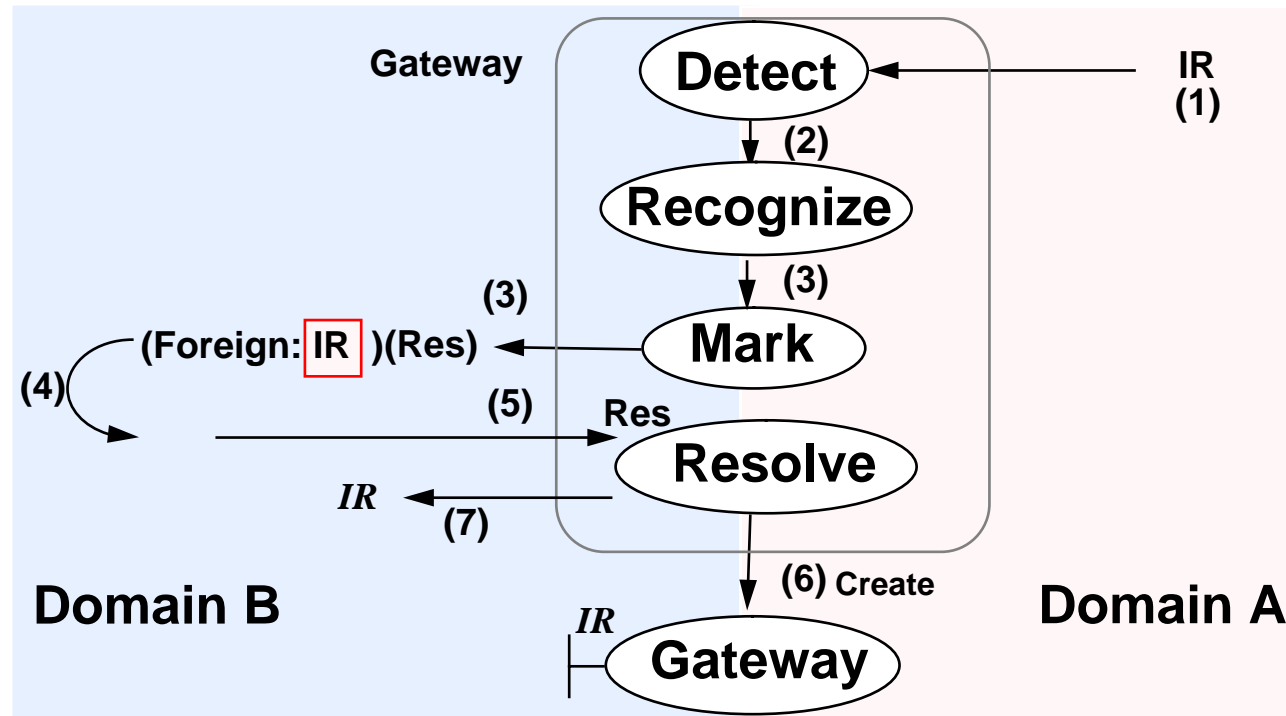
- **Two major strategies of resolution emerge from the description of the phases of the interception process:**
  - **Immediate resolution: resolve differences immediately upon the information passing the gateway**
  - **Deferred resolution: mark the necessary parts of the passing information to indicate what has to be resolved and where, pass the marked information into the other domain, deferring the resolution process on a “need to use” basis**
- **There are intermediate flavours**
- **Invocation References (IRs) can be:**
  - **ANSAware Interface References (Ifref's)**
  - **DCE Binding Handles**
  - **CORBA Object Pointers**

## Immediate resolution strategy



- Recipient in Domain<sub>B</sub> always gets immediately usable information
- All action takes place in Gateway -> no need to change anything in Domain<sub>A</sub> or Domain<sub>B</sub>

