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## **Training**

# **ANSAwise - Distributed Client/Server In Action**

**Chris Mayers**

### **Abstract**

Organizations require proof that client/server systems can be effectively implemented in a distributed environment.

This module of the ANSAwise training programme describes two large-scale, distributed client/server systems: Scottish Hydro-Electric and the NASA Astrophysics Data System (ADS). Both of these are ultimately based on distributed systems technology supplied by ANSA.

It was originally presented as part of the course "Implementing Client/Server Systems in a Distributed Environment" in Peritas event 'Networking '95', at which the majority of the participants were from ICL.

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**Approved**  
Briefing Note

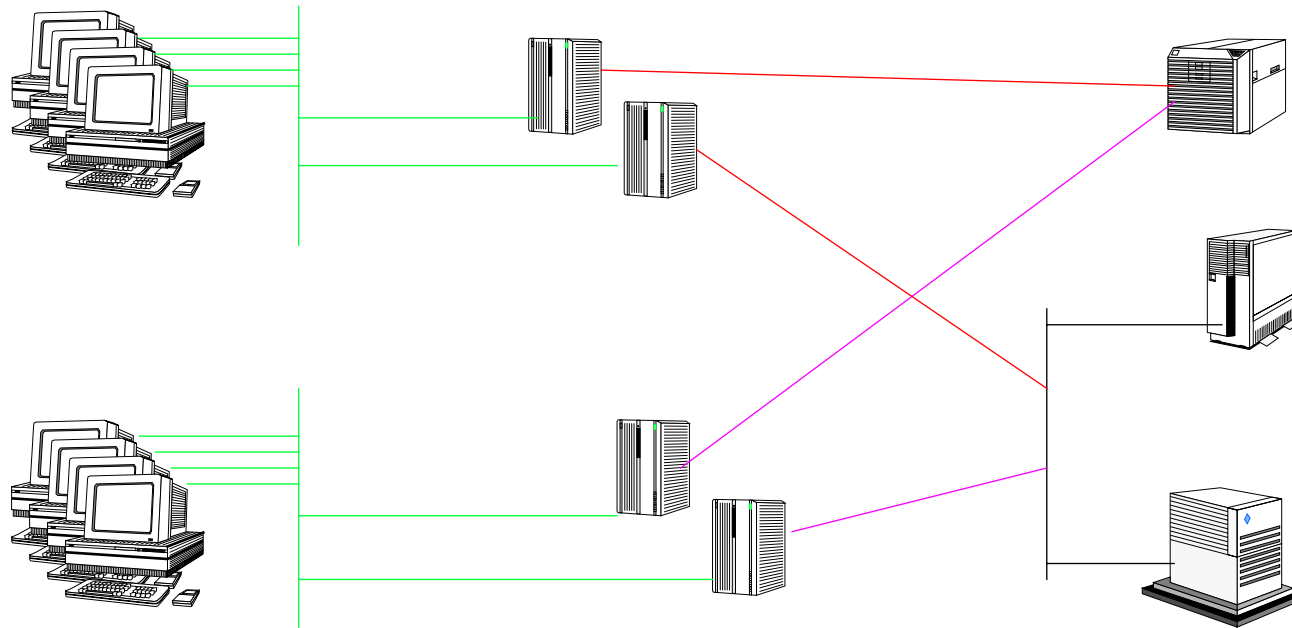
24th April 1995

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**Distribution:**  
**Supersedes:**  
**Superseded by:**



## Distributed Client/Server In Action





## In this session

- *Examine two case studies of large-scale distributed client/server systems*
- *Outline the specific challenges for each*
- *See what lessons can be learned from them*



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## The Top Business Objective

- **1- Increased Customer Satisfaction  
*and Increased Profit***
- **2 - *Reduced Cost***
- **3 - *Improved Product/Service Quality***
- **4 - *Improved Efficiency***

Source: Paradigm Services



## The Top Business Survival Issue

- *“Customer service is going to be the survival issue for the 1990s”*
  - Rob Baldock, Andersen Consulting



## The Top Business Investment Issue

### *Investment areas for 1994*

- **1 - Customer service**
- **2 - Order processing**
- **3 - Delivery/logistics**
- **4 - Sales**
- **5 - Manufacturing/operations**

Source: Computer Sciences



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## The Top Information Services Issue

