CS 524 Homework #6

Due: April 25, 2016

This homework is rather straightforward, as was the previous one. It is essentially a reading assignment, and thus only a week is given for its completion. Note: this assignment should take about five hours (the other five hours to be dedicated to the completion of the Lab Assignment #4).

Make sure that you allocate sufficient time to complete this homework!

Reading assignment: Chapter 7 and Appendix (except for the Identity Management part)

1. **(10 points)** Explain the motivation for developing COPs
2. **(5 points)** What feature is intrinsically new to COPs (compared to SNMP)
3. **(5 points)** Explain why NAS and SAN but not DAS are readily applicable to Cloud Computing. What are the limitations of DAS? Why is DAS suitable for keeping local data (such as boot image or swap space)?
4. **(5 points)** Why is there a need for the *Phy* layer in the SAS architecture? How is it different from the physical layer?
5. **(10 points)** List the generic file-related system calls. Why in the NFS there is no RPC invocation for the *close <file>* system call? Under which circumstances other file operations may not result in an RPC invocation?
6. (**10 points)** What types of *connection topologies* are supported in *FC-2M?* Which of them is the most flexible? Why?
7. **(5 points)** How does the FCF respond to a discovery solicitation from the ENode?
8. **(5 points)** Please answer the following four questions:
   a) What features of TCP are leveraged in *iSCSI*?
   b) Explain why these features are essential to *SCSI* operations.
   c) Why is not SCTP used in *iSCSI*?
   d) Why does *iSCSI* has to be deployed over an *IPsec* tunnel when its path traverses an untrusted network?
9. **(10 points)** What is *connection allegiance?* Explain how *iSCSI* sessions are managed.

10. **(10 points)** Why the *credential* (as defined in ANSI INCITS 458-2011) itself cannot serve as a *proof* for access control? Give one example of a *proof* derived from the capability key.

11. **(10 points)** Describe the three approaches to the block-level virtualization. Which approach is most suitable to the needs of Cloud Computing? What are the differences between the *in-band* and *out-of-band* mechanisms of the network-based approach along with their advantages and disadvantages.

12. **(5 points)** Explain the difference (in terms of their capabilities) between the *NOR flash*- and *NAND flash* solid state drives.

13. **(5 points)** What are the three limitations that stand in the way of deploying the *NAND flash* solid state drives in the Cloud?

14. **(10 points)** Explain the mechanism of *consistent hashing* used in *Memcached servers.*