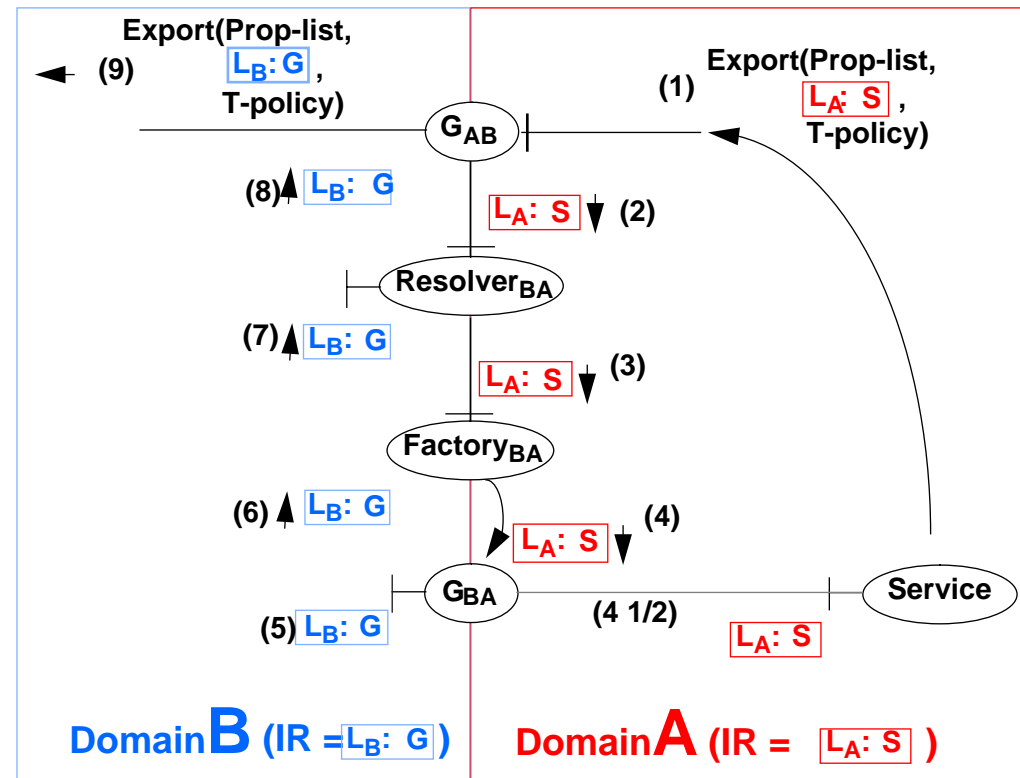
## Deferred resolution strategy



- Requires Domain<sub>B</sub> to be able to deal with marked information

## IR Boundary Crossing (Immediate Method)

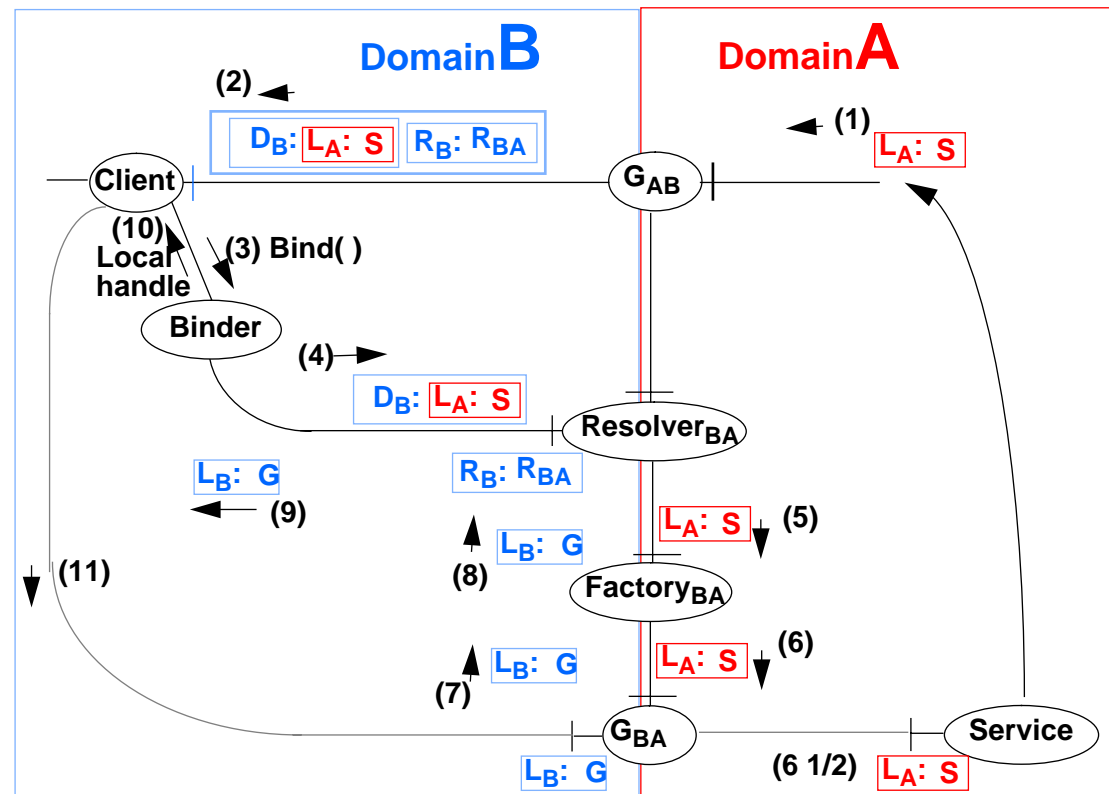
- **Export()** across an IR boundary:
  - different format (but mappable)
  - different information (but mappable)
  - different protocols (but mappable)
- **Trader in Domain B does not have to deal with foreign IR's**
- **It may be required to add another property to Prop-list indicating IR boundary has been crossed**
- **Same sequence when passing IR's as parameters in operations other than Export()**