### *Customer service access to information*

- *1 in 3: access isn't fast enough*
- *1 in 2: cannot access customer account information*
- *1 in 8: cannot access any information from another department*
- *... and a quarter of customer data still isn't computerised anyway!*

Source: Syntegra





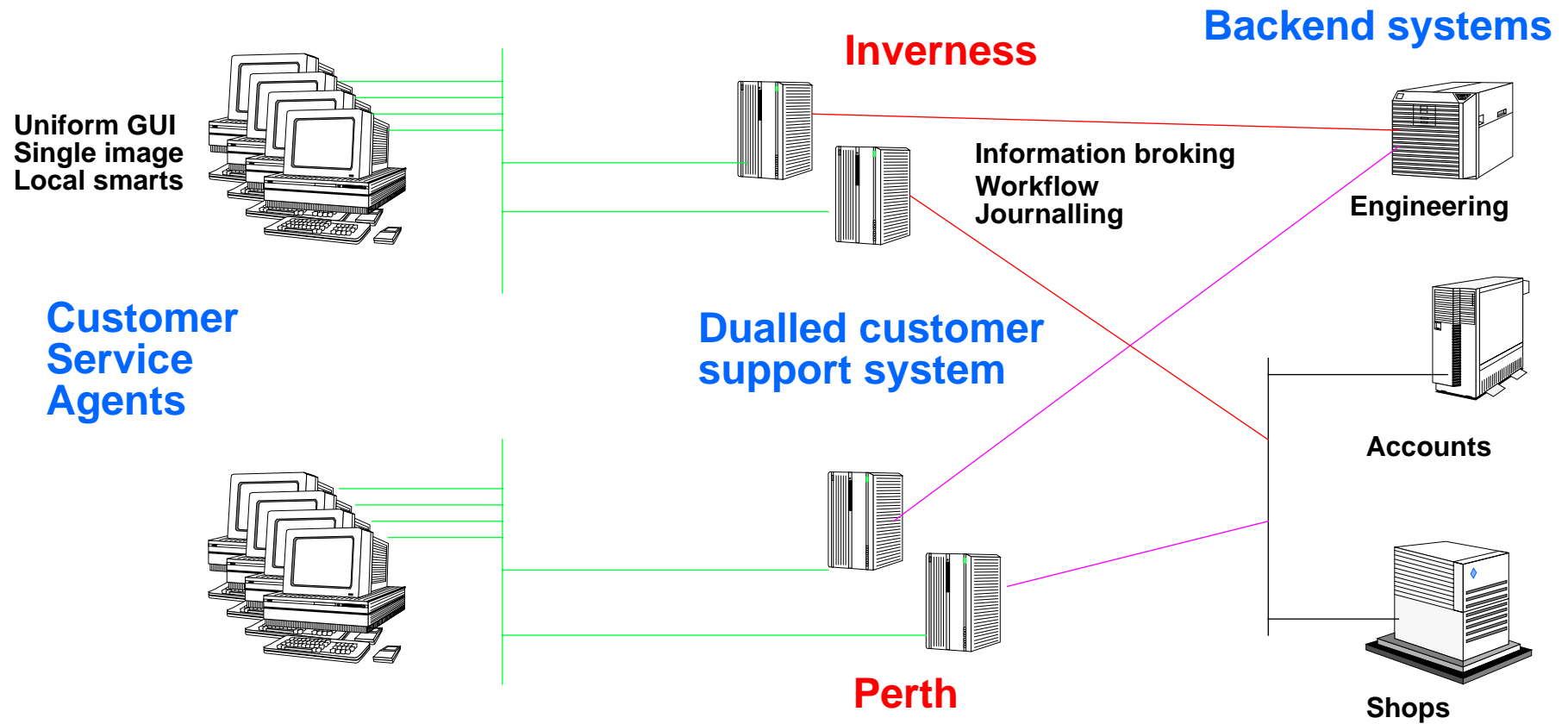
## What's the cause?

