

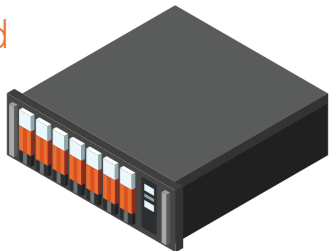
Infrastructure

Finding data

Efficiency

Structure

Disc-based



DISK STORAGE

Data is mechanically recorded on a spinning disk – often on a large array of networked storage appliances.

INDIRECT

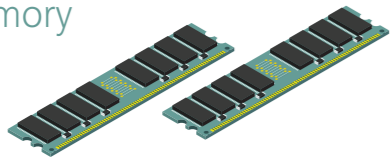
For data to be read or written, the correct address must first be found on the physical disk, which is divided into cylinders, blocks, and sectors. Overhead for input/output (I/O) activities causes delays to large and/or complicated jobs.

Relational

OLTP Row-based structure suited for transactional integrity and SQL-based querying. Complex queries and joins require tiered processing, with staging of intermediate results, leading to more I/O overhead.

	Name	Product	Status	ID
Record 1	Customer 1	Product A	Open	#111111
Record 2	Customer 2	Product B	Closed	#222222
Record 3	Customer 3	Product C	Closed	#333333
Record 4	Customer 4	Product B	Open	#444444

In-memory



MAIN MEMORY

Data is stored in the machine's main system memory, allowing in-line processing and manipulation.

DIRECT

Streamlined data retrieval and processing; with no mechanical parts, no movement or alignment is involved.

Columnar

OLAP Data is organised by attributes (what would be columns in relational structure), allowing compression, eased aggregation and analytics, and faster complex queries across large data sets.

Record 1	Record 2	Record 3	Record 4
Customer 1	Product A	Open	#111111
Customer 2	Product B	Closed	#222222
Customer 3	Product C		#333333
Customer 4			#444444