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## **Training**

# **ANSAwise - Distributed Client/Server in Action [Eurocontrol]**

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### **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.

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Briefing Note

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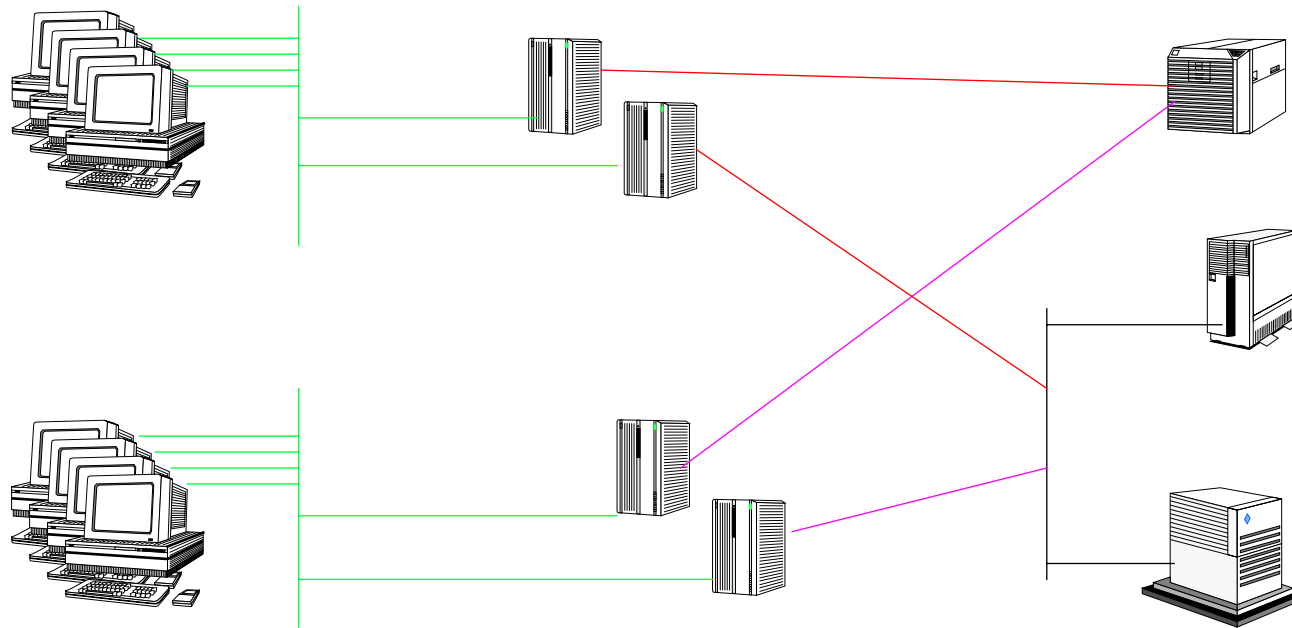
**Distribution:**

**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**Superseded by:**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/marketing***
- ***5 - Manufacturing/operations***

