USN ☐☐☐☐☐☐☐☐☐☐ 10CS/IS765

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016
Storage Area Networks

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1   a.   A hospital uses an application that stores patient X-ray data in the form of large binary objects in an oracle database. The application is hosted on a UNIX server, and the hospital staff accesses the X-ray records through a GB Ethernet backbone. An EMC CLARiion storage array provides storage to the UNIX server, which has 6 TB of usable capacity. Explain the core elements of the data center, and key requirements for data center elements. What are the typical challenges the storage management team may face in meeting the service-level demands of the hospital staff? **(12 Marks)**

   b.   Consider a disk I/O system in which an I/O request arrives at the rate of 80 IOPS. The disk service time is 6ms.
   i)   Compute the following: utilization of I/O controller, total response time, average queue size and total time spent by a request in a queue.
   ii) Compute the preceding parameter if the service time is halved. **(08 Marks)**

2   a.   An application has 1000 heavy users at a peak of 2 IOPS each and 2000 typical users at a peak of 1 IOPS each, with a read/write ratio of 2:1. It is estimated that the application also experiences an overhead of 20% for other workloads. Calculate the IOPS required for RAID 1, RAID 3, RAID 5 and RAID 6. Also compute the number of drives required to support the application in different RAID environments if 10K rpm drives with a rating of 130 IOPS per drive were used. **(10 Marks)**

   b.   Categories and explain intelligent storage systems with diagram. **(10 Marks)**

3   a.   If three hard disk drives are connected in a daisy chain and communicate over SCSI, explain SCSI-3 standard architecture and SCSI communication model. **(10 Marks)**

   b.   What is zoning? Discuss a scenario, where soft zoning is preferred and where hard zoning is preferred. **(05 Marks)**

   c.   Differentiate between full and partial mesh topology. **(05 Marks)**

4   a.   What are the factors affecting NAS performance? **(04 Marks)**

   b.   Draw and explain the components, the topologies and the protocol stack of iSCSI. **(16 Marks)**

PART – B

5   a.   Explain the data object storage process and process of data retrieval from CAS system with diagram. **(10 Marks)**

   b.   Illustrate a NAS environment before and after the implementation of file level virtualization. **(10 Marks)**

6   a.   Draw and explain BC planning life cycle. **(12 Marks)**

   b.   What are different back-up topologies? Explain. **(08 Marks)**

7 a. A host generates 8000 I/Os at peak utilization with an average I/O size of 32 KB. The response time is currently measured at an average of 12 ms during peak utilizations. When synchronous replication is implemented with a fibre channel link to a remote site, what is the response time experienced by the host if the network latency is 6 ms per I/O? **(04 Marks)**

 b. What is the importance of recoverability and consistency in local replication? **(04 Marks)**

 c. Discuss the effects of a bunker failure in a three-site replication for the following implementations:
  i) Multihop synchronous and disk buffered
  ii) Multihop synchronous and asynchronous
  iii) Multitarget **(12 Marks)**

8 a. What are monitoring parameters and components monitored for storage infrastructure? Explain in details. **(10 Marks)**

 b. Explain storage infrastructure management activities in detail. **(10 Marks)**

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