- ***Systems designed to support functions rather than activities***
  - they focus on customer operations rather than services
- ***Systems not designed to interwork with other systems***
  - they use ad-hoc techniques rather than systematic ones
- ***Systems not built to be flexible***
  - they are costly, time-consuming, and risky to change

***... Legacy systems***



# Hydro-Electric Company





## OASIS - The Partners

- *Scottish Hydro-Electric Customer Information Systems*
- *ICL*
- *University of Nottingham*
- *Gid Ltd.*



## Objectives

- ***Provide a common front-end to customer-based systems***
  - giving an integrated view of customer information across existing application systems and databases...
  - ...identify the customer once
- ***Allow merging of data from within a system***
- ***Allow merging of data from multiple systems***



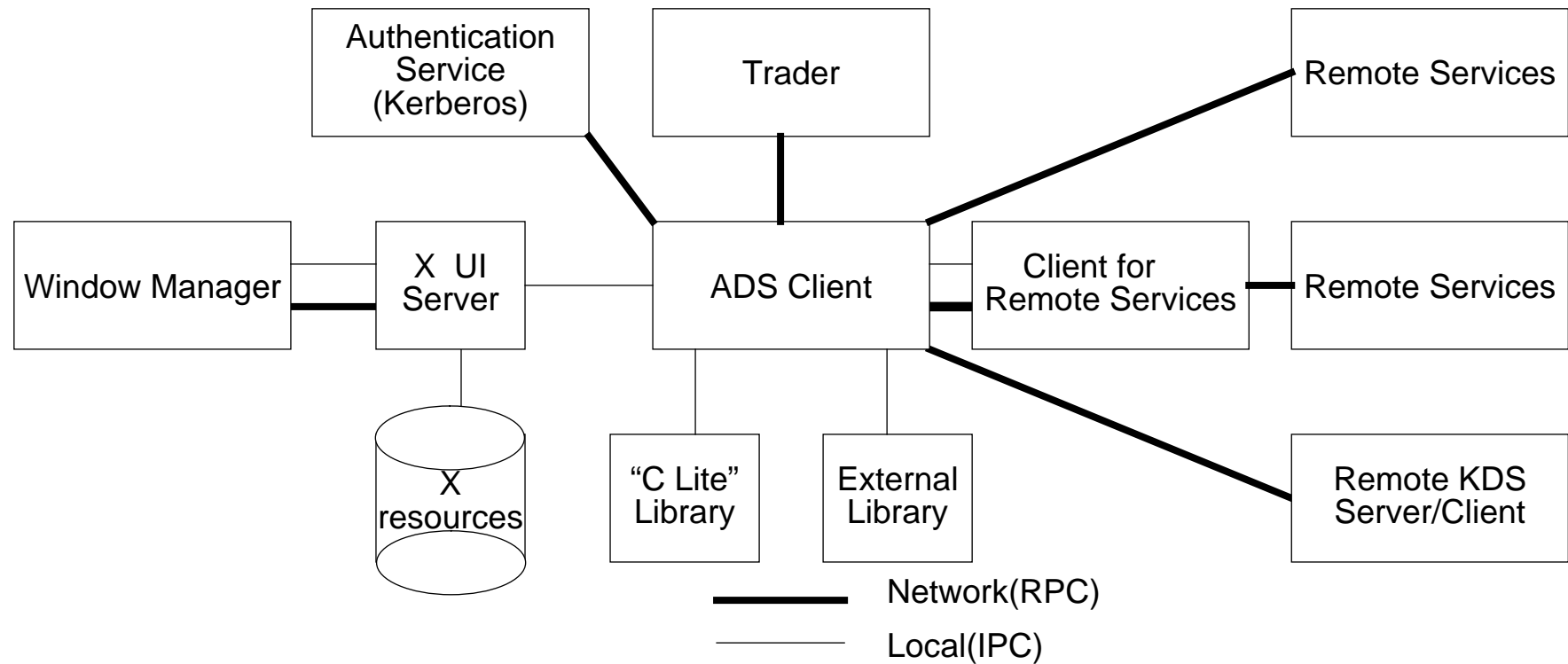
## Challenges and Successes

- *Reduce time to identify customer*
- *Reduce time to train new users*
- *Cope with change*

**...delivered on time, to specification, within budget**



# NASA Astrophysics Data System (ADS)





## Objectives

- ***Provide the science investigator***
  - **efficient and broad access to NASA's current and future data holdings**
  - **tools for ease of data interpretability**
  
- ***Provide NASA***
  - **a common information infrastructure for science analysis**
  - **increased scientific return from missions, reducing the duplication of effort**



