► IBM Spectrum Virtualize does not require a control network or fabric to be installed to manage Global Mirror. For intercluster Global Mirror, the system maintains a control link between the two systems. This control link is used to control the state and to coordinate the updates at either end. The control link is implemented on top of the same FC fabric connection that the system uses for Global Mirror I/O.

► IBM Spectrum Virtualize implements a configuration model that maintains the Global Mirror configuration and state through major events, such as failover, recovery, and resynchronization, to minimize user configuration action through these events.

► IBM Spectrum Virtualize implements flexible resynchronization support, enabling it to resynchronize volume pairs that experienced write I/Os to both disks, and to resynchronize only those regions that changed.

► An optional feature for Global Mirror is a delay simulation to be applied on writes that are sent to auxiliary volumes. It is useful in intracluster scenarios for testing purposes.

Colliding writes

The Global Mirror algorithm requires that only a single write is active on a volume. I/Os that overlap an active IO are sequential, which is called *colliding writes*. If another write is received from a host while the auxiliary write is still active, the new host write is delayed until the auxiliary write is complete. This rule is needed if a series of writes to the auxiliary must be tried again, which is called *reconstruction*. Conceptually, the data for reconstruction comes from the master volume.

If multiple writes are allowed to be applied to the master for a sector, only the most recent write gets the correct data during reconstruction. If reconstruction is interrupted for any reason, the intermediate state of the auxiliary is inconsistent. Applications that deliver such write activity do not achieve the performance that Global Mirror is intended to support. A volume statistic is maintained about the frequency of these collisions.

An attempt is made to allow multiple writes to a single location to be outstanding in the Global Mirror algorithm. There is still a need for master writes to be sequential, and the intermediate states of the master data must be kept in a non-volatile journal while the writes are outstanding to maintain the correct write ordering during reconstruction. Reconstruction must never overwrite data on the auxiliary with an earlier version. The volume statistic that is monitoring colliding writes is now limited to those writes that are not affected by this change.
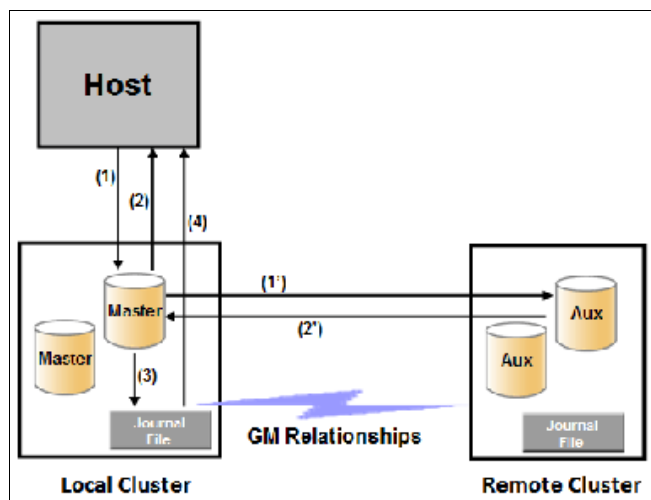
Figure 11-91 shows a colliding write sequence example.

Figure 11-91   Colliding writes example