



**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**

Training

ANSAwise - Elements of Client/Server Computing

Chris Mayers

Abstract

Organizations may be aware that client/server computing can meet business needs, but be unsure which technology would be meet their needs.

There are many possible techniques and products being sold under the banner of "client/server". Each has different strengths and weaknesses.

This module of the ANSAwise training programme starts with an general definition of client/server, then explores each technique in turn. The presentation is historical, starting with client/server, and ending with intelligent software agents.

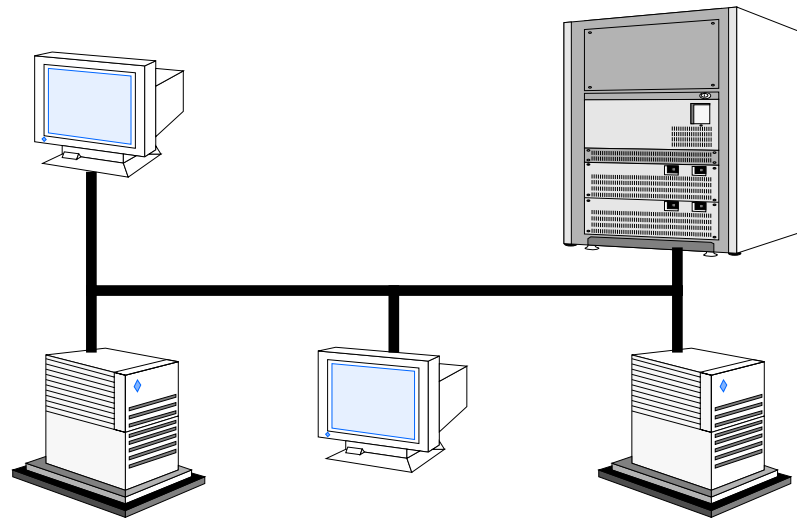
APM.1477.01

Approved
Briefing Note

4th May 1995

Distribution:
Supersedes:
Superseded by:

Elements of Client/Server Computing





In this session

- *Examine the ideas behind client/server computing*
- *Examine the different types of client/server products*
- *Review the issues that affect large-scale client/server systems*



What is client/server computing?

- *'The splitting of an application into tasks that are performed on separate computers, one of which is a programmable workstation'*
- *'User control of applications, IT control of infrastructure'*
- *'The marriage of the usability of PCs to the infrastructure of the mainframe'*
- *'Distributed data + distributed processing + graphical user interface'*

...?



Techniques for client/server computing

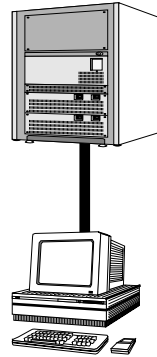
- *Terminal emulation*
- *Data download*
- *Remote data access*
- *Intelligent agents*

Terminal emulation



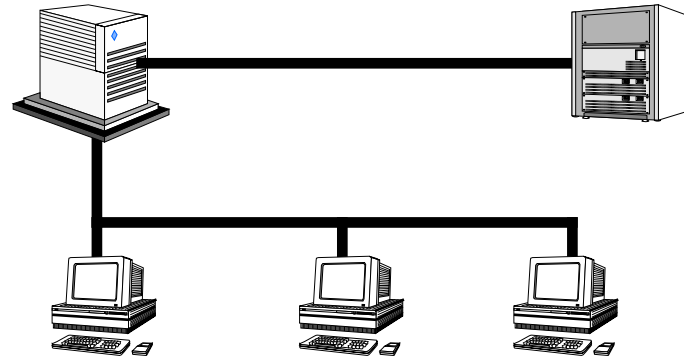
- *In the 1970s, each computer was designed to use a particular type of terminal*
- *To use each host system, you had to use a different type of terminal*
- *So, manufacturers offered terminals that could also emulate other types of terminals*

Terminal emulation and the PC



- *In the 1980s, the terminal emulation could be done by special PC software*
- *The PC was directly connected to the host computer, just like the original terminal*

Terminal emulation and the PC network



- *With the rise of the PC local area network (LAN), not every PC needed a host connection*
 - connection was indirect, via the LAN
- *This was done with a communications gateway*
 - funnelling traffic to the host computer



Beyond terminal emulation

- *Terminal emulation is effective, but does not exploit the capabilities of the PC*
- *The user interface looks just as it would on a real terminal*
 - very different from the PC's own user interface
- *We can fit a PC-style 'look and feel' to the terminal emulation*
 - this is called "screen-scraping"



“Screen Scraping”

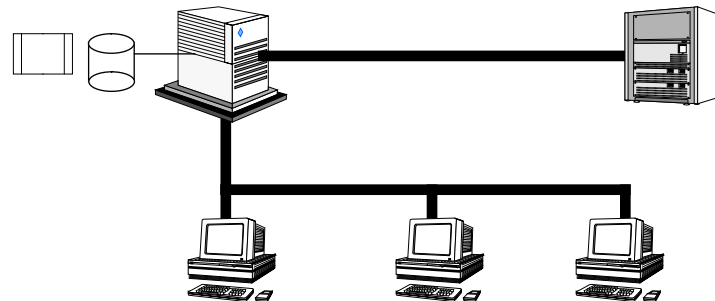
- *Provides a ‘face-lift’ for terminal emulation*
- *Usually provides*
 - short-cut keys for quick access
 - access to several host computers or applications at the same time
- *May provide*
 - integration into desktop productivity applications (spreadsheets,...)
 - continuous monitoring and display of information
 - a single point of login