## Challenges and Successes

- *Turn the ultimate legacy system into the world's largest open distributed system*
  - 7 large mainframes (IBM 3081, CDC Cyber 180, DEC VAX 8600, Britton-Lee IDM,...)
  - 15 heterogeneous databases
  - terabytes of existing data (text, data, images,...)
- *Support a variety of client machines, including low-cost PC*
- *Deploy a solution rapidly*





## Information retrieval in the NASA ADS

- *Database front-ended by the Knowledge Dictionary System (KDS)*
  - Factor spaces (initially 30 fields, 600 terms) for retrieval
  - SQL for remote data access
- *Trader supports location transparency for databases*

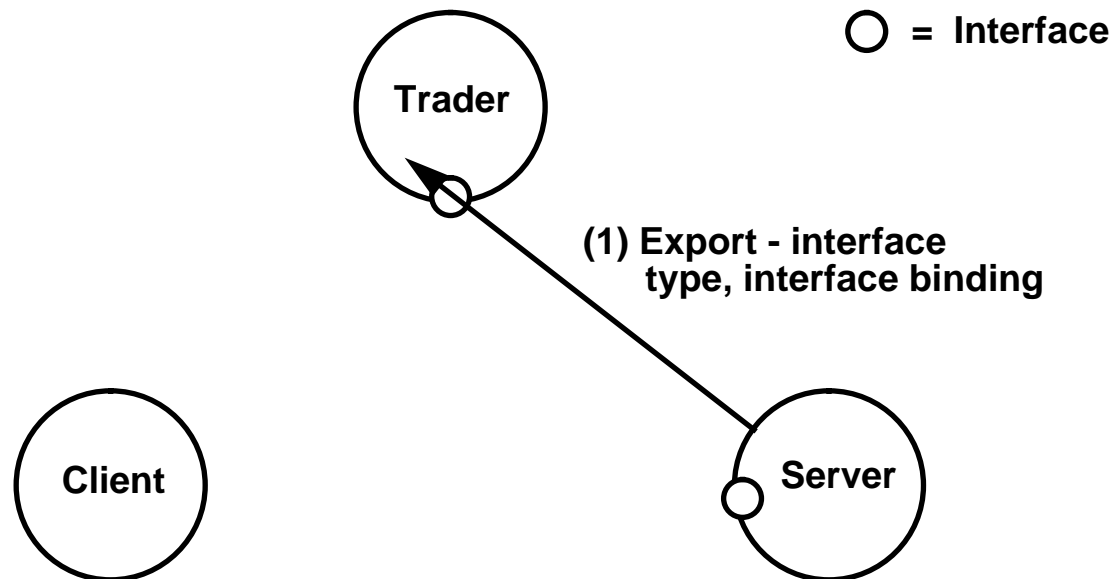


## Trading - Basic needs

- *Server must state what it provides*
  - it must export a service offer
- *Client must state what it requires*
  - it must import a service offer
- *Trading must find a service offer that matches the request*

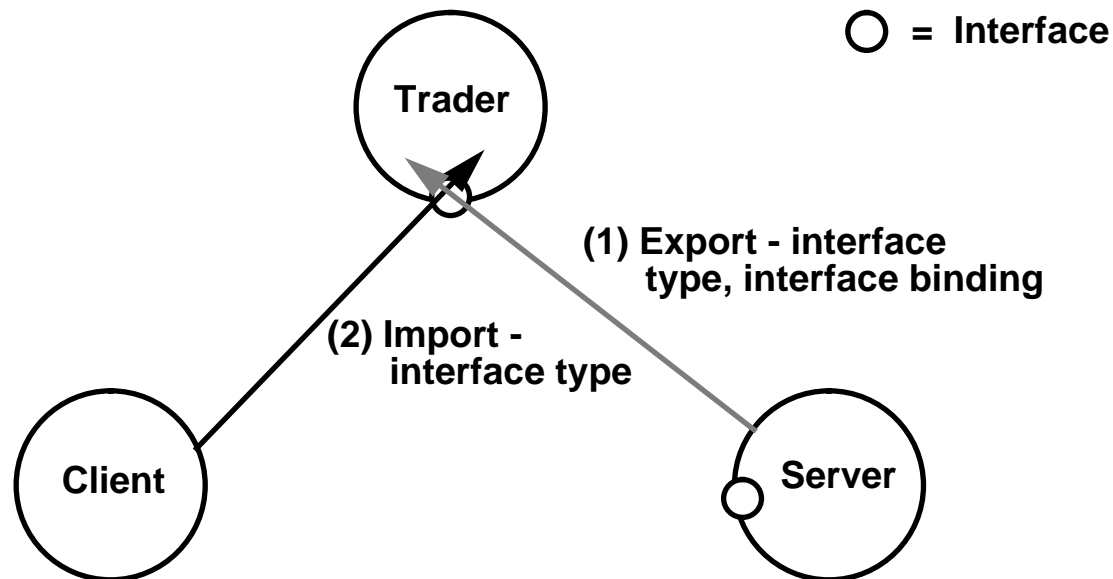
## Steps in Trading - (1)

