X3T9.2/91-195

What's In a Queue?

X3T9.2 W.G.

Edward A. Gardner

Digital Equipment Corporation

November 12, 1991

Problem

- SCSI-2 consistently refers to "Queued I/O Processes"
- SCSI-2 defines a mode parameter to allow "unrestricted re-ordering" or "restricted re-ordering" to maintain "data integrity". This requires knowledge of the commands in the queue (e.g., reads versus writes).
- Recent discussions have focussed on more re-ordering or overlapped execution restrictions based on knowledge of the commands in the queue.

But:

- The device only has knowledge of the current command in each I/O Process.
- Interesting commands (writes, formats, etc.) may occur later in the I/O Process, where they won't be visible to the device until it has already assumed that the I/O Process doesn't include such commands.
- Example: implementing an atomic directory update with an I/O Process containing the commands Reserve, Read, Write, and Release.

Possible Solutions

1. Remove queuing from SCSI-3.
2. Remove linked commands from SCSI-3.
3. Make it illegal to use queuing and linked commands simultaneously.
4. Disallow using knowledge of the command to affect execution order. Execution order and simultaneous execution would be controlled solely by queue tags. We would probably want to define more queue tags to affect the controls that might otherwise use knowledge of the command.
5. Requeue I/O Process for each linked command. Essentially equivalent to # 2.
6. Pass all linked commands (within an I/O Process) to the device up front.
7. Don't change anything but document the quirks. Eg., explain this as part of the Mode Select discussion of restricted and unrestricted re-ordering.