Source: Computer Sciences



## 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





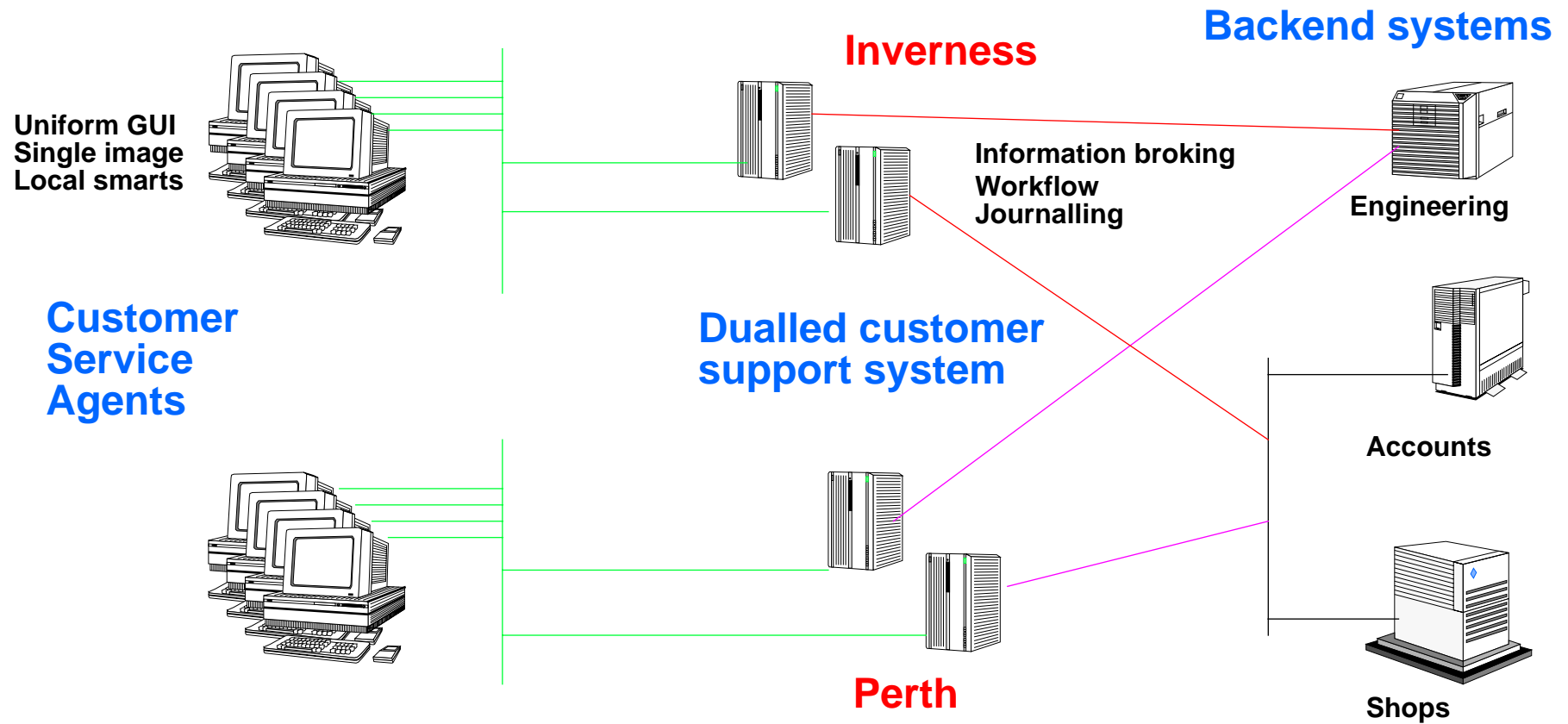
## What's the cause?