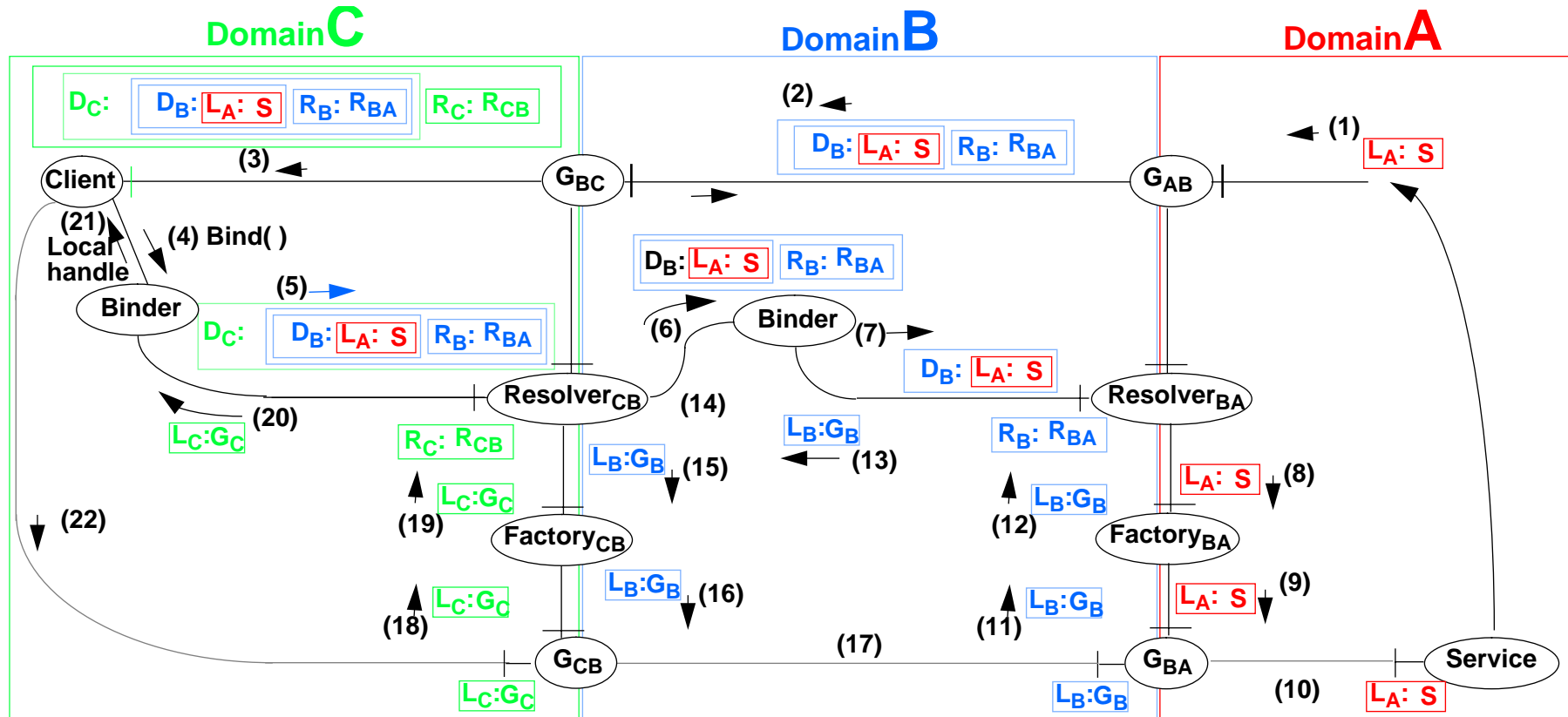


## Resolution of Deferred Method

- IR has to have information for Binder:
  - the deferred information marked
  - where to resolve it
- Binder has to be able to deal with it

