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CSC 536

Homework 5

1.

(a)

Because the client still has access to servers X and Y, and because those two servers have access to each other, but not server Z, they will obtain both a read and write quorum of 2. Because this is sufficient, both the read and write will occur.

(b)

Because server Z has no connectivity to either of the other two servers, it will not be able to meet the read or write quora and will be unable to successfully respond to the client’s operations.

(c)

Because the read quorum is two and there are two accessible servers, the read will occur. The data from the server with the most recent version number will be returned to the client.

2.

Akamai needs to make sure that changes to the website configurations which they host are both quickly replicated and consistent amongst the replica set. To do this, they use the quorum protocol when distributing these updates. Each storage point (one of many distributed servers across the network) accepts files from clients and begins to send the changes to neighboring storage points. Part of this message is a vector of bits indicating how many other servers have already seen and forwarded this update. In the case where the bit vector has a majority of elements set, the receiving server knows that at least half of the servers in the network have accepted this update, meeting the quorum requirement. With this satisfied, it updates its own snapshot of the newest configurations. The edge servers query their local storage point for changes to subscribed configurations, pulling in the now-agreed upon changes.

At a high level, this systems allows for changes to be spread across the network quickly using a quorum protocol that ensures overlapping quorum between subsequent updates (N\_w > N/2), providing consistent replication of configuration files to the >15,000 edge servers in Akamai’s network.