- *(1) Server exports a service offer to the Trader*



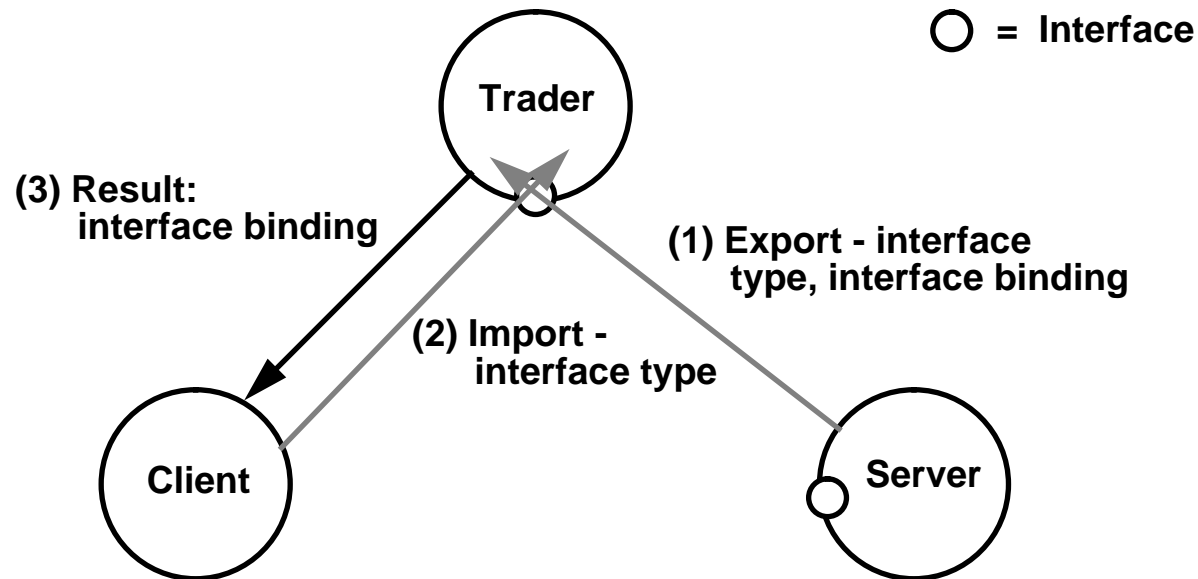
## Steps in Trading - (2)

- *(2) Client requests a service offer from the Trader*



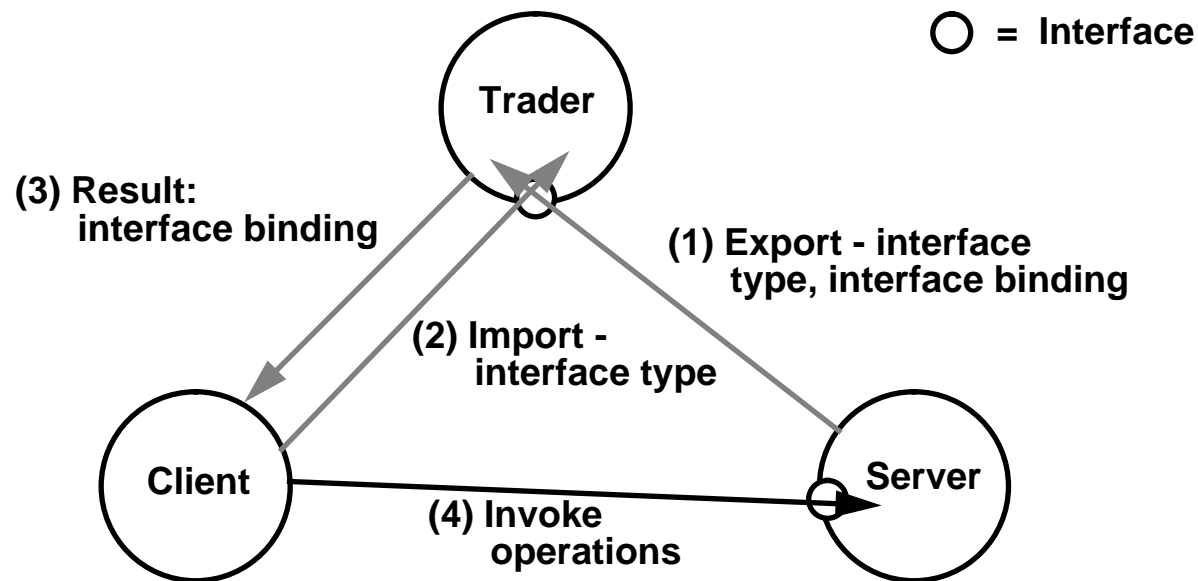
## Steps in Trading - (3)