- ***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***



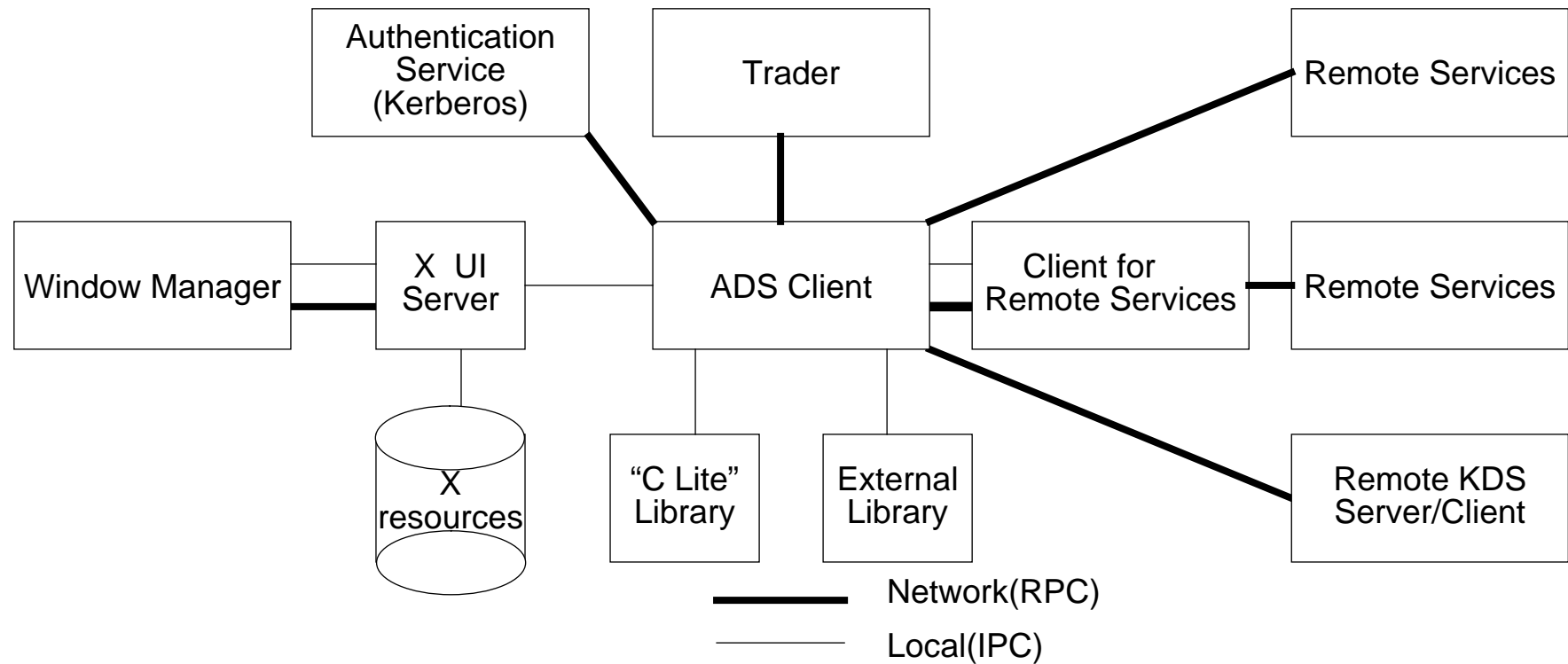
## Challenges and Successes

- *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*

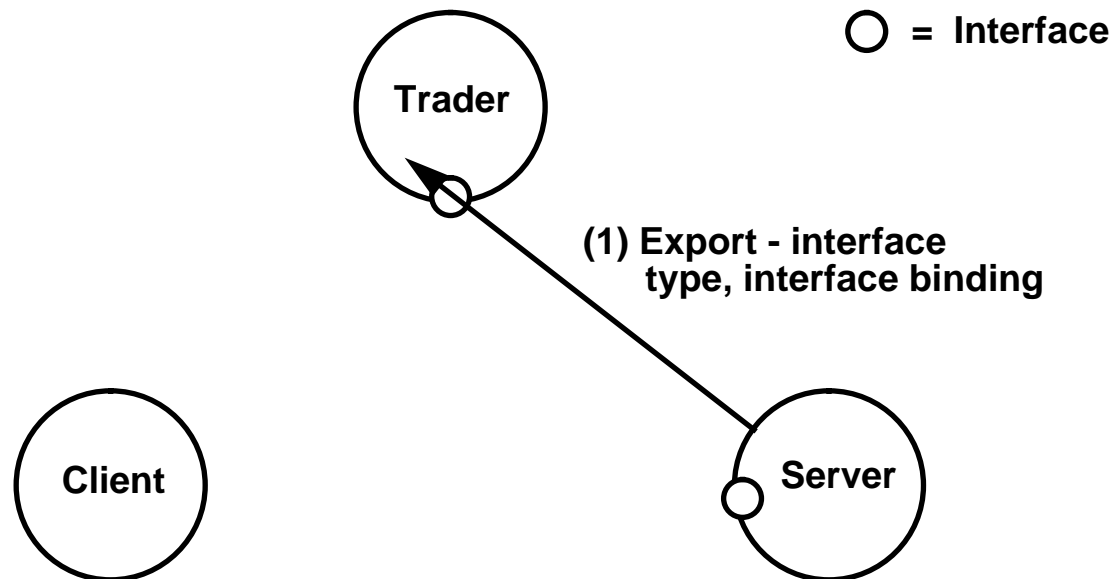


