Summary of Asynchronous I/O Techniques in Database Systems

Study	Date	Database System	Async vs Sync	Hardware Platform	Database Size	Primary Evaluation Metric
Axboe [1]	2019	io_uring design	Async only	Linux kernel	N/A	I/O performance, CPU overhead
Mehdi et al. [2]	Jul 2023	ScaleDB (in-memory)	Async only	Multi-core servers	In-memory	Throughput (QPS/TPS), Abort rate
Pestka et al. [3]	Nov 2024	Theoretical analysis	Async only	Modern SSDs	N/A	IOPS scaling, CPU sensitivity
Chen et al. [4]	Nov 2024	Redis (in-memory)	Async only	Ryzen 7 + NVMe	In-memory datasets	Throughput (ops/s), Persistence time
Xiao et al. [5]	Jul 2025	FlashANNS (ANNS)	Async only	NVMe SSD	Billion-scale vectors	Throughput (QPS), Recall
Our Study	2025	PostgreSQL 18	Both compared	VM + Laptop	1GB-100GB	TPC-H metrics (Query execution time)