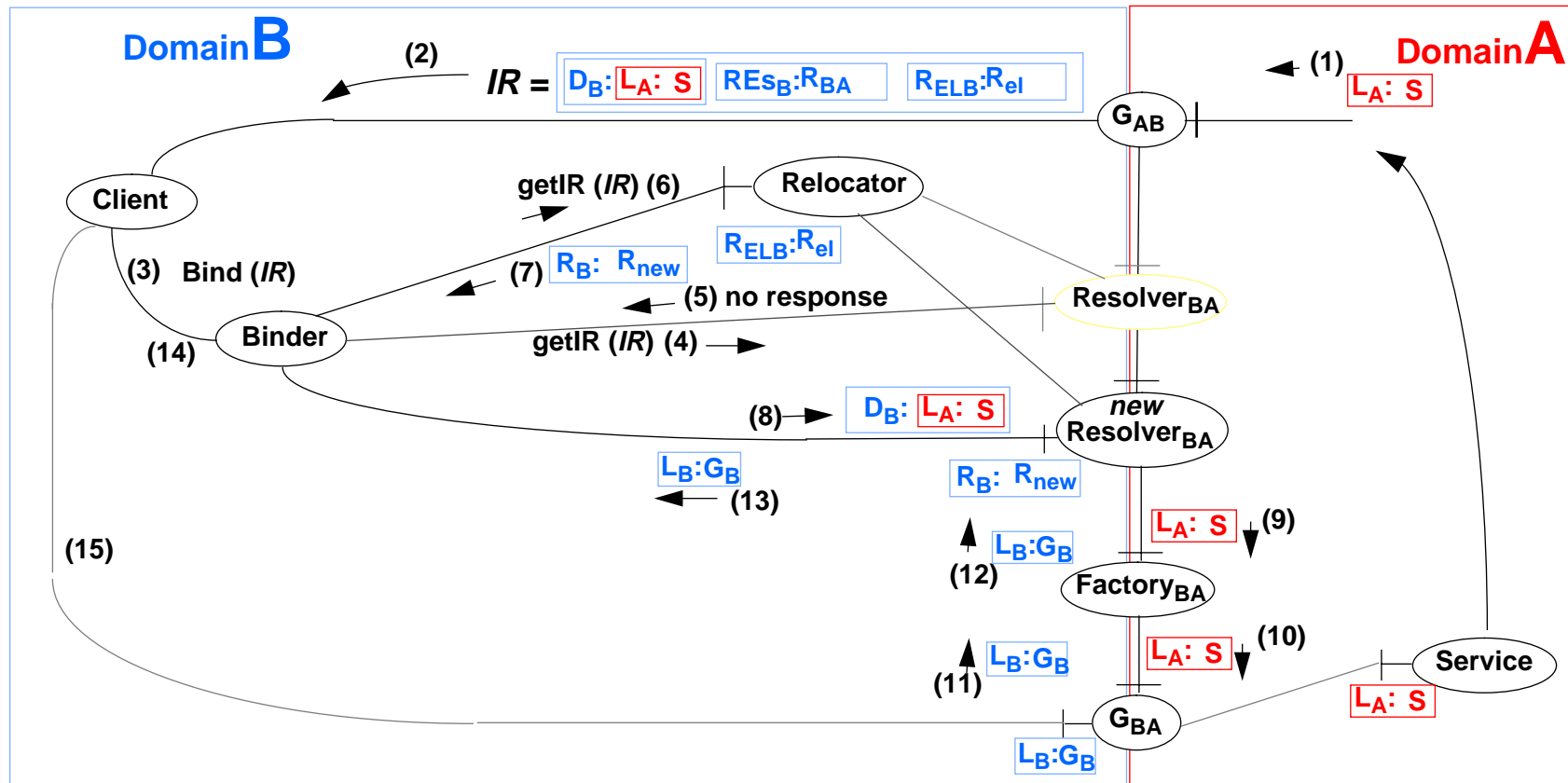


# Multiple Resolution of Deferred Method

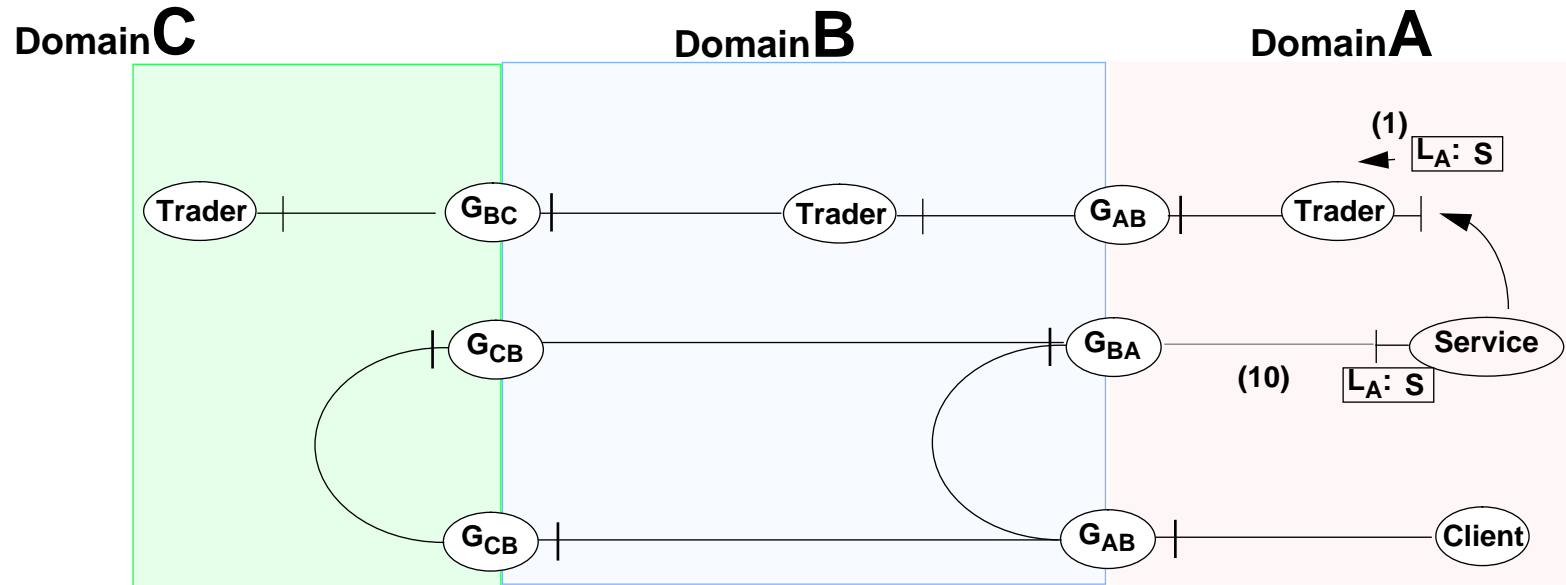


Note: instead of steps 6-7 it is possible to provide G<sub>CB</sub> with the information to be used when it is invoked (Implicit vs explicit binding)