## Trading - Basic needs

- *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*

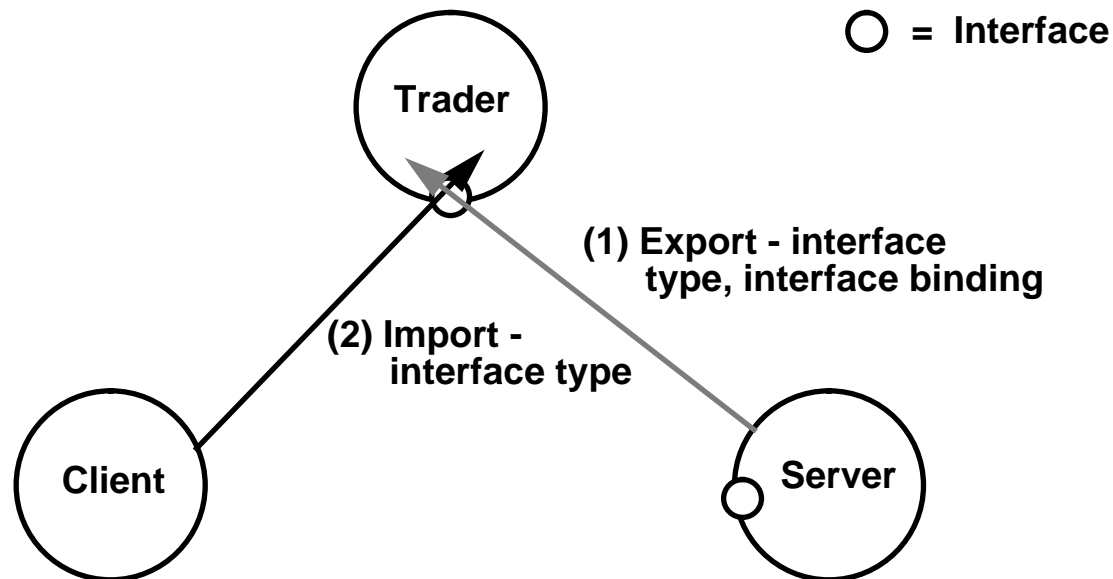
## Steps in Trading - (1)

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



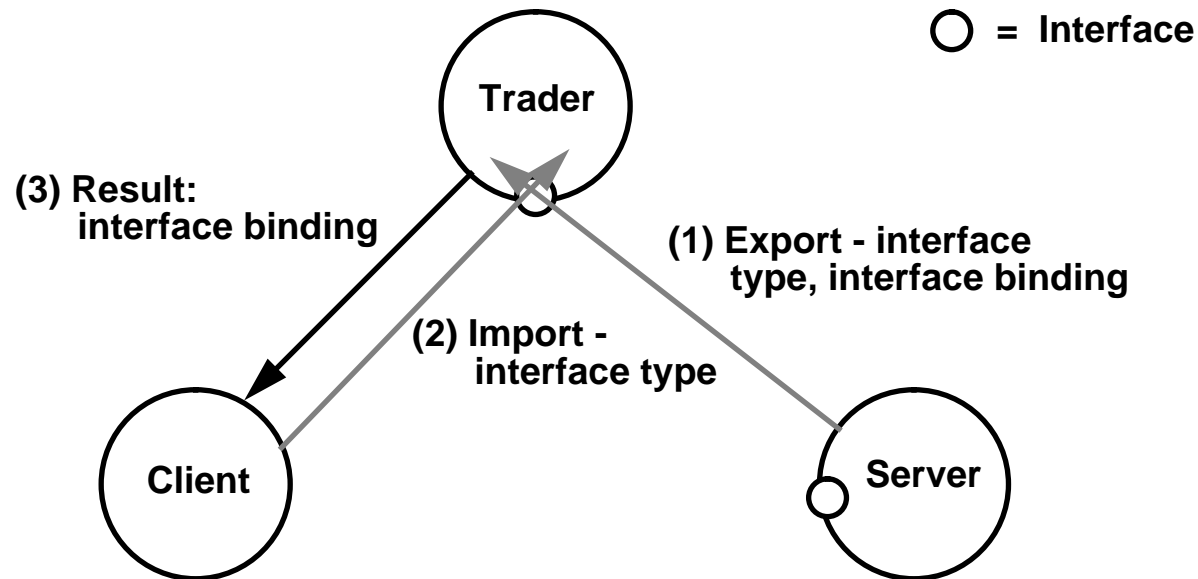
## Steps in Trading - (2)