- **(3) Trader returns a matching service offer to the client**
  - **it returns the interface binding given by the server**



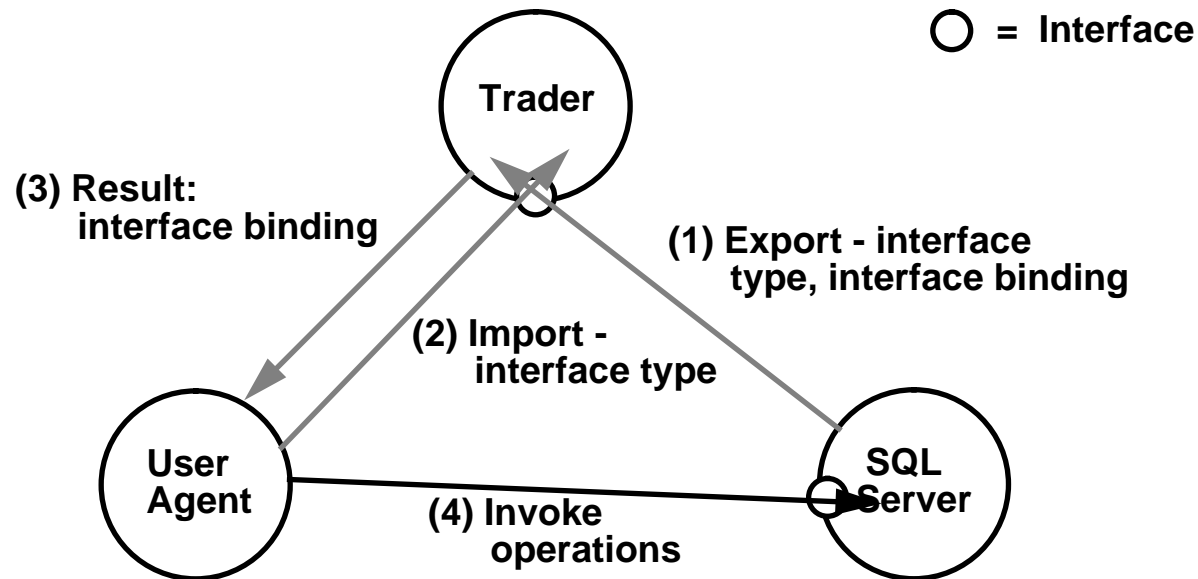
## Steps in Trading - (4)

- (4) *Client uses interface binding to invoke the server's operations*
  - Trader takes no further part in the interaction
  - an interface binding from the Trader is invoked just like any other



## Trading in the NASA ADS

- **In the NASA ADS**
  - the client is the ADS User Agent (KDS)
  - the server is the SQL server





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## Benefits of a Trader service

- *The main benefit is location transparency*
  - clients need not know the location of server objects
  - new server objects and new clients can be introduced independently
  - server objects may later move
- *... but the Trader is an ordinary service, and doesn't require special support*





## Summary

- ***Providing a common front-end to distributed information offers major benefits***
  - particularly for customer-facing applications...
  - ... examples abound in insurance, health-care,...
- ***Careful user interface design is vital***
  - for intelligent search and correlation of information
- ***Design and development for large-scale heterogeneous distributed systems is difficult***
- ***A proven distributed systems infrastructure limits the risks***