

Solution to the Fourth COSC 6360 Quiz for Fall 2013

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First question

- According to the comparison study of journaling and soft updates by Seltzer et al., which two solutions perform the best?
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 -
- What is their *common limitation*?
 -

Answer (I)

- According to the comparison study of journaling and soft updates by Seltzer et al., which two solutions perform the best?
 - **Journaling w/ asynchronous log updates**
 - **Soft updates**

Answer (II)

- What is their *common limitation*?
 - They do not guarantee the **durability** of updates

Second question

- What is the *main problem* with journaling file systems using the *writeback mode*?
- Can you guess the *main advantage* of that mode?

Answer (I)

- What is the *main problem* with journaling file systems using the *writeback mode*?
 - File system can be *corrupted* if the system crashes
 - *After* some metadata are marked as committed
 - *Before* the data they point to are written to disk

Answer (II)

- Can you guess the *main advantage* of that mode?
 - It has lower overhead and faster throughput than safer mode.

Third Question (I)

- Consider a diskless client trying to access a file named **"/usr/joe/paper.tex"** that is stored on its NFS server.
 - Assuming that the client already has a handle for its root directory, how many `lookup()` requests will it issue?

Answer (I)

- The client will issue three lookup requests:
 - One for **/usr**
 - One for **/usr/joe**
 - One for **/usr/joe/paper.tex**

Third question (II)

- What does NFS do to *speed up* these requests?

Answer (II)

- What does NFS do to *speed up* these requests?
 - It lets client cache recently accessed file handles

Fifth question (I)

- Consider a DFS implementing *close-to-open consistency*. Assuming that
 - Alice opens the file at 9:30 AM
modifies it and closes it at 10:20 AM,
 - Bob opens the file at 10:00 AM
modifies it and closes it at 10:40 AM,
 - Carol opens the file at 10:25 AM,
modifies it and closes it at 10:30 AM.

Fifth question (II)

- Which of these three users would see his or her changes actually incorporated in the final version of the file?

Answer

- Which of these three users would see his or her changes actually incorporated in the final version of the file?

– *Only Bob*

Sixth question

- Explain how the Blue file system saves energy by *aggregating writes*.

Answer

- Explain how the Blue file system saves energy by *aggregating writes*.
 - Aggregating writes produce quick bursts of writes separated by idle periods during which disks can be powered down.

Seventh question (I)

- Comparing *callbacks* and *leases*, which one is better suited to environments where:
 - The users' workstations always remain connected to their servers? *Why?*

Answer (I)

- Leases are much better for environments where the users' workstations are always connected to their servers because it protects better file consistency in the presence of current updates.

Seventh question (II)

- Comparing *callbacks* and *leases*, which one is better suited to environments where:
 - The users' workstations will sometimes operate in disconnected mode? *Why?*

Answer (II)

- Callbacks are better than leases in environments where users' workstations will sometimes operate in disconnected mode because it allows disconnected clients to access their cached files while leases would not.

Eighth question

- How does the LBFS file server ensure the *atomicity* of its updates?

Answer

- How does the LBFS file server ensure the *atomicity* of its updates?
 - The LBFS server ensures the *atomicity* of its updates by *writing them first into a temporary file.*