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



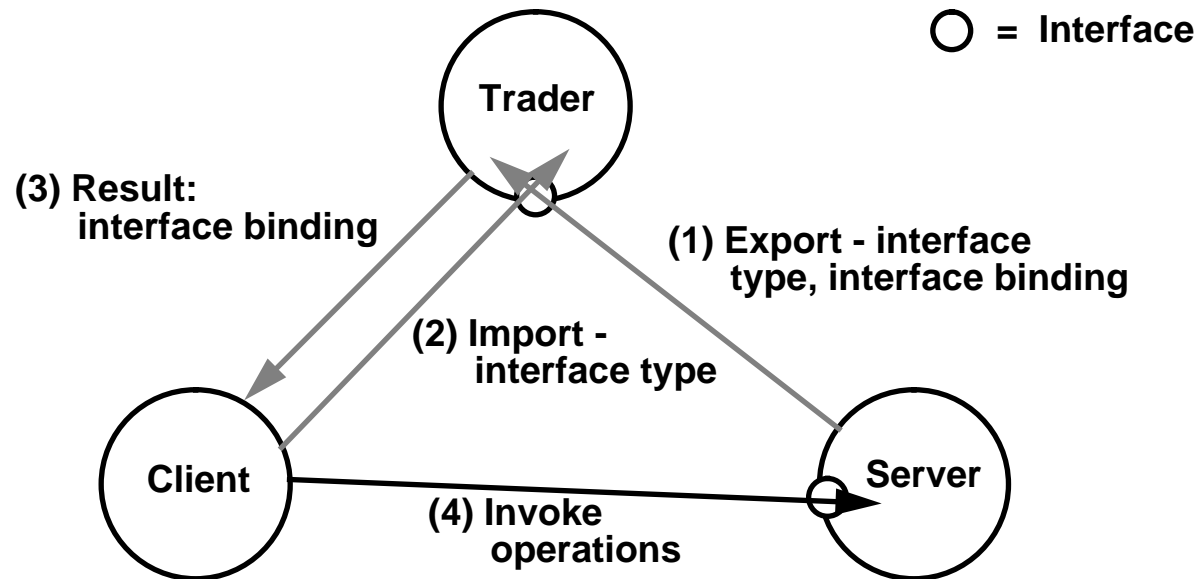
## Steps in Trading - (3)

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



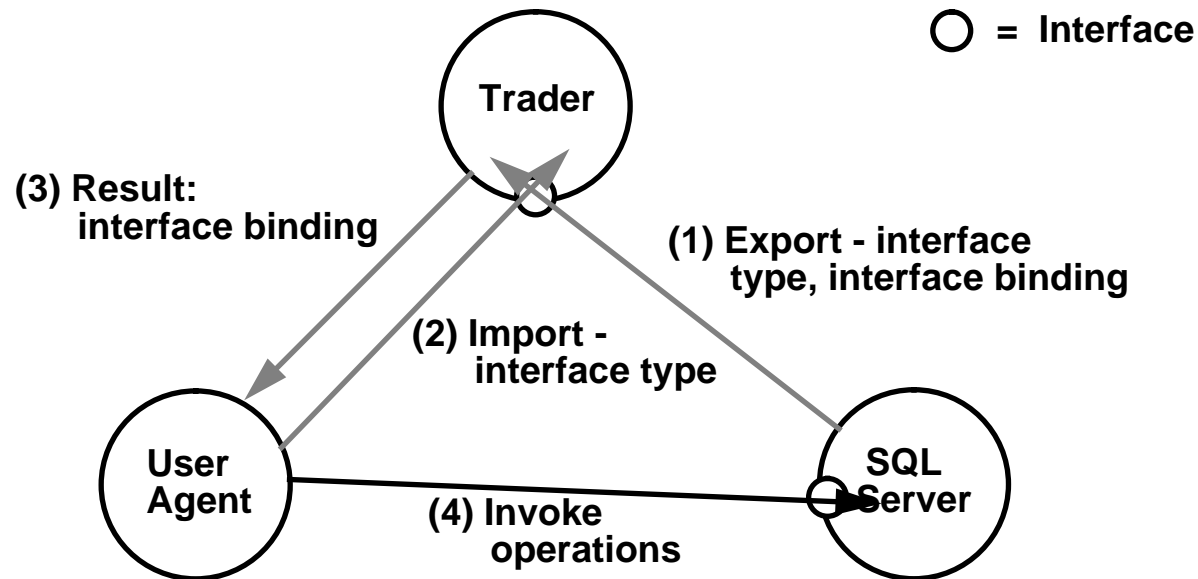
## Steps in Trading - (4)

- **(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





## 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
- *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***