# Deferred method and relocation

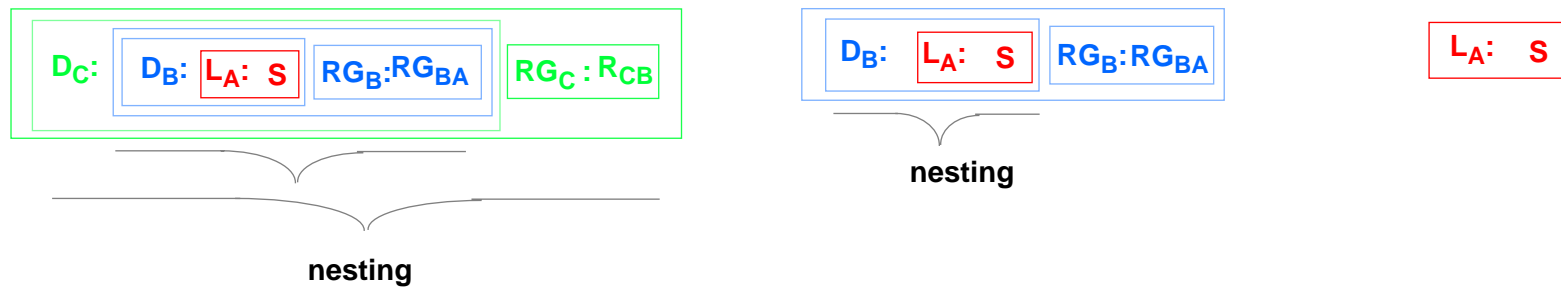


# Circularity of reference





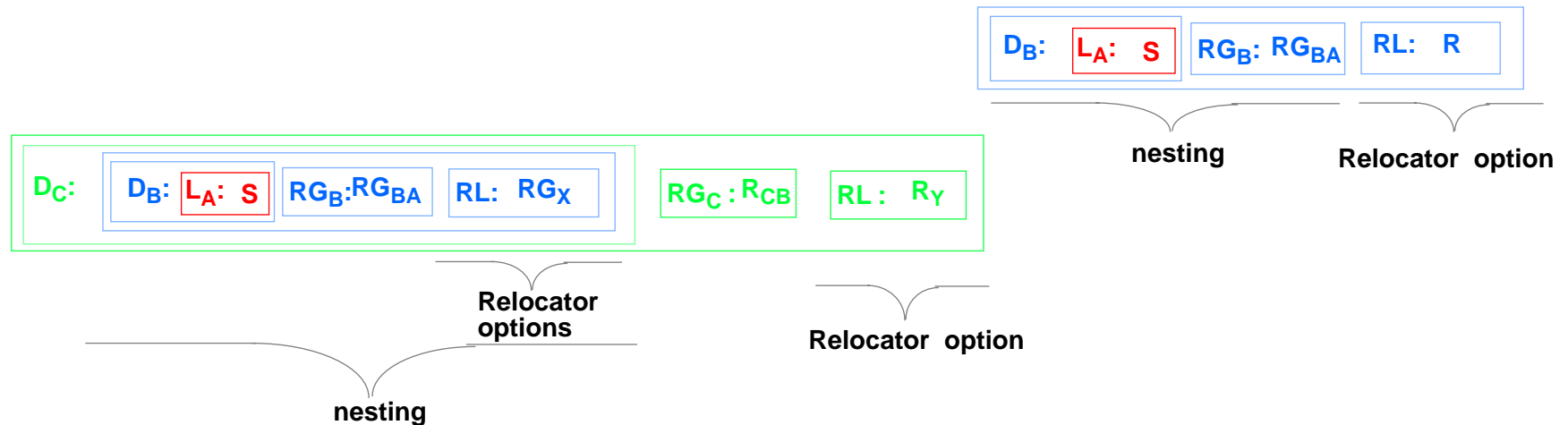
## Invocation Reference nested structure => Gateways



- Gateways: encapsulated/nested IR records -> cascade of gateways
- Nested records are NOT options - Binder must not jump a gateway if it cannot resolve
- Requires domain reserved words: Local, Deferred, Resolve, Relocate



# Invocation Reference sequenced structure => Relocation



- Relocators: sequence of IR records -> options of increasing scope
- Binder will only use the next one if the previous one did not work



---

## Requirements from infrastructure

- **Extension to IR's to allow:**
  - **structure of IR to include:**
    - ▲ **sequences of IR records**
    - ▲ **nested IR records**
    - ▲ **be able to incorporate foreign IR's**
  - **language of IR to mark local, deferred and other cases of IR records**
- **Extensions to Binder to deal with:**
  - **relocation**
  - **gateways**
  - **other cases should fit the scheme:**
    - ▲ **passivation/activation**
    - ▲ **migration**
- **Use: ANSAware relocation scheme, UNO proposal IOR structure**  
(UNO = Universal Networked Objects, IOR = Inter-operable Object References)



## Current status

- **Hand crafted implementation of a simple gateway for:**
  - ANSAware client and Orbix server
  - Orbix client and ANSAware server
- **Monitoring facilities integrated to allow visualization (with the DEMON tool)**





## Future directions and implementation work

- **Passing IR's between platforms:**
  - type inference problems: when IR's are of a type whose operations pass IR's
- **Implement Immediate resolution method between Orbix and ANSAware:**
  - federate traders in both platforms: Orbix Match-maker and ANSAware Trader
  - generate gateways when IR's cross
- **Implement Deferred resolution method between Orbix and ANSAware:**
  - change of Binder in ANSAware
  - change of IR format in ANSAware