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Training

ANSAwise - Characteristics of Open Distributed Systems

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Abstract

Open distributed systems offer business flexibility, but the characteristics of these systems and their implications are often misunderstood.

This module of the ANSAwise training programme explores some of the characteristics of open distributed systems (openness, scalability, diversity/heterogeneity, concurrency) through paper exercises and group discussion.

The solution being offered is the application of the ANSA architectural principles.

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Briefing Note

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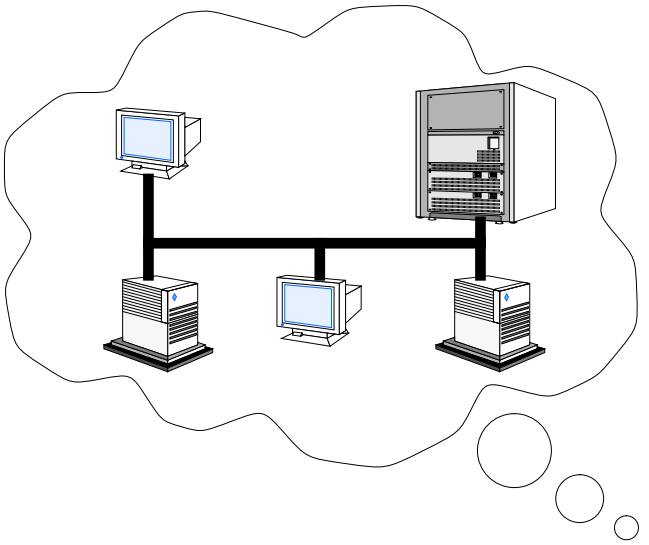
Characteristics of Open Distributed Systems



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In this session

- *Explore some characteristics of open distributed systems...*
- *... through some brief discussions*
- *Review the implications*

There are no right answers!

The aim of this session is understand the issues

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1 - “Openness”

- ***Which of these would you class an “open system”?***

	Yes	No	Don’t know
IBM PC			
Apple Macintosh			
Unix			
Microsoft Windows			
The worldwide telephone network			
Novell NetWare			
A 4GL that you know			

- ***Which system most closely fits your idea of an open system (it may not be listed above)?***

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Thinking about openness

- *Looking at your answers, try to write down what you think defines "openness". (A list of keywords is fine)*

- *Try out your definition with some other systems you have heard of*

	Yes	No	Don't know

Get ready to discuss this

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Your notes

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2 - Scalability

- ***Think of an application that you have used regularly***
  - **a desktop application (word-processor, game, spreadsheet,...)**
  - **or, a business application (accounting system, order processing)**
- ***Think of the machine that this application uses***
- ***Suppose that you are upgrading to a new version of this application***
  - **a version that adds many new and sophisticated features**
  - **features that you must have**
- ***You believe that you'll need to expand your machine to cope with these new features***

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Expanding your machine

- ***Which parts of the machine do you expect to have to expand (think of as many as you can)?***

	Yes	No	Don't know
Memory			
Processor			
Number of attached terminals			

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Economy of expansion

- ***For each part, is the expansion possible? If it is possible, does it make economic sense to do so?***

Component	Impossible	Possible, but not economical	Economical
Memory			
Processor			
Number of terminals			

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Expanding other machines

- ***Suppose you were upgrading the same application, but on a different type or model of machine***
  - **for example, a Unix workstation rather than a PC**

Component	Impossible	Possible, but not economical	Economical
Memory			
Processor			
Number of terminals			

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Expanding another machine

- ***Would your answers be the same (impossible, not economical, economical)***
  - **if not, why not?**
- ***Make a list of the differences, and the reasons for them***

Component	Answer A	Answer B	Reason for difference

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3 - Diversity

- *You have been asked to make a keynote speech at a big conference*
- *Your speech will of course be printed in the conference proceedings, and you are sending the document to the organizer in electronic form*
- *In which document format (e.g. WordMaster) do you send it, and why?*
- *And in which media format (e.g. punched card) do you send it, and why?*

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Diversity - other questions

- ***What problems do you anticipate with this process?***

- ***How do you expect new technology to solve these problems (if at all)?***

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4 - Concurrency

- *You are working in the technical support department of a multinational product company*
- *The product is large and complex, and help is provided 24 hours a day. In fact there are two help desks; one in the US and one in the UK (8 hours apart). Customers pay for and expect rapid response*
- *The two help desks are supported by a database containing customer reports and background technical information. There are several hundred updates per day originating at both US and UK sites*
- *You are responsible for the deployment of this database. Controlling running costs is important*

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Concurrency - questions

- *Do you propose having only one database, or one at each site? What factors would influence you (e.g. a new Far East office?)*

- *How would communications operate between the two sites?*

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Your notes

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Characteristics we've discussed

- *We've covered some implications of*
  - Openness
  - Scalability
  - Diversity
  - Concurrency
- *There are many others to consider*
  - ANSA has carried out a systematic analysis, and produced a set of principles to guide architectural design

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Two of the ANSA principles and their implications

- ***Distributed systems are fundamentally different from centralized systems***
  - **diversity and concurrency (for example) must be assumed**
  - **we say that you should *reverse the assumptions* that are held by centralized systems**
- ***Different applications need different solutions***
  - **a spectrum of scalability and consistency (for example) supports this**

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Summary

- ***The characteristics of open systems are perceived differently by different people***
- ***Technology alone will not help exploit the positive characteristics and contain the negative characteristics***
- ***For more on the characteristics of open and distributed systems***
  - **on the architectural principles that these characteristics lead to, see *An Overview of ANSA* (AR.000)**
  - **on the business implications, see *The Characteristics of Open Systems* (UK DTI report)**

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