Question 1 [Points 4] Why is live migration possible in virtual environments but much less possible for a native operating system?

Live migration is doable in virtual environments because of the well-defined interfaces between guests and VMMs and the limited state that the VMM maintains for the guest.

Question 2 [Points 2] Describe four benefits of virtualization.

There are many benefits.

Question 3 [Points 6] A distributed system has two sites, A and B. Consider whether site A can distinguish among the following:

a. B goes down.

b. The link between A and B goes down.

c. B is extremely overloaded, and its response time is 100 times longer than normal.

What implications does your answer have for recovery in distributed systems?

Site A cannot distinguish between the three cases until communication has resumed with site B. The action which it performs while B is inaccessible must be correct irrespective of which of these situations has actually Practice Exercises 3 occurred, and must be such that B can re-integrate consistently into the distributed system once communication is restored.

Question 4 [Points 4] Discuss whether OpenAFS and NFS provide the following: (a) location transparency and (b) location independence.

NFS provides location transparence since one cannot determine the server hosting the file from its name. (One could however view the mount-tables to determine the file server from which the corresponding file system is mounted, but the file server is not hardcoded 115 116 Chapter 17 Distributed File Systems in the name of the file.) NFS does not provide location independence since files cannot be moved automatically between different file systems. AFS provides location transparence and location independence.

Question 5 [Points 4] under what circumstances would a client prefer a location transparent DFS? Under what circumstances would she prefer a location-independent DFS? Discuss the reasons for these preferences.

Location-transparent DFS is good enough in systems in which files are not replicated. Location-independent DFS is necessary when any replication is done.