Screen Scraping - advantages and disadvantages

- **Advantages**
 - low risk
 - host computer continues to maintain data integrity
 - a technique that is always available
- **Disadvantages**
 - “Brittle” - there can be a high maintenance overhead
 - it’s the same original application underneath
 - need to support and train users on old and new user interfaces
 - there are no open standards for screen scraping

Data Download



- *Fetch the data from the host computer (possibly via a communications gateway)*
 - download data to individual machines, or a local LAN file server
 - download data from more than one source
- *Analyse the data with local applications*



Data Download - building the local applications

- *Use whichever software development tools you prefer*
 - a standard application package
 - a standard database package
 - a 4GL
 - a graphical development tool



Data Download - advantages and disadvantages

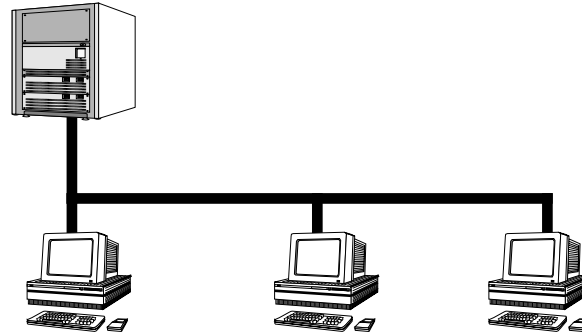
- ***Advantages***

- little change needed to host system
- each data is internally consistent
- flexible information processing

- ***Disadvantages***

- cannot easily be used to update information
- does not cope well with large volumes of data
- relies on understanding the format of the source data

Remote Data Access



- *Applications send and receive data directly from the host system*
 - program-to-program communication, not terminal emulation
- *Information processing is cooperative between the client and the server*
 - the host system is the server



Remote Data Access - advantages and disadvantages

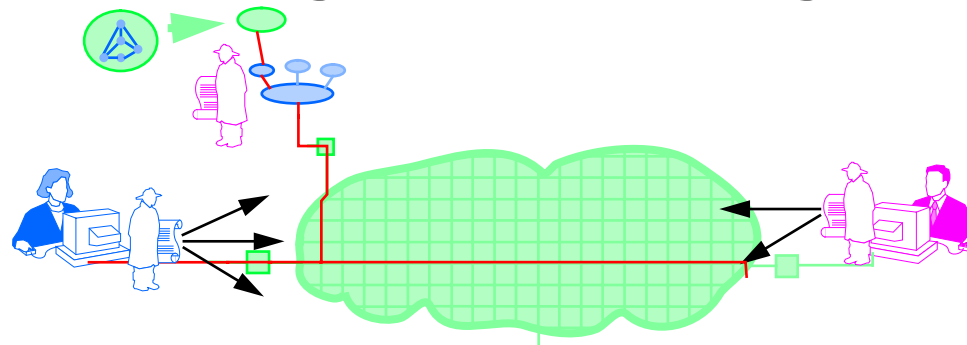
- ***Advantages***

- most flexibility in developing new applications
- it may be possible to use standard software development tools

- ***Disadvantages***

- local applications become responsible for data consistency
- impractical if the host system does not provide suitable interfaces
- it may place an unacceptable load on the host system

Intelligent Software Agents



- *Intelligent agents will move around networks*
 - gathering and processing information, before returning to the user
- *It will be some years before agent technology is mainstream*
- *It will be used together with other client/server techniques*



General Issues for Client/Server Systems

- **Scalability**
 - can the system expand as needed?
 - can the system be deployed in small and large configurations?
- **Interoperability**
 - can the system interwork with other systems?
- **Dependability**
 - can the system be made reliable?
 - can the system be made secure?
- **Internationalization**
 - can the system be deployed anywhere in the world?



What People Say About Client/Server: Facts or Fallacies?

- *“By the year 2000 there will be no mainframes”*
- *“70% of all commercial applications at the enterprise level will be Unix by 1996”*
- *“UK leads the world in client-server deployment”*
- *“Only 1 in 4 department client/server applications built today ever gets completed”*
- *“Client/server is more expensive than mainframes”*



The Cost of Client/Server

- *How much does a client/server terminal cost per year?*



Client/Server Cost per User

- *From a rolling survey of 30 large US organizations*

Support	£1700	53.2%
Hardware	£870	27.7%
Software	£330	10.6%
LAN	£270	8.5%

Source: Real Decisions



Choice without Order?

- *Diverse types of solution elements*
 - networks
 - platforms
 - operating systems

- *Diverse types of requirements*
 - for services
 - for applications

- *... but who is responsible for the end-to-end solution?*



Constructing the end-to-end solution

- *We have solution elements...*
 - ...networks, platforms, operating systems,...

- *We have approaches...*
 - ...open systems, client/server, object-orientation,...

- *...we need a framework for choice*



Open architectural framework for solutions

- *We need an open architectural framework that*
 - guides the choices in solution elements and approaches
 - protects the investment in networking and legacy systems
 - allows integration of products from many vendors
 - minimises risk
 - supports large-scale client/server systems



Large-scale client/server

- *Typically, large-scale client/server systems are distributed systems, rather than centralized ones*
 - distributed systems being those which consist of interconnected cooperating components...
 - ...there being no central machine (or group of machines)



Interoperability in distributed systems

- *Interoperability is difficult to achieve in distributed systems because of diversity*
 - communication protocols, data representations, hardware platforms,...
- *“Middleware” is a software infrastructure that facilitates interoperability*
- *So, the open architectural framework must embrace distributed systems using open middleware technology*



Summary

- *There is a wide range of techniques in client/server computing*
 - *to support large-scale and small-scale systems*
- *Different techniques are useful in different circumstances*
- *For large-scale client/server systems, an architectural framework is needed*
- *Client/server will not replace the mainframe for all purposes*