Distributed System
TP2
Chapter 1: Characterization of Distributed Systems

1. Give four types of hardware resource and five types of data or software resource that can usefully be shared. Give examples of their sharing as it occurs in practice in distributed systems.

2. How might the clocks in two computers that are linked by a local network be synchronized without reference to an external time source? What factors limit the accuracy of the procedure you have described? How could the clocks in a large number of computers connected by the Internet be synchronized? Discuss the accuracy of that procedure.

3. When you arrive at a restaurant, carrying a PDA that is capable of wireless networking. Suggest how you could be provided with information about the local services and amenities at the restaurant, without entering the restaurant's name or attributes. What technical challenges must be overcome?

4. Compare and contrast cloud computing with more traditional client-server computing? What is novel about cloud computing as a concept?

5. Use the World Wide Web as an example to illustrate the concept of resource sharing, client and server. What are the advantages and disadvantages of HTML, URLs and HTTP as core technologies for information browsing? Are any of these technologies suitable as a basis for client-server computing in general?

6. An open distributed system allows new resource sharing services such as the BLOB object to be added and accessed by a variety of client programs. What extent the needs of openness differ from those of heterogeneity.

7. Suppose that the operations of the BLOB object are separated into two categories – public operations that are available to all users and protected operations that are available only to certain named users. State all of the problems involved in ensuring that only the named users can use a protected operation. Supposing that access to a protected operation provides information that should not be revealed to all users, what further problems arise?

8. List the three main software components that may fail when a client process invokes a method in a server object, giving an example of a failure in each case. Suggest how the components can be made to tolerate one another's failures.

9. A service is implemented by several servers. Explain why resources might be transferred between them. Would it be satisfactory for clients to multicast all requests to the group of servers as a way of achieving mobility transparency for clients?

10. Resources in the World Wide Web and other services are named by URLs. What do the initials URL denote? Give examples of three different sorts of web resources that can be named by URLs.

11. Give an example of an HTTP URL. List the main components of an HTTP URL, stating how their boundaries are denoted and illustrating each one from your example. To what extent is an HTTP URL location-transparent?