

SAFEST

`std::memory_order::seq_cst`

- **Mode:** Strict Global Ordering (Default).
- **Guarantee:** "God's Eye View".
All threads observe the *exact same* order of operations.
- **Cost:** Highest. Flush CPU buffers completely.



`std::memory_order::acq_rel`

`::release` (Producer)

Barrier: ↓ Blocked

Ensure Data is READY.

`::acquire` (Consumer)

Barrier: ↑ Blocked

Ensure Data is SEEN.

- **Cost:** Moderate. Enforce local "Happens-Before".

Constraint ↗
Speed ↘



`std::memory_order::relaxed`

FASTEST

- **Mode:** Free / Racing.
- **Guarantee:** Atomicity Only. Operations can be reordered freely.
- **Cost:** Minimal.